CLINICAL GUIDELINES

Physical and Occupational Therapy Services

Effective June 7, 2017

CareCore National, LLC d/b/a eviCore healthcare (eviCore)

Clinical guidelines for medical necessity review of physical and occupational therapy services.

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Dear Provider,

This document provides detailed descriptions of eviCore's basic criteria for musculoskeletal management services. They have been carefully researched and are continually updated in order to be consistent with the most current evidence-based guidelines and recommendations for the provision of musculoskeletal management services from national and international medical societies and evidence-based medicine research centers. In addition, the criteria are supplemented by information published in peer reviewed literature.

Our health plan clients review the development and application of these criteria. Every eviCore health plan client develops a unique list of CPT codes or diagnoses that are part of their musculoskeletal management program. Health Plan medical policy supersedes the eviCore criteria when there is conflict with the eviCore criteria and the health plan medical policy. If you are unsure of whether or not a specific health plan has made modifications to these basic criteria in their medical policy for musculoskeletal management services, please contact the plan or access the plan's website for additional information.

eviCore healthcare works hard to make your clinical review experience a pleasant one. For that reason, we have peer reviewers available to assist you should you have specific questions about a procedure.

For your convenience, eviCore Customer Service support is available from 7 a.m. to 7 p.m. Our toll free number is (800) 918-8924.

Gregg P Allen, M.D. FAAFP
EVP and Chief Medical Officer

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Physical Therapy Policy

Subject:

Physical Therapy

Description:

Physical therapy (PT) is the treatment of the complications and sequelae of a disease, or injury by the use of therapeutic exercise and other treatment modalities, that focus on improving posture, locomotion, strength, endurance, balance, coordination, joint mobility, flexibility, an individual's ability to go through the functional activities of daily living (ADL), and on reducing pain. Treatment may include active and passive modalities using a variety of means and techniques, based upon biomechanical and neurophysiologic principles.

Medically Necessary Services

To be considered reasonable and necessary the following conditions must each be met:

- Services are for the treatment of a covered injury, illness or disease, and are appropriate treatment for the condition
- Treatments are expected to result in significant, functional improvement in a reasonable and generally predictable period of time, or are necessary for the establishment of a safe and effective maintenance program. Treatment should be directed toward restoration or compensation for lost function. The improvement potential must be significant in relation to the extent and duration of the therapy required
- The services must be currently accepted standards of medical practice, and be specific and effective treatments for the patient's existing condition
- The complexity of the therapy and the patient's condition must require the judgment and knowledge of a licensed qualified clinician practicing within the scope of practice for that service. Services that do not require the performance or supervision of a qualified clinician are not skilled and are not considered reasonable or necessary therapy services, even if they are performed or supervised by a qualified professional.
- The amount, frequency, and duration of the services must be reasonable under accepted standards of practice.
- Services shall be of such a level of complexity and sophistication or the condition of the patient shall be such that the services required can be safely and effectively performed only by a therapist, or in the case of physical therapy and occupational therapy by or under the supervision of a therapist. Services that do not require the performance or supervision of a therapist are not skilled and are not considered reasonable or necessary therapy services, even if they are performed or supervised by a qualified professional.

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For these purposes, “generally acceptable standards of practice” means standards that are based on credible scientific evidence published in the peer-reviewed literature generally recognized by the relevant healthcare community, specialty society evidence-based guidelines or recommendation, or expert clinical consensus in the relevant clinical areas.

Coverage Criteria for Providers

Several provider specialties utilize various approaches to achieve therapeutic benefit in the treatment of neuromusculoskeletal conditions. Physical therapy services are provided according to the members’ benefit certificates and the health plan’s medical policies. For example, physical therapy must be provided by physical therapists (PT) or physical therapist assistants (PTA). Services billed “incident to” by MDs/DOs/DPMs must meet the Centers for Medicare & Medicaid Services (CMS) “incident to” guidelines for physical therapy and must be rendered by “qualified providers” as defined by CMS. This means that MDs/DOs/DPMs may only bill physical therapy services as “incident to” if provided by an MD, DO, DPM, PA, ARNP, PT and a PTA under supervision of a PT.

Services Not Covered

Physical Therapy services will not be covered when provided by athletic trainers, and other providers not recognized by the Health Plan.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their activities of daily living, instrumental activities of daily living and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation,

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and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase.T his phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Supportive Care

Supportive care is that phase of care that occurs following the corrective or rehabilitative phase. The supportive care phase may last up to 12 months from onset. It may apply to chronic conditions or very severe injuries. Treatment is directed towards management of ongoing, unresolved symptoms that may or may not impact functional status. The therapeutic goal of this phase is patient/caregiver education, self-management, and to prevent deterioration of physical or functional status. Means and methods include progression of exercise and continued patient education. Intensity of care is minimal. This is often not covered by the health plan's benefit.

Palliative Care (Noncovered Service)

Palliative care is typically given to alleviate symptoms and does not provide corrective benefit to the condition treated. A patient receiving palliative care, in most instances, demonstrates varying lapses between treatments. If an exacerbation of a condition occurs, care becomes therapeutic rather than palliative, and documentation of the necessity for care (e.g., etiology of exacerbation, objective findings, and desired outcomes) must be obtained.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

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- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Preventive Care Examinations (Non covered Service)

Preventive care includes management of the asymptomatic patient. Preventive care examinations may include pre-participation athletic examination.

Habilitation:

Physical, occupational and speech therapy services provided in order for a person to attain and maintain a skill or function for daily living, that was never learned or acquired and is due to a disabling condition such as developmental delay, developmental disability, developmental speech or language disorder, developmental coordination disorder and mixed developmental disorder.

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Severity is determined by several factors including, but not limited to, mode of onset, duration of care, loss of work days, and functional deficits.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss

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3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Criteria/Guidelines for Provision of Physical Therapy

Indications for Coverage

1. Contract limitations for physical therapy services will determine the available benefit if such therapy is determined to be medically necessary.
2. Physical therapy services must be ordered by a physician (exception in direct-access states).
   - Each member should be provided with a treatment plan at their start of care describing appropriate treatment modalities and exercises.
   - The member's treatment plan must contain objective data, reasonable expectations, and measurable goals for a specific diagnosis.
   - Re-assessments of member progress should be undertaken as part of every ongoing PT session; assessments of this nature should be included in the treatment session and should not be performed in a separate treatment session.
   - The assessment is a part of ongoing care and should occur throughout each treatment session so that therapy continues to be patient- focused to meet the changing needs of the member.
   - A formal reassessment with objective measures and updated goals should occur at least every 30 days.
   - Lack of measureable and significant change at reassessments should result in a change in the program or discharge to a home management program.
3. Physical therapy services are reviewed and evaluated by *CareCore National* periodically during a member's episode of care based on the provider's utilization management tier assignment.
   - At each review, the clinical reviewer will evaluate the key objective and subjective measures of the member's clinical status, with a focused review on function using a standardized assessment tool.
   - This information, in the context of the generally accepted natural history of the condition(s) under care, will be used to determine the medical necessity of the care provided to date, and/or the care that is proposed.
   - Refer to the Evidence-based Guidelines, Patient History and Presentation for information on specific conditions.

Reasonable and Necessary Services

Physical therapy (PT) services are considered medically necessary when all of the following criteria are met:

1. Therapy requires the judgment, knowledge and skills of a qualified provider of physical therapy services due to the complexity and sophistication of the therapy and the physical condition of the patient.

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- A qualified provider of physical therapy services is one who is licensed where required and performs within the scope of licensure.
- Services provided by PT aides or other non-qualified professionals are not covered.

2. PT services meet the functional needs of the member who suffers from a physical impairment due to illness, disease, or injury and are appropriate treatment for the condition. The patient must have functional deficits that interfere with Activities of Daily Living or return to work (see definitions at the end of policy)
   - Refer to the Evidence-based Guidelines, Admission Criteria, for information on specific functional losses for specific conditions.
3. PT services achieve a specific diagnosis-related goal for a member, who has a reasonable expectation of achieving measurable improvement, in a reasonable and predictable period of time.
   - Significant is defined as a measureable and meaningful increase (as documented in the patient's record) in the patient's level of physical and functional abilities that can be attained with short-term therapy, usually within a two month period.
   - Refer to the Evidence-based Guidelines for expected functional recovery for specific conditions.
4. PT services inherently include the introduction and provision of, and education about a home (self) management program, appropriate for the condition(s) under treatment. In keeping with professional standards, this home management program should be introduced into the course of treatment at the earliest appropriate time; *(This may also be applicable to parents, guardians, or caregivers of pediatric patients and adult patients needing assistance.)*
5. PT services provide specific, effective, and reasonable treatment for the member's diagnosis and physical condition. Refer to the Evidence-based Guidelines for a review of specific conditions and their course of recovery.
6. PT services must be described using standard and generally accepted medical/physical therapy/rehabilitation terminology. Such terminology includes objective measurements for ranges of motion, motor ability, and levels of function.
   - Standardized tests for strength, motion, and function are required. Examples of validated tests include the Oswestry, DASH, TUG, LEFS, etc.
   - Standardized subjective measurements for pain are also expected;
7. Services do not duplicate those provided concurrently by any other therapy, particularly occupational therapy. When a patient receives both occupational and physical or speech therapy, the therapies should provide different interventions and not duplicate the same treatment.T hey must have separate treatment plans and goals with treatment occurring in separate treatment sessions and visits.

Rehabilitative Physical Therapy Services Are Generally Not Considered Medically Necessary Under the Following Circumstances

1. Training in nonessential self-help, recreational tasks, or athletic performance. Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their activities of daily living, instrumental activities of daily living

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and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.
2. Maintenance care when palliative procedures are performed that are repetitive or to reinforce previously learned skills or when services performed are related to activities for the good and welfare of member such as a fitness program.
3. Passive modalities that extend beyond the acute phase of recovery.
   - Non-skilled routine, repetitive and reinforced procedures that do not require one-to-one intervention such as stationary bike riding, progressive resistive exercise after instruction, and passive range of motion.
4. Group exercise/ therapy programs defined as the simultaneous treatment of two or more patients who may or may not be doing the same activities is not a covered benefit.
5. Massage therapy when provided as a stand-alone procedure rather than as part of a comprehensive therapeutic treatment plan

Discharge Criteria

Criteria utilized for determining whether a member is eligible for discharge from PT is determined based on the following (objective data) and is available in the Evidence-based Guidelines under Discharge Criteria:

- Normative functional range of motion (ROM) for the injured or impaired body part(s). (Examples of these values can be found in Measurement of Joint Motion, a Guide to Goniometry, 3rd Edition, 2003 by Norkin and White as well as other texts and are referenced in the Evidence-based Guidelines.)

1. Satisfactory motor ability of the impaired or injured part(s) such that further improvement can be accomplished with a self-management program. Refer to the Evidence-based Guidelines, Home and Self-Care Techniques.
2. The member is able to perform activities of daily living (ADLs) and instrumental activities of daily living (IADLS).
3. When there is no documented continual progression of function or improvement over the course of treatment, or a negative trend occurs.
4. Member non-compliance with therapy.
5. Physical therapy services are not considered medically necessary for pain mediation alone.T he goals of PT are for improvement in restoration of function, motor ability, and range of motion as indicated previously.

Definitions:

Skilled Care:

- The member's special medical complications require the skills of a therapist to perform a therapy service or the needed therapy services are of such complexity that the skills of a therapist are required to perform the procedure.

Unskilled Care:

- Unskilled services are palliative procedures that are repetitive or reinforce previously learned skills

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- They are not covered because they do not involve complex and sophisticated therapy procedures, or require the judgment and skill of a qualified therapist for safety and effectiveness.
- Services related to activities for the good and welfare of patient do not constitute PT/OT services for Medicare and Medicaid purposes (e.g., general exercises to promote overall fitness and flexibility and activities to provide diversion or general motivation).
- Services not provided under a therapy plan of care, or are provided by staff not qualified or appropriately supervised, are not covered or payable therapy services.
  a. Activities of Daily Living (ADL): Activities in which most people take part on a daily basis. Eating, bathing, dressing, toileting and moving from one place to another are some examples.
  b. Instrumental Activities of Daily Living:A ctivities that are often performed by a person who is living independently in a community setting during the course of a normal day, such as managing money, shopping, telephone use, travel in the community, housekeeping, preparing meals, and taking medications correctly. IADLs measure a person's ability to live independently.

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Occupational Therapy Policy

Subject:

Occupational Therapy

Description:

Occupational therapy (OT) is the treatment of neuromusculoskeletal and psychological dysfunction through the use of specific task or goal-directed activities designed to improve the functional performance of an individual.T hese services emphasize useful and purposeful activities to improve neuromusculoskeletal and cognitive functions, and to teach adaptive skills to accomplish the activities of daily living (i.e., feeding, dressing, bathing, and other self-care activities). Other occupational therapy services include guidance in the selection and use of adaptive equipment.

Medically Necessary Services

To be considered reasonable and necessary the following conditions must each be met:

- Services are for the treatment of a covered injury, illness or disease, and are appropriate treatment for the condition
- Treatments are expected to result in significant, functional improvement in a reasonable and generally predictable period of time, or are necessary for the establishment of a safe and effective maintenance program.T reatment should be directed toward restoration or compensation for lost function. The improvement potential must be significant in relation to the extent and duration of the therapy required
- The services must be currently accepted standards of medical practice, and be specific and effective treatments for the patient's existing condition
- The complexity of the therapy and the patient's condition must require the judgment and knowledge of a licensed qualified clinician practicing within the scope of practice for that service. Services that do not require the performance or supervision of a qualified clinician are not skilled and are not considered reasonable or necessary therapy services, even if they are performed or supervised by a qualified professional.
- The amount, frequency, and duration of the services must be reasonable under accepted standards of practice.
- Services shall be of such a level of complexity and sophistication or the condition of the patient shall be such that the services required can be safely and effectively performed only by a therapist, or in the case of physical therapy and occupational therapy by or under the supervision of a therapist. Services that do not require the performance or supervision of a therapist are not skilled and are not considered reasonable or necessary therapy services, even if they are performed or supervised by a qualified professional.

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For these purposes, “generally acceptable standards of practice” means standards that are based on credible scientific evidence published in the peer-reviewed literature generally recognized by the relevant healthcare community, specialty society evidence-based guidelines or recommendation, or expert clinical consensus in the relevant clinical areas.

Coverage Criteria for Providers

Several provider specialties utilize various approaches to achieve therapeutic benefit in the treatment of neuromusculoskeletal conditions. Occupational therapy services are provided according to the members’ benefit certificates and the health plan’s medical policies. For example, occupational therapy must be provided by occupational therapists (OT) or licensed occupational therapist assistants. Services billed “incident to” by MDs/DOs/DPMs must meet the Centers for Medicare & Medicaid Services (CMS) “incident to” guidelines for occupational therapy and must be rendered by “qualified providers” as defined by CMS. This means that MDs/DOs/DPMs may only bill occupational therapy services as “incident to” if provided by an MD, DO, DPM, PA, ARNP, OT or a COTA under supervision of an OT.

Services Not Covered

Occupational Therapy services will not be covered when provided by athletic trainers, and other providers not recognized by Landmark Healthcare or provided beyond the scope of his or her license.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

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Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase.T his phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Supportive Care

Supportive care is that phase of care that occurs following the corrective or rehabilitative phase. The supportive care phase may last up to 12 months from onset. It may apply to chronic conditions or very severe injuries. Treatment is directed towards management of ongoing, unresolved symptoms that may or may not impact functional status. The therapeutic goal of this phase is patient/caregiver education, self-management, and to prevent deterioration of physical or functional status. Means and methods include progression of exercise and continued patient education. Intensity of care is minimal.T his is often not covered by the health plan’s benefit.

Palliative Care (Noncovered Service)

Palliative care is typically given to alleviate symptoms and does not provide corrective benefit to the condition treated. A patient receiving palliative care, in most instances, demonstrates varying lapses between treatments. If an exacerbation of a condition occurs, care becomes therapeutic rather than palliative, and documentation of the necessity for care (e.g., etiology of exacerbation, objective findings, and desired outcomes) must be obtained.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member’s current condition or to prevent or slow deterioration of the member’s condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

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Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Preventive Care Examinations (Noncovered Service)

Preventive care includes management of the asymptomatic patient. Preventive care examinations may include pre-vocational or ergonomic assessments.

Habilitation:

Physical, occupational and speech therapy services provided in order for a person to attain and maintain a skill or function for daily living, that was never learned or acquired and is due to a disabling condition such as developmental delay, developmental disability, developmental speech or language disorder, developmental coordination disorder and mixed developmental disorder.

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Severity is determined by several factors including, but not limited to, mode of onset, duration of care, loss of work days, and functional deficits.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits:	Mild/no loss	Mild to moderate	Considerable loss

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1. Range of motion		loss	
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Criteria/Guidelines for Provision of Occupational Therapy

Indications for Coverage

1. Contract limitations for occupational therapy services will determine the available benefit if such therapy is determined to be medically necessary.
2. Occupational therapy (OT) services must be ordered by a physician
   - Each member should be provided with a treatment plan at their start of care describing appropriate treatment modalities and exercises.
   - The member's treatment plan must contain objective data, reasonable expectations, and measurable goals for a specific diagnosis.
   - Re-assessments of member progress should be undertaken as part of every ongoing OT session; assessments of this nature should be included in the treatment session and should not be performed in a separate treatment session.
   - The assessment is a part of ongoing care and should occur throughout each treatment session so that therapy continues to be patient- focused to meet the changing needs of the member.
   - A formal reassessment with objective measures and updated goals should occur at least every 30 days.
   - Lack of measureable and significant change at reassessments should result in a change in the program or discharge to a home management program.
3. Occupational therapy services are reviewed and evaluated by *CareCore National* periodically during a member's episode of care.
   - At each review, the clinical reviewer will evaluate the key objective and subjective measures of the member's clinical status, with a focused review onf unction.
   - This information, in the context of the generally accepted natural history of the condition(s) under care, will be used to determine the medical necessity of the care provided to date, and/or the care that is proposed.
   - Refer to the Evidence Based Guidelines, Patient History and Presentation for information on specific conditions.

Reasonable and Necessary Services

Occupational therapy (OT) services are considered medically necessary when all of the following criteria are met:

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1. Therapy requires the judgment, knowledge and skills of a qualified provider of occupational therapy services due to the complexity and sophistication of the therapy and the physical condition of the patient.
   - A qualified provider of occupational therapy services is one who is licensed where required and performs within the scope of licensure.
   - Services provided by OT aides or other non-qualified professionals are not covered.
2. OT services meet the functional needs of the member who suffers from a physical impairment due to illness, disease, or injury and are appropriate treatment for the condition.
   - The patient must have functional deficits that interfere with Activities of Daily Living
   - Refer to the Evidence Based Guidelines, Admission Criteria, for information on specific functional losses for specific conditions.
3. OT services achieve a specific diagnosis-related goal for a member, who has a reasonable expectation of achieving measurable improvement, in a reasonable and predictable period of time.
   - Significant is defined as a measureable and meaningful increase (as documented in the patient's record) in the patient's level of physical and functional abilities that can be attained with short-term therapy, usually within a two month period.
   - Refer to the Evidence Based Guidelines for expected functional recovery for specific conditions.
4. OT services inherently include the introduction and provision of, and education about a home (self) management program, appropriate for the condition(s) under treatment. In keeping with professional standards, this home management program should be introduced into the course of treatment at the earliest appropriate time; *(This may also be applicable to parents, guardians, or caregivers of pediatric patients and adult patients needing assistance.)*
5. OT services provide specific, effective, and reasonable treatment for the member's diagnosis and physical condition. Refer to the Evidence Based Guidelines for a review of specific conditions and their course of recovery.
6. OT services are only considered medically necessary for the restoration of basic functional activities of daily living.
7. OT services must be described using standard and generally accepted medical/occupational therapy/rehabilitation terminology. Such terminology includes objective measurements for ranges of motion, motor ability, and levels of function.
   - Standardized tests for strength, motion, and function are required. Examples of validated tests include the Oswestry, DASH, TUG, LEFS, etc.
   - Standardized subjective measurements for pain are also expected;
8. Services do not duplicate those provided concurrently by any other therapy. When a patient receives both occupational and physical or speech therapy, the therapies should provide different interventions and not duplicate the same treatment.T hey must have separate treatment plans and goals with treatment occurring in separate treatment sessions and visits.

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Occupational Therapy Services Considered Not Medically Necessary Under Any Of The Following Circumstances:

1. Training in nonessential self-help or recreational tasks such as:
   - Homemaking, gardening, educational activities and driving, return to sport or recreational activities (e.g., golf, tennis, running, jogging, swimming, basketball, gymnastics, football, baseball, martial arts, dance, etc.), or for the performance of work-related or other specific vocational tasks.
2. Maintenance OT services
   Maintenance therapy is defined as ongoing therapy after the patient has reached maximum rehabilitation potential, or functional level has shown no significant improvement for 2 weeks, and initial instruction in a maintenance program is completed. This is particularly applicable to patients with chronic, stable conditions where skilled supervision/interventions are no longer required and further clinical improvement cannot reasonably be expected from continuous ongoing care. This includes but is not limited to:
   - Therapy that is supportive rather than corrective in nature
   - Therapy that is intended to maintain a gradual process of healing, or to prevent deterioration or relapse
   - Ongoing treatment solely to improve endurance, strength, or distance
   - Passive exercises to maintain range of motion that can be carried out by non-skilled persons
   - A general exercise program to promote overall fitness
   - Treatment that is intended to provide diversion or general motivation
   - Treatment that seeks to prevent disease, promote health, and prolong and enhance quality of life
3. Ongoing or prolonged treatment for chronic conditions and/or chronic pain is not considered medically necessary in the absence of measurable improvement that is sustained from treatment visit to treatment visit.T herapy is also not covered when the condition is not expected to improve significantly within a reasonable time period.
   - Therapy is not meant to address ongoing safety issues related to cognitive and physical impairments that do not appear to be improving.
4. OT treatment must include active, skilled therapy (i.e. that requiring an occupational therapist or physician) during each session, at intensity and of duration necessary to the condition(s) under treatment.
   - The use of passive modalities should be limited to the acute phase of recovery and care should quickly transition to active care.
   - Non-skilled therapy includes but is not limited to routine, repetitive and reinforced procedures that do not require one-to-one intervention such as using a UBE, progressive resistive exercise after instruction, and passive range of motion.T hese procedures do not generally require the skills of a qualified provider of OT services and are therefore not covered.
5. The intensity or frequency of care should not exceed the number of visits necessary for a clinician to provide skilled care.
   - Repetitive care and exercise is not considered skilled and can be transitioned to a home management program. (For example a member receiving passive exercise following an orthopedic procedure will require a visit for instruction and

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periodic visits to monitor the patient's progress and update the program.T his normally does not exceed 1 to 2 visits weekly.)
    - Refer to the Evidence Based Guidelines for examples of treatment progression based on the nature and severity of clinical findings.
6. Group exercise/ therapy programs defined as the simultaneous treatment of two or more patients who may or may not be doing the same activities is not a covered benefit.
7. Occupational therapy is not covered when an individual's improvement potential is insignificant when compared to the extent and duration of the therapy needed.
8. Occupational therapy is not covered when the member suffers a temporary loss or reduction of function and could reasonably be expected to improve spontaneously without the services of an occupational therapist.
9. Instruction of other agency or professional personnel in the patient's physical therapy program
10. Collaboration with other agency or professional personnel or with other community resources
11. Emotional support, adjustment to extended hospitalization and/or disability, and behavioral readjustment

Discharge Criteria

Criteria utilized for determining whether a member is eligible for discharge from OT is determined based on the following (objective data) and is available in the Clinical Practice Guidelines under Discharge Criteria:

1. Functional range of motion (ROM) for the injured or impaired body part(s). ROM measurements will be reviewed on an individual basis.
    - ROM values will be compared to standard normative measures that have been published in the medical/orthopedic literature with respect to functional ability as demonstrated by the member.
    - These values can be found in Measurement of Joint Motion, a Guide to Goniometry, 3rd Edition, 2003 by Norkin and White as well as other texts and are referenced in the Clinical Practice Guidelines.
2. Satisfactory motor ability of the impaired or injured part(s) such that further improvement can be accomplished with a home exercise (management) program (HEP). Refer to the Clinical Practice Guidelines, Home and Self-Care Techniques.
3. The member is able to perform activities of daily living (ADLs) such as walking in the home, bathing, grooming, feeding, positioning, dressing and elimination.
4. For additional therapy requests to be considered medically necessary, they must include documented objective, measurable clinical data demonstrating the need for continued treatment.
    - Valid and reliable instruments should be used to provide the data.
    - In those instances when there is no documented continual progression of function or improvement over the course of treatment, or when a negative trend occurs, further OT services generally will not be approved due to lack of medical necessity.

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5. If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, OT will be deemed to be not medically necessary and the member should be discharged from OT.
6. Occupational therapy services are not considered medically necessary for pain mediation alone.T he goals of OT are for improvement in restoration of function, motor ability, and range of motion as indicated previously.

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General Medical Rehabilitation

Benign Paroxysmal Positional Vertigo

Synonyms

BPPV, BPV

Definition

Benign paroxysmal positional vertigo (BPPV) is a type of dizziness that is characterized by sudden onset of spinning or lightheadedness following head movement or position change.T he vertigo is benign in nature, intermittent and usually is of short duration. It is the most common vestibular disorder in adults. (1) The condition is reported in adults of all ages with the mean age onset of 49.4 years with increasing incidence with increasing age. (7) It is present, but is uncommon in children. Etiology includes post -head trauma, viral labyrinthitis/neuritis, post general or ear surgery, Meniere's Disease, chronic otitis/mastoiditis, ototoxicity, and after ischemia occurs in the distribution of the anterior vestibular artery, but it is largely idiopathic. (8)

Patient History

Patient history may include:

- Onset of problem is characteristic and is crucial in assisting in diagnosis.P atients usually experience a sudden onset of nystagmus and vertigo of short duration that occurs with head or position change in the planes of one of the semi-circular canals.T he symptoms stop if they remain still or move out of the provoking position. It usually occurs in bed during the night or in the morning when rolling over or trying to get up, but can occur at any time throughout the day. Other provoking positions can include, but are not limited to looking up into a cupboard, tipping head back in the shower, bending over to look under a bed, lying down in bed, or tipping backward in dentist or beauty shop chair. (4)
- Mechanism of onset – Calcium carbonate crystals in the utricle called otoconia break free from the macula of the utricle.T he otoconia float into the semicircular canals, which are attached to the utricle.T he crystal thus makes the canals gravity sensitive, causing cupulolithiasis or canalithiasis.
  - Cupulolithiasis is described as an inappropriate deflection of the cupula due to the adherence of the otoconia, which persists as long as the canal is in the provoking position. This form of BPPV is less common. (4).
    - Characteristics include:
      - Immediate onset of vertigo when the patient moves into the provoking position
      - Nystagmus characteristic of BPPV that appears with the onset of vertigo complaints

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        - Vertigo and nystagmus persist as long as the provoking position is maintained (not fatigable), lasting longer than 60 seconds.
- Canalithiasis is described as inappropriate deflection of the cupula due otoconia free floating in the semi-circular canal endolymph.T his is the most common form of BPPV.
    - Characteristics include:
        - Delay in onset of vertigo (1 to 40 seconds) after moving into provoking position. The latency is due the amount of time it takes for the disruption of the endolymph to pull on the cupula.
        - Nystagmus characteristic of BPPV that appears with onset of vertigo complaints.
        - Vertigo and nystagmus symptoms build to a crescendo and then lessen usually disappearing within 60 seconds.
- Nature of the symptoms – Patients may experience nausea and vomiting, imbalance and difficulty walking a straight path. Many patients have a fear of falling. The dizziness may be described as lightheadedness, spinning or dysequilibrium. Associated symptoms include sweating, blurred vision, jumping vision and a heavy-headed or difficulty concentrating feeling. (10) (4)
- Frequency of symptoms – Intermittent, dependent on how much the patient moves.

Patient Data

- General demographics
- Living environment including home barriers and social support system
- Functional status and activity level including independence level in self-care activities, driving, working and assistive device use
- Medications with special consideration toward medications causing/relieving dizziness and nausea
- Other tests and measurements (laboratory and diagnostic tests) including vestibular function testing, audiogram, MRI/CT
- Past history including history of prior therapy and response to prior treatment

Specific Considerations

- Rule out red flag diagnoses (require medical management).
- Identify co-.morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
History of neck surgery	Absolute contra-indication to Dix-Hallpike test and canalith repositioning techniques
Recent neck trauma	Absolute contra-indication to Dix-Hallpike test and canalith repositioning techniques
Severe Rheumatoid Arthritis	Absolute contra-indication to Dix-Hallpike test and canalith repositioning techniques
Atlantoaxial +/or occipitoatlantal instability	Absolute contra-indication to Dix-Hallpike test and canalith repositioning techniques
Cervical myelopathy or radiculopathy	Absolute contra-indication to Dix-Hallpike test and canalith repositioning techniques
Carotid sinus syncope	Absolute contra-indication to Dix-Hallpike test and canalith repositioning techniques
Chiari malformation	Absolute contra-indication to Dix-Hallpike test and canalith repositioning techniques
Vascular Dissection syndromes	Absolute contra-indication to Dix-Hallpike test and canalith repositioning techniques

- Other red flag signs include pure vertical nystagmus, prolonged, persistent nystagmus, abnormal pursuits and saccades, nystagmus that does not change with fixation, lateropulsion, ocular tilt reaction, positive VOR cancellation, direction changing nystagmus, and spontaneous nystagmus

Presentation

Subjective Findings

- History should include date of and conditions of onset including symptoms, length of dizziness episode, provoking and remitting circumstances and associated past medical history including but not limited to migraine, psychosocial and past incidences of vestibular disorders, traumas or surgeries.
- Patient may report history of head trauma, labyrinthitis/neuritis, or ischemia in distribution of anterior vestibular artery, recent surgery, and/or associated vestibular problems such as Meniere's Disease or ototoxity.
- Patient may report insidious onset
- Patient reports brief episodes of vertigo when head moved into different positions.V ertigo commonly occurs when lying in bed, rolling over in bed, bending over, and looking up.
- Patient reports resolution of vertigo with position change or immobility.

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- Patient reports postural instability which can include difficulty walking, veering to involved side, difficulty turning or walking while head is turning; instability in low lighting or darkness or over uneven ground.

Objective Findings

Objective findings may include:

- Positive Positional testing, including the Dix-Hallpike (a.k.a. Barany or Nylen-Barany Maneuver) test, Side-Lying test, Roll test and others (see Scope of Examination).
- Fall Risk using Functional Outcome measures including, but not limited to Dynamic Gait Index, Timed Up and Go (TUG), Functional Gait Assessment, Functional Reach, Multi-directional Reach, Berg Balance Scale.

Scope of Examination

Oculomotor Exam

- With fixation (room light):o cular ROM, gaze-holding, saccades, pursuits, VOR (vestibular ocular reflex) to slow and fast head (Head Thrust) movements, check for spontaneous and gaze holding nystagmus.
- Without fixation (using infra-red goggles or Frenzel Lenses): spontaneous nystagmus, gaze-holding nystagmus, post-head shaking nystagmus
- Cervical Range of Motion: checking for limitations for positional testing
- Positional Testing -Best performed with fixation blocked with infrared goggles or Frenzel Lenses. May include:
- Dix-Hallpike: tests the posterior and anterior (superior) canals
- Roll Test: tests the horizontal canals
- Sidelying test: alternative to Dix-Hallpike that can be used when positioning for Dix-Hallpike is uncomfortable or contraindicated.
- Seated Supine Positioning Test (helps to determine involved side if positive Roll Test) (14) (15)
- Bow and Lean Test (aka Choung's Test, Head Tilt or Pitch Test) (16) (17)
- Null Point Test (helps to determine involved side if positive Roll Test) (19)
- Dix-Hallpike Test with straight head hanging for anterior canal (18)
- Static and Dynamic Visual Acuity Testing
- Static and Dynamic Balance Assessment in sitting and standing
- Testing measures may include Dynamic Posturography, Clinical Test for Sensory Interaction in Balance (CTSIB), modified CTSIB, Dynamic Gait Index, Berg Balance Scale, Romberg, Sharpened Romberg, Single Leg Stance (SLS)
- Assess balance with visual (eyes closed) and/or proprioceptive (foam) challenges

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Gait Assessment

- Use of assistive device, gait deviations such as wide base of support, imbalance with head turns or turning, veering, slow cadence, extra steps or slowing with obstacles.
- Testing Measures may include Dynamic Gait Index, TUG, gait speed, Functional Gait Assessment

Outcome Assessment

- Motion Sensitivity Quotient (usually used for other vestibular disorders)
- Dizziness Handicap Inventory
- Activities-Specific Balance Confidence Scale (ABC)
- May include previously mentioned Functional Outcome Measures (i.e. DGI, FGA)

Specific Examination Considerations

Results if Benign Paroxysmal Positional Vertigo

- Diagnosis is based on characteristic findings:
  - Latency of one or more seconds after head is moved into provoking position before vertigo and nystagmus occur together, if canalithiasis.T here is no latency with cupulolithiasis.
  - Initial heightening then gradual decrease (crescendo) in reduction of symptoms (less than 60 seconds, if canalithiasis and > 60 seconds if cupulolithiasis
  - Nystagmus characteristic of BPPV:
  - Posterior Canal- up beating with torsional nystagmus rotating toward involved side (down ear).
  - Anterior/Superior Canal – downbeating with torsional nystagmus rotating toward involved side (down ear).
  - Horizontal canal – geotropic when canalithiasis or ageotropic (apogeotropic) when cupulolithiasis (13)
  - Reversal of nystagmus and recurrence of vertigo when returning to sitting
  - Decreased intensity of vertigo with repeated movements for canalithiasis (fatigability).
  - Atypical BPPV
  - BPPV may be positive without characteristic nystagmus including lack of any nystagmus (Subjective BPPV) (11), (12) provided that the described symptoms and history are characteristic of BPPV
  - Some sources consider horizontal and superior canal involvement to be Atypical BPPV

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Differential Diagnoses

Otological Disorders	Neurological Disorders	Other
▪ Meniere's Disease ▪ Vestibular Neuritis ▪ Labyrinthitis ▪ Superior Canal Dehiscence ▪ Post-traumatic Vertigo ▪ Acoustic neuroma ▪ Perilymphatic Fistula ▪ Hypermobile stapes ▪ Mal de Debarquement	▪ Migraine associated vertigo ▪ VBI ▪ Demyelinating diseases ▪ CNS lesions ▪ CVA/TIA ▪ Orthostatic Tremor ▪ Convergence Spasm	▪ Anxiety and panic disorders ▪ Cervicogenic ▪ Medication side effects ▪ Postural hypotension

Physical/Occupational Therapy Management

Requirements for Physical/Occupational Therapy Visits

Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations, i.e. Activities Specific Balance Confidence Scale
2. Neurological signs: vertigo; nystagmus. Positional test should be performed every treatment to determine response to treatment and continued presence of BPPV.

Treatment frequency and duration must be based on:

- Severity of clinical findings
- Presence of complicating factors
- Natural history of condition
- Expectation for functional improvement
- Response to canalith repositioning techniques
- Number of canals and sides involved
- Patient level of assistance

Treatment Methods

- Particle Repositioning technique: Will vary dependent on mechanism (canalithiasis vs. cupulolithiasis), which semicircular canal is involved, comorbidities, and patient's ability to adhere to treatment:
- Canalith Repositioning (a.k.a. Epley Maneuver, Canalith Repositioning Technique (CRT), Canalith Repositioning Maneuver (CRM))
- Liberatory Maneuver (Semont Maneuver)
- Brandt-Daroff Habituation Exercises

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- Liberatory Maneuver for Horizontal Canalithiasis (aka Appiani Maneuver) (4)
- Lempert Roll Maneuver for Horizontal Canalithiasis (aka Barb-B-Que Roll) (4)
- Forced Prolonged Positioning for Horizontal Canalithiasis BPPV (4)
- Gufoni treatment for Horizontal Canalithiasis in anterior arm followed by other treatment for HC canalithiasis (20)
- Quick BBQ Roll Treatment for Cupulolithiasis (4)
- Modified Semont Maneuver for Horizontal Canal Cupulolithiasis (aka Casani) (4)
- Modified Brandt-Daroff for Horizontal Canal Cupulolithiasis
- Forward Particle Repositioning Maneuver for Anterior Canalithiasis (21)

Neck Extension repositioning maneuver for Anterior Canalithiasis

- Neuromuscular re-education for static and dynamic balance and gait
- Patient Education

Fall Prevention Strategies

- Risk of recurrence
- Causes, mechanism and treatment of BPPV for basic understanding of their condition

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Discharge Criteria

- The patient is discharged when positional testing is negative.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.

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- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.

Referral Guidelines

Refer patient to their primary care provider, for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines or improvement reaches a plateau;
- Failure to respond to treatment resulting in the need for further assessment to confirm diagnosis.
- Increased neurologic signs/symptoms

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence, provided there are no limiting factors for capacity to self-treat. Examples of limiting factors include age, dementia, safety, anxiety, pain, and ability to understand and correctly administer the techniques.

Self-Care Techniques

- Post-procedural instructions.T hese vary among practitioners
- Self-administered canalith/particle repositioning techniques

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Pelvic Pain Syndrome

Synonyms

- Vulvar Vestibulitis
- Vulvodynia
- Chronic Prostatitis/proctalgia
- Vaginismus/anismus
- Dyspareunia/painful intercourse
- Detrussor/Sphincter Dyssenergia
- Pudendal neuralgia
- Urethral syndrome
- Pelvic floor tension myalgia
- Levator ani syndrome
- Coccygodynia
- Interstitial cystitis
- Paradoxical puborectalis contraction (PPC)

Possible Causes

- Musculoskeletal components, including muscular, joint and/or movement dysfunctions
- Psychogenic factors including lifestyle and stress issues and/or history of sexual abuse
- Visceral or systemic factors: inflammation, infection , or disease
- Iatrogenic factors such as scars or adhesions
- Neurologic factors including diseases or CNS dysfunction

Note: Metabolic, hormonal, and functional neurological disorders such as hypoglycemia, neurally mediated hypotension, reproductive hormone imbalance can be as important pelvic pain as any musculoskeletal diagnosis. If missed, they will prevent complete recovery and return to function.

Definition

Pelvic or perineal pain without evidence of regional infection.

Patient History and Data Collection

Subjective and Historical Information collected should include:

- Symptom picture
  - Have patient draw a picture
  - Describe the problem, i.e., type of pain, consistency, duration
- Symptom pattern
  - Frequency

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    - Daily and nightly patterns
- Symptom intensity
    - Rate using 1-10 scale; assess in daytime and in night time
- Bladder and bowel symptoms, plus regularity
- Associated symptoms
- Sleep/Wake Patterns
- Other Medical Problems
- Reproductive History
- Pregnancy History
- Menopause History
- Family History
- Medications
- Self-Care Coping Strategies
- Occupation and activity level
- Patient Goals

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma related; determine nature and extent of traumatic event.
- Determine OPQRST (Onset, Provocative/Palliative factors, Quality, Radiation/Referral pattern, Site [location], Timing of complaint).

Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear, fracture
Fever, severe pain	Infection
Palpable mass	Hemangioma; soft tissue tumor; foreign body
Diabetes; paresthesias	Neuropathy; other metabolic causes (e.g., B12 deficiency, hypothyroidism)
Constipation, symptoms worse or better with meals, bloody stools	GI conditions
Pain with urination, hematuria	UTI, renal stone
Immune compromised state	Infection
Altered reflexes/progressive weakness	Cord signs/cauda equina

Presentation

The patient presents with pelvic pain symptoms lasting at least six months and is non-cyclical in nature.

Subjective Findings

- Dull, aching, burning, or sharp pains in pelvis, perineum, and/or lower abdomen
- Pain radiating to the low back and rectum
- Bladder or bowel frequency, urgency, incontinence, hesitancy, or straining

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- Chronic constipation
- Painful sitting
- Men may complain of constant burning pain in the penis and post-ejaculatory pain
- Women may complain of pain increased during or following sexual intercourse, menstrual periods and pregnancy

Objective Findings

Objective data collected should include:

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Basic Physiological Tests
  - Blood Pressure
  - Blood Glucose Level
  - Heart Rate
  - Basal Body Temperature
- Postural Assessment
  - Standing – 2 feet, 1 foot standing
  - Sitting
  - Supine
- Pain assessment
- Specific examination considerations:
  - Skin – include color and exudates, symmetry of structures
  - Palpation – trigger points or tender points Abdominals, lumbopelvic, thigh and pelvic floor musculature
  - Range of motion lumbar spine, hips, sacroiliac joints and coccyxManual Muscle Test – trunk and lower extremities, pelvic floor
  - Biofeedback EMG Assessment using surface or internal sensors
  - Gait assessment
  - Functional assessment screening of bed mobility, transfers, squatting, lifting strategies, standing, sitting

  Functional Reporting Measures including Pelvic Floor Impact or Disability or Pelvic Floor DIstree Inventory, Chronic Prostatitis Symptom Index, Oswestry, or Pain Disability Index, and a Health-related quality of life questionnaire

Scope of Examination

Examine the pelvic and trunk region and musculoskeletal system for possible causes, or contributing factors to the complaint.

Findings of Pelvic Pain Syndrome

- Muscles in the pelvic region are generally resistant to stretching and ROM is limited by pain

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- Tender nodules or taut bands are noted in involved muscle groups and may lead to referral of pain
- Inefficient breathing patterns
- Abnormal postures, movement and holding patterns

Differential Diagnoses

- Interstitial Cystitis
- Pelvic Inflammatory Disease
- Pelvic Cellulitis
- Cancer
- Hip Pathology
- Lumbar Radiculopathy

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and

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monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

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Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-12 weeks	12 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination) and community outings.	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Impaired muscle performance
3. Impaired functional mobility (refer to Maximal Complex Motion Necessary for Functional Activities)
4. Pain with urination, pain with intercourse, pain with sitting for prolonged periods, pain limiting function and at least 3/10

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

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Treatment Methods

Frequency and duration of treatment requires continuous assessment and modification based on patient progress and response.

This is a chronic condition so therapy should focus on teaching management skills and techniques to be followed through by the client. Therapy focuses on stretching and strengthening of affected muscles and correction of aggravating postural and biomechanical factors. Breathing and relaxation training is often indicated. Modalities such as electrical muscle stimulation can be useful to decrease pain to allow participation in an active exercise program. Various other techniques may also be effective i.e. massage and exercise, stretching, ultrasound, biofeedback and behavior modification.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Neurological deficits appear/progress

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Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Decrease pain/spasms	▪ Modalities i.e.interferential current, electrical muscle stimulation, functional electrical stimulation, transcutaneous electrical nerve stimulation ▪ Cryotherapy ▪ Thermotherapy ▪ EMG Biofeedback ▪ Trigger point therapy
Restore flexibility of the affected musculature and vertebral joints	▪ Segmental joint mobilization ▪ Range of motion within pain free range ▪ Sustained stretching exercises ▪ Soft tissue mobilization
Increase strength of the pelvic floor muscles	▪ Isotonic exercises ▪ Resisted exercises using vaginal cones
Increase strength and endurance of the spine and extremities	▪ Resisted Isometric Exercises ▪ Segmental strengthening ▪ Isotonic exercises ▪ Functional training
Improvement in body mechanics and postural stabilization	▪ Body mechanics training ▪ Postural stabilization activities ▪ Postural Control

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Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home Medical Equipment

- Hot pack
- Vaginal Cones
- Theraband for therapeutic exercises
- Gymball for therapeutic exercises
- Home electrical stimulation unit

Self-Care Techniques

- Pelvic Floor Muscle Exercises
- Stretching and strengthening exercises
- Postural advice, instruction on proper body mechanics
- Heat applications if needed to relieve discomfort
- Deep breathing and relaxation techniques
- Adjunct Therapy
  - Acupuncture
  - Nerve stimulation devices
  - Injection of tender sites
  - Surgical treatment

Medicare References

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Rheumatoid Arthritis Hip, Knee, Foot, Ankle, Shoulder & Hand

Synonyms

None

Definition

Rheumatoid arthritis is an inflammatory disease primarily affecting joint synovial tissue.

- Prevalence is up to 1 percent of the U.S. population.
- Autoimmune disease with genetic factors playing a role in its development.
- Women are more likely to be affected than men.
- Onset usually occurs between 20 and 50 years of age.
- Exacerbations and remissions are common.
- Wrist and proximal finger joints are frequently affected; however, the neck, jaw, and all extremity joints can be involved.
- Chronic inflammation leads to joint destruction with instability and loss of range of motion.
- Eventually systemic involvement can lead to cardiopulmonary complications.

Patient History

Patient history may include:

Patient Data

Stiffness of the joints is a major symptom in any type of arthritis and particularly in RA. Frequently, RA is accompanied by “morning stiffness.” Other inflammatory conditions, such as polymyalgia rheumatica and ankylosing spondylitis, also may be accompanied by morning stiffness. The severity of stiffness may better differentiate a primary inflammatory process from other joint processes. Edema of the synovium and periarticular structures contributes to stiffness in RA by mechanically interfering with the usual biomechanics of the joint. With normal sleep patterns, stiffness is most pronounced in the morning, in part due to redistribution of interstitial fluid while sleeping.

Pain is a significant problem for most patients with RA. Although the assessment is subjective, the patient's relief from pain is the objective for treatment. Swollen joints with an applied load or joints with rapidly evolving effusions may be extremely painful due to high intra-articular pressures that lead to excessive stresses on the extensively innervated periarticular supporting structures.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.

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- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, ligament tear
Fever, severe pain	Infection
Diabetes	Neuropathy
Unilateral edema	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of extremity	Arterial occlusion
Immune-compromised state	Infection

Presentation

Patients may present with stiffness, and tenderness of affected joints. Pain on joint motion may be due to damage of cartilage and bone. Enlargement of synovial membrane and deformity of the joint may develop over time as articular and supporting structures are damaged by the inflammatory process. The patient may also present with limitation of motion, generalized malaise and fatigue.

Subjective Findings

- Complaints of joint stiffness after sleep or periods of inactivity
- Pain, redness, swollen and warm joints
- Multiple joint complaints, frequently symmetrical
- Fatigue
- Fever
- Possible weight loss

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Nodules
  - Joint swelling
  - Symmetrical involvement
  - Deformities
- Palpation of bony and soft tissue
  - Joint tenderness

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    - Sensory changes
    - Temperature changes
- Range of motion, active and passive
    - Test passive and active range of motion of involved joints
- Manual Muscle Testing
    - Test resisted isometric movements of involved joints
- Orthopedic and neurologic testing if neurologic signs are present
    - Joint Play movements of affected joints
    - Test for joint instability of affected joints
    - Reflexes
    - Dermatomes and myotomes
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
    - Functional Independence Measure scale (FIM) (Granger 1993)
    - Functional Life Scale (FLS) (Sarno 1973)
- Psychosocial assessment

Findings of Rheumatoid Arthritis

- May present with signs of inflammation around the joint
- Limited range of motion
- Joint deformity or instability, and possible derangement or subluxation of related joint structures
- Proliferation of synovial tissue
- Usually more than single joint involvement

Differential Diagnoses

- Osteoarthritis
- Psoriatic arthritis
- Articular cartilage pathology including neoplastic pathology
- Osteonecrosis
- Crystalline deposition diseases including gout and pseudogout (chondrocalcinosis)

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)
Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member

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- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to Maximal Complex Motion Necessary for Functional Activities)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

- Minimize pain and inflammation,
- Normalize gait, if affected
- Normalize pain-free range of motion,
- Prevent muscular atrophy and deformity
- Maintain proprioception, and
- Relieve joint pain so that other objectives may be achieved
- Use therapeutic exercises for ROM and strengthening
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition.

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Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:
- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of extremity occurs
- Neurologic testing worsens
- Range of motion plateaus or decreases

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Acute Phase** presentation.
Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Decrease pain and stiffness	▪ Use ice-packs, topical sprays for acutely inflamed joints ▪ Soft tissue mobilization
Reduce deformities and correct biomechanical alignment	▪ Use of splints and orthosis: ▪ Metatarsal pad or bar is used to remove weight from painful MTP joints and a rocker-bottom sole can be used to facilitate roll-off. Hind foot pronation is addressed with custom inserts ▪ Knee orthosis to control patellar alignment and hyperextension ▪ Dynamic hand splints are used to increase dexterity. Resting hand splints are used for acutely inflamed joints

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Decrease stiffness and improve flexibility	▪ Passive range of motion ▪ Active assisted range of motion ▪ Joint mobilization
Improve strength and endurance	▪ Isometric exercises ▪ Isotonic exercises within pain free range
Joint protection education	▪ Use of adaptive equipment ▪ Avoid overuse during the inflammatory phase ▪ Modification of tasks to decrease joint stress
Teach energy conservation techniques	▪ Teach use of adaptive equipment ▪ Teach modification of activities ▪ Rest periods during the day
Self-management	▪ Teach application of ice and soft tissue mobilization to management inflammation ▪ Teach home exercise program of range of motion and strengthening

The following table lists the procedures for **Subacute and Corrective/Rehabilitative Phase** presentation.

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Decrease pain and stiffness	▪ Superficial or deep heat i.e. moist hot packs, electric mittens, ultrasound, diathermy or paraffin ▪ Soft tissue mobilization
Reduce deformities and correct biomechanical alignment	▪ Use of splints and orthosis: ▪ Metatarsal pad or bar is used to remove weight from painful MTP joints and a rocker-bottom sole can be used to facilitate roll-off. Hind foot pronation is addressed with custom inserts. ▪ Knee orthosis to control patellar alignment and hyperextension ▪ Dynamic hand splints are used to increase dexterity
Decrease stiffness and improve flexibility	▪ Active range of motion ▪ Stretching exercises within pain free range ▪ Joint mobilization

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Improve strength and endurance	▪ Isotonic exercises within pain free range ▪ Begin progressive resistance exercises when isometric program is well established and patient is pain free. ▪ Closed chain exercises ▪ Postural stabilization exercises
Joint protection education	▪ Use of adaptive equipment ▪ Modification of tasks to decrease joint stress
Improve balance	▪ Retraining in balance and proprioception
Teach energy Conservation techniques	▪ Teach use of adaptive equipment ▪ Teach modification of activities ▪ Rest periods during the day
Improve functional status	▪ ADL training in grooming, transfers, dressing, bathing, toileting ▪ IADL training ▪ Gait training ▪ Stair mobility ▪ Measure function improvement using the FIM scale
Self-management	▪ Teach application of heat before stretching and range of motion exercises ▪ Teach home exercise program of range of motion and strengthening ▪ Encourage daily aerobic conditioning

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Heating pads
- Splints

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Heating pad, if needed, to relieve discomfort

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- Patient education in joint protection and splinting

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Surgery
- Medication

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Urinary Incontinence

Synonyms

- Functional Incontinence
- Stress Incontinence, female and male
-
- Mixed Incontinence, male and female
- Overflow Incontinence
- Urge Incontinence
- Pelvic Muscle Wasting/Atrophy
- Detrusor Sphincter Dyssynergia
- Neurogenic Bladder
- Bladder Hypertonicity

Definition

Urinary incontinence is involuntary loss of urine that results in lifestyle alterations, emotional changes or feelings of discomfort. Dysuria is abnormal urine flow without involuntary leaking. Therefore, urgency and frequency (overactive bladder) are dysuria, not incontinence.
There are several types of incontinence:

Stress Urinary Incontinence

Involuntary leakage of urine with increased intra-abdominal pressure, i.e. physical exertion, physical activity, sneezing or coughing. In the elderly, it may result from rolling over in bed, sitting up from reclining, or getting up from a chair. In a younger population, running, bending over, lifting, and jumping are common activities which lead to stress urinary incontinence. Stress urinary incontinence is more frequent in women than in men. Most often it is associated with an incompetent bladder neck and sphincter, weakened urethral musculature, and following multiple vaginal deliveries or pelvic surgery. Stress urinary incontinence results in smaller amounts of urine loss rather than a total loss of urine in one accident.

Urge Urinary Incontinence

Involuntary loss of large amounts of urine preceded by a sudden unexpected feeling of urgency. Urge urinary incontinence is the loss of a large amount of urine at one time and the inability to get the bathroom in time when the urge to goarises.

Mixed incontinence

Involuntary leakage of urine associated with urgency and also with effort, exertion, coughing, or sneezing. This is a combination of stress and urge incontinence.

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Functional incontinence

Involuntary leakage of urine when a person cannot get to or use the toilet in a timely fashion due to mobility, dexterity, environmental or psychological factors.

Overflow Urinary incontinence

Involuntary loss of urine in an oozing or unconscious small constant leaking due to the bladder outlet being blocked or the bladder muscles' inability to contract to push urine out in a consistent fashion. As the bladder fills without effective emptying, there is increased pressure on the outlet which causes constant leaking or oozing of urine.

Total Urinary incontinence

Involuntary loss of urine without any control and due to neurological or tissue damage.

Causes of Incontinence

Stress Incontinence

Caused by inadequate closure of the urethra. There are five urethral closure mechanisms to maintain urine in the bladder during activity:

- Pelvic muscle resting tone
- Sphincter resting tone
- Urethral smooth muscle resting tone
- Urethral coaptation
- Bladder angle with the urethra

One or more of the urethral closure mechanisms can be ineffective due to:

- Pelvic muscle weakness
- Pelvic muscle system imbalance
- Hormonal related tissue composition changes
- Neurologic/innervation changes to pelvic muscles
- Descent of bladder from normal angled position

Conditions that lead to ineffective closure mechanisms include:

- Pregnancy in women
- Childbirth, including episiotomy, in women
- Pelvic surgery
- Menopause and andropause (men)
- Pelvic, spinal injury, or trauma
- Inactivity, especially lack of walking
- Repetitive straining from lifting or coughing
- CNS dysfunction
- PNS dysfunction ie. post radical prostatectomy in men

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Urge Incontinence

Caused by bladder and/or autonomic nervous system dysfunction. There are bladder (detrusor) muscle and autonomic nervous system mechanisms that maintain normal bladder function:

- 10-12 reflex arcs from the subcortex/spine through the autonomic nervous system (ANS) to the bladder that unconsciously controls filling and emptying.
- Sympathetic division of ANS quiets bladder to allow filling
- Parasympathetic division of ANS activates the bladder to facilitate emptying
- Bladder wall mucosa protects muscle tissue from direct irritation

One or more of these mechanisms can be ineffective due to:

- Imbalance of ANS sympathetic and parasympathetic divisions
- Alteration of bladder control reflex arcs, ie. bladder-sphincter dyssynergia
- Alteration of bladder wall lining

Conditions that lead to irritable bladder muscle activity, include:

- Menopause and andropause (men)
- Aging
- CNS dysfunction
- Cancer and radical prostatectomy
- Pelvic surgery
- Stress
- Food and drink (such as spicy foods, coffee, tea, and alcoholic beverages)

Note: This is primarily a bladder muscle and ANS problem and only secondarily a pelvic muscle problem.

Overflow Incontinence:

Caused by urine overflowing through a blocked or closed bladder outlet. There are two major mechanisms that facilitate urine flowing through an open bladder/urethral outlet:

Neurological reflex arc–reflex inhibition

When the bladder contracts, the reflex arc causes the bladder to open.

Neurological reflex arc

When the bladder is stretched from being full, the reflex causes the bladder to contract repetitively and with force to push urine out of the opened urethra.
One or more of these mechanisms can be ineffective due to:

- Spinal reflex, subcortical reaction/reflex alteration
- Mechanical bladder outlet obstruction, ie. stones, muscle hypertrophy, tumor
- Atonic, lazy bladder is unable to respond to filling pressure

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Risk Factors

- Age
- Functional impairment
- Parity, childbirth, and postpartum state
- Menopause
- Dietary factors
- Smoking
- Obesity
- Genetic factors
- Prostate disorders
- Dementia
- Psychiatric disorders, specifically depression
- Diabetes
- Urinary tract infection
- Chronic gastrointestinal (GI) conditions such as irritable bowel syndrome (IBS), diarrhea, constipation, and inflammatory bowel diseases (IBD)
- Cardiovascular and pulmonary conditions
- Gastrointestinal, gynecologic, and urological procedures
- Neurological disorders, such as stroke and spinal cord problems

History

Medical and social history should include:

- Pregnancies: miscarriages, live births
  - Complications during labor, pregnancy, delivery
  - Surgical procedures during delivery – cesarean, episiotomy
  - Length of labor
  - Position of delivery
  - Episiotomy and/or tearing
- Relevant past gynecologic/urologic history
- Menopause
  - Related symptoms, hysterectomy, related physical changes
- Urologic history
  - When toilet trained, day and night
  - Childhood toileting patterns – bladder and bowel
- Medications and dates of use
- Medical Conditions – chronic conditions such as allergies, pain conditions, MS, etc
- Surgical History – Brain, pelvic, urologic, gynecologic, spine, pelvic, hip
- Physical Activity level – type, frequency, intensity of exercise program
- Present symptoms
  - With urination, bowel movement, menstruation, sexual activity, intercourse, and exercise
- Pain rating
- If available, review bladder diary, fluid intake/output, and diet

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Intake Interview and Data Collection

- Subjective Urinary and Bowel Symptoms
  - Urinary
    - Loss of urine with sudden urgency
    - Loss of urine with physical activity
    - Loss of urine, oozing with little awareness
    - Loss of urine when walking, undressing, etc.
    - Loss of urine during sleep
  - Bowel
    - Type and frequency of bowel movement
    - Loss of bowel movement during the day – solid or diarrhea
    - Relation to urinary dysfunction
  - Pain – related to urinary symptoms
  - Menstruation – related to urinary symptoms
- Objective Urinary and Bowel Symptoms
  - 2-3 day bladder and bowel diary to be completed prior to the initial visit
  - Includes urinary, bowel, fluid frequency and type, food intake, and pad use
- Functional Impact Questionnaire
  - 1. Urogenital Distress Inventory
  - 2. Incontinence Impact Questionaire
  - 3. Geriatric Self Efficacy Scale for Urinary Incontinence

Specific Aspects of History

- Rule out red flags (require medical management)
- Identify co-morbidities requiring medical management and those which affect therapy management
- Determine if trauma-related; determine nature and extent of traumatic event

Red Flag	Possible Consequence or Cause
Hematuria (reddish or dark brown urine)	▪ Disease of genitourinary tract ▪ Acute glomerulonephritis
Dark urine	▪ Hepatic obstructive disease ▪ Biliary obstructive disease ▪ Acute exertional rhabsomyolysis
Urinary urgency	Infection
Dysuria	Inflammation
Polyuria	Diabetes
Reduced force of flow	Benign prostatic hyperplasia Pelvic Mass
Reduced caliber of urine flow	Benign prostatic hyperplasia Pelvic Mass
Difficulty initiating urine stream	Benign prostatic hyperplasia Pelvic Mass

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Recent onset of urinary dysfunction, saddle anesthesia with back pain	Neurologic disease

Presentation

Subjective Complaints

Complaint of involuntary leakage of urine with or without urgency. Symptoms may be related to effort, exertion, sneezing, or coughing.

Objective Findings

Specific Aspects of Examination for Urinary Incontinence:

Women

- External exam
  - Observe the perineum for skin condition, color, scars, symmetry of anatomy, swelling, gland enlargement, condition of the introitus, and location of structures at rest.
  - Observe the movement of the perineum from the resting position, contracted position, bearing down position, and with coughing
  - Palpate the perineum externally to assess for tenderness, hypo/hypertonicity and hypersensitivity.
  - Assess light touch, deep pressure, and if possible, pin prick sensation.
  - Perform reflex assessment including anal sphincter reflex, bulbocavernosus reflex, and cough reflex.
- Internal exam
  - Assess sensation
  - Assess muscle tone
  - Perform manual muscle test of pelvic floor muscles and ability to isolate
  - Assess for presence (absence) of prolapse
- Additional testing may include
  - Functional Stop Test
  - Jump Test

Men

- External exam
  - Perineal exam
  - Check for redness, rashes, and infection of the penile, perineal, scrotal, and anal areas.
  - Identify any congenital abnormalities
  - Assess strength of pelvic floor muscles and ability to isolate
- Internal exam
  - Digital anal examination to assess strength and tonicity

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Scope of Musculoskeletal Examination

- Inspection
- Palpation of bony and soft tissue
- Range of motion
- Girth measurements of involved area
- Orthopedic and neurologic testing if neurologic signs are present

Normal Adult Bladder Function:

(To be used as a reference to define abnormal function)

- Toileting every 2-4 hours during the day
- Presence of a controllable awareness of the need to toilet on a 2-4 hour basis
- Strong, continuous flow of urine for 10-20 seconds in duration
- Urine is light yellow color and without strong odor
- Automatic initiation and completion of urine flow without hesitancy or dribbling
- Absence of leaking with physical activities, coughing, sneezing, bending, lifting, exercise, getting up from sitting or reclining
- Absence of frequent uncontrollable urge feelings with loss of urine.
- Sleeping 7-8 hours throughout the night without toileting

Exceptions to guidelines include:

- Pregnancy - toileting will increase in frequency
- Aging - after 65 years of age, frequency of toileting in the day and at night increases

Differential Diagnosis:

- Cystitis in females
- Multiple Sclerosis
- Prostatitis
- Spinal Cord Neoplasms
- Spinal Cord Trauma and Related Diseases
- Spinal Epidural Abscess
- Urinary Obstruction
- Urinary Tract Infection in males
- Uterine Prolapse
- Vaginitis

Physical/Occupational Therapy Management

- For Stress Urinary Incontinence:
  - Education
    - Review anatomy and function of the urogenital system
    - Review relation to bowel patterns and changes
  - Lifestyle changes
    - Food, drink, sleep, walking, social and recreational activities.
  - Autonomic Nervous System Retraining
    - Biofeedback thermal, EMG resting tone retraining

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        - Visceral Organ Alignment
            - Wedge inversion, manual techniques
        - Pelvic Muscle Retraining
            - Pelvic muscle exercises including Kegels and Roll for Control exercises
            - Biofeedback – using internal or external sensor
            - Electrical Stimulation
            - Vaginal cones
        - Postural Correction
        - Functional Activity Retraining, Coordinating breathing with abdominal and pelvic musculature
    - For Urge Urinary Incontinence:
        - Education
            - Review anatomy and function of the urogenital and autonomic nervous systems
            - Review relation to bowel patterns and changes
        - Lifestyle changes
            - Food, drink (fluid intake and toileting patterns)
            - Sleep patterns, walking, social and recreational activities.
        - Autonomic Nervous System Retraining – essential in management of urge urinary incontinence. Focus on urge suppression.
            - Biofeedback thermal, EMG resting tone retraining
            - Physiological Quieting techniques
        - Visceral Organ Alignment
            - Wedge inversion, manual techniques
        - Pelvic Muscle Retraining
            - Pelvic muscle exercises including Kegels and Roll for Control exercises
            - Biofeedback – using internal or external sensor
            - Electrical Stimulation
            - Vaginal cones
        - Postural Correction
        - Functional Activity Retraining
    - For Overflow Incontinence
        - Education
            - Review anatomy and function of the urogenital and autonomic nervous systems
            - Review relation to bowel patterns and changes
        - Lifestyle changes
            - Food, drink (fluid intake and toileting patterns)
            - Sleep patterns, walking, social and recreational activities.
        - Autonomic Nervous System
            - Biofeedback thermal, EMG resting tone retraining
            - Physiological Quieting techniques
            - Very important in post radical prostatectomy recovery
        - Visceral Organ Alignment
            - Wedge inversion, manual techniques
        - Pelvic Muscle Retraining

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        - Pelvic muscle exercises including Kegels and Roll for Control exercises
        - Biofeedback – using internal or external sensor
        - Electrical Stimulation
        - Vaginal cones
    - Postural Correction
    - Functional Activity Retraining
- For Functional Incontinence
    - Treatment of non-urogenital dysfunctions such as cognitive and/or physical impairments
    - Includes gait, balance, activities of daily living, therapeutic activities

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.

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- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Expected Outcome	Procedures/Modalities Such As
Decrease episodes of incontinence	▪ Therapeutic Exercise ▪ Neuromuscular Re-education ▪ Manual therapy ▪ Electrical Stimulationor biofeedback (not needed routinely. Use when patient cannot actively contract the pelvic floor muscles, needs motivation, assistance for adherence or for locating targeted musculature .)
Teach self management techniques	▪ Self care/home management training

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at her or his residence.

- Home Medical Equipment
- Vaginal weights
- Home electrical stimulation unit

Self-Management Techniques

- Bladder training
- Bladder diaries
- Lifestyle interventions
- Weight loss

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Neurological Rehabilitation

Acquired Brain Injury

Synonyms

- Stroke
- CVA
- Head injury
- Brain injury

Definition

Acquired brain injury refers to any damage to the brain that occurs after birth. That damage can be caused by an accident or trauma, by a stroke, a brain infection, by alcohol or other drugs or by diseases of the brain such as Parkinson's disease.

Patient History

Patient history may include:

Patient Data

There are two types of brain injury traumatic and non-traumatic. A traumatic brain injury can be classified as an open or closed injury. A closed injury is caused when the brain is bounced around in the skull due to a blow to the head or severe shaking such as in a road traffic accident. A closed motion can cause tearing, shearing or stretching of the brain tissue. These types of injury are much more common than open head injuries. An open injury occurs when an object such as a bullet, fractures the skull and enters the brain. These injuries usually damage relatively localized areas of the brain resulting in specific damage. A non-traumatic injury is an injury that does not occur as a result of trauma. This includes stroke, tumors, infectious diseases, lack of oxygen or toxicity.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Trauma	Active hemorrhage, fracture
Fever, severe pain	Possible infection, intracranial pressure
Progression of symptoms	Evolving CVA
Immune-compromised state	Infection
Cancer history	Cause of symptoms (metastatic or primary)
Transient neurological signs	TIA, may need medical management; multiple

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	sclerosis
Exertional symptoms, history of cardiac disease	Syncopal episodes of cardiac origin possible
Abnormal, or sudden changes in blood pressure	Medication management
Diminished level of consciousness	Metabolic abnormalities (e.g., hypernatremia, hyperglycemia, severe hypothyroidism)

Presentation

Severity is dependent on cause, location and quantity of brain tissue involved, and general health of patient. Initially patient will have motor paralysis, possibly even flaccidity that generally improves after initial shock. Over the next few weeks, paralysis tends to become spastic with increased deep tendon reflexes, and positive Babinski on the involved limb. Gait and functional impairments are common, as are hemi-sensory loss, perceptual ability changes, speech and visual losses. Ultimately, loss of intellectual ability may become more of a limiting factor than physical impairments. Severe acquired brain injury is characterized by Glasgow scores of 3-8, and severe motor problems. Moderate acquired brain injury is defined as Glasgow scores of 9-12, and periods of unconsciousness of 1 to 24 hours, mild acquired brain injury, which is most common, demonstrate Glasgow scores of 13 to15, and no period of unconsciousness.

Subjective Findings

- Frequently, patient reports a history of recurrent transient weakness, swallowing dysfunction, and/or speech deficits.
- Vertigo, visual disturbances, memory loss and confusion are common.
- Sensory and motor symptoms can be unilateral or bilateral.
- Patients may report headaches, fatigue, anxiety, depression, aggression, and lability.
- Diminished judgment, problem solving, concentration, and loss of appropriate inhibition interfere with normal relationships and employment.

Objective Findings

Objective findings may include:

Scope of Examination

- History, including social and living environment, co-morbidities, and prior level of function
- Assessment of gross coordinated movement (balance, gait, locomotion, transfers, transitions), including standardized tests such as the Berg and Tinetti tests
- Motor function (motor control and motor learning)
- Communication ability
- Emotional and behavioral responses that may interfere with rehabilitation outcomes
- Musculoskeletal (ROM, symmetry) assessment

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- Cognition and memory

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Posture
  - Synergistic patterns
  - Contractures
  - Type of gait pattern
  - Type of assistive device
  - Use of orthotics for upper and lower extremity
- Palpation of bony and soft tissue
  - Pain
  - Hyper/hypotonicity
  - Spasticity
  - Joint integrity (shoulder joint)
  - Effects of postural changes (orthostatic hypotension)
- Functional assessment (Refer to standardized tests list below)
  - Feeding
  - Grooming
  - Bathing
  - Dressing
  - Toileting
  - Transfers to different surfaces
  - Ambulation/wheelchair mobility
  - Stair mobility
  - Community mobility (uneven surfaces, car transfers, side-walks)
- Neurological testing
  - Muscle stretch reflex
  - Deep tendon reflexes
  - Babinski reflex
  - Sensation
- Cognitive testing (using a standardized test)
  - Arousal
  - Attention
  - Behavior
  - Memory deficits
- Balance/Proprioception test
- Sensory and Coordination test
- Musculoskeletal testing as indicated
  - Test passive and active range of motion
  - Voluntary movements
  - Muscle patterns
- Cardiovascular/pulmonary assessment
  - Resting: Pulse, respiratory rate and blood pressure

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- Integumentary assessment
  - Open lesions
  - Lacerations
- Interview of family/caregivers

Comprehensive assessment of patients with acquired brain injury is necessary for appropriate clinical management and evaluation of outcomes for quality management. The use of well-validated, standardized instruments in evaluating acquired brain injury patients is recommended. These instruments help to ensure reliable documentation of the patient's neurological conditions, levels of disability, functional independence, family support, quality of life, and progress over time. The following is a list of such tools that can be used when evaluating acquired brain injury patients.

Functional Tests	Cognitive Tests	Balance Tests	Sensory / Coordination Tests
▪ Functional Independence Measure (FIM) ▪ National Outcome Measure System (NOMS) ▪ National Institutes of Health Stroke Scale (NIHSS)* ▪ Motor Activity Log ▪ Barthel Index ▪ Functional Ability Scale ▪ Continuous Scale Physical Functional Performance Test ▪ Emory Functional Ambulation Profile	▪ Motor Visual Perception Test(MVPT) ▪ Hooper visual organizational test ▪ Mini Mental State Exam	▪ Functional reach test ▪ Multi-dimensional reach test ▪ Berg balance scale ▪ Tinetti Balance Test ▪ Sharpened Romberg eyes open/closed	▪ Semmes Weinstein monofilament test ▪ Two point discrimination test ▪ Stereognosis test ▪ Proprioceptive testing ▪ Purdue pegboard ▪ Jensen Taylor Hand test

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Findings of Acquired Brain Injury

- Findings on evaluation may be physical, such as:
  - Diminished strength and coordination,
  - Loss of range of motion,
  - Abnormal tone, or reflexes,
  - Balance deficits, and
  - Endurance limitations,
  - Fatigue,
  - Headaches,
  - Chronic pain,
  - Seizures,
- Functional testing may show limited mobility skills for transfers and gait.
- Cognitive deficits/behavioral deficits may be found and related to:
  - Memory,
  - Ability to interpret meaning of facts, or language,
  - Safety awareness,
  - Problem solving,
  - Communication,
  - Lack of insight,
  - Poor concentration,
  - Depression,
  - Impulsivity,
  - Inappropriate behavior
- The presence of social, economic, and family issues may indicate the need for appropriate referral.
- The patient may also have medical complications that may be cardiopulmonary, musculoskeletal, integumentary, or related to bowel and bladder.

Differential Diagnosis

Not applicable

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care (Medicare Transmittal 179)

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition.

Services are covered for maintenance care if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member

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- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4.ADLs(Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination) and IADLs (includes cooking, driving, shopping, managing finances and medication etc.)	Mild/no loss	Mild to moderate	Moderate to severe

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living,) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to Maximal Complex Motion Necessary for Functional Activities)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

- Therapy goals are as follows:
  - Prevention of complications,
  - Restoration of lost function,
  - Adaptation of environment,
  - Patient instruction in compensatory strategies, and
  - Coordination of interventions across practice settings, with a care giving team.
- Early exercise and mobility training is recommended.
- Therapy may consist of:
  - Training of orthotics/bracing,
  - Training on equipment,
  - Airway clearance techniques,
  - Therapeutic exercise,
  - Neuromuscular reeducation
  - Gait training
  - Electrotherapeutic and
  - Physical agents.
- Treatment plan must include predicted outcomes, based on initial and follow up functional measures.
- Treatment may also need to address complications such as:
  - Shoulder subluxation,
  - Genu recurvatum,
  - Reflex sympathetic dystrophy, and

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    - Frozen shoulder
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Recommend that if depression and motor, sensory, cognitive, communication, and swallowing deficits are found, all patients should be formally assessed by the appropriate clinician from the coordinated rehabilitation team.

Management/Intervention

Most improvement is noted in the first 6 months post-brain injury. Patients who have had a severe brain injury or who are maximally dependent in ADLs and have a poor prognosis for functional recovery are not candidates for rehabilitation intervention. Families and caregivers should be educated in the care of these patients, which may include the following: prevention of recurrent brain injury, signs and symptoms of potential complications and psychological dysfunction, assisted ADL tasks (e.g., transfers, bathing, positioning, dressing, feeding, toileting, and grooming), swallowing techniques, skin care, contractures, home exercises (range of motion), and sexual functioning. Families should receive counseling on the benefits of nursing home placement for long-term care.

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Rehabilitation should include therapy that is directed at specific training of skills and at functional training. Therapy should be given with sufficient intensity to promote skill acquisition. Major theories of rehabilitation training include the following:

Traditional Therapy

This form of therapy employs range-of-motion (ROM), strengthening, mobilization, and compensatory techniques. The process of mental practice may also be used to improve the performance of certain activities. This is when a patient mentally rehearses an action without physically performing the action. Current evidence is not clear on whether this practice, in conjunction with physical practice, actually improves motor capacity of the upper limb region. Further studies are required.

Neuro-developmental Approach

According to the neuro-developmental approach, muscle patterns, not isolated movements, are used for motion. The theory states that persons with motor deficiencies following stroke are unable to direct nervous impulses to muscles in the different combinations used by persons with an intact central nervous system (CNS).
The therapy, therefore, is meant to suppress abnormal muscle patterns before normal patterns are introduced. Abnormal patterns are modified at proximal key points of control, such as the neck, spine, shoulder, and pelvis.

Proprioceptive Neuromuscular Facilitation

This form of therapy aims to stimulate nerve/muscle/sensory receptors to evoke response through manual stimuli to increase ease of movement and promote function.

Brunnstrom Movement Therapy

This therapy involves central facilitation using Twitchell's recovery. It aims to enhance specific synergies through the use of cutaneous/proprioceptive stimuli.

1. Of the many independent variables tested, those listed below have been reported to have the most influence on outcome. Factors predicting poor ADL outcome include the following (Coupar et al, 2012):
   - Advanced age
   - Comorbidities
   - Myocardial infarction
   - Diabetes mellitus
   - Severe stroke
   - Severe weakness
   - Poor sitting balance
   - Visuospatial deficits
   - Mental changes
   - Incontinence
   - Low initial ADL scores
   - Delay in initiating rehabilitation following onset

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Studies

- Every patient should avoid strenuous exercise after stroke, but it is a good idea to participate in an individualized exercise program. At 1 year post stroke, improvement in functional walking ability was seen in stroke patients who underwent either locomotor training, including body weight supported treadmill, or a progressive home exercise program supervised by a physical therapist. No significant differences in improvement were found between the two groups *(Duncan et al, 2011)*. Reports in the literature state that for young stroke survivors who participated in an aerobic fitness program, improvement in fitness levels, ambulatory speed, and life satisfaction was statistically significant.
- Results from a randomized, controlled, assessor-blinded study indicated that even long after a stroke, kinesthetic ability training, administered in combination with a conventional rehabilitation program, can improve balance in hemiparetic stroke patients *(Alptekin et al 2008).*
- The inclusion of breathing retraining (BRT) and inspiratory muscle training (IMT) in the rehabilitation program of patients who have suffered a stroke can result in improved respiratory muscle function, exercise capacity, and quality of life, according to a study by Sutbeyaz et al. In this study, patients received BRT and IMT training for half an hour daily, 6 times a week for 6 weeks *(Sutbeyaz ST, 2010)*
- Results from a systematic review indicate that modified constraint-induced movement therapy (CIMT) is more effective than traditional rehabilitation in reducing a patient's disability level *(Shi YX et al, 2011)*. It can improve upper extremity ability and increase movement spontaneity. Further studies are needed on CIMT's effectiveness in kinematic analysis.
- In a pilot, randomized, clinical trial, with a 6-month follow-up, the practicality and efficacy of conventional neurological therapy, constraint-induced therapy, and therapeutic climbing to improve minimal-to-moderate arm and hand function in stroke patients was evaluated. The study concluded that improvement of arm and hand function in the intermediate term was best achieved using the constraint-induced therapy approach *(Khan CM, 2011)*

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

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Home Medical Equipment

- Hot packs/cold packs
- Theraband, Swiss ball, for therapeutic exercises
- Assistive gait device
- AFO
- Shoulder sling
- Wheelchair
- Adaptive equipment for ADLs

Self-Care Techniques

- Family and caregiver training
- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Community resources
- Referral to PCP
- Professional and support groups
- Speech therapy
- Orthotist

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Complex Regional Pain Syndrome (CRPS)

or Reflex Sympathetic Dystrophy (RSD)

Synonyms

- Causalgia
- Sudeck's Atrophy
- Post Traumatic Dystrophy
- Shoulder Hand Syndrome
- Reflex Neurovascular Dystrophy

Definition

CRPS has both peripheral and central nervous system components, which pathophysiology is not well understood. Widespread disturbance of central autonomic regulation is thought to be due to vasospasm of small arterioles and capillaries of plasma and fibrin. This regional, post-traumatic, neuropathic pain problem most often affects one or more limbs. Most patients with CRPS have an identifiable inciting or initiating injury that maybe trivial or severe.

Patient History

Patient history may include:

Patient Data

Various insults that may lead to CRPS include the following:

- Trauma (e.g., sprain, dislocations, fractures, surgery, burns, crash injury)
- Neurologic disorders (eg, stroke, tumor, syringomyelia)
- Herpes zoster infection
- Myocardial infarction
- Musculoskeletal disorder (shoulder rotator cuff injury)
- Malignancy
- Spontaneous/idiopathic

The common characteristic features of CRPS are spontaneous pain, hyperalgesia, impairment of motor function, swelling, changes in sweating, and vascular abnormalities in a single extremity. An overt nerve injury is not detectable.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, ligament tear
Fever, severe pain	Infection
Popliteal fossa pain, sudden onset	Popliteal aneurysm
Diabetes	Neuropathy
Multiple joint involvement, large tophus	Rheumatologic diseases, gout
Unilateral edema	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of foot or leg	Arterial occlusion
Immune-compromised state	Infection

Presentation

Pain is the first and primary complaint. It typically occurs in one or more extremities, and it is described as severe, constant, burning and/or deep aching pain. All tactile stimulation of the skin may be perceived as painful. Skin may appear shiny, dry or scaly. Hair may initially grow coarse and then thin. Nails in the affected extremity may be more brittle, grow faster and then slower. Pitting or hard edema is usually diffuse and localized to the painful and tender region. Patients have difficulty moving, this decreased mobilization leads to muscle wasting. Initially symptoms are generally localized to the site of injury, as time progresses pain and symptoms become more diffuse.

Subjective Findings

- Intense prolonged pain
- Complaints of warmth or cold in limb
- Allodynia and hyperalgesia
- Abnormal vasomotor activity

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Skin color
  - Shiny, dry, scaly skin
  - Brittle nails
  - Pitting or hard edema

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    - Localized or diffused symptoms
    - Difficulty initiating movement
    - Muscle atrophy
    - Postural assessment
    - Gait Analysis
- Palpation of bony and soft tissue
    - Pain/tenderness
    - Tactile stimulation of the skin
    - Vasomotor changes
    - Muscle spasm/guarding
- Range of motion, active and passive of the affected joints
- Manual muscle testing
    - Resisted isometric movements of the affected joints
- Orthopedic and neurologic testing if neurologic signs are present
    - Coordination
    - Dexterity
    - Sensation
    - Balance (Tinetti test)
    - Accessory Joint movements
    - Reflexes
- Functional assessment - The following standardized tests may be used to assess functional limitation:
    - Multiple joints affected: Functional Independence Measure (FIM)
    - Upper Extremity affected: Disabilities of the Arm, Shoulder and Hand (DASH)
    - Lower Extremity affected: Lower extremity functional scale (LEFS)

Findings of Complex Regional Pain Syndrome (CRPS)

- Swelling
- Pitting edema
- Tenderness
- Bluish skin color with shiny red discoloration
- Restricted movement
- Osteopenic changes on X-ray

Differential Diagnosis

- Chronic Pain Syndrome
- Compartment Syndrome
- Diabetic Neuropathy
- Ischemic Monomelic Neuropathy
- Mononeuritis Multiplex
- Neoplastic Brachial Plexopathy
- Neoplastic Lumbosacral Plexopathy
- Postpolio Syndrome
- Radiation-Induced Brachial Plexopathy
- Radiation-Induced Lumbosacral Plexopathy

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- Traumatic Brachial Plexopathy

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to

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self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks

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Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy program goals are to

- control pain,
- decrease inflammation and swelling,
- normalize gait,
- normalize pain-free range of motion,
- prevent muscular atrophy, and
- relieve joint pain so the other objectives may be achieved.

The therapy program will consist of

- modalities to minimize inflammation,
- therapeutic exercises for ROM and strengthening, and
- instruction in a home program; complete rest and immobilization are harmful.

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Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Acute Phase** presentation.
Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

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Expected Outcome	Procedures/Modalities Such As
Decrease pain	▪ Superficial heat ▪ Ultrasound ▪ Transcutaneous Electrical Nerve Stimulation ▪ Myofascial release ▪ Massage ▪ Contrast Baths
Gradual desensitization of increasing sensory stimuli	▪ Sensory stimuli-tapping, vibration, rubbing, massage
Facilitate normal tissue length and improve functional positioning	▪ Splinting /bracing
Instruction in home program	▪ Complete rest and immobilization is harmful ▪ Use of arm for ADLs ▪ Use of TENS, heat, massage to control edema and pain

The following table lists the procedures for **Subacute Phase** presentation. Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Expected Outcome	Procedures/Modalities Such As
Edema control	▪ Massage ▪ Elevation
Improve flexibility	▪ Gentle gliding exercises
Improve strength	▪ Steady progression from gentle weight-bearing to progressive active weight-bearing
Correction of postural abnormalities	▪ Postural exercises in sitting/standing
Self-management techniques	▪ Teach home exercise program of gliding exercises and isometric strengthening exercises

The following table lists the procedures for **Corrective/Rehabilitative Phase** presentation.

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

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Expected Outcome	Procedures/Modalities Such As
Improve flexibility	▪ Gentle range of motion exercises
Gradual stress loading of the joint	▪ Balance and proprioception exercises
Improve strength and coordination	▪ Progressive resistance training ▪ Coordination exercises ▪ Dexterity exercises
Postural normalization	▪ Postural retraining exercises in functional positions
Improve balance	▪ Balance and proprioception exercises
Education and self-management	▪ Teach stress-loading program as home exercise program training

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Hot packs
- Theraband for therapeutic exercises
- Heating pad
- Assistive devices
- Home electrical stimulation unit

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening and desensitization
- Cold packs, if needed, to relieve discomfort
- Heating pad

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Surgery
- Medication
- Sympathetic nerve blocks
- Surgical evaluation for sympathetic blocks, intravenous regional blocks, intrathecal infusion, sympathectomy, amputations

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- Evaluation by a psychologist or psychotherapist
- Biofeedback and counseling

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Impaired Mobility

Synonyms

- Muscle Weakness
- Lack of Coordination
- Difficulty Walking
- Abnormality of Gait
- Progressive Muscular Atrophy
- Muscular Wasting, Disuse Atrophy
- Muscular Dystrophies and Other Myopathies
- Disorders of the Muscle, Ligament and Fascia

Definition

Generalized muscular weakness may have awkward, uncoordinated movements and walking, usually due to loss of integration of strength, balance, and coordination. Clinical presentation can be attributed to neurological, muscular or joint problems.

Patient History

Patient history may include:

Patient Data

Usually arises from conditions such as Parkinson's disease, Multiple Sclerosis, and other hereditary or degenerative diseases of the central nervous system such as amyotrophic lateral sclerosis, progressive bulbar palsy and progressive muscular atrophy. Joint problems may also be the causative factor.

Possible causes may include but not limited to:

- Acute infective polyneuritis: Guillain-Barre syndrome, post-infectious polyneuritis
- Disorders of the Central Nervous system: Parkinson's, Multiple Sclerosis, Amyotrophic Lateral Sclerosis, Progressive Bulbar Palsy, Progressive muscular Atrophy, Primary Lateral Sclerosis, Cerebral Palsy
- Neuropathies: Charcot's Marie Tooth Disease, Diabetic Polyneuropathy,
- Muscular: Myasthenia Gravis
- Cognitive: Alzheimer's, Dementia

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Trauma	Active hemorrhage, fracture
Fever, severe pain	Possible infection, intracranial pressure
Progression of symptoms	Evolving CVA
Immune-compromised state	Infection
New unilateral weakness; speech abnormalities	Cerebrovascular accident
Marked extremity asymmetry; redness, point tenderness, swelling	Deep vein thrombosis
Diminished level of consciousness	Intracerebral hemorrhage; hydrocephalus; intracerebral tumor; metabolic abnormalities (e.g., hyponatremia, hyperglycemia, severe hypothyrodism)
Bowel or bladder incontinence	Spinal cord involvement

Presentation

Severity is dependent on cause, acuity, and general health of patient. Difficulty in performing daily activities due to joint pains may resolve spontaneously when pain is no longer present.

Subjective Findings

- Pain on weight-bearing
- Weakness
- Limitation in joint motion
- Muscle Spasms
- Vertigo, visual disturbances, and confusion are common
- Sensory and motor symptoms can be unilateral or bilateral

Objective Findings

Objective findings may include:

Scope of Examination

- History, including social and living environment, co-morbidities, pertinent labs
- Assessment of gross coordinated movement (balance, gait, locomotion, transfers, transitions)
- Motor function (motor control and motor learning)
- Communication ability
- Emotional and behavioral responses
- Musculoskeletal (ROM, symmetry)

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

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- Inspection
  - Posture
  - Synergistic patterns
  - Contractures
  - Type of gait pattern
  - Type of assistive device
  - Use of orthotics for upper and lower extremity
- Palpation of bony and soft tissue
  - Pain
  - Hyper/hypotonicity
  - Spasticity
  - Joint integrity (shoulder joint)
  - Effects of postural changes (orthostatic hypotension)
- Functional assessment - Standardized tests may be used to assess functional limitations:
  - Lower Extremity Functional Scale (LEFS) Binkley, 1999.
  - Patient Specific Functional Scale (PSFS) Westaway, 1998.
  - Timed Up and Go Test (TUG) Shumway, 1996.
  - Dynamic Gait Index (DGI) Shumway-Cook 1995
  - Activities Balance Confidence Scale (ABC Scale) Powell, 1994
  - Disabilities of the Arm, Shoulder and Hand (DASH) Hudack, 2003
- Neurological testing
  - Muscle stretch reflex
  - Deep tendon reflexes
  - Babinski reflex
  - Sensation
- Cognitive testing (using a standardized test)
  - Attention
  - Behavior
  - Memory deficits
- Balance/Proprioception test - Standardized tests may be used to assess balance:
  - Berg Balance Scale
  - Tinetti Balance Test
  - Functional Reach Test
  - Multi-dimensional Reach Test
  - Romberg Test
- Sensory and Coordination test
  - Musculoskeletal testing as indicated
  - Test passive and active range of motion
  - Voluntary movements
  - Muscle patterns
- Cardiovascular/pulmonary assessment
  - Resting: Pulse, respiratory rate and blood pressure
- Integumentary assessment
  - Open lesions
  - Lacerations

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- Interview of family/caregivers

Findings of Impaired Mobility

- Findings on evaluation may be physical, such as:
  - Diminished strength and coordination,
  - Loss of range of motion,
  - Abnormal tone, or reflexes,
  - Balance deficits, and
  - Endurance limitations.
- Functional testing may show limited ADL skills and mobility skills for transfers and gait.
- Cognitive deficits/behavioral deficits may be found and related to:
  - Memory,
  - Ability to interpret meaning of facts, or language,
  - Safety awareness,
  - Problem solving, and
  - Communication.
  - The presence of social, economic, and family issues may indicate the need for appropriate referral.

Differential Diagnosis

Difficulty Walking (719.7) is used when the causative factor is arthropathic or orthopedic in nature. Some orthopedic treatments may result in difficulty walking such as amputations or arthroplasties. Refer to specific orthopedic condition for clinical practice guideline.

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

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- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

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Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)

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3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition,
- Acuity or chronicity of condition, and
- Expectation for functional improvement.

Treatment Methods

- Therapy goals are as follows:
  - Prevention of complications,
    - Restoration of lost function,
    - Adaptation of environment,
    - Patient instruction in compensatory strategies, and
    - Coordination of interventions across practice settings, with a caregiving team.
  - Early exercise and mobility training is recommended.
- Therapy may consist of:
  - Training of orthotics/bracing,
  - Training on equipment,
  - Therapeutic exercise,
  - ADL/IADL Training
  - Neuromuscular reeducation
  - Gait training
  - Electrotherapeutic and
  - Physical agents.
- Treatment plan must include predicted outcomes, based on initial and follow up functional measures.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or

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periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Recommend that if depression and motor, sensory, cognitive, communication, and swallowing deficits are found, all patients should be formally assessed by the appropriate clinician from the coordinated rehabilitation team.

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Patients who are maximally dependent in ADLs and have a poor prognosis for functional recovery are not candidates for rehabilitation intervention. Families and caregivers should be educated in the care of these patients, which may include the following: signs and symptoms of potential complications and psychological dysfunction, assisted ADL tasks (eg, transfers, bathing, positioning, dressing, feeding, toileting, and grooming), swallowing techniques, skin care, contractures, home exercises (range of motion), and sexual functioning. Families should receive counseling on the benefits of nursing home placement for long-term care.

The following table lists the procedures for **Acute Phase** presentation.

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Prevention of complications	▪ Contractures: Use of resting, dynamic splints, passive and active range of motion exercises
Adaptation of environment	▪ Home evaluation to assess safety, may need bathroom modification with adaptive equipment, modification of furniture to aid transfers and addition

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	of a ramp to enter the home
Restoration of normal movement patterns	▪ Neurodevelopmental training ▪ Proprioceptive neuromuscular facilitation ▪ Proprioceptive stimuli
Teach compensatory strategies	▪ Teach use of adaptive equipment for bathing, dressing, transfers ▪ Teach compensatory strategies when performing ADL tasks
Restoration of lost function	▪ ADL Training ▪ Balance and proprioception ▪ Sensory and coordination training ▪ Ambulation and wheelchair mobility
Coordination of intervention with other team members and caregivers	▪ Teach home exercises program, use of modalities for pain control and donning and doffing orthotics or braces to caregivers and patient. ▪ Teach techniques for prevention of complications

The following table lists the procedures for **Subacute Phase** presentation. Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Expected Outcome	Procedures/Modalities Such As
Restoration of normal movement patterns	▪ Neurodevelopmental training ▪ Proprioceptive neuromuscular facilitation ▪ Proprioceptive stimuli
Restoration of lost function	▪ ADL Training ▪ Balance and proprioception ▪ Sensory and coordination training ▪ Ambulation and wheelchair mobility ▪ Stair mobility ▪ Community re-integration: community ambulation, car transfers, ambulating on uneven surfaces ▪ Strength and endurance ▪ Use of aquatic exercises
Teach self-management techniques	▪ Teach home exercises program, use of modalities for pain control and donning and doffing orthotics or braces to caregivers and patient ▪ Encourage regular aerobic conditioning

The following table lists the procedures for **Corrective/Rehabilitative Phase** presentation.

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Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Teaching compensatory strategies	▪ Teach use of adaptive equipment for bathing, dressing, transfers ▪ Teach compensatory strategies when performing ADL tasks
Adaptive equipment changes or further caregiver training if decline in function	▪ Assess need for changes in adaptive equipment (▪ Provide addition training for care-givers if decline in function occurs
Maximize functional ability	▪ Gait Training/stair mobility ▪ Neuromuscular Re-education ▪ Wheelchair Training ▪ Community re-entry ▪ Balance and proprioceptive training ▪ Coordination Training
Teach self-management techniques	▪ Teach home exercises program, use of modalities for pain control and donning and doffing orthotics or braces, to caregivers and patient ▪ Encourage regular aerobic conditioning

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his/her residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband, Swiss ball, for therapeutic exercises
- Assistive gait device
- AFO
- Wheelchair
- Adaptive equipment for ADLs

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Self-Care Techniques

- Family and caregiver training
- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Community resources
- Referral to PCP
- Professional and support groups
- Orthotist

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Spinal Cord Injury

Synonyms

- Tetraplegia
- Paraplegia

Definition

Spinal cord injury (SCI) is an insult to the spinal cord resulting in a change, either temporary or permanent, in its normal motor, sensory, or autonomic function. The International Standards for Neurological and Functional Classification of Spinal Cord Injury is a widely accepted system describing the level and extent of injury based on a systematic motor and sensory examination of neurologic function. The following terminology has developed around the classification of SCI:

- Tetraplegia (replaces the term quadriplegia) - Injury to the spinal cord in the cervical region, with associated loss of muscle strength in all 4 extremities
- Paraplegia - Injury in the spinal cord in the thoracic, lumbar, or sacral segments, including the cauda equina and conus medullaris

Patient History

Patient History may include

Patient Data

SCI can be sustained through different mechanisms, with the following 3 common abnormalities leading to tissue damage:

- Destruction from direct trauma
- Compression by bone fragments, hematoma, or disk material
- Ischemia from damage or impingement on the spinal arteries

The most common causes of SCI include the following:

- Motor vehicle accidents (44.5%) - These are the major cause of traumatic SCI in the United States.
- Falls (18.1%) - These are most common in persons at or above age 45 years. Older females with osteoporosis have a propensity for vertebral fractures from falls with associated spinal cord injury.
- Violence (16.6%) - This is the most common cause of SCI in some urban settings in the United States, although a trend toward a slight decrease in violence-related SCI has been found. One study showed that among patients who had suffered an assault, SCI from a penetrating injury tended to be worse than that from a blunt injury.

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- Sports injuries (12.7%) - Such injuries are responsible for many cases of SCI. The sport that most commonly leads to SCI is diving.

    - Other causes of SCI include the following:
    - Vascular disorders
    - Tumors[9]
    - Infectious conditions
    - Spondylosis
    - Iatrogenic injuries, especially after spinal injections and epidural catheter placement
    - Vertebral fractures secondary to osteoporosis
    - Developmental disorders

Injuries by ASIA classification

- Incomplete tetraplegia - 29.5%
- Complete paraplegia - 27.9%
- Incomplete paraplegia - 21.3%
- Complete tetraplegia - 18.5%

The most common neurologic level of injury in tetraplegia is C5. In paraplegia, T12 is the most common level.

The ASIA Impairment Scale classifies the completeness of SCI on a scale from A-E, as follows :

- A - Complete; no sacral motor or sensory sensation in segments S4-5
- B - Sensory incomplete; preservation of sensation below the level of injury, extending through sacral segments S4-5
- C - Motor incomplete; voluntary anal sphincter contraction or sensory sacral sparing, with sparing of motor function distal to 3 levels below the motor level of injury and with the majority of key muscles having a strength grade of less than 3
- D - Motor incomplete; voluntary anal sphincter contraction or sensory sacral sparing, with sparing of motor function distal to 3 levels below the motor level of injury and with the majority of key muscles having a strength grade of 3 or greater
- E - Normal; normal motor and sensory recovery (hyper-reflexia may be present)

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event

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Red flags may include:

- Severe orthostatic hypotension
- Cardiovascular changes
- Respiratory changes
- Autonomic Dysreflexia
- Infected decubiti
- Depression with suicidal ideation

Objective Findings

Objective Findings may include

Scope of Examination

Specific Examination Considerations

1. Comprehensive and detailed neurologic examinations that are performed early and are repeated often form an important component of patient assessment and of neurologic and functional outcome prediction. Key elements of the examination include motor and sensory testing, which allows for the designation of a neurologic level of injury (NLOI) and of the completeness of injury. In addition, rectal examination is required to assess motor and sensory functions.

Neurologic level of injury

The NLOI is defined as the most caudal (i.e., lowest) level of the spinal cord that has normal motor and sensory function. The motor level, which is a better predictor of the patient's functional abilities, is determined by the manual testing of key muscle groups on both sides of the body. These groups represent neurologic levels, and findings are graded 0-5

Motor levels representing upper and lower extremity function (and key muscles) are as follows:

- C5 - Elbow flexion (biceps)
- C6 - Wrist extension (extensor carpi radialis)
- C7 - Elbow extension (triceps)
- C8 - Finger flexion (flexor digitorum profundus)
- T1 - Small finger abductors (abductor digiti minimi)
- L2 - Hip flexion (iliopsoas)
- L3 - Knee extension (quadriceps)
- L4 - Ankle dorsiflexion (tibialis anterior)
- L5 - Great toe extension (extensor hallucis longus)
- S1 - Ankle plantar flexion (gastrocsoleus complex)

Sensory testing is performed at the following levels:

- C2 - Occipital protuberance

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- C3 - Supraclavicular fossa
- C4 - Top of the acromioclavicular joint
- C5 - Lateral side of antecubital fossa
- C6 - Thumb
- C7 - Middle finger
- C8 - Little finger
- T1 - Medial side of antecubital fossa
- T2 - Apex of axilla
- T3 - Third intercostal space (IS)
- T4 - Fourth IS at nipple line
- T5 - Fifth IS (midway between T4 and T6)
- T6 - Sixth IS at the level of the xiphisternum
- T7 - Seventh IS (midway between T6 and T8)
- T8 - Eighth IS (midway between T6 and T10)
- T9 - Ninth IS (midway between T8 and T10)
- T10 - 10th IS or umbilicus
- T11 - 11th IS (midway between T10 and T12)
- T12 - Midpoint of inguinal ligament
- L1 - Half the distance between T12 and L2
- L2 - Midanterior thigh
- L3 - Medial femoral condyle
- L4 - Medial malleolus
- L5 - Dorsum of the foot at third metatarsophalangeal joint
- S1 - Lateral heel
- S2 - Popliteal fossa in the midline
- S3 - Ischial tuberosity
- S4-5 - Perianal area (taken as 1 level)

Sensory scoring is for light touch and pinprick, as follows:

- 0 - Absent
- 1 - Impaired or hyperesthesia
- 2 - Intact

Lower extremities motor score (LEMS) - Uses the ASIA key muscles in both lower extremities, with a total possible score of 50 (i.e., maximum score of 5 for each key muscle [L2, L3, L4, L5, and S1] per extremity). A LEMS of 20 or less indicates that the patient is likely to be a limited ambulator. A LEMS of 30 or more suggests that the individual is likely to be a community ambulator.

C1-C4 Tetraplegia (High Tetraplegia)

- Individuals with complete C1-C4 (high) tetraplegia have little or no movement of upper and lower extremity muscles. They have movement of the head and neck, as well as, possibly, shoulder elevation (shrug). Persons with an injury at the C4 level have innervation of the diaphragm (the primary muscle for respiratory

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inspiration). They should not need long-term ventilatory assistance, although it is not uncommon to receive ventilation initially after injury.

- Patients with C1-C3 injuries are likely to require long-term mechanical ventilatory support because of the loss of innervation to the diaphragm. These individuals may be candidates for FES of the phrenic nerve (or diaphragm) to reduce their need for mechanical ventilation, if their lower motor innervation to the diaphragm remains intact. Swallowing and phonation functions are preserved.
- Individuals with injuries at the C1-C4 level will likely (need to) depend on others for help with almost all of their mobility and self-care needs, although they may be able to use a power wheelchair with chin**,** head or pneumatic (sip and puff) controls. In the case of an incomplete C1-C4 level, if their elbow flexion and shoulder movement are suboptimal (muscle grade 2 or 3), a balanced forearm orthosis (BFO) or mobile arm support (MAS) may assist them with feeding and grooming activities. The use of a long bottle or straw can allow these individuals to drink independently.
- Patients should be able to communicate with caregivers (and provide direction) about their mobility needs, as well as about self-care and bladder and/or bowel care. Assistive technologies, such as electronic aids to daily activities (EADLs, previously referred to as environmental control units), may be accessed by using a mouth stick or switch or by employing voice activation. Assistive devices transmit signals by means of radio waves, infrared light, or ultrasonographic waves to facilitate an individual's control of his/her environment. In this way, the person can accomplish such tasks as answering phones, adjusting bed height, and controlling computers, lights, and televisions.
- Brain Control Interface (BCI) methods, using noninvasive electroencephalography (EEG), is being trialed in order to bridge the disconnection between the brain and muscle. With BCI, it is necessary to interpret brain activity and interface brain signals with a computer, and this may enable a person with tetraplegia to control a computer, operate devices such as an EADL, or control a power wheelchair. Individuals using BCI systems indicate it gives them an increased sense of independence and improves their quality of life. This technology needs further refinement before it can be clinically implemented.
- Patient will require a power seating system with tilt and/or recline to complete pressure relief independently to prevent decubitis ulcer formation.

C5 Tetraplegia

- Individuals with C5 tetraplegia have functional use of elbow flexion. With the help of specialized assistive devices (such as wrist or hand orthotics to allow them to hold objects), these persons can achieve independence in feeding and grooming. It is important to prevent contractures of elbow flexion and forearm supination caused by unopposed biceps activity. Patients with a C5 injury can assist with upper extremity dressing and bed mobility.
- For persons with C5 tetraplegia, a power wheelchair with hand controls will probably be required for most of their mobility needs, although a manual wheelchair with grip enhancements (rim projections) may be used for short-

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distance mobility on level surfaces. Patients require assistance for most other self-care (e.g., lower extremity dressing, bathing), for transfer mobility, and for bladder and/or bowel tasks.

- As with persons who have sustained injuries at higher cervical levels than this one, assistive technology (e.g., EADLs) can play an important role in maximizing the individual's control of his/her environment, helping the patient to adjust bed height, answer phones, and use computers, lights, and televisions. Patients will also require a power seating system to complete pressure relief independently. Driving a specially modified or adapted van is possible.

C6 Tetraplegia

- Individuals with C6 tetraplegia have the added function of wrist extension. This permits tenodesis, or passive thumb adduction on the index finger during active wrist extension, which assists with grasp and release. A wrist-hand orthosis (tenodesis splint) can be used to facilitate these abilities. The patient should avoid overstretching the finger flexors **especially with wrist extension**, which limits the tenodesis action.
- C6 is the highest level at which patients can have a complete injury and still function independently without the aid of an attendant, although this situation is not common. Individuals with injuries at this level can achieve functional independence in terms of feeding, grooming, bathing, and bed mobility- **assistive devices may be required to increase independence**. They can dress their upper body and assist with lower-body dressing, as well as with the bladder and bowel program. **Although they usually require assistance, persons with C6 tetraplegia may become independent in performing transfers from a bed to a chair, possibly with the use of a slide board, For men, intermittent catheterization for bladder care may be possible with set-up and assistive devices, although this is not common. For women it is technically more difficult than for men causing them to require more assistance.**[14]
- Manual wheelchairs with enhancement for gripping the wheel rims may be used for community mobility, although patients may prefer a power chair**.***Must be able to complete pressure relief independently to be able to use a manual W/C. So it may not just be that they prefer it-may be needed to perserve skin integrity**** Driving a vehicle with adaptations, such as a custom lift and hand controls, is an option. Patients with C6 injuries can be independent in using a phone, turning pages, and writing and typing (with assistive devices).

C7 Tetraplegia

- Individuals with C7 tetraplegia have the functional ability to extend their elbow, which greatly enhances their mobility and self-care skills. C7 is usually the highest level at which patients can have an injury and still be able to live independently. They may achieve independence in feeding, upper extremity dressing, bathing, bed mobility, transfers (although they may require assistance with moving over uneven surfaces), and manual wheelchair propulsion in the community (with the exception of going over curbs).

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- With the use of assistive devices, patients may also become independent with regard to grooming, lower extremity dressing, and bowel care. Individuals with a C7 injury, especially women, may need help with bladder care (eg, intermittent catheterization). Patients may be able to independently drive an adapted van or a car that has been adapted with hand controls. Patients with C7 tetraplegia can be independent, with or without assistive devices, in writing, typing, turning pages, answering phones, and using computers.

C8 Tetraplegia

- Individuals with C8 tetraplegia have functional finger flexion, which improves their independence in terms of hand grasp and release. They can achieve independence in feeding, grooming, upper and lower extremity dressing, bathing, bed-mobility transfers, manual wheelchair propulsion, and bladder and bowel care, as well as in typing, writing, answering phones, and using computers. These persons can also drive independently using an adapted van or a car that has been adapted with hand controls.

Thoracic Paraplegia

- Individuals with T1-T12 paraplegia have innervation and function of all upper extremity muscles, including those for hand function. They can achieve functional independence in self-care (including light housekeeping and meal preparation), in bladder and bowel skills, and, at the wheelchair level, in all mobility needs. Individuals should receive advanced wheelchair training so that they can move over uneven surfaces, rough terrain, and ramps and curbs, as well as do "wheelies" and make transfers from the floor to the wheelchair. Like patients with an injury to the low cervical levels, persons with thoracic paraplegia can drive independently by using an adapted van or a car adapted with hand controls.
- Individuals with a T2-T9 injury have variable trunk control (of the paraspinal and abdominal muscles), and they may be able to stand by using bilateral knee-ankle-foot orthoses (KAFOs) along with a walker or crutches. Persons with a T10-T12 injury have better trunk control than do patients with a higher injury, and they may be able to walk household distances independently with KAFOs and assistive devices; they may even attempt to walk up and down stairs. Unfortunately, these maneuvers can require extreme energy expenditure, and many individuals may prefer wheelchair mobility.

Lumbar Paraplegia

- Individuals with lumbar or sacral paraplegia can achieve functional independence for all mobility, self-care, and bladder and bowel skills. Advanced wheelchair training (as mentioned above) should be undertaken.
- Patients with this injury can drive independently by using a car adapted with hand controls. In addition, individuals with an injury at the lumbar level can become functionally independent in terms of household and community ambulation, which is often defined as unassisted ambulation for distances of greater than 150 feet, with or without the use of braces and assistive devices. Orthotic devices (KAFOs and ankle-foot orthoses [AFOs]) are often prescribed to assist patients with lower

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extremity standing and walking. Full- or part-time use of a manual wheelchair is often necessary. Paraplegics should be able to load a rigid light weight wheelchair into a care independently.

SCI Clinical Syndromes

The prognosis for enhanced functional outcomes is most favorable for patients with incomplete spinal cord injury (SCI).

Central cord syndrome

Central cord syndrome, which is a relatively common cervical incomplete injury, is characterized more by weakness of the upper extremities (especially of the hands) than of the lower extremities. Individuals with central cord syndrome may also have sensory and bladder dysfunction. This syndrome is frequently seen in elderly individuals with degenerative spinal stenosis and is associated with hyperextension injuries.

In general, patients with central cord syndrome have a favorable prognosis for functional ability in ADLs, bladder and bowel control, and ambulation. Residual upper extremity weakness may persist and can affect basic self-care. Moreover, the patient may need to use assistive devices for ambulation. Favorable prognostic factors are age younger than 50 years (at the time of injury), good initial hand or lower extremity motor score, education, decreased comorbidities, decreased spasticity, and rapid early improvement.

Brown-Sequard syndrome

Often attributed to spinal cord hemisection, Brown-Séquard syndrome is characterized by relative ipsilateral paresis, along with proprioception and/or vibratory loss and contralateral loss of pain or temperature sensation below the level of injury. The prognosis for functional independence in ADLs and ambulation, as well as for bladder and bowel continence, is good.

Anterior cord syndrome

Anterior cord syndrome, which is characterized by a variable loss of motor and pinprick sensation, has relatively little effect on proprioception and vibration. Lesions result from damage to the anterior two thirds of the spinal cord, but the posterior columns are spared. In comparison with the other 5 syndromes discussed here, the prognosis for neurologic recovery in anterior cord syndrome is diminished. Functional outcomes in terms of ADLs and mobility depend on the level of injury.

Posterior cord syndrome

The least common of the SCI clinical syndromes, posterior cord syndrome results from a selective injury to the posterior columns in the spinal cord, leading to a loss of proprioception and vibration sensation below the level of injury. Motor strength, as well as pain and temperature sensation, is relatively spared. Functional outcomes for mobility and self-care, as well as for bladder and bowel continence, are good, although individuals may require the use of assistive devices (walker, cane) for ambulation.

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Conus medullaris syndrome

Conus medullaris syndrome is characterized by injury to the sacral cord and to the lumbosacral nerve roots. The result is symmetrical and (often) complete saddle anesthesia, bladder and bowel dysfunction, and lower-extremity motor weakness. The functional prognosis for mobility and ADLs is good, although bladder or bowel function is less likely than in other conditions, and neurologic recovery is limited.

Cauda equina syndrome

Because cauda equina syndrome is characterized by injury to the lumbosacral nerve root, it is not truly an SCI. It causes saddle anesthesia, bladder and bowel dysfunction, and variable motor weakness of the lower extremity. Cauda equina syndrome is often less complete and symmetrical than is conus medullaris injury. Because axons of the peripheral nerve root can regenerate (unlike spinal cord axons) and because these injuries are often incomplete, neurologic recovery may continue for many months or years. The functional prognosis for mobility and self-care skills is good, although bladder and bowel continence vary.

Functional Outcome Measures

Several functional outcome measures are reliable and valid for use in SCI. Outcome measures need to be standardized and validated so that clinicians know how to perform them, are clear on their measuring characteristics, and are capable of providing information about clinically meaningful outcome changes. A common scale for the measurement of functional ability is the Functional Independence Measure (FIM), which uses a 7-point scale to measure 18 items in the following 6 categories:

- Mobility
- Locomotion
- Self-care
- Continence of the bowel and/or bladder
- Communication
- Social cognition

On the FIM scale, a score of 1 indicates total dependence on a caregiver, and a score of 7 indicates independence. Numbers between 1 and 7 represent different levels of assistance required from a caregiver or assistive device to perform a specific skill. Additional functional assessment scales are as follows:

- Quadriplegic Index of Function (QIF) - Designed to detect small, but clinically relevant, changes in individuals with tetraplegia, in 9 categories of activities of daily living (ADL)
- Modified Barthel Index (MBI) - A 15-item assessment of self-care and mobility skills
- Walking Index for SCI (WISCI and WISCI II) - A scale that has demonstrated validity and responsiveness to change in neurologic/walking function after SCI
- Capabilities of Upper Extremity Instrument (CUE) - A 32-item measure for assessing upper extremity function with tetraplegia

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- Spinal Cord Independence Measure (SCIM) - Designed as an alternative to the FIM to assess 16 categories of self-care, mobility, and respiratory and sphincteric function
- Canadian Occupational Performance Measure (COPM) - Used to assess outcomes in the area of self-care, productivity, and leisure
- Grasp and Release Test (GRT) - Designed to assess hand function in people with C6-7 level injuries
- Six-Minute Walk Test (6MWT) - Measures the distance a patient can walk on a flat, hard surface in 6 minutes
- Ten-Meter Walking Test (10MWT) - Assesses short duration walking speed

Differential Diagnosis

- Aortic Dissection
- Epidural and Subdural Infections
- Hanging Injuries and Strangulation
- Neck Trauma
- Spinal Cord Infections
- Syphilis
- Transverse myelitis
- Acute intervertebral disk herniation
- Extradural spinal cord compression.

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Requirements for Physical/Occupational Therapy Visits

1. The patient's condition must indicate a potential for rehabilitation.
2. It must be reasonable to expect significant functional improvement, in light of the patient's condition, at the start of the outpatient rehabilitation program.
3. The patient must not have a significant psychological diagnosis that would hinder his ability to benefit from the program.
4. Comorbidities must not affect the patient's ability to participate and benefit from therapy (e.g., pain must be controlled, etc.). and must not put other patients or staff at risk (e.g., infectious disease)
5. The patient must exhibit at least two of the following impairments:
   - Mobility Impairment (including inability to transfer safely, inability to operate a wheelchair, etc.).
   - Activities of Daily Living Impairment (may include bathing, grooming, dressing, feeding, and toileting).
   - Spasticity Control Problems
   - Risk of Decubitus ulcer formation associated with sensory deficit.
   - Perceptual impairment sufficient to limit safety or reasonable function.

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Treatment Methods

The objectives of rehabilitation after an individual has sustained an acute spinal cord injury (SCI) include maximizing the patient's medical, functional, and psychosocial outcomes, with functional outcomes being tied to the level of the individual's SCI. Providing education to the patient and his/her family is also essential. Rehabilitation should begin as soon as possible after injury in order to optimize outcomes and reduce complications.

Functional outcomes may vary by individual, depending on such factors as the level and completeness of the injury, neurologic recovery (or loss), associated medical complications (pain, spasticity, contractures, cardiac disease, musculoskeletal injury), the amount of rehabilitation training that the patient receives, and the rehabilitation team's level of expertise, as well as the patient's motivation, age, and family and financial resources.

The use of orthotics and assistive devices (some of which are mentioned below) can sometimes facilitate the patient's functional abilities. Advances in surgical reconstruction and functional electrical stimulation (FES) also may enhance the patients' functional abilities.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.

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- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.

Referral Guidelines

Refer patient to their primary care provider to explore alternative treatment options when you find:

- Severe depression
- Skin breakdown
- Severe orthostatic hypotension

Appropriate Procedures/Modalities

A spinal cord injury (SCI) at the cervical level results in tetraplegia, the loss of hand and upper limb function with impairment or loss of motor and/or sensory function. In incomplete spinal cord injuries, some neural transmissions can still pass through the spinal cord but it is often fragmentary or distorted which leads to additional neurological complications such as chronic pain or spasticity. Tetraplegia results in impairment of function in the arms as well as in the trunk, legs and pelvic organs. Individuals with tetraplegia rely on the use of their hands and upper limbs in order to complete basic activities of daily living such as self-feeding, dressing, bathing and toileting. Mobility needs such as transfers from surface to surface, transitional movements such as rolling, bridging and sit to lying down, crutch walking and wheeled mobility is also completed by using their arms (Snoek et al. 2004). The level at which the injury or lesion occurs and the completeness of the lesion (incomplete or complete) indicate the level of independence of the person (Ditunno1999).

The main focus in rehabilitation of the spinal cord injured person is compensation of functional loss and using those parts of the sensorimotor system, which are still intact (van Truijl et al.2002). Research findings regarding neuroplasticity and neurological recovery of the spinal cord also include current rehabilitation practices that should focus on strategies to restore functional lost after SCI.

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Upper Extremity Rehabilitation

- There is level 1 evidence based on one retrospective clinical trial that physical capacity continues to improve after 1- year post discharge.
- There is level 2 evidence based on one pre/post study that neuromuscular stimulation-assisted ergometer alone and in conjunction with voluntary arm crank exercise was an effective strengthening intervention for chronically injured individuals.
- There is level 2 evidence based on one study that muscle strength continues to improve up to 15 months post hospital discharge for both tetraplegic and paraplegic individuals.
- There is level 4 evidence based on one study that neuromuscular stimulation-assisted exercise improves muscle strength over conventional therapy.
- There is level 1 evidence (from 2 RCTs) that augmented feedback is not effective in improving upper limb function in tetraplegia.
- The use of neuroprostheses appears to have a positive impact on pinch and grip strength and ADL functions in C5-C6 complete tetraplegia, however, access to the devices are limited and continue to be expensive in use.
- There is level 1 evidence from one RCT that showed that massed practice (repetitive activity) and somatosensory stimulation (median nerve stimulation) demonstrated significant improvement in grip and pinch strength required for functional activity use.
- There is level 2 evidence from one RCT that showed that the use of concomitant auricular and electrical acupuncture therapy may improve the neurological and functional recovery of acutely injured spinal cord individuals.
- There is level 2 evidence based on one RCT that wearing a thumb opponens splint will improve pinch strength and functional use of the hand.
- There is level 1 evidence based on two RCTs that a shoulder exercise and stretching protocol reduces the intensity of shoulder pain post SCI.
- There is level 2 evidence that general acupuncture is no more effective than Trager therapy in reducing post-SCI upper limb pain.
- There is level 4 evidence from multiple studies that support the use of reconstructive surgery for the tetraplegic upper limb for the improvement of ADL and quality of life.
- There is level 4 evidence from multiple studies that support the use of neuroprostheses for persons with C5-C6 complete tetraplegia in the improvement of pinch and grip strength and ADL functioning. However, many devices are only available in clinical trials in specialized rehabilitation centers and the overall cost of the device continues to be expensive.

Lower Extremity Rehabilitation

- Patterned Electrical Stimulation (PES) programs are beneficial in preventing and restoring lower limb muscle atrophy as well as improving lower limb muscle strength and endurance.

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- Functional Electrical Stimulation (FES)-assisted exercise programs are beneficial in preventing and restoring lower limb muscle atrophy as well as improving lower limb muscle strength and endurance.
- For patients less than 6 months post-SCI, body weight supported treadmill training has equivalent effects on gait outcomes to conventional rehabilitation consisting of over-ground mobility practice. .Body weight-support gait training strategies can improve gait outcomes in chronic, incomplete SCI, but no body weight-support strategy (over-ground, treadmill, with FES) is more effective.
- FES-assisted walking can enable walking or enhance walking speed in incomplete SCI or complete (T4-T11) SCI. Regular use of FES in gait training or activities of daily living can lead to improvement in walking even when the stimulator is not in use.
- There is limited evidence that bracing alone does not enable significant gains in functional ambulation for people with complete SCI. The advantages of bracing appear largely restricted to the general health and well-being benefits related to practice of standing and the ability to ambulate short-distances in the home or indoor settings. The benefits of bracing-alone on functional ambulation are primarily with people with incomplete spinal lesions.
- There is limited evidence that a combined approach of bracing and FES results in additional benefit to functional ambulation in paraplegic patients with complete SCI. Locomotor training programs are beneficial in improving lower limb muscle strength although in acute SCI similar strength benefits can be obtained with conventional rehabilitation. The real benefit of locomotor training on muscle strength may be realized when it is combined with conventional therapy. This should be further explored in acute, incomplete SCI where better functional outcomes may be realized with the combination of therapies.

Home and Self-Care Techniques

The patient/caregiver can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Wheelchair
- Orthotics
- Assistive gait device
- Hospital bed and shower chair/drop arm commode

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Heat packs

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Psychologist

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- Social Worker
- Case Manager
- Physician
- Medication

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Orthopedic – Cervical Disc-Radicular

Cervical, Brachial Neuritis or Radiculitis

Synonyms

- Lateral recess entrapment of cervical nerve root
- Cervical radiculopathy due to spinal stenosis

Definition

Neurogenic pain following the distribution of one, or less commonly, more than one cervical nerve root(s). Pain may be accompanied by upper extremity numbness, weakness, or hyporeflexia, and may be due to cervical disc herniation (younger patients), or foraminal encroachment or spinal stenosis (older patients).

Patient History

Patient history may include:

- Data about the patient's environment and symptoms that are indicators of the diagnosis;
- Specific considerations that must be dealt with immediately;
- Patient's current condition; and
- Subjective complaints that are often associated with the diagnosis in question.

Patient Data

- General demographics
- Occupation/employment
- Hand dominance
- Living environment
- History of current condition
- Functional status and activity level (prior level of function)
- Medications
- Other tests and measurements (laboratory and diagnostic tests)
- Past history (including history of prior therapy and response to prior treatment)

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Direct trauma to the head with loss of consciousness LOC)	Subdural hematoma; epidural hematoma; fracture
Nuchal rigidity, and/or positive Brudzinskis, or Kernigs sign	Subarachnoid hemorrhage; meningitis
Bladder dysfunction associated with onset of neck pain	Myelopathy; spinal cord injury
Associated dysphasia	Cerebrovascular Accident
Associated cranial nerve, or central nervous system (CNS) signs/symptoms	Tumor; intracranial hematoma
Onset of a new headache	Tumor; infection; vascular cause (older patients, also consider temporal arteritis; glaucoma)
Co-morbidities of rheumatoid arthritis, seronegative arthritides, Down syndrome	Atlantoaxial instability due to associated transverse ligament laxity
Cancer	Cause of symptoms (metastatic or primary)
Alcoholism, drug abuse	Side effect or withdrawal phenomenon
Immune-compromised state	Infection

Patient Presentation

Patient may report trauma or insidious onset. Incidence of disc herniation in patients over age 40 decreases due to dehydration of the nucleus pulposus.

Subjective Findings

- Pain, numbness, tingling, paresthesias in upper extremity following cervical nerve root distribution, particularly with hyperextension and rotation.
- Weakness in upper extremity, such as with grip strength.
- Lack of upper extremity coordination and difficulty with fine manipulation tasks, including handwriting, may be reported.
- Midline disc protrusions may involve both extremities.
- Better with rest.
- Relief from placing hand on top of head, which decreases tension on the irritated cervical nerve.
- Headaches and neck pain, which accompany upper extremity pain.

Objective Findings

Objective findings may include:

Scope of Examination

Examine neuromusculoskeletal system for possible causes, or contributing factors to the neck pain.

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Note: Diseases that may refer pain to the cervical spine include: brain lesions, CAD, dental disease, esophageal disease, upper airway disease, lymphadenopathy.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection—spine, shoulder, elbow, wrist
- Palpation of bony and soft tissue
  - Lateral portions of the cervical spine and spinous process
  - Thoracic spine
  - Glenohumeral Joint
  - Elbow
  - Wrist
- Range of motion in all planes (active, active movements with overpressure, and passive)
  - Cervical spine
  - Thoracic spine
  - Glenohumeral Joint
  - Elbow
  - Wrist
- Motion palpation of spine
- Manual muscle testing
- Orthopedic testing—spine, shoulder, elbow, wrist
  - Phalen's test
  - Tinel's test
  - Thoracic Outlet Test
  - Spurlings test (foraminal compression)
  - Nerve root tension (shoulder depression)
  - Distraction Test
  - Brachial Plexus Tension or Elvey Test
  - Scalene Cramp Test (Thoracic Outlet Symptoms)
- Neurologic testing
  - Myotome Test (C5-T1)
  - Dermatomal Sensation Test (C4-T1)
  - Deep Tendon Reflexes-Biceps C5, Triceps C6, Brachioradialis C7
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
  - Neck Disability Index
  - McGill Pain Questionnaire
  - Patient Specific Functional Scale

Findings of Cervical Radiculitis

- Cervical ROM restrictions may be present, may be a loss of cervical lordosis
- Muscle spasms in corresponding myotomes or paravertebral muscles

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- Nerve root tension signs (shoulder depression) are typically positive but may be absent in cases involving a free fragment of disc tissue
- Foraminal compression may cause radiating upper extremity pain
- Extension with rotation of cervical spine may cause shoulder or arm pain
- Dejerine's triad may be positive
- Dural tension signs
- Extremities symptoms and findings, if present, follow nerve root pattern
- Sensory abnormalities in dermatome
- Loss of reflex
- Motor power weakness of upper extremity (particularly the hand)
- Decreased upper extremity girth may be present (Muscle atrophy)

Differential Diagnoses

- Adhesive capsulitis of shoulder with referred cervical pain (restricted active and passive shoulder motion)
- Cervical nerve root compression
- Demyelinating conditions (symptoms, intensity and location vary)
- Multiple sclerosis
- Metastatic Ca
- Myelopathy (trunk or leg dysfunction, gait disturbance, bowel or bladder dysfunction, signs of upper motor neuron involvement)
- Myocardial ischemia (refer for evaluation if suspected)
- Peripheral nerve entrapment (Phalen's test, Tinel's test at elbow and wrist)
- Rotator cuff disorder with referred cervical pain (significant pain with shoulder circumduction motions)
- Thoracic outlet syndrome (positive TOS orthopedic test)
- TIA/CVA
- Signs of upper motor neuron involvement (clonus, hyperreflexia, Babinski reflex) may suggest compression of spinal cord, which should be evaluated medically

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist

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of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based

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on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

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1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to Maximal Complex Motion Necessary for Functional Activities)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

- Depending on evaluation findings, you may use modalities to address pain.
- If there are muscle spasms present, modalities and/or soft tissue mobilization would be indicated.
- Other manual techniques such as cervical manual traction or joint mobilization may also be indicated.
- Patient should be progressed to cervical stabilization exercises and flexibility exercises, and provided with postural instruction and exercises. Cervical mechanical traction may be helpful.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be

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deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:
- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of upper extremity occurs
- Signs of demyelinating condition, tumor or infection
- Increased neurologic signs/symptoms: increased UE numbness/tingling, increasing UE weakness, increasing UE pain, decreasing UE reflexes

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists procedures for **Acute Phase** presentation.

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Decreased pain and muscle spasm	▪ Modalities are only used in the acute phase; deep heating modalities should be avoided in the acute phase as they augment inflammation and may exacerbate radicular pain and nerve root injury. ▪ Mechanical/Manual Traction ▪ Soft Tissue and Connective Tissue mobilization
Improvement in cervical and upper extremity range of motion and strength	▪ Joint/segmental mobilization ▪ Flexibility exercises ▪ Cervical spine stabilization exercises
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Teach home exercise program ▪ Gradual tolerance of activities and positions ▪ Self-management of symptoms

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The following table lists procedures for **Subacute Phase** presentation.
Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Expected Outcome	Procedures/Modalities Such As
Decreased pain and muscle spasm	▪ Modalities should be used sparingly on an as needed basis ▪ Mechanical/Manual Traction ▪ Soft Tissue and Connective Tissue mobilization
Improvement in cervical and upper extremity range of motion and strength	▪ Joint/segmental mobilization ▪ Flexibility exercises ▪ Strengthening exercises ▪ Endurance training for neck and upper extremity ▪ Cervical spine stabilization exercises
Improvement in body mechanics and postural stabilization	▪ Body mechanics training ▪ Postural stabilization activities ▪ Postural Control
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual tolerance of activities and positions ▪ Self-management of symptoms ▪ Teach home exercise program

The following table lists procedures for **Corrective/Rehabilitative Phase** presentation.

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Decrease referred symptoms	▪ Mechanical/Manual Traction ▪ Soft Tissue and Connective Tissue mobilization
Improvement in cervical range of motion	▪ Joint/segmental mobilization ▪ Flexibility exercises
Improvement in cervical and upper extremity Strength	▪ Strengthening exercises-Active, isometric, isotonic ▪ Endurance training for neck and

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	upper extremity ▪ Cervical spine stabilization exercises
Improvement in body mechanics and postural stabilization	▪ Body mechanics training ▪ Postural stabilization activities ▪ Postural Control
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual tolerance of activities and positions ▪ Self-management of symptoms ▪ Teach home exercise program ▪ Functional training

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cervical traction
- Hot packs/cold packs

Self-Care Techniques

- Postural advice, postural exercises
- Cervical isometric exercises, cervical stabilization exercises, flexibility exercises
- Aerobic conditioning
- Cold/heat applications, if needed, to relieve discomfort/stiffness
- Brief use of cervical collar, if necessary, in the acute stages to limit motion

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic Manipulation
- Chiropractic
- Physiatry
- Medication

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Cervical, Intervertebral Disc Syndrome

Synonyms

- Cervical disc herniation
- Herniated nucleus pulposus in cervical spine

Definition

Cervical disc pathology that results in nerve root irritation. Pain follows the distribution of one, or less commonly, more than one cervical nerve root. Pain may be accompanied by numbness, weakness, or hyporeflexia.

Patient History

Patient history may include:

Patient Data

- General demographics
- Occupation/employment
- Hand dominance
- Living environment
- History of current condition
- Functional status and activity level (prior level of function)
- Medications
- Other tests and measurements (laboratory and diagnostic tests)
- Past history (including history of prior therapy and response to prior treatment)

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Direct trauma to the head with loss of consciousness (LOC)	Subdural hematoma; epidural hematoma; fracture
Nuchal rigidity and/or positive Brudzinskis, or Kernigs sign	Subarachnoid hemorrhage; meningitis
Bladder dysfunction associated with onset of neck pain	Myelopathy; spinal cord injury
Associated dysphasia	Cerebrovascular accident
Associated cranial nerve or central nervous system (CNS) signs/symptoms	Tumor; intracranial hematoma
New onset headache	Tumor; infection; vascular cause (older

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	patients, also consider temporal arteritis; glaucoma)
Co-morbidities of rheumatoid arthritis, seronegative arthritides, Down syndrome	Atlantoaxial instability due to associated transverse ligament laxity
Cancer	Cause of symptoms (metastatic or primary)
Alcoholism, drug abuse	Side effect, or withdrawal phenomenon
Immune-compromised state	Infection

Patient Presentation

Patient is typically between the ages of 25-50. Chance of disc herniation after age 40 decreases as the nucleus pulposus dehydrates. There is often a history of trauma involving extremes of extension, flexion, and/or rotation of the neck. No aggravating event in 50% of patients.

Subjective Findings

- Pain and stiffness in the neck—often associated with numbness or pain that may reach to the distal ends of upper extremity
- Weakness in upper extremity, such as with grip strength
- Lack of upper extremity coordination and difficulty with fine manipulation tasks, including handwriting, may be reported
- Upper extremity symptoms may predominate
- Midline disc protrusions may involve both extremities
- Better with rest
- Placing hand on top of head may provide relief by decreasing tension on irritated cervical nerve(C5-C6, Bakody's sign)
- Headaches may accompany pain

Objective Findings

Objective findings may include:

Scope of Examination

Examine the neuromusculoskeletal system for possible causes, or contributing factors to the neck pain.

Note: Diseases that may refer pain to the cervical spine include: brain lesions, CAD, dental disease, esophageal disease, upper airway disease, lymphadenopathy.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
- Palpation of bony and soft tissue

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    - Lateral portions of the cervical spine and spinous process
    - Thoracic spine
    - Glenohumeral Joint
- Range of motion in all planes (active, active with overpressure, passive, and resisted movements)
    - Cervical spine
    - Thoracic spine
    - Glenohumeral Joint
- Motion palpation of spine
- Orthopedic testing—spine, shoulder, elbow, wrist
    - Phalen's test
    - Tinel's test
    - Thoracic Outlet Test
    - Spurlings test (foraminal compression)
    - Nerve root tension (shoulder depression)
    - Distraction Test
    - Brachial Plexus Tension or Elvey Test
    - Scalene Cramp Test (Thoracic Outlet Symptoms)
- Neurologic testing
    - Myotome Test (C5-T1)
    - Dermatomal Sensation Test (C4-T1)
    - Deep Tendon Reflexes-Biceps C5, Triceps C6, Brachioradialis C7
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
    - Neck Disability Index
    - McGill Pain Questionnaire
    - Patient Specific Functional Scale

Findings of Cervical Intervertebral Disc Syndrome

- Often antalgic so as to minimize symptoms
- ROM restrictions (Rotation and Lateral Flexion)
- Nerve root tension signs (shoulder depression) are typically positive but may be absent in cases involving a free fragment of disc tissue
- Foraminal compression may cause radiating upper extremity pain
- Extension with rotation of cervical spine may cause shoulder or arm pain
- Dejerine's triad may be positive
- Dural tension signs
- Forward Head Posture
- Hypertrophy of anterior neck musculature
- Hypermobility of C4-C5
- Extremity symptoms and findings, if present, follow a nerve root pattern:
    - Sensory abnormalities in dermatome
    - Loss of reflex
    - Motor power weakness of upper extremity
    - Decreased upper extremity girth may be present

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Differential Diagnoses

- Myocardial ischemia (refer for evaluation if suspected).
- Thoracic outlet syndrome (positive TOS orthopedic test)
- Peripheral nerve entrapment (Phalen's test, Tinel's test at elbow and wrist)
- Adhesive capsulitis of shoulder with referred cervical pain ¶ (restricted active and passive shoulder motion)
- Rotator cuff disorder with referred cervical pain (significant pain with shoulder circumduction motions)
- Signs of upper motor neuron involvement (clonus, hyperreflexia, Babinskis reflex) may suggest compression of spinal cord that should be evaluated medically.

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the

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condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

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Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

- Depending on the pain level, modalities to address pain may be utilized.

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- If there is muscular spasm present, soft tissue mobilization would be indicated.
- Patient should be progressed to cervical stabilization exercises and flexibility exercises, and provided with postural instruction and exercises.
- Cervical traction (manual or mechanical) may be utilized to decrease pain and peripheral symptoms.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer back to referring physician if there are increasing neurologic signs: increasing UE numbness/tingling, increasing UE weakness, increasing UE pain and/or decreasing UE reflexes.

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The table below lists procedures for **Acute Phase** presentation.
Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency

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of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Decrease pain and muscle spasm	▪ Physical modalities are only used in the acute phase; deep heating modalities should be avoided in the acute phase as they augment inflammation and may exacerbate radicular pain and nerve root injury. ▪ Mechanical Traction in extension
Decrease muscle spasms	▪ Soft tissue mobilization
Improve cervical range of motion and strength	▪ For most cervical disc disorders, studies support conservative treatment, such as the McKenzie approach and cervicothoracic stabilization programs which includes cervical spine flexibility exercises, postural correction and strengthening, combined with aerobic conditioning.
Patient education and home exercise program	▪ Avoid flexion ▪ Use of soft collar for the first few days ▪ Remain as active as possible ▪ Teach home management program

The table below lists procedures for **Subacute Phase** presentation.
Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Expected Outcome	Procedures/Modalities Such As
Decrease pain and muscle spasm	▪ Modalities should be used sparingly on an as needed basis
Restore flexibility, strength and body mechanics of the cervical joint	▪ Studies support conservative treatment, such as the McKenzie approach and cervicothoracic stabilization programs which includes cervical spine flexibility exercises, postural correction and strengthening, combined with aerobic conditioning.
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual tolerance of activities and positions ▪ Self-management of symptoms ▪ Functional training ▪ Teach home exercise program

The table below lists procedures for **Corrective/Rehabilitative Phase** presentation.

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Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Restore flexibility, strength and body mechanics	▪ Studies support conservative treatment, such as the McKenzie approach and cervicothoracic stabilization programs which includes cervical spine flexibility exercises, postural correction and strengthening, combined with aerobic conditioning.
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual tolerance of activities and positions ▪ Self-management of symptoms ▪ Functional training ▪ Teach home exercise program

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence

Home Medical Equipment

- Use of a cervical pillow while sleeping may be helpful
- Use of a cervical collar
- Theraband for therapeutic exercises
- Cervical traction unit
- Hot packs/cold packs
- Home electrical stimulation unit
- Gymball

Self-Care Techniques

- Postural advice/postural exercises
- Cervical isometric exercises, cervical stabilization exercises, stretching exercises
- Aerobic conditioning
- Cold/heat applications, if needed, to relieve discomfort/stiffness
- Use of cervical pillow, if helpful

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- Brief use of cervical collar, if necessary, in the acute stages to limit motion
- Home cervical traction

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Physiatry
- Medication

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Cervical, Post-Surgical Syndrome

Post ORIF Syndrome

Post Fusion Syndrome

Post Discectomy Syndrome

Post Laminectomy Syndrome

Synonym

Failed Spinal Surgery Syndrome

Definition

Post-surgical course, in which patient continues to show abnormal findings for strength, ROM, and pain with referral to upper back, shoulder, arm, and/or hand. Patient may also have altered reflexes and sensation. Because multiple factors can contribute to this syndrome, patients are considered to be suffering from a chronic pain syndrome. It is recommended that patients be treated by a multidisciplinary team including at least an MD/anesthesiologist, physical therapist, occupational therapist and psychologist to help manage the rehabilitation.

Patient History

Patient history may include:

Patient Data

In addition to the standard information gathered, a complete understanding of the surgical procedure performed should be obtained from surgeon.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever, focal redness	Infection
Direct trauma to the head with loss of consciousness (LOC)	Subdural hematoma; epidural hematoma; fracture
Nuchal rigidity, and/or positive Brudzinskis, or Kernigs sign	Subarachnoid hemorrhage; meningitis
Bladder dysfunction associated with	Myelopathy; spinal cord injury

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onset of neck pain	
Associated dysphasia; unilateral weakness	Cerebrovascular accident
Associated cranial nerve or central nervous system (CNS) signs/symptoms	Tumor; intracranial hematoma
Onset of a new headache	Tumor; infection; vascular cause (older patients, also consider temporal arteritis; glaucoma)
Co-morbidities of rheumatoid arthritis, seronegative arthritides, Down syndrome	Atlantoaxial instability due to associated transverse ligament laxity
Cancer	Cause of symptoms (metastatic or primary)
Alcoholism, drug abuse	Side effect or withdrawal phenomenon
Immune-compromised state	Infection

Presentation

Patient presents with continued signs and symptoms post operatively. There may be surgery specific precautions that vary by surgeon.

Subjective Findings

- Pain, numbness, tingling, paresthesias in upper extremity following cervical nerve root distribution
- May complain of weakness in upper extremity, such as with grip strength
- May complain of difficulty with fine manipulation tasks, including handwriting, may be reported
- Headaches and neck pain may accompany upper extremity pain

Objective Findings

Objective findings may include:

Scope of Examination

Examine the neuromusculoskeletal system for possible causes, or contributing factors to neck pain.

Note: Diseases that may refer pain to the cervical spine include: brain lesions, CAD, dental or oral diseases, esophageal disease, upper airway disease, lymphadenopathy.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection—spine, shoulder, elbow, wrist
  - Gait Analysis
- Palpation of bony and soft tissue—spine, shoulder, elbow, wrist

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    - Lateral portions of the cervical spine and spinous process
    - Thoracic spine
    - Glenohumeral Joint
    - Elbow
    - Wrist
- Range of motion in all planes (active, active with overpressure, and passive)
    - Cervical spine
    - Thoracic spine
    - Glenohumeral Joint
    - Elbow
    - Wrist
- Motion palpation of spine
- Manual muscle testing
- Orthopedic testing
    - Phalen's test
    - Tinel's test
    - Thoracic Outlet Test
    - Spurlings test (foraminal compression)
    - Nerve root tension (shoulder depression)
    - Distraction Test
    - Brachial Plexus Tension or Elvey Test
    - Scalene Cramp Test (Thoracic Outlet Symptoms)
- Neurologic testing
    - Lhermitte’s Sign (upper motor neuron lesion)
    - Myotome Test (C5-T1; L2-S1)
    - Dermatomal Sensation Test (C4-T1)
    - Babinski (upper motor neuron lesion)
    - Deep Tendon Reflexes-Biceps C5, Triceps C6, Brachioradialis C7
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
    - McGill Pain Questionnaire
    - Neck Pain and Disability Index
    - Patient Specific Functional Scale

Findings of Cervical Examination

- Cervical ROM restrictions may be present
- Muscle spasms in corresponding myotomes
- Nerve root tension signs (shoulder depression) are typically positive but may be absent in cases involving a free fragment of disc tissue
- Foraminal compression may cause radiating upper extremity pain
- Extension with rotation of cervical spine may cause shoulder or arm pain
- Dejerine's triad may be positive
- Dural tension signs
- Extremities symptoms and findings, if present, follow nerve root pattern
- Sensory abnormalities in dermatome
- Loss of reflex

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- Motor power weakness of upper extremity
- Decreased upper extremity girth may be present

Differential Diagnoses

- Myocardial ischemia (refer for evaluation if suspected)
- Demyelinating conditions (symptoms, intensity and location vary)
- Myelopathy (trunk or leg dysfunction, gait disturbance, bowel or bladder dysfunction, signs of upper motor neuron involvement)
- Thoracic outlet syndrome (positive TOS orthopedic test)
- Peripheral nerve entrapment (Phalen's test, Tinel's test at elbow and wrist)
- Adhesive capsulitis of shoulder with referred cervical pain (restricted active and passive shoulder motion)
- Rotator cuff disorder with referred cervical pain (significant pain with shoulder circumduction motions)
- Signs of upper motor neuron involvement (clonus, hyperreflexia, Babinski reflex) may suggest compression of spinal cord, which should be evaluated medically.

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Therapy must show measurable functional progress.

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Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom

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Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions

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and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Complexity of surgical procedure, and

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- Expectation for functional improvement.

Treatment Methods

- Depending on evaluation findings, you may use modalities to address pain
- If there are muscle spasms present, modalities and/or soft tissue mobilization would be indicated.
- Patient should be progressed to postural instruction, cervical stabilization, and flexibility exercises once surgical precautions have been lifted. A home program that includes these procedures should be instituted.
- Physician specific protocols will be considered in the context of the health plan definition of medical necessity.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of upper extremity occurs
- Signs of demyelinating condition, tumor or infection

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- Increased neurologic signs/symptoms: increased UE numbness/tingling, increasing UE weakness, increasing UE pain, decreasing UE reflexes

Management/Intervention

The type of physical therapy intervention for post-operative patient of the cervical spine depends on the type of surgical approach. Therapists should take into consideration:

- Anterior vs. Posterior approach
- Wound healing
- Signs of infection
- Physical and Psychological condition of the patient
- Patient motivation
- Specific goals

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.
There is insufficient research on specific structured exercise programs that are effective treatments after surgery of the cervical spine.

Proposed Cervical Interventions

- ROM (as per specific protocols in regards to limitations) progressive to tolerance
- Stabilization with neuromuscular re-education for deep neck flexors
- Flexibility: posterior paraspinals, upper traps, levator scapula, scalenes
- Strengthening of upper quarter muscles
- Mobility–manual therapy to cervico-thoracic joints (where appropriate)
- Aerobic conditioning program
- Cognitive behavioral therapy
- Patient education
- Activity modification

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- Postural awareness
- Body mechanics for work or ADLs
- HEP

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband
- Gymball
- Home electrical stimulation unit

Self-Care Techniques

- Postural advice, postural exercises
- Cervical isometric exercises, cervical stabilization exercises, flexibility exercises (when precautions are lifted)
- Aerobic conditioning
- Cold/heat applications, if needed, to relieve discomfort/stiffness
- Brief use of cervical collar, if necessary, in acute stages, to limit motion
- Instruct patient in any surgery specific precautions

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Physiatry
- Medication
- Acupuncture
- Anesthesia/pain management

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Stenosis – Cervical / Thoracic Spine

Synonyms

- Spondylosis
- Spinal canal narrowing

Definition

Condition caused by a narrowing of the spinal canal, usually present with pain or weakness in extremities on walking. Condition may be mistaken for intermittent claudication due to vascular disease. Size of canal may be small since birth due to some congenital or developmental factors in certain individuals. Later in life when degenerative changes occur, canal is further narrowed by osteophytes from facet joints and vertebral body, thickening of posterior longitudinal ligament or ligamentum flavum, or retrolisthesis of vertebral body secondary to narrowing of disc space.

Patient History

Patient history may include:

Patient Data

- General demographics
- Occupation/employment
- Hand dominance
- Living environment
- History of current condition
- Functional status and activity level (prior level of function)
- Medications
- Other tests and measurements (laboratory and diagnostic tests)
- Past history (including history of prior therapy, and response to prior treatment)

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

The following table presents common red flags for this diagnosis and their possible causes.

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Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Direct trauma to the head with loss of consciousness (LOC)	Subdural hematoma; epidural hematoma; fracture
Nuchal rigidity, and/or positive Brudzinskis, or Kernigs sign	Subarachnoid hemorrhage; meningitis
Bladder dysfunction associated with onset of neck pain	Myelopathy; spinal cord injury
Associated dysphasia	Cerebrovascular accident
Associated cranial nerve, or central nervous system (CNS) signs/symptoms	Tumor; intracranial hematoma
Onset of a new headache	Tumor; infection; vascular cause (older patients, also consider temporal arteritis; glaucoma)
Co-morbidities of rheumatoid arthritis, seronegative arthritides, Down syndrome	Atlantoaxial instability due to associated transverse ligament laxity
Exertional pain, history of CAD	CAD
Pleuritic pain, chronic cough, dyspnea	Pulmonary diseases
Cancer	Cause of symptoms (metastatic or primary)
Alcoholism, drug abuse	Side effect, or withdrawal phenomenon
Immune-compromised state	Infection

Presentation

Lateral cervical stenosis (radiculopathy) is typical of lower motor neuron disorders.

- Signs typically include hyperreflexia of affected upper extremity accompanied by motor weakness and sensory disturbances consistent with level of compression of nerve root.
- Cervical ROM is typically limited, and extension and ipsilateral side-bending may exacerbate upper extremity symptoms.
- Spurling's test is usually positive. Upper extremity symptoms may be reduced or relieved with manual cervical traction.
- Neck pain is not always present.
- Unsteadiness in gait or clumsiness often is an early symptom.
- Central cervical stenosis (myelopathy) involves upper motor neuron or long-tract disorders.
- Weakness with spasticity may be present, along with clonus and a positive Babinski sign.
- Vibratory sensation typically, is diminished in lower extremities, and both upper and lower extremity reflexes may become hyperactive.
- Cervical ROM is typically restricted in all planes.
- Lhermittes sign may be present.
- Spurling's test is expected to be negative, and manual cervical traction has no effect on symptoms.
- Possible loss of bowel and bladder control.

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- Wide-based gait pattern-ataxia.
- Proprioception affected.

Subjective Findings

- Neck Pain
- Upper Extremity numbness and weakness
- Lower Extremity numbness and weakness
- Loss of dexterity in hands

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection (including postural evaluation and gait analysis).
- Palpation of bony and soft tissue
  - Lateral portions of the cervical spine and spinous process.
  - Thoracic spine.
  - Glenohumeral Joint
- Range of motion in all planes (active, active movement with overpressure, and passive)
  - Cervical spine
  - Thoracic spine
  - Glenohumeral Joint
  - Lumbar spine
- Motion palpation of spine
- Manual muscle testing (to include resisted isometric measures)
- Orthopedic testing
  - Spurling's test (foraminal compression)
  - Nerve root tension (shoulder depression)
  - Distraction Test
  - Brachial Plexus Tension
  - Scalene Cramp Test (Thoracic Outlet Symptoms)
- Neurologic testing
  - Lhermitte's Sign (upper motor neuron lesion)
  - Myotome Test (C5-T1; L2-S1)
  - Dermatomal Sensation Test (C4-T1)
  - Deep Tendon Reflexes-Biceps C5, Triceps C6, Brachioradialis C7
- Functional Assessment - The following standardized tests may be used to assess functional limitations:

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- Neck Disability Index
- Neck Pain and Disability Scale
- Patient Specific Functional Scale

Findings of Stenosis

- Foraminal compression may cause radiating upper extremity pain
- Extremities symptoms and findings, may follow nerve root pattern
- Sensory abnormalities may follow a dermatomal distribution
- Signs of upper motor neuron involvement (clonus, hyperreflexia, Babinski reflex) may suggest compression of spinal cord, which should be evaluated medically

Differential Diagnoses

- Cervical nerve root compression
- Other myelopathies
- Multiple sclerosis
- Metastatic Ca
- TIA/CVA

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation,

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and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade

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and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,

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- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy intervention is frequently aimed at providing symptomatic relief in acute exacerbations of a pain complaint.

- Short term modality intervention is appropriate if significant relief is provided.
- If successful in reducing pain complaint, strengthening of weak musculature, restoration of function and instruction in self-management techniques to stabilize condition is also appropriate.
- Activities and exercises should have a flexion bias, as extension is thought to be aggravating.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau

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- Atrophy of upper extremity occurs
- Signs of demyelinating condition, tumor or infection
- Increased neurologic signs/symptoms: increased UE numbness/tingling, increasing UE weakness, increasing UE pain, decreasing UE reflexes

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists procedures for **Acute Phase** presentation.
Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Decrease pain/muscle spasm	▪ Passive modalities such as heat, cold, transcutaneous electrical nerve stimulation (TENS), and ultrasound may provide transient analgesia and increased soft tissue flexibility and may be indicated in the acute phase.
Improve cervical range of motion and strength	▪ Mobilization of adjacent segments ▪ Active movements in pain-free range ▪ Teach flexion based exercises
Patient education and Home exercise program	▪ Instruct patient to avoid extension of cervical spine and working above head ▪ Remain as active as possible ▪ Gait training ▪ Teach home exercise program

The following table lists procedures for **Subacute Phase** presentation.
Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Expected Outcome	Procedures/Modalities Such As
Decrease pain/spasms	▪ Modalities should be used sparingly on an as needed basis.
Restore flexibility, strength and postural control	▪ Cervicothoracic stabilization program: ▪ includes cervical spine flexibility exercises, ▪ postural correction and,

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	▪ strengthening, combined ▪ Aerobic conditioning
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual tolerance of activities and positions ▪ Self-management of symptoms ▪ Functional training ▪ Teach home exercise program

The following table lists procedures for **Corrective/Rehabilitative Phase** presentation.

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Restore flexibility, strength and postural control	▪ Cervicothoracic stabilization program: ▪ includes cervical spine flexibility exercises, ▪ postural correction and, ▪ strengthening, combined ▪ Aerobic conditioning
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual tolerance of activities and positions ▪ Self-management of symptoms ▪ Functional training ▪ Teach home exercise ▪ Gait training

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises

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- Home traction unit

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises, stretching
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication
- Anesthesia/pain management
- Acupuncture

Medicare References

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Orthopedic – Non Specific Cervicalgia

Head, Neck and Upper Back Dysfunction

Definition

Head, neck, and upper back pain is defined as pain that consists of soreness, tension, pain, and/or stiffness in the neck and upper back region without a radicular component.T his includes neck and upper back pain that is typically increased with movement or prolonged positioning, decreased with rest, and is of mechanical and/or chemical origin. Head, neck and upper back pain can be categorized according to the International Classification of Functioning, Disability and Health (ICF) impairment-based category of low back pain (World Health Organization [WHO], 2005) in the following ways:

- Neck pain with mobility deficits (b7101 Mobility of several joints)
- Neck pain with headaches (b28010 Pain in head and neck)
- Neck pain with movement coordination impairments (b7601 Control of complex voluntary movements)

Patient History

Patient history may include:

Patient Data

- general demographics
- living environment
- functional status and activity level
- medications
- other tests and measurements (laboratory and diagnostic tests)
- past history (including history of prior therapy and response to prior treatment)

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Direct trauma to the head with loss of consciousness (LOC)	Subdural hematoma; epidural hematoma; fracture
Nuchal rigidity, and/or positive Brudzinskis, or Kernigs sign	Subarachnoid hemorrhage; meningitis
Bladder dysfunction associated with onset of neck pain	Myelopathy; spinal cord injury
Associated dysphasia	Cerebrovascular accident
Associated cranial nerve or central nervous system (CNS) signs/symptoms	Tumor; intracranial hematoma
Onset of new headache	Tumor; infection; vascular cause (older patients, also consider temporal arteritis, glaucoma)
Co-morbidities of rheumatoid arthritis, seronegative arthritides, Downs syndrome	Atlantoaxial instability due to associated transverse ligament laxity
Cancer	Malignancy, or primary site
Alcoholism, drug abuse	Side effect, or withdrawal phenomenon
Immune-compromised state	Infection

Presentation

- Pain is usually of insidious onset
- May report prior history of episodic neck pain
- May begin between the 3rd and 6th decades of life and persist for years

Subjective Findings

- Pain and stiffness in neck—pain typically worse with motion
- Headaches may accompany neck pain
- Essentially constant awareness of some level of neck discomfort, or limitations in motion

Objective Findings

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Note: Diseases that may refer pain to the cervical spine include: brain lesions, CAD, dental disease, esophageal disease, upper airway disease, lymphadenopathy, TMJ dysfunction, ankylosing spondylitis.

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Clinical Evaluation and Diagnosis Guidelines

The medical literature would indicate that the cause of a patient/client's neck pain is often not clearly known (Borgouts, Koes, & Bouter, 1998) therefore, the physical therapist should assess for impaired muscular, neural, connective tissue, and articular joint function. The patient history is to also clarify any concerns or questions that may arise from the self-report questionnaires (Cleland, Childs, Fritz, & Whitman, 2006). Factors in the patient/client history that have importance include age greater than 40 years of age, co-existing lower back pain, greater than 3 months duration, loss of hand strength/function, and psychological factors such as anxiety, and poor quality of life, and medical "red flags (Cook, 2008). Use of the Canadian Cervical Spine Rule should be considered especially in a direct access environment (Bandiera, G., Stiell, I.G., Wells, G.A., Clement, C., De Maio, V., Vandemheen, K.L., Greenberg, G.H., Lesiuk, H., Brison, R., Cass, D. and Dreyer, J., 2003). In performing subjective and objective examination of the patient/client, clinicians should take into consideration those diagnostic classifications associated with serious pathological conditions and/or psychosocial factors. The patient's reported activity limitations or impairments of body function and structure should be consistent with conditions improvable with physical therapy interventions.

Evaluation

- **Postural Observation**
- **Palpation**
- **Cervical active range of motion**
  Measurement of bodily impairment. Cervical active range of motion is measured ordinarily in the seated, upright position and flexion, extension, lateral side flexionand bilaterally rotation directions are measured (Cleland, Childs, Fritz, & Whitman, 2006). Use of a validated measurement instrument is necessary (Youdas, Carey, &Garret, 1991).
- **Cervical and upper thoracic segmental mobility**
  Measurement of bodily impairment. The purpose of this assessment is to determine the amount of accessory movement available at each spinal segment in relation to motion segments proximal and distal to the segment being assessed (Maitland, 2001). The patient is placed either in a supine or prone position and examination of the inter-segmental movement is palpated and assessed. The therapist is assessing for normal, hypomobile, or hypermobile movement correlated with pain associated with movement impairment (Bovim, Schrader, & Sand, 1994; Sandmark & Nisell, 1995).
- **Upper cervical ligamentous stability tests**
  - **A. Distraction test**
    Measurement of nervous system structural impairment. The purpose of the test is to maximize the diameter of the neuroforamina and correlate diminishment of the patient's primary symptom complaint (Cook & Hegedus, 2008; Wainner, Fritz Irrang, Boninger, Delitto, & Allison, 2003). A positive test is indicated if the client/patient has a reduction or elimination of primary symptoms.
  - **B. Alar and transverse ligament tests**

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1. **Sharp-Purser Test**
   Measurement of nervous system structural impairment. The patient is sitting with support and one palm of the examiner's hand is place on thepatient forehead and while the craniovertebral junction is in a slight flexed position the head is glided backwards on the neck. The patient's primary symptoms are reproduced. This is a test for spinal cord compression syndromes of the upper cervical spine (Sharp & Purser, 1961; Uitvlugt & Idenbaum, 1988).
2. **Alar Ligament Test**
   Measurement of bodily impairment. This test tests for ligamentous insufficiency of the alar ligaments which provide stability to the atlanto-occipital junction of the upper cervical spine (Cook & Hegedus, 2008; Magee, 2002). This test is first performed with the patient in a sitting position, and the therapist stabilizes the spinous process of C2 by use of a pinch grip with one hand while slightly sidebend the patient's head with the other hand. A delay in movement of the C2 spinous process would indicate a positive test (Hoffman, Mower, Wolfson, Todd, & Zucker, 2000).

- **C1/2 Rotation Assessment**
  Measurement of bodily impairment. This test assesses the presence of cervicogenic headaches (Cook & Hegedus, 2008). The patient is supine and the therapist maximally flexes the cervical spine and while maintaining this position the therapist carefully rotates the head bilaterally. Limited movement to less than 45 degrees of rotation to either side would indicate a positive test (Hall & Robinson, 2004).
- **Cranio-cervical flexion test**
  Measurement of bodily impairment. The patient is supine and the test is performed by the patient by flexing the cranio-cervical junction against a graded resistance and thereby flattening the cervical lordosis. A normal response is a 26-30 mm Hg pressure increase held for >10 seconds (Fernandez-De-Las-Penas, Perez-De-Heredia, Molero-Sanchez, & Mianogolarra, 2007; Jull, Barrett, Magee & Ho, 1999).
- **Neck Flexion Muscle Endurance Test**
  Measurement of bodily impairment. The patient is supine and the test is carried out by the patient's ability to lift the head and neck against resistance with the chin maximally retracted for an extended period of time (Harris, Heer, Roy, Santos Whitman & Wainner, 2005; Olsen, Millar, Dunker, Hicks & Glanz, 2006).
- **Vertebral Artery Insufficiency Test**
- **Neurological testing**
  - **A. Upper limb adverse neural tension tests**
    Measurement of nervous system structural impairment. The purpose of the upper Limb tension test is to assess the degree of mobility of the upper limb neural elements correlating with client/patient primary symptom reproduction. A test is considered positive if reproduction of the primary complaint, and/or side-to-side differences in ROM greater than 10 degrees is present (Wainner, Fritz, Irrang, Boninger, Delitto, & Allison, 2003). The

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patient is tested in a non-weight bearing supine position and upper limb peripheral nerve biased tension tests are carried out for symptom reproduction and impairment correlation (Butler, 2000).

B. Spurling's test
Measurement of nervous system structural impairment. Assessment of the patient's ability to combine sidebending with axial compression to diminish the diameter of the neuroforamina of the cervical spine. A positive test is considered when the patient's primary peripheralising symptoms are reproduced (Cook & Hegedus, 2008; Wainner, Fritz, Irrang, Boninger, Delitto & Allison, 2003).

C. Valsalva Test
Measurement of nervous system structural impairment. The patient inhales and bears down without exhaling in order to increase intrathecal pressure and reproduce the patient's primary complaint (Wainner, Fritz, Irrang, Boninger, Delitto, & Allison, 2003).

D. Upper Extremity Manual Muscle Tests

E. Dermatomal Testing

F. Upper Extremity Reflex Tests

- **Functional outcome measures (Level I, Strong evidence base.)**
  Clinicians should consider use of scientifically validated self-report patient/client functional outcome measures such as:
  1. Neck Disability Index [NDI] (Pietrobon, Coeytaux, Carey, Richardson, & DeVellis, 2002),
  2. Pain diagrams using the Numeric Pain Rating Scale (NPRS) (Aprill, Dwyer, & Bogduk, 1990; Chan, Goldman, Ilstrup, Kunselman, & O'Niell, 1993)
  3. Patient-Specific Functional Scale (Stratford, Gill, Westaway, & Binkley, 1995; Westaway, Stratford, & Binkley, 1998).

These outcome scoring methods are useful in identifying baseline, interval progress, and discharge status.

Findings of Cervicalgia

- Limited active cervical range of motion
- Neck pain
- Tenderness to palpation
- Normal neurological findings

Differential Diagnoses

- Cervical nerve root compression
- Other myelopathies
- Multiple sclerosis
- Metastatic Ca
- TIA/CVA
- Cervical disc herniation (neurologic abnormality and radicular pain typically)

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- Dislocation of the cervical spine (significant trauma, greater than 3 mm loss of contact between contiguous segments)
- Fracture of cervical spine (history, abnormal radiograph)
- Inflammatory arthritides, such as rheumatoid arthritis (history, radiographic findings)
- Cervical spine tumor, or infection (night pain, weight loss, history of cancer, fever)

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

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Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

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Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1.Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2.Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3.Neurologic findings	None	May be present	May be present
4.BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations using the Patient Specific Functional Scale (i.e. Activities of daily living) – In addition Practitioners may utilize other peer reviewed, standardized tools to quantify functional limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

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Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy including but not limited to, lack of meeting Minimally Clinical Important Differences in pain and functional measures
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider, for evaluation of alternative treatment options or referal for maintenance care if:

- Improvement does not meet above guidelines or improvement reaches a plateau;
- Atrophy of upper extremity occurs;
- Signs of fracture or dislocation occurs;
- Increased neurologic signs/symptoms: increased UE numbness/tingling, increased UE weakness, increased UE pain, decreased UE reflexes.
- No objective clinical improvement after 6 weeks of direct care

Management/Intervention

Neck pain has a good natural course with 80-90% of cases diminishing within 4-6 weeks (Douglass, & Bope, 2004). Head, neck and upper back pain can be described as having a normal expected course and an abnormal one. In a normal course of head, neck and upper back pain, symptoms should diminish over time and can be improved with appropriate intervention. An abnormal episode occurs when a patient's symptoms and/or disabilities do not decrease over time and either stay the same or increase. The role of the therapist is to provide appropriate therapeutic interventions and education of the patient/client in appropriate preventive measures in cases where the patient/client symptoms and/or disabilities exhibit an abnormal course.

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A. Clinical Interventions (Recommended)

1.Cervical passive vertebral mobilization/manipulation techniques (Level I, Strong evidence)

Cervical mobilization and manipulative passive motion procedures are recommended, especially in conjunction with appropriate cervical exercises (Bronfort, Evans, Nelson, Aker, Goldsmith & Vernon, 2001; Cleland, Glynn, et al., 2007; Evans, Bronfort, Nelson & Goldsmith, 2002; Gross, Hoving, Haines, Goldsmith, Kay, Aker,…Cochrane Group, 2004; Hoving, Koes, de Vet, et al., 2002; Nilsson, Christensen & Hartvigsen, 1997; Walker, Boyles, Young, et al., 2008; Gross A, Langevin P, Burnie SJ, Bédard-Brochu MS, Empey B, Dugas E, Faber-Dobrescu M, Andres C, Graham N, Goldsmith CH, Brønfort G, Hoving JL, LeBlanc F. 2015).

2.Cervical Coordination, Strengthening and Endurance Exercises (Level I, Strong evidence)

Clinicians should consider active exercise interventions that emphasize coordinated movement, endurance development and strength training of the cervical spine and scapulothoracic musculature. (Chiu, Lam, & Hedley, 2005; Falla, Jull, Russell, Vicenzino, & Hodges, 2007; Jull, Falla, Treleaven, Hodges & Vicenzino, 2007; Jull, Trott, Potter, et al., 2002; Taimela, Takala, Asklof, Seppala, & Parviainen, 2000; Ylinen, Nikander, Nykänen, Kautiainen, & Häkkinen, 2010; Gross A, Kay TM, Paquin JP, Blanchette S, Lalonde P, Christie T, Dupont G, Graham N, Burnie SJ, Gelley G, Goldsmith CH, Forget M, Hoving JL, Brønfort G, Santaguida PL 2015).

3.Patient/Client Education and Counseling (Level I, strong evidence)

Educating the patient/client regarding favorable outcomes, early movement interventions and self-care is recommended. The patient/client is educated that early return to normal, non-provocative movement is important and that return to function and full recovery are the most common outcomes over the long term (Schnabel, Ferrari, Vassiliou, & Kaluza, 2004; Vassiliou, Kaluza, Putzke, Wulf, & Schnabel, 2006).

B. Clinical interventions with neutral recommendation (Level II evidence or based on weak evidence

1.Thoracic mobilization/manipulation techniques (Weak evidence)

Thoracic mobilization and manipulative passive motion procedures are proposed with neutral recommendations (Cleland, Childs, McRae, Palmer, & Stowell, 2005; Cleland, Glynn, Whitman, Eberhart, MacDonald & Childs, 2007; Fernandez, Fernandez, Plaza, Lomas, Miangolarra, 2004).

2.Cervical or upper thoracic muscle soft tissue stretching techniques (Weak evidence)

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Manual muscle stretching or other soft tissue mobilization/manipulation techniques have been found to be helpful in treatment of non-specific neck pain. Treatment typically places an emphasis on assessment and treatment of impaired flexibility in the suboccipital, anterior/medial/posterior scalene, upper trapezius, levator scapulae, pectoralis minor and pectoralis major muscle groups (Brousseau, et al., 2012; Ylinen, Kautianen, Wiren & Hakkinen, 2007). However stretching alone has not been shown to have any benefit. (Gross A, Kay TM, Paquin JP, Blanchette S, Lalonde P, Christie T, Dupont G, Graham N, Burnie SJ, Gelley G, Goldsmith CH, Forget M, Hoving JL, Brønfort G, Santaguida PL 2015)

3. Low level laser therapy (Weak evidence)

Weak evidence supports LLLT for cervical osteoarthritis. There is moderate evidence supporting LLT for chronic neck pain. (Gross, A.R., Dziengo, S., Boers, O., Goldsmith, C.H., Graham, N., Lilge, L., Burnie, S. and White, R., 2013.)

4. Dry Needling (Moderate evidence)

Trigger Point Dry Needling may decrease neck pain intensity and widespread pressure pain sensitivity, and also increase active cervical range of motion, in patients with acute mechanical neck pain. (Mejuto-Vázquez, M.J., Salom-Moreno, J., Ortega-Santiago, R., Truyols-Domínguez, S. and Fernández-de-las-Peñas, C., 2014; Liu, L., Huang, Q.M., Liu, Q.G., Ye, G., Bo, C.Z., Chen, M.J. and Li, P., 2015; Llamas-Ramos, R., Pecos-Martín, D., Gallego-Izquierdo, T., Llamas-Ramos, I., Plaza-Manzano, G., Ortega-Santiago, R., Cleland, J. and Fernandez-De-Las-Penas, C., 2014)

5. **Transcutaneus Electrical Nerve Stimulation (TENS) (weak evidence)**

Moderate to weak evidence supports TENS for acute neck pain (Johnson MI, Paley CA, Howe TE, Sluka KA. 2015)

C. Clinical interventions not recommended (Poor evidence or expert opinion)

1.Activity Limitation/Participation Measures

Evidence supporting the long term benefit of patient education procedures, use of soft cervical collars, and activity limiting interventions in isolation of other more active interventions is generally lacking, therefore it is not recommended that physical therapy clinicians utilize activity limiting interventions and use education methods that are easily reproduced by the patient (Crawford, Khan & Varley, 2004; Jull, Trott, Potter, et al., 2002; Rosenfeld, Seferiadis, A, Carlsson & Gunnarsson, 2003; Schnabel, Ferrari, Vassiliou, & Kaluza, 2004)

2.Therapeutic Modalities (Poor or insufficient evidence)

Therapeutic modalities including pulsed electromagnetic therapy, electrical stimulation, therapeutic ultrasound, transcutaneous electrical nerve stimulation are not recommended due to poor or insufficient evidence of treatment efficacy(TENS) (Gross, Aker, Goldsmith, & Pelosso, 2002; Kjellman, Skargren, &

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Oberg, 1999; Verhagen, Peeters, de Bie, & Oostendorp, 2002). Galvanic current, iontophoresis, EMS, and a static magnetic field are not recommended**.** (Kroeling P, Gross A, Graham N, Burnie SJ, Szeto G, Goldsmith CH, Haines T, Forget M. 2013)

3. Mechanical Traction

No strong evidence supports continuous nor intermittent traction for non-specific neck pain nor chronic neck pain. There may be some short-term pain relief but the evidence is insufficient. (Graham N, Gross A, Goldsmith CH, Klaber Moffett J, Haines T, Burnie SJ, Peloso PMJ. 2008; Borman, P., Keskin, D., Ekici, B. et al. 2008; Yang JD, Tam KW, Huang TW, Huang SW, Liou TH, Chen HC 2016; Chiu TTW, Ng JK-F, Walther-Zhang B, Lin RJH, Ortelli L, Chua SK 2011)

Positive Patient Response and Review of the Medical Literature

Review of relevant medical literature and determination of therapy intervention(s) with defined recommendations are based primarily on results demonstrating functional gains attained through the intervention that can be objectively measured, such as positional tolerances, range of motion, strength, endurance, activities of daily living (ADL), cognition, psychological behavior, and efficiency/velocity measurements. Subjective reports of pain and function should be considered and given relative weight when the pain has an anatomic and/or physiological basis. All findings must be based on objective medical evidence.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Use of a cervical pillow while sleeping may be helpful
- Theraband for therapeutic exercises
- Cervical traction (if patient presents with radiculopathy)
- Hot packs/cold packs
- Home electrical stimulation unit
- Gymball

Self-Care Techniques

- Postural advice, postural exercises
- Flexibility exercises
- Cervical stabilization exercises, isometrics
- Aerobic conditioning, such as walking or swimming
- Heat applications, cold packs, if needed, to relieve discomfort/stiffness

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation

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- Chiropractic
- Physiatry
- Medication
- Acupuncture

Medicare References

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Orthopedic – General

Compartment Syndrome

Synonyms

- Volkmann ischemia
- Chronic exertional compartment syndrome

Definition

Compartment syndrome occurs when increased pressure in a muscle compartment compresses the nerves and blood vessels in the area. Compartment syndrome may be related to acute trauma such as fractures or muscle injury. It may also be associated with exertion, repetitive stresses and microtrauma, in which case it can be chronic or acute.

Patient History

Patient history may include:

Patient Data

Trauma, fractures, bleeding in enclosed space, external compression of the limb, vigorous exercise, small thrombotic or embolic events, periostitis (shin splints), and intramuscular injection have all been implicated in the pathogenesis of compartment syndrome.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever, severe pain	Possible infection
Unilateral edema	Lower extremity deep vein thrombosis
Immune-compromised state	Infection
Cancer history	Cause of symptoms (metastatic or primary)
Discoloration of foot, toes, exertional foot or calf pain	Vascular occlusion; vascular insufficiency

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Presentation

All of the following conditions have been implicated in the pathogenesis of compartment syndrome:

- Trauma
- Fractures
- Bleeding in enclosed space
- External compression of the limb by casts or dressings
- Limb placement during surgery
- Small thrombotic or embolic events
- Intramuscular injection
- Frostbite
- Snake bite
- Vigorous exercise
- Muscle imbalances
- Extremity malalignment
- Training errors
- Inadequate footwear
- Poor technique

Subjective Findings

Pain, swelling, and a feeling of tightness in the involved region are often the chief complaints.In the acute situation, the level of pain reported by the individual is often disproportionate to the physical findings. In the chronic stage, symptoms are often related to an overuse injury, and pain is often activity related.

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Atrophy
  - Color of skin
  - Postural assessment
  - Localized swelling
  - Deformities
- Palpation of bony and soft tissue for:
  - Tightness

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    - Swelling
    - Pain
    - Pulselessness
    - Paresthesia
- Range of motion, active and passive
    - Test affected area
    - Test joint above and below
- Orthopedic/neurological testing
    - Manual muscle testing
    - Reflexes
    - Test dermotomes. myotomes
    - Joint play movements of joints above and below affected area
- Gait Analysis (Test when the is lower extremity involvement)
    - Gait cycle
    - Stance and swing phase
    - Double-leg stance
    - Single-leg stance
    - Normal cadence
    - Pelvic shift
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
    - Functional Independence Measure scale (lower extremity and upper extremity involvement)
    - Disabilities of the Arm, Shoulder and Hand (DASH) (upper extremity involvement)
    - Lower extremity functional scale (LEFS)

Findings of Compartment Syndrome

- Pain
- Skin may be shiny with abnormal tissue feel
- Paresthesia and possible diminished sensation
- Possible motor weakness
- Pulse and capillary refill are typically unaffected
- Most frequently occurs in the arm and leg in acute cases, and in the anterior pretibial compartment of the leg in chronic syndromes

Differential Diagnoses

- Stress fracture
- Radiculopathy
- Shin splints
- Anterior tibialis tendonitis

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

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Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

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Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate	Considerable loss

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		loss	
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Chronic or exertional syndromes are the most commonly treated in therapy and may be helped by:

- Reducing demands on affected limb,
- Modifying training schedules or programs to slowly improve activity level, and
- Massaging and stretching of soft tissues.

Post fasciotomy patients may require:

- Training in the use of assistive devices to reduce weight bearing,
- Exercise for improved range of motion, and
- Progression to strengthening and return to normal activities.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

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Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.
The following table lists the procedures for **Conservative Management**.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

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Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Decrease pain and swelling	▪ Modalities i.e. Ice/ heat ▪ Interferential current ▪ Functional electrical stimulation ▪ Transcutaneous electrical nerve stimulation ▪ Soft Tissue massage
Restore flexibility of the affected musculature	▪ Range of motion within pain-free range ▪ Sustained stretching exercises ▪ Soft tissue mobilization
Increase strength and endurance	▪ Start with exercises that decrease load to affected area e.g. aquatics ▪ Gradually add isometric and isotonic exercises ▪ Add to progressive resistive exercises ▪ Add closed chain exercises ▪ Add functional training
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual tolerance of activities and positions ▪ ADL Training ▪ Gait training ▪ Stair mobility ▪ Functional training activities ▪ Teach home exercise program of stretching, strengthening, and massage ▪ Decrease activity/load to affected compartment

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The following table lists the procedures for **Post Fasciotomy Management**:

Expected Outcome	Procedures/Modalities Such As
Decrease pain and swelling	▪ Modalities i.e. interferential current ▪ Functional electrical stimulation ▪ Transcutaneous electrical nerve stimulation ▪ Soft Tissue massage
Restore flexibility of the affected musculature	▪ Range of motion within pain-free range ▪ Gentle sustained stretching exercises ▪ Soft tissue mobilization ▪ Mobilize adjacent joints
Increase strength and endurance	▪ Begin with isometric and isotonic exercises ▪ Add progressive resistive exercises ▪ Add closed chain exercises ▪ Mobilize adjacent joints
Normalize gait pattern	▪ Gait training ▪ Endurance training ▪ Stair mobility
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual tolerance of activities and positions ▪ ADL Training ▪ Functional training activities ▪ Teach home exercise program of stretching, strengthening, and massage ▪ Decrease activity/load to affected compartment

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Hot packs/cold packs

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- Theraband for therapeutic exercises

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises, stretching
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Surgery
- Medication

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Musculoskeletal Disorders

Definition

Musculoskeletal disorders affect the bones, muscles, ligaments, tendons, and nerves. Onset may be acute (having a rapid onset of symptoms) or insidious. Duration of a musculoskeletal condition may be short term (days or weeks) or chronic (long-lasting). Musculoskeletal pain can be localized in one area, or widespread. Musculoskeletal conditions may be caused by an injury to the bones, joints, muscles, tendons, ligaments, and/or nerves. Direct trauma, e.g. motor vehicle accidents, falls, fractures, collisions, or indirect trauma, e.g. poor posture, repetitive strain, prolonged immobilization or loss of mobility, or overuse, generally underlies development of musculoskeletal complaints.

Symptoms and Causes

- Bone pain: This is usually deep, penetrating, or dull. It most commonly results from injury such as contusions. It is important to be sure that the pain is not related to a fracture or tumor.
- Muscle pain: Muscle pain can be caused by an injury, an autoimmune reaction, loss of blood flow to the muscle, infection, or a tumor. The pain can also be caused by muscle spasms and trigger points.
- Tendon and ligament pain: Tendon and ligament injuries are strain injuries that result in damage to the connective tissue fibers of the tendon or ligament. Tendon injuries range from tendinitis (micro trauma) to rupture (macro trauma). Ligamentous injuries occur when ligament tears either partially or completely. This type of musculoskeletal pain often becomes worse when the affected area is stretched or moved.
- Joint pain: Joint injuries and diseases usually produce a stiff, aching, "arthritic" pain. The pain may range from mild to severe and worsens when moving the joint. The joints may also swell. Joint inflammation (arthritis) is a common cause of pain.
- Fibromyalgia: This is a condition that may cause pain in the muscles, tendons, joints, and other soft tissue. The pain is usually in multiple locations and can be difficult to describe. Fibromyalgia is usually accompanied by other symptoms.
- "Tunnel" syndromes: This refers to musculoskeletal disorders that cause pain due to nerve and/or tendon compression/inflammation. The disorders include carpal tunnel syndrome, cubital tunnel syndrome, and tarsal tunnel syndrome. The pain tends to spread along the path supplied by the nerve and may feel like burning. These disorders are often caused by overuse.

Symptoms and Causes

- Aching or stiffness of the entire body.
- The feeling that your muscles have been pulled or overworked
- Fatigue
- Sleep disturbances

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- Swelling or effusion
- Decreased range of motion
- Joint instability
- Muscle guarding or weakness
- Loss of strength, power, endurance
- Inability to perform purposeful, functional, intentional movements

Functional Limitations and Impairments

- Inability to ambulate
- Decreased functional work capacity
- Inability to climb stairs
- Inability to perform repetitive tasks
- Inability to perform self-care tasks
- Inability to reach
- Inability to access the community
- Inability to access transportation
- Limited independence in activities of daily living

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever, severe pain	Possible infection
Edema, redness, pain	Lower extremity deep vein thrombosis
Immune-compromised state	Infection
Cancer history	Cause of symptoms (metastatic or primary)
Discoloration of the affected area (s)	Vascular occlusion; vascular insufficiency
Homans Sign	Deep vein thrombosis
Axial compression	Compression fracture
Positive vertebral artery test	Vertebrobasilar ischaemia, TIA
Widespread neurological symptoms	Neurological disease
Positive Lhermitte Sign	Spinal cord pathology
Dyspnea	Lung disease/diaphragmatic paralysis

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

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Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Assistive devices
  - Assess assistive and adaptive devices and equipment used during used during functional activities
- Protective and supportive devices
  - Assess safe use of devices
  - Assess fit and alignment
- Balance tests (static, dynamic and during functional tasks)
  - Balance scale
  - Dizziness inventories
  - Fall scales
  - Motor impairment scales
- Gait and Locomotion
  - Foot sprint analysis
  - Gait indexes
  - Mobility skills profiles
  - Functional assessment profiles
- Motor Function Tests
  - Dexterity
  - Coordination
  - Agility
- Skin Integrity
  - Skin characteristics (blistering, color, sensation, temperature, texture)
  - Wound (signs of infection, scar tissue characteristics, stage of healing)
- Palpation of bony and soft tissue
  - Palpate involved muscles for tender nodule, taut band, tight ropiness
  - Observe pattern of referred pain
  - Provocation tests
- Edema (measure both sides for comparison)
  - Girth measurements
  - Palpation
  - Volume measurements
- Postural assessment
  - Postural alignment and position
- Range of motion
  - Active and passive movement of affected area and joint above and below and contralateral joints
  - Functional ROM (e.g. squat tests, toe touch tests)
- Manual Muscle Testing
  - Test related joints
- Joint Integrity and mobility
  - Compression and distraction
  - Apprehension
  - Joint play and end feel

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- Glide
- Impingement
- Stress tests
  - Anterior/posterior drawer
  - Varus/valgus, shear
- Neurologic testing
  - Sensory tests (discrimination tests, coarse and light touch, cold and heat, pain, pressure, and vibration.
  - Myotome testing
  - Deep tendon reflexes

Outcome Measures by Condition/Diagnosis

There are many validated instruments that may be used. The therapist should choose an appropriate instrument. The following standardized tests may be used to assess functional limitations on admission, and functional change at discharge and periodically during the course of care.

Condition/Diagnosis	Test	Definition	Author
Elderly > 65 y.o.	Berg Balance Test	Measures both statis and dynamic balance using a 14-item scale	Donoghue and Stokes, 2009
	Gait speed	Measures overall walking performance	Mangione, et al., 2010
	Six Minute Walk test	Tests endurance by measuring the maximum distance that a person can walk in six minutes	Mangione, et al., 2010
	Short Physical Performance Battery (SPPD)	Composite of three timed tests: -Chair rise for 5 repetitions - Standing balance - Walking speed	Mangione, et al., 2010
	Timed Up and GO (TUG)	Functional mobility test generally used for the geriatric population	Mangione, et al., 2010
	Performance Oriented Mobility Assessment, Tinetti	Evaluates balance and gait	Faber, et. al., 2006 Tinetti, 1986
Hip Fracture with Surgical Repair	Gait Speed	Measures overall walking performance	Latham, et al., 2008
	Six Minute Walk test	Tests endurance by measuring the maximum distance	Latham, et al., 2008

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		that a person can walk in six minutes	
	Short Physical Performance Battery (SPPD)	Composite of three timed tests: -Chair rise for 5 repetitions - Standing balance - Walking speed	Latham, et al., 2008
Hip/Knee Osteoarthritis	Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)	Disease-specific, self-administered questionnaire used with patients who have hip/knee osteoarthritis	Pua, et al., 2009
	Get UP and Go Test	Measures fall risk	Priva, et al., 2004
	Lower Extremity Functional Scale (LEFS)	20-itemcondition specific questionnaire designed for use for musculoskeletal conditions of the lower extremity	Binkley, et al, 1999
LE Musculoskeletal Disorder	Lower Extremity Functional Scale (LEFS)	20-itemcondition specific questionnaire designed for use for musculoskeletal conditions of the lower extremity	Binkley, et al, 1999
	Patient Specific Functional Scale (PSFS)	Patient self-report measure used to quantify activity limitation and measure functional outcome	Chatman, et al, 1997
Low Back Pain, Chronic or Acute	Fear Avoidance Beliefs Questionnaire (FABQ)	Used to quantify fear-avoidance beliefs specific to low back pain and can help predict those who have a high pain avoidance behavior	George, et al, 2010 Waddell, et al., 1993
	Oswestry Disability Index	Self-report questionnaire that measures the degree to which back or leg pain impacts functional activities	Davidson and Keating, 2002 Maughan and Lewis, 2010

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	Quebec Back Pain Disability Scale	20-item self-report questionnaire that measures the level of physical functioning in patients with low back pain	van der Roer, et al, 2006 Davidson and Keating, 2002
	Roland Morris Questionnaire	Self-administered disability questionnaire that consists of 24 statements regarding activity limitations due to back pain	Maughan and Lewis, 2010 Stratford, et al, 1996
	Patient Specific Functional Scale (PSFS)	Patient self-report measure used to quantify activity limitation and measure functional outcome	Cleland, et al, 2006
Neck Pain/Cervical Radiculopathy Pain	Neck Disability Index (NDI)	10 item questionnaire, 7 items related to ADLs, 2 items related to pain, and 1 item related to concentration	Cleland, et al, 2006 Young, et al, 2009
	Patient Specific Functional Scale (PSFS)	Patient self-report measure used to quantify activity limitation and measure functional outcome	Cleland, et al., 2006
	Numeric Pain Rating Scale (NPRS)	11-pont numerical rating scale for determining pain intensity	Spadoni et al, 2004
UE Dysfunction/Musculoskeletal Disorder	American Shoulder and Elbow Surgeons Score (ASES)	Measures functional limitation and pain of the shoulder	Michener, et al, 2002
	Disabilities of Arm, Shoulder, Hand (DASH)	30 item questionnaire, region specific and allow comparisons across diagnosis of the upper extremity	Schmitt and Di Fabio, 2004
	Penn Shoulder Score	Condition specific self-report measure,	Leggin et al, 2006

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		uses a 100 point scale consisting of 3 subscales - pain, satisfaction, and function	
	Shoulder Pain and Disability Index (SPADI)	13-item self-administered questionnaire relating to pain and functional status of the shoulder region	Schmitt and Di Fabio, 2004
	Patient Specific Functional Scale (PSFS)	Patient self-report measure used to quantify activity limitation and measure functional outcome	Hefford, et al, 2012
Total Hip/Knee Arthroplasty	WOMAC	Disease-specific, self-administered questionnaire used with patients who have hip/knee osteoarthritis	Knee-Escobar, et al, 2007 Hip-Quintana, et al, 2005

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Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

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- For periodic re-evaluations of the maintenance program
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Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

For post-surgical cases, progression of the rehabilitation program is primarily time based to allow tissue healing; individual surgeons may have their own performance criteria for advancing. Both criteria may vary based on the type of surgery and specific technique used. Consult with referring surgeon.

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Problem/Expected Outcome	Procedures/Modalities Such As
Decrease pain/spasms/inflammation/ Swelling/effusion	▪ Modalities i.e. phonophoresis, ultrasound, interferential current, electrical muscle stimulation, functional electrical stimulation, transcutaneous electrical nerve stimulation ▪ Cryotherapy ▪ Thermotherapy ▪ EMG Biofeedback ▪ Trigger point therapy ▪ Paraffin baths ▪ Compression therapies ▪ Massage ▪ Mobilization/manipulation ▪ Manual traction ▪ Home program
Restore flexibility of the affected musculature and joints	▪ Segmental joint mobilization ▪ Passive exercises ▪ Range of motion within pain-free range ▪ Sustained stretching exercises ▪ Soft tissue mobilization ▪ Home program
Increase strength and endurance of the spine and extremities	▪ Active assisted exercises, active, and resistive exercises (concentric, isotonic, eccentric, isokinetic, isometric, and plyometric ▪ Aquatic programs ▪ Home program
Improvement in body mechanics and postural stabilization	▪ Body mechanics training ▪ Postural stabilization activities ▪ Postural Control ▪ Home program
Increase balance, coordination, and agility	▪ Motor function retraining ▪ Neuromuscular re-education ▪ Perceptual training ▪ Home program
Improvement in gait and locomotion	▪ Gait training ▪ Training in use of assistive devices ▪ Wheelchair training ▪ Home program
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ ADL training ▪ Device and equipment use and training ▪ IADL training ▪ Home program
Preparation for Discharge	▪ Teach a self-management program ▪ Instruction and education of patient and care-givers on current condition and functional limitations

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Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises
- Gymball for therapeutic exercises
- Home electrical stimulation unit
- Home traction
- Soft tissue mobilization devices - tennis balls, knobblers, etc.
- Exercise equipment – bike, treadmill, weights

Self-Care Techniques

- Postural advice, instruction in proper body mechanics
- Instruction in activity modification
- Stretching exercises
- Aerobic conditioning exercises to increase strength and endurance
- Heat/cold applications, if needed, to relieve discomfort/stiffness
- Self-mobilization, soft tissue mobilization
- Ergonomics
- Strengthening exercises

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Massage therapy
- Physiatry
- Medication
- Chiropractic care
- Homeopathy
- Nutritional intervention
- Acupuncture
- Yoga

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Myofascial Pain Syndrome

Synonyms

- Myalgia
- Fibromyositis

Definition

An inflammation/irritation of myofascial tissue, associated with focal points of tender nodules that may refer pain to other areas of the body when palpated.

Patient History

Patient history may include:

Patient Data

Patients usually report regionalized aching and poorly localized pain in the muscles and joints. They also may report sensory disturbances such as numbness in a characteristic of distribution. The type of pain felt is characteristic of the muscle involved. Onset may be acute after a specific event or trauma (e.g., moving quickly in an awkward position) or chronic from poor posture or overuse. Patients may note disturbed sleep. Those with cervical and periscapular myofascial pain may try to find a comfortable sleeping position. They may or may not be aware of muscle weakness in the affected muscles. They may have a tendency to drop things.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.
- Determine OPQRST (Onset, Provocative/Palliative factors, Quality, Radiation/Referral pattern, Site [location], Timing of complaint).

Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear, fracture
Fever, severe pain	Infection
Loss of distal pulse	Arterial occlusion
Progressive weakness	Muscular dystrophies; Guillan-Barre; dermatomyositis, MS, entrapment neuropathies
Palpable mass	Hemangioma; soft tissue tumor; foreign body
Diabetes; paresthesias	Neuropathy; other metabolic causes (e.g., B12 deficiency, hypothyroidism)
Multiple joint involvement	Rheumatologic diseases
Unilateral edema	Deep vein thrombosis, infection
Cancer	Cause of symptoms (metastatic or primary)

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Discoloration of extremity, exertional extremity pain	Arterial occlusion
Exertional symptoms in chest or upper extremities	CAD
Pleuritic pain, SOB, unrelenting cough	Pulmonary diseases
Constipation, symptoms worse or better with meals, bloody stools	GI conditions
Pain with urination, hematuria	UTI, renal stone
Immune-compromised state	Infection

Presentation

This condition often occurs in areas of muscles that previously experienced cumulative or sudden onset trauma. Typically, subsequent acute manifestations are precipitated by exposure to cold, or by overstretching/overloading the same region of muscle frequently seen in people with poor posture. Symptoms are suggestive of neurologic disorders including: diffuse pain and tenderness, headache, vertigo, visual disturbances, paresthesias, incoordination, and referred pain and are characterized by the presence of myofascial trigger points.

Subjective Findings

- Dull aching pains in muscles rather than joints
- Patient complains of a diffuse area of pain/stiffness covering an area adjacent to the main area of complaint
- May report "knots" or "bumps" in the involved muscles

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Postural assessment
  - Localized swelling
  - Deformities
- Palpation of bony and soft tissue
  - Palpate involved muscles for tender nodule, taut band, tight ropiness
  - Observe pattern of referred pain
  - Temperature changes

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    - Motion palpation of spine
    - Test accessory movement
- Range of motion
    - Test active, passive movement of affected area and joint above and below.
- Manual Muscle Testing
- Orthopedic testing
    - Cervical spine: Spurling's test, Distraction test, Nerve tension test, Vertebral artery test
    - Lumbar spine: Straight leg raise test, specific torsion test, slump test, Trendelenberg test, leg length discrepancy test
- Neurologic testing if complaints radiate to extremities or signs/symptoms of cauda equina syndrome are present
    - Dermatomes
    - Myotomes
    - Deep tendon reflexes
- Functional assessment - The following standardized tests may be used to assess functional limitations:
    - Cervical spine: Use Neck Disability Index to assess functional disability
    - Lumbar/Thoracic spine: Use the Oswestry Disability Index to track functional disability

Findings of Myofascial Pain Syndrome

- Involved muscle is generally resistant to stretching, limited by pain, taut band is palpable.
- Tender nodules or areas of ropiness are noted in involved muscle group.
- Nodular areas are tender to palpation and may elicit a jump.
- Sensitized areas are generally called trigger points, and if active, palpation may lead to referral of pain.

Differential Diagnoses

- Fibromyalgia
- Radiculopathy

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member

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- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy focuses on correction of muscle shortening by targeted stretching and strengthening of affected muscles and correction of aggravating postural and biomechanical factors. Modalities such as electrical muscle stimulation can be useful to decrease pain to allow participation in an active exercise program. Corrections of leg-length discrepancies with a heel lift or use of dynamic insoles also may be helpful. Various other techniques may also be effective i.e. massage and exercise, stretching, ultrasound and biofeedback.

Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition.

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Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:
- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

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Expected Outcome	Procedures/Modalities Such As
Decrease pain/spasms	▪ Modalities i.e. Phonophoresis, interferential current, electrical muscle stimulation, functional electrical stimulation, transcutaneous electrical nerve stimulation ▪ Cryotherapy ▪ Thermotherapy ▪ EMG Biofeedback ▪ Trigger point therapy
Restore flexibility of the affected musculature and vertebral joints	▪ Segmental joint mobilization ▪ Range of motion within pain-free range ▪ Sustained stretching exercises ▪ Soft tissue mobilization
Increase strength and endurance of the spine and extremities	▪ Resisted Isometric Exercises ▪ Segmental strengthening ▪ Isotonic exercises ▪ Functional training
Improvement in body mechanics and postural stabilization	▪ Body mechanics training ▪ Postural stabilization activities ▪ Postural Control
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual tolerance of activities and positions ▪ Perform ergonomic work assessment ▪ Avoid prolonged static postures ▪ Teach home exercise program of stretching, strengthening, and application of ice or heat ▪ Assess need for orthotics (i.e. dynamic insoles)

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises
- Gymball for therapeutic exercises
- Home electrical stimulation unit

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Self-Care Techniques

- Postural advice, instruction in proper body mechanics
- Instruction in energy conservation techniques
- Stretching exercises
- Aerobic conditioning exercises to increase strength and endurance
- Heat applications, if needed, to relieve discomfort/stiffness

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Massage therapy with aggressive deep myofascial therapy
- Physiatry with aggressive deep myofascial therapy
- Medication
- Chiropractic

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Myositis Ossificans

Synonyms

- Myo-osteosis
- Traumatic ossifying myositis
- Ossifying hematoma

Definition

Myositis Ossificans is the development of bony deposits in muscle tissue. This occurs as an abnormal healing response after a trauma, or chronic irritation to the muscle.

Patient History

Patient history may include:

Patient Data

Condition most frequently arises when an existing muscle contusion is treated too vigorously, or when patient is returned to activity before complete muscle healing has occurred.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, ligament tear
Fever, severe pain	Infection, Osteomyelitis
Popliteal fossa pain, sudden onset	Popliteal aneurysm
Diabetes	Neuropathy
Multiple joint involvement	Rheumatologic diseases
Unilateral edema	Deep vein thrombosis
Cancer, osteosarcoma	Cause of symptoms (metastatic or primary)
Discoloration of extremity	Arterial occlusion, vascular insufficiency
Immune-compromised state	Infection
Palpable mass	Hemangioma, soft tissue tumor, foreign body

Presentation

Palpable mass in a muscle belly (commonly reported in the quadriceps or biceps brachialis muscles), although definitive diagnosis usually comes via radiography.

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Subjective Findings

- Complaint of stiffness accompanied by loss of range of motion in adjacent joint.
- Pain on palpation.
- History of blunt trauma or recurrent trauma to muscle with hematoma.

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

- Soft-tissue tumors
- Hemangioma
- Foreign body

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Contractures
  - Muscle atrophy
  - Antalgic gait
  - Posture/alignment
- Palpation of bony and soft tissue
  - Effusion/hematoma
  - Mass in muscle belly
  - Warmth
- Range of motion, active and passive
  - Quadriceps: knee -flex, extension, Lateral-medial rotation, hip-flex, extension, abduction, external rotation, internal rotation
  - Biceps brachialis-Elbow flex, extension, supination, pronation
- Manual muscle testing
  - Quadriceps: knee -flex, extension, hip-flex, extension, abduction, external rotation, internal rotation
  - Biceps brachialis-Elbow flex, extension, supination, pronation
- Orthopedic testing
  - Joint play movements
  - Ligamentous instability tests
  - Meniscal tears
  - Patellofemoral joint involvement
  - Leg length discrepancy
  - Balance/proprioception
- Neurologic testing if neurologic signs are present
  - Test reflexes-Lower extremity: Patellar, Hamstring,

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        - Upper extremity: Biceps, Brachialis
        - Test dermatomes:
            - Lower extremity-L4, L5, S1
            - Upper Extremity-C5-T1
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
    - Lower extremity functional scale (LEFS) (For Lower extremity involvement)
    - Disabilities of the Arm, Shoulder and Hand (DASH)) For upper extremity involvement)

Findings of Myositis Ossificans

- Swelling usually occurs at the time of initial injury.
- Restricted motion caused by pain or swelling.
- Painful limit may be present

Differential Diagnoses

- Neoplastic pathology
- Osteonecrosis

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

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Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

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Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

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Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy program goals are to:

- minimize hematoma in acute phase,
- normalize pain-free range of motion,
- prevent muscular atrophy, and
- maintain proprioception and cardiovascular fitness.

Therefore, a therapy program will consist of modalities to minimize the effusion, and therapeutic exercises for ROM and strengthening.

Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

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Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Restore flexibility of affected muscles	▪ Iontophoresis (with acetic acid), ultrasound to affected muscles to soften the bony mass ▪ Gentle pain-free passive range of motion ▪ Active range of motion ▪ Avoid forceful or sustained stretching
Enhance neuromuscular performance during functional activities	▪ Begin with isometric exercises ▪ Begin light resistance exercises as

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	range of motion increases ▪ Add closed chain exercises
Improvement in body mechanics and postural stabilization	▪ Body mechanics training ▪ Postural stabilization activities ▪ Balance and proprioception exercises ▪ Endurance exercises
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual resumption of activities relating to work, community and leisure ▪ Gait training ▪ Functional Training ▪ Teach application of passive, active range of motion and strengthening program ▪ Use of protective pad to area when sports resumes

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Surgery
- Medication

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Osteitis Pubis

Synonyms

None

Definition

Osteitis Pubis is a noninfectious inflammation of the pubis symphysis.

Patient History

Patient history may include:

Patient Data

While the cause remains unclear, the most common history is that of recent invasive pelvic procedures. Athletics has also been identified as a precipitating factor. Men may be more likely to develop osteitis pubis, perhaps due to greater involvement in sports. Men tend to be affected most commonly in the age group of 30-50, while women are affected in their thirties.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.

Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear, pelvic fracture; avascular necrosis, muscle strain, gracilis avulsion, fatigue fracture
Fever, severe pain	Infection
Diabetes	Neuropathy
Multiple joint involvement	Rheumatologic diseases
Unilateral edema	Deep vein thrombosis
Skin rash in dermatomal pattern	Shingles
Constipation, bloody stools, unexplained weight loss	Colon or pelvic organ cancer
Groin pain	Inguinal hernia, pelvic pathology
Pain with urination, hematuria	UTI; renal stone
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of leg or foot, pain with ambulation	Arterial occlusion; arterial insufficiency
History of steroid use	Avascular necrosis
Immune-compromised state	Infection

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Presentation

- Patient may report a sudden or insidious onset of pain over the symphysis.
- Pain may radiate to the groin, abdomen or medial thigh.
- Weight bearing activities tend to be aggravating.
- Sidelying and valsalva maneuver can also produce pain.
- Some people may have clicking or popping.
- Eventually, patient may have weakness and difficulty walking.

Subjective Findings

Complains of pain that radiates to the medial thigh, into the groin or abdomen, clicking or popping in the hip joint, increase in pain when weight-bearing and impaired gait secondary to lower extremity weakness.

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Gait abnormalities
  - Foot pronation
  - Deformities
  - Postural alignment
  - Orthotics/brace
  - Leg length
- Palpation of bony and soft tissue
  - Pain lower abdominal, groin, medial thigh
  - Clicking, popping with joint movement
- Range of motion, active and passive
  - Hip: flex, extension, rotation, abduction, adduction
  - Lumbar spine: flex, extend, rotation, side bending
- Orthopedic testing
  - Varus/valgus deformity of knee
  - Provocative test: Adduction, sit-ups
  - Joint play movements of lumbar spine
  - Joint play movements of the hip joint
  - Joint play movements of the sacro-iliac joint
- Neurologic testing if neurologic signs are present
  - Reflexes: Patellar, hamstring, Achilles tendon

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    - Dermatomes: L3, L4, L5, S1
- Manual muscle testing
    - Hip: flex, extension, rotation, abduction, adduction
    - Lumbar spine: flex, extend, rotation, side bending
- Functional Assessment - The following standardized test may be used to assess functional limitations:
    - Lower extremity functional scale (LEFS)

Findings of Osteitis Pubis

- Symphysis pain with compression of the greater trochanters
- Frequently weakness of the hip adductors, occasionally with the flexors
- Waddling gait

Differential Diagnoses

- Iliopsoas bursitis
- Iliopsoas tendonitis
- Rectus femoris tendonitis
- Urological disorders
- Sacroiliac dysfunction
- Nerve entrapment
- Malignant/nonmalignant tumors
- Sportsman's hernia
- Avulsion fracture
- Hip disorders (e.g., osteoarthritis [OA], degenerative joint disease [DJD], slipped capital femoral epiphysis [SCFE], acetabular defects)
- Gastrointestinal disorders
- Sexually transmitted diseases
- Gynecological complaints
- Groin strains/sprains
- Inguinal hernia

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

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Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy program goals are to:

- Reduce pain and inflammation.
- Rest and orthotics such as a sacroiliac belt may help unload the pelvis.
- Modalities to reduce pain and inflammation are appropriate.
- Patient education consists of rest/reduction of strenuous activities, as well as identification of causative factor and correction of faulty technique.
- Gait training with assistive devices may be warranted.
- Exercises that increase stress on the pelvic ring should be avoided.
- Pelvic tilting and stabilization exercises may be attempted.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or

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periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:
- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Acute Phase** presentation.
Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Decrease pain and inflammation	▪ Modalities i.e. Moist heat, TENS, Interferential current ▪ Soft Tissue mobilization
Improve flexibility of the Sacro-iliac joint and the hip joint	▪ Joint mobilization techniques to hip joint and sacro-iliac joint ▪ Passive and active range of motion exercises to hip joint ▪ Stretching of the hip adductor
Improve strength and endurance of hip and back musculature	▪ Isometric exercises ▪ Add progressive resistive exercises ▪ Add closed chain exercises ▪ Pelvic stability exercises and pelvic tilts

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	▪ Concentrate on hip flexors and adductors
Improvement in body mechanics and postural stabilization	▪ Body mechanics training ▪ Postural stabilization activities ▪ Endurance exercises
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual resumption of activities relating to work, community and leisure ▪ Gait retraining ▪ Stair mobility ▪ Functional Training
Patient education and self-management	▪ Avoid pain producing, activities/strenuous activities ▪ Patient should be on a general fitness program ▪ Correct leg length discrepancy with shoe lift, excessive pronation with orthosis and use sacro-iliac belt to unload the pelvis ▪ Teach application of moist heat, stretching and strengthening exercises

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises

Self-Care Techniques

- Rest, reduce strenuous activities
- Home exercises, pelvic tilts
- Progression to therapeutic exercise—stabilization exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic
- Chiropractic
- Medication
- Surgery

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Osteoporosis

Synonyms

In advanced stages, frequently coexists with osteomalacia/osteopenia.

Definition

Osteoporosis is the reduction in the number and size of bony trabeculae resulting in weakened bone, deformity, and, when associated with trauma or other pathology pain. It is more frequent in women, generally beginning after menopause, and often leading to fractures in the spine (occasionally spontaneous), hip and wrist. Long-term corticosteroid use is also associated with osteoporosis.

Risk Factors

- Age > 65 years
- Female
- Positive family history
- Caucasian, Asian, Hispanic
- Low body weight
- Life style characteristics smoker, sedentary, ETOH, high caffeine intake

Patient History

Patient history may include:

Patient Data

- General demographics
- Living environment
- History of current condition
- Functional status and activity level
- Medications
- Other tests and measurements (laboratory and diagnostic tests),
- Past history (including history of prior therapy and response to prior treatment)
- Menopause
- Body type
- Prior level of function

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Trauma	Fracture
Onset following minor fall or heavy lifting in elderly	Fracture
Direct Blow to the back in young adult	Fracture
Unexplained weight loss	Malignancy
Prior history of cancer	Malignancy
Pain that is worse with recumbency or worse at night	Malignancy
Fever or recent bacterial infection	Infection
Intravenous drug abuse or immunosuppression	Infection
Pain that does not change with change in position	Kidney disease

Presentation

Patient often presents with diffuse pain complaints that can become sharp on flexion or compressive activities. The vertebral body tends to fracture and compress to a wedge shape resulting in thoracic kyphosis and flattening of the lumbar lordosis.

Subjective Findings

- Pain typically worse with flexion of the spine when osteoporosis involves the vertebrae.
- Back motion not greatly restricted.
- Surrounding muscle spasm.
- Frequently, there are no symptoms until a fracture occurs.

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Note: Extra spinal diseases that may refer pain to the back include: aortic aneurysm, colon Cancer, endometriosis, hip disease, kidney stones, ovarian disease, pancreatitis, pelvic infections, tumors or cysts of the reproductive tract, uterine cancer.

The most serious cause of low back pain is malignant tumor. Most malignant tumors are metastatic and some may cause bony collapse and paralysis. Primary cancers that most commonly metastasize to bone consist of adrenal, breast, kidney, lung, prostate, and thyroid.

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Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection for:
  - Thoracic kyphosis, Dowager's hump (decreased cervical lordosis), decreased lumbar lordosis
  - Use of assistive devices
- Palpation of bony and soft tissue
  - Muscle spasms
  - Muscular pain
  - Tenderness secondary to fractures (percussion on vertebrae)
- Range of motion
  - Active and passive range of motion of:
  - Cervical spine, lumbar spine, thoracic spine, hips, wrist
- Motion palpation of spine
  - Accessory joint movements of thoracic and lumbar spine
- Orthopedic testing
  - Straight leg raise test
  - Prone knee bending test Femoral nerve traction test
  - Specific Torsion Test
  - Trendelenburg's test and S1 nerve root test
- Neurologic testing if complaints radiate to lower extremities or signs/symptoms of cauda equina syndrome are present
  - Myotomes: Hip Flex. (L2), Knee ext. (L3), Ankle dorsiflexion. (L4)
  - Dermatomal Sensation Tests (L1-S1)
  - Deep Tendon Reflexes: Patella, Dorsiflexion, and Hamstring
- Functional Assessment - The following standardized tests may be used to assess functional limitation such as lifting, walking, sitting, standing, sleeping, social life and vocation.
  - Oswestry Low Back Pain Disability Index (Fairbank, 2000)
  - Lower Extremity Scale (LEFS) (Binkley, 1999)

Findings of Osteoporosis

The historical information discussed in the Definition, Risk Factors, and Patient Data sections are good indicators of the presence of osteoporosis; however, the best indicator of osteoporosis is a bone mineral density test. A bone mineral density test measures bone mass and it is considered the most important predictor of fractures caused by osteoporosis.

Differential Diagnoses

- Extra spinal causes (ovarian cyst, kidney stone, pancreatitis, ulcer)
- Rule out fracture , femoral neck, Colles fracture
- Infection in disc or bone (fever, history of IV drug use, history of severe pain)
- Inflammatory arthritides (family history, patient age/sex, morning stiffness)
- Metastatic disease, myeloma, lymphoma (pathologic fracture, severe night pain)

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- Spinal tuberculosis (lower socioeconomic groups, AIDS)
- Depression
- Vitamin D deficiency (rickets)

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and

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management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on	Restriction, depending on

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		occupation; 0-2 weeks	occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Depending on level of pain, modalities to address pain may be utilized in the initial therapy visits.

- Postural exercises should be taught and continued on a home program.
- Patients with spinal compression fractures should avoid forceful trunk flexion exercises.
- Gentle weight bearing activity may help prevent or slow loss of bone density.

The approach to care focuses on long term self-management.

- Recommend smoking cessation if patient is a smoker and weight reduction if overweight.

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- If patient has significant spine involvement, assistive devices may be needed for ADLs and/or ambulation.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider to explore alternative treatment options, if:

- Improvement does not meet the above guidelines or improvement has reached a plateau
- Fever, chills, unexplained weight loss, significant night time pain
- Presence of pathological fracture
- Obvious deformity
- Saddle anesthesia
- Loss of major motor function
- Bowel or bladder dysfunction
- Abdominal pain
- Visceral dysfunction
- Increasing neurologic signs/symptoms: increasing LE weakness, increasing LE pain, increasing LE numbness/tingling, and decreasing LE reflexes

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Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.
The approach to care focuses on long term self-management.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Reduce pain and muscle spasm	▪ Modalities i.e. moist heat, Interferential current, TENS ▪ Thoracic orthosis to limit motion of spine
Restore flexibility of lumbar spine	▪ Flexibility exercises (hamstring stretch, Hip flexors stretch, back muscle stretch, Quadriceps stretch, pelvic mobilization)
Enhance neuromuscular performance to reduce risk of falls and fractures	▪ Begin with isometric exercises, avoid flexion exercises ▪ Stabilization exercises ▪ Functional Restoration ▪ Physical Reconditioning program-add low impact weight bearing exercises
Improvement in body mechanics and postural stabilization	▪ Body mechanics training ▪ Postural stabilization activities ▪ Postural Control ▪ Pectoral and intercostal strengthening exercises ▪ Endurance exercises

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Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual resumption of activities relating to work, community and leisure ▪ Gait training with/without assistive devices ▪ Teach application of heat, stretching and strengthening program ▪ Teach deep breathing exercises
Home modification and prevention of falls and fractures	▪ Use of handrails, grab bars in hallways, stairs and bathrooms ▪ Use of shower chairs, tub bench, adaptive bathing devices ▪ Use of non-skid tape to steps indoors and outdoors ▪ Remove all throw rugs ▪ Cessation of smoking, alcohol and caffeine consumption ▪ Regular program of physical activity

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Hot pack/cold pack
- Theraband
- Home electrical stimulation unit
- Assistive devices if needed
- Adaptive equipment for ADLs

Self-Care Techniques

- Postural advice, instruction in proper body mechanics
- Postural exercises, to include back extensor exercises
- Aerobic conditioning, such as walking or swimming
- Heat applications, cold packs, if needed, to relieve discomfort/stiffness

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Physiatry

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- Medication
- Acupuncture

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Temporomandibular Joint Dysfunction

Synonyms

- Temporomandibular Joint Syndrome
- Myofascial pain dysfunction
- Craniomandibular disorders
- TMJ
- TMD

Definition

TMJ Dysfunction does not have a universally agreed upon definition, or diagnostic criteria, and can have multiple etiologies.

- Syndrome is characterized by TMJ pain and swelling, headache and neck pain occur frequently.
- Typically, patient has difficultly, or an inability to open their mouth.
- Crepitation is common.
- Less frequent symptoms are tinnitus, vertigo, and ear or shoulder pain.
- Underlying cause may be of muscular, articular, or disease process origin.
- Frequently, onset is attributed to trauma, dental procedures, stress or degenerative processes.

Patient History

Patient history may include:

Patient Data

- General demographics
- Medical/dental history
- History of current condition
- Functional status as it relates to eating and speech (prior level of function)
- Medications
- Other tests and measurements (laboratory and diagnostic tests)
- Past history (including history of prior therapy and response to prior treatment)
- Prior level of function

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever, severe pain	Possible infection
Immune-compromised state	Infection
Cancer history	Cause of symptoms (metastatic or primary)

Presentation

Presents with pain associated with chewing, clicking, popping, and snapping sounds in the jaw, limited opening and locking episodes and headaches, Other associated symptoms may be neck pain and stiffness, shoulder pain and dizziness.

Subjective Findings

Patient presents with a complaint of
- Pain,
- Clicking or locking of the joint, and
- Swelling.

History of
- Grinding their teeth,
- Extensive dental procedures,
- Trauma, and
- Lifestyle stresses.

Frequently they also complain of
- Difficulty chewing,
- Neck pain, and
- Feeling of fullness in the ear.

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.
- Inspection
  - General survey of oral cavity
  - Position of head and shoulders
  - Atrophy/hypertrophy
- Palpation of bony and soft tissue
  - Tenderness/sites of pain
  - Warmth
  - muscle spasm

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    - Click, lock or crepitus
- Range of motion, active and passive
    - Active movements with overpressure: depression, elevation, lateral deviation, protraction, retraction
    - Passive movements-note end feel, pain , spasms
    - Resisted movements (static tests)-opening, protrusion, lateral excursion
- Orthopedic and neurologic testing if neurologic signs are present
    - Passive joint plate movements-Caudal traction, ventral glide, medial-lateral glide, medial glide
    - Dermatome of the face, scalp, neck
    - Upper extremity reflexes
    - Jaw reflexes
    - Cervical-upper extremity scan
    - Test Occipito-Atlantal joint and Atlanto-Axial joint
- Biomechanical assessment of joint function
    - Dynamic loading of one joint
    - Posterior loading (compression) of both joints
    - Distraction (unloading)
    - Assess stability and mobility of the joint
- Functional Impairment
    - No standardized functional test for the TMJ
    - Use the Neck Disability Index Scale for the Cervical Spine

Findings of TMJ Syndrome

- Tender to palpation
- Limited joint mobility for opening and protrusion with deviations
- Swelling or asymmetry of the face
- Abnormal cervical posture
- Clicking, locking or crepitation

Differential Diagnoses

- Headache syndromes
- Pharyngeal abscess
- Ear infection
- Infections of the oral cavity
- Herpes zoster
- Temporal Arteritis
- Trigeminal Neuralgia
- Styloid process syndrome
- Paratrigeminal syndrome
- Cervical spine disorders
- Acute pseudogout
- Maxillary sinusitis
- MI/Coronary
- Parotitis

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Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

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Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate	Considerable loss

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		loss	
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

- Provide symptomatic relief, and restore normal joint function.
- Modality treatment such as heat/cold, ultrasound, electrical stimulation and biofeedback are frequently used to reduce pain and inflammation.
- Procedures to restore normal joint function include joint mobilization, soft tissue mobilization, and exercises for stretching and strengthening.
- Relaxation exercises may be appropriate.
- Patient education in self-management techniques should be included as well.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.

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- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Further deterioration such as increasing pain, further limitation of movement and increased joint sounds
- Dental and otic infections occur
- Paratrigeminal syndrome occur

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

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Expected Outcome	Procedures/Modalities Such As
Decrease pain and muscle spasm	▪ Modalities i.e. Friction massage, ultrasound, Transcutaneous electrical nerve stimulation, biofeedback ▪ Relaxation exercises
Restore flexibility of the affected musculature and restore normal joint mechanics	▪ Active/ passive stretching exercises ▪ Soft tissue mobilization ▪ Joint mobilization techniques
Improve posture awareness and balance of the upper quadrant	▪ Correct body mechanics ▪ Postural control ▪ Correct body positioning of cervical spine and masticatory muscles
Improve swallow sequence	▪ Instruction on normal resting position of tongue and proper swallowing ▪ Maintenance of correct head on neck posture
Patient education and self-management	▪ Avoid large bites, clenching teeth, keep jaw relaxed. ▪ Teach application of moist heat, massage to jaw and temple and sustained stretching exercises ▪ Teach good sleep posture ▪ Use of occlusal repositioning splints ▪ Teach diaphragmatic breathing exercises

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- TENS
- Orthotic appliances

Self-Care Techniques

- Relaxation training
- Home ROM exercises, stretching

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- Progression to therapeutic exercise—stretching and strengthening exercises, postural exercises
- Hot packs/cold packs, if needed, to relieve discomfort
- Instruction in use of orthotic appliances

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication
- Steroid injection
- Surgery
- Acupuncture
- Psychological counseling; group management

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Orthopedic – Knee

Anterior Cruciate Ligament (ACL) Reconstruction, Knee

Synonyms

ACL repair (a misnomer, implying direct primary repair)

Definition

Reconstructive surgery after ACL injury is performed to provide stability and long- term normal function. Procedure usually involves an intra-articular autograft of the middle third of patellar tendon, or tendons of semitendinosus/gracilis. Occasionally an allograft is used from a donor.

Patient History

Patient history may include:

Patient Data

Injury to the ACL is a common type of knee injury. The frequency of this type of injury is approximately 1 in 3000 per year in the U.S. population. This type of injury is more common with females. A majority of individuals that require surgical repair to the ACL are able to return to strenuous activities with proper rehabilitation.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma, post operatively	Fracture
Fever, severe pain	Infection
Popliteal fossa pain, sudden onset	Popliteal aneurysm
Diabetes	Neuropathy
Multiple joint involvement	Rheumatologic diseases, gout
Unilateral edema	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of foot, or leg, exertional leg, or foot pain	Arterial occlusion; vascular insufficiency; compartment syndrome
Immune-compromised state	Infection

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Presentation

Patient usually has had trauma to the knee involving a twisting motion, and may also be a non-contact injury, as in cutting, sidestepping, or landing from a jump. Patient frequently reports having heard a pop. Hemarthrosis develops rapidly.

There is debate as to the proper timing of surgical reconstruction. A recent trend is to delay surgery pending a reduction in edema. Patient will probably be in a motion control brace.

Subjective Findings

- Hearing a pop at the time of injury
- Feeling like the knee is “giving out”
- Swelling
- Loss of motion

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

- Patellofemoral syndromes
- Contusions
- Osteoarthritis
- Iliotibial band syndrome
- Lumbosacral radiculopathy
- Medial synovial plica irritation
- Pes anserine bursitis
- Crystalline deposition diseases such as gout and pseudogout (Chondrocalcinosis)
- Surgical modifications such as meniscus repair

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member’s condition allows during the course of care.

- Inspection
  - Assessment of surgical wound integrity
  - Assess for hemathrosis
  - Assess for edema
  - Assess Gait (as allowed by weight bearing status)
- Palpation of bony and soft tissue
- Manual muscle testing
- Orthopedic testing
  - Leg length discrepancy

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- Neurologic testing
  - Test proprioception
  - Test sensation (L2-L4)
- Test ipsilateral and contralateral hip and ankle for pathology
- Functional Tests for the knee - The following standardized tests may be used to assess functional limitations:
  - Knee Outcome Survey
  - International Knee Documentation Committee Questionnaire

Findings of Anterior Cruciate Ligament (ACL) Reconstruction, Knee

Not applicable

Differential Diagnoses

Not applicable

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

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Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal

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of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result

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from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

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Treatment Methods

Post-operative treatment of ACL reconstruction has changed in recent years based on observed outcomes of compliant and non-compliant patients. Historically, protocols placed conservative restrictions on patients, which when ignored by the non-compliant group, actually improved patient outcomes over the compliant group. This led to the development of more aggressive protocols or accelerated protocols. There is not, however, universal agreement. Clinician must balance the need to protect reconstructed ligament with activities needed to reach goals of functional restoration. Most protocols have similar progressions but differing time frames.

- Common to most are early ROM and weight bearing.
- Edema control is important due to its inhibitory effect on the quadriceps. Initially quadriceps setting and hamstring strengthening are started to provide dynamic control.
- During exercise, shearing effects should be minimized. This is particularly true early in the program.
- Open kinetic chain exercises should be modified to decrease forward translation of the tibia on the femoral condyles (most commonly accomplished by limiting extension and providing proximal resistance on the tibia).
- Proprioceptive retraining is commonly included as patient progresses.
- Muscle strengthening is advanced to include closed chain exercise, agility training, and endurance.
- Progression through various levels of activity should be both time and criteria based.
- Physician specific protocols will be considered in the context of the plans definition of medical necessity.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.
- The goal of rehabilitation is to return patient to full ADL within the first three months.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.

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- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their surgeon for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of lower extremity occurs
- Range of motion plateaus or decreases
- Re-injury occurs
- Signs of infection

Management/Intervention

A number of different programs are used by different physical therapists. The therapy program chosen depends on the activity level of the patient and the type of surgery performed, coexistent injuries (meniscal or other ligamentous injury), and the surgeon.

Goal-oriented rehabilitation

The following lists procedures for **Acute Phase** presentation. The goal is to maintain terminal knee extension and progression toward 90° of flexion.

- Emphasize a normal heel-to-toe gait pattern; the patient may weight bear as tolerated on the involved leg.
- Continue passive flexion ROM exercises.
- Have the patient increase quadriceps activity, introducing the partial squat with progression from bilateral to unilateral, placing increased body weight on the extremity involved at no more than 45° of flexion.
- Continue these exercises, continue the knee immobilizer when ambulating and continue regular icing of the knee.

The following lists procedures for **Subacute Phase** presentation.

- Advance therapy to include wall slide-squats and a stationary bike as tolerated.
- Place emphasis on terminal extension, progressive flexion, and full weight-bearing ambulation with normal heel-to-toe mechanics.
- In a controlled environment (no pets, children, or distractions), have the patient begin practicing crutch ambulation while out of the knee immobilizer.
- The patient should achieve full terminal knee extension and approximately 90-100° of knee flexion.

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- If the patient is ambulating with normal gait mechanics, the knee immobilizer can be removed.
- Advance the patient's activity to include loaded squats, swimming, eccentric quadriceps strengthening.
- During this time, the patient can develop tendonitis of the quadriceps tendon or other repetitive use injuries of the lower extremity.
- Application of ice after each therapy session is very important.

The following lists procedures for **Corrective/Rehabilitative Phase** presentation.

- Release the patient to light jogging or bicycling.
- If the patient is older and has concomitant degenerative joint disease, encourage bicycling.
- The graft is still very weak at this stage, so advise the patient that it is important not to fall.
- The patient should jog only on a track or other flat protected surface.
- At this point, active ROM should be approaching 0-125° with minimal or no joint effusion.
- Work on balance and proprioception with activity drills.
- At 3 months, recommend that the patient begin a gradual return to normal activities. At this point, most people do not require bracing, but occasionally, some athletes request a brace to increase their own comfort level when competing.

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self -care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Knee brace
- Assistive gait device
- Home electrical stimulation unit for pain control
- Neuromuscular re-education (NMES) of the quadriceps muscles

Self-Care Techniques

- Instruction in home exercise program for Range Of Motion and strengthening

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- Cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Surgery
- Medication
- Knee bracing

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Knee Pain and Dysfunction

Definition

Knee pain is defined as pain that consists of soreness, tension, instability, pain, and/or stiffness in the knee region that may extend from the mid-thigh to upper portion of the lower leg. Joints involved may include the tibio-femoral articulation, the articulation of the patella within the trochlear groove of the femur, as well as the proximal articulation of the fibula with the tibia.P athology may be related to trauma or repetitive strain of the musculotendinous structures or ligaments such as the cruciate or collateral ligaments. Other structures such as the menisci, bursae, or patellar fat pad can also be generators of pain or disability.

Knee pain may be described in terms of how long the individual has been dealing with the condition. Acute knee pain' is defined as pain that has been present for less than 3 months, and 'chronic knee pain' as pain that has persisted for longer than 3 months.

Some subsets of knee pain describe a significant portion of patient's seeking medical care. Knee osteoarthritis affects 28% of adults older than 45 and 37% of adults older than 65 years old in the United States (Dillon, et al., 2006; Jordan, et al, 2007).P atellofemoral pain is more prevalent in younger, more active patient populations, affecting 26% of young athletes (Cosca andN avazio, 2007) and 7% of young active adults (Cosac & Navazio, 2007;W itvrouw, et al., 2000).

Knee pain and dysfunction can be categorized according to the International Classification of Functioning, Disability and Health (ICF) (World Health Organization [WHO], 2005) in the following ways:

- Knee pain(b28016 pain in joints)
- Knee stiffness, loss of ROM, or locking(b7100 mobility of a single joint)
- Difficulty walking, antalgic gait(b770 gait pattern functions)
- Knee instability (b7150 stability of a single joint)
- Knee pain with movement coordination impairments (b7601 control of complex voluntary movements)

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, ligament/meniscal tear
Fever, severe pain	Infection
Popliteal fossa pain, sudden onset	Popliteal aneurysm
Diabetes	Neuropathy
Multiple joint involvement	Rheumatologic diseases
Unilateral edema or positive Homan's sign	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of foot or leg, exertional pain	Arterial occlusion, vascular insufficiency
Immune-compromised state	Infection

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes or contributing factors to the complaint.

Clinical Examination

1. The examination begins with an appropriate clinical history that provides the necessary information to guide the clinical exam. It should provide a general overview of the patient's health status, as well as additional data related tocurrent reason for seeking formal physical therapy.
   - date of initial onset of symptoms and /or most recent exacerbation
   - prior and current level of functioning
   - living situation
   - pain rating
   - precautions or co-morbidities
   - diagnostic testing that has been performed to date
   - any durable medical equipment that the patient may be using
   - patient's goals
2. Range of Motion (ICF category: Measurement of impairment of body function-mobility of a single joint)
   - The amount of active and passive range of motion of knee flexion and extension should be measured using a goniometer (Clapper, 1988; Steultjens, 2000).
3. Muscle Testing (ICF category:M easure of impairment of body function, power of isolated muscles and muscle groups). Manual muscle testing ofk nee flexion and extension strength may be of benefit in patients functioning at lower levels and having difficulty moving through a full range against gravity. For patients at higher levels of function, maximum voluntary isometric strength using a dynamometer, or isokinetic testing could be performed (Longerstedt, 2010). Many clinics will not have this equipment available, so the inclined squat strength test could be used as a substitute (Munich, 1997). It is considered more functional and has shown good reliability (Cook, 2007). Measurement of knee flexion angle attained while the patient does a unilateral squat may also be used for side to side comparison.

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4. Special Tests:C linical special tests are a crucial part of the clinical examand are used to rule in or rule out specific diagnoses.T hey may be used at the beginning of the exam as a screening tool or at the end to confirm a diagnosis (Woolf, 2003). All cited studies below had QUADAS (Quality Assessment of Diagnostic Accuracy Studies) scores of 8 or greater per Cook and Hegedus, 2008. A score of 7 or greater on a 14 point scale indicates a high-quality diagnostic accuracy study (Cook & Hegedus, 2008).T his represents only a partial list of tests available for the knee. Sound clinical judgment is required on a case by case basis to determine which of these tests are called for and if additional procedures are warranted.
   - McMurray Test: torn tibial meniscus -moderate level of evidence (Akseki, 2004; Pookarnjanamorakot, et al., 2004
   - Thessaly Test: torn tibial meniscus - moderate level of evidence
   - (Karachalios, et al., 2005; Pookarnjanamorakot, et al., 2004)
   - Lachman Test: ACL tear - moderate level of evidence (Cooperman, 1990; Bomberg, 1990)
   - Posterior Drawer Test: PCL tear-m oderate level of evidence (Fowler & Messieh, 1987; Rubinstein, 1994)
   - Posterior Sag Test: PCL tear - moderate level of evidence(Fowler & Messieh, 1987; Staubli & Jacob, 1990)
   - Varus Stress Test at 30 degrees: LCL tear - minimally supported by evidence
   - Valgus Stress Test at 30 degrees: MCL tear -m oderately supported by evidence (Harilainen, 1986; Sandberg, 1986)
   - Varus /Valgus Instability at 0 degrees: PCL tear -m inimally supported by evidence
   - Patella Apprehension Test: patella dislocation/ instability -moderate level of evidence (Nijs, et al.,2 006; Niskanen, et al., 2001)
5. Outcome Measures (Moderate Evidence) Clinicians should consider the use of scientifically validated self-report patient /client functional outcome measures such as:
   - Medical Outcomes Survey Short Form (SF-36) (Patel, 2007)
   - IKDC 2000 Subjective Knee Form (Wright, 2009)
   - KOS-ADLS (Irrgang, 1998), KOOS (Wright, 2009)
   - IKDC 2000 Subjective Knee Form (Irrgang, 2006)
   - Cincinnati Knee Rating Scale (Wright, 2009)
   - Marx Activity Level Scale (Wright, 2009)
   - Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) (Pua, et al., 2009)
   - Lower Extremity Functional Scale (LEFS) (Binkley, et al, 1999)
   - Patient Specific Functional Scale (PSFS) (Chatman, et al, 1997

Differential Diagnosis

- Joint effusion from crystal disease (i.e., gout), trauma, infection, rheumatologic diseases
- Diabetic neuropathy
- Fractures
- Neurovascular compromise

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- Septic arthritis
- Deep vein thrombosis

Physical/Occupational Therapy Management

Therapy must show significant functional change using a scientifically validated self-report patient/client functional outcome measure. .

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and

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management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on	Restriction, depending on

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		occupation; 0-2 weeks	occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations using the Patient Specific Functional Scale(i.e. Activities of daily living) – In additional practitioners may also utilize other validated, peer reviewed, standardized tools to quantify functional limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition.

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Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:
- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

Management/Intervention

Clinical Interventions Recommended

1. Education and Self-Management: (high level of evidence)
- Patients should be educated on the diagnosis and prognosis of their condition, healthy lifestyle choices, use of a walking aid if indicated, and the importance of maintaining a healthy weight (Devos-Comby, et al, 2006;H euts, Drietelaar, & Artez 2005;R ichmond,e t al. 2009).

2.Strengthening Exercise:(high level of evidence)
- Quadriceps strengthening in particular has been consistently shown to be beneficial for various types of knee pathology (Bolgla & Boling, 2011;P eeter, et al., 2011; Jamtvedt, et al., 2008;H arvie, O'Leary, & Kumar, 2011).
- Hip strengthening, particularly the gluteus medius and maximus, has also been shown to be beneficial for patients dealing with patellofemoral pain (Bolgla & Boling, 2011; Fukuda, et al., 2010; Nagakawa, Muniz, & de Marche Baldon, 2008).

3.Manual Therapy:(moderate level of evidence)
- Therapists should consider adding manual therapy to exercise in patients with knee osteoarthritis in cases of pain and reversible limitation in joint mobility-anterior / posterior mobilization of the tibio-femoral joint and patella mobilization (Pollard, Ward, Hoskins, & Hardy, 2008; Deyle, et al., 2005; Jansen, et al., 2011)

Clinical Interventions with Neutral Recommendation

1.Patella Taping:(weak or inconclusive evidence)

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- Some evidence supports the use of taping for the patella when added to strength programs (Bolga & Boling, 2011; Whittingham, Palmer, & Macmillan, 2004; Peeter, et al., 2011; Warden, et al., 2008).T he benefit is likely due to improved proprioceptive input or neuromuscular control, and may be considered as a method for pain modulation for patients who are limited in their ability to exercise due to pain.

2.Stretching/ Flexibility Training:(limited evidence)

- Although stretching is included in multiple studies reporting positive outcomes, there are few studies that look at stretching alone.T here has been some evidence to indicate that improved length of the iliopsoas, quadriceps, and iliotibial band is related to positive outcomes (Tyler, et al., 2006; Peeler & Anderson, 2007)

3.Acupuncture: (weak or inconclusive evidence)

- Some studies have shown acupuncture to be beneficial in improving pain and function in individuals with knee osteoarthritis (Berman, Lao, Langenberg, et. al, 2004;S angdee, Teekachunhatean, Sananpanich, et. al., 2002) and anterior knee pain (Jensen, Gothesen, Liseth, et. al., 1999).
- In a recent systematic review of 16 RCTs of 3,498 people, the authors concluded that while acupuncture for knee osteoarthritis does show some statistically significant benefit, these benefits are small and may be due at least in part to placebo effect (Manheimer, et. al., 2010).
- An initial short course of acupuncture may be reasonable, especially in cases where pain is not able to be controlled through medication or other methods.

4.Knee Bracing and Foot Orthoses:(inconclusive evidence)

- Based on the current evidence available it is not possible to make a recommendation for or against the consistent use of knee bracing or orthotic intervention. Sound clinical reasoning should be applied by the therapist on a case by case basis, and these interventions may be considered for patients who do not respond to a strengthening and/or manual therapy based program (Bolga & Boling, 2011;R aja & Dewan, 2011)

5.Therapeutic Ultrasound:(weak/conflicting evidence)

- Recent studies and reviews have shown ultrasound to provide some benefit in patients with knee osteoarthritis, although the strength of evidence is weak and the magnitude of effects on pain relief and function is uncertain (Rutjes, Nuesch, Sterchi, & Juni, 2010;T ascioglu, Kuzgun, Armagan, & Ogutter, 2010).

6.TENS / Electrical Stimulation: (conflicting/inconclusive evidence)

- There is some evidence for the use of TENS/electrical stimulation for the short term relief of knee pain from osteoarthritis (Peter, et al., 2011; Bjordal, et al., 2007). It may be most appropriate to use for patients with high pain levels in situations where medical management and exercise based intervention were not beneficial (Zang, et al., 2008)

7.Iontophoresis:(weak/ limited evidence)

- Iontophoresis is rarely mentioned in most systematic reviews or existing practice guidelines for knee pain. Some studies do suggest some benefit in patients with knee RA (Li, Scudds, Heck, & Harth 1996) , knee OA (Akinbo, et. al., 2007), and infrapatella tendonitis (Pellecchia, Hamel, Behnke, 1994).

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Clinical Interventions Not Recommended

1. **Thermal Modalities- hot packs, cold packs, ice massage:(moderate level of evidence)**
   - Based on current evidence, it is not recommended that thermal modalities be routinely used in patients with knee pain (Jamtvedt, et al., 2008). Ice massage may have some potential benefit on ROM, function, and knee strength in patients with kneeO A, but further research is needed (Brosseau, et al., 2003)
2. **Therapeutic Modalities for the Treatment of Patellofemoral Pain:(moderate level of evidence)**
   - Evidence for the use of therapeutic modalities such as ultrasound, estim, laser, iontophoresis, and biofeedback for the treatment of patellofemoral pain is generally lacking and cannot be recommended at this time as a stand-alone treatment. Further studies are needed to confirm a benefit of their addition to a program of conventional physical therapy interventions (Lake & Wofford, 2011;C ollins, Bisset, Crossley & Vicenzino, 2012)
3. **Kinesio Taping:(limited evidence)**
   - Despite the amount of positive anecdotal evidence and case studies available, high quality studies to confirm these findings are still needed.T wo recent reviews found limited quality evidence to support the use of kinesio taping (Williams, Whatman, Hume, & Sheerin 2012;M ostafavifar, Wertz, & Borchers, 2012). In the clinic, kinesiotaping is often used as a complimentary treatment along with therapeutic exercise or manual therapy, or for neuromuscular re-education to facilitate or inhibit certain muscle groups.
   - As more high quality evidence becomes available, the role of kinesio taping as a standalone treatment will be clarified.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Theraband for therapeutic exercises
- Knee brace Orthotics as needed
- Home electrical stimulation unit for pain control or muscle re-education

Self-Care Techniques

- Therapeutic exercises, with emphasis on quadriceps (VMO) in terminal knee extension
- Ice massage, if needed, to relieve discomfort
- Use of knee brace or orthotics as needed

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- AcupunctureSurgical (as a last resort)
- Medication

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Knee, Tear, Lateral or Medial Meniscus

Synonyms

None

Definition

A torn meniscus is the most common cause of mechanical symptoms in the knee. Knee injuries may result in isolated or combined meniscal lesions. They usually occur when a person attempts to turn, twist, or change direction when weight bearing, but can also occur from contact to the lateral or medial aspect of the knee while the lower extremity is planted.

The meniscus has two types of tears: bucket handle meniscus tear, a longitudinal tear; and the transverse or peripheral tear. Tears are graded from I to III based on the completeness of tears (Grade III is a complete tear of the meniscus).
Surgical options include partial meniscectomy, meniscal repair depending on grade and location, and allograft transplantation. In general, meniscectomy healing is more rapid than meniscal repair. Long term outcomes vary depending on the type, grade and surgical technique employed.

Approximately one third of meniscal tears can be treated with conservative intervention that focuses on the resolution of impairments such as swelling, restricted range of motion, and strength using exercises, bracing, and oral medications.

Patient History

Patient history may include:

Patient Data

Meniscal tears are one of the most common knee injuries. This type of injury is more common in males than females. This type of injury may be due to trauma or a degenerative process.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, ligament tear
Fever, severe pain	Infection
Popliteal fossa pain, sudden onset	Popliteal aneurysm
Diabetes	Neuropathy

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Multiple joint involvement	Rheumatologic diseases
Unilateral edema	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of foot, or leg	Arterial occlusion
Immune-compromised state	Infection

Presentation

This type of injury is commonly preceded by a sudden twist or repeated squatting. Individuals often report clicking, catching, locking, or a feeling of giving away in the knee.

Subjective Findings

- Pain is localized to the joint line.
- Pain from meniscus injuries is commonly intermittent, and usually the result of synovitis or abnormal motion of the unstable meniscus fragment.
- Includes clicking, catching, locking, pinching, or a sensation of giving way.

Objectives Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Gait analysis
- Palpation of bony and soft tissue
- Range of motion (active and passive)
  - Assess ipsilateral and contralateral hip, knee and ankle range of motion
- Manual muscle testing
  - Assess ipsilateraland contralateral hip, knee and ankle strength
- Neuromuscular tests
  - Repeated half-squats (L3)
  - Repeated toe-raises (S1-S2)
  - Resisted hip flexion (L2-L3)
  - Patella reflex (L3-L4)
  - Resisted dorsiflexion (L5)
  - Medial hamstring reflex (L5)
- Orthopedic tests
  - Leg length discrepancy test
  - Joint play movements

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    - Straight leg raise test
    - Iliotibial band length
    - Ligamentous Instability tests (Varus Stress, valgus Stress, Anterior Drawer, Lachman test, pivot shift test, Posterior Drawers tests
    - Patello-femoral tests (Apprehension, medial-lateral, patellar tilt, patella grind tests)
    - Provocative Tests (McMurray's test, Apley's test, Steinmann's sign)
- Functional Tests for the knee- The following standardized tests may be used to assess functional limitations:
    - Knee Outcome Survey
    - International Knee Documentation Committee

Findings of Meniscus Tear

- Swelling usually occurs as a delayed symptom or may not occur at all.
- Immediate swelling indicates a tear in the peripheral vascular aspect.
- Degenerative tears often present with recurrent effusions due to synovitis.
- Joint line tenderness.
- Mechanical block to motion or frank locking can occur with displaced tears.
- Restricted motion caused by pain or swelling is common.
- McMurray test usually elicits pain or a reproducible click.
- Steinmann test may be positive.
- Apley test is suggestive of meniscal pathology if pain at the medial joint line is elicited.
- Similar tests including Bragard sign, Bohler sign, Payr sign, Merke sign, Childress sign, and Finochietto sign are based on the provocative principle.

Differential Diagnoses

- Anterior cruciate ligament injury
- Contusions
- Iliotibial band syndrome
- Knee osteochondritis dissecans
- Lateral collateral knee ligament injury
- Lumbosacral radiculopathy
- Medial collateral knee ligament injury
- Medial synovial plica irritation
- Patellofemoral joint syndromes
- Pes anserine bursitis
- Posterior cruciate ligament injury
- Articular cartilage pathology including arthritis, neoplastic pathology
- Osteonecrosis of the femur or tibia
- Crystalline deposition diseases including gout and pseudogout (chondrocalcinosis)
- Ipsilateral hip disease
- Plica

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Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

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Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate	Considerable loss

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		loss	
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

- Minimize the effusion,
- Normalize gait,
- Normalize pain-free range of motion,
- Prevent muscular atrophy, and
- Maintain proprioception and cardiovascular fitness
- Use Therapeutic exercises for ROM, and strengthening
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.

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- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of lower extremity occurs
- Range of motion plateaus or decreases
- Re-injury occurs

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Conservative Management

The following table lists the procedures for **Acute Tear**.
Please note, weight-bearing is restricted on a knee that cannot extend fully secondary to effusion.

Expected Outcome	Procedures/Modalities Such As
Decrease pain/effusion	▪ Ice/ ice packs ▪ Friction massage ▪ Ultrasound ▪ Vasopneumatic devices
Normalize pain-free range of motion/avoid contractures	▪ Manual therapy techniques ▪ Stretching at end range ▪ Passive/active assisted/active range

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	of motion exercise ▪ Stretch hamstrings and iliotibial band
Strengthen lower extremity musculature and achieve motor control	▪ Neuromuscular facilitation using electrical stimulation with maximum muscle contraction ▪ Isometric exercises ▪ Isotonic exercises ▪ Isokinetic Exercises ▪ Proprioception and balance
Patient education, self-management, joint protection, and home exercise program	▪ Non-weightbearing on crutches, do not bear weight on a locked knee ▪ Teach home exercise program ▪ Ice to manage effusion
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual tolerance of activities and positions ▪ Lower extremity bathing/dressing ▪ Gait training and ambulation, level and uneven surfaces ▪ Stair mobility ▪ Functional training

The following table lists the procedures for **Chronic Tear**.

- Do not encourage extension if restriction is due to intra-articular block
- Minimize compressive loading of the joint until adequate muscular protection and joint reorganization have been developed.

Expected Outcome	Procedures/Modalities Such As
Normalize pain-free range of motion/avoid contractures	▪ Manual therapy techniques ▪ Stretching at end range ▪ Passive/active assisted/active range of motion exercise ▪ Stretch hamstrings and iliotibial band
Strengthen lower extremity musculature and achieve motor control	▪ Neuromuscular facilitation using electrical stimulation with maximum muscle contraction ▪ Isometric exercises ▪ Isotonic exercises ▪ Isokinetic Exercises ▪ Proprioception and balance ▪ Dynamic stabilization
Patient education, self-management, joint protection, and home exercise program	▪ Teach home exercise program - Friction massage ▪ No forced extension
Ability to perform physical actions, tasks or activities related to self-care, home	▪ Gradual tolerance of activities and positions

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management, work, community and leisure	▪ Lower extremity bathing/dressing ▪ Gait training and ambulation, level and uneven surfaces ▪ Functional training

Post-Operative Management

Standard 'cookbook' protocols should be avoided and individualized programs - based on the type of surgical procedure, which meniscus was repaired, the presence of coexisting knee pathology (ligamentous laxity or OA), meniscal tear type, the patient's age, preoperative knee status (including the time between injury and surgery), loss of ROM and strength, and the patient's motivation – should be encouraged.

Accelerated meniscal repair rehabilitation programs that permit full knee ROM and full weight bearing are becoming more common, with return to full activity as early as 10 weeks after surgery.

- Control the pain and inflammation - cryotherapy, vasopneumatic devices
- Regain good knee control
- Restore ROM (Range of motion)- ROM exercises within any limits in range that the surgeon has requested
- Restore the flexibility
- Restore muscle function – neuromuscular electrical stimulation should be used in the arly phase, specific strengthening exercises including quadriceps (A medial meniscus lesion influences the strength of the M. Vastus medialis.), hamstrings, calf, hip. The exercise program should consist of both concentric and eccentric exercises to receive muscular hypertrophy as well as neuromuscular function.
- Optimize neuromuscular coordination - proprioceptive re-education
- Progress weight bearing - weight bearing and joint stress are necessary to enhance the functionality of the meniscal repair so should be progressed as indicated by the surgeon. Excessive shear forces may be disruptive and should be avoided initially.

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Cold packs

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- Theraband for therapeutic exercises
- Home electrical stimulation unit for pain control or muscle re-education

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Surgery
- Medication

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Tibial Plateau Fractures with ORIF

Synonyms

None

Definition

Tibial plateau fractures are categorized into at least six types, using the Schatzker classification system. Patients referred for therapy post operatively, should have stabilized fractures by use of screws, bone grafting, buttress plates and other forms of fixation.

Patient History

Patient History may include

Patient Data

Only 25% of tibial plateau fractures result from impact with automobile bumpers. The most common mechanism of injury involves axial loading, such as results from a fall. Other patterns of injury result from laterally directed forces or from a twisting injury. In all cases, force is directed from the femoral condyles onto the medial and lateral portions of the tibial plateau, resulting in fracture. In younger patients, the most common pattern of fracture is splitting, while in older, more osteoporotic patients, depression fractures typically are sustained.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma post op	Fracture
Fever, severe pain, drainage	Possible infection
Lower extremity angulation or instability	Fracture
Unilateral edema	Lower extremity deep vein thrombosis
Recent invasive procedures post op (dental work, urologic procedures)	Infection
Discoloration of foot or leg, exertional leg or foot pain	Arterial occlusion; vascular insufficiency; compartment syndrome

Presentation

Patient usually presents after surgery having limited weight bearing, limited AROM, pain and swelling. There may be ecchymosis. Symptoms are usually localized. Patients who

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suffered ligamentous injuries along with the fracture may have ROM restricted by a brace.

Subjective Findings

Complains of joint stiffness, swelling, pain with joint movement, and inability to ambulate.

Objective Findings

Objective Findings may include.

Scope of Examination

- History of present post op condition
- Medical history, including social support systems
- Review of systems
- Cardiovascular/Pulmonary (blood pressure, edema, heart rate, respiratory rate)
- Integumentary (skin/wound assessment, presence of scar formation)
- Musculoskeletal (gross ROM, strength, symmetry)
- Neuromuscular (gross coordinated movements, motor control, and motor learning)

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Infection
  - Swelling
  - Wound/scar
  - Color changes
- Palpation of bony and soft tissue
  - Pain
  - Temperature changes
  - Sensation
  - Pedal pulses
- Range of motion, active and passive movements of ipsilateral and contralateral joints
  - Knee (flexion, extension)
  - Ankle (dorsiflexion, plantarflexion, pronation, supination)
  - Hip (flexion, extension, abduction, adduction, external rotation, internal rotation)
- Manual muscle testing of ipsilateral and contralateral joints
  - Knee (flexion, extension)
  - Ankle (dorsiflexion, plantarflexion, pronation, supination)
  - Hip (flexion, extension, abduction, adduction, external rotation, internal rotation)
- Orthopedic and neurologic testing if neurologic signs are present

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    - Joint play movements of the knee and ankle joints
    - Measure leg length discrepancy
    - Test sensation along L5-S1
    - Reflexes: Patellar Tendon, Achilles Tendon
- Functional Assessment - The following standardized tests may be used to test balance, gait, transfers and ADL status:
    - Knee Injury and Osteoarthritis Outcome Score (Koos)
    - Lower Extremity Functional Scale (LEFS)
- Assessment of home's environment
    - Adequate lighting
    - Loose carpeting
    - Clear hallways
    - Accessibility to bathroom and bedroom
- Communication assessment
- Cognitive assessment

Findings of Tibial Plateau Fracture

Not applicable.

Differential Diagnosis

Not applicable.

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

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Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

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Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

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Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy program goals are to:

- Modalities to minimize the inflammation,
- Normalize gait,
- Normalize pain-free range of motion,
- Prevent muscular atrophy,
- Maintain proprioception,
- Relieve joint pain, and
- Increase strength so that other objectives may be achieved.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

The therapy program will consist of modalities to:

- Minimize the inflammation,
- Therapeutic exercises for ROM and strengthening, and
- Instruction in a home program.

Therapy program goals are based on the time interval of presentation for treatment.

- Initially, protection of weight bearing and mobilization of the knee is a focus.
- Many surgeons prefer CPM machines early in care.
- Concurrently, patient should be taught functional mobility with compensatory strategies within their precautions.
- Eventually, exercises should progress to strengthening, endurance and progression of weight bearing.
- Finally, full unsupported weight bearing and resumption of previous activity becomes the focus includes:
    - Therapeutic exercise,
    - Instruction in functional mobility,
    - Manual therapy techniques (i.e. patellar mobilization),
    - Electrotherapeutic modalities, and
    - Mechanical modalities.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.

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- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider to explore alternative treatment options when you find:

- Swelling or redness without history of trauma
- Muscle wasting
- Loss of reflexes

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.
The following table lists the procedures for **Acute Phase** presentation.
Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Pain and edema control	▪ Modalities i.e.-Cryotherapy ▪ Interferential ▪ Soft tissue massage
Improve range of motion	▪ Active assisted movements ▪ Passive movements ▪ Grade I/II joint and patellar mobilization techniques ▪ Stationary bike (auto-assisted exercises)
Improve strength	▪ Exercises in water (aquatics)

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	▪ Isometric contractions ▪ Isotonic exercises ▪ Electrical stimulation with maximum muscle contraction
Functional mobility training	▪ Gait training with assistive device and weight-bearing restriction ▪ Teach stair mobility with weight-bearing restrictions ▪ Teach ADLs with compensatory techniques
Patient education regarding joint protection and teach home exercise program	▪ Elevate to decrease swelling ▪ Avoid activities that require forceful quads contraction ▪ Teach home exercise program of stretching and strengthening exercises ▪ Physician may order use of CPM at home ▪ Teach signs and symptoms of compartment syndrome and infection

The following table lists the procedures for **Subacute Phase** presentation. Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Expected Outcome	Procedures/Modalities Such As
Improve range of motion	▪ Active movements ▪ Passive stretching ▪ Grade III joint mobilization techniques
Improve strength and endurance	▪ Closed chain kinetics ▪ Isotonic exercises ▪ Stair stepper ▪ Endurance training
Improve proprioception and balance	▪ Proprioceptive retraining ▪ Balance retraining ▪ Coordination
Functional mobility training	▪ Gait retraining ▪ Progression of weight-bearing ▪ Stair mobility ▪ ADL training
Patient education regarding joint protection and teach home exercise program	▪ Teach home exercise program of progressive stretching and strengthening exercises

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The following table lists procedures for **Corrective/Rehabilitative Phase** presentation.

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Improve range of motion	▪ Active movements ▪ Grade III/IV joint mobilization techniques
Improve strength	▪ Closed chain kinetics ▪ Isokinetic exercises ▪ Plyometrics (athletes)
Improve proprioception and balance	▪ Proprioceptive retraining ▪ Balance retraining
Return to activity	▪ Endurance training ▪ Begin controlled running (athletes) ▪ Specific sport training ▪ Vocational training i.e. Squatting, kneeling, standing

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his/her residence.

Home Medical Equipment

- Hot packs/cold packs after incision heals
- Theraband, ankle weights, for home exercise
- Assistive gait devices
- Brace

Self-Care Techniques

- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

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Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication

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Total Knee Arthroplasty, Osteoarthritis Knee

Synonyms

- TKA
- Total knee replacement

Definition

Total knee arthroplasty articular surfaces of the knee joint are replaced with artificial materials.

- Most commonly in response to disabling pain due to arthritic degeneration.
- While there are many types of prosthetics produced, most can be categorized by degree of constraint and type of fixation.
- Unconstrained prostheses are not common and rely on inherent joint stability.
- Most prostheses are semiconstrained; this type is frequently used in conjunction with the correction of contractures and varus/valgus deformity.
- Fully constrained prostheses limit motion and are reserved for severely unstable joints and severe deformity.
- Another distinguishing characteristic is method of fixation.
- More sedentary patients will receive a cemented prosthesis.
- More active patients will receive a porous ingrowth prosthesis.
- Due to difficulties encountered with loosening of tibial components, some surgeons prefer a hybrid fixation, with the femoral and patellar components press fit and the tibial component cemented.

Patient History

Patient history may include:

Patient Data

The most common etiology of Total Knee Replacement is osteoarthritis. This history provides the best post-operative outcome. This surgery is also performed in severe cases of inflammatory arthritis. Occasionally revisions of previous partial or total knee arthroplasty are performed.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma, post op	Fracture, component loosening
Fever, severe pain, drainage	Infection
Popliteal fossa pain, sudden onset	Popliteal aneurysm

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Diabetes	Neuropathy
Unilateral edema	Deep vein thrombosis
Discoloration of foot, or leg, exertional leg or foot pain	Arterial occlusion, vascular insufficiency
Immune-compromised state	Infection

Presentation

Patient usually presents with a complaint of pain that limits both active and passive ROM, and function in activities of daily living. There is frequently swelling and ecchymosis about the joint. Patient may have precautions against weight bearing, or initially be required to use an immobilizer for weight bearing activities.

Subjective Findings

- Knee pain
- Pain with motion
- Loss of ROM
- Post-operative effusion
- ADL limitations

Objective Findings

Objective findings may include:

Scope of Examination

- History of present post op condition
- Medical history, including social support systems
- Review of systems
- Cardiovascular/Pulmonary (blood pressure, edema, heart rate, respiratory rate)
- Integumentary (skin/wound assessment, presence of scar formation)
- Musculoskeletal (gross ROM, strength, symmetry)
- Neuromuscular (gross coordinated movements, motor control, and motor learning)

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
- Palpation of bony and soft tissue
- Mensuration
    - Measure swelling (compare to opposite side)
    - Measure quads lag
    - Measure for leg length discrepancy
- Range of motion, active and passive, as indicated for ipsilateral and contralateral hip, knee and ankle
- Manual muscle testing of ipsilateral and contralateral hip, ankle and knee

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- Tests and standardized measurements for balance and gait:
  - Balance: Berg Balance Test
  - Gait analysis
- Other Function Assessments - The following standardized tests may be used to assess functional limitations:
  - Western Ontario and McMasters Universities Arthritis Index Oxford-12

Findings of Arthroplasty, Osteoarthritis Knee

Not applicable

Differential Diagnosis

Not applicable

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or

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injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

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Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

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Treatment Methods

Treatment of patients after total knee arthroplasty is aimed at preventing post-operative complications, re-gaining functional independence, restoring pain-free ROM, and achieving adequate strength of the knee musculature.

Treatment includes:

- Use of therapeutic exercise,
- Training in mobility and ADL skills,
- Manual therapy techniques,
- Selection of assistive devices and equipment,
- Electrotherapeutic modalities, and
- Physical and mechanical devices.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their surgeon for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of lower extremity occurs
- Range of motion plateaus or decreases

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Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Acute Phase** presentation.
Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Control Pain and swelling	▪ Ice ▪ Electrical stimulation ▪ Vasopneumatic devices
Improve Range of motion, prevent contractures	▪ Manual therapy techniques ▪ Soft Tissue Mobilization ▪ Passive/active assisted range of motion exercises
Improve strength/power of lower extremity musculature and motor control	▪ Isometric exercises ▪ Isotonic exercises ▪ Proprioception ▪ Balance
Patient education on joint protection and home exercise program	▪ Knee immobilizer (per physician protocol) ▪ Continuous Passive Motion machine (per physician protocol) ▪ Elevation ▪ Use of assistive device ▪ Avoid sit/stand from low surfaces ▪ Inspect incision for signs of infection ▪ Assess need for Durable medical equipment e.g. tub bench, raised toilet seat, reachers, shoe horn ▪ Teach home exercise program
Improve mobility and ADL skills	▪ Training in bathing/dressing lower extremities ▪ Training in transfers into tub/shower, onto toilet ▪ Gait training/ambulation-level surfaces ▪ Stair mobility

The following table lists the procedures for **Subacute Phase** presentation.
Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing

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tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Expected Outcome	Procedures/Modalities Such As
Control Pain and swelling	▪ Ice ▪ Superficial heat ▪ Electrical stimulation ▪ Vasopneumatic devices
Improve Range of motion, prevent contractures	▪ Manual therapy techniques ▪ Soft Tissue Mobilization ▪ Active range of motion exercises
Improve strength/power of lower extremity musculature and motor control	▪ Isometric exercises ▪ Isotonic exercises ▪ Isokinetic exercises ▪ Proprioception ▪ Balance
Patient education on joint protection and home exercise program	▪ Knee immobilizer (per physician protocol) ▪ Use of Assistive device ▪ Avoid sit/stand from low surfaces ▪ Teach home exercise program
Improve mobility and ADL skills	▪ Training in bathing/dressing lower extremities ▪ Training in transfers into tub/shower, onto toilet ▪ Gait training/ambulation-level surfaces ▪ Stair mobility ▪ Cardiovascular fitness

The following table lists procedures for **Corrective/Rehabilitative Phase** presentation.

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Improve Range of motion, prevent contractures	▪ Manual therapy techniques ▪ Soft Tissue Mobilization ▪ Passive/active assisted range of motion exercises ▪ Passive overstretch at end of range
Improve strength/power of lower extremity musculature and motor	▪ Isotonic exercises ▪ Isokinetic exercises

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control	▪ Proprioception ▪ Balance
Improve mobility and ADL skills	▪ Training in car transfers ▪ Gait training/ambulation-level and uneven surfaces, community ambulation ▪ Cardiovascular fitness ▪ Stair mobility ▪ Advanced home exercise program

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Hot packs/heating pad
- Knee bracing
- CPM if indicated

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication
- Orthotist

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Orthopedic – Lower Extremity

Ankle/Foot Pain

Definition

'Ankle/foot pain' is defined as pain that consists of soreness, tension, pain, and/or stiffness in the ankle and/or foot region without a radicular component. This includes ankle/foot pain that is typically increased with movement, decreased with rest, and is of mechanical and/or chemical origin. This does not include pain attributable to possible serious underlying pathology or to so-called "red flags" (Cook, 2008). Ankle/foot pain can be categorized according to the International Classification of Functioning, Disability and Health (ICF) impairment-based category of ankle/foot pain (World Health Organization [WHO], 2005) in the following ways:

- b2804 heel pain
- b28015 Pain in lower limb
- b2804 Radiating pain in a segment or region
- b7300 Power of isolated muscles and muscle groups
- b7800 Sensation of muscle stiffness
- s75012 Muscles of lower leg
- s75028 Structure of ankle and foot, specified as Achilles tendon

Patient History

The history of ankle and foot pain may find etiological factors in arthritic, neurologic, traumatic or other systemic conditions (American College of Foot and Ankle Surgeons [ACFAS], 2010). It is recognized that the vast majority of cases of ankle and foot pain is of mechanical origin (ACFAS, 2010). Risk factors for foot and ankle pain of mechanical origin include mechanical overload (Bergmann, 1990; Fuller, 2000; Riddle, Pulisic, Pidcoe, et al, 2003), abnormal ankle dorsiflexion motion (Kaufman, Brodine, Shaffer, Johnson, & Cullison, 1999; Riddle, Pulisic, Pidcoe, et al, 2003; Tabrizi, McIntyre, Quesnel, & Howard, 2000), abnormal subtalar joint range of motion (Kvist, 1991; Siegler, Chen, & Schneck, 1990), increased foot pronation (McCrory, Martin, Lowery, 1999), abnormal tendon structure (Gardin, Bruno, Movin, Kristofferson-Wiberg, and Shalabi, 2006), obesity (Holmes & Lin, 2006; Riddle, Pulisic, Pidcoe, et al., 2003), diabetes mellitus (Holmes & Lin, 2006) and decreased ankle plantar flexion strength (Mahieu, Witrouw, Stevens, Van Tiggelen, & Roget, 2006). Screening for potential "red flag" indications is recommended (Cook, 2008; Egol, Amirtharajah, Tejwani, Capla, & Koval, 2004; Moore, 2009; Wells Hirsh, Anderson, Lensing, Foster, Kearon, Weitz, D'Ovidio, Cogo, & Prandoni, 1995).

Specific Considerations

- Rule out red flags (require medical management).

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- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic or primary)
Unilateral edema	Lower extremity deep vein thrombosis
Immune-compromised state	Infection
Diabetes	Neuropathy
Discoloration, cool foot	Vascular occlusion

Presentation

Presents with swelling, ecchymosis, severe pain, and inability to bear weight or ambulate on the ankle.

Subjective Findings

- Decreased muscle strength
- Ankle/foot stiffness
- Balance difficulties
- Swelling

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

In performing subjective and objective examination of the patient/client, clinicians should take into consideration those diagnostic classifications associated with serious pathological conditions and/or psychosocial factors when the patient's reported activity limitations or impairments of body function and structure are not consistent with conditions improvable with physical therapy interventions.

1)Functional outcome measures (Level I, Strong evidence base.)

Clinicians should consider use of scientifically validated self-report patient/client functional outcome measures such as the:

- Foot and Ankle Disability Index (Martin, Burdett, & Irrang, 1999),
- Foot and Ankle Ability Measure (Martin & Irrgang, 2007),
- Lower Extremity Functional Scale (Binkley, Stratford, Lott, & Riddle, 1999),
- Victorian Institute of Sport assessment [VISA-A] (Robinson, Cook, Purdam, et al., 2001)

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These outcome scoring methods are useful in identifying baseline, intervalp rogress, and discharge status.

2)Ottawa Ankle Rules (Level I, Strong evidence base)

This instrument consists of a questionnaire for assessment of the ankle and foot injuries and has been found to be valid and consistent in its ability to screen for patients who need to undergo radiological screening for fractures of the mid-foot and ankle. Patients who meet the criteria should be referred for further medical screening (Bachmann, Kolb, Koller, Steurer, and ter Tiet, 2003; Dowling, Spooner, Liang, et al., 2009;

3)Ankle-Foot active range of motion measurement (Moderate level of evidence)

- Measurement of bodily impairment.
- Ankle/foot active range of motion is measured ordinarily in the supine and prone positions (Cook, 2008).
- Use of a validated measurement instrument is recommended (Elveru, Rothstein, & Lamb, 1988**;** Jonson & Gross, 1997; Martin & McPoil, 2005).

4)Special clinical tests (Strong to Moderate level of evidence)

It is to be noted that the reliability of the methods to measure mechanicallaxity of the ankle have been questioned and results are influenced by the examiner's experience and subjectivity (Frost & Amendola, 1999; Harper, 1992; Hubbard & Hicks-Little, 2008; Kovaleski, Gurchiek, Heitman, Hollis, & Pearsall, 1999; Tohyama, Yasuda, Ohkoshi, Beynnon, & Renstrom, 2003).

a. Fibular translation test (Moderate level of evidence)

Measurement of bodily impairment. The patient /client is sidelying and the examiner applies anterior and posterior translational force on the fibula above the level of the syndesmosis. A positive test demonstrates increased movement compared to the unaffected side (Beumer, Swierstra, & Mulder, 2002; Beumer, van Hemert, Swierstra, Jasper, & Belkoff, 2003).

b. Anterior drawer test (Moderate level of evidence)

Measurement of bodily impairment. The patient/client is supine and thea nkle is pre-positioned into slight plantarflexion. The calcaneus and talus is glided anteriorly on a stabilized tibia. A positive test is excessive translation of the affected side in comparison to the unaffected side (Hertel, Denegar, Monroe, & Stokes, 1999; Phistkul, Chaichankul, Sripongsai, Prasitdamrong, Tengtrakulcharoen, & Suarchawaratana, 2009).

c. Medial sub-talar glide test (Moderate level of evidence)

Measurement of bodily impairment. The patient/client is supine and thet alus is manually stabilized superiorly while the calcaneus is gripped around the plantar aspect. A medial gliding of the calcaneus is applied on the fixed talus. A positive test is gross laxity when compared to the unaffected side (Hertel, Denegar, Monroe & Stokes, 1999).

d. Medial Talar Tilt Stress Test (Moderate level of evidence)

Measurement of bodily impairment. The patient/client is supine ors itting and the affected ankle is held proximal to the malleoli. The calcaneus is medially thrust in a quick fashion. A positive test is present when excessive laxity is present when compared to the unaffected side (Hertel, Denegar, Monroe, & Stokes, 1999).

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e. Forced dorsiflexion test (Moderate level of evidence)
Measurement of bodily function. The patient is sitting and the distal aspect of the tibia is manually stabilized. The examiner places his thumb on the antero-lateral aspect of the talus at the lateral gutter. While applying pressure at the lateral gutter, forcefully dorsiflex the foot. A positive test is symptom reproduction at the antero-lateral aspect of the foot when dorsiflexed.

f. Measurement of Swelling (Strong level of evidence)
Measurement of bodily function. The patient/client is positioned in an eutral ankle or 20 degree plantar flexion position, and a tape measure is wrapped around the ankle in a figure eight manner and measurement is taken. A comparison is made to the unaffected ankle (Pugia, Middel, Seward, et al., 2001; Rohner-Spengler, Mannion, & Babst, 2007).

g. Single-Limb Balance Test (Strong level of evidence)
Measurement of bodily function. The patient/client stands on one leg for one minute with eyes open and one minute with eyes closed. The first time the patient/client touches the non-support leg to the floor or other leg, the timer is stopped (Chrintz, Falster & Roed, 1991; Freeman, Dean, & Hanham, 1965)

Differential Diagnoses

- Radicular pathology
- Crystalline deposition diseases: gout and pseudogout (Chondrocalcinosis)
- Infections
- Metastasis

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a

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combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

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Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. ADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination) and IADLs (such as cooking, driving, managing finances and medication ect.)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

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1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress.

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Management/Intervention

A. Clinical interventions with Strong Recommendation (based on Level I-II evidence, moderate to strong level of evidence)

1.Exercise Intervention

Proprioception training

The preponderance of studies has shown that proprioceptive and balance training improves functional stability of ankle dysfunction and is preventive of future recurrence (Baltaci, & Kohl, 2003; Bernier, & Perrin, 1998; Forkin, Koczur, Battle, & Newton, 1996; Leanderson, Eriksson, Nilsson, & Wykman, 1996; Matsusaka, Yokoyama, & Tsurusak, 2001; Tropp, Ekstrand, & Gillquist, 1984; Verhagen, van Mechelen, & de Vente, 2000;)

2.Taping and Bracing

Taping has two functions: to exert a mechanical or stabilizing effect by limiting harmful movement and influence on the proprioceptive function of the foot and ankle (Firer P., 1990; Karlsson, Swärd, & Andréasson, 1993). Extensive reviews show strong evidence for the use of external support to prevent ankle pain relapses (Handoll, Rowe, Quinn, & de Bie, 2001; Verhagen, van Mechelen, & de Vente, 2000).

3.Cryotherapy

Application of cryotherapy appears to be beneficial with the recommendation of longer rather than shorter duration of time application with intermittent application. No specific time of duration is specified in the studies reviewed **(**Bleakley, McDonough, & MacAuley, 2004).

4.Manual therapy techniques

Manual therapy techniques including but not limited to specific muscle stretching techniques, joint mobilization-manipulation techniques, and manual traction techniques have been shown to be beneficial in treatment of foot-ankle pain (Green, Refshauge, Crosbie, & Adams, 2001; van der Wees, Lenssen, Hendriks, Stomp, Dekker, & de Bie, 2006). Application of manual therapy techniques including long-axis distraction, graded joint mobilizations, and manipulation have been shown to be the most beneficial **(**Köhne, Jones, Korporaal, Price, Brantingham, & Globe, 2007).

5.External Support in acute phase

Evidence including systematic reviews favor the use of external support such as semi-rigid bracing and/or crutch support with progressive weight bearing (Cooke, Marsh, Clark, et al., 2009; Kerkhoffs, Rowe, Assendelft, Kelly, Struijs, & van Dijk, 2001)

B. Clinical interventions with neutral recommendation (Level II-III evidence, Moderate to Low Level of evidence)

1.Strength, endurance and flexibility exercise

Exercise both passive and active that has the intention of gaining strength, increase/maintain range of motion, and general/specific flexibility is recommended as muscle weakness and stiffness is common in painful foot ankle conditions (DiGiovanni, Nawoczenski, Lintal, Moore, Murray, Wilding, & Baumhauer, 2003; DiGiovanni, Nawoczenski, Malay, D.P., Graci, P.A.,

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Williams, T.T., Wilding, & Baumhauer, 2006; Smith, Docherty, Simon, Klossner, & Schrader, 2012).

Exercise that is low intensity with controlled movement and without increased pain is recommended (Drewes, 2009). It is recommended that a general course of a minimum of six weeks of physical therapy be utilized in order to effect both physiologic and behavioral changes (Vogel, et al., 2003).

C. Clinical interventions not recommended (Poor evidence, no evidence, or expert opinion)

1.Modalities

The role and effectiveness of therapeutic modalities is unclear in the evidence or is clearly not recommended with the exception of cryotherapy modality as noted above (Gezondheidsraad, 1999; van den Bekerom, van der Windt, ter Riet, van der Heijden, & Bouter, 2011; Van der Heijden, Torenbeek, Windt, Hidding, Dekker, & Bouter, 1999;). This includes transcutaneous electrical nerve stimulation, heat, laser therapy, iontophoresis, diathermy, and ultrasound modalities.

Positive Patient Response and Review of the Medical Literature

Review of relevant medical literature and determination of physical therapy intervention(s) with defined recommendations are based primarily on results demonstrating functional gains attained through the intervention that can be objectively measured, such as positional tolerances, range of motion, strength, endurance, activities of daily living (ADL), cognition, psychological behavior, and efficiency/velocity measurements. Subjective reports of pain and function should be considered and given relative weight when the pain has an anatomic and/or physiological basis. All findings must be based on objective medical evidence.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Ankle brace
- Assistive gait device

Self-Care Techniques

- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation

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- Medication
- Surgery (as last resort)
- Bracing

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Ankle Ligament, Reconstruction, and Repair

Synonyms

None

Definition

Reconstruction is distinguished from repair, as a technique that re-directs tendons, fascia or grafts to increase stability of the ankle. Repair is designed to re-establish the damaged ligament.

Patient History

Patient history may include:

Patient Data

Patients that are candidates for surgery, experienced chronic ankle instability, and have not responded to more conservative measures.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever, severe pain	Possible infection, compartment syndrome
Cancer history	Cause of symptoms (metastatic or primary)
Unilateral edema	Lower extremity deep vein thrombosis
Immune-compromised state	Infection
Multiple joint involvement, tophi	Rheumatologic diseases, gout
Diabetes	Neuropathy
Severe pain, swelling, discoloration, cold to touch within 12-24 hours following trauma	Compartment syndrome

Presentation

Patient is usually immobilized after surgery for four to eight weeks, depending on the type of surgery and surgeon preference. Most patients are non-weight bearing immediately post op for a period of one to three weeks, after which many patients will

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be allowed to progressively bear weight in a cast or AFO. Check with the referring surgeon. In the case of ligament repair—patient may have precautions against adduction and inversion.

Subjective Findings

- Tenderness over the involved ligament
- May complain of weakness or apprehension
- Stiffness and limited ROM
- Functional losses

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Note: Post-surgical complications include:
- Sural nerve entrapment
- Wound dehiscence (usually from infection)
- Intra-articular hemorrhage
- Sinus tarsitis
- Degenerative joint disease
- Osteophytic proliferation
- Recurrence of instability
- Residual pain

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Surgical wound/scar adhesions
  - Swelling
  - Ecchymosis
- Palpation of bony and soft tissue
  - Pain over ligament
  - Swelling
  - Anatomical position of ankle
- Range of motion, active and passive, ipsilateral and contralateral joints (as allowed by post op precautions)
- Ankle
    - Dorsiflexion
    - Plantarflexion
    - Inversion

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        - Eversion
        - Toe movements
- Knee
        - Flexion
        - Extension
- Hip (flexion, extension, abduction, adduction, internal rotation, external rotation)
- Orthopedic Testing and Neurologic testing
    - Joint play movements: Assess for hypomobility, hypermobility at the ankle
    - Test dermatomes and myotomes of L4, L5, S1, S2
    - Test tendon reflexes: Achilles Tendon, Patella Tendon
    - Test for leg-length discrepancy
    - Ankle Instability Tests
        - Anterior Drawer test
        - Tilt Test
        - Peroneal tendon stability test
- Assessment of gait (as allowed by weight bearing status)
- Barefoot walking (use paper walkway 20-24 ft – analyze base of support, cadence, stride length, velocity, heel strike, midstance, toe off, trunk lurch, hip extension
        - Normal Gait
        - Walk on toe
        - Walk on heels
- Standing with feet fixed:
        - Externally rotate legs on feet
        - Internally rotate legs on feet
- Standing with knees extended:
        - Evert feet
        - Invert feet
- Functional Activities (clinical assessment in PT, Lippincott, 1990) - The following standardized tests may be used to assess functional limitations:
    - Foot and Ankle Outcome Score (FAOS)
    - Foot and Ankle Ability Measure (FAAM)

Findings of Ligament Reconstruction or Repair

- Weakness
- Impaired motor function
- Limited ROM
- Patient probably will have weight bearing and/or bracing restrictions
- Pain and swelling

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

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Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

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Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1.Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2.Muscle Strength	Mild/no loss	Mild to moderate	Considerable loss

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		loss	
3.Neurologic findings	None	May be present	May be present
4.BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to Maximal Complex Motion Necessary for Functional Activities)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy program goals are to:

- Reduce pain and inflammation;
- Aid stretching and strengthening; and
- Assist in gradual return to activity.

Methods used include:

- Modalities to reduce pain and inflammation are appropriate.
- Following a period of immobilization that will probably last several weeks, gentle ROM is started avoiding adduction and inversion.
- Next in the usual sequence are isometrics, followed by proprioceptive and functional strengthening.
- Peroneal strength and control are usually a high priority with lateral repair.
- Progression is primarily time based to allow tissue healing, but individual surgeons may have their own performance criteria for advancing.
- Both criteria may vary based on the type of surgery and specific technique used.

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- Consult with referring surgeon.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress.

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for treatment following the **Post-operative immobilization period** (immobilization lasts 4-8 weeks, patient is non-weightbearing for 1-3 weeks):

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Expected Outcome	Procedures/Modalities Such As
Reduce pain and swelling	▪ Cryotherapy ▪ Phonophoresis ▪ Interferential current
Improve flexibility	▪ Passive stretches of the Achilles tendon ▪ Active range of motion of ankle joint, avoid adduction and inversion
Improve strength	▪ As pain decreases add isometric and isotonic exercises ▪ Once weight-bearing restrictions are lifted and wound is healed: ▪ Advance to close-chain exercises ▪ Balance and proprioception training
Patient education and self-management techniques	▪ Frequent icing ▪ Teach mobilization techniques ▪ Teach range of motion and strengthening exercises ▪ Scar management ▪ Correct footwear, wear high-topped footwear to increase ankle stability ▪ Teach protective taping to increase ankle stability
Correct gait abnormality and proper biomechanics and gradual return to normal function	▪ Correct gait pattern ▪ Ambulation and endurance on level, uneven surfaces ▪ Stair mobility

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises
- Orthotics
- Assistive gait device

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Self-Care Techniques

- Gentle progression of activities
- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Orthotist
- Medication
- Local injections (i.e., long acting anesthetics)
- Surgery (as last resort)

Medicare References

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Ankle Tendon Repair

Synonyms

None

Definition

Tendon repair involves suturing the ends of torn tendon into approximation, and usually, immobilization for a period of weeks. It also may involve modification of associated fascial structures. Some tendon tears are treated with immobilization alone, depending on factors such as age, activity level and co-morbidities.

Patient History

Patient history may include:

Patient Data

Tendon rupture can occur from a single strenuous event, typically causing a forceful eccentric contraction, or from degenerative changes in a tendon. The latter usually has a history of pain, with a previous diagnosis of inflammatory processes.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever	Possible infection
Cancer history	Cause of symptoms (metastatic or primary)
Unilateral edema	Lower extremity deep vein thrombosis
Immune-compromised state	Infection
Multiple joint involvement	Rheumatologic diseases
Diabetes	Neuropathy
Discoloration of foot, exertional foot or calf pain	Vascular occlusion; vascular insufficiency
Severe pain, swelling, discoloration, cold to touch	Compartment syndrome

Presentation

Presents with a short-leg splint or walking boot, with weight bearing restrictions and an assistive device. May also present with pain, stiffness and weakness of the ankle.

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Subjective Findings

- Tenderness over the involved tendon
- May complain of weakness or apprehension
- Stiffness and limited ROM
- Functional losses

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

- Biomechanics of foot during gait
- Wound healing, and presence of scar
- Possibility of repair failure

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Surgical scar/ wound
  - Antalgic gait
  - Posture
  - Weight-bearing status
  - Use of assistive device
  - Type of immobilization of ankle joint
- Palpation of bony and soft tissue
  - Swelling
  - Adhesions
  - Sensation
  - Skin temperature changes
- Range of motion, active and passive (as allowed by post op precautions) and manual muscle test for ipsilateral and contralateral joints
  - Ankle: Dorsiflexion, Plantarflexion, inversion, eversion
  - Knee: Flexion, extension, medial rotation, lateral rotation
  - Toe movements
  - Hip movements
- Orthopedic and neurologic testing
  - Joint play movements: Assess for hypomobility, hypermobility at the ankle
  - Test dermatomes and myotomes of L4, L5, S1, S2
  - Test tendon reflexes: Achilles Tendon, Patella Tendon
  - Test for leg-length discrepancy
  - Ankle Instability Tests
    - Anterior Drawer test

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        - Tilt Test
        - Peroneal tendon stability test
- Assessment of wound integrity
    - Wound healing
    - Extensibility of scar tissue
- Assessment of gait (as allowed by weight bearing status)
- Barefoot walking (use paper walkway 20-24 ft – analyze base of support, cadence, stride length, velocity, heel strike, midstance, toe off, trunk lurch, hip extension)
        - Normal Gait
        - Walk on toes
        - Walk on heels
- Standing with feet fixed:
        - Externally rotate legs on feet
        - Internally rotate legs on feet
- Standing with knees extended:
        - Evert feet
        - Invert feet
- Functional Activities: The following standardized tests may be used to assess functional limitations:
    - Foot and Ankle Outcome Score (FAOS)
    - Foot and Ankle Ability Measure (FAAM)

Findings of Tendon Repair

- Pain and swelling over the tendon particularly with movement
- Weakness
- Impaired motor function
- Limited ROM
- Patient probably will have weight bearing and/or bracing restrictions

Differential Diagnoses

Not applicable

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)
Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member

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- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Complexity of surgical procedure, and
- Expectation for improvement.

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

- Usually the first few weeks after immobilization (typically six weeks) are geared towards gently improving ROM.
- If tolerated well, then resistive activities are phased in, isometrics first, then isotonics.
- Gait training follows approximately two weeks after starting resistive strengthening.
- Patient education in careful progression of activities, as well as identification of, and correction of faulty technique (i.e. instruction in proper warm-up and cool-down; and instruction in appropriate footwear) should take place to protect against re-rupture.
- Heel lift may be ordered initially, for added protection of an Achilles repair.
- Trend with Achilles repairs to accelerate rehabilitation (having undergone surgical repair with a Kessler type suture).
- Patient is allowed full weight bearing on post op day one, within an AFO "walker", and instructed to perform passive ROM in a limited range.
- In either case, the provider should check with surgeon for individual preferences.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

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Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Peroneal Longus and Brevis Repair: Ankle is immobilized in a short leg cast for 6 weeks, weight-bearing at 4 weeks and foot placed in a boot for a further 4 weeks.

Achilles Tendon Repair: Ankle is immobilized with an AFO walker for 6 weeks. Weight-bearing is allowed immediately. The ankle is initially placed in plantarflexion, dorsiflexion is gradually increased until neutral is achieved at 4 weeks.

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Expected Outcome	Procedures/Modalities Such As
Reduce pain and swelling	▪ Cold applications ▪ Electrical stimulation ▪ Ultrasound ▪ Soft tissue mobilization
Increase range of motion and flexibility	▪ Passive range of motion ▪ Joint mobilization
Improve strength and muscle power	▪ Begin with isometric and isotonic exercises ▪ Add progressive resisted exercises ▪ Add closed chain exercises once full weight-bearing is allowed
Improve balance and proprioception	▪ Neuromuscular re-education ▪ Balance and proprioception activities in standing
Gradual return to normal function	▪ Use of a standardized test to monitor functional improvement ▪ Gait training with progressive weight-bearing with/without assistive device ▪ Stair mobility ▪ Squatting and kneeling activities ▪ Work on other activities required for return to work
Sports specific training (for athletes only)	▪ Running straight ahead ▪ Running, twisting, cutting ▪ Jumping ▪ Jumping and going into full squat ▪ Use protective taping and/or bracing for 6 weeks after repair
Education and self-management	▪ Teach stretching and proper conditioning to prevent re-rupture ▪ Use of appropriate and properly fitting shoes ▪ Teach use of ice/heat for pain control and swelling ▪ Teach home exercise program of stretching, strengthening and joint mobilization techniques.

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

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Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises
- Orthotics
- Heel lift
- Assistive gait device

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises, stretching
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Orthotist
- Medication
- Surgery (as last resort)

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Calcaneus Fracture

Synonyms

Broken foot

Definition

A fracture is essentially a structural failure of bone. The nature of a fracture is determined by the inherent properties of bone, its structure, and type of forces applied to it.

- Forces of tension, compression, bending and torsion can load bone beyond its structural strength.
- External forces may render a fracture displaced or undisplaced, with two or more fragments.
- Displaced fragments may be overriding one another, lateral to each other, extremely distracted from one another, angulated, or rotated out of alignment.
- Displaced fractures may be open fractures with a fragment breaking through the skin, exposing the fracture site to the external environment and increases risk of infection.
- In addition to bony involvement, fractures frequently result in associated injury of soft tissues attached to, or adjacent to, the bone.
- Calcaneous is the most frequently fractured tarsal bone, and is usually the result of compression rather than tension.
- Surgical treatment may be performed for fractures disrupting the articular surface.

Patient History

Patient history may include:

Patient Data

Patient may have a history of falls from a height or a motor vehicle accident. Patients are more likely to be young male individuals with intra-articular injuries.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear
Fever, severe pain	Infection
Loss of distal pulse, severe pain 12-24 hours after trauma	Compartment syndrome, arterial occlusion
Diabetes	Neuropathy

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Multiple joint involvement, tophi	Rheumatologic diseases, gout
Unilateral edema	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of leg or foot	Arterial occlusion
Immune-compromised state	Infection

Presentation

- Short leg cast or orthosis
- Non-weight-bearing gait with assistive device
- Knee and hip held in flexion

Subjective Findings

- Pain with joint movement
- Swelling of the ankle, foot and lower leg

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

- Ligament involvement
- Plantar fasciitis
- Achilles tendonitis

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Edema/ecchymosis
  - Deformities of the heel or plantar-arch
  - Type of weight-bearing
  - Asssistive device used
- Palpation of bony and soft tissue
  - Edema
  - Pain aknle and heel
  - Ligaments and soft tissue
  - Skin color
  - Pedal Pulses
- Range of motion, active and passive movements of ipsilateral and contralateral joints
  - Ankle Joint: Dorsiflexion, plantarflexion, pronation, supination
  - Knee Joint; Knee flexion, extension, Medial rotation, lateral rotation

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    - Toe movements
- Manual muscle testing of ipsilateral and contralateral joints
    - Ankle Joint: Dorsiflexion, plantarflexion, pronation, supination
    - Knee Joint; Knee flexion, extension, Medial rotation, lateral rotation
    - Toe movements
- Orthopedic and neurologic testing if neurologic signs are present
    - Joint play movements of the ankle joint (test for hyper/hypomobility)
    - Ligament stability test: Anterior Drawers test, Tilt test, Peroneal Stability test
    - Thompson's Test (Achilles Tendon Rupture)
    - Reflexes: Patellar Tendon, Achilles tendon
    - Myotomes, Dermatomes (L5-S1)
- Assessment of gait (when weight-bearing is allowed)
- Barefoot walking and running (in athletes) (use paper walkway 20-24 ft – analyze base of support, cadence, stride length, velocity, heel strike, midstance, toe off, trunk lurch, hip extension)
        - Normal Gait
        - Walk on toes
        - Walk on heels
- Standing with feet fixed:
        - Externally rotate legs on feet
        - Internally rotate legs on feet
- Standing with knees extended:
        - Evert feet
        - Invert feet
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
    - Foot and Ankle Outcome Score (FAOS)
    - Foot and Ankle Ability Measure (FAAM)

Findings of Calcaneus Fracture

- Swelling occurs at fracture site
- Restricted motion caused by pain, swelling, immobilization, or soft tissue shortening is common
- Muscle atrophy

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to

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perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

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- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

- Normalize gait,
- Normalize pain-free range of motion,
- Prevent muscular atrophy,
- Maintain proprioception,
- Relieve joint pain, and
- Increase strength so that other objectives may be achieved.
- Use Modalities to minimize inflammation, and
- Use therapeutic exercises for ROM and strengthening, with instruction in a home program.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or

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periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.

- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Swelling or redness without history of trauma
- Muscle wasting
- Loss of reflexes

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for treatment during the **Acute Phase** (patient will have a short leg cast for 2 weeks, Range of motion begins after two weeks.):

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Reduce pain and inflammation	▪ Ice massage/cold packs ▪ Pulsed Ultrasound ▪ Electrical stimulation ▪ Soft tissue mobilization
Improve flexibility	▪ Passive range of motion of ankle joint ▪ Active range of motion ▪ Joint mobilization
Improve strength	▪ As pain decreases add isometric and isotonic exercises
Improve ambulation	▪ Teach non-weight-bearing gait and stair mobility with assistive device

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Patient education and self-management techniques	▪ Frequent icing/ice packs ▪ Teach home exercise program of active and passive exercises ▪ Teach compensatory techniques for ADL performance

The following table lists the procedures for **Subacute Phase** presentation (Progressive weight-bearing is allowed at 8 weeks and full weight-bearing at 12 weeks):

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Expected Outcome	Procedures/Modalities Such As
Improve flexibility	▪ Achilles stretching ▪ Active range of motion
Restore normal biomechanics	▪ Progressive resistance exercises, isokinetic exercises ▪ Add Closed chain exercises when Full weight-bearing is allowed
Improve balance and proprioception	▪ Proprioception and balance re-training
Improve gait pattern and distance	▪ Gait training with progressive weight-bearing ▪ Stair mobility
Patient education, self-management and home exercise program	▪ Modification of training activities/elimination of activities that aggravate symptoms ▪ Home exercise program of strengthening and stretching
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual tolerance of activities and positions ▪ ADL training ▪ Sports specific skills or vocational training

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

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Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Heat packs
- Assistive gait device

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Heat packs

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic Manipulation
- Chiropractic
- Medication

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Femoral Shaft Fracture, with ORIF

Synonyms

None

Definition

Stabilization of fracture fragments using open surgical procedures to place devices, such as plate-and-screw, intramedullary rods, wires, and pins and nails to reduce displacement and promote healing.

Patient History

Patient History may include

Patient Data

Femoral Shaft Fractures are high energy injuries usually due to trauma, falls, gunshot wounds, sports injuries. These fractures can also be caused by metabolic bone disease or tumors.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma post op	Fracture, dislocation
Fever, severe pain, drainage	Possible infection
Lower extremity shortening or external rotation	Fracture, dislocation
Unilateral edema	Lower extremity deep vein thrombosis
Recent invasive procedures post op (dental work, urologic procedures)	Infection

Presentation

Patient usually presents after surgery having limited weight bearing, limited ROM, pain and swelling. There may be ecchymosis. Symptoms are usually localized between the proximal and distal incisions; however, persistent knee stiffness is a frequent issue.

Subjective Findings

- Pain with lower extremity movements
- Knee stiffness

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- Swelling

Objective Findings

Objective Findings may include

Scope of Examination

- History of present post op condition
- Medical history, including social support systems
- Review of systems
- Cardiovascular/pulmonary (blood pressure, edema, heart rate, respiratory rate, peripheral pulses)
- Integumentary (skin/wound assessment, presence of scar formation)
- Musculoskeletal (gross ROM, strength, symmetry)
- Neuromuscular (gross coordinated movements, motor control, and motor learning)

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Edema
  - Surgical wound/scar formation
  - Skin color
  - Antalgic gait
  - Type of assistive device
- Palpation of bony and soft tissue
  - Pain
  - Temperature
  - Sensation
  - Pedal Pulses
- Range of motion, active and passive, as indicated for ipsilateral and contralateral joints
  - Hip Joint: Flex, extension, adduction, adduction external rotation, internal rotation
  - Knee: Flex, extension, medial rotation,lateral rotation
  - Ankle Joint: Dorsiflexion, plantarfelxion, supination, pronation
- Manual muscle testing, as indicated for ipsilateral and contralateral joints
  - Hip Joint: Flex, extension, adduction, adduction external rotation, internal rotation
  - Knee: Flex, extension, medial rotation,lateral rotation
  - Ankle Joint: Dorsiflexion, plantarfelxion, supination, pronation
- Tests and standardized measurements for balance, gait, transfers and ADL status
  - Bathing/dressing lower extremity (FIM)
  - Gait analysis

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    - Tinetti test for balance
    - Timed Get up and Go test
    - Stair mobility (FIM)
    - Transfers (FIM)
- Assessment of homes physical environment
    - Adequate lighting
    - Loose carpeting
    - Clear hallways
    - Accessibility to bathroom and bedroom
- Communication assessment
- Cognitive assessment
- Functional Assessment - The following standardized test may be used to assess functional limitations:
    - Lower Extremity Functional Scale (LEFS)

Findings of Femoral Shaft Fracture

- Antalgic Gait
- Shortening of one leg
- Swelling
- Deformity
- Impaired range of motion and strength

Differential Diagnosis

- Compartment Syndrome
- Hip Dislocation
- Hip Fracture

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status

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of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

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Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)

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3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy program goals are based on the time interval of presentation for treatment.

- Initially, protection of weight bearing and mobilization of uninvolved joints is a focus.
- Concurrently, patient should be taught functional mobility with compensatory strategies within their precautions.
- Eventually, exercises should progress to strengthening, endurance and progression of weight bearing.
- Finally, full unsupported weight bearing and resumption of previous activity becomes the focus includes therapeutic exercise, instruction in functional training, manual therapy techniques, electrotherapeutic modalities and mechanical modalities.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.

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- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Swelling or redness without history of trauma
- Muscle wasting
- Loss of reflexes

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Acute Phase** presentation:
Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Reduce pain and edema	▪ Modalities i.e: Cyotherapy, interferential, soft tissue mobilization
Improve range of motion	▪ Active assisted and Passive movements of the hip and knee joints ▪ Grade I/II hip and knee joint and patellar mobilization techniques ▪ Stationary bike (auto-assisted exercises)
Improve strength	▪ Exercises in water (aquatics) ▪ Isometric contractions ▪ Isotonic exercises
Functional mobility training	▪ Gait training with assistive device and weight-bearing restriction ▪ Teach stair mobility with weight-bearing restrictions ▪ Teach ADLs with compensatory techniques
Patient education regarding joint protection and teach home exercise program	▪ Elevate to decrease swelling ▪ Avoid activities that require forceful quads contraction ▪ Teach home exercise program of stretching and strengthening exercises ▪ Teach signs and symptoms of Heterotrophic Ossification

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The following table lists the procedures for **Subacute Phase** presentation:
Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Expected Outcome	Procedures/Modalities Such As
Improve range of motion	▪ Active movements ▪ Passive stretching ▪ Grade III joint mobilization techniques
Improve strength and endurance	▪ Closed chain kinetics ▪ Isotonic exercises ▪ Stair stepper ▪ Endurance training
Improve proprioception and balance	▪ Proprioceptive retraining ▪ Balance retraining ▪ Coordination
Functional mobility training	▪ Gait retraining ▪ Progression of weight-bearing to full weight-bearing ▪ Stair mobility ▪ ADL training
Patient education regarding joint protection and teach home exercise program	▪ Teach home exercise program of progressive stretching and strengthening exercises

The following table lists procedures for **Corrective/Rehabilitative Phase** presentation:

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Improve range of motion	▪ Active movements ▪ Grade III/IV joint mobilization techniques
Improve strength	▪ Closed chain kinetics ▪ Isokinetic exercises ▪ Plyometrics (athletes)
Return to activity	▪ Endurance training ▪ Begin controlled running (athletes) ▪ Specific sport training ▪ Vocational training i.e. Squatting, kneeling, standing

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Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Hot packs/cold packs after incision heals
- Theraband, ankle weights, for home exercise
- Assistive gait devices, wheelchair

Self-Care Techniques

- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication

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Hallux Rigidus, Pre- and Post-Surgical

Synonyms

Stiff big toe

Definition

Hallux Rigidus is the loss of dorsiflexion at the first metatarsophalangeal (MTP) joint, and may be acute with inflammation, pain, and muscle spasm. It is more problematic in its chronic form, with the development of osteophytic outgrowths over the top of the toe. Following are the two types of hallux rigidus:

- Adolescent—consistent with an osteochondritis dissecans or localized articular disorder.
- Adult—more generalized degenerative arthritis of unknown etiology.

No studies have linked levels of physical activity to the developmet of hallux rigidus. A common surgical procedure is a Cheilectomy, in which the dorsal bone spurs and bony outgrowths are removed from both bones of the joint, making dorsiflexion possible again. Arthrodesis is also a common solution. The resulting fusion eliminates painful movement, however, patient must accept a permanently stiff toe. Finally, arthroplasty is also performed, with replacement of joint surfaces with an artificial joint.

Patient History

Patient history may include:

Patient Data

Hallux rigidus is a syndrome with symptoms related to degenerative arthritis of the great toe MTP joint. Symptoms are due to: cartilage wear, altered joint mechanics, and osteophyte formation, particularly on the dorsal aspect of the first MT head. Hallux rigidus usually causes pain from impingement of dorsal osteophytes, range of motion (ROM) pain due to irregularity of the articular cartilage surface, pain from inflammation, and pain from shoe-related pressure on prominent osteophytes. This condition is seen in two distinct populations: those who present in adolescence and those who present in adulthood. The true etiology of hallux rigidus is not known. Most commonly, hallux rigidus is thought to be due to wear and tear on the first MTP joint.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, avulsions
Fever	Possible infection
Cancer history	Cause of symptoms (metastatic or primary)
Multiple joint involvement	Rheumatoid disease
Immune-compromised state	Infection
Diabetes	Neuropathy
Discoloration; delayed capillary refill	Vascular occlusion, arterial insufficiency
Gout	Frequently involves first MTP joint
History of high impact activities	Stress fracture

Presentation

Patient presents before surgery with a complaint of pain, especially on push off, swelling and stiffness.

- Characteristic overgrowth on top of toe.
- Due to changes in weight bearing, frequently there is callus formation at the planter surfaces of second and third metatarsal heads.
- Patient may externally rotate foot to allow for toe clearance. This tendency to unload the hallux MTP joint may present with a transfer of stress to the lateral aspect of foot leading to synovitis of the lesser MTP joints, or stress fractures of the lesser metatarsals.
- May be abrasions or ulcerations where osteophytes rub against footwear.
- Patient may also experience tingling and numbness on dorsum of toe due to compression of cutaneous nerves.

Patients presenting post surgically will have differing issues depending on the type of procedure performed, and length of time since its completion. Those that do, may be patients with continuing pain, swelling or wound/scar problems. Patients whose surgery preserves continued range of motion, persistent stiffness may occur. Due to casting after arthrodesis, secondary joint stiffness could develop at the ankle.

Subjective Findings

- Pain
- Antalgic gait
- Swelling
- Possible ROM restriction

Objective Findings

Objective findings may include:

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

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Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Swelling
  - Ecchymosis
  - Abrasions and ulcerations
  - Callus formation
  - Wound/surgical scar
- Palpation of bony and soft tissue
  - Tender dorsal osteophyte at 1st MTP joint
  - Crepitus with 1st MTP joint
  - Tingling/numbness of dorsum of great toe
  - Collateral ligament
  - Sesamoids
  - Plantar plate
  - Dorsal capsule
- Range of motion, active and passive movements of ipsilateral and contralateral joints (if not contraindicated by surgery type)
  - Dorsiflexion, plantarflexion of the hallux metatarsophalangeal joint
  - Dorsiflexion, plantarfexion, inversion, eversion of ankle joint
- Manual muscle testing of ipsilateral and contralateral joints (as appropriate)
  - Dorsiflexion, plantarflexion of the hallux metatarsophalangeal joint
  - Dorsiflexion, plantarfexion, inversion, eversion of ankle joint
- Orthopedic testing and neurologic testing
  - Assess instability of Metatarsophalangeal joint, compare to contralateral side
  - Varus-valgus stress test
  - Dorsoplantar Drawer test
  - Sensation
  - Reflexes (Achilles Tendon, Patella Tendon)
- Assessment of gait (as allowed by post-operative weight-bearing restrictions)
  - Barefoot walking and running (in athletes) (use paper walkway 20-24 ft – analyze base of support, cadence, stride length, velocity,heel strike, midstance, toe off, trunk lurch, hip extension)
    - Normal Gait
    - Walk on toes
    - Walk on heels
- Functional assessment - The following standardized test may be used to assess functional limitations:
  - Foot and Ankle Outcome Score (FAOS)

Findings of Hallux Rigidus

- Pain
- Possible swelling and ecchymosis

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- Persistent ROM issues
- Possible deformity

Differential Diagnoses

- Sesamoid dysfunction
- Gout
- Tenosynovitis
- Neuroma
- Stress fracture

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

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Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

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Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Initial intervention involves shoe modifications, rest, and NSAIDs.

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- Shoes with an extra-depth toe box can help decrease dorsal pressure on the first MTP joint.
- Stiff-soled shoe, or a rigid custom orthotic with a Mortons extension can help limit toe dorsiflexion.
- Rocker-bottom soles can also help to decrease the extension of the hallux during normal gait.
- If symptoms increase, surgical intervention may be necessary.
- Very little literature exists on post-surgical rehabilitation of this patient group.
- General treatment principles would suggest reduction of inflammation; protection from injury would be an early approach.
- Specific mobilization goals and timing of rehabilitation should be determined on a case by case basis, with consultation from the referring surgeon.
- Shoe modifications may be needed.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs

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- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Non-Surgical Management** presentation:

Expected Outcome	Procedures/Modalities Such As
Reduce pain and inflammation	▪ Ice massage/cold packs ▪ Phonophoresis ▪ Interferential current
Improve flexibility	▪ Passive stretches ▪ Joint mobilization of MTP joint
Improve strength	▪ As pain decreases add isometric and isotonic exercises ▪ Advance exercises to close-chain ▪ Balance and proprioception training
Assess for orthotics and shoe modifications	▪ Shoe modifications-extra-depth toe box, low heel stiff soled shoe with rocker-bottom soles ▪ Custom orthotics with a Morton extension to decrease MTP joint motion
Patient education and self-management techniques	▪ Frequent icing ▪ Teach mobilization techniques ▪ Range of motion and strengthening exercises ▪ Educate on activity modification-avoid extremes of dorsiflexion of great toe i.e. kneeling or squatting with toes in extension
Correct gait abnormality and proper biomechanics and gradual return to normal function	▪ Correct gait pattern ▪ Ambulation and endurance training on level, uneven surfaces ▪ Stair mobility

The following table lists the procedures for **Post-Surgical Management**:

- Cheilectomy: Immediately post-operatively, weight-bear as tolerated, passive movements started in one week if wound is dry.
- Arthrodesis: Foot immobilized in cast, which extends beyond toes or post-operative boot until union occurs. Weight-bearing is dependent upon fixation, usually partial weight-bearing occurs 2-3 weeks post-operatively when wound is closed and dry. Full weight-bearing after union.

Add each phase of exercise based on type of surgery.

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Expected Outcome	Procedures/Modalities Such As
Reduce pain and swelling	▪ Cold packs/Hot packs ▪ Phonophoresis ▪ Interferential current
Improve flexibility	▪ Passive stretches ▪ Joint mobilization of MTP joint (except following an arthrodesis)
Improve strength	▪ As pain decreases and range of motion improves add isometric and isotonic exercises ▪ When weight-bearing is allowed: ▪ Advance exercises to close-chain exercises ▪ Balance and proprioception training
Patient education and self-management techniques	▪ Frequent icing ▪ Teach mobilization techniques ▪ Range of motion and strengthening exercises ▪ Educate on activity modification-avoid extremes of dorsiflexion of great toe i.e. kneeling or squatting with toes in extension
Correct gait abnormality and proper biomechanics and gradual return to normal function	▪ Correct gait pattern ▪ Ambulation and endurance training on level, uneven surfaces ▪ Stair mobility

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Crutches or other appropriate assistive device
- Thick soled footwear or shoe modifications or orthotics
- TENS or interferential electrical stimulation

Self-Care Techniques

- Modification of activities, use of protective footwear
- Home exercises—stretching and strengthening
- Reduction of inflammation with cold packs

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- Pain modulation if needed with electrical stimulation

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Orthotist
- Medication
- Acupuncturist

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Hip Fracture, Closed, With or Without ORIF

Synonyms

None

Definition

A fracture is essentially a structural failure of bone. The nature of the fracture is determined by inherent properties of bone, its structure, and type of forces applied to it.

- Forces of tension, compression, bending, and torsion can load bone beyond its structural strength.
- External forces may render a fracture displaced or undisplaced with two or more fragments.
- Displaced fragments may be overriding one another, lateral to each other, extremely distracted from one another, angulated, or rotated out of alignment.
- Displaced fractures may be open fractures with a fragment breaking through the skin, exposing the fracture site to external environment and increases risk of infection.
- In addition to bony involvement, fractures frequently result in associated injury of soft tissues attached to, or adjacent to, the bone.
- Hip fractures are associated with high mortality within one year because they occur often in debilitated patients with many co-morbid conditions.
- ORIF is the stabilization of fracture fragments using open surgical procedures to place devices such as plate-and-screw, intramedullary rods, wires, pins and nails to reduce displacement and promote healing.

Patient History

Patient History may include

Patient Data

The etiology of intertrochanteric fractures is the combination of increased bone fragility of the intertrochanteric area of the femur associated with decreased agility and decreased muscle tone of the muscles in the area secondary to the aging process. The increasing bone fragility results from osteoporosis and osteomalacia secondary to a lack of adequate ambulation or antigravity activities, as well as decreased hormone levels, increased levels of demineralizing hormones, decreased intake of calcium and/or vitamin D, and other aging processes. Benign and malignant tumors, along with metastases such as multiple myeloma and other malignancies, can also lead to weakened bony structure.

The combination of increased fragility of bone and a traumatic event such as a motor vehicle accident or fall may result in either a direct impact or generation of a torsional force transmitted through the leg to the intertrochanteric area. When such forces are greater than the strength of the bone in the intertrochanteric area, a fracture occurs.

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Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma post op	Fracture, dislocation, ligament tear, avascular necrosis
Fever, severe pain, drainage	Possible infection
Lower extremity shortening or external rotation	Fracture
Unilateral edema	Lower extremity deep vein thrombosis
Recent invasive procedures post op (dental work, urologic procedures)	Infection
Diabetes	Neuropathy
Multiple joint involvement	Rheumatologic diseases
Unilateral edema	Deep vein thrombosis
History of steroid use	Avascular necrosis
Immune-compromised state	Infection

Presentation

Though not all patients will require surgical fixation, patients having a femoral neck fracture, a subtrochanteric fracture or an intertrochanteric fracture usually presents after surgery.

Subjective Findings

- Fractures are usually the result of trauma or falls.
- The elderly and women have a higher incidence.
- Depending on the specific fracture and surgical repair, weight bearing may be protected for a period of weeks.
- Patient usually has pain complaints over the lateral thigh and/or the groin, occasionally on the buttock.
- Ecchymosis and swelling may be present.
- Functional limitations immediately post-procedure are very common.
- Most patients will regain their previous ambulation status.
- Prognosis is associated with age and presence of co-morbidities, and perhaps most importantly, with cognitive impairment.

Objective Findings

Objective Findings may include

Scope of Examination

- History of present post op condition
- Medical history, including social support systems

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- Review of systems
- Cardiovascular/Pulmonary (blood pressure, edema, heart rate, peripheral pulses, respiratory rate)
- Integumentary (skin/wound assessment, presence of scar formation)
- Musculoskeletal (gross ROM, strength, symmetry)
- Neuromuscular (gross coordinated movements, motor control, and motor learning)

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Swelling and ecchymosis
  - Wound/surgical scar
  - Type of assistive device
  - Weight-bearing status
  - Antalgic gait
- Palpation of bony and soft tissue
  - Pain lateral thigh/ groin area
  - Sensation
  - Temperature
  - Leg length discrepency
- Range of motion, active and passive movements of the ipsilateral and contralateral joints, as indicated
  - Hip joint: Flex, extension, adduction, abduction, external rotation, medial rotation
  - Lumbar spine: Flexion, extension, rotation, lateral bending
  - Knee joint: Flex, extension, medial rotation, lateral rotation
  - Ankle joint: dorsiflexion, plantarflexion, inversion and eversion
- Manual muscle testing of ipsilateral and contralateral joints, as indicated
  - Hip joint: Flex, extension, adduction, abduction, external rotation, medial rotation
  - Lumbar spine: Flexion, extension, rotation, lateral bending
  - Knee joint: Flex, extension, medial rotation, lateral rotation
  - Ankle joint: dorsiflexion, plantarflexion, inversion and eversion
- Tests and standardized measurements for balance, gait, transfers and ADL status
  - Bathing/dressing lower extremity (FIM)
  - Gait analysis
  - Tinetti test for balance
  - Timed Get up and Go test
  - Stair mobility (FIM)
  - Transfers (FIM)
- Assessment of homes physical environment
  - Adequate lighting
  - Loose carpeting

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    - Clear hallways
    - Accessibility to bathroom
- Communication assessment
- Cognitive assessment
- Functional assessment - The following standardized test may be used to assess functional limitations:
    - Lower Extremity Functional Scale (LEFS)

Findings of Hip Fracture

- Pain at fracture site
- Impaired range of motion and strength
- Impaired balance, gait, transfers and ADL status

Differential Diagnosis

- Groin Injury
- Hip Dislocation
- Pelvic Fractures

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation,

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and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

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and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,

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- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy program goals are based on the time interval of presentation for treatment.

- Initially, protection of weight bearing and mobilization of involved joints is a focus.
- Concurrently, patient should be taught functional mobility with compensatory strategies within their precautions.
- Eventually, exercises should progress to strengthening, endurance and progression of weight bearing.
- Finally, full unsupported weight bearing and resumption of previous activity becomes the focus—this includes:
    - Therapeutic exercise,
    - Instruction in functional mobility,
    - Manual therapy techniques,
    - Electrotherapeutic modalities, and
    - Mechanical modalities
    - Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

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Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Swelling or redness without history of trauma
- Muscle wasting
- Loss of reflexes

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Post-Surgical ORIF** (Patients will be non-weight-bearing or limited weight-bearing). Their rehabilitation program will advance as weight-bearing status changes.

Expected Outcome	Procedures/Modalities Such As
Decrease pain and inflammation	▪ Modalities i.e.-Moist heat, Ice ▪ Electrical stimulation, soft tissue mobilization
Normalize pain-free range of motion	▪ Passive range of motion ▪ Active assisted/active range of motion ▪ Joint mobilization
Strengthen lower extremity musculature	▪ Isometric strengthening exercises ▪ Isotonic strengthening exercises ▪ AS weight-bearing status changes add closed chain exercises
Patient education, self-management and home exercise program	▪ Teach home exercise program of stretching, strengthening and application of hot/cold packs ▪ Prevent post-operative complications i.e. Pneumonia, decubitii, DVT by encouraging early movement
Correct gait abnormality and proper biomechanics	▪ Teach normal gait pattern (correct external rotation and stride length) ▪ Use of crutches, walker, orthotics, shoe lift ▪ Progress ambulatory distance
Achieve independence with ADLs Assess need for and order durable medical equipment to assist with ADLs	▪ Transfer training ▪ Stair mobility ▪ ADL training ▪ Community integration

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Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Hot packs/cold packs after incision heals
- Theraband, ankle weights, for home exercise
- Assistive gait devices, wheelchair

Self-Care Techniques

- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication

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Hip Pain and Dysfunction

Definition

'Hip Pain' is defined as pain that consists of soreness, tension, pain, and/or stiffness in the hip region that may extend to the knee without a radicular component. This includes hip pain that is typically increased with movement, decreased with rest, and is of mechanical and/or chemical origin. This does not include pain attributable to possible serious underlying pathology or to so-called "red flags" (Cook, 2008). Hip pain can be categorized according to the International Classification of Functioning, Disability and Health (ICF) impairment-based category of hip pain (World Health Organization [WHO], 2005) in the following ways:

- b2816 Pain in joints
- b7100 Mobility of a single joint
- s75001 Hip joint
- s7402 Muscle of pelvic region
- s7403 Ligaments and fascia of pelvic region

Patient History

The history of hip osteoarthrosis is not clearly understood however, there are predisposing factors such as age, developmental disorders, and previous injury. It is recommended that clinicians screen for these risk factors when considering physical therapy interventions. The patient history may include subjective reports of anterior or lateral hip pain and is generally in patient/clients >50 years of age. Morning stiffness of less than one hour duration is common (Altman, et al., 1991). Screening for potential "red flag" indications are recommended (Cook, 2008).Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management such as:
  - Coronary Artery Disease
  - Respiratory Disease
  - Hypertension
  - Obesity
  - Diabetes
  - Chronic Venous Insufficiency
  - Previous surgery
  - Macro/Micro Trauma
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear, pelvic fracture; avascular necrosis
Fever, severe pain	Infection
Loss of distal pulse, severe pain beginning 12-	Compartment syndrome

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24 hours after trauma	
Diabetes	Neuropathy
Multiple joint involvement	Rheumatologic diseases
Unilateral edema	Deep vein thrombosis
Skin rash in dermatomal pattern	Shingles
Constipation, bloody stools, unexplained weight loss	Colon, or pelvic organ cancer
Groin pain	Inguinal hernia, pelvic pathology
Pain with urination, hematuria	UTI; renal stone
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of leg or foot, pain with ambulation	Arterial occlusion
History of steroid use	Avascular necrosis
Immune-compromised state	Infection

Subjective Findings

- Anterior or Lateral hip pain
- Pain may radiate into the thigh
- Pain with activity
- Morning stiffness

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

In performing subjective and objective examination of the patient/client, clinicians should take into consideration those diagnostic classifications associated with serious pathological conditions and/or psychosocial factors when the patient's reported activity limitations or impairments of body function and structure are not consistent with conditions improvable with physical therapy interventions.

1) **Functional outcome measures (Level I, Strong evidence base.)** Clinicians should consider use of scientifically validated self-report patient/client functional outcome measures such as the Lower Extremity Functional Scale (Binkley, Stratford, Lott, & Riddle, 1999), Hip Disability and Osteoarthritis Outcome Score (de Groot et al, 2006) and the Western Ontario and McMaster Universities Osteoarthritis Index (Bellamy, Buchanan, Goldsmith, Campbell, & Stitt, 1988). These outcome scoring methods are useful in identifying baseline, interval progress, and discharge status.
2) **Hip range of motion measurement (Moderate level of evidence)**

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Measurement of bodily impairment. Hip active range of motion is measured ordinarily in the supine and prone positions (Birrell, Croft, Cooper, Hosie, Macfarlane, & Silman, 2001). Use of a validated measurement instrument is recommended. Limited range of motion is associated with higher levels of functional limitations (Steultjens, Dekker, van Baar, Oostendorp, & Bijlsma, 2000).

3) Special clinical tests (Moderate level of evidence)

a. Log roll test

Measurement of bodily impairment. The patient /client is supine and with both lower extremities extended the examiner passively rolls the lower extremity into internal and external rotation with a comparison made between sides. Tests for iliofemoral ligament laxity (Clohisy, Knaus, Hunt, Lesher, Harris-Hayes, & Prather, 2009).

b. Patrick's Test- FABER test (Moderate level of evidence)

Measurement of bodily impairment. The patient/client is supine with the heel of the tested extremity place on the knee of the opposite lower extremity. The test hip joint is passively externally rotated, abducted and extended via manual pressure. A positive test is indicated by concordant pain reproduced and limited movement (Cliborne, Wainner, Rhon, Judd, Fee, Matekel, & Whitman, 2004).

c. Hip muscle strength tests

Measurement of body function. Strength testing, specifically with a validated handheld strength dynamometer has been shown to demonstrate weakness consistent with hip pain and osteoarthrotic dysfunction (Click, Bellew, Pitts, & Kay, 2003; Pua, Wrigley, Cowan, & Bennell, 2008).

d. Hip scour test

Measurement of bodily function. The test is performed with the patient supine and the clinician flexes and adducts the hip gently bringing the hip into an arc of movement until pain or resistance is detected. Positive symptom reproduction with detection of limited movement is considered a positive test (Cliborne, Wainner, Rhon, Judd, Fee, Matekel, & Whitman, 2004).

Differential Diagnoses

- Fracture of the femur must be considered if there was significant trauma, particularly in elderly or osteoporotic individuals.
- Lumbosacral radiculopathy can cause pain that radiates down the lower limb.
- Labral tears
- Capsular laxity
- Sacro-iliac joint pain
- Osteitis Pubis

Physical/Occupational Therapy Management

Therapy must show significant functional change.

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Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

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Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate	Considerable loss

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		loss	
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations using the Patient Specific Functional Scale (i.e. Activities of daily living) – In addition practitioners may utilize other validated peer reviewed, standardized tools to quantify functional limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for improvement.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be

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deemed to be not medically necessary and the member should be discharged from therapy.

- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

Management/Intervention

- Clinical interventions (Recommended based on strong Level I evidence)
  1. Patient education interventions
  The clinician should recommend patient self-management strategies to decrease pain, improve function and reducing medical usage (Callahan, Mielenz, Freburger, Hootman, Brady, Buysse, & Schwartz, 2008).
  2. Manual therapy interventions
  Manual therapy techniques including but not limited to specific muscle stretching techniques, joint mobilization-manipulation techniques, and manual traction techniques have been shown to be beneficial in treatment of hip pain (Hoeksma, Dekker, Ronday, 2004)

- Clinical interventions with neutral recommendation (Level II evidence or based on weak evidence
  1. Strength, endurance and flexibility exercise
  Exercise both passive and active that has the intention of gaining strength, increase/maintain range of motion, and general/specific flexibility is recommended as muscle weakness and stiffness is common in painful and osteoarthrotic hips (Steultjens, Dekker, van Baar, Oostendorp, & Bjilsma, 2001). Exercise that is low intensity with controlled movement and without increased pain is recommended (Ettinger, et al., 1997; Felson, et al., 2000; Oostendorp, van den Heuvel, Dekker, & van Baar, 1998; Zhang, Moskowitz, Nuki, 2007). It is recommended that a general course of a minimum of six weeks of physical therapy be utilized in order to effect both physiologic and behavioral changes (Vogel, et al., 2003).
  2. Hydrotherapy (Kovar , Allegrante, MacKenzie, Peterson, Gutin, & Charlson, 1992; Minor , Hewett, Webel, Anderson, Kay, 1989)

- Clinical interventions not recommended (Poor evidence, no evidence, or expert opinion)
  1. Modalities

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The role and effectiveness of therapeutic modalities is unclear in the evidence (Gezondheidsraad, 1999; Van der Heijden, Torenbeek, Windt, Hidding, Dekker, & Bouter, 1999). This includes transcutaneous electrical nerve stimulation, heat, cold, laser therapy, iontophoresis, and ultrasound modalities.

Positive Patient Response and Review of the Medical Literature
Review of relevant medical literature and determination of physical therapy intervention(s) with defined recommendations are based primarily on results demonstrating functional gains attained through the intervention that can be objectively measured, such as positional tolerances, range of motion, strength, endurance, activities of daily living (ADL), cognition, psychological behavior, and efficiency/velocity measurements. Subjective reports of pain and function should be considered and given relative weight when the pain has an anatomic and/or physiological basis. All findings must be based on objective medical evidence.

Home and Self-Care techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises
- Orthotics if needed
- Mobility aids
- Assistive devices

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises, stretching lower extremity musculature
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort
- Stress management
- Joint protection
- Weight loss

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication
- Acupuncture
- Natural remedies
- Massage therapy

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Hip Total Replacement

Synonym

Total hip arthroplasty

Definition

Implantation of an artificial femoral head and acetabulum to replace a degenerative joint. Most common conditions requiring surgery are trauma, arthritis, avascular necrosis, previously failed hip surgery, fracture, osteomyelitis (not active), and hereditary disorders. The procedure may involve replacing only the femoral component (Hemiarthroplasty). Components may be cemented, non-cemented, or hybrid (femoral component cemented, with non-cemented acetabular component).

Patient History

Patient History may include

Patient Data

- History of present post op condition
- Medical history, including social support systems
- Review of systems
- Cardiovascular/Pulmonary (blood pressure, edema, heart rate, respiratory rate)
- Integumentary (skin/wound assessment, presence of scar formation)
- Musculoskeletal (gross ROM, strength, symmetry)
- Neuromuscular (gross coordinated movements, motor control, and motor learning)

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of the traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma post op	Fracture, dislocation
Fever, severe pain	Possible infection
Lower extremity shortening or internal rotation	Dislocation
Unilateral edema	Lower extremity deep vein thrombosis
Recent invasive procedures post op (dental work, urologic procedures)	Infection
“Pistoning” during gait	Dislocation

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Presentation

Patient presents differently based on the use, or nonuse of cement, as well as the surgical approach used—anterior, posterior or transverse. Use of cement will allow immediate post op weight bearing in most cases.
In cementless hip devices, weight bearing must be protected until tissue in-growth of the prothesis occurs. Patients with protected weight bearing may also need to minimize compressive forces of the hip in exercise and functional training. This is particularly true of patients who received osteotomies. The specific approach will also dictate precautions to be taken to avoid post op dislocation due to tissue laxity. There is some variation in precautions between surgeons that must be clarified pre-treatment.

Subjective Findings

- Pain
- Swelling
- Joint stiffness
- Lower extremity weakness
- Antalgic gait

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Skin/surgical site, swelling
- Palpation of bony and soft tissue
  - Joint play movements
  - Leg length
- Range of motion, active and passive movements of ipsilateral and contralateral joints, as indicated
  - Hip movements in all planes
  - Knee movements
  - Ankle movements
- Manual muscle testing of ipsilateral and contralateral joints, as indicated
  - Hip
  - Knee
  - Ankle movements
- Tests and standardized measurements for:
  - Balance (Tinetti)

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    - Gait Analysis
    - Transfers, ambulation, lower extremity bathing and dressing, stair mobility - measure using the Functional Independence Measure scale
    - Assess need for durable medical equipment
- Assessment of home's physical environment
    - Safety
    - Accessibility
- Communication assessment
- Cognitive assessment
- Functional assessment - The following standardized tests may be used to assess functional limitations:
    - Lower Extremity Functional Scale (LEFS)
    - Western Ontario and McMasters Osteoarthritis Index (WOMAC)

Findings of Hip Total Replacement

- Post-surgical wound
- Painful hip
- Swelling of hip and thigh
- Hip and Knee stiffness
- Lower extremity weakness
- Weightbearing restriction depending on surgeon's protocol
- Hip replacement precautions

Differential Diagnosis

None indicated.

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the

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recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

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Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)

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3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy program goals are to

- Teach independent transfers and gait.
- Regain functional strength.
- Minimize post op complications (i.e. thrombophlebitis, dislocation of the prosthesis, decubiti, and pneumonia).
- Restore pain free ROM as allowed. Based on these goals, treatment may include:
  - Therapeutic exercise
  - Instruction in functional mobility
  - Manual therapy techniques
  - Electrotherapuetic modalities
  - Mechanical modalities
  - Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Early focus is usually on instruction for mobility with dislocation precautions and ROM and strengthening—follow again with concern for dislocation, restricted weight bearing and protection of osteotomy if applicable. In the latter case, strong muscular contractions, particularly in abduction, may be contraindicated.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition.

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Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:
- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Post-Operative Management

Expected Outcome	Procedures/Modalities Such As
Decrease pain and inflammation	▪ Moist heat, Ice
Normalize pain-free range of motion	▪ Passive range of motion ▪ Active assisted/active range of motion
Strengthen lower extremity musculature	▪ Isometric strengthening exercises ▪ Isotonic strengthening exercises ▪ Aquatic exercises ▪ Maximal strength training
Patient education, self-management and home exercise program	▪ Teach hip dislocation precautions ▪ Teach home exercise program of stretching, strengthening and application of hot/cold packs ▪ Prevent post-operative complications i.e. Pneumonia, decubitii by encouraging early movement
Correct gait abnormality and proper biomechanics	▪ Postural re-education ▪ Teach normal gait pattern (correct external rotation and stride length) ▪ Use of crutches, walker, orthotics, shoe lift

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	▪ Progress ambulatory distance
Achieve independence with ADLs	▪ Assess need for and order durable medical equipment to assist with ADLs ▪ Transfer training ▪ Stair mobility ▪ ADL training

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Cold packs/hot packs after incision heals
- Theraband, ankle weights, for home exercise
- Assistive gait devices, wheelchair
- Abduction night splints

Self-Care Techniques

- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Cold packs/hot packs, if needed, to relieve discomfort
- Hip dislocation precautions

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication

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Lower Extremity, Amputation with Subsequent Prosthesis, AKA & BKA

Synonyms

None

Definition

Amputation of the lower leg occurs either above the knee (above knee amputation—AKA), through the knee—(TKA), or below the knee (below knee amputation—BKA), and at multiple sites in the ankle and foot. In general, age, level of amputation, and presence of comorbidities will most significantly impact degree of regaining function. The greater the sparing of the residual limb, the higher the functional level may be achieved.

Patient History

Patient History may include

Patient Data

Diabetes accounts for 45% of non-traumatic amputations, of which the majority are elderly, and frequently in poor health. Frostbite and peripheral vascular disease are also common in the etiology. There is usually a higher incidence in the elderly.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Assessment of employment, home environment, and social support
- Pain assessment

Red Flag	Possible Consequence or Cause
Fever, severe pain	Infection
Diabetes	Neuropathy
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of residual limb, progressive pain with ambulation	Arterial occlusion
Skin rash with fever and tenderness	Cellulitis
Immune-compromised state	Infection

Presentation

Presents with soft or semi-rigid dressing, bulbous swelling, non-healing wound, phantom limb pain, hypersensitivity, joint contractures, balance and gait impairments.

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Subjective Findings

- Pain in the distal residual limb
- May experience phantom pain
- May have pain with prosthesis wearing, may be due to hypersensitivity vs a poorly fitting prosthesis

Objective Findings

Objective Findings may include

Scope of Musculoskeletal Examination

- Examine musculoskeletal system
- Examine nervous system
- Examine skin around residual limb

Specific Elements of Musculoskeletal Examination

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Assessment of shape of residual limb
  - Skin, wound, edema, type of dressing
- Palpation of bony and soft tissue
  - Pressure points
  - Joint play movements
- Range of motion, active and passive
  - Test active and passive range of motion for remaining joints of the residual limb and contralateral limb
- Manual muscle testing
  - Test resisted isometric movements of the residual limb and the contra-lateral limb
- Orthopedic testing
  - Balance (Tinetti)
  - Gait Analysis
  - Proprioception/Kinesthetic awareness
  - Endurance (muscular/cardiovascular)
  - Assess need for durable medical equipment
- Neurologic testing, if neurologic signs are present
  - Sensation
  - Reflexes
- Circulation assessment
- ADL assessment (Use the Functional Independence Measure scale to track progress)
  - Feeding
  - Grooming
  - Bathing

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    - Dressing
    - Toileting
    - Transfers
    - Ambulation
    - Stair mobility
- Functional assessment - The following standardized test may be used to assess functional limitations:
    - Lower Extremity Functional Scale (LEFS)

Findings of Amputation, AKA, TKA, or BKA

Post amputation patients present with a combination of issues impacting their future functional success.

- Initially there may be wound healing and edema control problems.
- Risk for contractures that can limit effective use of prosthesis.
- Mechanically, loss of limb will create body alignment, balance, strength, and proprioception changes.
- Pain can also be a limiting factor, both acutely after surgery, and later due to phantom pain and hypersensitivity.
- Some patients find amputation psychologically distressing to the extent that it interferes with their rehabilitation.

Differential Diagnosis

Not Applicable.

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a

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combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

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Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)

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3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

The overall goal of treatment is the resumption of prior level mobility and self-care, which will involve greater, or less rehabilitation depending on co-morbidities, and the anatomical level of amputation.

Partial Foot Amputation	▪ Generally only a custom molded shoe filler is needed
Ankle Disarticulation (Symes Amputation)	▪ May require compression ▪ Can be fitted with prosthesis with SACH foot (Solid Ankle Cushioned Heel)
Below Knee Amputation	▪ Approximately two-thirds of amputees at this level are ambulatory with a prosthesis ▪ Very short residual limb worsens functional prognosis
Knee Disarticulation	▪ Present with cosmetic issues, as axis of knee joints will not be at equal levels ▪ Provides good weight bearing surface ▪ Good sitting balance for non-ambulatory patients
Above Knee Amputation	▪ Increased danger of hip flexion, abduction and external rotation contracture ▪ Decreased probability of successful prosthesis use, may need a trial prosthesis
Hip Disarticulation and Hemipelvectomy	▪ Wound healing may be most significant issue ▪ For stronger patients prostheses are available

Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.

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- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Skin breakdown of the residual limb or of the contralateral lower extremity
- Inadequate cardiopulmonary fitness for required tasks
- Inadequate pain control
- Contracture not responding to treatment

Goals of Treatment

The goals of treatment are:

- Stump care and shaping
- Upper Extremity and Lower Extremity strengthening
- Range of motion (ROM) maintenance or improvement
- Gait training without prosthesis
- Gait training with prosthesis
- Higher level of mobility
- Improved performance in activities of daily living

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

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Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Decrease pain and edema	▪ Moist heat, Ice, electrical stimulation, intermittent compression
Normalize pain-free range of motion	▪ Passive stretching ▪ Active assisted/active range of motion
Strengthen lower extremity musculature	▪ Isometric strengthening exercises ▪ Isotonic strengthening exercises
Patient education, self-management and home exercise program	▪ Teach home exercise program of stretching, strengthening and application of hot/cold packs ▪ Prevent post-operative complications i.e. edema, skin breakdown, contractures, phantom limb pain ▪ Apply ace wrap to residual limb ▪ Donn/doff prosthesis ▪ Teach progressive desensitization
Improve balance and proprioception	▪ Kinesthetic awareness ▪ Balance retraining
Correct gait abnormality and proper biomechanics	▪ Postural re-education ▪ Teach normal gait pattern with prosthesis on level and uneven surfaces ▪ Use of crutches, walker ▪ Progress ambulatory distance, and community ambulation ▪ Teach stair mobility
Achieve independence with	▪ Assess need for and order durable medical

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ADLs	equipment to assist with ADLs ▪ Transfer training ▪ Stair mobility ▪ ADL training (bathing, dressing, IADLs) ▪ Community integration

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Cold packs/hot packs
- Theraband for therapeutic exercises
- Ace wrap for wrapping of residual limb, stump shrinker/socks
- Electrical stimulation for pain relief
- Assistive gait devices
- Prosthesis

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Hot packs/cold packs, if needed, to relieve discomfort
- Education in skin care guidelines, ace wrapping the residual limb, donning and doffing prosthesis
- Home exercise program, instruct patients and caregivers in use of prosthesis
- Instruct caregivers in assisting mobility as required
- Instruct patient in edema control
- Refer to community resources for access and support

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Prosthetist
- Chiropractic
- Medication

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Tarsal Tunnel Syndrome With and Without a Release

Synonyms

None

Definition

Tarsal tunnel syndrome is an entrapment neuropathy of the tibial nerve, or one of its branches (medial or lateral plantar nerve, medial calcaneal branch) as it passes through the anatomic tunnel between the flexor retinaculum and medial malleolus.

Patient History

Patient History may include

Patient Data

Tarsal tunnel syndrome is a multifaceted compression neuropathy that typically manifests with pain and paresthesias that radiate from the medial ankle distally and, occasionally, proximally. These findings may have a variety of causes, which can be categorized as extrinsic, intrinsic, or tensioning factors in the development of signs and symptoms of tarsal tunnel syndrome. Extrinsic causes may contribute to the development of tarsal tunnel syndrome. Examples include external trauma due to crush injury, stretch injury, fractures, dislocations of the ankle and hindfoot, and severe ankle sprains. Local causes may be intrinsic causes of the neuropathy. Examples include space-occupying masses, localized tumors, bony prominences, and a venous plexus within the tarsal canal.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic, primary or paraneoplastic), potential complications of chemotherapy
Unilateral edema	Lower extremity deep vein thrombosis
Immune-compromised state	Infection
Multiple joint involvement, unusual skin rashes, other vascular involvement	Rheumatologic diseases (e.g., Rheumatoid arthritis, Sjogren's Syndrome, Systemic Lupus Erythematosis, Polyarteritis nodosa)
Stocking-glove neurological involvement	Diabetes, alcoholism, B12 deficiency

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Presentation

Patient usually presents with an insidious onset characterized by poorly localized burning dysesthesias or hypoesthesia and pain, especially at night, often in the distribution of the plantar nerves. Weight bearing activities usually exacerbate the symptoms.

Subjective Findings

- Intermittent burning pain, tingling or numbness in the toes and distal portion of the foot, provoked by prolonged standing and walking
- Numbness and tingling in the foot
- Nocturnal burning pain

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection, including rear foot position in stance
- Atrophy of intrinsic foot muscles
- Edema
- Surgical wound
- Assessment of gait (Assess only when full weight bearing is allowed post-surgery)
- Barefoot walking and running (in athletes) (use paper walkway 20-24 ft – analyze base of support, cadence, stride length, velocity, heel strike, midstance, toe off, trunk lurch, hip extension)
    - Normal Gait
    - Walk on toes
    - Walk on heels
- Standing with feet fixed:
    - Externally rotate legs on feet
    - Internally rotate legs on feet
- Standing with knees extended:
    - Evert feet
    - Invert feet
- Palpation of bony and soft tissue
    - Tenderness at tarsal tunnel
- Range of motion, active and passive movements of ipsilateral and contralateral joints (For surgical management - test range of motion once splint is removed.)

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- Ankle
    - Dorsiflexion
    - Plantarflexion
    - Inversion
    - Eversion
    - Toe movements
- Knee
    - Flexion
    - Extension
- Hip
    - Flexion
    - Extension
    - Abduction
    - Adduction
    - External Rotation
    - Internal Rotation
- Orthopedic Testing
    - Joint play movements: Assess for hypomobility, hypermobility at the ankle, knee, hip joints
    - Tinel's sign
    - Dorsiflexion-eversion test
- Neurologic Testing
    - Test dermatomes and myotomes of L4, L5, S1, S2
    - Test tendon reflexes: Achilles Tendon, Patella Tendon
- Manual Muscle Testing of ipsilateral and contralateral joints
    - Ankle (Dorsiflexion, plantarflexion, eversion, inversion)
    - Knee (Flexion, extension)
    - Hip (Flexion, extension, abduction, adduction, external rotation, internal rotation)
- Functional limitations: - The following standardized tests may be used to assess functional limitations:
    - Foot and Ankle Outcome Score (FAOS)
    - Foot and Ankle Ability Measure (FAAM)

Findings of Tarsal Tunnel

- May have decreased sensory testing (light touch and two point discrimination) in the plantar aspect, depending on severity
- Tinel's sign positive
- Tenderness at the tarsal tunnel
- Motor weakness and muscle atrophy in advanced cases
- Pain with passive dorsiflexion or eversion
- Normal results for the neurologic examination

Differential Diagnoses

- Metatarsalgia
- Neuroma/neuritis

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- Lumbar radiculopathy
- Proximal nerve impingement
- Plantar fasciitis
- Chronic heel pain syndrome
- Flexor hallucis longus tenosynovitis

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

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Corrective or Rehabilitative Care

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Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost

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Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition and
- Expectation for improvement.

Treatment Methods

The following modalities may ease discomfort, and aid in the healing process:

- Ice massage,
- Ultrasound,
- Electrical stimulation,
- Phonophoresis,
- Iontophoresis, and
- Friction massage.

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- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.
- Orthotic can be fabricated as needed, to assist in eliminating excess pronation, thereby reducing stress on structure within the tarsal tunnel.
- One inch heel lift will decrease tension on the tibial nerve.
- Strengthening and stretching exercises will be started when pain becomes manageable.
- Retraining for proper positioning to avoid re-injury and other factors in occupationally related overuse syndromes is an important component of the overall therapy consult.
- If conservative treatment fails, surgical intervention may be indicated.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

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Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

There is a lack of high quality research on effective management of tarsal tunnel syndrome. The physical therapist should stage the patient based on swelling, pain, duration of symptoms and/or time since surgery. Management should be impairment based to address specific strength, flexibility, gait and functional limitations of a given patient.

Conservative Management

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

	Physical Agents	Orthotics	Therapeutic Ex	Manual Therapy
Acute Stage Goal: reduce pain and swelling	▪ Ice ▪ Pulsed ultrasound ▪ Phonophoresi ▪ E-stim	▪ Ankle bracing ▪ CAM walker ▪ Plantar arch taping ▪ Medial heel wedge	▪ Calf stretching ▪ Nerve mobility	▪ Soft tissue massage ▪ Tibial nerve mobilization

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		▪ Pt education on footwear		
Subacute Stage Goal: increase flexibility and strength	See above	See above	Posterior tibialis strengthening	See above
Corrective Stage Goal: promote symmetrical flexibility, strength, and functional mobility	See above	See above	Posterior tibialis strengthening in WB	See above

Tarsal Tunnel Release

Immediately following surgery the foot is wrapped in a compression bandage and held in a splint with the foot in inversion for approx. 3 weeks. Patient is non-weight-bearing.

Phase	Goals	Intervention
Phase I	▪ Protect nerve, joint, and incision site ▪ Control swelling - Reduce painn	▪ Immobilization with NWB precautions ▪ Ankle passive ROM ▪ RICE ▪ Gait training with assistive device
Phase II	▪ Prevent contractures ▪ Prevent scar tissue adhesions ▪ Increase joint mobility	▪ WBAT ▪ Gentle passive and active ankle stretching ▪ Begin tibial nerve glide with anti-tension technique (foot PF and inverted ▪ Gait training to tolerance with protective splint ▪ Aquatic therapy
Phase III	▪ Normal gait mechanics ▪ Increase ankle mobility ▪ Increase PF strength	▪ Gait training without splint ▪ Pain free theraband exercises ▪ Tibial nerve glide progression (foot everted and dorsiflexed) ▪ Weight bearing exercises ▪ Resistive exercises (impairment approach

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	▪ Specific skill development	▪ Balance/proprioceptive training ▪ Specific skill development in pain free range ▪ Cardiovascular fitness

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Cold packs
- Orthoses
- Theraband
- Heel lift

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication
- Surgery
- Acupuncture

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Tarsal/Metatarsal Fracture, Post-Cast Removal or ORIF

Synonyms

Broken foot

Definition

A fracture is essentially a structural failure of bone. The nature of the fracture is determined by the inherent properties of bone, its structure, and the type of forces applied to it.

- Forces of tension, compression, bending, and torsion can load bone beyond its structural strength.
- External forces may render a fracture displaced or undisplaced with two or more fragments.
- Displaced fragments may be overriding one another, lateral to each other, extremely distracted from one another, angulated, or rotated out of alignment.
- Displaced fractures may be open fractures with a fragment breaking through the skin, exposing the fracture site to external environment and increases risk of infection.
- In addition to bony involvement, fractures frequently result in associated injury of soft tissues attached to, or adjacent to, the bone.
- Fractures may be treated by immobilization with casts, sling/immobilizer, ORIF, percutaneous pinning, or, external fixator.

Patient History

Patient History may include

Patient Data

The two major causes of Lisfranc injuries are low-energy loading observed in sports-related injuries and high-energy loading observed in motor vehicle and industrial accidents. In low-energy settings, tarsometatarsal (TMT) injuries are caused by a direct blow to the joint or by axial loading along the metatarsal (MT), either with medially or laterally directed rotational forces. In high-energy injuries, the method of loading is not significantly different, but the energy absorbed by the articulations results in significantly more collateral damage to bony and soft-tissue structures.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear
Fever, severe pain	Infection
Loss of distal pulse, severe pain 12-24 hours after trauma	Compartment syndrome, arterial occlusion
Diabetes	Neuropathy
Multiple joint involvement	Rheumatologic diseases
Unilateral edema	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of leg or foot	Arterial occlusion
Immune-compromised state	Infection

Presentation

The patient may present with an orthotic with a well molded arch, weight-bearing as tolerated, ankle pain, stiffness and weakness of the lower extremity.

Subjective Findings

- Ankle/foot pain
- Swelling
- Stiffness
- Weakness

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

- Tarsal tunnel syndrome
- Plantar fasciitis
- Neuroma/neuritis

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Atrophy of intrinsic foot muscles
  - Color of skin
  - Edema
  - Surgical wound
  - Weight-bearing status
  - Use of assistive device
  - Use of splint or orthosis

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- Palpation of bony and soft tissue
  - Tenderness at fracture site
  - Pulses
  - Sensation
  - Temperature
- Range of motion, active and passive movements of ipsilateral and contralateral joints (Test range of motion once cast is removed.)
  - Ankle
    - Dorsiflexion
    - Plantarflexion
    - Inversion
    - Eversion
    - Toe movements
  - Knee
    - Flexion
    - Extension
  - Hip
    - Flexion
    - Extension
    - Abduction
    - Adduction
    - External Rotation
    - Internal Rotation
- Manual muscle testing of ipsilateral and contralateral joints (Test muscle strength once cast is removed.)
- Ankle
    - Dorsiflexion
    - Plantarflexion
    - Inversion
    - Eversion
    - Toe movements
- Knee
    - Flexion
    - Extension
- Hip
    - Flexion
    - Extension
    - Abduction
    - Adduction
    - External Rotation
    - Internal Rotation
- Orthopedic and Neurologic Testing
  - Joint play movements: Assess for hypomobility, hypermobility at the ankle, knee
  - Test dermatomes and myotomes of L4, L5, S1, S2
  - Test deep tendon reflexes: Achilles Tendon, Patella Tendon

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    - Tinel's sign
- Assessment of gait (Assess only when full weight bearing is allowed post-surgery)
    - Barefoot walking and running (in athletes) (use paper walkway 20-24 ft – analyze base of support, cadence, stride length, velocity, heel strike, midstance, toe off, trunk lurch, hip extension)
        - Normal Gait
        - Walk on toes
        - Walk on heels
- Standing with feet fixed:
    - Externally rotate legs on feet
    - Internally rotate Legs on feet
- Standing with knees extended:
    - Evert feet
    - Invert feet
- Functional assessment - The following standardized tests may be used to assess functional limitations:
    - Foot and Ankle Outcome Score (FAOS)
    - Foot and Ankle Ability Measure (FAAM)

Findings of Tarsal/Metatarsal Fracture, Post-Cast Removal or ORIF

- Swelling occurs at fracture site
- Restricted motion caused by pain, swelling, immobilization, or soft tissue shortening is common
- Muscle atrophy

Differential Diagnosis

- Tarsal tunnel syndrome
- Plantar fasciitis
- Neuroma/neuritis

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member

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- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy program goals are to:

- Minimize the inflammation,
- Normalize gait,
- Normalize pain-free range of motion,
- Prevent muscular atrophy,
- Maintain proprioception,
- Relieve joint pain, and
- Increase strength so that the other objectives may be achieved.

Therapy program will consist of:

- Modalities to minimize the inflammation,
- Therapeutic exercises for ROM and strengthening,
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.

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- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider to explore alternative treatment options when you find:

- Swelling or redness without history of trauma
- Muscle wasting
- Loss of reflexes

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Non-operative management:

The patient is put into a non-weight-bearing short leg cast for a minimum of 6 weeks. After 6 weeks, progressive weight-bearing can be allowed in a well-molded cast, advancing as comfort allows. When full weight-bearing in a cast is comfortable, the patient can be advanced to regular shoe wear. Rehabilitation begins once cast is removed.

Post-operative management:

Rigid immobilization in a non-weight-bearing posture for 8-12 weeks; advance weight-bearing only as comfort allows. For three months after cast removal, the patient should wear a protective shoe with a well-molded orthotic. Rehabilitation begins once cast is removed.

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Expected Outcome	Procedures/Modalities Such As
Reduce pain and edema	▪ Ice massage/cold pack ▪ Electrical stimulation ▪ Soft tissue mobilization
Improve flexibility	▪ Gentle passive range of motion exercises ▪ Joint mobilization ▪ As pain decreases progress to active range of motion exercises and stretches
Restore normal biomechanics	▪ Strengthening exercises using isometric exercises ▪ As pain subsides progress to isotonic exercises, resisted exercises, isokinetic exercises and closed chain exercises
Improve balance and proprioception	▪ Proprioception and balance re-training
Patient education, self-management and home exercise program	▪ Modification of training activities ▪ Frequent use of ice/cold packs to manage swelling ▪ Home exercise program of strengthening, stretching, joint mobilization and soft tissue mobilization
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual tolerance of activities ▪ Gait training and stair mobility ▪ Community ambulation ▪ Sports specific skills or vocational training

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Heat packs
- Assistive gait device
- Orthotics if needed

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Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Heat packs

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication

Medicare References

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Tibia Fracture, Post-ORIF

Synonyms

Broken leg

Definition

A fracture is essentially a structural failure of bone. The nature of the fracture is determined by the inherent properties of bone, its structure, and type of forces applied to it.

- Forces of tension, compression, bending, and torsion can load bone beyond its structural strength.
- External forces may render a fracture displaced or undisplaced with two or more fragments.
- Displaced fragments may be overriding one another, lateral to each other, extremely distracted from one another, angulated, or rotated out of alignment.
- Displaced fractures may be open fractures with a fragment breaking through the skin, exposing fracture site to external environment and increases risk of infection.
- In addition to bony involvement, fractures frequently result in associated injury of soft tissues attached to, or adjacent to, the bone.

Patient History

Patient History may include

Patient Data

Motor vehicle accidents, skiing accidents, and high-energy falls are the common causes. The mechanism of injury determines the fracture configuration (eg, skiing injuries typically cause spiral fractures). Most fractures are comminuted. Pedestrians who are hit in the upper and middle one third of the tibia sustain bumper injuries. Distal tibial and plafond fractures are commonly a result of a fall from a significant height.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear
Fever, severe pain	Infection
Loss of distal pulse, severe pain 12-24 hours after trauma	Compartment syndrome, arterial occlusion
Diabetes	Neuropathy

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Multiple joint involvement	Rheumatologic diseases
Unilateral edema	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of leg or foot	Arterial occlusion
Immune-compromised state	Infection

Presentation

Patient may present in a splint or functional brace, with an antalgic gait, knee joint stiffness and muscle atrophy.

Subjective Findings

- Pain with movement
- Knee stiffness
- Muscle weakness
- Difficulty walking

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

- Knee pathology
- Ankle pathology

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Infection
  - Swelling
  - Wound/scar
  - Color changes
- Palpation of bony and soft tissue
  - Pain
  - Temperature changes
  - Sensation
  - Pedal pulses
- Range of motion, active and passive movements of ipsilateral and contralateral joints
  - Knee (flexion, extension)
  - Ankle (dorsiflexion, plantarflexion, pronation, supination)

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    - Hip (flexion, extension, abduction, adduction, external rotation, internal rotation)
- Manual muscle testing of ipsilateral and contralateral joints
    - Knee (flexion, extension)
    - Ankle (dorsiflexion, plantarflexion, pronation, supination)
    - Hip (flexion, extension, abduction, adduction, external rotation, internal rotation)
- Orthopedic and neurologic testing if neurologic signs are present
    - Joint play movements of the knee and ankle joints
    - Measure leg length discrepancy
    - Test sensation along L5-S1
    - Reflexes: Patellar Tendon, Achilles Tendon
- Tests and standardized measurements for balance, gait, transfers and ADL status
    - Bathing/dressing lower extremity (FIM)
    - Gait analysis
    - Tinetti test for balance
    - Timed Get up and Go test
    - Stair mobility (FIM)
    - Transfers (FIM)
- Functional assessment - The following standardized test may be used to assess functional limitations:
    - Lower Extremity Functional Scale (LEFS)

Findings of Tibia Fracture, Post-ORIF

- Swelling occurs at fracture site
- Restricted motion caused by pain, swelling, immobilization, or soft tissue shortening is common
- Muscle atrophy

Differential Diagnosis

Not applicable.

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member

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- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy program goals are to:

- Minimize the inflammation,
- Normalize gait,
- Normalize pain-free range of motion,
- Prevent muscular atrophy,
- Maintain proprioception,
- Relieve joint pain, and
- Increase strength so that other objectives may be achieved.

The therapy program will consist of modalities to:

- Minimize the inflammation,
- Therapeutic exercises for ROM and strengthening, and

Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.

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- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider to explore alternative treatment options when you find:

- Swelling or redness without history of trauma
- Muscle wasting
- Loss of reflexes

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **post-operative** presentation.

Expected Outcome	Procedures/Modalities Such As
Control pain and edema	▪ Modalities i.e. Cryotherapy, interferential current , soft tissue massage
Improve range of motion and flexibility	▪ Passive stretching ▪ Active assisted exercises ▪ Auto-assisted exercises using a stationary bicycle ▪ Active exercises ▪ Ankle and knee joint mobilization
Improve strength and endurance	▪ Isometric exercises ▪ Isotonic exercises ▪ Add closed chain exercises and isokinetic exercises when weight-bearing is allowed

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Improve proprioception of the lower extremity	▪ Balance re-training ▪ Coordination exercises
Improve gait and stair mobility	▪ Gait training with/without assistive device ▪ Community ambulation ▪ Stair mobility with/without assistive device
Gradual integration into community activities, sports, leisure and vocation	▪ ADL training ▪ Tolerance for different positions and activities ▪ Sports/vocation specific training i.e. plyometrics or kneeling, squatting
Patient self-management and education	▪ Teach application of pain relieving modalities ▪ Teach stretching, strengthening and joint mobilization for home exercise program

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Heat packs
- Assistive gait device

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Heat packs

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication

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Tri-malleolar, Fracture, Post-Cast Removal

Synonyms

- Broken foot
- Broken ankle

Definition

A fracture is essentially a structural failure of bone. The nature of the fracture is determined by the inherent properties of bone, its structure, and type of forces applied to it.

- Forces of tension, compression, bending, and torsion can load bone beyond its structural strength.
- External forces may render a fracture displaced or undisplaced with two or more fragments.
- Displaced fragments may be overriding one another, lateral to each other, extremely distracted from one another, angulated, or rotated out of alignment.
- Displaced fractures may be open fractures with a fragment breaking through the skin, exposing fracture site to external environment and increases risk of infection.
- In addition to bony involvement, fractures frequently result in associated injury of soft tissues attached to, or adjacent to, the bone.
- Tri-malleolar fractures are generally treated with open reduction and internal fixation, especially in younger patients.

Patient History

Patient History may include

Patient Data

Trimalleolar fractures involve both the medial and lateral malleoli, along with a fracture to the posterior lip of the tibial plafond. This fracture is usually secondary to an avulsion of the posterior tibiofibular ligament at its insertion site. This type of fracture is usually caused by acute trauma.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear
Fever, severe pain	Infection
Fever, severe pain	Infection, arterial occlusion
Diabetes, parasthesias	Neuropathy, other metabolic causes (e.g. B12 deficiency, hypothyroidism)
Multiple joint involvement	Rheumatologic diseases
Unilateral edema	Deep vein thrombosis, infection
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of leg or foot	Arterial occlusion
Immune-compromised state	Infection

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

- Achilles tendonitis
- Neuroma, neuritis
- Plantar fasciitis

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
- Surgical wound/scar adhesions
- Swelling
- ecchymosis
- Weight-bearing status
- Type of assistive device
- Color of skin
- Type of orthosis
- Palpation of bony and soft tissue
- Pain over medial/lateral malleoli
- Swelling
- Anatomical position of ankle
- Crepitus with ankle movements
- Ligament laxity
- Range of motion, active and passive movements of ipsilateral and contralateral joints
- Ankle

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    - Dorsiflexion
    - Plantarflexion
    - Inversion
    - Eversion
    - Toe movements
- Knee
    - Flexion
    - Extension
- Hip
    - Flexion
    - Extension
    - Abduction
    - Adduction
    - External rotation
    - Internal rotation
- Manual Muscle Testing of ipsilateral and contralateral joints
    - Ankle joint
    - Knee joint
    - Hip joint
- Orthopedic and neurologic (testing if neurologic signs) are present
    - Joint play movements: Assess for hypomobility, hypermobility at the ankle
    - Test dermatomes and myotomes of L4, L5, S1, S2
    - Test tendon reflexes: Achilles Tendon, Patella Tendon
    - Test for leg-length discrepancy
    - Ankle Instability Tests
    - Anterior Drawer test
    - Tilt Test
    - Peroneal tendon stability test
- Assessment of gait (as allowed by weight bearing status)
    - Barefoot walking (use paper walkway 20-24 ft – analyze base of support, cadence,s tride length, velocity, heel strike, midstance, toe off, trunk lurch, hip extension)
    - Normal Gait
    - Walk on toes
    - Walk on heels
    - Standing with feet fixed:
    - Externally rotate legs on feet
    - Internally rotate legs on feet
    - Standing with knees extended:
    - Evert feet
    - Invert feet
- Functional assessment - The following standardized tests may be used to assess functional limitations:
    - Foot and Ankle Outcome Score (FAOS)
    - Foot and Ankle Ability Measure (FAAM)

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Findings of Tri-malleolar, Fracture, Post-Cast Removal

- Swelling occurs at fracture site
- Restricted motion caused by pain, swelling, immobilization, or soft tissue shortening is common
- Muscle atrophy

Differential Diagnosis

Talofibular Ligament injury

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

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Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

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Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on the following:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

Therapy program goals are to:

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- Minimize the inflammation,
- Normalize gait,
- Normalize pain-free range of motion,
- Prevent muscular atrophy,
- Maintain proprioception,
- Relieve joint pain, and
- Increase strength so that other objectives may be achieved.
- Home program, individually prescribed, is central to the care of all patients. The teachingf or this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been a
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider to explore alternative treatment options when you find:

- Swelling or redness without history of trauma
- Muscle wasting
- Loss of reflexes

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Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for treatment **post-cast removal**. The ankle should be put in a cast in a neutral position to avoid shortening of the Achilles tendon. Generally, 4-6 weeks of immobilization is required for healing. Progressive weight-bearing is allowed after 6 weeks. Cast boots are generally preferred after swelling dissipates so that intermittent motion can commence.

Expected Outcome	Procedures/Modalities Such As
Reduce pain and swelling	Modalities such as: ▪ Cryotherapy ▪ Interferential current
Improve flexibility	▪ Passive stretches of the Achilles tendon ▪ Joint mobilization ▪ Active assisted and Active range of motion of ankle joint is allowed once full passive motion is achieved
Improve strength	▪ As pain decreases add isometric and isotonic exercises ▪ Once weightbearing restrictions are lifted and wound is healed: ▪ Advance to close-chain exercises ▪ Balance and proprioception training
Patient education and self-management techniques	▪ Frequent icing ▪ Teach mobilization techniques ▪ Teach range of motion and strengthening exercises ▪ Scar management ▪ Correct footwear, wear high-topped footwear to increase ankle stability ▪ Teach protective taping to increase ankle stability
Correct gait abnormality and proper biomechanics and gradual return to normal function	▪ Correct gait pattern and progress weight-bearing as tolerated ▪ ambulation and endurance on level, uneven surfaces ▪ Stair mobility

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is

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contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Heat packs
- Assistive gait device
- Orthotics if needed

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Heat packs

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication

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Orthopedic – Lumbosacral Disc-Radicular

Lumbar Intervertebral Disc Syndrome

Synonyms

- Disc herniation
- Bulging disc

Definition

A condition involving nerve root irritation as a result of lumbar disc pathology.

Patient History

Patient history may include

Patient Data

- General demographics
- Occupation/employment
- Living environment
- History of current condition
- Functional status and activity level
- Medications
- Other tests and measurements (laboratory and diagnostic tests)
- Past history (including history of prior therapy and response to prior treatment)
- Prior level of function

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Onset following minor fall, or heavy lifting in elderly or osteoporotic patient	Fracture
Direct Bbow to the back in young adult	Fracture
Saddle anesthesia	Cauda equina syndrome

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Severe, or progressive neurologic complaints	Cauda equina syndrome
Global, or progressive motor weakness in the lower extremities	Cauda equina syndrome
Recent onset of bowel dysfunction, or acute onset of bladder dysfunction in association with low back pain	Cauda equina syndrome
Unexplained weight loss	Malignancy
Prior history of cancer	Malignancy
Pain that is worse with recumbency, or worse at night	Malignancy
Fever, or recent bacterial infection	Infection
Intravenous drug abuse, or immunosupression	Infection
Prolonged steroid use	Osteoporosis
Symptoms that do not change with change in position	Kidney disease

Presentation

- Typical patient is between ages of 25-60.
- Activity precipitating pain, typically involves bending, twisting, and/or lifting.
- No aggravating event in 50% of patients.
- Usually reports history of several or more resolved low back pain episodes previous to current onset.

Subjective Findings

- Pain and stiffness in low back
- Often associated with numbness, pain, and/or weakness that may reach to the distal ends of lower extremities
- Extremity symptoms may predominate
- Midline disc protrusions may involve both extremities
- Type and radiation of pain vary
- Worse with prolonged sitting, standing, bending, stooping, lifting
- Better with rest.

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Note: Extraspinal diseases that may refer pain to the back include: aortic aneurysm, colon cancer, endometriosis, hip disease, kidney stones, ovarian disease, pancreatitis, pelvic infections, tumors or cysts of the reproductive tract, uterine cancer.

The most serious cause of low back pain is malignant tumor. Most malignant tumors are metastatic and some may cause bony collapse and paralysis. Primary cancers that

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most commonly metastasize to bone consist of adrenal, breast, kidney, lung, prostate, and thyroid.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Assess Gait/posture for sciatic list (provocative test)
- Palpation of bony and soft tissue
- Range of motion
  - Active/Passive Range of motion
  - Forward Flexion (provocative test)
  - Extension
  - Side flexion (left & right)
  - Rotation (Left & right)
- Peripheral joint scan for range of motion and strength
  - Thoracic spine, sacroiliac joint, hip, knee, ankle
- Motion palpation of spine
  - Joint play movements in side-lying for the lumbar spine
- Resisted isometric tests
- Orthopedic testing
  - One leg standing lumbar extension test
  - Slump test (provocative test)
  - Straight leg raise test (provocative test)
  - Prone knee bending test
  - Femoral nerve traction test (provocative test)
  - Specific Torsion Test
  - Trendelenburg's test and S1 nerve root test
- Neurologic testing:
  - Myotomes: Hip Flex. (L2), Knee ext. (L3), Ankle dorsiflexion. (L4)
  - Dermatomal Sensation Tests (L1-S1)
  - Deep Tendon Reflexes: Patella, Dorsiflexion, and Hamstring
- Functional limitations: - The following standardized tests may be used to assess functional limitation such as lifting, walking, sitting, standing, sleeping, social life and vocation.
  - Oswestry Disability Index
  - Bournemouth Questionnaire
- Evaluate psycho-social status

Findings of Lumbar Intervertebral Disc Syndrome

- Often antalgic
- Antalgic posture, sciatic list
- ROM restrictions
- Nerve root tension signs (i.e., SLR, WLR, Bechterew's, Bowstring) are typically positive but may be absent in cases involving a free fragment of disc tissue

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- Kemp's test may cause radiating lower extremity pain
- Dejerine's triad may be positive
- Follow a nerve root path if extremities symptoms and findings are present:
  - Sensory abnormalities in dermatome
  - Loss of corresponding reflex possible
  - Motor power weakness, heel/toe walk, squat
  - Decreased lower extremity girth may be present
  - CT/MRI studies can often confirm disc involvement, but is equivocal unless correlated with clinical findings.
  - NCV studies are typically of better diagnostic value than EMG studies in isolating the nerve root involvement, and in differentiating IDS intervertebral disc syndrome from peripheral neuropathies.
- 98% of all disc lesions are located at L4/5 or L5/S1

Differential Diagnoses

- Extraspinal causes (ovarian cyst, kidney stone, pancreatitis, ulcer)
- Osteoporosis and compression fractures (major trauma, or minor trauma in elderly/osteoporotic patient)
- Infection in disc or bone (fever, history of IV drug use, severe pain or tuberculosis)
- Inflammatory arthritides (family history, patient age/sex, morning stiffness)
- Metastatic disease, myeloma, lymphoma (pathologic fracture, severe night pain, night sweats)
- Spinal tuberculosis (lower socioeconomic groups, alcoholism, AIDS)

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a

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combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

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Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)

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3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Treatment Methods

- Depending on level of pain, modalities to address pain may be utilized.
- If muscular spasms are present, soft tissue mobilization would be indicated.
- Flexion vs. extension exercises are assessed for localization of symptoms—patient is started on appropriate exercise.
- Flexibility exercises and lumbar stabilization exercises are recommended.
- Lumbar traction (manual or mechanical) may be utilized to decrease pain and peripheral symptoms.
- Ergonomic assessment of work site may be appropriate.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

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Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of lower extremity occurs
- Signs of demyelinating condition, tumor or infection
- Increased neurologic signs/symptoms: increased LE numbness/tingling, increasing LE weakness, increasing LE pain, decreasing LE reflexes

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Intervention for Non-Specific Back Pain (Brennan et al 2006)

Specific Exercise

Treatment for this category includes exercises or manual interventions that focus on centralizing and abolishing the patient's symptoms. The most common treatment would include a form of repeat and/or sustained lumbar extension. In some cases repeat/sustained flexion or lateral gliding exercises may be indicated instead. Patients who fall into this category will typically meet the following criteria; symptoms that radiate

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into the lower extremity, a strong preference for either sitting or walking, centralization and peripheralization with repeated lumbar spine movements.

Traction

Treatment for this category includes manual and/or mechanical lumbar traction. Patients who fall into this category typically meet the following criteria; pain radiating into the lower extremity, peripheralization of symptoms with extension, a positive Well (crossed) SLR.

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self care at his residence.

Home Medical Equipment

- Home lumbar traction unit

Self-Care Techniques

- Postural advice, instruction in proper body mechanics
- Lumbar stabilization exercises, flexibility exercises
- Aerobic conditioning
- Cold/heat applications, if needed, to relieve discomfort/stiffness

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Physiatry
- Medication

Medicare References

1. Centers for Medicare & Medicaid Services (CMS), Medicare Benefit Policy Manual-Pub. 100-2: Chapter 15, Section 220, Covered Medical and Other Health Services, Conditions of Coverage and Payment Outpatient Physical Therapy, Occupational Therapy, or Speech-Language Pathology Services. http://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/bp102c15.pdf

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Lumbar Post Surgery Syndrome

Post Arthroscopic Discectomy Syndrome

Post Laminectomy Syndrome, Post Fusion/ORIF Syndrome

Synonym

Failed back surgery syndrome

Definition

Post-surgical condition, in which patient continues to present with abnormal findings in strength, ROM, and pain referred to the sacro-iliac, and/or lower extremity. Patient may also have altered reflexes and sensation.

Patient History

Patient history may include

Patient Data

- General demographics
- Occupation/employment
- Living environment
- History of current condition
- Functional status and activity level
- Medications
- Other tests and measurements (laboratory and diagnostic tests)
- Past history (including history of prior therapy and response to prior treatment)
- Prior level of function

In addition to the standard information gathered, a complete understanding of surgical procedure performed should be obtained from surgeon.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.
- Determine if trauma occurred post-operatively; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Onset following minor fall or heavy lifting in elderly, or osteoporotic patient	Fracture
Direct blow to the back in young adult	Fracture
Saddle anesthesia	Cauda equina syndrome
Severe, or progressive neurologic complaints	Cauda equina syndrome
Global, or progressive motor weakness in the lower extremities	Cauda equina syndrome
Recent onset of bowel dysfunction, or acute onset of bladder dysfunction in association with low back pain	Cauda equina syndrome
Unexplained weight loss	Malignancy
Prior history of cancer	Malignancy
Pain that is worse with recumbency, or worse at night	Malignancy
Fever, or recent bacterial infection	Infection
Intravenous drug abuse, or immunosupression	Infection
Prolonged steroid use	Osteoporosis

Presentation

- Patient may report trauma, or insidious onset.
- Disc herniations tend to occur more frequently in younger patients due to the gradual dehydration of the nucleus pulposus that normally occurs with aging.
- Patient will probably have spinal precautions in the acute and sub-acute phases that vary by method of fusion and surgeon preference.

Subjective Findings

- Pain, numbness, tingling, paresthesias in lower extremity following lumbar nerve root distribution
- Weakness in the lower extremity
- Midline disc protrusions may involve both extremities
- Better with rest
- Flexing knee may provide relief by decreasing tension on irritated lumbar nerve
- Pain in the low back
- Worse with prolonged sitting, and standing (early on, patient will generally have precautions to avoid bending, stooping and lifting)

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

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Note: Extraspinal diseases that may refer pain to the back include: aortic aneurysm, colon cancer, endometriosis, hip disease, kidney stones, ovarian disease, pancreatitis, pelvic infections, tumors or cysts of the reproductive tract, uterine cancer.

The most serious cause of low back pain is malignant tumor. Most malignant tumors are metastatic and some may cause bony collapse and paralysis. Primary cancers that most commonly metastasize to bone consist of adrenal, breast, kidney, lung, prostate, and thyroid.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Assess Gait
  - Posture assessment, look for sciatic list
  - Leg length discrepancy
- Palpation of bony and soft tissue
- Range of motion
  - Test active and passive range of motion of lumbar spine if allowed by precaution
  - Forward Flexion
  - Extension
  - Side flexion (left & right)
  - Rotation (left & right)
- Motion palpation of spine
  - Test accessory joint movements
- Peripheral joint scan for range of motion and strength
  - Thoracic spine, sacroiliac joint, hip, knee, ankle
- Resisted isometric tests (provocative test)
- Orthopedic testing
  - Straight leg raise test (provocative test)
  - Prone knee bending test
  - Femoral nerve traction test
  - Trendelenburg's test and S1 nerve root test
- Neurologic testing
  - Myotomes: Hip Flex. (L2), Knee ext. (L3), Ankle dorsiflexion. (L4)
  - Dermatomal Sensation Tests (L1-S1)
  - Deep Tendon Reflexes: Patella, Dorsiflexion, and Hamstring
- Test balance, coordination, endurance
- Functional limitations - The following standardized tests may be used to assess functional limitation such as lifting, walking, sitting, standing, sleeping, social life and vocation.
  - Oswestry Disability Index
  - Bournemouth Questionnaire
- Evaluate psycho-social status

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Findings of Lumbar Examination

- Lumbar ROM restrictions may be present, due to pain or by precaution
- Muscle spasms in corresponding myotomes
- Nerve root tension signs (SLR, Braggards) are typically positive but may be absent in cases involving a free fragment of disc tissue
- Dejerine's triad may be positive
- Posture may be antalgic
- Dural tension signs
- Follow a nerve root path if extremities symptoms and findings are present:
  - Sensory abnormalities in dermatome
  - Loss of reflex
  - Motor power weakness of lower extremity
  - Decreased lower extremity girth may be present
- The most commonly involved nerve root is L5, followed in frequency by the S1 and L4 nerve roots.

Differential Diagnoses

- Extraspinal nerve entrapment (due to abdominal or pelvic mass)
- Cauda equina syndrome (saddle anesthesia, bladder or bowel dysfunction, bilateral involvement)
- Myelopathy due to thoracic disc herniation
- Demyelinating disease
- Lateral femoral cutaneous nerve entrapment (lateral thigh, sensory only, reverse SLR or femoral nerve stretch test)
- Trochanteric bursitis (no nerve root tension signs, pain on lateral thigh/leg, exquisite tenderness to palpation over trochanter)
- Symptoms may arise from lesions, or pathology at sites other than the surgical level

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist

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of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based

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on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

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1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Treatment Methods

- Depending on level of pain, modalities to address pain may be utilized.
- If muscular spasms are present, soft tissue mobilization would be indicated—patient is started on appropriate exercise.
- Flexibility and lumbar stabilization exercises are common once patient is taken off post-surgical precautions.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.
- Because multiple factors can contribute to this syndrome, patients are considered to be suffering from a chronic pain syndrome. It is recommended that these patients be treated by a multi-disciplinary team, including at least an MD anesthesiologist, physical therapist, occupational therapist and psychologist to help manage the rehabilitation.
- Physician specific protocols will be considered in the context of the plans definition of medical necessity.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.

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- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider to explore alternative treatment options, if:

- Improvement does not meet the above guidelines, or has reached a plateau
- Atrophy of lower extremity
- Signs of demyelinating condition, tumor or infection
- Increasing neurologic signs/symptoms: increasing LE numbness/tingling, increasing LE weakness, increasing LE pain, and/or decreasing LE reflexes.
- Signs of upper motor neuron involvement (clonus, hyperreflexia, Babinski reflex) may suggest compression of the spinal cord, which should be evaluated medically.

Management/Intervention

Use of modalities and or passive treatments should be limited. The goal is to transition patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Acute Phase** presentation.

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Decrease pain	▪ Modalities to relieve pain e.g. Cryotherapy, TENS, interferential current
Improve vascularity and extensibility of soft tissue and connective tissue	▪ Soft tissue mobilization ▪ Myofascial Release
Improve lumbar flexibility	▪ Gentle Flexibility exercises (hamstring stretch, Hip flexors stretch, Quadriceps stretch)
Improve strength and power of back musculature and ability to walk for least 30 minutes	▪ Isometric exercises of abdominal and back muscles ▪ Stability exercises in side-lying, standing
Patient education and initiation of home exercise program	▪ Physician protocol may require lumbar orthotics/brace

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	▪ Avoid bending, twisting, or lifting more than 5 pounds ▪ Application of ice or hot-packs ▪ Remain as active as possible ▪ Body mechanics ▪ Teach home exercise program

The following table lists the procedures for **Subacute Phase** presentation. Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Expected Outcome	Procedures/Modalities Such As
Restore flexibility of lumbar spine	▪ Flexibility exercises (hamstring stretch, Hip flexors stretch, back muscle stretch, Quadriceps stretch, pelvic mobilization) ▪ Endurance training ▪ Lumbar range of motion exercises once restrictions are lifted
Increase strength and endurance of Lumbar spine and lower extremities	▪ Advanced dynamic stabilization exercises ▪ Strengthening exercises to trunk and lower extremity
Improvement in body mechanics and postural stabilization	▪ Postural stabilization activities ▪ Postural Control ▪ Body mechanics
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual resumption of activities relating to self-care and home management ▪ Self-management of symptoms ▪ Functional restoration ▪ Teach home exercise program

The following table lists procedures for **Corrective/Rehabilitative Phase** presentation.

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

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Expected Outcome	Procedures/Modalities Such As
Increase strength and endurance of Lumbar spine and lower extremities	▪ Advanced dynamic stabilization exercises ▪ Progressive resistive exercise program
Ability to perform physical actions, tasks or activities related to self-care, home management, work, community and leisure	▪ Gradual resumption of activities relating to work, community and leisure ▪ Self-management of symptoms ▪ Work hardening or vocational rehabilitation to learn different job skills ▪ Postural control and body mechanics ▪ Teach home exercise program

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband
- Gymball
- Home electrical stimulation unit

Self-Care Techniques

- Postural advice, instruction in proper body mechanics
- Lumbar stabilization exercises, flexibility exercises, as indicated
- Aerobic conditioning
- Cold/heat applications, if needed, to relieve discomfort/stiffness
- Brief use of lumbar support, if necessary, in the acute stages to limit motion
- Instruct patient in any surgery specific precautions

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Physiatry
- Medication

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- Acupuncture
- Chiropractic
- Anesthesia/pain management

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Lumbar Radiculopathy and Sciatica

Synonyms

- Lumbar root compression syndrome
- Neurogenic leg pain
- Lumbosacral neuritis NOS

Definition

Neurogenic pain following the distribution of one or less commonly more, lumbar nerve root(s) due to mechanical pressure and inflammation of the lower lumbar nerve roots. Pain may be accompanied by lower extremity numbness, weakness, or hyporeflexia. Pain may be due to lumbar disc herniation (typically younger patients) or bony mechanical pressure of lower lumbar nerve root(s) (typically in older patients).

History

Patient History may include

Patient Data

- General demographics
- Occupation/employment
- Living environment
- History of current condition
- Functional status and activity level
- Medications
- Other tests and measurements (laboratory and diagnostic tests)
- Past history (including history of prior therapy and response to prior treatment)
- Prior level of function

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Onset following minor fall or heavy lifting in elderly, or osteoporotic patient	Fracture
Direct blow to the back in young adult	Fracture
Saddle anesthesia	Cauda equina syndrome

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Severe or progressive neurologic complaints	Cauda equina syndrome
Global or progressive motor weakness in the lower extremities	Cauda equina syndrome
Recent onset of bowel dysfunction or acute onset of bladder dysfunction in association with low back pain	Cauda equina syndrome
Unexplained weight loss	Malignancy
Prior history of cancer	Malignancy
Pain that is worse with recumbency or worse at night	Malignancy
Fever or recent bacterial infection	Infection
Intravenous drug abuse or immunosuppression	Infection
Prolonged steroid use	Osteoporosis

Presentation

- Patient may report trauma or insidious onset.
- Disc herniations tend to occur more frequently in younger patients due to the gradual dehydration of the nucleus pulposus that normally occurs with aging.

Subjective Findings

- Pain, numbness, tingling, paresthesia in the lower extremity following lumbar nerve root distribution
- Weakness in the lower extremity
- Midline disc protrusions may involve both extremities
- Better with rest
- Flexing knee may provide relief by decreasing tension on irritated lumbar nerve

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Note: The most serious cause of low back pain is malignant tumor. Most malignant tumors are metastatic and some may cause bony collapse and paralysis. Primary cancers that most commonly metastasize to bone consist of adrenal, breast, kidney, lung, prostate, and thyroid.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Assess Gait/posture for sciatic list (provocative test)

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- Palpation of bony and soft tissue
- Range of motion
  - Active/Passive Range of motion
  - Forward Flexion (provocative test)
  - Extension
  - Side flexion (left & right)
  - Rotation (Left & right)
- Peripheral joint scan for range of motion and strength
  - Thoracic spine, sacroiliac joint, hip, knee, ankle
- Motion palpation of spine
  - Joint play movements in side-lying for the lumbar spine
- Manual muscle testing
- Orthopedic testing
  - One leg standing lumbar extension test
  - Slump test (provocation test)
  - Straight leg raise test (provocation test)
  - Prone knee bending test
  - Femoral nerve traction test (provocation test)
  - Specific Torsion Test
  - Trendelenburg's test and S1 nerve root test
- Neurologic testing
  - Myotomes: Hip Flex. (L2), Knee ext. (L3), Ankle dorsiflexion. (L4)
  - Dermatomal Sensation Tests (L1-S1)
  - Deep Tendon Reflexes: Patella, Dorsiflexion, and Hamstring
- Functional limitations - The following standardized tests may be used to assess functional limitation such as lifting, walking, sitting, standing, sleeping, social life and vocation.
  - Oswestry Disability Index
  - Bournemouth Questionnaire
- Evaluate psycho-social status

Findings of Lumbar Radiculopathy or Sciatica

- Posture may be antalgic.
- Lumbar ROM restrictions may be present.
- Muscle spasms in corresponding myotomes
- Nerve root tension signs (SLR, Braggards) are typically positive but may be absent in cases involving a free fragment of disc tissue.
- Positive flip sign (leaning back when the knee is extended from seated position combined with positive SLR (leg pain below knee) at less than 45° is highly indicative of lumbar disc herniation.
- Dejerine's triad may be positive.
- Dural tension signs.
- Follow nerve root pattern if extremities symptoms and findings are present:
  - Sensory abnormalities in dermatome
  - Loss of reflex

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- The most commonly involved nerve root is L5, followed in frequency by the S1 and L4 nerve roots.

Differential Diagnoses

- Extraspinal nerve entrapment (due to abdominal or pelvic mass)
- Cauda equina syndrome (saddle anesthesia, bladder or bowel dysfunction, bilateral involvement)
- Myelopathy due to thoracic disc herniation
- Demyelinating disease
- Lateral femoral cutaneous nerve entrapment (lateral thigh, sensory only, reverse SLR or femoral nerve stretch test)
- Trochanteric bursitis (no nerve root tension signs, pain on lateral thigh/leg, exquisite tenderness to palpation over trochanter)

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or

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injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

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Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Treatment Methods

Depending on level of pain, modalities to address pain may be utilized.

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- If muscular spasms are present, soft tissue mobilization would be indicated.
- Flexion vs. extension exercises are assessed for localization of symptoms, and patient is started on appropriate exercise.
- Flexibility and lumbar stabilization exercises are recommended.
- Lumbar traction (manual or mechanical) may be utilized to decrease pain and peripheral symptoms.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of lower extremity occurs
- Signs of demyelinating condition, tumor or infection
- Increased neurologic signs/symptoms: increased LE numbness/tingling, increasing LE weakness, increasing LE pain, decreasing LE reflexes

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Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Intervention for Non-Specific Back Pain

Specific Exercise

Treatment for this category includes exercises or manual interventions that focus on centralizing and abolishing the patient's symptoms. The most common treatment would include a form of repeat and/or sustained lumbar extension. In some cases repeat/sustained flexion or lateral gliding exercises may be indicated instead. Patients who fall into this category will typically meet the following criteria; symptoms that radiate into the lower extremity, a strong preference for either sitting or walking, centralization and peripheralization with repeated lumbar spine movements.

Traction

Treatment for this category includes manual and/or mechanical lumbar traction. Patients who fall into this category typically meet the following criteria; pain radiating into the lower extremity, peripheralization of symptoms with extension, a positive Well (crossed) SLR.

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self -care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband
- Gymball
- Lumbar traction
- Home electrical stimulation unit

Self-Care Techniques

- Postural advice, instruction in proper body mechanics
- Lumbar stabilization exercises, flexibility exercises

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- Aerobic conditioning
- Cold/heat applications, if needed, to relieve discomfort/stiffness
- Brief use of lumbar support, if necessary, in the acute stages to limit motion

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Physiatry
- Medication

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Lumbar Spinal Stenosis

Synonym

Degenerative spinal stenosis (DSS)

Definition

Lumbar spinal stenosis is defined as any narrowing of the lumbar spinal canal, nerve root canals, and/or intervertebral foramina that may encroach on the nerve roots of the lumbar spine. Facet joint arthrosis and hypertrophy, bulging and thickening of the ligamentum flavum, posterior/lateral bulging of the disk, and degenerative spondylolisthesis are the most common changes contributing to lumbar spinal stenosis. Because degenerative changes are the predominant cause of lumbar spinal stenosis, patients are generally older than age 50 with a long history of low back pain.

Patient History

Patient History may include

Patient Data

Symptoms start gradually and usually occur in males over age 45-50; history may be vague.

Specific Considerations

Rule out red flags (require medical management).

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Onset following minor fall, or heavy lifting in elderly or osteoporotic patient	Fracture
Direct blow to the back in young adult	Fracture
Saddle anesthesia	Cauda equina syndrome
Severe or progressive neurologic complaints	Cauda equina syndrome
Global or progressive motor weakness in the lower extremities	Cauda equina syndrome
Recent onset of bowel dysfunction or acute onset of bladder dysfunction in association with low back pain	Cauda equina syndrome
Unexplained weight loss	Malignancy
Prior history of cancer	Malignancy
Pain that is worse with recumbency or worse at night	Malignancy

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Fever or recent bacterial infection	Infection
Intravenous drug abuse or immunosuppression	Infection
Prolonged steroid use	Osteoporosis

Note: Extraspinal diseases that may refer pain to the back include: aortic aneurysm, colon cancer, endometriosis, hip disease, kidney stones, ovarian disease, pancreatitis, pelvic infections, tumors or cysts of the reproductive tract, uterine cancer.

The most serious cause of low back pain is malignant tumor. Most malignant tumors are metastatic and some may cause bony collapse and paralysis. Primary cancers that most commonly metastasize to bone consist of adrenal, breast, kidney, lung, prostate, and thyroid

Presentation

Most patients have symptoms of pain, and/or numbness of one or both legs.

- Chronic nerve compression may lead to diminished lower extremity reflexes and strength or sensation deficits.
- Lumbar range of motion, particularly in extension, is limited and painful, often reproducing leg symptoms.
- Symptoms tend to be posture dependent, worsening with spinal extension, and improving with flexion.
- Compression of the nerve within the canal may result in a limitation of the arterial supply or claudication resulting from the compression of the venous return (neurogenic claudication).
- Neurogenic claudication presents as poorly localized pain, paresthesias, and cramping of one or both lower extremities.
- Symptoms are provoked by walking and relieved by sitting.

Subjective Findings

- Unilateral or bilateral complaints of leg pain
- May complain of weakness in the lower extremity
- Better with rest
- Flexing spine may provide relief by decreasing pressure on lumbar nerve root
- Symptoms increase with lumbar extension activities such as walking and prolonged standing

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

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Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Assess Gait
  - Posture assessment, look for sciatic list
  - Leg length discrepancy
- Palpation of bony and soft tissue
  - Palpate lumbar spine for tenderness, altered temperature and muscle spasm
- Test for Intermittent Claudication (Stoop Test)
- Vascular assessment (check pulses of Dorsalis Pedis Artery and Tibialis Posterior muscle pulse)
- Resisted isometric tests (provocative test)
- Range of motion
  - Test active and passive range of motion-lumbar spine
  - Forward Flexion
  - Extension
  - Side flexion (left & right)
  - Rotation (Left & right)
- Motion palpation of spine
  - Test accessory joint movements
- Peripheral joint scan for range of motion and strength
  - Thoracic spine, sacroiliac joint, hip, knee, ankle
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  - Dermatomal Sensation Tests (L1-S1)
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- Test balance, coordination, endurance
- Functional limitations - The following standardized tests may be used to assess functional limitation such as lifting, walking, sitting, standing, sleeping, social life and vocation.
  - Oswestry Disability Index
  - Bournemouth Questionnaire
- Evaluate psychosocial status

Findings of Spinal Stenosis

- Flattened lumbar lordosis
- Lumbar ROM restrictions side bending is often limited bilaterally

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- Lumbar extension may be quite limited and reproduce or intensify symptoms
- Lumbar flexion is also frequently limited in range but somewhat relieves the symptoms
- Postural dependency of symptoms
- Deficits in vibratory or pinprick sensation
- Strength and reflex deficits
- Muscle cramps with activity
- Posture may be antalgic
- Diminished walking tolerance
- Signs of upper motor neuron involvement (clonus, hyperreflexia, Babinski reflex) may suggest compression of the spinal cord that should be evaluated medically.

Differential Diagnoses

- Extra spinal nerve entrapment (due to abdominal or pelvic mass)
- Cauda equina syndrome (saddle anesthesia, bladder or bowel dysfunction, bilateral involvement)
- Myelopathy due to thoracic disc herniation
- Demyelinating disease
- Lateral femoral cutaneous nerve entrapment (lateral thigh, sensory only, reverse SLR or femoral nerve stretch test)
- Trochanteric bursitis (no nerve root tension signs, pain on lateral thigh/leg, exquisite tenderness to palpation over trochanter)
- Disc protrusion
- Herniated nucleus pulposus
- Peripheral vascular disease

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

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2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
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3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Treatment Methods

- Depending on level of pain, modalities to address pain may be utilized.
- If muscular spasms are present, soft tissue mobilization would be indicated—patient is started on appropriate exercise.
- Flexion-oriented exercises are indicated.
- Strength and flexibility deficits identified during examination should be addressed.
- Pelvic traction may be helpful for pain reduction but should be combined with active forms of therapy to improve function.
- General conditioning activities are useful and may include stationary cycling aquatic exercise and walking as tolerated.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Refer patient to their primary care provider to explore alternative treatment options if:

- Improvement does not meet the above guidelines
- Improvement has reached a plateau
- Atrophy of lower extremity becomes evident
- Signs of demyelinating condition, tumor or infection become evident
- Increasing neurologic signs/symptoms: increasing lower extremity numbness/tingling, increasing lower extremity weakness, increasing lower extremity pain, and/or decreasing lower extremity reflexes

Management/Intervention

The treatment plan needs to be individualized based on patient presentation.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

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Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Proposed Treatment

- Lumbar extension exercises should be avoided in this population, as spinal extension and increased lumbar lordosis are known to worsen LSS.
- Flexion exercises for the lumbar spine should be emphasized, as they reduce lumbar lordosis and decrease stress on the spine. Spinal flexion exercises increase the spinal canal dimension, thus reducing neurogenic claudication (NC). Williams' flexion-biased exercises target increased lumbar lordosis, paraspinal and hamstring inflexibility, and abdominal muscle weakness. Ancillary exercises to target weak gluteals, as well as shortened hip flexors and hamstrings and body weight supported treadmill ambulation in a flexed posture are indicated. Others advocate stationary cycling.
- Passive modalities such as heat, cold, transcutaneous electrical nerve stimulation (TENS), and ultrasound may provide transient analgesia and increased soft tissue flexibility in LSS patients.
- The addition of a rolling walker is often necessary in many cases. The rolling walker provides some stability and promotes a flexed posture, which allows the afflicted patient to ambulate greater distances.

Whitman et al. found that the combination of the interventions listed above had superior outcomes compared to a combination of flexion exercises, non-thermal ultrasound to the lumbar area, and regular treadmill walking in treating patients with spinal stenosis. There were improvements in disability, patient satisfaction, and in the Two-Stage Treadmill Test.

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

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Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self -care at his residence.

Home Medical Equipment

- Hot packs
- Cold packs
- Home traction unit
- Home electrical stimulation unit

Self-Care Techniques

- Postural advice, instruction in proper body mechanics
- Lumbar stabilization exercises, flexibility exercises, as indicated
- Aerobic conditioning
- Cold/heat applications, if needed, to relieve discomfort/stiffness
- Brief use of lumbar support, if necessary, in the acute stages to limit motion

Alternatives/Adjuncts to Physical /Occupational Therapy Management

- Osteopathic manipulation
- Physiatry
- Medication
- Chiropractic
- Surgery
- Acupuncture

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Orthopedic – Lumbrosacral Non Specific

Back Pain and Dysfunction

Synonyms

Lumbago
Backache
Non-Specific Low Back Pain
Non-radicular Low Back Pain

Definition

Back Pain is a term used to describe low back pain, nonspecific in origin, and/or nature. It can be acute, or chronic in nature. It is generally not used to describe episodes that involve radicular symptoms.

Patient History

Patient Data

- General demographics
- Occupation/employment
- Living environment
- History of current conditions
- Functional status and activity level
- Medications
- Other tests and measurements (laboratory and diagnostic tests)
- Past history (including history of prior therapy and response to prior treatment)

Special Considerations

- Rule out red flags (require medical management) See Table below.
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Onset following minor fall or heavy lifting in elderly or osteoporotic patient	Fracture
Direct Blow to the back in young adult	Fracture

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Saddle anesthesia	Cauda equina syndrome
Severe or progressive neurologic complaints	Cauda equina syndrome
Global or progressive motor weakness in the lower extremities	Cauda equina syndrome
Recent onset of bowel dysfunction, or acute onset of bladder dysfunction in association with low back pain	Cauda equina syndrome
Unexplained weight loss	Malignancy
Prior history of cancer	Malignancy
Pain that is worse with recumbency, or worse at night, pain at rest	Malignancy
Fever, or recent bacterial infection	Infection
Intravenous drug abuse or immunosuppression	Infection
Prolonged steroid use	Osteoporosis
Pain that does not change with change in position	Kidney disease

Presentation

The onset of pain is usually insidious, typically but not limited to occurring between the 3rd and 6th decades of life. Patient may report a prior history of episodic low back pain lasting over several years.

Subjective Findings

- Pain typically worse with motion
- Pain distribution in the low back, gluteals or thighs above the knee
- Stiffness upon arising from a seated position
- Essentially constant awareness of some level of back discomfort, or limitations in motion
- Pain and stiffness in the low back which may have intermittent, sporadic, sharp local pain
- Patient is in general good health

Objective Findings

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Note: Extraspinal diseases that may refer pain to the back include: aortic aneurysm, colon cancer, endometriosis, hip disease, kidney stones, ovarian disease, pancreatitis, pelvic infections, tumors or cysts of the reproductive tract, uterine cancer.

The most serious cause of low back pain is malignant tumor. Most malignant tumors are metastatic and some may cause bony collapse and paralysis. Primary cancers that

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most commonly metastasize to bone consist of adrenal, breast, kidney, lung, prostate, and thyroid.

Specific Examination Considerations

The physical therapy examination begins with an appropriate clinical history that provides the necessary information to guide the clinical examination (Deyo, Rainville, & Kent, 1992; The Swedish Council, 2000; Van den Hoogen, Koes, van Eijk, & Bouter, 1995) and includes the following criteria for non-specific low back pain without a radicular or neurologic component.

1. Mobility (ICF category: Measurement of impairment of body function- mobility of several joints; good level of documentation and moderate level of evidence)
   - Mobility of the spine in lateral flexion, rotation, and ventral flexion and extension (Alaranta, 1994; Johnson, 1990; van Tulder, et al., 2006;M agnussen, 1999; Strand, Ljunggren, Haldorsen, & Espehaug, 2001; Saur, Ensink, Frese, Seeger, & Hildebrandt, 1996)
   - Neurological examination of the lower extremities to rule out nerve root involvement. (ICF category: Measurement of impairment of bodily function—mobility and function of nerves; very good level of documentation and very good level of evidence).
   - Muscle function (Devillé, Van der Windt, Dzaferagic, Bezener, & Bouter, L., 2000; Deyo, Rainville & Kent, 1992; Waddell, McIntosh, Hutchinson, Feder, & Lewis, 1999).
   - Nerve stretch tests
   - Lasegues/straight leg raise- dural and lower limb nerve mobility sign (Deville, Van der Windt, Dzaferagic, Bezener & Bouter, 2000; Deyo, Rainville & Kent, 1992; The Swedish Council, 2000; Vroomen, de Krom & Knottnerus, 1999; Waddell, McIntosh, Hutchinson, Feder & Lewis, 1999).
   - Cross Lasegues test (Deville, Van der Windt, Dzaferagic, Bezener & Bouter, 2000).
   - Prone knee flexion test- dural and lower limb nerve mobility sign performed in prone position (Asquier, Troussier, Chirossel, Chardonnet, Mouries, Juvin, & Phelip, 1996; Kreitz, Cute, & Yong-Hing, 1996).
   - Slump test- a dural and lower limb nerve mobility test (Philip, Lew, & Matyas, 1989; Massey, 1985)
2. Trunk Muscle Power/Endurance (ICF category- Measurement of impairment of body function—pain in back; pain in lower limb; very good level of documentation and very good level of evidence) using tests that assess performance of trunk flexor, extensor, lateral abdominal, transverse abdominis, hip abductor and extensor musculature (Evans, Refshauge, & Adams, 2007; Godges, MacRae, & Engelke, 1993; Hodges, Richardson, & Jull, 1996; Krause, Youdas, Hollman, & Smith, 2005; McGill, Childs, & Liebenson, 1999; Nelson-Wong, Flynn, & Callaghan, 2009; Schellenberg, Lang, Chan, & Burnham, 2007).
3. Segmental Mobility Tests (ICF category- measurement of impairment of body function- mobility of joint functions, specified as mobility of vertebral segment; moderate level of documentation and moderate level of evidence)

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- Prone lumbar instability test (Hicks, Fritz, Delitto, & Mishock, 2003).
- Presence of aberrant movement (Hicks, Fritz, Delitto, & Mishock, 2003).

4. Passive hip internal rotation, external rotation, flexion and extension- (ICF category-- measurement of impairment of body function; moderate level of documentation and moderate level of evidence.) This is the amount of passive hip rotation, flexion and extension movement (Clapis, Davis, & Davis, 2008; Cliborne, Wainner, Rhon, et al., 2004; Ellison, Rose, & Sahrmann, 1990; Godges, MacRae, & Engelke, 1993); Van Dillen, McDonnell, Fleming, & Sahrmann, 2000)
5. Outcome measures (Very good documentation and very good level of evidence)

- Medical Outcomes Survey Short form (SF-36) in particular the physical functioning domain (Deyo, et al., 1994)
- Oswestry Disability Index (Fritz & Irrgang, 2001; Frost, Lamb, & Steward-Brown, 2008),
- Roland-Morris Disability Questionnaire (Roland & Morris, 1983).
- Patient Specific Functional Scale (Cleland et al, 2006)
- Start Back Screening Tool (Beneciuk, J.M., Bishop, M.D., Fritz, J.M., Robinson, M.E., Asal, N.R., Nisenzon, A.N. and George, S.Z., 2012)

6. Identify factors indicating the risk of long term disability such as those proposed in the Guide to Assessing Psychosocial Yellow Flags in Acute Low Back Pain.

- "Presence of a belief that back pain is harmful or potentially severely disabling"
- "Fear- avoidance behavior (avoiding a movement or activity due to misplaced anticipation of pain) and reduced activity levels"
- "Tendency to low mood and withdrawal from social interaction"
- "An expectation that passive treatments rather than active participation will help."

Findings of Non-specific Low Back Pain

- May relate tenderness to palpation in the lumbar spine and sacroiliac joints
- May demonstrate ROM restrictions in the lumbar spine
- Neurological exam is generally negative
- May report pain in the lower back, hips, or posterior thigh (above the knee) with active motion

Differential Diagnoses

- Extraspinal causes (ovarian cyst, kidney stone, pancreatitis, ulcer)
- Osteoporosis and compression fractures (major trauma, or minor trauma in elderly/osteoporotic patient)
- Infection in disc or bone (fever, history of IV drug use, history of severe pain)
- Inflammatory arthritides (family history, patient age/sex, morning stiffness)
- Metastatic disease, myeloma, lymphoma (pathologic fracture, severe night pain)
- Spinal tuberculosis (lower socioeconomic groups, AIDS)
- Depression

Physical/Occupational Therapy Management

Therapy must show significant functional change using a scientifically validated self-report patient/client functional outcome measure.

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Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

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Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate	Considerable loss

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		loss	
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations using the Patient Specific Functional Scale (PSFS) (i.e. Activities of daily living) – In addition, practitionersm ay utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy including but not limited to, lack of meeting Minimally Clinical Important Differences in pain and functional measures

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- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider to explore alternative treatment options or referral for maintenance care, if:

- Improvement does not meet the above guidelines or improvement has reached a plateau
- Fever, chills, unexplained weight loss, significant night time pain
- Presence of pathological fracture
- Obvious deformity
- Saddle anesthesia
- Loss of major motor function
- Bowel or bladder dysfunction
- Abdominal pain
- Visceral dysfunction
- Increasing neurologic signs/symptoms: increasing LE weakness, increasing LE pain, increasing LE numbness/tingling, and decreasing LE reflexes
- No objective clinical improvement has been made after 6 weeks of direct care

Management/Intervention

- **General Activity Advice and Education (high level of evidence)**
  Clinicians are encouraged to educate patient/clients to continue/rapidly resume normal daily activities which have been shown to lead to quicker recovery and improved overall function. Patients should progressively increase their physical activity levels according to an agreed plan rather than being guided by their pain level. (Chou, Qaseem, Snow, et al., 2007; Dahm, Brurberg, Jamtvedt, & Hagen, 2010; Hagen, Hilde, Jamtvedt, & Winnem, 2004; National Health committee, 2004; Swedish Council, 2000; Waddell, Feder, & Lewis, 1997)
- **Manual therapies (moderate to high level of evidence)**
- Mobilization/manipulation technique interventions for the lumbar spine are recommended to provide added help to shorten pain duration, range of motion and patient satisfaction. Moderate evidence for recommending thrust manipulation within 1-2 weeks after onset of symptoms. (Assendelft, Bouter, & Knipschild, 1996; Bronfort, 1999; Brox, Hagen, Juel, & Storheim, 1999; Fritz, Childs, & Flynn, 2005; Childs, Fritz, Flynn, & et al., 2004; Cleland, Fritz, Kulig, et al., 2009; Koes, Assendelft, van der Heijden, & Bouter, 1996; Shekelle, Adams, Chassin, Hurwitz, & Brook, 1992; The Swedish Council, 2000; Franke, H., Franke, J.D. and Fryer, G., 2014).
- Mobilization/Manipulation may not be effective in chronic LBP (Rubinstein SM, van Middelkoop M, Assendelft WJ, de Boer MR, van Tulder MW 2011)

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- Manual therapy techniques for improvement of hip mobility is recommended due to emerging evidence of moderate to high level supporting improvement in lumbar symptoms with improvement in hip passive movement (Burns, Mintken, & Austin, 2011; Fogel, & Esses, 2003; Mellin, 1988; Offierski, & MacNab, 1983; Reiman, Harris, & Cleland, 2009; Whitman, Flynn, Childs, et al., 2006; Whitman, Flynn, Fritz, 2003.
- **Exercise/training and centralization/directional preference exercise (moderate to high level of evidence)**
- It is not recommend that clinicians prescribe specific exercises during the first few weeks after an initial onset of low back pain. Both systematic and guidelines show varying or no effect of early exercise (Brox, Hagen, Juel, & Storheim, 1999; Faas, 1996; van Tulder, Koes, & Bouter, 1997; van Tulder, Schoolmen, Koes, & Deyo, 2000).
- Clinicians should consider the following exercise approaches a few weeks after symptom onset:
- **Centralization and directional preference exercises** (Aina, May, & Clare, 2004; Clare, Adams, & Maher, 2004; Browder, Childs, Cleland, & Fritz, 2007; Long, Donelson, & Fung, 2004; Long, May, & Fung, 2008; Murphy, Hurwitz, Gregory, & Clary, 2006; Simotas, Dorey, Hansraj, & Cammisa, 2000; Werneke, Hart, Cutrone, et al., 2011).
- **Motor Control, Core specific, or Stabilization exercises are no better than General Exercises in the long term** (Smith, B.E., Littlewood, C. and May, S., 2014.; Wang X-Q, Zheng J-J, Yu Z-W, Bi X, Lou S-J, et al. 2012; Saragiotto BT, Maher CG, Yamato TP, Costa LOP, Menezes Costa LC, Ostelo RWJG, Macedo LG 2016)
- **Clinician's should consider Group Exercise programs for non-specific LBP** (O'Keeffe M, Hayes A, McCreesh K, Purtill H, O'Sullivan K 2016; Robertson B, Harding KE 2014; Toomey E, Currie-Murphy L, Matthews J, Hurley DA 2015)
- **Trunk coordination, endurance and strengthening exercises** (Choi, Verbeek, Tam, & Jiang, 2010; Costa, Maher, & Latimer, et al., 2009; Hayden, van Tulder, Malmivaara, & Koes, 2005; Hides, Jull, & Richardson, 2001; Kulig, Beneck, Selkowitz, et al., 2009; Macedo, Maher, Latimer, & McAuley, 2009; Rasmussen-Barr, Ang, Arvidsson, & Nilsson-Wikmar, 2009; Yilmaz, Yilmaz, Merdol, Parlar, Sahin, & Kuran, 2003; Ishak NA, Zahari Z, Justine M 2016; . Steffens D, Maher CG, Pereira LSM, Stevens ML, Oliveira VC, Chapple M, Teixeira-Salmela LF, Hancock MJ 2016).
- **Aerobic Exercise is suggested (chronic)** (Meng, X.G. and Yue, S.W., 2015; Lawford BJ, Walters J, Ferrar K 2016)
- **Multidisciplinary Rehabilitation (chronic)** (Chou R, Deyo R, Friedly J, Skelly A, Hashimoto R, Weimer M, Fu R, Dana T, Kraegel P, Griffin J, Grusing S, Brodt E. 2016; Kamper SJ, Apeldoorn AT, Chiarotto A, Smeets RJ, Ostelo RWJG, Guzman J, van Tulder MW 2014)
- **Superficial Heat (acute)** (Chou R, Deyo R, Friedly J, Skelly A, Hashimoto R, Weimer M, Fu R, Dana T, Kraegel P, Griffin J, Grusing S, Brodt E. 2016)
- **Dry Needling (chronic)** (Chou R, Deyo R, Friedly J, Skelly A, Hashimoto R, Weimer M, Fu R, Dana T, Kraegel P, Griffin J, Grusing S, Brodt E. 2016; Furlan

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AD, van Tulder MW, Cherkin D, Tsukayama H, Lao L, Koes BW, Berman BM. 2005)

- Clinical Interventions Not Recommended (moderate to high level of evidence or lacks sufficient evidence (noted) to recommend)
- **Traction** (Beurskens, de Vet, Koke, et al., 1995; Fritz, Lindsay, Matheson, et al., 2007; Schimmel, de Kleuver, Horsting, Spruit, Jacobs, & van Limbeek, 2009; van der Heijden, Beurskens, Assendelft, de Vet, & Bouter, 1995; van Tulder, Koes, Assendelft, & Bouter, 1999; Wegner I, Widyahening IS, van Tulder MW, Blomberg SEI, de Vet HCW, Bronfort G, Bouter LM, van der Heijden GJ 2013; Delitto A, George SZ, Dillen LV, Whitman JM, Sowa G, Shekelle P, Denninger TR, Godges JJ 2012; Thackeray, Anne et al 2016)
- **Therapeutic ultrasound** (der Windt, van der Heijden, & Berg, 1999; Gam, & Johannsen, 1995; Ebadi S, Henschke N, Nakhostin Ansari N, Fallah E, van Tulder MW 2014)
- **Electrotherapy modalities including TENS and electrical stimulation** (Van der Heijden, G.J.M.G., Torenbeek, M., van der Windt, Hidding, Dekker, & Bouter, 1999; van Tulder, Koes, Assendelft, & Bouter, 1999; Nnoaham KE, Kumbang J.2008; Dubinsky, R.M. and Miyasaki, J., 2010)
- **Laser modality** (De Bie, Verhagen, Lenssen, de Vet, van de Wildenberg, Kootstra, & Knipschild, 1998; Gam, & Johannsen, 1995; Gam, Thorzen, & Lonnberg, 1993;
- **Kinesiotaping** (Vanti, C., Bertozzi, L., Gardenghi, I., Turoni, F., Guccione, A.A. and Pillastrini, P., 2014; Added, M.A.N., Costa, L.O.P., Freitas, D.G.D., Fukuda, T.Y., Monteiro, R.L., Salomão, E.C., Medeiros, F.C.D. and Costa, L.D.C.M., 2016)**Phonophoresis** (Durmus, D., Alayli, G., Goktepe, A.S. et al.2013)
- **Low Level Laser Therapy- insufficient evidence** (Yousefi-Nooraie R, Schonstein E, Heidari K, Rashidian A, Pennick V, Akbari-Kamrani M, Irani S, Shakiba B, Mortaz Hejri S, Jonaidi AR, Mortaz-Hedjri S. 2008
- **Pilates- insufficient evidence** (Yamato TP, Maher CG, Saragiotto BT, Hancock MJ, Ostelo RWJG, Cabral CMN, Menezes Costa LC, Costa LOP 2015)
- **Muscle Energy Technique- insufficient evidence** (Franke H, Fryer G, Ostelo RWJG, Kamper SJ. 2015)

Home and Self-Care techniques

The importance of educating patients to understand that uncomplicated mechanical low back pain (LBP) has a natural course of recovery cannot be overemphasized. The patient can be taught to use medical equipment and administer self-care at his residence. General recommendations are to resume normal, or near normal, activity as soon as possible.

Home Medical Equipment

- Hot pack/cold pack

Self-Care Techniques

- Postural advice, instruction in proper body mechanics

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- Flexibility exercises
- Lumbar stabilization exercises
- Aerobic conditioning, such as walking or swimming
- Heat applications, cold packs, if needed, to relieve discomfort/stiffness
- Proper Nutrition
- Stress management

Alternatives/Adjuncts Management

- Osteopathic manipulation
- Chiropractic
- Physiatry
- Medication
- Yoga
- Pilates
- Cognitive Behavioral Therapy
- Acupuncture

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Orthopedic – Shoulder

Arthroscopic Procedure of the Shoulder

Synonyms

None

Definition

Arthroscopic procedures at the shoulder may be performed for all of the following reasons:

- Stabilization of chronic shoulder dislocations
- Bankart lesions Avulsion or detachment of the anterior portion of the inferior gleno-humeral ligament complex and glenoid labrum off the anterior rim of the glenoid; can contribute to recurrent instability.
- Rotator Cuff Tears—Neers Classification
  - Stage I: edema and hemorrhage, pain with activity that usually resolves with rest. Condition is reversible, treatment conservative (rest and medication)
  - Stage II: fibrosis and tendonitis, recurrent pain with activity that does not always abate with rest. May require sub-acromial decompression if conservative treatment fails
  - Stage III: bone spur and tendon rupture, history of progressive disability. Surgery advised.
  - Stage IV: cuff tear arthropathy, history of progressive disability with a torn rotator cuff. Surgical management consists of rotator cuff repair, hemi-arthroplasty, or total shoulder replacement.
- Capsular Release - The tight capsule of the joint is released with a special radio-frequency probe
- SLAP lesions Superior labrum anterior and posterior (SLAP) lesion
  - Grade I: degenerative fraying of the labrum
  - Grade II: avulsion of the superior labrum and biceps tendon
  - Grade III: bucket-handle tear of the superior labrum
  - Grade IV: same as grade II or III with extension into the biceps tendon
- Impingement syndromes: impingement syndrome describes pain in subacromial space when the humerus is elevated or internally rotated; during humeral flexion, the supraspinatus tendon and bursa become entrapped between the anteroinferior corner of the acromion (and CA ligament) and the greater tuberosity; this syndrome is thought to precipitate attritional changes in the rotator cuff, leading to RTC tear.

Patient History

Patient History may include:

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Patient Data

Patients have experienced a shoulder condition that required surgical correction.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, rotator cuff tear
Exertional, history of cardiac diagnosis	Cardiac pain can radiate to the shoulder
Constant, relieved/worse with meals, positional, associated with fatty meals	Gastrointestinal diseases including cholelithiasis
Pleuritic, shortness of breath, associated with cough	Pulmonary diseases
Multiple joint involvement, tophi	Rheumatology diseases (gout)
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic or primary)
Unilateral edema	Upper extremity deep vein thrombosis
Immune-compromised state	Infection

Presentation

Patient presentation varies depending on the extent of injury, type of injury, and the length of time that elapses before seeking rehabilitative services.

Subjective Findings

- Shoulder pain
- Pain with active ROM
- Loss of ROM

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

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Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Surgical scar
  - Swelling
- Palpation of bony and soft tissue
  - Joint-play movements
  - Glenohumeral joint
  - Cervical spine
  - Thoracic spine
  - Sternoclavicular joint
  - Acromioclavicular joint
  - Scapulothoracic mechanism
- Manual Muscle Testing, if indicated by phase of rehabilitation for ipsilateral joint (probably will not include resistance on initial evaluation), test contralateral joints
  - Resisted isometric movements in supine
- Range of motion-Active and passive movements of ipsilateral joint per surgical protocol, and contralateral joint
  - Gleno-humeral joint-Flexion, extension, abduction, Horizontal adduction, internal and external rotation
  - Shoulder Girdle-Protraction, retraction, elevation, circumduction and depression
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
  - Disabilities of the Arm, Shoulder and Hand (DASH)
  - Shoulder Pain and Disability Index (SPADI)
  - Oxford Shoulder Score

Findings of Arthroscopic Procedure

Not applicable.

Differential Diagnoses

- Referred pain from cardiac, pulmonary, or gastrointestinal pathology
- Inflammatory diseases
- Infection
- Fracture
- Rotator cuff pathology
- Glenohumeral arthritis

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

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Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

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Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)
Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss

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3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Physician specific protocols will be considered in the context of the plans definition of medical necessity.

Treatment Methods

The therapy treatment plan consists of

- Pain reduction
- Manual therapy,
- ROM/stretching exercises,
- Progression to strengthening exercises, and
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.

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- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their surgeon for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of upper extremity occurs
- Signs of infection

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Post-operative Management

There is a strong emphasis on a home exercise regimen to be done daily by the patient in addition to attending formal therapy sessions.
Patients are usually immobilized in a sling for four to six weeks, which is dictated by the surgeon. The focus of physical therapy is to protect the repaired tissues but to allow for joint mobility without excessively stressing the repair.

Phase I

- Initiated between weeks 2-6
- Pendulum exercises and can be initiated immediately post-operatively
- Active-assistive range of motion in supine/sitting can be safely done in sagittal plane as comfort allows.
- In the first six weeks it is best to restrict ER to 30 degrees

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- Limitations of the periscapular muscle length and trunk mobility should be addressed early in the intervention process.

Phase II

- Initiated between post-operative weeks 4 – 6
- Vasopneumatic devices and cryotherapy for pain and swelling
- Less than or equal to 80% glenohumeral mobility and gentle stretching of ER with abduction is permitted to allow progress to prior activity.
- Slow return to activity functionally utilizing the arm in multiple planes is encouraged.
- Pool can be used for gravity.
- Improvement of scapulohumeral rhythm via initiation of AA/AROM exercises

Phase III

- Initiate at post op week 8-12.
- Educate patient in continued modifications to weight lifting regimen and daily activities to minimize excessive anterior joint stressors (i.e. deep bench press, deep chest fly or tricep dips behind body).
- Strengthening can be accomplished with combination of theraband and free weights, working both concentric and eccentric progressing to scapular stabilizers and dynamic trunk/ core stabilizers.

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises
- Overhead pulleys
- Home electrical stimulation unit

Self-Care Techniques

- Postural advice to remove compression in the subacromial area
- Written progressive home exercise program, home self-joint mobilization techniques
- Progression to therapeutic exercise —strengthening exercises

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- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Acupuncture
- Medication

Medicare References

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2. Centers for Medicare & Medicaid Services (CMS), Medicare Benefit Policy Manual-Pub. 100-2: Chapter 15, Section 230, Covered Medical and Other Health Services, Practice of Physical Therapy, Occupational Therapy, and Speech Language Pathology. http://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/bp102c15.pdf
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Rotator Cuff Tear Repair, With and Without Distal Clavicle Resection

Synonyms

None

Definition

The rotator cuff is made up of four interrelated muscles arising from the scapula and attaching to the tuberosities:

- Supraspinatus muscle
- Infraspinatus muscle
- Teres minor muscle
- Subscapularis muscle
-

Impingement may cause tendon degeneration and progression to a complete tear, referred to as an attritional or degenerative tear.

- Acute injury such as a fall on an outstretched arm or an abduction movement of high force and velocity can also tear the rotator cuff.
- Rotator cuff tears can be classified as full-thickness tears, pure transverse ruptures, pure vertical rents or longitudinal splits paralleling the direction of cuff fibers, tears with retraction, and massive avulsions.
- Surgical repair is most common with the supraspinatus tendon being sewn back to its attachment.
- Distal clavicle is sometimes excised during the rotator cuff repair when the distal clavicle is felt to be impinging upon the rotator cuff.

Patient History

Patient History includes

Patient Data

Patients have experienced surgical correction of a rotator cuff tear. Patients may have a history of recurrent rotator cuff tendonitis or acute injury. This type of injury is rare in patients under the age of 30, more commonly patients are age 45 or older.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Exertional, history of cardiac disease	Cardiac pain can radiate to the shoulder
Constant, relieved/worse with meals, positional, associated with fatty meals	Gastrointestinal diseases including cholelithiasis and perforated ulcer
Pleuritic pain, shortness of breath, associated with cough	Pulmonary diseases
Multiple joint involvement	Rheumatology diseases
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic or primary)
Unilateral edema	Upper extremity deep vein thrombosis
Immune-compromised state	Infection

Presentation

The following factors will help in assessing a patient and determining a rehabilitation course:

- Arthroscopic vs. open surgical procedure—arthroscopic repairs have smaller incisions, avoid detachment of the deltoid, have less tissue dissection and less pain than open repairs.
- Size of tear.
- Occupation of patient.

Subjective Findings

Patients typically complain of shoulder pain, weakness, and loss of function.

Objective Findings

Objective Findings include

Scope of Examination

Consider other possible causes:

- Glenohumeral arthritis
- Thoracic outlet syndrome
- Deltoid bursitis
- Bicipital head rupture
- Rotator cuff syndrome

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Surgical scar

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    - Swelling
- Assess ain level
- Palpation of bony and soft tissue
    - Joint-play movements
    - Glenohumeral joint
    - Cervical spine
    - Thoracic spine
    - Sternoclavicular joint
    - Acromioclavicular joint
    - Scapulothoracic mechanism
- Manual Muscle Testing, if indicated by phase of rehabilitation (probably will not include resistance on evaluation), also test contralateral joints:
    - Resisted isometric movements in supine position
- Range of motion -Active and passive movements of ipsilateral joints per surgeon protocol, also test contralateral joints:
    - Gleno-humeral joint -Flexion, extension, abduction, Horizontal adduction, internal and external rotation
    - Shoulder Girdle-Protraction, retraction, elevation, circumduction and depression
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
    - Disabilities of the Arm, Shoulder and Hand (DASH)
    - Shoulder Pain and Disability Index (SPADI)
    - Oxford Shoulder Scores

Findings of Rotator Cuff Tear

Not applicable.

Differential Diagnosis

Not applicable.

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member

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- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.
-

Physician specific protocols will be considered in the context of the plans definition of medical necessity.

Treatment Methods

- Modalities to reduce pain and minimize effusion,
- Normalize pain-free range of motion with therapeutic exercises,
- Strengthen rotator cuff musculature (and accessory musculature), and
- Improve ADL's
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

The progression is primarily time based to allow tissue healing; individual surgeons may have their own performance criteria for advancing. Both criteria may vary based on the type of surgery and specific technique used. Consult with referring surgeon.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.

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- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of upper extremity occurs

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Post-operative Management

Weeks 1-4

Expected Outcome	Procedures/Modalities Such As
Decrease pain and swelling	▪ Ice 3-4 times per day ▪ Vasoneumatic devices
Improve range of motion	▪ Passive range of motion-pendulum, wand, table slides ▪ Manual therapy (Grade I-II) to the glenohumeral joint ▪ Cervical range ▪ Elbow range
Improve strength of shoulder joint	▪ Isometric strengthening exercise ▪ Hand squeezes ▪ Progress to submaximal isometrics and rhythmic stabilization

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Patient education and self-management	▪ Arm will be in sling for 5-6 weeks, held in slight flexion and internal rotation, external rotation is restricted ▪ Teach application of ice, passive range of motion, isometric exercises and compensatory techniques for ADLs ▪ Precautions: No active use of shoulder, no reaching behind back, no weight through the shoulder

Weeks 5-8

Discharge the sling at physician discretion, full passive range by week 4, do not overstress healing tissue.

Expected Outcome	Procedures/Modalities Such As
Decrease pain and swelling	▪ Modalities: Ice/heat
Improve shoulder range of motion	▪ Active assisted range of motion ▪ Active exercises ▪ Add horizontal adduction and internal rotation by week 7
Improve strength of shoulder joint	▪ Isometric exercises ▪ Light theraband exercises ▪ Scapular manual resistive exercises ▪ Rhythmic stabilization
Patient education and self-management	▪ Continue application of ice/heat, Active range of motion, isometric exercises and compensatory techniques for ADLs

Week 9 onwards

Full active range achieved by end of week 7.

Expected Outcome	Procedures/Modalities Such As
Improve strength/dynamic muscle contraction	▪ Strengthen in pain free range ▪ Isotonic exercises to rotator cuff muscles ▪ Strengthening exercises in all planes using graduated resistance ▪ Closed chain exercises to strengthen scapular stabilizers I.e. Wall Push-ups, shoulder shrugs ▪ Upper extremity ergometry exercises
Progressive return to normal function	▪ Gradual resumption of activities relating to work community, and leisure ▪ Functional training patterns ▪ Home exercise program

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Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Overhead pulleys
- home electrical stimulation unit

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Shoulder immobilization based on repair and physician's protocol

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication
- Acupuncture

Medicare References

1. Centers for Medicare & Medicaid Services (CMS), Medicare Benefit Policy Manual-Pub. 100-2: Chapter 15, Section 220, Covered Medical and Other Health Services, Conditions of Coverage and Payment Outpatient Physical Therapy, Occupational Therapy, or Speech-Language Pathology Services. http://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/bp102c15.pdf
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Shoulder Impingement, Release

Synonyms

- Acromioplasty
- A subacromial decompression (SAD)

Definition

May be performed as an open procedure or arthroscopicaly. Includes debridement of the subacriomial bursa and resection of the coracoacromial ligament and the anteroinferior acromion as well as under hanging osteophytes from the acromioclavicular joint. This procedure is indicated for those patients who have failed a course of conservative therapy.

Patient History

Patient History may include

Patient Data

Patients have experienced surgical correction for shoulder impingement.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect physical therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, rotator cuff tear, tendon rupture
Exertional, history of cardiac diagnosis	Cardiac pain can radiate to the shoulder
Constant, relieved/worse with meals, positional, associated with fatty meals	Gastrointestinal diseases including cholelithiasis
Pleuritic, shortness of breath, associated with cough	Pulmonary diseases
Multiple joint involvement, tophi	Rheumatology diseases (gout)
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic or primary)
Unilateral edema	Upper extremity deep vein thrombosis
Immune-compromised state	Infection
Discoloration of hand, cold	Arterial occlusion

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Presentation

The following factors will help in assessing a patient and determining a rehabilitation course:

- Arthroscopic vs. open surgical procedure—arthroscopic repairs have smaller incisions, avoid detachment of the deltoid, have less tissue dissection and less pain than open repairs.
- Activity requirements of patient.

Subjective Findings

- Shoulder pain
- Pain with active abduction
- Loss of ROM

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Surgical site
- Palpation of bony and soft tissue
  - Joint-play movements
  - Glenohumeral joint
  - Cervical spine
  - Thoracic spine
  - Sternoclavicular joint
  - Acromioclavicular joint
  - Scapulothoracic mechanism
- Range of motion-Active, and passive movements of
  - Gleno-humeral joint-Flexion, extension, abduction, Horizontal adduction, internal and external rotation
  - Shoulder Girdle-Protraction, retraction, elevation, circumduction and depression
- Manual Muscle Testing, if indicated by phase of rehabilitation (probably will not include resistance on evaluation)
  - Resisted isometric movements in supine position

Provocation Tests to confirm SAI in a non-surgical shoulder

- Painful Arc (between 60□ and 120□)

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    - Empty can (Jobe)
    - External rotation resistance tests
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
    - Disabilities of the Arm, Shoulder and Hand (DASH)
    - Shoulder Pain and Disability Index (SPADI)
    - Croft-Disability Questionnaire

Findings of Impingement Release

- Limited AROM when compared with PROM
- Possible instability depending upon surgical approach and chronicity

Differential Diagnoses

- Referred pain from cardiac, pulmonary, or gastrointestinal pathology
- Inflammatory diseases
- Infection
- Fracture
- Rotator cuff pathology
- Glenohumeral arthritis
- Thoracic outlet syndrome

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

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Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

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Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

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Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Treatment Methods

Therapy management may consist of modalities to:

- Modalities to reduce pain and inflammation,
- Joint mobilization,
- ROM/stretching exercises,
- Progression to strengthening exercises, and
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of upper extremity occurs

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Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Non-Surgical Treatment

- Use of modalities to relieve pain
- Restore motion – soft tissue mobilization with joint mobilization
- Improve functional and impairment levels – manual therapy along side therapeutic exercises are most effective. Therapeutic exercises should include rotator cuff strengthening, lower/middle trapezius strengthening, stretching anterior and posterior shoulder.
- Once manual therapy is no longer necessary and the patient has an adequate home exercise program, formal therapy is often no longer necessary.

Surgical Treatment

(Strengthening exercises can only be progressed when range of motion is normal and pain has decreased.)

Phase I

Expected Outcome	Procedures/Modalities Such As
Decrease pain and swelling	▪ Modalities: Ice, Ultrasound, Interferential current
Improve shoulder range of motion	▪ Passive range of motion ▪ Active assisted range of motion ▪ Active range of motion
Improve strength of shoulder joint	▪ Isometric strengthening exercise
Patient education and self-management	▪ Arm will be in sling, remove when patient is comfortable ▪ Teach application of ice/heat, range of motion and isometric exercises

Phase 2

Expected Outcome	Procedures/Modalities Such As
Decrease pain and swelling	▪ Modalities: Ice/moist heat, Ultrasound, Interferential current
Improve strength/dynamic muscle contraction	▪ Strengthen in pain free range ▪ Isotonic exercises to rotator cuff muscles ▪ Closed chain exercises to strengthen scapular stabilizers I.e. Push-ups, shoulder shrugs ▪ Joint mobilization ▪ Upper extremity ergometry exercise
Progressive return to normal function	▪ Gradual resumption of activities relating to work community, and leisure

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	▪ Functional training patterns ▪ Home exercise program

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Evicore recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises
- Overhead pulleys
- Home electrical stimulation unit

Self-Care Techniques

- Postural advice to remove compression in the subacromial area
- Home ROM exercises, home self joint mobilization techniques
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Acupuncture
- Medication

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Shoulder Pain and Dysfunction

Definition

For the purpose of these guidelines “shoulder” refers to the articulation of the scapula, clavicle and humerus together with the ligaments, tendons, muscles and other soft tissues with a functional relationship to these structures (AAMG, 2003).There is no universal definition of shoulder pain.

Types of shoulder pain:

- “Acute shoulder pain” is defined as pain that has been present for less than three months. It does not refer to the severity or quality of the pain..
- “Chronic shoulder pain” is pain that has persisted for longer than 3 months. (AAMG, 2003)

Patient History

Many people with acute shoulder pain are likely to have conditions that resolve spontaneously regardless of treatment.2 3% of all new episodes of shoulder pain resolve fully within one month and 44% resolve within three months of onset.

The results of studies on the natural history of shoulder pain vary considerably because of the range of definitions used to describe shoulder disorders (van der Heijden, 1999). The risk that uncomplicated shoulder pain will persist beyond the acute phase appears to be related to personality traits, coping style, and occupational factors (van der Heijden, 1999). Forty-one percent of the people had persistent symptoms after one year. Prevalence figures for shoulder disorders vary widely for point prevalence (7-26%), one month prevalence (19-31 %), one year (5-47%) and lifetime prevalence (7-66%) (Gillian, Robb, Aroll, & Reid 2009).

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

(Moderate evidence Grade B Kelley, Shafer, Kuhn, Michener, Seitz, Uhl, Godges, McClure, 2011, Cook, 2007) (AAMG, 2003; Level 4 evidence).

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, dislocation, rotator cuff tear
Exertional, history of cardiac disease	Cardiac pain can radiate to the shoulder
Constant, relieved/worse with meals, positional, associated with fatty meals	Gastrointestinal diseases including cholelithiasis and perforated ulcer
Pleuritic pain, shortness of breath,	Pulmonary diseases

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associated with cough	
Multiple joint involvement	Rheumatology diseases
Fever, severe pain	Possible infection
Cancer history, night pain	Cause of symptoms (metastatic or primary)
Unilateral edema	Upper extremity deep vein thrombosis
Immune-compromised state	Infection
Unexplained weight loss	cancer or autoimmune dysfunction
Pain at rest or unrelated to activity	visceral source
History of smoking	lung cancer and referred pain from cancer
Other conditions referring to the shoulder	cervical radiculopathy

Presentation

Patient will present with shoulder pain and/or limited shoulder movement. The patient's condition may be related to a specific injury or the onset may be insidious.

Scope of Musculoskeletal Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

I.Subjective

- History
  - Conduct a history and physical examination to assess for the presence of serious conditions. Ancillary investigations are not generally indicated unless features of serious conditions are identified. Information obtained from the history may alert to the presence of a serious condition as the underlying cause of acute shoulder pain.The reliability and validity of individual features in histories have low diagnostic significance. The history is to be interpreted with caution when choosing a course of action. (Level III -2) (AAMG, 2003).

1. Site of symptoms
2. Distribution of symptoms
3. Quality of symptoms
4. Duration of symptoms
5. Periodicity of symptoms
6. Intensity of symptoms
7. Aggravating factors
8. Alleviating factors
9. Effect of pain on ADL's
10. Associated Symptoms
11. Onset of symptoms
12. Previous Similar symptoms

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13. Previous Rx
14. Current Rx

- Biological Factors
  1. Age
  2. Female gender
  3. Past history
  4. Response to repetitive physical tasks (Level III)
- Psychological Factors
  1. Job dissatisfaction
  2. Work demands (Level III-2)
  3. Tampa Kinesiophobia Scale or Fear Avoidance Beliefs Questionnaire (elevated scores demonstrate a relationship to longer recovery, chronic symptoms and work loss in patients with shoulder pain)
- Prognostic Risk Factors:
  - Recurrence of problems can occur in even those who seem to have recovered. Consideration should be given to the possible role of prognostic risk factors in influencing the onset of acute shoulder pain or the progression to chronic problems. These factors may be assessed by pt. history and exam.
  1. Biological (intrinsic or extrinsic)
     - Biological intrinsic risk factors: gender, age, bodily habitus and
     - health status, physical attributes that determine susceptibility to
     - pathogenic mechanics
     - Biological extrinsic risk factors: external physical influences such
     - as forces sustained during activity, daily living, work and leisure pursuits
  2. Psychosocial risk factors (yellow flags): intrapsychic factors interpersonal factors and sociocultural factors. These predict chronicity.

II.Objective

Level 5, Grade F, Expert opinion: (Kelley et al., 2011) (AAMG, 2003; Magee, 1992; Butler, 1991).

Physical Exam Differential evaluation of clinical findings suggestive of musculoskeletal impairments of body functioning (ICF) and the associated tissue pathology/disease (ICD).

The physical examination begins with an appropriate clinical history that provides the necessary information to guide the clinical examination. Most cases of acute shoulder pain are of “mechanical” origin and can be managed as acute regional pain (Level III evidence).

Clinicians should utilize patient education that:

1. Describes the natural course of the disease
2. Promotes activity modification, pain free ROM
3. Matches the intensity of stretching to patient’s current level of irritability
4. Provides information, assurance and advice on resuming normal activity

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5. Outlines other options for pain management as needed

Findings of shoulder examination must be interpreted cautiously in light of the evidence of limited utility. No clinical test is both reliable and valid for any specific diagnostic entity (Level III-2 evidence). Causes of shoulder pain cannot be diagnosed by clinical assessment. However, with the exception of serious conditions, satisfactory outcomes do not depend on precise identification of cause (Level III evidence). Despite limitations, physical exam is an opportunity to identify features of potentially serious conditions.

Potential causes of acute shoulder pain may be classified as:

1. Local impairments of anatomical structures of the shoulder
2. Serious conditions (see red flags)
3. Intrinsic neurological conditions involving local neural structures
4. Mechanical conditions (sprains, impingement syndrome, rotator cuff lesions, supraspinatous, tendonosis, instability, frozen shoulder)
5. Conditions referring to the shoulder

Inspection

Palpation of shoulder, acromioclavicular (AC) joint, sternoclavicular (SC) joint, clavicle, scapula, cervical and thoracic spine and ribs: Tenderness is the main physical sign elicited by palpation. It may be focal or diffuse. Focal is more significant as it reproduces the patient's typical pain.

Physical Impairment measures (ICF)

Measurement of impairment body function: mobility of a single joint. Grade E recommendation based on theoretical/foundational evidence.

- Movement Testing:
  - AROM (extend, flex abduct, adduct, externally and internally rotate) can be measured visually or with goniometer or inclinometer.
  - PROM, accessory and restraints to movement, end feel
  - Resisted Isometric Movements of shoulder and elbow (due to some of the muscle of shoulder also cross the elbow): extend, flex, abduct, adduct, internally and externally rotate. Elbow: flex, extend.
- Neurological Testing:
  - Upper limb Tissue Tension Tests
  - Reflexes
  - Cutaneous distribution
- Tissue Irritability Levels:
  - High >7/10, medium 4-6/10, low<3/10. Level 5
- Special Tests:
  - (Hegedus, 2012)No single shoulder test can make a pathognomonic diagnosis. Combinations of shoulder tests provide better accuracy but marginally so. Findings support a comprehensive history and clinical exam. Utility score represents expert opinion of the clinical use of a special test after gathering and clinically evaluating all of the literature

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regarding the test. The relevant literature studied looks at the test's discriminatory ability and reliability.The "utility score" scale is :
1.Evidence strongly supports the use of this test.
2.Evidence moderately supports the use of this test.
3.Evidence minimally supports or does not support the use of this test.
4.The test has not been researched sufficiently so it is unclear as to its value (Cook, Hegedus, 2013).

- Special tests for Shoulder (Cook, Hegedus, 2008):
  - Highly recommended: Utility score: 1
    - Tests for Torn Labrum/Instability
    - Biceps Load Test II
  - Moderately recommended:Utility score: 2
    - Tests for torn rotator cuff/impingement
    - Rent Test
    - Lift off Test
    - External rotation lag sign
    - Internal rotation lag sign
    - Drop sign
    - Empty Can /Supraspinatus Test
    - Full Can/Supraspinatus Test
  - Moderately recommended:Utility score: 2
    - Tests for Impingement
    - Internal rotation Resisted Strength
    - Infraspinatus Test
    - Neer, Hawkins,Yocum, 1980 Likelihood ratio 3.6 (AAMG, 2003)
    - Likelihood ratio: A positive likelihood ratio (+ LR) identifies the strength of a test in determining the presence of a finding.The value of greater than 1 indicates an equivocal strength of diagnostic power: values that are higher suggest greater strength. A finding of less than 1 suggests the test provides "bogus" or little information. (Cook, 2007)
  - Moderately recommended:Utility score 2
    - Tests for Torn Labrum/Instability
    - Crank Test
    - Kim Test
    - Jerk Test
    - Anterior Release Surprise Test
  - Moderately recommended:Utility score 2
    - AC Jt. Pathology
    - AC Resisted Extension Test
    - AC joint palpation
    - Recommended:(AAMG, 2003)
    - Biceps Tendon Lesions:
    - Neer, Hawkins and Yocum, 1.76 likelihood ratio
    - Speed test: 1.05 likelihood ratio
- Summary of Best Tests: (Cook, 2008)

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        - Rotator cuff tears: Rent test, Lift off test, Internal rotation lag sign External rotation lag sign: Show promising results. Drop sign: value as a pos. test for ruling in a supraspinatus tear
        - Supine Impingement Test: show promise as a screen where a negative test would rule out a rotator cuff tear
        - Impingement is a broad diagnosis including: subacromial bursitis, to partial rotator cuff tear, to a full thickness rotator cuff tear, making its value as a diagnostic label questionable. No test of diagnostic value in patients with impingement.
        - Detection of laxity/instability, only one test : Anterior release/Surprise Test :some promise: more research needed
        - SLAP lesions: Biceps Load Test II: good diagnostic tool
        - Posterior inferior labral tears: Kim test Jerk test:Shows promise
        - AC joint pathology:Pain with palpation is a good screen.
        - Resisted Extension Test: some use in diagnosing AC joint pathology, but need more research.
- Outcome Measures:
    - The shoulder outcomes that are most widely used by professional societies involved with the treatment of shoulder pain are:
        - Constant Score (most widely used in Europe)
        - Disabilities of the Arm Shoulder and Hand (DASH)
        - Shoulder Pain and Disability Index (SPADI): superior responsivenessC ompared to the DASH with adhesive capsulitis
        - American Shoulder and Elbow Surgeons Shoulder Scale (ASES).Two most recent systematic reviews on: ASES, DASH, and SPADI demonstrated acceptable psychometric properties and are recommended for clinical use.

Differential Diagnoses

- Cervical Disc Disease
- Cervical Myofascial Pain
- Cervical Spondylosis
- Cervical Sprain and Strain
- Complex Regional Pain Syndromes
- Fibromyalgia
- Rheumatoid Arthritis
- Thoracic Outlet Syndrome

Physical/Occupational Therapy Management

Therapy must show significant functional change.

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Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

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Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)
Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss

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3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations using the Patient Specific Functional Scale(i.e. Activities of daily living) – In addition, practitioners may utilize other peer reviewed, standardized tools to quantify functional limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Physician specific protocols will be considered in the context of the plans definition of medical necessity.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.

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- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of upper extremity occurs

Management/Intervention

Shoulder pain is one of the most common reasons that people seek medical attention. Prospective studies in Europe have shown approximately 11 out of 1000 patients seen by a family practitioner have shoulder pain. Over 50% of patients diagnosed by a general practitioner to have shoulder tendonitis are referred to physical therapy (Albright, Allman, 2011).

There is a wide variety of treatment approaches, likely related to uncertainty about the efficacy of these multiple interventions. The interpretation of shoulder pain research is complicated by the broad inclusion criteria that allow mixed populations with different etiologies of shoulder pain.

Clinical Interventions

Differential evaluation of musculoskeletal findings is used to determine the most relevant physical impairments associated with the patient's reported activity limitations and medical diagnosis. Clusters of the clinical findings that commonly co-exist in patients are described as impairment patterns and are labeled according to the key impairments in body functions associated with that cluster. The impairment patterns drive the interventions which focus on normalizing the key impairments of body function. The interventions are designed to improve the movement and function of the patient and lessen or alleviate the activity limitations commonly reported by the patients who meet the diagnostic criteria of that pattern. Patients often fit more than one impairment pattern and the most relevant impairments and intervention may change during the course of their rehab. Thus, it is very important to continually re-evaluate (Kelley et al, 2011).
It is important to take prognostic risk factors into consideration and to intervene early to prevent progression to chronic pain (AAMG, 2003).

- High Recommendation
    1. **Outcome Measures:**

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Strong evidence, Highly recommended Grade A (Kelley, et al., 2011)
There are several outcome measures designed to assess patients with shoulder disorders. These tools can be classified as shoulder joint specific, shoulder disease specific or upper limb specific. Over 30 tools have been published. Validated functional outcome measures should be used before and after interventions intended to alleviate the impairments of body function and structure, activity limitations and participation restrictions.

- Moderate Recommendation
  1. **Therapeutic exercise (therapeutic ex.):**
     Moderate evidence with mod recommendation Grade B
     Fair evidence Level II for non-specific shoulder pain
     - May improve shoulder pain compared to placebo in people with rotator cuff disease in both short and long term with improvement in function and abduction. (Level I) (Kelley et al, 2011; Albright et al., 2001; AAMG, 2003; Agency for Health Care Research and Quality National Guideline U. S. Dept. of Health and Human Resources, 2011)
     - Therapeutic ex.: an effective intervention for pts. with shoulder dysfunction.
     - Often supplemented with joint mobs techniques: not proven to be superior to therapeutic ex alone for pain reduction, increase in ROM and function and decrease in disability (Brudvig, et al., 2011).
     - Exercise is effective for producing small improvement in ROM (van der Dolder, Ferreira, Refshauge, 2012).
     - Comparison of customized vs. standard exercise: equally effective in increasing strength, function and decreasing pain intensity (Wang, Truedell-Jackson, 2006).
     - Home exercise program effective in improving symptoms and reduced disability (Ludewig, Borstad, 2003).
     - One hour of strength training/week effective in reducing neck and shoulder pain with fewer and longer sessions providing more gains than shorter more frequent (Anderson, Anderson, Gram, Pedergen, Mortenson, Zebis, Sjogaard, 2012).
     - Specific exercise is effective in reducing pain, improving function and reduced need for surgery at 3 months (Holmgren, Hallgren, Oberg, Adolfsson Johansson , 2012).
     - Graded exercise is more effective in restoring ADL's in chronic patients vs. usual care (Gereats, Goosensens, de Goot, de Bruin, de Bic, Dinont, van der Heijden, 2005).
     - Core training should be considered in strengthening program for shoulder due to increased isometric peak torque of glenohumeral movements (Clinically significant)
     - (Moghadum, Mohamadi, 2011).
     - Cross body stretch more effective than no stretch and more effective than sleeper stretch in improving int. rotation (McClure, Balacuis, Heiland, Broersman, Thorndike, Wood, 2007).

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- Exercise, multiple physical modalities are all equally effective in restoring neuromuscular control short term (Ginn, Cohen, 2005).
- Stretching exercises for adhesive capsulitis with intensity determined by tissue irritability. Moderate evidence Level I /II (Kelley et al, 2011).
- For chronic pain patients: Activity modification: reduce overhead activity, avoid painful arc 60-120 degrees, avoid heavy loading. Stretching and strengthening exercises should be done to relieve pain by improving overall shoulder function and provide short term recovery and long term results. (Burbank, Stevenson, Czarnecki, Dorfman, 2008).

2. Manual Therapy:

- Shoulder jt. mobs combined with hot pack active exercise stretching, soft tissue mobilization and education, may improve acute shoulder pain in the short term compared to combined treatments alone. Level I (AAMG, 2003).
- Manual therapy combined with home exercise: no short term effects but greater improvement noted at follow up (22 weeks) with shoulder function and strength suggest benefits with active treatment take longer to manifest. (Bennell, Wee,, Coburn, Green, Harris, Staples, Forbes, Buchbinder, 2010).
- Combined manual therapy with multimodal or exercise therapy, Grade B (Brantingham, Cassa, Bonnefin, Jensen, Globe, Hicks, Korporaal, 2011).
- Minor neurogenic shoulder pain and shoulder osteoarthritis respectively. Limited Level C and insufficient evidence (AAMG, 2003).
- Manipulative therapy in addition to usual medical care accelerates recovery of shoulder symptoms (Bergman, Winters, Groenier, Pool, Meyboom-de Jong, Heijden,2 004).
- Clinically relevevant: the number of muscles with active myofasical trigger points was significantly reduced (Bron, de Gast, Dommerholt, Stegengan, Wensing, Oogtendorp, 2011).
- Scapular mobs may be useful: small increase in ROM and decrease in pain (Surenkik, Agtar, Beltai, 2009).
- STM with stretching can benefit shoulder posture and muscle . function J. (Bodyn, Wang, Coleman, Dipersia, Sang Wright, 2010).
- High grade mob technique more effective (by small amount) than low grade technique in improving jt. mobility and reducing disability. End range mobility for capsulitis was increased. Poor study and no controls. (Vermeulen, Oberman, Burger, Rozing, Vandende, 2000).
- Manipulation more effective than exercise in treating more intense pain in shoulder and neck (Savoloinen, Ahlberg, Nummila, Nissinen, 2004).
- No data for calcific tendonitis, insufficient data for capsulitis, bursitis, tendonitis non-specific pain (Albright et al, 2011).
- Joint mobs useful to reduce pain and increase ROM and function for adhesive capsulitis Grade C Level III/IV (weak evidence) (Albright et al, 2011).

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- Neutral Recommendation
    1. **Therapeutic ultrasound:**
       High to weak evidence for recommendation: conflicting
        - Good evidence Level 1, RCT good recommendation. Grade A for pain and function. Clinically important benefit for short term relief of calcific shoulder tendonitis for 2 month period, no difference at end of 9 months (Albright et al.).
        - Grade C Level 1: for capsulitis bursitis and tendonitis, non-specific pain (Albright et al).
        - Pulsed ultrasound was not beneficial. (Nykanen, 1995).
        - Adhesive capsulitis some ROM increase, Level II (Kelley et. 2011)
        - Ultrasound is commonly used in physiotherapy management of musculoskeletal pain in peripheral joints. Study demonstrated ultrasound has no clinical benefit beyond that of placebo ultrasound in physiotherapy treatment of shoulder pain. (Prospective double blind placebo controlled randomized trial, Ainsworth, Dziedzic, Hiller, Daniels, Bruton, Broadfield, 2007).
    2. **Acupuncture**:
       High to weak evidence for recommendation: conflicting: Level 1 systematic review. Comparison of the effectiveness of acupuncture compared to placebo ultrasound for shoulder pain and function. (AAMG, 2003).
- Low Recommendation
    1. **Activity limitations:**
       Grade F Level 5 Expert opinion:
       (Kelley et al, 2011): utilize easily reproducible activities
       The following measures can help to assess changes over time:
- Pain during sleep
- Pain and difficulty grooming and dressing
- Pain and difficulty with reaching activities- to the shoulder level, behind back and overhead.
    1. **Iontophoresis:**
       Low level of evidence: case studies: Symptoms of calcific tendonitis joint pain and tenderness soon disappear and range of motion is restored when acetic acid iontophoresis method is employed. (Psaki, Caroll, 1958). Subdelotid bursitis clinical signs and symptoms improved with use of magnesium sulfate iontophoresis. (Weinstein, Gordon, 1958).
- Expert opinion
    1. **Non Pharmacological interventions:**
       Simple interventions providing information, assurance and encouraging reasonable maintenance of activity may be used alone or in combination with other interventions for the successful management of acute musculoskeletal pain (AAMG, 2003).
- Not Recommended
    1. **Thermotherapy (heat, cold**): **Insufficient evidence**

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- Thermotherapy (heat, cold): no data for calcific tendonitis, insufficient for capsulitis, tendonitis and bursitis, and non-specific pain. (AAMG, 2003)
- Insufficient Level D for cryotherapy (Albright et al., 2001)
- Ice reduced soreness after pitching. Controlled trial non-random (Yanglsowa, Miyanaga, Shiralki, Shinojo, Mokai, 2003)
- Little evidence for use of modalites alone for chronic pain patients. (Burbank, et al., 2008).

2. **Transcutaneous electrical nerve stimulation (TENS):**
   Insufficient evidence to include or exclude for shoulder pain
   No data for calcific tendonitis and insufficient data for capsulitis, bursitis, tendonitis. Insufficient evidence: Level 1 Electrical stimulation, (Albright et al., 2001). Weak evidence Level III/IV for adhesive capsulitis combined with mobility and stretching (Kelley et al., 2011).
3. **Kinesiotaping:**
   No effect on pain but changed the area in overall ROM where pain was felt (Lewis, Wright, Green, 2005).
4. **Massage:**
   No data for calcific tendonitis or insufficient data for capsulitis, bursitis, tendonitis (Albright et al., 2001)
   Low quality of evidence for improving ROM or function. (van der Dolder, Rerreira, Refshauge, 2012)
5. **Combined rehab interventions:**
   No data: (Albright et al, 2001)

Conclusion

The research indicates the need for more randomized clinical trials for the management of acute shoulder pain. There are few published guidelines and most recommendations have been based on observation and expert opinion which is considered low level of evidence. However, there is a high level of evidence to support the use of outcome measures and moderate evidence to support the use of therapeutic exercise and manual therapy.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Theraband for therapeutic exercises
- Overhead pulleys if limited in ROM

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening

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Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Surgery
- Acupuncture
- Medication

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Shoulder Total Joint Replacement

Synonyms

Total shoulder arthroplasty

Definition

Total joint replacement involves replacing the shoulder joint surfaces with artificial materials. Replacement of the humeral component only is similar to a hemiarthroplasty of the hip. The prosthesis may be cemented or, in the presence of good cortical bone, an in-growth prosthesis placed. The glenoid component is the more problematic aspect of the replacement, and not performed if the glenoid is acceptable. The bone of the scapula is relatively thin, which precludes the use of a thick anchoring system. As in total knee replacement, the shoulder prosthesis may be unconstrained, semi constrained, or constrained, having long-term range of motion implications.

Patient History

Patient History may include

Patient Data

The most common etiology of Total Shoulder Replacement is osteoarthritis. This is the type of history with the best post-operative outcome. The surgery is also performed due to inflammatory arthritis, fracture, multiple dislocation and rotator cuff global defect (the latter two after failed attempts at more conservative surgical interventions). The procedure is also done in revision of a previous total shoulder arthroplasty.

Specific Considerations

- History of present post-op condition
- Medical history, including social support systems
- Review systems
- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Trauma post op	Fracture, dislocation
Fever, severe pain, drainage, swelling	Possible infection
Pain at rest, or radiating pain	Neurological or metastatic disease
Unilateral edema	Deep vein thrombosis
Exertional arm pain	CAD, vascular insufficiency
Recent invasive procedures post op (dental work, urologic procedures)	Infection

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Presentation

Patients present differently based on several factors.

- Some patients will have limited goals by design, such as those with extensive bone loss, recurrent dislocations or massive tears of the rotator cuff.
- Also patients with a fully constrained prosthesis will have limited goals that should be clarified on a case-by-case basis.
- Others may have normal goals, but require extra time frames to heal and advance. Examples would be those who had a concurrent acromioclavicular repair, who have concurrent healing fractures or rotator cuff repairs.

Patient may also present, at some point in the process, with secondary diagnoses.

- Patient may develop inflammations of bursae or tendons.
- Adhesive capsulitis can develop if patient stops the home program.
- Patient will probably be in a sling post-operatively, from a few days to several weeks depending on the presence of fractures or tendon repairs.
- Patient will have typical post-operative pain, swelling, and joint immobility.
- In the frail elderly, the loss of even one arm can have functional limitation and mobility implications.
- As only the surgeon knows the extent of soft tissue damage and repair, it is important to communicate regarding post-operative guidelines prior to the initial evaluation.

Subjective Findings

- Shoulder pain
- Pain with motion
- Loss of ROM

Objective Findings

Objective Findings may include

Scope of Examination

- Cardiovascular/Pulmonary (blood pressure, edema, heart rate, respiratory rate)
- Integumentary (skin/wound assessment, presence of scar formation)
- Musculoskeletal (gross ROM, strength, symmetry as allowed by post-operative precautions)
- Neuromuscular (gross coordinated movements, motor control, and motor learning as allowed by post-operative precautions)
- Hand dominance

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

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- Inspection
  - Surgical scar
  - Swelling
- Palpation of bony and soft tissue
- Joint-play movements
  - Glenohumeral joint
  - Cervical spine
  - Thoracic spine
  - Sternoclavicular joint
  - Acromioclavicular joint
  - Scapulothoracic mechanism
- Range of motion - Active and passive movements of ipsilateral and contralateral joints:
  - Gleno-humeral joint - Flexion, extension, abduction, Horizontal adduction, internal and external rotation
  - Shoulder Girdle - Protraction, retraction, elevation, circumduction and depression
- Manual Muscle Testing, if indicated by phase of rehabilitation (probably will not include resistance on evaluation) for ipsilateral joints, also test contralateral joints
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
  - Disabilities of the Arm, Shoulder and Hand (DASH)
  - Shoulder Pain and Disability Index (SPADI)
  - Croft-Disability Questionnaire

Findings of Total Joint Replacement

Not applicable.

Differential Diagnosis

Not applicable.

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)
Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member

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- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

Therapy program goals are to

- Restore functional upper extremity use, and
- To provide compensatory strategies for dealing with patient's limitations.

Home program is essential to success. Patient may also require treatment of secondary diagnoses that includes:

- Thermal and electrotherapeutic modalities
- Soft tissue
- Gentle manual therapy techniques (except with constrained prostheses)
- Patient instruction in functional activities
- Precautions, and of course
- Exercise

Most total shoulder protocols are based on the Neer protocol. This is widely available and is a three phase time based program. It may be highly modified on a case by case basis to accommodate co-morbidities.

Phase I is essentially passive—progressing from forward flexion in the scapular plane, pendulum exercises and elbow ROM to, limited external rotation, pulleys, wand extension and finally internal rotation.

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Phase II concentrates more on active ROM and includes some stretching.

Phase III advances the difficulty, and has a stretching component and a strengthening component.

Precautions and timing of phases should be discussed with the surgeon. There is a difference of opinion on what restrictions should be placed under what circumstances. There does appear to be some consensus that extremes of motion should be avoided in all planes. Many find that end range limitations of 15 to 30 degrees are not functionally significant in this patient population.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of upper extremity occurs

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

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The following table lists the procedures for **Acute Phase** presentation.

Expected Outcome	Procedures/Modalities Such As
Decrease pain and swelling	▪ Modalities: Ice, Interferential, TENS
Improve shoulder range of motion	▪ Passive range of motion in forward flexion ▪ Pendular exercises, external rotation, pulleys, wand and internal rotation
Improve strength of shoulder joint	▪ Isometric strengthening exercise
Patient education and self-management	▪ Arm will be in sling for 6-8 weeks ▪ Teach application of ice/heat, passive range of motion, isometric exercises and compensatory techniques for ADLs ▪ Aerobic conditioning

The following table lists the procedures for **Subacute Phase** presentation:
Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Expected Outcome	Procedures/Modalities Such As
Decrease pain and swelling	▪ Modalities: Ice/heat, Interferential current, TENS
Improve shoulder range of motion	▪ Active assisted range of motion ▪ Active range of motion ▪ Joint mobilization (except for constrained prosthesis) ▪ Gentle stretching
Improve strength of shoulder joint	▪ Isometric strengthening exercises
Patient education and self-management	▪ Continue application of ice/heat, Active range of motion, isometric exercises and compensatory techniques for ADLs

The following table lists procedures for **Corrective/Rehabilitative Phase** presentation:

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

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Expected Outcome	Procedures/Modalities Such As
Improve shoulder flexibility	▪ Segmental joint mobilization-Grade III ▪ Flexibility exercises
Improve strength/Dynamic muscle contraction	▪ Progressive resistance exercises ▪ Closed chain exercises
Progressive return to normal function	▪ Dynamic stabilization exercises ▪ Functional training ▪ ADL training and self-care ▪ Gradual resumption of activities related to work, community, leisure and sport

Note: 3 months after surgery may be able to return to swimming, golf, tennis and non-contact sport.

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs after incision heals
- Theraband, hand weights, for home exercise
- Assistive devices
- Overhead pulleys
- Sling or elastic shoulder immobilizer
- Abduction splint if rotator cuff repair was performed

Self-Care Techniques

- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication
- Physiatry

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Orthopedic – Upper Extremity

Carpal Fracture, Closed and Open, Post-Cast Removal

Synonyms

- Broken wrist
- Scaphoid fracture

Definition

Essentially, a fracture is a structural failure of bone. The nature of a fracture is determined by the inherent properties of bone, its structure, and type of forces applied to it. Forces of tension, compression, bending, and torsion can load bone beyond its structural strength. External forces may render a fracture displaced or non-displaced, with two or more fragments.

Displaced fragments may be overriding one another, lateral to each other, extremely distracted from one another, angulated, or rotated out of alignment. Displaced fractures may be open fractures with a fragment breaking through the skin, which exposes the fracture site to the external environment and increases risk of infection. Fractures may be treated by immobilization with casts, sling/immobilizer, ORIF, percutaneous pinning, or external fixator. The scaphoid is the most commonly fractured carpal bone. There is a high incidence of delayed healing, or non-union of scaphoid fractures, and are inherently unstable.

Patient History

Patient History may include

Patient Data

Distal radius, scaphoid, and lunate fractures usually are the result of a fall on an outstretched hand. Wrist fractures may be caused by hyperflexion mechanisms and by direct blows to the wrist.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear
Fever, severe pain	Infection
Loss of distal pulse	Compartment syndrome

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Diabetes	Neuropathy
Multiple joint involvement	Rheumatologic diseases
Unilateral edema	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of wrist or hand; delayed capillary refill	Arterial occlusion; arterial insufficiency
Immune-compromised state	Infection

Presentation

- With scaphoid fractures, the point of maximal tenderness lies in the anatomic snuffbox, which lies between the tendons of the extensor pollicis brevis and abductor pollicis longus. Radial deviation of the wrist or axial loading of the first metacarpal may increase pain.
- The lunate can be localized just distal to the Lister tubercle, which is palpable on the dorsal radius. Axial loading of the third metacarpal may increase pain with a lunate injury. In addition, lunate fractures may be associated with point tenderness over the lunate fossa (located distal to the radius at the base of the long finger metacarpal).
- With triquetrum fractures, the point of maximal tenderness is localized to the triquetrum with ulnar sided wrist pain.
- The classic finding in a Colles fracture is the so-called dinner fork deformity, which is produced by dorsal displacement of the distal fracture fragments. A Smith fracture may show an obvious volar displacement of the wrist relative to the forearm, known as a garden spade deformity.

Subjective Findings

- Pain and tenderness
- Open wound/break in skin
- Ecchymosis and swelling
- Impaired circulation
- Loss of function

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection

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    - Skin and nails
    - Atrophy of forearm muscles
    - Bony structure and alignment
    - Wound/surgical scar
- Palpation of bony and soft tissue
    - Skin-cool, moist
    - Edema
    - Tenderness
    - Extent of residual malalignment
- Range of motion, active and passive movements of ipsilateral and contralateral joints
    - Interphalangeal joints and MCP (Flexion, extension)
    - Wrist and forearm movements (flex, extension, radial and ulna deviation, pronation, supination)
    - Shoulder motion for capsular tightening
- Manual Muscle Testing of ipsilateral and contralateral joints
    - Interphalangeal joints and MCP (Flexion, extension)
    - Wrist and forearm movements (flex, extension, radial and ulna deviation, pronation, supination)
    - Elbow (flexion, extension)
    - Grip strength
    - Elbow
    - Shoulder
- Orthopedic and neurologic testing
    - Joint play movements of the wrist and hand
    - Phalen's test
    - Carpal compression test,
    - The square wrist test
    - Tinel's sign
    - Sensation along C6-C7
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
    - Disabilities of the Arm, Shoulder and Hand (DASH)
    - Patient Rated Wrist Evaluation
    - Hand Assessment Tool (HAT)

Findings of Carpal Fracture

- Complaints of dorsal wrist pain and tenderness over the anatomic snuff box
- Swelling occurs at fracture site.
- Restricted motion caused by pain, swelling, immobilization, or soft tissue shortening is common
- Muscle atrophy

Differential Diagnoses

- Forearm fractures
- Hand fractures

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- Tendonitis
- Tenosynovitis

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and

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methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on	Restriction, depending on

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		occupation; 0-2 weeks	occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

Therapy program goals are to:

- Minimize inflammation,
- Normalize pain-free range of motion,
- Prevent muscular atrophy,
- Maintain proprioception,
- Relieve joint pain, and
- Increase strength so that other objectives may be achieved.

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The therapy program will therefore consist of:

- Modalities to minimize inflammation,
- Therapeutic exercises for ROM and strengthening, and
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient□s condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

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Therapy is initiated once fixation is deemed to be stable.

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs/hot packs ▪ Electrical stimulation
Improve flexibility	▪ Passive stretching of the fingers and wrist ▪ Progress to active assisted and active Range of motion exercises of the fingers and wrist ▪ Joint mobilization to wrist and fingers
Improve strength and endurance	▪ Progressive resistance and grip training of the fingers and wrist ▪ General strengthening of the upper extremity
Improve postural control and proprioception	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization ▪ Joint stability/co-contractions using closed chain exercises
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure, vocation and sports ▪ Functional training activities (ADL training)
Patient education and self-management	▪ Modification of job/recreational tools and or equipment until sufficient strength and range of motion is achieved ▪ Continue flexibility and strengthening activities ▪ Teach application of heating modalities before stretching ▪ Wear static wrist-hand splints to increase tissue extensibility

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self care at his residence.

Home Medical Equipment

- Cold packs/heat packs
- Theraband for therapeutic exercises
- Wrist splint

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Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Heat packs

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication

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Carpal Tunnel Syndrome With and Without Release

Synonyms

None

Definition

Carpal tunnel syndrome (CTS) is a compression neuropathy affecting the median nerve in the carpal tunnel, leading to symptoms in the radial 3.5 digits, and possibly thenar muscle atrophy or fasciculation.

- Presents with an insidious onset characterized by parasthesias and numbness in the fingers and deep palm.
- Women are more likely to develop CTS than men.
- Individuals with rheumatoid arthritis are also at high risk.

When non-operative treatment fails to relieve symptoms, or when either thenar atrophy or significant electrodiagnostic studies occur, surgical intervention is the treatment of choice.

- Carpal tunnel release is the definitive treatment, and is usually a very successful procedure.
- Cutting the transverse carpal ligament is standard surgical procedure to relieve pressure on carpal ligament.
- Surgical treatment involves either open or endoscopic release of transverse carpal ligament.
- Open release involves a mid-palmar incision at the wrist through which transverse carpal ligament is cut, and incision is closed.
- Endoscopic release involves smaller incisions through which an endoscope is inserted to visualize the transverse carpal ligament before it is cut.

Patient History

Patient History may include

Patient Data

- A number of inherited medical conditions are associated with CTS (eg, diabetes, thyroid disease, hereditary neuropathy with liability to pressure palsies):
- Vocational/avocational activities often associated with CTS include:
- Prolonged severe force through the wrist,
- Prolonged extreme posture of the wrist,
- High amounts of repetitive movements,
- Exposure to vibration and/or cold may be associated with CTS (particularly in combination).
- Other factors associated with CTS include:
- Pregnancy and breastfeeding,

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- Use of wheelchairs and/or walking aids,
- Space-occupying lesions within the carpal tunnel (eg, flexor tenosynovitis, ganglions, hemorrhage, aneurysms, anomalous muscles, various tumors, edema).

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic, primary or paraneoplastic) potential complications of chemotherapy
Unilateral edema	Upper extremity deep vein thrombosis
Immune-compromised state	Infection
Cold Intolerance, fatigue, constipation	Hypothyroidism
Multiple joint involvement, unusual skin rashes, other vascular involvement	Rheumatologic diseases (e.g., Rheumatoid arthritis, Sjogren's Syndrome, Systemic Lupus Erythematosis, Polyarteritis nodosa)
Stocking-glove neurological involvement	Diabetes, Alcoholism, B12 deficiency
Auto repair occupation, battery exposure	Lead poisoning
Hand/skull disproportionately large	Acromegaly

Presentation

- The most common complaints include that the hands fall asleep or things slip from the fingers without the person's noticing (loss of grip, dropping things), as well as numbness and tingling.
- Symptoms are usually intermittent and are associated with certain activities
- The sensory symptoms above commonly are accompanied by an aching sensation over the ventral aspect of the wrist. This pain can radiate distally to the palm and fingers or, more commonly, extend proximally along the ventral forearm.
- Many patients with CTS also complain of a tight or swollen feeling in the hands and/or temperature changes (eg, hands being cold/hot all the time).
- Many patients also report sensitivity to changes in temperature (particularly cold) and a difference in skin color.
- Loss of power in the hand (particularly for precision grips involving the thumb) does occur.

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Subjective Findings

- Wrist pain, frequently with proximal radiation
- Numbness and tingling in the radial three and one half digits
- Pain consisting of a “pins and needles” feeling at night, frequently awakening patient
- Weakness in grip or pinch which may result in dropping items
- A feeling of incoordination, clumsiness
- Symptoms are exacerbated with sustained activity

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member’s condition allows during the course of care.

- Inspection (including thenar eminence size and structure)
- Palpation of bony and soft tissue
  - Swelling
  - Temperature changes (hands usually cold)
- Range of motion, active and passive of ipsilateral and contralateral joints
  - Finger (flexion, extension)
  - Wrist (flexion, extension, ulnar and radial deviation)
  - Elbow (flexion, extension, pronation, supination)
- Orthopedic and neurologic testing
  - Tinel’s sign (moderate to severe cases of entrapment) - tapping over the median nerve at the wrist crease producing an electric shock sensation along median nerve distribution ,
  - Phalen’s test
  - Carpal compression test, The square wrist test
  - Test sensation along C6-C7 distribution
- Manual Muscle Testing of ipsilateral and contralateral muscles:
  - 1st and 2nd Lumbricals
  - Oppens Pollicis
  - Abductor Pollicis Brevis
  - Flexor Pollicis Brevis
  - Grip strength
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
  - Disabilities of the Arm, Shoulder and Hand (DASH)
  - Carpal Tunnel Questionnaire

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Findings of Carpal Tunnel

- May have decreased sensory testing (light touch) in the radial 3.5 digits, depending on severity
- May have decreased grip and strength, depending on severity

Differential Diagnoses

- Cervical radiculopathy
- Proximal nerve impingement
- Pregnancy secondary to fluid retention

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

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Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

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Treatment Methods

The following modalities have been proven to ease discomfort and aid in healing process:

- Ice massage,
- Ultrasound,
- Electrical stimulation,
- Phonophoresis,
- Iontophoresis, and
- Friction massage.

Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Patient will be educated in proper protection techniques to be utilized during all activities.

- A wrist splint will be fabricated as needed to assist in eliminating extreme or awkward wrist motions, thereby, reducing stress on structure within the carpal tunnel.
- Ergonomic modifications can help alleviate symptoms.
- Strengthening and stretching exercises will be started when pain becomes manageable.
- Retraining for proper positioning to avoid re-injury, and other factors in occupationally related overuse syndromes is an important component of the overall therapy consult.
- Manage conservatively for two weeks.
- Patients who do not improve with conservative measures may undergo surgical decompression of the carpal tunnel.
- Surgery may be endoscopic or open, with the former being used more commonly.
- Procedure generally involves a division of the transverse carpal ligament, thereby increasing the tunnel volume and reducing the compression. Post-operatively the patient is placed in a splint for approximately 10 days.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or

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periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.

- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs/progresses
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.
The following table lists the procedures for **Conservative Management** presentation.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most

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cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Relief of pain and chronic inflammation	▪ Ice packs ▪ Phonophoresis
Improve flexibility	▪ Range of motion exercises of the wrist, elbow, forearm ▪ Stretching to wrist, elbow, forearm
Improve strength and endurance	▪ Progress strength and grip training from isometric to concentric to eccentric contraction ▪ General strengthening of the unaffected areas of the arm
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports ▪ Functional training activities (ADL Activities) ▪ Joint stability/co-contractions using closed chain exercises
Patient education and self-management Improve sensation	▪ Modification of job/recreational tools and or equipment ▪ Avoid activities that require repetitive motion, extreme force, or vibration through wrist. ▪ Continue flexibility and strengthening activities ▪ Avoid caffeine, alcohol, nicotine ▪ Weight loss ▪ Wear wrist-hand orthosis at night ▪ Ultrasound ▪ Median nerve glides

The following table lists the procedures for **Post Release** presentation (**immobilized in splint or brace**).

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs ▪ Phonophoresis ▪ Electrical stimulation
Improve flexibility	▪ Gentle passive stretching of the fingers and wrist ▪ Progress to active assisted and active Range of motion exercises of the fingers and wrist
Improve strength and endurance	▪ Progress strength and grip training from isometric to concentric to eccentric contraction of the fingers and wrist ▪ General strengthening of the unaffected areas of the arm (strengthening exercises allowed gradually)

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Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports ▪ Functional training activities (ADL training) ▪ Joint stability/co-contractions using closed chain exercises
Patient education and self-management	▪ Modification of job/recreational tools and or equipment ▪ Avoid activities that require repetitive motion, extreme force, or vibration through wrist. ▪ Continue flexibility and strengthening activities ▪ Avoid caffeine, alcohol, nicotine ▪ Weight loss ▪ Wear wrist-hand orthosis at night

All other modalities will require supporting documentation regarding medical necessity.

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Wrist splint
- Orthoses

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Cold packs, if needed, to relieve discomfort
- Manual self massage for scar management

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Electro diagnostic testing
- Osteopathic manipulation

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- Chiropractic
- Medication
- Surgery
- Cortisone injection

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Cubital Tunnel, Ulnar Nerve Entrapment

Synonyms

- Ulnar nerve lesion
- Cubital tunnel syndrome

Definition

The ulnar nerve can be compressed or entrapped at a number of locations, including the cubital tunnel and in the medial intermuscular septum. Due to the superficial location of the ulnar nerve, repetitive motion may initiate a cycle of inflammation and edema that inhibits the normal gliding of the nerve. Additional injury occurs when traction forces caused by elbow flexion produce an additional compressive force on the internal architecture of the nerve. The severity of the nerve injury will be dependent on the magnitude, duration, and character of the applied forces.

Patient History

Patient History may include

Patient Data

Entrapment neuropathies of the upper extremity are common problems. What has traditionally been attributed to features of normal aging (eg, weakness, loss of function or sensation) has been subsequently recognized in younger patients whose vocations require repetitive motion to complete work-related tasks. Repetitive motion, force, posture, and vibratory influences on the peripheral nerves of the upper extremity are poorly understood but are blamed as contributing factors to the development of neuropathic symptoms.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture/ligament rupture
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic, primary or paraneoplastic), potential complications of chemotherapy
Unilateral edema	Upper extremity deep vein thrombosis
Loss of distal pulse, severe pain 12-24 hours after trauma	Compartment syndrome
Immune-compromised state	Infection

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Cold Intolerance, fatigue, constipation	Hypothyroidism
Multiple joint involvement, unusual skin rashes, other vascular involvement, tophi	Rheumatologic diseases (e.g., rheumatoid arthritis, Sjogren's syndrome, systemic lupus erythematosis, polyarteritis nodosa), gout
Stocking-glove neurological involvement	Diabetes, alcoholism, B12 deficiency
Auto repair occupation, battery exposure	Lead poisoning
Hand/skull disproportionately large	Acromegaly

Presentation

Signs and symptoms: These include pain in the forearm which radiates in the distribution of the ulnar nerve; numbness; tingling in the 1.5 fingers of the ulnar aspect; wasting or weakness of intrinsic hand muscles; a positive compression test result at the elbow; recurrent subluxation of the nerve over the epicondyle; and the reproduction of symptoms with elbow flexion, with or without wrist extension.

Subjective Findings

- Activity related pain and paresthesias distal to the elbow through the ulnar nerve distribution, most often of the small finger and ulnar side of the ring finger
- Pain and tenderness about the medial aspect of the elbow
- Decreased sensation in the ulnar distribution of the hand
- Weakness of grip power and dexterity
- Progressive inability to separate the fingers
- Symptoms may be aggravated by resting the flexed elbow on a firm surface
- In chronic cases, pain may be referred into the scapular region

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Skin changes
  - Hand deformities (clawing)
  - Muscle atrophy along ulnar aspect of hand
- Palpation of bony and soft tissue
  - Tenderness medial aspect of elbow, scapular

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    - Temperature changes
- Range of motion and manual muscle testing of ipsilateral and contralateral joints
    - Fingers, wrist, elbow, shoulder
- Provocation tests
    - The Elbow Flexion Test
    - The Pressure Provocative Test
    - Tinel's Sign
- Orthopedic and neurologic testing
    - Accessory joint movements at elbow, wrist, fingers
    - Tinel's sign (provocative test)
    - Elbow flexion test (elbow flexed past 90 degrees, supinated, wrist extended) (provocative test)
    - Froment's sign with key pinch
    - Wartenburg sign (clawing or abduction of small finger with extension)
    - 2-point discrimination
    - Grip and pinch test
    - Vibratory perception and light touch
    - Test sensation C7-T1
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
    - Disabilities of the Arm, Shoulder and Hand (DASH)
    - Patient Rated Wrist Evaluation
    - Hand Assessment Tool (HAT)

Findings of Ulnar Nerve Entrapment

- May have decreased sensory testing in the ulnar nerve distribution, depending on severity
- Pseudomotor changes of the skin
- Tinel's sign positive
- Froment's sign positive
- Wartenberg's sign positive
- Weakness in the muscles of ulnar nerve distribution
- Atrophy in the ulnar nerve distribution (late sign)
- Clawing contracture of the ring and little fingers (late sign)

Differential Diagnoses

- Cervical radiculopathy
- Proximal nerve impingement
- Pregnancy
- HIV
- Olecranon bursitis
- Medial epicondylitis
- Radiculopathy
- Thoracic outlet syndrome
- Guyon's canal syndrome

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Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

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Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate	Considerable loss

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		loss	
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

Conservative treatment consists primarily of rest, immobilization, and elimination of the external cause, if present, and is recommended for patients with intermittent symptoms, and without changes in two-point discrimination or muscle atrophy.

- Night splinting of elbow at 40-60 degrees may be helpful.
- In severe cases, splint is worn during the day or elbow is cast at 45 degrees of flexion and full supination.
- Elbow pads are advised with caution to avoid additional pressure on ulnar nerve within ulnar groove.
- Limiting repetitive flexion and extension is recommended.
- Limited leaning on elbow is recommended
- Limited sustained elbow flexion is recommended
- Strengthening and stretching exercises will be started when pain becomes manageable.

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- Retraining for proper positioning to avoid re-injury, and other factors in occupationally related overuse syndromes is an important component of the overall therapy consult.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs/progresses
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.
The following table lists the procedures for **Acute Phase** presentation.

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Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Relief of pain and chronic inflammation	▪ Modalities: Nerve gliding techniques, hot packs/cold packs, ultrasound, electrical stimulation
Improve flexibility	▪ Active range of motion exercises of the wrist, elbow, forearm ▪ Passive stretching to wrist, elbow, forearm muscles (avoid traction of the nerve) ▪ Segmental joint manipulation
Improve strength and endurance	▪ Strengthen elbow flexors and extensors, isometrically and isotonically within 0-45 degrees (limit the arc of elbow motion to an extended range to prevent ulna nerve compression ▪ Progress strength and grip training from isometric to concentric to eccentric contraction ▪ General strengthening of the unaffected areas of the arm
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports ▪ Functional training activities (ADL Activities)
Patient education and self-management	▪ Modification of job/recreational tools and or equipment ▪ Avoid activities that require repetitive motion ▪ Continue flexibility and strengthening activities

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	▪ Initially wear splint at all times with elbow at 45 degrees of flexion. As symptoms decrease, wear only at night.

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband
- Theraputty
- Splint, if necessary
- Elbow pads

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Cold packs, if needed, to relieve discomfort
- Instruction in splint use, if necessary

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication
- Surgery

Medicare References

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Dupuytren's Contracture, Post-Release

Synonyms

- Viking disease
- Palmar fasciitis

Definition

Dupuytren's contracture is characterized by the proliferation of fibroblasts and production of collagen starting in the fibrofatty tissue that presents as nodules in the palmar and digital fascia along longitudinal tension lines. In the advanced stage, fibrous tissue adheres to overlying skin and may also involve the tendon sheath of the long flexors of the finger. Flexion contracture develops at the MCP and PIP. Ultimately, the joint capsule contracts and permanent changes at the articular surfaces of the bones occur.
When the disease has progressed so that the MCP joint contracts to 30 degrees and the deformity becomes a functional problem there are several options for treatment.

Collagenase injection is a conservative treatment which may be done in the physician's office. The affected cord is injected and the next day the treated joint is manipulated to attempt cord rupture. Minimal hand therapy is usually needed following this procedure.

Percutaneous needle fasciotomy may be performed for recurrent disease.

A more invasive Dupuytren's release may be performed. This surgery involves making an incision in the palm of the hand to remove inflamed and contracted connective tissue. The extent of the operation is dependent upon whether the contracture affects one or several fingers. Timing of the operation is based on the rate of progression of the disease and, consequently, may be performed in stages.

The following five invasive procedures are used to relieve Dupuytren's contracture:

- Subcutaneous fasciotomy,
- Partial fasciectomy (most commonly used procedure),
- Complete fasciectomy,
- Fasciectomy with skin grafting, and
- Amputation

Patient History

Patient History may include

Patient Data

- A patient typically presents with a history of progressive loss of range of motion (ROM) of the affected finger(s).

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- The fourth digit most commonly is involved. The fifth, third, and second fingers are involved in decreasing order of frequency. Specifically, there is a decreased ability to extend the MCP joint(s) fully, and sometimes a decreased ability to extend the PIP joint(s) fully is noted.
- The history may refer to an isolated nodule in this area, initially somewhat tender, which may have hardened and then disappeared.
- Asking about functional disabilities may elicit a history of certain tasks that the individual can no longer perform, such as grasping objects and typing.
- No sensory deficits are reported, unless there is some other concomitant pathology.
- The condition is painless in its later stages.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, ligament tear
Fever, severe pain	Infection
Diabetes, paresthesia	Neuropathy, other metabolic conditions (e.g. B12 deficiency, hypothyroidism)
Multiple joint involvement, tophi	Rheumatologic diseases, gout
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of arm or hand	Arterial occlusion; vascular insufficiency
Immune-compromised state	Infection

Presentation

- Examination reveals a palmar skin nodule, generally within the distal aspect of the palm.
  - The nodularity generally is not tender to palpation.
  - Puckering of the skin above the nodularity may be noted. Overlying skin may be adherent to the fascia, and a fibrous cord can extend into the finger.
- Flexion of the digit is normal for both passive and active ROM.
  - Conversely, extension is limited at the MCP and sometimes the PIP joints of the affected digits. This limitation in finger extension occurs when testing both passive and active ROM.
  - The ring finger (digit 4) is the most commonly involved site, followed by the small finger (digit 5). Other digits may be involved in some cases, although less commonly.

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- Loss of progressive flexion of the fingers in the resting position from the radial to ulnar side may be noted.
- Although the patient may have difficulty grasping objects due to the contractures, strength is normal within the available ROM.
- Sensation is typically normal.

Subjective Findings

- Pain
- Difficulty grasping objects
- Difficulty with fine motor tasks
- Inability to fully extend fingers

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Surgical scar
  - Color of skin
  - Circulatory changes
- Palpation of bony and soft tissue
  - Sensation (pin prick, hot-cold sensation)
  - Temperature
- Range of motion, active and passive movements of ipsilateral and contralateral joints:
  - PIP Joint (flexion, extension)
  - MCP joint (flexion, extension)
  - Wrist (flexion, extension, ulnar and radial deviation)
- Manual muscle testing of ipsilateral joints (if allowed by Surgeon), also test contralateral joints:
  - PIP Joint (flexion, extension)
  - MCP joint (flexion, extension)
  - Wrist (flexion, extension, ulnar and radial deviation)
  - Grip strength
- Orthopedic testing
- Neurologic testing
  - Test dermatome C6, C7, T1
- Functional assessment - The following standardized tests may be used to assess functional limitations:

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- Disabilities of the Arm, Shoulder and Hand (DASH)
- Patient Rated Wrist Evaluation
- Hand Assessment Tool (HAT)

Findings of Dupuytren's Contracture

Dupuytren’s is more common in men than women and is most prevalent in people of European descent. Differential Diagnoses

- Osteoarthritis
- Tenosynovitis
- Spastic contracture in hemiplegia
- Ulnar nerve paralysis
- Scleroderma
- Rheumatoid nodules
- Trigger finger
- Articular cartilage pathology including neoplastic pathology
- Osteonecrosis

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation,

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and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade

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and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,

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- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

Scar management and splinting are an important part of the postoperative management.

- Initial splint is positioned to provide slight MCP joint flexion of 10-20 degrees with PIP joint extension to allow maximal elongation of the wound.
- Active, assisted, and passive exercises are usually initiated at the first treatment session.
- Splint will be worn to hold the fingers in extension until healed.
- Splinting is gradually reduced to only nightwear.

Home program, individually prescribed, is central to the care of all patients and should include flexion and extension exercises The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

- Affected hand should be elevated during initial weeks to help control edema.
- Ice packs should be used to control swelling.
- When incision is fully healed, patient can engage in hydrotherapy.
- Different gripping exercises may be introduced.
- To reduce the amount of contracture induced by scar, scar management should be a part of the daily plan.

Therapy program goals are to:

- Normalize pain-free range of motion,
- Prevent muscular atrophy, and to
- Relieve joint pain so that the other objectives may be achieved.

The therapy program will therefore consist of:

- Modalities to warm tissues prior to stretching,
- Therapeutic exercises for ROM and strengthening, and
- Scar management with instruction in a home program.

Because of some genetic predisposition to Dupuytren's disease and contractures, symptoms may recur or progress after treatment.

- Between 50-80% of individuals treated surgically have good return of hand function and decreased pain for 10 years.
- Recurrence is most common in the first finger joint.
- Long term use of extension splints at night is often recommended.

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Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Muscle wasting of the fingers and hand occurs
- Sensory deficits appear

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Post- Surgical Release**(Immobilized in splint or brace with MCP joints in10-20 degrees of flexion and PIP in extension for 5-7 days).

A standard protocol for postoperative management of Dupuytren disease, was developed by Engstrand et al. in 2009.

- Within the initial 5 days postoperative, the primary interventions are to educate the patient on decreasing edema and the importance of performing range of motion exercises on the uninvolved fingers.

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- After 5-7 days postoperative, the primary interventions shift to range of motion exercises and splinting.
- The exercises used in Engstrand's protocol were adapted to each subject's individual goals and were based on their impairment, physical status, and competency.
- The types of splints used included volar splints, dynamic extension splint, dynamic flexion splints, exercise splints, and wrist splints.

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs ▪ Phonophoresis prior to stretching
Improve flexibility and range of motion	▪ Begin with passive range of motion ▪ Progress to active-assisted and active Range of motion exercises of the MCP and PIP joints
Improve strength and endurance	▪ Progress strength and grip training from isometric to concentric to eccentric contraction of MCP and PIP joints ▪ General strengthening of the unaffected areas of the hand and wrist ▪ Once scar heals, hydrotherapy can be used
Improve scar extensibility	▪ Scar massage
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports ▪ Functional training activities ▪ Vocational training activities
Patient education and self-management	▪ Elevate hand to reduce edema ▪ Frequent icing ▪ Teach stretching, range of motion and gripping exercises several times per day ▪ Teach scar massage ▪ Use splint or brace for approximately 6 weeks and night splint for 3 months

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

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Home Medical Equipment

- Cold packs
- Theraband
- Theraputty
- Splint

Self-Care Techniques

- Instruction in home exercise program for ROM, scar management, and strengthening
- Cold packs, if needed, to relieve discomfort
- Education in use of splint

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication

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Elbow Collateral Ligament Reconstruction

Synonyms

None

Definition

Reconstruction of the collateral ligament is one of the most common surgeries performed on a throwing athlete. The detached ulnar collateral ligament is reattached to its point of origin or insertion. Posterior olecranon osteophytes, if present, are removed. The ulnar nerve is typically mobilized and transposed during the procedure. Post-operatively, the elbow is immobilized in a posterior splint for 7 to 10 days at 90 degrees of flexion, in neutral rotation, or in a bulky dressing.

Patient History

Patient History may include

Patient Data

- Medial elbow pain in athletes who throw is the most common symptom. Pain may be especially prominent during the acceleration phase of the overhead throw.
- Pain is often chronic or recurrent and may lead to a slow erosion of throwing ability.
- Athletes may report similar pain in previous seasons.
- Rest generally helps relieve pain.
- Occasionally, athletes may experience acute pain over the medial elbow, sometimes associated with a popping sensation, during a single throw that causes them to stop throwing immediately.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture/ligament rupture
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic, primary or paraneoplastic), potential complications of chemotherapy
Unilateral edema	Upper extremity deep vein thrombosis
Loss of distal pulse	Arterial occlusion
Immune-compromised state	Infection

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Presentation

- Medial elbow tenderness and swelling are the most notable findings. UCL tenderness may occasionally be difficult to differentiate from flexor pronator tendonitis, but the pain of flexor pronator tendinitis is aggravated by resisting forearm pronation.
- Loss of elbow range of motion (ROM) is occasionally observed.
- With acute rupture, ecchymosis may be observed over the medial elbow.
- Pain may be reproduced on making a clenched fist.

Subjective Findings

- Localized pain
- Popping sensation
- Distal numbness
- Weakness

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Swelling
  - Surgical Wound
- Palpation of bony and soft tissue
  - Pain medial elbow
  - Popping sensation
  - Temperature
- Range of motion, active and passive (assess after brace is removed) movements of ipsilateral and contralateral joints
  - Elbow (flexion, extension, supination, pronation)
  - Wrist (flexion, extension)
- Manual muscle testing of ipsilateral joints per post-surgical protocol, also test contralateral joints:
  - Elbow (flexion, extension, supination, pronation)
  - Wrist (flexion, extension)
- Orthopedic and neurologic testing (test after brace is removed)
  - Joint-play movements of the humeroulnar joint, radioulnar joint, and humeroradial joint
  - Joint and ligamentous tests:

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- Valgus stress test
- Varus stress test
- Neurological test
- Tinel's Test
- Deep tendon reflexes
- Functional assessment - The following standardized tests may be used to assess functional limitations:
  - Disabilities of the Arm, Shoulder and Hand (DASH)

Findings of Collateral Ligament Reconstruction

Not applicable.

Differential Diagnoses

- Proximal ulnar nerve impingement secondary to transposition
- Epicondylitis
- Gout

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a

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combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)
Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions

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and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and

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- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

The following modalities may ease discomfort and aid in healing process:

- Ice massage,
- Ultrasound,
- Electrical stimulation,
- Phonophoresis,
- Iontophoresis, and
- Friction massage
- Orthotic can be fabricated as needed to assist in eliminating excess stress on joint.
- Strengthening and stretching exercises will be started when pain becomes manageable.
- Retraining for proper positioning to avoid re-injury and other factors in occupationally related overuse syndromes, is an important component of the overall therapy consult.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.
- Patient will be educated in proper protection techniques to be utilized during all activities.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.

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- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs/progresses
- Neurological deficits appear with Ulnar Nerve entrapment or injury
- Elbow joint instability occurs

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.
Post Ulnar Collateral Ligament Reconstruction (Immobilized in posterior splint with elbow held at 90 degrees flex, neutral rotation, wrist is free for 7-10 days).

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs ▪ Phonophoresis ▪ Electrical stimulation
Improve flexibility	▪ Active Range of motion exercises of the wrist, elbow, forearm and shoulder (allowed once splint is removed) ▪ A hinged brace is worn 4-6 weeks to prevent valgus stress
Improve strength and endurance	▪ Begin isometric and isotonic exercises 4 weeks after surgery ▪ Progressive strengthening exercises using resistance begins 8 weeks post surgery ▪ Teach proper biomechanical throwing techniques at 4-6 months
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports ▪ Functional training patterns ▪ Joint stability/co-contractions using closed chain exercises
Patient education and self-management	▪ Teach proper warm-up and flexibility exercises ▪ Continue strengthening activities

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Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Cold packs
- Theraband
- Theraputty
- Orthosis, as needed

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication

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Elbow Dislocation

Synonyms

None

Definition

The most common elbow dislocation occurs when the radius or ulna moves posterior to the humerus, generally with considerable force, and possibly with associated fractures. Anterior and lateral dislocations also can occur. In children the most common elbow dislocation is subluxation of the radial head distally through the annular ligament.

Patient History

Patient history may include

Patient Data

In posterior elbow dislocation, the patient often describes falling on an outstretched hand (FOOSH injury) as the mechanism of injury. Anterior dislocations are usually the result of a direct posterior blow to a flexed elbow. In children, a radial head subluxation often occurs when the arm is pulled.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture/ligament rupture, neural damage
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic, primary or paraneoplastic), potential complications of chemotherapy
Unilateral edema	Upper extremity deep vein thrombosis
Loss of distal pulse	Arterial occlusion
Immune-compromised state	Infection
Cold Intolerance, fatigue, constipation	Hypothyroidism
Multiple joint involvement, unusual skin rashes, other vascular involvement	Rheumatologic diseases (e.g., Rheumatoid arthritis, Sjogren's Syndrome, Systemic Lupus Erythematosis, Polyarteritis nodosa)
Stocking-glove neurological involvement	Diabetes, alcoholism, B12 deficiency

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Auto repair occupation, battery exposure	Lead poisoning
Hand/skull disproportionately large	Acromegaly

Presentation

The patient will present with swelling, painful movements, weakness and decreased range of motion of the elbow and hand and decreased sensation.

Subjective Findings

Complains of recurrent painful clicking, snapping, clunking, or locking of the elbow are common.

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Type of immobilization
  - Swelling
  - Skin color
  - Wound/surgical scar
- Palpation of bony and soft tissue
  - Distal Pulses (Brachial Artery)
  - Sensation-palmers aspect of 1st-5th digits
- Skin temperature
- Pain at elbow
- Range of motion, active and passive movements of ipsilateral and contralateral joints:
  - Elbow (flexion, extension, supination, and pronation)
  - Wrist (flexion, extension)
  - Shoulder movements
- Manual Muscle Testing (as allowed by physician protocol) of ipsilateral and contralateral joints:
  - Elbow (flexion, extension, supination, and pronation)
  - Wrist (flexion, extension
  - Shoulder movements
- Orthopedic Testing

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    - Joint-play movements of the humeroulnar joint, radioulnar joint, and humeroradial joint
    - Tinel's Sign
- Neurologic Testing (if neurologic signs are present)
    - Test integrity of Ulnar nerve (abduction & adduction of digits) and Median nerve (opposition of thumb)
- Functional Assessment - The following standardized test may be used to assess functional limitations:
- Disabilities of the Arm, Shoulder and Hand (DASH)

Findings of Elbow Dislocation

- May have decreased sensory testing (light touch) in the ulnar or median nerve distribution depending on severity
- Loss of active and passive ROM especially in extension
- Marked effusion and ecchymosis may be present

Differential Diagnoses

- Proximal nerve impingement
- Epicondylitis
- Olecranon bursitis
- Tophaceous gout
- Cubital tunnel syndrome

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a

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combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

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Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)

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3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Treatment Methods

Modalities such as the following may ease the discomfort and aid in the healing process:

- Ice massage,
- Ultrasound,
- Electrical stimulation,
- Phonophoresis,
- Iontophoresis, and
- Friction massage

Patient education in joint protection, and the home program expectations are also an early goal.

- Range of motion and strengthening exercises may be dependent on the stability of the joint or surgical repairs, and the possible presence of associated fractures.
- Rehabilitation must balance the risk of being too aggressive, which can lead to chronic instability, fractures or myositis ossificans, with being too conservative leading to contractures.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.

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- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs/progresses
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

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The following table lists the procedures for **Conservative Management** presentation (Elbow is immobilized in a supportive brace or splint for <3 weeks).

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs ▪ Phonophoresis ▪ Iontophoresis ▪ Friction massage ▪ Electrical stimulation
Improve flexibility, strength and endurance of the elbow	▪ Begin with gentle active range of motion of the elbow ▪ Add passive range of motion ▪ Add progressive strengthening exercises once full range of motion is achieved ▪ Strengthening exercises to the unaffected areas of the upper extremity should be added at the beginning of rehab ▪ The goal is to prevent contractures, however aggressive rehab. can lead to fractures, instability and Myositis Ossificans
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure, vocation and sports ▪ Functional training patterns ▪ Joint stability/co-contractions using closed chain exercises ▪ ADL training
Patient education and self-management	▪ Modification of job/recreational tools and or equipment until sufficient range of motion and strength is achieved ▪ Continue flexibility and strengthening activities ▪ Teach patient to observe for signs and symptoms of Heterotropic Ossification, Ulnar or Median Nerve Neuropathy, Compartment syndrome

The following table lists the procedures for **Post Reduction with Fixation** presentation (Elbow is immobilized at 90 degrees of flexion with padded posterior splint for 1 week. The elbow is then placed in a hinged orthosis for 4-6 weeks to prevent varus-valgus stresses).

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs ▪ Electrical stimulation
Improve flexibility,	▪ Begin with gentle active range of motion and isometric

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strength and endurance of the elbow	exercises of the elbow for the first 4-6 weeks. ▪ Add passive range of motion once orthosis is removed ▪ Add progressive strengthening exercises once full range is achieved
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization exercises
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure, vocation and sports ▪ Functional training patterns ▪ Joint stability/co-contractions using closed chain exercises ▪ ADL training
Patient education and self-management	▪ Modification of job/recreational tools and or equipment until sufficient range of motion and strength is achieved ▪ Continue flexibility and strengthening activities ▪ Teach patient to observe for signs and symptoms of Heterotropic Ossification, Myositis Ossificans, Ulnar or Median Nerve Neuropathy, and Compartment syndrome

Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication

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Elbow Fracture, Closed, Post-Cast Removal

Synonyms

- Broken elbow

Definition

A fracture is essentially a structural failure of bone. Nature of a fracture is determined by the inherent properties of bone, its structure, and type of forces applied to it.

- Forces of tension, compression, bending and torsion can load bone beyond its structural strength.
- External forces may render a fracture displaced or undisplaced, with two or more fragments.
- Displaced fragments may be overriding one another, lateral to each other, extremely distracted from one another, angulated, or rotated out of alignment.
- Displaced fractures may be open fractures with a fragment breaking through the skin, exposing the fracture site to an external environment and increases risk of infection.
- In addition to bony involvement, fractures frequently result in associated injury of soft tissues attached to, or adjacent to the bone.
- The elbow can also be dislocated at the radial head.
- Fractures may be treated by immobilization with casts, sling/immobilizer, open reduction and internal fixation (ORIF), percutaneous pinning, joint replacement, or external fixator.

Patient History

Patient history may include

Patient Data

The mechanism for most elbow fractures is direct elbow trauma or a fall onto an outstretched hand.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear
Fever, severe pain	Infection
Loss of distal pulse	Compartment syndrome
Diabetes	Neuropathy

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Multiple joint involvement, large tophus	Rheumatologic diseases, gout
Unilateral edema	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of wrist or hand	Arterial occlusion
Immune-compromised state	Infection

Presentation

Patient presents with a history of fracture at, or near the elbow joint.
The elbow will be placed in a hinged functional brace. The patient may also present with swelling, painful movements, weakness and decreased range of motion of the elbow and hand.

Subjective Findings

- Pain at the fracture site
- Decrease movement at elbow joint and hand
- Weakness of the arm
- Inability to use to perform ADLs

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Type of immobilization
  - Swelling
  - Skin color
  - Lacerations
- Palpation of bony and soft tissue
  - Distal Pulses (Brachial Artery)
  - Sensation-palmers aspect of 1st-5th digits
- Skin temperature
- Pain at elbow
- Range of motion, active and passive movements of ipsilateral and contralateral joints:
  - Elbow (flexion, extension, supination, pronation)
  - Wrist (flexion, extension)
  - Shoulder movements

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- Manual Muscle Testing of ipsilateral joints (as allowed by physician protocol) and contralateral joints
  - Elbow (flexion, extension, supination, pronation)
  - Wrist (flexion, extension
  - Shoulder movements
- Orthopedic Testing
  - Tinel's Sign
  - Joint-play movements of the humeroulnar joint, radioulnar joint, and humeroradial joint
- Neurologic Testing (if neurologic signs are present)
  - Test integrity of Unar nerve (abduction & adduction of digits) and Median nerve (opposition of thumb)
- Functional Assessment - The following standardized test may be used to assess functional limitations:
- Disabilities of the Arm, Shoulder and Hand (DASH)

Findings of Elbow Fracture

- Swelling occurs at fracture site
- Restricted motion caused by pain, swelling, immobilization, or soft tissue shortening is common
- Muscle atrophy

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

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Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

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Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

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Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Treatment Methods

Therapy program goals are to:

- Minimize inflammation,
- Normalize pain-free range of motion,
- Prevent muscular atrophy,
- Maintain proprioception,
- Relieve joint pain, and
- Increase strength so that other objectives may be achieved.

Therapy program will consist of modalities to:

- Minimize inflammation
- Therapeutic exercises for ROM and strengthening. Some authorities believe that overly aggressive overstretching the elbow may cause heterotopic ossification.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

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Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs/progresses
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Post Cast Removal (Immobilized in splint or cast for 7-14 days followed by hinged functional brace with early range of motion).

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs ▪ Phonophoresis ▪ Electrical stimulation
Improve flexibility	▪ Gentle passive range of motion of the elbow is allowed once splint/cast is removed. ▪ Avoid aggressive stretching ▪ Begin active range of motion of the shoulder and wrist immediately
Improve strength and endurance	▪ Begin active range of motion once fracture union occurs ▪ Add progressive strengthening exercises of the elbow ▪ General strengthening of the unaffected areas of the arm
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure, vocation and sports ▪ Functional training patterns ▪ Joint stability/co-contractions using closed chain exercises ▪ ADL Training
Patient education and self-management	▪ Modification of job/recreational tools and or equipment until sufficient range of motion and strength is achieved ▪ Continue flexibility and strengthening activities ▪ Teach patient to observe for signs and symptoms of Heterotropic Ossification, Ulnar or Median Nerve Neuropathy, Compartment syndrome

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Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Heat packs

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Heat packs

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication

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Elbow Fracture, with ORIF

Synonyms

Broken elbow

Definition

A fracture is essentially a structural failure of bone. The nature of the fracture is determined by inherent properties of the bone, its structure, and type of forces applied to it.

- Forces of tension, compression, bending, and torsion can load bone beyond its structural strength.
- External forces may render a fracture displaced or undisplaced, with two or more fragments.
- Displaced fragments may be overriding one another, lateral to each other, extremely distracted from one another, angulated, or rotated out of alignment.
- Displaced fractures may be open fractures with a fragment breaking through skin, exposing the fracture site to external environment and increases risk of infection.
- In addition to bony involvement, fractures frequently result in associated injury of soft tissues attached to, or adjacent to, the bone.
- Radial head can also be dislocated mimicking/complicating an elbow fracture.
- Fractures may be treated by immobilization with casts, sling/immobilizer, ORIF, percutaneous pinning, or joint replacement.

Patient History

Patient history may include

Patient Data

The mechanism for most elbow fractures is direct elbow trauma or a fall onto an outstretched hand.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear
Fever, severe pain	Infection
Loss of distal pulse	Compartment syndrome
Diabetes	Neuropathy
Multiple joint involvement, large tophus	Rheumatologic diseases, gout

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Unilateral edema	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of wrist or hand	Arterial occlusion
Immune-compromised state	Infection

Presentation

The patient presents with the elbow placed in a supportive brace or splint with swelling, painful movements, weakness and decreased range of motion of the elbow and hand.

Subjective Findings

- Elbow pain
- Pain with motion
- Restricted movement

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

- Olecranon bursitis
- Tophaceous gout
- Epicondylitis
- Radial head dislocation

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Type of immobilization
  - Swelling
  - Skin color
  - Wound/surgical scar
- Palpation of bony and soft tissue
  - Distal Pulses (Brachial Artery)
  - Sensation-palmer aspect of 1st-5th digits
- Skin temperature
- Pain at elbow
- Range of motion, active and passive movements of ipsilateral and contralateral joints:
  - Elbow (flexion, extension, supination, pronation)
  - Wrist (flexion, extension)
  - Shoulder movements

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- Manual Muscle Testing of ipsilateral joints (as allowed by physician protocol), and of contralateral joints:
  - Elbow (flexion, extension, supination, pronation)
  - Wrist (flexion, extension
  - Shoulder movements
- Orthopedic testing
  - Tinel's Sign
  - Joint-play movements of the humeroulnar joint, radioulnar joint, and humeroradial joint
- Neurologic Testing (if neurologic signs are present)
  - Test integrity of Ulnar nerve (abduction & adduction of digits) and Median nerve (opposition of thumb)
- Functional Assessment - The following standardized test may be used to assess functional limitations:
  - Disabilities of the Arm, Shoulder and Hand (DASH)

Findings of Elbow Fracture with ORIF

- Swelling occurs at fracture site
- Restricted motion caused by pain, swelling, immobilization, or soft tissue shortening is common
- Muscle atrophy

Differential Diagnosis

None indicated.

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in

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preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

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Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.

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1. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
2. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
3. Pain: limiting function and at least 3/10
4. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Treatment Methods

Therapy program goals are to:

- Minimize the inflammation,
- Normalize pain-free range of motion,
- Prevent muscular atrophy,
- Maintain proprioception,
- Relieve joint pain, and
- Increase strength so that other objectives may be achieved.
- Use therapeutic exercises for ROM and strengthening, and
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Some authorities believe that overly aggressive overstretching of the elbow may cause heterotopic ossification.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be

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deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:
- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs/progresses
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Post ORIF (Elbow is placed in a supportive brace or splint)

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs ▪ Electrical stimulation
Improve flexibility, strength and endurance of the elbow	▪ Begin with gentle active range of motion of the elbow for the first 6 weeks. ▪ Add passive range of motion for the next 4 weeks ▪ Add progressive strengthening exercises 10 weeks after surgery ▪ Can use dynamic flexion/extension splints as needed ▪ Strengthening exercises to the unaffected areas of the upper extremity should be added at the beginning of rehab
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure, vocation and sports ▪ Functional training patterns ▪ Joint stability/co-contractions using closed chain exercises ▪ ADL training
Patient education and self-management	▪ Modification of job/recreational tools and or equipment until sufficient range of motion and strength is achieved ▪ Continue flexibility and strengthening activities

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	▪ Teach patient to observe for signs and symptoms of Heterotropic Ossification, Ulnar or Median Nerve Neuropathy, Compartment syndrome

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Heat packs

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Heat packs

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication

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Elbow Radial Nerve Entrapment, With and Without Surgical Release

Synonyms

None

Definition

A condition that involves radial nerve entrapment between anatomical structures causing nerve compression resulting in paresthesia, pain, and weakness.

Patient History

Patient History may include

Patient Data

A number of radial nerve entrapments are recognized, and are named according to the location where they occur:

High Radial Nerve Palsy	▪ Radial nerve palsy is frequently related to humeral fractures, and may occur by direct trauma or callus formation, or by compression from scarring or musculature. Weakness of the wrist and finger extensors is present, as well as sensory deficits.
Radial Tunnel Syndrome (RTS)	▪ Radial tunnel syndrome involves compression of the deep branch of the radial nerve. The same structures implicated in PIN compression syndrome can cause radial tunnel syndrome, although RTS is often thought of as a dynamic compression syndrome. Compression of the nerve occurs during elbow extension, forearm pronation, and wrist flexion that caused the ECRB and the fibrous edge of the superficial part of the supinator to tighten around the nerve. ▪ Symptoms mimic those of tennis elbow: tenderness over the lateral aspect of the elbow; pain on passive stretching of the extensor muscles; and, pain on resisted extension of the wrist and fingers. Men and women are equally affected and onset is common in the fourth to sixth decades of life. ▪ Pain, poorly localized over the radial aspect of the proximal forearm is the most common primary presenting symptom. Maximal tenderness is usually elicited over the radial tunnel and pain may be reproduced by resisted middle finger extension.
Superficial Radial Nerve Palsy	▪ Wartenberg's syndrome, or Cheiralgia paresthetica are terms used to describe a mononeuritis of the superficial radial nerve that can become entrapped where it pierces the fascia between the brachioradialis and extensor carpi radialis longus tendons. ▪ Symptoms include shooting or burning pain along posterior-

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	radial forearm, wrist, and thumb associated with wrist flexion and ulnar deviation. Symptoms may lead to the belief that anatomic snuffbox joint and tendons are involved, or that DeQuervain's disease is present.

Posterior interosseous nerve syndrome (PINS)

The PIN has five potential sites of compression as it traverses through the radial tunnel:

1. Fibrous bands connecting the brachialis to the brachioradialis.
2. Vascular leash of Henry, a fan of blood vessels that cross the nerve at level of radial neck.
3. Medial proximal portion (leading edge) of ECRB.
4. Between fibrous bands at proximal and distal edge of the supinator; proximal border is referred to as Arcade of Fröhse.
5. PINS involves loss of motor function of some, or all of the muscles innervated by the posterior interosseous nerve, and is characterized by weakness.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever, severe pain	Possible infection
Unilateral edema	Upper extremity deep vein thrombosis
Immune-compromised state	Infection
Cancer history	Cause of symptoms (metastatic or primary)
Discoloration of hand/fingers	Vascular occlusion, shunt emboli (dialysis patients)
Exertional symptoms, history of cardiac disease	Anginal equivalent

Presentation

Patient's specific presentation will depend on the severity, duration and location of the nerve compression. Weakness of the wrist and finger extensors, abnormal sensation, and pain are common complaints, varying in location and prominence with each area of entrapment.

Subjective Findings

- Pain
- Weakness of wrist and fingers
- Altered sensation

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- Impaired fine motor control

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Posture
  - Skin condition
- Palpation of bony and soft tissue
  - Palpate forearm for pain
  - Test sensation in forearm and hand
  - Muscle atrophy
- Range of motion, active and passive movements of ipsilateral and contralateral joints:
  - Elbow (flexion, extension, supination, pronation)
  - Wrist (flexion, extension)
  - Shoulder
  - Cervical Spine
- Orthopedic and neurologic testing
- Joint-play movements of the humeroulnar joint and humeroradial joint
- Neurological test
  - Tinel's Test
  - Deep tendon reflexes (C5-C7
  - Dermatomes (C7-T1)
- Manual muscle testing of ipsilateral and contralateral joints:
  - Wrist
  - Elbow
  - Shoulder
  - Cervical spine
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
  - Disabilities of the Arm, Shoulder and Hand (DASH)

Findings of Radial Nerve Entrapment

- High Radial Nerve Palsy
- Abnormal sensation on the dorsum of the hand
- Radial Tunnel Syndrome
- Lateral forearm pain

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- Weakness of wrist extensors
- Radial Sensory Nerve Entrapment
- Distal forearm pain
- Posterior interosseous nerve syndrome
- Weakness in the extensors, sometimes with sparing of radial deviation
- Forearm pain

Differential Diagnoses

- C6 or C7 cervical nerve root compression
- Crystalline deposition such as gout and pseudogout (Chonrocalcinosis)
- Lateral epicondylitis
- De Quervain disease
- Olecranon bursitis

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or

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injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

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Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

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Treatment Methods

Therapy program goals are to:

- reduce pain and inflammation,
- aid stretching and strengthening, and
- assist in gradual return to activity.

Treatment methods used:

- Modalities to reduce pain and inflammation.
- Splinting (static and dynamic) is often used for protection, improved function and/or rest.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.
- Patient education in rest/reduction of strenuous activities, as well as identification of causative factors and correction of faulty technique is frequently performed.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the hand occurs

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- Neurological deficits appear with Radial Nerve entrapment or injury

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

The following table lists the procedures for **Conservative Management**.

Expected Outcome	Procedures/Modalities Such As
Relief of pain and chronic inflammation	▪ Ice packs ▪ Phonophoresis ▪ Friction massage
Improve flexibility	▪ Range of motion exercises of the wrist, elbow, forearm ▪ Sustained stretch to wrist, elbow, forearm
Improve strength and endurance	▪ Progress strength and grip training from isometric to concentric to eccentric contraction of forearm muscles ▪ General strengthening of the unaffected areas of the arm
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports ▪ Functional training activities ▪ Joint stability/co-contractions using closed chain

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	exercises
Patient education and self-management	▪ Modification of job/recreational tools and or equipment ▪ Avoid activities that require repetitive elbow extension, forearm supination, wrist flexion ▪ Fabrication and use of functional splint ▪ Continue flexibility and strengthening activities

The following table lists the procedures for **Post Fascial Release** (Immobilized in splint or brace with elbow flexed at 90 degrees and forearm neutral).

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs ▪ Phonophoresis ▪ Electrical stimulation
Improve flexibility	▪ Active Range of motion exercises of the wrist, elbow, forearm and shoulder (allowed 1 week after surgery)
Improve strength and endurance	▪ Progress strength and grip training from isometric to concentric to eccentric contraction of forearm muscles, especially the wrist flexors ▪ General strengthening of the unaffected areas of the arm (strengthening exercises allowed gradually)
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports ▪ Functional training activities ▪ Joint stability/co-contractions using closed chain exercises
Patient education and self-management	▪ Modification of job/recreational tools and or equipment ▪ Avoid activities that require repetitive elbow extension, forearm supination, wrist flexion ▪ Fabrication and use of functional splint ▪ Continue flexibility and strengthening activities

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

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Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises
- Splint
- Theraputty

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises, stretching wrist extensor musculature
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication

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Elbow Sprain/Strain

Synonyms

None

Definition

Made up of three articulating surfaces within a common capsule, the elbow is a complex joint. Lateral stability is provided by the lateral collateral ligament over the radiohumeral joint, and the annular ligament that supports the superior radioulnar joint. Medial stability is provided by the fan shaped medial collateral ligament extending from the medial epicondyle to the olecranon and coronoid processes.

Three main functional muscle groups cross the joint; muscle groups originating proximal to the elbow control flexion and supination (brachialis and biceps), and elbow extension (triceps). In addition the medial and lateral epicondyles are the origin of the common wrist flexor and extensor groups. Flexor group also provides wrist ulnar deviation and forearm pronation. Extensor group controls wrist radial deviation and supination, in addition to wrist extension.

Sprains and strains of the elbow are commonly produced by valgus stresses, hyperextension or traction. Sprains and strains may be graded from microtrauma to partial tears of muscle or ligaments, to complete tears or avulsion. Dislocations can occur, some of which may reduce prior to medical attention, however, leaving patient with derangement of the joint structures.

Patient History

Patient History may include

Patient Data

The patient often describes falling on an outstretched hand (ie, the FOOSH injury) as the mechanism of injury. When compressive forces or distraction forces are directed on to the outstretched hand, the radius and ulna, along with the valgus force at the elbow will cause a sprain/strain. In addition, hyperextension at the elbow has been seen with elbow strains.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Fracture/ligament rupture
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic, primary or paraneoplastic), potential complications of chemotherapy
Unilateral edema	Upper extremity deep vein thrombosis
Loss of distal pulse	Compartment syndrome
Immune-compromised state	Infection
Cold Intolerance, fatigue, constipation	Hypothyroidism
Multiple joint involvement, unusual skin rashes, other vascular involvement	Rheumatologic diseases (e.g., rheumatoid arthritis, Sjogren's syndrome, systemic lupus erythematosis, polyarteritis nodosa)
Stocking-glove neurological involvement	Diabetes, alcoholism, B12 deficiency
Auto repair occupation, battery exposure	Lead poisoning
Hand/skull disproportionately large	Acromegaly

Presentation

Patients present with immobilization, restricted elbow range of motion, pain swelling, altered sensation, motor changes, and impaired ability to use their arm.

Subjective Findings

- Pain around the elbow, medially, and/or laterally
- May have history of swelling
- History of trauma

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specifics Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Focal Swelling
  - Skin Color
- Palpation of bony and soft tissue
  - Pain posterior tip of ulna

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    - Temperature
- Range of motion, active and passive and manual muscle testing of ipsilateral and contralateral joints:
    - Elbow (flexion, extension, supination, pronation)
    - Wrist (flexion, extension)
- Orthopedic testing
    - Joint-play movements of the humeroulnar joint and humeroradial joint
    - Joint and ligamentus tests:
- Valgus stress test
- Varus stress test
- Neurological test
    - Tinel's Test
    - Deep tendon reflexes
- Functional Assessment - The following standardized test may be used to assess functional limitations:
    - Disabilities of the Arm, Shoulder and Hand (DASH)

Findings of Sprain/Strain

- May have decreased sensory testing (light touch) in the ulnar or median nerve distribution depending on severity
- Varus and/or valgus stress testing is painful
- Resisted wrist flexion and/or pronation may be painful
- Symptoms should gradually resolve

Differential Diagnoses

- Cervical radiculopathy
- Proximal nerve impingement
- Fluid retention due to pregnancy

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist

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of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based

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on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

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1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

The following modalities may ease discomfort and aid in healing process:

- Ice massage,
- Ultrasound,
- Electrical stimulation,
- Phonophoresis,
- Iontophoresis, and
- Friction massage

Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Patient will be educated in proper protection techniques to be utilized during all activities.

- Splint can be fabricated as needed to assist in eliminating excess stress on the joint.
- Strengthening and stretching exercises will be started when pain becomes manageable.
- Retraining for proper positioning to avoid re-injury, and other factors in occupationally related overuse syndromes is an important component of the overall therapy consult.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.

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- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Acute Phase** presentation.

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Relief of pain and inflammation	▪ Ice packs/ice massage ▪ Phonophoresis ▪ Friction massage ▪ Iontophoresis ▪ Electrical stimulation ▪ Compression wrap

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Improve range of motion	▪ Stretch wrist, forearm and elbow
Improve postural control	▪ Postural awareness of upper trunk and shoulder girdle ▪ Scapular stabilization
Patient education and self-management	▪ Self-management of symptoms-application of ice, friction massage, ▪ Avoid activity that exacerbates pain ▪ Modify activities and equipment ▪ Perform ergonomic evaluation of workplace

The following table lists the procedures for **Subacute Phase and Corrective/Rehabilitative Phase** presentation (Do not advance program too quickly).

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
The main goal is to improve strength, endurance and flexibility so normal function can be achieved	▪ Begin with squeezing activities to strengthen forearm muscles ▪ Progress to gentle flex-ext of the wrist with light weights ▪ Add elbow flex-ext, wrist pronation, supination activities with light resistance
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure, sports, and vocation ▪ Functional training ▪ Biomechanical training in the workplace or home to prevent re-aggravation
Patient education and self-management	▪ Modification of job/recreational tools and or equipment ▪ Avoid activities that require repetitive

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	activities ▪ Return to sports when 90% of strength is achieved

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband
- Splints/braces

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication
- Surgery

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Elbow Ulnar Nerve Transposition

Synonyms

None

Definition

Ulnar nerve transposition is accomplished by creating a new tunnel using the flexor muscles of the forearm. The ulnar nerve is then moved (transposed) out of the cubital tunnel and placed in the new tunnel.

Patient History

Patient History may include

Patient Data

Patient presents post operatively with a history of ulnar nerve entrapment. Entrapment at the elbow occurs on the medial aspect, and can be the result of trauma that has caused scarring or bony malformation, or may be the result of compression from inadequate spaces as the nerve travels across the joint.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture/ligament rupture
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic, primary or paraneoplastic), potential complications of chemotherapy
Unilateral edema	Upper extremity deep vein thrombosis
Loss of distal pulse, severe pain 12-24 hours after trauma	Compartment syndrome
Immune-compromised state	Infection
Cold Intolerance, fatigue, constipation	Hypothyroidism
Multiple joint involvement, unusual skin rashes, other vascular involvement, tophi	Rheumatologic diseases (e.g., rheumatoid arthritis, Sjogren's syndrome, systemic lupus erythematosis, polyarteritis nodosa), gout
Stocking-glove neurological involvement	Diabetes, alcoholism, B12 deficiency

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Auto repair occupation, battery exposure	Lead poisoning
Hand/skull disproportionately large	Acromegaly

Presentation

The term ulnar nerve transposition is used to describe a number of more specific procedures that have varying post-operative precautions. Precautions are generally issued by the referring surgeon, depending on the specific procedure performed.

Subjective Findings

- May complain of hypesthesia in ulnar nerve distribution
- Elbow pain
- Swelling at the elbow
- Decreased elbow ROM (once allowed)
- Decreased grip and pinch

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection-Posture
  - Skin condition
  - Surgical wound/scar
  - Muscle atrophy
- Palpation of bony and soft tissue
  - Palpate forearm for pain
  - Test sensation in forearm and hand
  - Finger contractures, deformities
  - Skin Temperature
- Range of motion, active and passive movements of ipsilateral and contralateral joints:
  - Fingers, Thumb
  - Elbow (flexion, extension, supination, pronation)
  - Wrist (flexion, extension)
  - Shoulder
  - Cervical Spine
- Orthopedic and neurologic testing
  - Joint-play movements of the humeroulnar joint and humeroradial joint

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    - Tinel's Test
    - Deep tendon reflexes (C5-C7)
    - Dermatomes (C7-T1)
- Manual Muscle Testing of ipsilateral and contralateral joints:
    - Fingers, thumb
    - Wrist
    - Elbow
    - Shoulder
    - Cervical spine
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
    - Disabilities of the Arm, Shoulder and Hand (DASH)

Findings of Elbow, Ulnar Nerve Transposition

- Pain
- Swelling
- Muscle weakness
- Numbness and/or sensory changes
- Impaired upper extremity function

Differential Diagnosis

Not applicable

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a

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combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

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Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)

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3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

Therapy program goals are to:

- Reduce pain and inflammation,
- Aid stretching and strengthening, and
- Assist in gradual return to activity.

Treatment methods used:

- Modalities to reduce pain and inflammation.
- Protective splinting may be appropriate in acute post operative period.
- Post operative care may have time based criteria for advancement of activity.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.
- Patient education consists of rest/reduction of strenuous activities, as well as identification of and avoidance of positions and postures that are provocative factors.

As stated above, precautions are generally issued by the referring surgeon, depending on the specific procedure performed.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition.

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Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:
- Improvement does not meet above guidelines, or improvement has reached a plateau
- Increased muscle weakness and/or atrophy occurs
- Neurological deficits appear/progress
- Infection or failure to heal occurs

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Post Ulnar Nerve Transposition

There are three types of transpositions:
- Subcutaneous transposition: post-operative immobilization of the elbow in 45 degrees of flexion for two weeks is necessary.
- Submuscular transposition requires immobilization for 3-4 weeks in a sugartong splint with slight pronation and wrist in neutral position.
- Intramuscular transposition requires 3 weeks of immobilization at 90 degrees of elbow flexion with forearm in full pronation
- Therapy will be initiated once immobilization is removed.

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs ▪ Phonophoresis ▪ Electrical stimulation
Improve flexibility	▪ Passive stretching ▪ Active Range of motion exercises of the wrist, fingers, elbow, forearm and shoulder ▪ Joint mobilization techniques to elbow ▪ Soft tissues mobilization

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Improve strength and endurance	▪ Progress strength and grip training from isometric to concentric to eccentric contraction of forearm muscles and elbow ▪ Progressive resistance exercises of the elbow and wrist ▪ General strengthening of the unaffected areas of the arm (strengthening exercises allowed gradually at the elbow and wrist
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports and vocation ▪ Functional training activities ▪ Joint stability/co-contractions using closed chain exercises
Patient education and self-management	▪ Modification of job/recreational tools and or equipment ▪ Avoid excessive pressure on elbow (use of elbow pad) ▪ Teach use of heating modalities before stretching ▪ Teach joint mobilization and soft tissue mobilization ▪ Continue flexibility and strengthening activities

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self -care at his residence.

Home Medical Equipment

- Cold packs
- Theraband
- Theraputty
- Splint, if necessary

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Cold packs, if needed, to relieve discomfort
- Instruction in splint use, if necessary

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Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication
- Cortisone injection

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Hand, Trigger Finger, With and Without Release

Synonyms

- Stenosing tendovaginitis
- Trigger digit
- Stenosing tenosynovitis

Definition

Trigger finger (TF) is one of the most common causes of hand pain and disability. The diagnosis is made when a finger is “locked” or attempts to lock in a position of flexion. If the flexor tendon cannot re-enter the canal at the A1 pulley, it assumes a flexed or “locked” position. This is usually due to the formation of a nodule in the flexor digitorum superficialis (FDS) tendon, where it glides under the A1 pulley in the region of the metacarpal head.

Condition begins as discomfort in the palm during movements of the involved digit(s). Gradually, or, in some cases acutely, the flexor tendon causes painful popping or snapping as the patient flexes and extends the digit.

Injection therapy generally is the first line of management. Surgery is considered for those in whom injections have failed or in whom other pathology, particularly RA, is the probable cause of the symptoms.

Patient History

Patient History may include

Patient Data

- The classic complaint is difficulty achieving full extension of a single digit, which eventually releases or snaps open with pain at the distal palm and into the digit.
- Multiple digits may be involved in trigger finger in individuals with diabetes or rheumatoid arthritis.
- Some patients have difficulty with finger flexion rather than extension, although the former is less common.
- Other patients may have a painful nodule in the distal palm without any catching or triggering.
- Some patients report stiffness in the fingers, especially after periods of inactivity such as sleeping.
- Some patients may have a history of repetitive trauma to the affected area.
- Patients may have a history of diabetes or rheumatoid arthritis.
- Some patients report swelling of the affected digit, particularly at the base or proximal aspect of the digit

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Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever, severe pain	Possible infection
Unilateral edema	Upper extremity deep vein thrombosis
Immune-compromised state	Infection
Cancer history	Cause of symptoms (metastatic or primary)
Discoloration of hand/fingers	Vascular occlusion, shunt emboli (dialysis patients)
Exertional symptoms, history of cardiac disease	Anginal equivalent

Presentation

- At the level of the distal palmar crease, a tender nodule can be palpated, usually overlying the metacarpophalangeal (MCP) joint.
- The affected digit may lock within a flexed position or, less commonly, within an extended position.
- In severe cases, the patient is unable to move the digit beyond the restriction, so no triggering occurs.
- With a trigger thumb, the tenderness to palpation is found at the palmar aspect of the first MCP joints, rather than over the distal palmar crease.

Subjective Findings

- Pain in the affected area
- Swelling
- Decreased grip or pinch
- Hypersensitivity
- Limited range of motion or fixed deformity
- Snapping or popping sensation

Objective Findings

Objective Findings may include

Scope of Examination

- Consider other possible causes
- Localized tissue thickness is common
- Post—operatively, check the wound

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Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Wound, surgical scar
  - Swelling
- Palpation of bony and soft tissue
  - Palpate for nodule at distal palmer crease (over MCPJ
  - Temperature Changes
  - Sensation
  - Snapping and popping of finger
- Range of motion, active and passive movements of ipsilateral and contralateral joints:
  - PIP Joint (flexion, extension)
  - MCP joint (flexion, extension)
  - Wrist (flexion, extension, ulnar and radial deviation)
- Manual Muscle Testing of ipsilateral joint (If allowed by surgeon), and of contralateral joints:
  - PIP Joint (flexion, extension)
  - MCP joint (flexion, extension)
  - Wrist (flexion, extension, ulnar and radial deviation)
  - Grip strength
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
  - Disabilities of the Arm, Shoulder and Hand (DASH)
  - Hand Assessment Tool (HAT)
  - Patient Rated Wrist Evaluation
- Neurologic testing
  - Test dermatome C6, C7, C8, T1

Findings of Trigger Finger

- Palpable nodule on tendon
- Pain and locking of finger into flexion
- Snapping or popping of finger

Differential Diagnoses

- Crystalline deposition such as gout and pseudogout (Chondrocalcinosis)
- Collateral ligaments of the metacarpophalangeal (MCP) joint catch on a bony prominence on the side of the metatarsal head (osteophyte)
- Localized swelling in the flexor digitorum profundus (FDP) gets entrapped at the decussation of the FDS
- Partially lacerated flexor tendon catches against the A1 pulley or the FDS decussation
- Nodule in the FDS catches against the A3 pulley
- Locking is simulated by abnormal sesamoids

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- Loose body is present in the MCP joint
- Snapping or subluxating extensor digitorum communis (EPC)

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

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methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

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- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

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Work restriction	None	Possible, depends on occupation; 0-2	Restriction, depending on occupation; 2 or

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		weeks	more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

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2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

Therapy program goals are to:

- Reduce pain and inflammation,
- Aid stretching and strengthening, and
- Assist in gradual return to activity.

Treatment methods used:

- Modalities to reduce pain and inflammation

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- Patient education consists of rest/reduction of strenuous activities, as well as identification of causative factor.
- Splinting may be necessary to correct flexion contracture. Splinting is also helpful to resolve synovitis around the A1 pulley.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
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- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

If improvement following the initial two weeks is not at least 50%, reassess case for other possible causes or complicating factors and consider different adjustive/manipulative technique. If patient is not asymptomatic or near asymptomatic at the end of the second two week trial or has reached a plateau, refer patients to primary care provider to explore other alternatives.

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Conservative Management (Therapy is generally not needed or effective. If a trial course is prescribed, the following conservative management is appropriate).

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Expected Outcome	Procedures/Modalities Such As
Relief of pain	▪ Hotpacks ▪ Phonophoresis before stretching
Improve flexibility	▪ Sustained non-ballistic stretch of flexor tendon ▪ Soft tissue mobilization ▪ Fabrication and application of Splinting
Patient education and self-management	▪ Modification of job/recreational tools and or equipment ▪ Rest, reduction of strenuous activity, identification of causative factors ▪ Teach application of heating modalities and application of sustained stretching ▪ Teach soft tissues mobilization

Post Surgical and Post Percutaneous Release (Immobilized in splint or brace with MCP joints in10-20 degrees of flexion and PIP in extension) .

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs ▪ Phonophoresis prior to stretching
Improve flexibility and range of motion	▪ Begin with passive range of motion ▪ Progress to active-assisted and active Range of motion exercises of the MCP and PIP joints
Improve strength and endurance	▪ Progress strength and grip training from isometric to concentric to eccentric contraction of MCP and PIP joints ▪ General strengthening of the unaffected areas of the hand and wrist ▪ Once scar heals, hydrotherapy can be used
Improve scar extensibility	▪ Scar massage ▪ Iontophoresis
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports ▪ Functional training activities ▪ Vocational training activities
Patient education and self-management	▪ Elevate hand to reduce edema ▪ Frequent icing ▪ Teach stretching, range of motion and gripping exercises several times per day ▪ Teach scar massage

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic

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maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises
- Theraputty
- Splint

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises, stretching wrist extensor musculature
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication

Medicare References

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Lateral Epicondylitis With and Without Fascial Release

Synonyms

- Tennis elbow
- Epitrochlear bursitis
- Epicondylitis

Definition

Lateral epicondylitis is a pathologic condition of the common extensor muscles at their origin on the lateral humeral epicondyle. It specifically involves the tendons of the muscles that control wrist extension and radial deviation resulting in pain on the lateral side of the elbow with contraction of these muscles. It most commonly involves the extensor carpi radialis brevis tendon in patients between 35 and 50 years of age (mean 45) and is more common in men than women and tends to involve the dominant arm.

This injury is typically caused by activities that involve wrist extension/grasp as the wrist extensors contract during grasping activities to provide stability to the wrist. There may be a partial tear of the tendon fibers at, or near their point of insertion on the humerus. Risk factors are forceful repetitive wrist or forearm movement. In 10% of cases, conservative measures have failed and a fascial release may be performed.

Patient History

Patient History may include

Patient Data

- Lateral epicondylitis is an overuse syndrome generally caused by repetitive use of the wrist extensors or sustained power gripping.
- Lateral epicondylitis can be associated with an imbalance secondary to muscle weakness and soft tissue inflexibility.
- The aching pain generally increases with activity. The patient may describe symptoms occurring during simple activities of daily living (ADL), such as picking up a cup of coffee or a gallon of milk.
- Pain may be present at night.
- Symptoms are typically unilateral.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever, severe pain	Possible infection
Unilateral edema	Upper extremity deep vein thrombosis
Immune-compromised state	Infection
Cancer history	Cause of symptoms (metastatic or primary)
Discoloration of hand/fingers	Vascular occlusion, shunt emboli (dialysis patients)
Multiple joint involvement, tophi	Rheumatolgical diseases; gout
Exertional symptoms, history of cardiac disease	Anginal equivalent

Presentation

- Presents with localized tenderness just distal and anterior to the lateral epicondyle. Pain increases with resisted wrist extension, especially with the elbow in extension.
- The patient may have a weakened grip on the affected side.
- Elbow range of motion (ROM) is typically normal.

Subjective Findings

- Weak grasp
- Dropping items
- Pain at lateral elbow
- Tenderness at lateral elbow

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Swelling
  - Skin color
  - Surgical scar/wound
  - Carrying angle of elbow
  - Shoulder height
- Palpation of bony and soft tissue
  - Pain distal and anterior to lateral epicondyle
  - Temperature

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    - Joint effusion
- Range of motion, active (sitting) and passive (supine) movements with overpressure of ipsilateral and contralateral joints:
    - Elbow (flexion, extension, supination, pronation)
    - Wrist (flexion, extension)
- Manual muscle testing (MMT) (Supine) of ipsilateral and contralateral joints:
    - Elbow
    - Forearm
    - Wrist
    - Grip/Pinch
    - Shoulder
    - Cervical Spine
- Orthopedic and neurologic testing if neurologic signs are present
    - Joint-play movements of the humeroulnar joint, radioulnar joint, and humeroradial joint
    - Joint and ligamentus tests:
- Valgus stress test
- Varus stress test
- Lateral tennis elbow test
- Neurological test
    - Tinel's Test
    - Deep tendon reflexes
- Functional Assessment - The following standardized test may be used to assess functional limitations:
    - Disabilities of the Arm, Shoulder and Hand (DASH)

Findings of Lateral Epicondylitis

- Tender to palpation over lateral epicondyle
- Greatest tension is elicited with the elbow in extension, forearm in pronation, and wrist in flexion
- MMT of affected wrist extensors is weak and painful – especially ECRL/ECRB, EDC
- Weak grip and pinch test

Findings of Lateral Epicondylitis Post-Release

- Tender to palpation
- MMT of affected wrist extensors is weak and painful
- Weak grip and pinch test
- Soreness with resisted wrist or long finger extension

Differential Diagnoses

- C6 or C7 cervical nerve root compression
- Posterior Interosseous Nerve Syndrome (PINS) entrapment of nerve as it travels through the radial tunnel
- Radial head arthritis

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- Posterolateral plica
- Posterolateral rotatory instability
- Olecranon bursitis
- Crystalline deposition such as gout and pseudogout (Chonrocalcinosis)
- Occult fractures of the radial head or lateral humeral epicondyle
- Tendonitis of the long head of the biceps at insertion on the radius

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

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Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

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Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

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Treatment Methods

Therapy program goals are to

- Reduce pain and inflammation,
- Aid stretching and strengthening, and
- Assist in gradual return to activity.

Treatment methods used (without fascial release):

- Modalities to reduce pain and inflammation; however, electrotherapy and thermotherapy have not been proven to be effective.
- Cross friction massage at the site of injury can help stimulate healing.
- Counterforce straps can be helpful, as can wrist splints.
- Patient education in rest/reduction of strenuous activities, as well as identification of causative factor and correction of faulty technique (such as too narrow grip on tennis racquet) is typically provided.

Treatment methods used (with fascial release):

- Modalities to reduce pain and inflammation are therefore appropriate
- Patient education as indicated above is appropriate.
- Patients are placed into a splint or brace at for comfort and support.
- Patients are allowed finger, hand, wrist and elbow range of motion as tolerated, but no lifting or gripping activities for seven to ten days.
- Resistive exercises are typically not done for 3 to 4 weeks after surgery.
- Unrestricted use of the extremity is allowed at 10-12 weeks as long as the patient is pain-free and has progressed adequately with the rehabilitation program.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be

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deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:
- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress
- Signs of an acute fracture or ligament rupture

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Acute Phase** presentation.

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Expected Outcome	Procedures/Modalities Such As
Relief of pain and inflammation	▪ Ice packs/ice massage ▪ Phonophoresis ▪ Friction massage ▪ Use counterforce brace
Improve range of motion	▪ Remove splint, stretch wrist into flex, pronation and elbow extension simultaneously
Improve postural control	▪ Postural awareness of upper trunk and shoulder girdle ▪ Scapular stabilization
Patient education and self-management	▪ Self-management of symptoms-application of ice, friction massage ▪ Avoid activity that exacerbates pain ▪ Immobilize wrist, hand, and fingers ▪ Stretch wrist, forearm and elbow

The following table lists the procedures for **Subacute Phase** presentation.

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Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Expected Outcome	Procedures/Modalities Such As
Relief of pain and chronic inflammation	▪ Phonophoresis ▪ Friction massage
Improve flexibility	▪ Range of motion exercises of the wrist, elbow, forearm ▪ Sustained, simultaneous stretch to wrist, elbow, forearm
Improve strength and endurance	▪ Progress strength and grip training from isometric to concentric to eccentric contraction of forearm muscles, especially the wrist extensors ▪ General strengthening of the unaffected areas of the arm
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports ▪ Functional training patterns ▪ Joint stability/co-contractions using closed chain exercises
Patient education and self-management	▪ Modification of job/recreational tools and or equipment ▪ Avoid activities that require repetitive gripping ▪ Use of counterforce brace ▪ Continue flexibility and strengthening activities

In chronic refractory cases of lateral epicondylitis, scapular stabilization should be addressed to prevent overuse of the wrist extensors during activities.

The following table lists the procedures for **Post Fascial Release** (Immobilized in splint or brace with elbow held at 90 degrees):

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs ▪ Phonophoresis ▪ Electrical stimulation
Improve flexibility	▪ Active Range of motion exercises of the wrist, elbow, forearm and shoulder (allowed 3-5 days after surgery)
Improve strength and endurance	▪ Progress strength and grip training from isometric to concentric to eccentric contraction of forearm muscles, especially the wrist extensors ▪ General strengthening of the unaffected areas of the arm (strengthening exercises allowed 3 weeks after surgery)
Improve postural control	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization

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Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports ▪ Functional training patterns ▪ Joint stability/co-contractions using closed chain exercises
Patient education and self-management	▪ Modification of job/recreational tools and or equipment ▪ Use of counterforce brace ▪ Continue flexibility and strengthening activities

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises
- Counterforce bracing

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises, stretching wrist extensor musculature
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication

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Medial Epicondylitis

Synonyms

- Golfer's elbow
- Peritendonitis
- Epicondylitis

Definition

Medial epicondylitis is a pathologic condition of the flexor muscles at their origin on the medial humeral epicondyle. It specifically involves the tendons of the muscles that control wrist flexion and ulnar deviation resulting in pain on the medial side of the elbow with contraction of these muscles. It commonly involves the flexor carpi radialis brevis and pronator teres tendons in patients between 35 and 50 years of age (mean 45). It is more common in men than women, and tends to involve the dominant arm.

This injury is typically caused by activities that involve wrist flexion/grasp and pronation as the wrist flexors contract during grasping activities to provide stability to the wrist. There may be a partial tear of the tendon fibers at, or near their point of insertion on the humerus. Risk factors are forceful repetitive wrist or forearm movement.

Patient History

Patient History may include

Patient Data

Medial Epicondylitis is caused by repetitive use of flexor/pronator muscles, especially with valgus stress at the medial epicondyle.

- Onset can accompany acute injury.
- Excessive topspin in tennis, excessive grip tension, improper pitching techniques in baseball and improper golf swing are common sports-related causes of ME.
- Causes also may be related to the patient's occupation (eg, those requiring repetitive actions like using a screwdriver or hammer).
- Medial Epicondylitis is characterized by pain over the medial epicondyle.
- Pain worsens with wrist flexion and pronation activities. Patients may report discomfort even when simply shaking hands with someone.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever, severe pain	Possible infection
Unilateral edema	Upper extremity deep vein thrombosis
Immune-compromised state	Infection
Cancer history	Cause of symptoms (metastatic or primary)
Discoloration of hand/fingers	Vascular occlusion, shunt emboli (dialysis patients)
Exertional symptoms, history of cardiac disease	Anginal equivalent
Multiple joint involvement, tophi	Rheumatological conditions, gout

Presentation

Tenderness with palpation over the anterior aspect of the medial epicondyle is the most consistent finding.

- Typically, pain is reproduced with resisted pronation or wrist flexion.
- Occasionally, the area of tenderness extends toward the proximal flexor pronator muscle mass just distal to the epicondyle for approximately 1 inch.
- Range of motion of the elbow and wrist usually is within normal limits.
- Patients may have symptoms of ulnar neuropathy (e.g., decreased sensation in the ulnar nerve distribution, a positive elbow flexion test, a positive Tinel sign). In more severe cases, decreased sensation is associated with intrinsic weakness and even intrinsic muscle atrophy may be noted.

Subjective Findings

- Complaints of pain over the flexor-pronator origin slightly distal and anterior to the medial epicondyle.
- Pain is made worse by gripping, resisted wrist flexion and pronation, and passive wrist extension and supination.
- Weak grasp in severe cases
- Possible medial collateral ligament laxity

Objective Findings

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Swelling
  - Skin color

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    - Muscle atrophy
- Palpation of bony and soft tissue
    - Antero-medial epicondyle
    - Joint effusion
    - Temperature
- Range of motion, active (sitting) and passive (supine) movements with overpressure , and manual muscle testing of ipsilateral and contralateral joints:
    - Elbow (flexion, extension, supination, pronation)
    - Wrist (flexion, extension)
- Orthopedic and neurologic testing
    - Joint-play movements of the humeroulnar joint, radioulnar joint, and humeroradial joint
    - Joint and ligamentous tests:
        - Valgus stress test
        - Varus stress test
        - Lateral tennis elbow test
- Neurological test
    - Tinel's Test
    - Deep tendon reflexes
- Functional Assessment - The following standardized test may be used to assess functional limitations:
    - Disabilities of the Arm, Shoulder and Hand (DASH)

Findings of Medial Epicondylitis Post Release

- Tender to palpation over medial epicondyle
- Manual muscle testing of affected wrist flexors and elbow-wrist mechanism is weak.
- Resisted wrist flexion and forearm pronation is painful.

Differential Diagnoses

- Cervical nerve root compression
- May accompany lateral epicondylitis
- Crystalline deposition such as gout and pseudogout (Chonrocalcinosis)
- Acute or chronic infection
- Olecranon bursitis
- Medial ulnar collateral ligament injury
- Ulnar nerve entrapment

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

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Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

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Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate	Considerable loss

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		loss	
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

Therapy program goals are to:

- Reduce pain and inflammation,
- Aid stretching and strengthening, and
- Assist in gradual return to activity.

Modalities to reduce pain and inflammation are therefore appropriate. Patient education should focus on rest, reduction of strenuous activities, as well as identification of causative factors and correction of faulty technique.

Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

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Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress
- Signs of an acute fracture or ligament rupture

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Acute Phase** presentation.

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

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Expected Outcome	Procedures/Modalities Such As
Relief of pain and inflammation	▪ Ice packs/ice massage ▪ Phonophoresis ▪ Friction massage ▪ Iontophoresis ▪ TENS
Improve range of motion	▪ Remove splint, stretch wrist, forearm and elbow
Improve postural control	▪ Postural awareness of upper trunk and shoulder girdle ▪ Scapular stabilization
Patient education and self-management	▪ Self-management of symptoms-application of ice, friction massage, ▪ Avoid activity that exacerbates pain ▪ Brace wrist in neutral, for ulna nerve involvement, use nighttime elbow extension splint and day time elbow pad to protect nerve ▪ Stretch wrist, forearm and elbow

The following table lists the procedures for **Subacute Phase and Corrective/Rehabilitative Phase** presentation.

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program

Expected Outcome	Procedures/Modalities Such As
Relief of pain and chronic inflammation	▪ Phonophoresis ▪ Friction massage ▪ Medial counterforce brace
Improve flexibility	▪ Range of motion exercises of the wrist, elbow, forearm ▪ Sustained stretch to wrist and forearm muscles
Improve strength and endurance	▪ Progress strength training from isometric to concentric to eccentric contraction of forearm muscles, especially the wrist flexors and elbow pronators. Increase resistance gradually ▪ General strengthening of the unaffected areas of the arm
Improve postural	▪ Postural awareness of the shoulder girdle

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control	▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports ▪ Functional training activities ▪ Joint stability/co-contractions using closed chain exercises
Patient education and self-management	▪ Modification of job/recreational tools and or equipment ▪ Avoid activities that require repetitive activities ▪ Use of counterforce brace ▪ Continue flexibility and strengthening activities

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises
- Wrist splint
- Theraputty

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises, stretching wrist musculature
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort
- Splint application

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication
- Surgery (as last resort)
- Cortisone injection

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Olecranon Bursitis

Synonyms

Elbow bursitis

Definition

The olecranon bursa lies between the superior olecranon and the skin. It may become inflamed because of trauma, inflammatory disease such as gout, or most often prolonged pressure, “student’s elbow”. Usually the elbow joint is not involved as the bursa and the joint do not communicate unless rheumatoid arthritis is present.

Patient History

Patient History may include

Patient Data

Causes:

- Acute trauma (eg, falling onto a hard floor or a playing field with artificial turf and landing on the olecranon process)
- Minor cumulative trauma, such as repetitive rubbing of the olecranon region against a desktop during writing
- Infection due to abrasion or laceration at the site or due to seeding from hematogenous spread by bacteremia
- Inflammation as part of a systemic inflammatory process (eg, rheumatoid arthritis) or crystal deposition disease (eg, gout, pseudogout)

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture/ligament rupture
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic, primary or paraneoplastic), potential complications of chemotherapy
Unilateral edema	Upper extremity deep vein thrombosis
Loss of distal pulse	Compartment syndrome
Immune-compromised state	Infection
Cold Intolerance, fatigue, constipation	Hypothyroidism
Multiple joint involvement, unusual	Rheumatologic diseases (e.g., rheumatoid

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skin rashes, other vascular involvement	arthritis, Sjogren's syndrome, systemic lupus erythematosis, polyarteritis nodosa)
Stocking-glove neurological involvement	Diabetes, alcoholism, B12 deficiency
Auto repair occupation, battery exposure	Lead poisoning
Hand/skull disproportionately large	Acromegaly

Presentation

- The classic finding is posterior elbow swelling that is very clearly demarcated, appearing as a goose egg over the olecranon process.
- The affected site may be tender to palpation.
- The area may be warm and red, particularly with infection.
- Skin inspection may reveal abrasion or contusion if there was recent trauma.
- Vital signs may reveal fever, but generally only with advanced infection.
- Elbow range of motion (ROM) usually is normal, but occasionally the end range of elbow flexion may be slightly limited due to pain.
- Patients with systemic inflammatory processes (e.g., rheumatoid arthritis) or crystal deposition disease (eg, gout, pseudogout) may reveal evidence of focal inflammation at other sites.
- Patients with rheumatoid arthritis may, upon inspection of the elbow, have rheumatoid nodules.
- Elbow pain during active or passive ROM may increase the clinician's suspicion of fracture of the olecranon process if there is a history of trauma.

Subjective Findings

- Lifestyle related, e.g., students, carpenters, desk workers, and others whose tasks involve constant pressure on the elbow
- Inflammation and swelling at the tip of the elbow
- Direct injury to the bursa that comes from repetitive contact with the artificial turf, wrestling mat, hardwood floor, or exercise mat

Objective Findings

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Focal Swelling
  - Skin Color

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- Palpation of bony and soft tissue
  - Pain posterior tip of ulna
  - Temperature
- Range of motion and manual muscle testing of ipsilateral and contralateral joints:
  - Elbow (flexion, extension, supination, pronation)
  - Wrist (flexion, extension)
- Orthopedic and neurologic testing
  - Joint-play movements of the humeroulnar joint and humeroradial joint
  - Joint and ligamentous tests:
- Valgus stress test
- Varus stress test
- Neurological test
  - Tinel's Test
  - Deep tendon reflexes
- Functional Assessment - The following standardized test may be used to assess functional limitations:
  - Disabilities of the Arm, Shoulder and Hand (DASH)

Findings of Olecranon Bursitis

- Well demarcated, goose egg swelling at the posterior elbow
- Symptoms should gradually resolve

Differential Diagnoses

- Gout
- Osteoarthritis
- Trauma

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status

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of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

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Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.

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2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

The following modalities may help ease discomfort and aid in healing process:

- Ultrasound,
- Phonophoresis,
- Heat
- Cold

Patient will be educated in proper protection techniques to be utilized during all activities and started on a home program. Retraining for proper positioning to avoid re-injury, and other factors in occupationally related overuse syndromes is an important component of the overall therapy consult.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.

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- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs/progresses
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.
In general, physical and occupational therapy are not needed for this condition. If a trial course is prescribed, the following conservative management is appropriate.

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Expected Outcome	Procedures/Modalities Such As
Relief of pain and inflammation	▪ Ice packs/ice massage ▪ Phonophoresis ▪ Electrical stimulation ▪ Compression wrap ▪ Elbow splint
Improve range of motion	▪ Elbow range of motion exercises
Improve upper extremity strength and endurance	▪ Strengthening exercises using isometric, isotonic and isokinetic exercises
Patient education and self-management	▪ Self-management of symptoms-application of ice, and compression wrap ▪ Avoid excessive pressure over elbow ▪ Use elbow pads until inflammation resolves ▪ Gradual return to job and recreational activities

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity.eviCore recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises
- Progression to therapeutic exercise—strengthening exercises
- Cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Medication
- Aspiration
- Surgical removal, if chronic

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Phalanges Post ORIF, Post Cast Removal, Metacarpal

Synonyms

- Broken hand
- Broken fingers

Definition

Essentially, a fracture is a structural failure of bone. Nature of a fracture is determined by the inherent properties of bone, its structure, and type of forces applied to it. Forces of tension, compression, bending, and torsion can load bone beyond its structural strength. External forces may render a fracture displaced or non-displaced. Displaced fragments may be overriding one another, lateral to each other, extremely distracted from one another, angulated, or rotated out of alignment. Displaced fractures may be open fractures with a fragment breaking through the skin that exposes the fracture site to the external environment and increases the risk of infection. Fractures may be treated by immobilization with casts, sling/immobilizer, ORIF, or percutaneous pinning.

Patient History

Patient History may include

Patient Data

Fractures and dislocations of the phalanges occur from a variety of mechanisms. In younger patients, these injuries are more likely to be sports related, while older patients are likely to be injured by machinery or by falls. Crush injuries are common at the distal phalanx, while the PIPJ is usually damaged by an axial blow to the finger.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear
Fever, severe pain	Infection
Loss of distal pulse	Infection, arterial occlusion
Diabetes, parathesias	Neuropathy, other metabolic disorders, (e.g. B12 deficiency, hypothyroidism)
Multiple joint involvement	Rheumatologic diseases
Unilateral edema	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of wrist or	Arterial occlusion

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hand	
Immune-compromised state	Infection

Presentation

Patient's typically present with pain, swelling, restricted range of motion, muscle atrophy, and surgical wound/scar.

Subjective Findings

- Impaired functional ability
- Pain
- Swelling
- Decreased flexibility of hand
- Muscle atrophy

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Wound, surgical scar
  - Swelling
- Palpation of bony and soft tissue
  - Palpate for scar adhesions
  - Temperature Changes
  - Sensation
  - Contractures
- Range of motion, active and passive (if allowed) of ipsilateral and contralateral joints:
  - PIP Joint (flexion, extension)
  - DIP joint (flexion, extension)
  - MCP joint (flexion, extension)
  - Wrist (flexion, extension, ulnar and radial deviation)
- Manual Muscle Testing of ipsilateral joints (If allowed by surgeon), and contralateral joints:
  - PIP Joint (flexion, extension)
  - MCP joint (flexion, extension)
  - Wrist (flexion, extension, ulnar and radial deviation)

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    - Grip strength
- Functional Assessment - The following standardized test may be used to assess functional limitations:
- DASH (Disability of Arm, Shoulder and Hand)
- Hand Assessment Tool (HAT)
- Neurologic testing
    - Test dermatome C6, C7, C8, T1

Findings of Fracture

- Swelling occurs at fracture site.
- Restricted motion caused by pain, swelling, immobilization, or soft tissue shortening is common.
- Muscle atrophy

Differential Diagnosis

Not applicable.

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a

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combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result

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from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,

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- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

Therapy program goals are to:

- Modalities to reduce inflammation,
- Normalize pain-free range of motion,
- Prevent muscular atrophy,
- Maintain proprioception,
- Relieve joint pain, and
- Increase strength so that the other objectives may be achieved.

The therapy program will consist of modalities to:

- Minimize inflammation,
- Therapeutic exercises for ROM and strengthening

Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

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Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress
- Severe loss of range of motion occurs
- Signs of malunion occur

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Finger Fracture Rehabilitation

If patient was treated only with casting, the program below should be shortened to a total of 12 weeks only. This program illustrates the rehabilitation for those fractures requiring open reduction and fixation. Length of program may also be impacted by hand dominance.

Distal Phalanx Fractures	▪ Protective splint 2-4 weeks until fracture site is nontender ▪ AROM begins at 2-4 weeks, earlier with stable fractures ▪ PROM begins at 5-6 weeks ▪ PREs begin at 7-8 weeks
Middle Phalanx Fractures	▪ Splinted (non-displaced) in intrinsic plus position for approximately 3 weeks ▪ AROM initiated when pain and edema subside ▪ PROM begins at 4-6 weeks ▪ PREs begin at 6-8 weeks
Proximal Phalanx Fractures	▪ Non-displaced extra-articular fractures splinted with buddy tape ▪ AROM initiated immediately ▪ PROM initiated 6-8 weeks ▪ Non-displaced intra-articular fractures splinted in intrinsic plus position for 2-3 weeks ▪ AROM begins at 2-3 weeks ▪ PROM initiated at 4-8 weeks ▪ PREs begin at clinical union – 8-12 weeks

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Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Heat packs
- Theraputty
- Splint

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Heat packs

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication

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Proximal Humeral Fracture, Open, Post-ORIF

Synonym

- Broken shoulder
- Broken arm

Definition

The most common fracture of the humerus, and involves the proximal third of the humerus as a result of a direct blow to the anterior, lateral, or posterolateral aspect of the humerus, or from a fall on an outstretched hand (FOOSH injury. Operative repair of humeral fracture is indicated when fracture is: open, associated with a nerve or vascular injury, multiple trauma, pathologic fracture or failure to maintain acceptable alignment by non-operative means. This condition is typically treated conservatively with an emphasis on controlling distal edema and stiffness and early motion at the shoulder to prevent development of arthrofibrosis secondary to prolonged immobilization.

Patient History

The history of the mechanism of injury is usually the result of a direct impact to the lateral shoulder or the result of an indirect mechanism, as in a fall onto the outstretched hand.

Patient Data

Obtain a detailed history of the mechanism of injury and associated metabolic morbidity (i.e., whether the injury was the result of a direct impact to the lateral shoulder or the result of an indirect mechanism, as in a fall onto the outstretched hand). Indirect causes of proximal humerus fractures result in greater degrees of fracture displacement. Determine whether seizure or electrical shock was involved, as these indirect mechanisms are associated with posterior dislocations.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, ligament/tendon rupture
Sensory loss along lateral deltoid	Axillary nerve injury
Fever, severe pain	Possible infection
Cancer history	Cause of symptoms (metastatic or primary)
Discoloration of wrist or hand	Arterial occlusion
Unilateral edema	Upper extremity deep vein thrombosis
Immune-compromised state	Infection

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Presentation

Patient may present with arm immobilized in a sling, immobilizer or a sling with an accompanying swathe. Patient may present with a surgical scar, swelling, ecchymosis, impaired range of motion, strength and pain with shoulder movements.

Subjective Findings

- Shoulder pain
- Pain with motion
- Loss of ROM

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Type of immobilization
  - Swelling
  - Muscle atrophy
- Palpation of bony and soft tissue
  - Crepitus at fracture site
  - Pain at shoulder joint
  - Test peripheral pulses (vascular compromise)
- Range of motion, active and passive of ipsilateral joints (as allowed by surgical protocol), and contralateral joints:
  - Gleno-humeral joint
  - Scapulo-thoracic joint
  - Sterno-clavicular joint
  - Acrimio-clavicular joint
  - Cervical spine
  - Elbow
- Manual Muscle Testing of ipsilateral joints (as allowed by surgical protocol), and contralateral joints:
  - Gleno-humeral joint
  - Scapulo-thoracic joint
  - Sterno-clavicular joint
  - Acrimio-clavicular joint
  - Cervical spine
  - Elbow

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- Orthopedic Testing
  - Joint play movements of the Gleno-humeral joint
- Neurologic Testing (if neurologic signs are present)
  - Test for axillary nerve damage-Deltoid muscle/sensation
  - Test for Brachial plexus injury □(C5-C8), Dermatomes and Myotomes
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
  - Disabilities of the Arm, Shoulder and Hand (DASH)
  - Shoulder Pain and Disability Index (SPADI)

Findings of Shoulder Fracture

- Swelling occurs at fracture site
- Restricted motion caused by pain, swelling, immobilization, or soft tissue shortening is common
- Muscle atrophy

Differential Diagnoses

- Infection
- Fracture
- Rotator cuff pathology
- Glenohumeral arthritis

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

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Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

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Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

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Treatment frequency and duration must be based on:
- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Treatment Methods

Therapy program goals are to:
- Minimize inflammation,
- Normalize pain-free range of motion,
- Prevent muscular atrophy,
- Maintain proprioception,
- Relieve joint pain, and
- Increase strength so that other objectives may be achieved.

The therapy program will consist of:
- Modalities to minimize the inflammation,
- Therapeutic exercises for ROM and strengthening, and
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

It is common for a surgeon to have a specific protocol for post-operative rehabilitation program. It is therefore common to progress as per the surgeon's protocol.
- Hand and forearm motion should be initiated immediately to reduce swelling and atrophy.
- Pendulum exercises are started when fracture moves as a unit with the shaft.
- As local tenderness over the fracture decreases, passive assisted exercises are started for forward flexion, external rotation, and internal rotation.
- Active exercises are begun only after union of fracture at 5-8 weeks post injury.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.

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- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider to explore alternative treatment options when you find:

- Swelling or redness without history of trauma
- Muscle wasting
- Loss of reflexes

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

The following table lists the procedures for **Non-Operative, Acute Phase** presentation (Begins 7-10 days after fracture) (No active movements allowed for 5-8 weeks or when bony union occurs. The focus of treatment is patient self-management until dynamic rehabilitation is initiated).

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Expected Outcome	Procedures/Modalities Such As
Decrease pain and swelling	▪ Modalities: Ice, Interferential current, TENS ▪ Hand motion to reduce swelling
Improve shoulder range of motion	▪ Passive range of motion-pendulum, wand exercises
Improve strength of shoulder joint	▪ Isometric strengthening exercise
Patient education and self-management	▪ Arm will be in sling, shoulder immobilizer, or sling with swathe and an axilla pad for 5-8 weeks ▪ Teach application of ice/heat, passive range of motion, isometric exercises and compensatory techniques for ADLs

The following table lists the procedures for **Non-Operative, Subacute and Corrective/Rehabilitative Phase**.

Expected Outcome	Procedures/Modalities Such As
Improve shoulder range of motion	▪ Active assisted range of motion ▪ Active exercises (started at 5-8 weeks)
Improve strength of shoulder joint and upper extremity	▪ Isometric exercises ▪ Isotonic ▪ Progressive resisted exercises
Improve proprioception	▪ Closed chain exercises ▪ Stereognosis re-training
Patient education and self-management	▪ Continue application of ice/heat, Active range of motion, strengthening exercises ▪ Gradual use of upper extremity to perform ADL tasks as strength improves

The following table lists the procedures for **Post-Operative, Acute Phase** presentation (No active movements allowed for 3-4 weeks. The focus of treatment is patient self-management until dynamic rehab could be initiated).

Expected Outcome	Procedures/Modalities Such As
Decrease pain and swelling	▪ Modalities: Ice, Interferential current, TENS ▪ Hand motion to reduce swelling
Improve shoulder range of motion	▪ Passive range of motion-pendulum, wand exercises
Improve strength of shoulder joint	▪ Isometric strengthening exercise
Patient education and self-management	▪ Arm will be in sling, shoulder immobilizer for 3-4 weeks ▪ Teach application of ice/heat, passive range of motion, isometric exercises and compensatory techniques for ADLs

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The following table lists the procedures for **Post-Operative, Subacute and Corrective/Rehabilitative Phase**.

Expected Outcome	Procedures/Modalities Such As
Improve shoulder range of motion	▪ Active assisted range of motion ▪ Active exercises (started at 4 weeks)
Improve strength of shoulder joint and upper extremity	▪ Isometric exercises ▪ Isotonic ▪ Progressive resisted exercises
Improve proprioception	▪ Closed chain exercises ▪ Stereognosis re-training
Patient education and self-management	▪ Continue application of ice/heat, Active range of motion, strengthening exercises ▪ Gradual use of upper extremity to perform ADL tasks as strength improves

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Heat packs
- Home electrical stimulation unit

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Heat packs

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication
- Acupuncture

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Thoracic Outlet Syndrome

Synonyms

None

Definition

The thoracic outlet is the anatomic space bordered by the 1st thoracic rib, the clavicle, and the superior border of the scapula through which the great vessels and nerves of the upper extremity pass. It is further defined by the interscalene interval, a triangle with its apex directed superiorly. This triangle is bordered anteriorly by the anterior scalene muscle, posteriorly by the middle scalene muscle, and inferiorly by the first rib.

Thoracic outlet syndrome (TOS) is a clinical syndrome characterized by symptoms attributable to compression of the neural or vascular anatomic structures that pass through the thoracic outlet: the brachial plexus, the subclavian artery, vein, or both.

Patient History

Patient History may include

Patient Data

The onset of TOS has been attributed to multiple causes. An insidious onset is not uncommon. Frequently the symptoms are attributed to trauma or described as a repetitive use syndrome. Overhead arm use has been identified as an aggravating factor. Many sources believe that anatomical compression due to postural changes of the shoulder girdle is a primary cause. Soft tissue fibers compress the neurovascular structures as they change in relationship to skeletal changes. Vascular occlusions or space occupying lesions such as tumors or callus formation may also play a role.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, ligament tear, tendon rupture
Fever, severe pain	Possible infection
Unilateral edema	Upper extremity deep vein thrombosis
Immune-compromised state	Infection
Cancer history	Cause of symptoms (metastatic or primary)
Discoloration of hand/fingers	Vascular occlusion, shunt emboli (dialysis patients)
Exertional symptoms, history of cardiac disease	Anginal equivalent

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Presentation

Pain, numbness and/or tingling, and heaviness of the involved upper extremity are common complaints reported. Neck pain and headaches are reported concomitantly. Autonomic phenomena (e.g., cold hands, blanching, swelling) also may be reported.

Subjective Findings

Patient presents with neurological type symptoms of the upper extremity. Pain, paresthesias, heaviness and temperature changes are common complaints. The neck is also frequently involved. Autonomic symptoms are sometimes present. Postural changes may be obvious, including the forward shoulders, forward head, excessive spinal curves, or significant leg length differences. Middle aged women are most frequently affected.

Objective Findings

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection of spine, thorax, shoulder girdles and upper extremities
  - Posture
  - Swelling of hand
- Palpation of bony and soft tissue
  - Pain between clavicle and 1st rib
  - Range of motion, active and passive movements of ipsilateral and contralateral joints:
  - Gleno-humeral joint-Flexion, extension, abduction, Horizontal adduction, internal and external rotation
  - Shoulder Girdle-Protraction, retraction, elevation, circumduction and depression
- Orthopedic and neurologic testing
  - Joint
  - Play movements
  - Glenohumeral joint
  - Cervical spine
  - Thoracic spine
  - Scapulothoracic mechanism
  - Sensation
  - Special tests
    - Adson Manuever
    - Wright test

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        - Roos/EAST test
        - Costoclavicular Bracing test
- Manual Muscle Testing of ipsilateral and contralateral joints:
    - Test shoulder girdle and glenohumeral joint
- Functional assessment - The following standardized test may be used to assess functional limitations:
    - Disabilities of the Arm, Shoulder and Hand (DASH)

Findings of Thoracic Outlet Syndrome

Many tests have been developed to assess the patient with TOS. They may be helpful in determining the cause and location of the compression, thus, assisting in proper therapy treatment.

Due to the high false positive rate for TOS tests, perform at least 3 tests to reduce this possibility.

Adson maneuver	Performed in the sitting or standing position with the examiner palpating the radial pulse in the patient's abducted and extended arm. The examiner extends and externally rotates the arm as the patient rotates his or her head toward the examiner and takes a deep breath. A diminished or absent radial pulse suggests compression of the subclavian artery by the scalene muscles.
Allen test	Test the involved side by having the patient make a fist and elevate their hand above their head for 30 seconds. Occlude the Ulnar and Radial arteries by placing direct pressure over each artery at the wrist. Ask the patient to open their hand (it should appear blanched). Return their hand to waist level and release the pressure on the Ulnar artery. Watch for color to return. Repeat procedure, this time release pressure on the Radial artery. Watch for color to return.
Roos test/EAST test (elevated arm stress test)	Patient holds both arms in the 90/90 position of the Allen test and then rapidly opens and closes the fingers for 3 minutes. Inability to maintain the test position, diminished motor function of the hands, or decreased sensation or paresthesia is suggestive of TOS secondary to neurovascular compromise. In one study, over 80% of patients with carpal tunnel syndrome (CTS) presenting to an electrodiagnostic medicine laboratory had a positive EAST.
Wright test	Arm is hyperabducted so that the hand is brought over the head with the elbow and arm in the coronal plane. Wright advocated performing the test in the sitting and then supine positions. Taking a breath or rotating or extending the head and neck may have an additional effect. The pulse is palpated for differences. This test is used to detect compression in the costoclavicular space.
Costoclavicular syndrome test or	Accomplished by palpating the radial pulse and drawing the patient's shoulder down and back. A positive test is indicated by

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military brace	the absence of the pulse.
Provocation elevation test	Patient elevates both arms above the horizontal and rapidly opens and closes the hands 15 times. If fatigue, cramping, or tingling occurs, the test is positive for vascular insufficiency and TOS.
Shoulder girdle passive elevation test	Patient crosses one arm on the chest. The examiner stands behind the patient and passively elevates the shoulder girdle upward and forward (passive shoulder shrug). The position is held for 30 seconds. A positive test is reported if the pulse becomes stronger, skin color improves, or hand temperature increases. The patient also my report a "relief phenomenon," which can range from numbness, pins and needles, or pain as the ischemia to the nerve is released.
Halstead maneuver	Radial pulse is palpated and the examiner applies a downward traction on the arm while the patient's neck is hyperextended and the head is rotated to the opposite side. Absence or decrease pulse indicates a positive test for TOS.

Differential Diagnoses

- Cervical myelopathy
- Cervical radiculopathy
- Double crush syndrome (thoracic outlet syndrome and compression at another distal or proximal site)
- Paget-von Schroetter syndrome, effort syndrome (spontaneous venous thrombosis, primary deep venous thrombosis of the upper extremity)
- Pancoast (apical lung) tumor
- Shoulder tendonitis, bursitis, impingement
- Shoulder (glenohumeral) instability
- Raynaud syndrome
- Ulnar neuropathy (cubital tunnel syndrome, Guyon canal syndrome)
- Fibromyalgia
- Infection

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member

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- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

Therapy program goals are to:

- Reduce pain and inflammation,
- Aid stretching and strengthening, and
- Assist in gradual return to activity.

Treatment methods used:

- Modalities to reduce pain and inflammation
- Correction of postural abnormalities of the neck and shoulder girdle,
- Strengthening of the scapular suspensory muscles,
- Stretching of the scapulothoracic muscles, and
- Mobilization of the whole shoulder complex and the first and second ribs
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.
- Emphasis should be placed on a program of self-management for exercise, instruction in activities of daily living modifications and the reduction of aggravating factors.

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Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress
- Disability/loss of functional ability of the upper extremity

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Acute Phase, Subacute Phase and Corrective, Rehabilitative Phase** presentation.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

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Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tapering over a short period of time.

Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Resolution of acute inflammation and pain	▪ Superficial heat, Ultrasound, Interferential current, TENS, spray and stretch
Improve range of motion	▪ Active range of motion of shoulder and cervical spine ▪ Stretch scapulothoracic muscles ▪ Stretch shoulder muscles ▪ Joint mobilization to shoulder, vertebral segments and 1st and 2nd rib
Improve postural control	▪ Postural awareness of upper trunk and shoulder girdle ▪ Scapular stabilization
Improve strength	▪ Begin with isometric strengthening exercises ▪ Gradually add isotonic exercises, resisted exercises and isokinetic exercises
Patient education and self-management and joint protection	▪ Self-management of symptoms-application of ice or heat, self-mobilization techniques, stretching and strengthening exercises ▪ Avoid activity that exacerbates pain ▪ Avoid overhead activities, activities requiring outstretched arms, heavy lifting and carrying
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports ▪ Functional training activities ▪ Work simplification/back protection

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Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraband for therapeutic exercises
- Use of cervical pillow while sleeping may be helpful
- Gymball
- Home electrical stimulation unit

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises, neurotension stretches
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication
- Psychotherapy

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Wrist Fracture, Distal Radius or Ulna (Post-ORIF)

Synonyms

- Colles' fracture
- Smith fracture
- Barton's fracture
- Buckle fracture

Definition

Essentially, a fracture is a structural failure of bone. The nature of the fracture is determined by the inherent properties of bone, its structure, and the type of forces applied to it. Forces of tension, compression, bending, and torsion can load bone beyond its structural strength. External forces may render a fracture displaced or non-displaced. Displaced fragments may be overriding one another, lateral to each other, extremely distracted from one another, angulated, or rotated out of alignment. Displaced fractures may be open fractures with a fragment breaking through the skin that exposes the fracture site to the external environment and increases the risk of infection. Fractures may be treated immobilization with casts, sling/immobilizer, ORIF, percutaneous pinning, or external fixator. Fracture of the distal radius is the most common wrist injury. Older patients usually sustain an extra-articular metaphyseal fracture, whereas younger patients experience more complicated intra-articular fractures.

Patient History

Patient History may include

Patient Data

- Distal radius, scaphoid, and lunate fractures usually are the result of a fall on an outstretched hand.
- Wrist fractures may be caused by hyperflexion mechanisms and by direct blows to the wrist.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Severe trauma	Ligament tear
Fever, severe pain	Infection
Loss of distal pulse	Compartment syndrome
Diabetes; paresthesias in stocking-glove distribution	Neuropathy; B12 deficiency, hypothyroidism, lead poisoning
Multiple joint involvement	Rheumatologic diseases
Unilateral edema	Deep vein thrombosis
Cancer	Cause of symptoms (metastatic or primary)
Discoloration of wrist or hand	Arterial occlusion
Immune-compromised state	Infection

Subjective Findings

- Wrist and finger stiffness, and possibly elbow stiffness
- Wrist and hand pain with ROM
- Decreased grip and pinch
- Wrist and finger swelling

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Skin and nails
  - Atrophy of forearm muscles
  - Bony structure and alignment
  - Surgical wound/scar
- Palpation of bony and soft tissue
  - Skin-cool, moist
  - Edema
  - Tenderness
  - Extent of residual malalignment
- Range of motion, active and passive movements of ipsilateral and contralateral joints:
  - Interphalangeal joints and MCP (Flexion, extension)
  - Wrist and forearm movements (flex, extension, radial and ulna deviation, pronation, supination)
  - Shoulder motion for capsular tightening

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- Manual Muscle Testing of ipsilateral and contralateral joints:
  - Interphalangeal joints and MCP (Flexion, extension)
  - Wrist and forearm movements (flex, extension, radial and ulna deviation, pronation, supination)
  - Grip strength
- Orthopedic and neurologic testing
  - Joint play movements of the wrist and hand
  - Phalen's test
  - Carpal compression test
  - The square wrist test
  - Tinel's sign
  - Sensation along C6-C7
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
  - Disabilities of the Arm, Shoulder and Hand (DASH)
  - Patient Rated Wrist Evaluation
  - Hand Assessment Tool (HAT)

Findings of Wrist Fracture

- Swelling occurs at fracture site
- Restricted motion caused by pain, swelling, immobilization, or soft tissue shortening is common
- Muscle atrophy
- Pain in affected areas

Differential Diagnoses

- Forearm fractures
- Hand fractures
- Tendonitis
- Tenosynovitis

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

Therapy program goals are to:

- Minimize the inflammation,
- Normalize pain-free range of motion,
- Prevent muscular atrophy,
- Maintain proprioception, and
- Relieve joint pain,
- Increase strength so that the other objectives may be achieved.
-

The therapy program will consist of modalities to minimize inflammation, and therapeutic exercises for ROM and strengthening.

- Static wrist splinting may be used for support and to increase ROM.
- Self-care and home management may need to be included based upon involvement of the dominant hand.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.

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- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress
- Signs of Reflex Sympathetic Dystrophy /Complex Regional Pain Syndrome (pain, stiffness, paresthesia, changes in skin temperature and color

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Wrist Fracture**, Post ORIF (mobilization is initiated once fixation is deemed stable).

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs/hot packs ▪ Electrical stimulation
Improve flexibility	▪ Passive stretching of the fingers and wrist ▪ Progress to active assisted and active Range of motion exercises of the fingers and wrist ▪ Joint mobilization of the fingers and wrist

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Improve strength and endurance	▪ Progressive resistance and grip strength training of the fingers and wrist ▪ General strengthening of the upper extremity
Improve postural control and proprioception	▪ Postural awareness of the shoulder girdle ▪ Scapular stabilization ▪ Joint stability/co-contractions using closed chain exercises
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure, vocation and sports ▪ Functional training activities (ADL training)
Patient education and self-management	▪ Modification of job/recreational tools and or equipment until sufficient strength and range of motion is achieved ▪ Continue flexibility and strengthening activities ▪ Teach application of heating modalities before stretching ▪ Wear wrist-hand orthosis at night to increase extensibility of tissues

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

Home Medical Equipment

- Cold packs
- Theraband for therapeutic exercises
- Heat packs
- Wrist splint, if necessary

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort
- Heat packs
- Instruction in use of wrist splint, if necessary

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation

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- Chiropractic
- Medication

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Wrist Tenosynovitis, Radial Styloid or de Quervain's

Synonyms

Tenovaginitis. Nickname "blackberry thumb"

Definition

Tenosynovitis is inflammation of the synovial sheath surrounding the tendon. It gives rise to pain that is aggravated by active movements of the tendon or by passive stretching. In de Quervain's disease, the tendons of the abductor pollicis longus and the extensor pollicis brevis at the styloid of the radius pass through a thick tendon sheath that frequently becomes stenosed and inflamed and produces symptoms.

Patient History

Patient History may include

Patient Data

Condition usually occurs in occupations requiring frequent thumb pinching and wrist movements. Arthritis is a predisposing factor.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture, ligament tear
Fever, severe pain	Infection
Diabetes	Neuropathy
Multiple joint involvement	Rheumatologic diseases, gout
Cancer	Cause of symptoms (metastatic or primary)
Unilateral edema	Upper extremity deep vein thrombosis
Discoloration of arm or hand	Arterial occlusion
Immune-compromised state	Infection

Presentation

Women(particularly postpartum) are more likely affected than men. There may be palpable thickening of the sheath present, with crepitation on movement.

Subjective Findings

- Complains of loss of function
- Localized tenderness at the radial styloid

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- Proximal radiating symptoms may be present
- Pain may radiate distally along the thumb

Objective Findings

Objective Findings may include

Scope of Musculoskeletal Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Swelling at the first dorsal compartment of the wrist
  - Deformities
  - Skin Color
- Palpation of bony and soft tissue
  - Localized pain at the dorsolateral aspect of the wrist
  - Temperature
- Range of motion, active and passive movements of ipsilateral and contralateral joints:
  - Thumb (abduction, adduction)
  - Wrist and forearm movements (flex, extension, radial and ulnar deviation, pronation, supination)
  - Elbow
  - Shoulder
  - Cervical motion
- Manual Muscle Test (MMT) of ipsilateral and contralateral joints:
  - Test resisted isometric movements of:
  - Thumb (abduction, adduction)
  - Wrist and forearm movements (flex, extension, radial and ulna deviation, pronation, supination)
  - Elbow
  - Shoulder
  - Grip and pinch strength
- Orthopedic and neurologic testing
  - Finkelstein test-make a fist wit thumb inside fingers, passively move wrist into ulnar deviation to reproduce dorsolateral wrist pain
  - Sensory testing of Median and Radial nerves
  - Assess upper extremity strength, muscle stretch reflex, Spurling's test to rule out cervical root impingement
  - Rule out Lateral epicondylitis
  - Joint play movements of the wrist and hand

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- Functional Assessment - The following standardized tests may be used to assess functional limitations:
  - Disabilities of the Arm, Shoulder and Hand (DASH)
  - Patient Rated Wrist Evaluation
  - Hand Assessment Tool (HAT)

Findings of Tenosynovitis

- Swelling may not be visually apparent
- Restricted motion is common.
- Localized tenderness
- Crepitus may be present
- Pain present with active dorsiflexion, volar flexion, or deviation (ulnar or radial) of the wrist
- Thumb extension against resistance or adduction across the palm reproduces the pain
- Pinch and grasp are often weak
- Positive Finkelstein's test
- Palpable thickening of extensor sheath

Differential Diagnoses

- Articular cartilage pathology including neoplastic pathology
- Carpal Tunnel Syndrome
- Cellulitis
- Compartment Syndrome Extremity
- Gout and Pseudogout
- Infection
- Intersection syndrome
- Osteoarthritis
- Osteonecrosis
- Reiter Syndrome
- Rheumatic Fever
- Spastic contracture in hemiplegia
- Trigger finger
- Ulnar nerve paralysis

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

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Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member

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- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

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Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement.

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

Therapy program goals are to:

- Normalize pain-free range of motion,
- Decrease inflammation,
- Prevent muscular atrophy,
- Maintain proprioception, and
- Relieve joint pain so that the other objectives may be achieved.

Initially, the therapy program will consist of modalities to:

- Decrease inflammation,
- Splinting to rest the tendon and decrease inflammation, and
- Gentle pain free ROM.

When inflammation is under control, therapy will consist of modalities to:

- Warm tissues prior to stretching,
- Therapeutic exercises for ROM and strengthening, and
- Instruction in a home program including splint management.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.

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- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition. Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:

- Improvement does not meet above guidelines, or improvement has reached a plateau
- Atrophy of the extremity occurs
- Neurological deficits appear/progress

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

Acute Phase

Acute care is characterized by a short and relatively severe course. Need for care is proportional to the severity of the signs or symptoms of the particular case. Frequency of therapeutic visits is gradually reduced over a short period of time, generally 1-4 weeks.

Subacute Phase

Subacute care is characterized by an intermediate and less severe course. It is a combination of direct care and with an emphasis on home management consisting of patient motivation and compliance. Intensity of care is guided by the condition of healing tissue structures, and generally includes less frequent therapeutic visits gradually tap ering over a short period of time.

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Corrective/Rehabilitative Phase

Corrective or rehabilitative care is the stage of ongoing care, and may also refer to conditions that are chronic in nature. Treatment is directed toward further symptom reduction and the achievement of optimal structural and functional restoration. In most cases, this type of care is largely active and is typically directed by the provider and performed by the patient as a home program.

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	Modalities such as: ▪ Ice packs/ hot-pack ▪ Phonophoresis ▪ Electrical stimulation
Improve flexibility and range of motion	▪ Begin with active range of motion ▪ Begin passive range of motion based on the above timeframes)
Improve strength and endurance	▪ Progress strength and grip training from isometric to concentric to eccentric contraction of MCP and PIP joints ▪ General strengthening of the unaffected areas of the hand and wrist. ▪ Once scar heals, hydrotherapy can be used ▪ Initiate PREs based on the above time frames
Improve scar extensibility	▪ Scar massage ▪ Iontophoresis
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure, sports, and vocation ▪ Functional training activities related to ADLS ▪ Vocational training activities
Patient education and self-management	▪ Elevate hand to reduce edema ▪ Frequent icing ▪ Teach stretching, range of motion and gripping exercises several times per day ▪ Teach scar massage ▪ Teach activity modification

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self-care at his residence.

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Home Medical Equipment

- Cold packs
- Heat packs
- Theraband for strengthening
- Theraputty for strengthening
- De Quervain's splint

Self-Care Techniques

- Instruction in home exercise program for ROM and strengthening
- Cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Surgery
- Medication
- Injection

Medicare References

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Wrist, Ulnar Nerve Entrapment, Post-op Release

Synonyms

Guyon's Canal SyndromeDefinition

Release of the ulnar nerve is most commonly performed at the elbow or the wrist, though entrapment can occur at other areas along the path of the ulnar nerve. The surgical procedure varies depending on the site but the common goal is to enlarge those spaces where compression is occurring. At the elbow the nerve is sometimes moved, or transposed, anterior to its original position.

Patient History

Patient History may include

Patient Data

A careful clinical history is imperative, noting the time of occurrence of symptoms. Determine whether symptoms are transient or continuous. Determine whether symptoms are related to work, sleep, or recreation. Elicit duration of symptoms and possible relation to trauma. The Guyon canal is the second most common site of entrapment and is located at the wrist. Entrapment may cause purely motor, purely sensory, or a mixed lesion, depending on the site of compression.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

Red Flag	Possible Consequence or Cause
Severe trauma	Fracture
Fever, severe pain	Possible infection
Unilateral edema	Upper extremity deep vein thrombosis
Paresthesias in stocking-glove distribution	B12 deficiency, hypothyroidism, lead poisoning
Immune-compromised state	Infection
Cancer history	Cause of symptoms (metastatic or primary)
Discoloration of hand/fingers	Vascular occlusion, shunt emboli (dialysis patients)

Presentation

Entrapment at the elbow occurs on the medial aspect, and can be the result of trauma that has caused scarring or bony malformation, or may be the result of compression from inadequate spaces as the nerve travels across the joint. Entrapment of the ulnar

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nerve at the wrist can occur at the Guyon canal. If ulnar neuropathy at the canal is suspected, it is helpful to evaluateethe pisotriquetral joint and the hook of the hamate. Abnormalities at either site may result in secondary ulnar neuropathies.

The clinical features of an ulnar nerve entrapment include:

- Claw hand resulting from unopposed action of the extensor digitorum communis in the 4th and 5th digits
- Inability to extend the proximal and distal interphalangeal jointsof any of the fingers
- Inability to adduct or abduct the fingers, or to oppose all the fingertips
- Inability to adduct the thumb
- Positive Froments sign
- Atrophy of the interosseous spaces, especially the first, and of the hypothenar eminence
- Loss of sensation on the ulnar side of the hand, the ring finger, and the entire little finger
- Dorsal aspect of the hand should be normal as that is innervated by the dorsal cutaneous branch

Subjective Findings

- Wrist or elbow pain
- Pain with movement
- Numbness/tingling in Ulnar Nerve distribution may be present
- Weakness in grip or pinch
- Inability to extend the proximal and distal interphalangeal jointsof any of the fingers

Objective Findings

Objective Findings may include

Scope of Examination

Examine the musculoskeletal system for possible causes, or contributing factors to the complaint.

Specific Examination Considerations

All of the following objective tests may not be appropriate on admission to therapy, but should be assessed as the member's condition allows during the course of care.

- Inspection
  - Posture
  - Skin condition
  - Surgical wound/scar
  - Muscle atrophy (Interosseous space)
- Palpation of bony and soft tissue
  - Palpate forearm/wrist for pain
  - Test sensation in hand

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    - Finger contractures, deformities (Claw hand)
    - Skin Temperature
- Range of motion (active and passive) of ipsilateral and contralateral joints:
    - Fingers, Thumb (abduction, adduction, opposition of fingers, adduction of thumb)
    - Elbow (flexion, extension, supination, pronation)
    - Wrist (flexion, extension)
    - Shoulder
    - Cervical Spine
- Orthopedic and neurologic testing
    - Joint-play movements of the humeroulnar joint and humeroradial joint
    - Positive Froments sign
    - Wartenberg's sign
    - Neurological test
    - Tinel's Test
    - Deep tendon reflexes
    - Dermatomes (C7-T1)
- Manual Muscle Testing of ipsilateral and contralateral joints:
    - Fingers, thumb
    - Wrist
    - Elbow
    - Shoulder
    - Cervical spine
- Functional Assessment - The following standardized tests may be used to assess functional limitations:
    - Disabilities of the Arm, Shoulder and Hand (DASH)
    - Patient Rated Wrist Evaluation
    - Hand Assessment Tool (HAT)

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

Care Classifications

Therapeutic Care

Therapeutic care is care provided to relieve the functional loss associated with an injury or condition and is necessary to return the patient to the functioning level required to perform their daily needs and work activities. Therapeutic care generally occurs within a reasonable period of time and is guided by evidence based practice of physical therapy.

Acute Care

Acute care is care of an injury or condition characterized by short and relatively severe symptom complex, generally up to the first month following onset of injury. The condition may be induced by either traumatic or non-traumatic factors and may consist of a new condition or an exacerbation of an existing one. Need for care is proportional

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to the severity of the signs and symptoms of the particular case, modified by the status of healing tissues. The therapeutic goals of acute care are patient education in the recovery/healing process, reduction of symptoms and minimization of functional loss, in preparation for resolution of the injury or condition. Means and methods include a combination of direct care and a home management program to progress towards recovery of function.

Subacute Care

Subacute care is care of an injury or condition characterized by a less severe symptom complex and intermediate course. Typically, it follows an acute injury or exacerbation, and can extend up to three months from onset. Subacute care is characterized by a combination of direct care and home management consisting of exercise, symptom management, patient education, and an emphasis on compliance. The therapeutic goal of this phase is to improve functional status by increasing existing range of motion and muscle strength and reducing signs and symptoms associated with the condition or injury. Means and methods include progression of exercise, instruction in self-care, and monitoring patient compliance and motivation. Intensity of care is guided by the condition of healing tissue structures, generally including therapy visits supplemented by a home management program.

Corrective or Rehabilitative Care

Corrective or rehabilitative care is the stage of ongoing care beyond the sub-acute phase. This phase of care may last up to 6 month from onset. It may also refer to treatment of conditions that are chronic in nature and do not occur in conjunction with an acute or subacute phase. The therapeutic goals of this phase are reduction and management of symptoms with a goal of maximizing function over time. Means and methods include progression of exercise, continued patient education, and transition to self-management. Intensity of care is guided by functional status, focusing on home management, supplemented by therapy visits.

Skilled Maintenance Care

Maintenance care is defined as services required to maintain the member's current condition or to prevent or slow deterioration of the member's condition. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Skilled maintenance care for Medicare and Medicaid enrollees is covered if the specialized skill, knowledge and judgment of a qualified therapist are required:

- To establish or design a maintenance program appropriate to the capacity and tolerance of the member
- To educate/instruct the member or appropriate caregiver regarding the maintenance program
- For periodic re-evaluations of the maintenance program
- When skilled services are required in order to provide reasonable and necessary care to prevent or slow further deterioration, coverage will not be denied based

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on the absence of potential for improvement or restoration as long as skilled care is required.

Skilled Maintenance Programs in an Outpatient and Home Health setting will not be covered if furnished by a Physical Therapist Assistant. (Chapter 15, Section 220.2 Subsection D of the Medicare Benefit Policy Manual)

Condition Severity Classifications

Severity is classified as mild, moderate and severe conditions. Mild conditions result from a variety of conditions, may or may not require treatment, symptoms are low-grade and generally do not affect activity of daily living tasks. Moderate conditions also result from a variety of causes; pain is usually mid-range (5-6/10), may have work restrictions and may affect performance of activities of daily living. Severe conditions mostly result from accidents or injuries, symptoms are intense, may result in loss of work, and will have a pronounced decrease in the ability to perform activities of daily living.

Conditions Severity Criteria Table

Criteria	Mild Condition	Moderate Condition	Severe Condition
Mode of Onset	Variable	Variable	Severe
Anticipated duration of care	1-6 weeks	6-10 weeks	10 or more weeks
Loss of work days	No loss of work days	0-4 days of work lost	5 or more days of work lost
Work restriction	None	Possible, depends on occupation; 0-2 weeks	Restriction, depending on occupation; 2 or more weeks
Functional deficits: 1. Range of motion	Mild/no loss	Mild to moderate loss	Considerable loss
2. Muscle Strength	Mild/no loss	Mild to moderate loss	Considerable loss
3. Neurologic findings	None	May be present	May be present
4. BADL (Basic daily function such as walking in the home, bathing, dressing, grooming, feeding, positioning, and elimination)	Mild/no loss	Mild to moderate	Moderate to severe

Requirements for Physical/Occupational Therapy Visits

Two or more of the following findings must be present to establish medical necessity. At least one of the findings must address functional limitation. Degree of abnormality should be specified at initiation of therapy, and periodically, to establish an objective response to therapy:

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1. Significant Functional Limitations (i.e. Activities of daily living, vocational activities) - Practitioners are strongly encouraged to utilize peer reviewed, standardized tools to quantify Functional Limitations.
2. Strength: <4/good (5 = normal; 4 = good; 3 = fair; 2 = poor; 1 = trace)
3. ROM: < than functional motion (refer to **Maximal Complex Motion Necessary for Functional Activities**)
4. Pain: limiting function and at least 3/10
5. Neurological signs: altered reflexes and/or sensations

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement
-

Physician specific protocols will be considered in the context of the plan's definition of medical necessity.

Treatment Methods

Therapy program goals are to:

- Reduce pain and inflammation
- Aid stretching and strengthening, and
- Assist in gradual return to activity.

Treatment methods used:

- Modalities to reduce pain and inflammation.
- Patient education consists of rest/reduction of strenuous activities, as well as identification of and avoidance of positions and postures that are causative factors.
- Protective splinting may be appropriate.
- Post-operative care may have time based criteria for the advancement of activity.
- Home program, individually prescribed, is central to the care of all patients. The teaching for this program should be started on the first day of therapy and continue throughout the formal therapy program with a planned transition.

Discharge Criteria

- The patient is discharged when the patient/care-giver can continue management of symptoms with an independent home program.
- Discharge occurs when reasonable functional goals and expected outcomes have been achieved.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, psychosocial factors or other personal circumstances.
- Repetitive exercise for range of motion, flexibility, or strengthening does not generally require the skills of a therapist beyond establishing the program and/or periodic reassessment related to significant change in the patient's condition.

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Therapy is discontinued when services become routine or repetitive in nature, indicating they are not of a skilled nature.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.
- If the member has been non-compliant with therapy as is evidenced by the clinical documentation, and/or the lack of demonstrated progress, therapy will be deemed to be not medically necessary and the member should be discharged from therapy.
- Therapy services are not considered medically necessary for pain mediation alone. The goals of therapy are for improvement in restoration of function, motor ability, and range of motion.

Referral Guidelines

Refer patient to their primary care provider for evaluation of alternative treatment options if:
- Improvement does not meet above guidelines, or improvement has reached a plateau
- Progressive palsy/paralysis occurs
- Muscle wasting or clawing of the 4th/5th digit occurs or progresses

Management/Intervention

Use of modalities and/or passive treatments should be limited. The goal is to transition the patient as quickly as possible to active care, self-management and functional independence.

The following table lists the procedures for **Post-Operative** presentation (Post Release - protective splinting may be necessary post-op):

Expected Outcome	Procedures/Modalities Such As
Relief of pain and swelling	▪ Ice packs ▪ Phonophoresis ▪ Electrical stimulation
Improve flexibility	▪ Passive stretching ▪ Active Range of motion exercises of the wrist, fingers, elbow, forearm and shoulder ▪ Joint mobilization techniques to elbow, wrist and fingers ▪ Soft tissues mobilization
Improve strength and endurance	▪ Progress strength and grip training from isometric to concentric to eccentric contraction of forearm muscles and elbow ▪ Progressive resistance exercises of the elbow and wrist ▪ General strengthening of the unaffected areas of the arm (strengthening exercises allowed gradually at the elbow and wrist)
Improve postural	▪ Postural awareness of the shoulder girdle

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control	▪ Scapular stabilization
Progressive return to normal function	▪ Gradual resumption of activities relating to community, leisure and sports and vocation ▪ Functional training activities ▪ Sensory re-education ▪ Joint stability/co-contractions using closed chain exercises
Patient education and self-management	▪ Modification of job/recreational tools and or equipment ▪ Avoid excessive pressure on elbow (use of elbow pad) ▪ Teach use of heating modalities before stretching ▪ Teach joint mobilization and soft tissue mobilization ▪ Continue flexibility and strengthening activities

Note: Not all of the above modalities are appropriate for each individual case; they require the skill and judgment of persons properly trained and licensed for safe use. Use of diathermies, including microwave, shortwave, and ultrasound, is controversial and is contraindicated in the presence of metals, and prior to neurological, and/or orthopedic maturity. Landmark recommends following all manufacturer and educational guidelines in the use of electrotherapeutic modalities.

Home and Self-Care Techniques

The patient can be taught to use medical equipment and administer self- care at his residence.

Home Medical Equipment

- Hot packs/cold packs
- Theraputty for therapeutic exercises
- Protective splint

Self-Care Techniques

- Rest, reduce strenuous activities
- Home ROM exercises, stretching
- Progression to therapeutic exercise—strengthening exercises
- Hot packs/cold packs, if needed, to relieve discomfort

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Osteopathic manipulation
- Chiropractic
- Medication

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Pediatric

Autism Spectrum Disorder

Definition

Autism Spectrum Disorder (ASD) is a set of neurodevelopmental disorders characterized by core deficits in communication and reciprocal social interaction; accompanied by restricted and stereotypic behaviors and interests that impact the child's interaction with his/her environment. The core symptoms are usually accompanied by developmental delay in one or more area. Under DSM-V, previously recognized subtypes of autistic disorder, childhood disintegrative disorder, Asperger's disorder, and pervasive developmental disorder not otherwise specified, have been combined under the diagnosis of ASD.

Presentation

Children with ASD vary widely in their presentation, including verbal/communication ability, social interactions, sensory profile, motor skills, and behavior.
Treatment of ASD is usually multidisciplinary, involving physicians, speech, occupational, and physical therapists, behavioral and developmental specialists, and other disciplines to address core symptoms and related developmental and functional issues. The latter includes:

- Motor planning dysfunction
- Low muscle tone
- Sensory modulation
- Visual motor skills/Visual spatial processing
- Adaptive behavior (attention, engagement, problem solving and executive function)
- Self care skills
- Auditory processing and language

Depending on severity, these areas are amenable to treatment by occupational and physical therapists. Treatment for ASD is child-centered and focuses on the needs of the individual's and family's needs and goals. Individualized assessment and an intervention plan that promotes collaboration between the family and professionals to achieve best results are indicated.

Care for individuals with ASD may occur throughout the lifespan. Early intervention is considered key to minimizing the impact of ASD on both the child and family.

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Lifespan Considerations

Early Intervention

Early intervention (EI) programs are provided to children between the ages of 0 and 5 years, with or at risk for developmental disabilities. Implementation of an effective early intervention program requires involvement of parents, professionals, and peers. Training in social skills (e.g., joint attention, joint engagement, etc.) and development of appropriate creative play skills are considered keys to improving the expected outcome of a child diagnosed with ASD.

Symbolic, or creative, play is essential to child development. Play is both a treatment intervention as well as the method through which other treatments (behavioral, sensory, motor) may be delivered. Participation in creative play is linked to higher language ability, better social interaction, improved cognitive skills, and development of understanding of others intentions, and theory of mind. Salient features of symbolic play - child driven, social context, language requirements - stimulate changes in the cerebral cortex that underlie appropriate behavioral and cognitive development. Neuro-typical children develop play skills without explicit instruction, while children with autism do not. Precursor skills, i.e. joint attention and imitation, emerge at 9-12 months, while symbolic play begins development at 18 months and continues through preschool age and beyond. Deviation from typical development generally occurs at this time, altering the trajectory of play development. Pretend play emerges later in autism, is more repetitive and less flexible, less frequent, and less predictable in progression towards more sophisticated play strategies. When children intentionally participate in symbolic play, the act of taking on roles, assigning roles to others, and determining the characteristics of object in the play scenario promotes development of narrative recall, joint attention, problem solving, and self-regulation. The rules embedded in dramatic play reflect socially acceptable behavior.

Parents can learn to deliver interventions successfully with their own children. Specifically, research has shown that parent-delivered therapies can lead to improvements in joint attention and joint engagement, emotional co-regulation between children and mothers, social interaction, communication, play skills, and developmental rating). A secondary, but important consequence of parent training is an improved sense of parental well-being and optimism, and reduced parental stress. Higher levels of parental stress are associated with reduced effectiveness of ASD intervention.

Childhood and Pre-teen

As the child ages, intervention shifts from development of precursor and play skills to areas that impact education and social needs. This includes motor skills necessary for writing, executive function and adaptive behavior, sensory modulation, and situational behavior, along with social participation and adaptive behavior. Therapeutic intervention to provide support may be required in addition to services provided by other licensed and non-licensed professionals.

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Teenage and Young Adult

If necessary, treatment is provide to support continued improvement in social participation and development of prevocational and vocational skills. This may include general and specific motor skills training, strategies for managing transportation, addressing lifestyle issues, and identifying job skills.

Adult

Focus is on vocational skills and management of day-to-day activities. Participation in self-care and social activities may require support and consultation.

History

Early Signs of ASD (Zwaigenbaum, et al, 2009)

- Impaired play (e.g., joint engagement, repetitive actions with toys)
- Impaired adaptive skills (e.g., imitation, executive functions)
- Impaired social – communication skills (e.g., eye gaze, joint attention, affect, orientation to name calling, social interest)
- Atypical language and cognition (e.g., delayed cognitive development, echolalia)
- Impaired sensory function (e.g., under- or over-reactivity to sensory stimulation
- Delayed gross or fine motor skills
- Repetitive and/or atypical motor behaviors
- Atypical regulatory functions (e.g., eating, sleeping)

The National Institute of Neurological Disorders and Stroke (NINDS) defines the early indicators of ASD more specifically, including:

- No babbling or pointing by age 1
- No single words by 16 months or two-word phrases by age 2
- No response to name
- Loss of language or social skills
- Poor eye contact
- Excessive lining up of toys or objects
- No smiling or social responsiveness

Later indicators include:

- Impaired ability to make friends with peers
- Impaired ability to initiate or sustain a conversation with others
- Stereotyped, repetitive, or unusual use of language
- Restricted patterns of interest that are abnormal intensity or focus
- Absence or impairment of symbolic play
- Preoccupations with certain objects or subjects
- Inflexible adherence to routines
- Regression or loss of communication, social, and/or sensorimotor skill(s)

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Specific characteristics of ASD

Motor problems in children with ASD span a wide range of dysfunction, including gross and fine motor control, motor learning deficits, motor planning, complex motor sequences (including praxia and imitation), postural control, and eye movement. Some authors consider motor impairment to be a core deficit of ASD; others consider motor abnormalities as an endophenotype for ASD. Motor problems tend to be more common in younger children than older children. Careful assessment should be made and clear goals and objectives should be defined prior to initiation of treatment for motor difficulties.

Sensory disturbances or unusual response to sensory stimuli are often among the earliest symptoms reported by parents. While sensory disturbances are, like motor problems, quite common in children with ASD, they are not universally present and may be highly idiosyncratic. Not all children with ASD have sensory processing difficulties. Careful assessment is recommended before incorporating sensory processing interventions into a treatment program. As with motor problems, clear outcomes and objectives should be defined prior to initiating treatment. Status should be reviewed on a regular basis.

Motor, sensory, behavioral, and social problems are not necessarily independent. Improvement in one or more domains following implementation of treatment in another domain often occurs. Activity-based (e.g., play) interventions may be used as a platform for development or reinforcement for skill goals.

- Behavior/sensory domain
  - Perseveration
  - Decreased perception of pain
  - Increased sensitivity to light tough or textures
  - Lining up objects
  - Walking on toes
  - Preoccupation with spinning
  - Hand flapping, head-banging, biting
  - Insomnia
  - Tantrums
- Motor domain
  - Decreased coordination, postural stability
  - Decreased fine motor skills, e.g., grasping, writing, object manipulation, dexterity
  - Possible mild hypotonia
  - Delays or deficits in motor development or physical activity behavior
  - Gait deviations
  - Visual-motor skills, perceptual ability
- Social domain
  - Decreased participation in play, reduced variability in play activities
  - Reduced eye contact
  - People regarded similar to objects

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    - Lack of sharing
    - Decreased peer-to-peer interaction
    - Inability to appropriately respond to facial expressions or social cues
    - Inability to display empathy
    - Behavior management (e.g., impulsiveness)
- Communication domain
    - Lack of joint attention or joint engagement
    - Echolalia
    - Limitations/delays in expressive and receptive language
    - Impaired symbolic or pretend play
    - Impaired comprehension of tone and affect

Areas of Functional Impairments in ASD

- Education domain
    - Written Language skills
    - Participation in classroom activities
    - Participation in general school activities
    - Attention and focus
    - Multi-step process tasks
- Physical activity and play
    - Participation in play and physical activities
    - Selection of activities
- Work domain
    - Skills related to job performance (punctuality, nuance, completion)
    - Interview skills
    - Interaction with peers
- ADL/IADL/Self-care domain
    - Dressing, hygiene
    - Meal preparation, eating
    - Fiscal management
    - Shopping
    - Community mobility
- Social participation
    - Appropriate interactions with peers, neighbors, community
    - Social awareness
    - Behavioral management

Objective Findings

Careful assessment of the individual sensory, motor, behavioral, and developmental profile of the child should be performed. Clinical treatment should be implemented to address a specific need, not because of the presence of a diagnosis.

Specific Aspects of Examination for Child and Adolescent with ASD

The evaluation should take into account relevant information about the child and family such as developmental status, cognition, language, behavior, family issues and related

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health issues, including past, concurrent, or anticipated medical or surgical interventions.

A. Environmental factors (circumstances in which evaluation is performed)
   - Routine
   - Predictable
   - Familiar
   - Open/closed

B. Arousal, Attention, and Cognition
   - Arousal and attention
   - Cognition, including ability to process commands
   - Communication
   - Motivation
   - Orientation to person, place, time, and situation
   - Recall, including memory and retention

C. Body Structure
   - Joint integrity:j oint, capsular, and ligamentous status
   - Functional muscle strength
   - Postural alignment and position (static and dynamic), including symmetry and deviation from midline
   - Apraxia
   - Postural control and stability
   - Sensory integration

D. Motor Control and Motor Learning
   - Qualitative assessment of movement: isolated control; presence of abnormal or unusual movements, or synergistic patterns.
     - Measured by coordination screens, motor impairment tests, motor proficiency tests, observation, fine and gross motor control tests, finger dexterity tests, manipulative ability tests.
     - Gait, locomotion, and balance
     - Kinetic analysis of gait deviations; analysis of temporal issues; e.g. cadence, speed, and smoothness of forward progression; functional capabilities and safety issues (e.g. community or household; terrain, stairs, slopes)
     - Fit, use, and appropriateness of orthotic and assistive devices
     - Assessment of alternative forms of locomotion e.g. rolling and crawling
     - Assessment of need for mobility equipment

E. Neuromotor Development and Sensory integration
   - Acquisition and evolution of motor skills, including age-appropriate development as measured by activity indexes, developmental inventories and questionnaires, infant and toddler motor assessments, learning profiles, motor function tests, motor proficiency assessments and neuromotor assessments
   - Sensorimotor integration, including postural, equilibrium, and righting reactions as measured by behavioral assessment scales, motor and processing skill tests, observation, postural challenge tests, sensory profiles and visual perceptual skill tests

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- Muscle Tone: resting muscle tone; spectrum includes varying degrees of exaggerated, reduced, or fluctuating stiffness
- Reflex status: integration, persistence, or re-emergence of primitive reflexes; emergence of mature reflexes; deep tendon reflexes; clonus
- Coordination: timing, grading, and smoothness of movement; presence of tremulousness, dysmetria

F. Participation
- Developmental delay
- Performance in free-play and organized physical activities
- Performance of self-care activities

G. Behavioral Profile
- Adaptive behavior
- Executive function

H. Equipment
- Assessment of current equipment: State of repair and fit; functional use; appropriateness to existing environmental challenges
- Assessment of need for other equipment to meet existing or emerging environmental challenges

I. Pre-vocational, and Vocational Assessment
- Sensorimotor, perceptual, or adaptive skills related to performing independent living or vocational tasks.
- Environmental issues related to independent living or vocational tasks

Other Findings

- When appropriate, interview child/adolescent, include family and/or caregiver to determine issues with regard to health, growth, development, environment or social context.
- Subjective assessment of the impact of the physical or functional deficits
- Subjective assessment of the direction and rate of change (i.e., progressive improvement or deterioration, daily, weekly, or monthly changes)
- Determine present use of equipment and/or assistive devices

Standardized Pediatric Tests

Objective testing is used to establish baseline measurements of deficits. Periodic reassessment of deficits is required to demonstrate progress. It should be noted that many standardized motor and sensory tests have not been normalized for an ASD population, or have been used for small sample studies only.

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Tests Specific to Diagnosis

Assessment	Description
Autism Diagnostic Observation Scale, 2nd edition (ADOS-2)	▪ Toddler to adult screening test ▪ Requires training to use
Childhood Autism Rating Scale – 2nd edition (CARS-2)	▪ Children over age 2 ▪ Severity measure and screen ▪ Requires training to use
Checklist for Autism in Toddlers (CHAT)	▪ Used at 18 months check-up ▪ Screening test
Modified Checklist for Autism in Toddlers (MCHAT)	▪ Caregiver questionnaire ▪ Used at 16-30 months ▪ Screening, not diagnostic ▪ May be cross cultural limitations
Social Responsiveness Scale (SRS)	▪ Ages 4-18 ▪ Quantifies social impairments

Motor Function

Assessment	Description
6-Minute Walk Test (6MWT)	▪ Measures exercise capacity in ▪ children ages 4-11 years.
Peabody Developmental Motor Scales, second edition (PDMS-2)	▪ Birth to 5 years ▪ Gross and fine motor scale
Gross Motor Function Measure (GMFM)	▪ Evaluates change in gross ▪ motor function in children with ▪ cerebral palsy and describes ▪ current level of motor function.

Developmental Tests

Assessment	Description
Bayley Scales of Infant Motor Development – III (BSID-III)	▪ Standardized, developmental assessment tool ▪ 16 days to 42 months of age ▪ Observation of cognition, language, and motor skills. Caregiver questionnaire for adaptive and social-emotional skills
Bruininks-Osteretsky Test of Motor Proficiency, Second Edition (BOT-2)	▪ Assesses motor functioning of ▪ children ages 4-9 years in ▪ areas of fine motor control, ▪ manual coordination, body ▪ coordination, strength and agility.
Test of Gross Motor Development-2 (TGMD-2)	▪ Measures twelve gross motor ▪ skills ages 3 -10 years to ▪ identify children who are ▪ significantly behind their peers ▪ in gross motor development.

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Movement Assessment Battery for Children, Second Edition (MABC-2)	▪ Screens/identifies motor ▪ competence for children in ▪ three age ranges: 3-6; 7-10; and 11-16 years. Eight items tested for each age group in three areas: manual dexterity, ball skills, and static and dynamic
Peabody Developmental Motor Scales (PDMS-2), Second Edition	▪ Measures gross and fine motor ▪ skills from birth-6 years.

Functional Tests

Assessment	Description
Pediatric Evaluation of Disability Inventory (PEDI)	Measures capability and performance of functional activities in self-care, mobility, and social function in children from 6 months - 7.5 years.

Sensory/Sensorimotor Tests

Assessment	Description
Developmental Test of Visual-Motor Integration, 6th Edition (VMI)	▪ VMI assess the extent to which individuals can integrate their visual and motor abilities. Includes norms for ages 2-18.
Sensory Processing Measure	▪ Children age 5-12
Short Sensory Profile	▪ Children age 37 months to 9 years
Sensory Integration and Praxis Test (SIPT)	▪ The SIPT has 17 subtests, which fall into six categories of sensory processing and motor function: form and space, visual motor, tactile discrimination, vestibular-proprioceptive processing, bilateral integration and sequencing and praxis.
Infant/Toddler Sensory Profile	▪ Children age 7 to 36 months

Reassessment

Services provided in school based settings (under IDEA) are required to perform an annual reassessment of progress, status, and goals. Clinic-based care, as always, requires careful evaluation, achievable and measureable goals, and continual reassessment. Reassessment should occur no less frequently than 4 months to differentiate between improvement attributable to therapeutic intervention rather than intrinsic development/growth.

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Admission Criteria

- For those aspects of sensorimotor function for which there are standardized tests, significant dysfunction is commonly indicated by performance that is moderately to severely delayed or 1.5 standard deviations or more below the mean.
- Medical diagnosis of ASD is made or child is deemed at risk.
- Findings indicate a periodic functional skills issue, in which a specific goal is likely to be obtained in a generally predictable time frame.
- Impaired motor skills/motor planning affecting functional ability
- Identified deficit can be measured and progress demonstrated throughout the treatment plan.
- Home program development, education and training
- Patient or caregiver training in medical, functional or adaptive equipment

Discharge Criteria

Termination of therapy services should occur when:

- the goals of treatment have been attained
- no measurable improvement towards the goals of treatment have occurred in one to six months depending on the frequency of treatment and individual's needs
- the degree of improvement is no longer functionally significant; or, when there is less than a 30% deficit on standardized testing. Functional significance requires that the progression of skills occur outside, as well as in the therapy session; comprise a direct component of a functional task that was a goal of treatment; and indicate improvement in comparison to age norms.
- improvements are attributed to intrinsic growth and development rather than therapeutic intervention

Physical/Occupational Therapy Management/Intervention

There are many intervention programs in which occupational or physical therapists play a role, but are not considered as lead providers. These include many forms of behavioral, developmental, and social skills intervention that require specific training in the specific methods. These approaches are often provided by paraprofessionals in a home setting, but input from licensed professionals may be incorporated.

Comprehensive programs for ASD include educational, developmental, and therapeutic interventions delivered in a variety of setting (home, school, clinic/agency) by a multi-disciplinary team. Some of the comprehensive programs for which evidence of effectiveness exist include:

A. TEACCH (Treatment and Education of Autistic and related Communication Handicapped Children)
B. Early Start Denver Model
C. Developmental, Individual Difference, Relationship (DIR) Model

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D. Intensive Behavioral Intervention

Sensory Integration Therapy

The empirical base for sensory and motor interventions in ASD is not strong. There are few or no well-designed research studies that clearly define the benefits associated with most therapeutic interventions (e.g., sensory integration, NDT) in ASD. This is in part due to methodology challenges. Sensory profiles and selected treatment modalities vary widely; best practice dictates that treatment be individualized according to the child's sensory modulation and integration profile. This poses a challenge for rigorous study of the techniques involved. Recent reviews of the effect of sensory integration therapy have shown low treatment effect and are limited by small sample sizes.

The American Occupational Therapy Association (AOTA) recognizes sensory integration therapy as appropriate to when deficits in sensory integration contribute to a significant documented discrepancy in skills. In a separate review, the AOTA found weak evidence that sensory integration therapy improved the outcome of children with ASD with respect to improved social interaction, play skills, and engagement.

Inclusion of sensory and motor components in a comprehensive treatment program that addresses behavioral, developmental, social, and communication goals is very common. Licensed professionals may participate in any aspect of a comprehensive program. It should be noted that sensory integration techniques, as many techniques included in comprehensive programs, are incorporated to serve the more general goals and cannot be considered as the main intervention.

Treatment Intensity and Frequency Guidelines

Treatment intensity in a pediatric is a function of the potential for improvement, required skill level of the person delivering the intervention, and the amount of clinical decision making necessary to implement the intervention (see below). Briefly, the four treatment models for a pediatric setting include:

- *Intensive therapy model*. Patient has potential for rapid progress towards goals. Rapid changes in condition necessitate frequent changes in treatment. Appropriate for patients in an extremely critical period for skill acquisition related to development or medical condition.
- *Weekly/frequent therapy model*. Patient demonstrates continuous progress towards established goals. Requires frequent intervention for a limited duration to achieve functional skills or requires frequent revisions or updates of home program. Treatment may be 1-2 times per week or 2-3 timesp er month
- *Periodic/monthly therapy model*. Appropriate for patients not in a critical period for skill acquisition or at risk of regression.
- *Consultative therapy model*. Appropriate when expertise is needed to identify problems or recommend a solution for a specific issue.

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ASD is considered a pervasive condition, with changes occurring along a developmental time framework. Rapid (daily or weekly) change does not typically occur during the treatment of ASD, nor is ASD considered a critical medical condition, absent a co-morbid condition. From a physical/occupational therapy perspective, the Intensive therapy model is unlikely to be appropriate without objective documentation of progress towards therapeutic goals. There are periods of greater likelihood for influencing change (e.g., early intervention) where more intensive care is indicated for defined periods. However, periodic or episodic care is often indicated in conjunction with other program components.

Home-based developmental interventions are recommended in conjunction with clinic-based intervention when possible. Education of and incorporation of the parent/family/caregiver in the developmental and interventional processes is considered central to achieving positive outcomes.

Medically-Based Physical/Occupational Therapy Services

Therapy resources are most responsibly allocated when they are driven by their potential to improve function and not simply by the existence of a diagnosis.

Best practice PT and OT avoids learned helplessness and dependence on therapy. It fosters the child's competence in his or her environment, prevents secondary complications and disability, uses home programs and other community resources to promote independence, and recognizes periods of steady state sensorimotor functioning.

Therapy services will be periodic and episodic to address specific functional problems related to emerging issues of health, growth, development, environment, and family need. Frequency and duration of treatment typically diminishes with age but new issues may emerge over the lifespan. Clinic-based treatment is appropriate when it has the potential to improve the child's functional level within 4-6 months.T reatment also may be appropriate in a child with a progressive disorder when it has potential to prevent loss of a functional skill, or enhance the adaptation to such functional loss.

Transition and/or Discharge

According to the American Occupational Therapy Association, therapy services are discontinued when they no longer produce a functional or measureable outcome or the patient is unable to progress towards anticipated goals. The American Physical Therapy Association standard of practice states that "the physical therapist… plans for discharge of the patient/client, taking into consideration achievement of anticipated goals and expected outcomes, and provides for appropriate follow-up or referral."

Clinic based care is deemed medically necessary when measurable change as a direct result of skilled intervention is likely to occur in a reasonable time frame. Conversely, when measurable change is not likely to occur, or appropriate intervention can be delivered in the home, or other setting, and does not require the clinical skill or problem solving of a licensed professional, care should be transitioned or discontinued.

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Transitions may also occur from clinic-based to home-based or school-based settings. Transition planning is mandatory when children move from (1) an EI program to preschool or kindergarten or (2) from high school to post-secondary education and/or community living.

(Bailes et al., Pediatric Phys Ther, 2008)

Clinical Factor	Intensive Mode (daily treatment or more)	Weekly/ Bimonthly mode	Periodic (monthly or less often)	Consultative Episodic or as needed
Potential to participate and benefit from the therapy process	▪ Rapid functional progress or potential for rapid decline ▪ Critical medical condition with risk of loss of function ▪ Almost daily changes in condition	▪ Patient shows continuous progress towards goals	▪ Patient shows slow rate of goal achievement in identified areas ▪ Does not regress ▪ Patient may not be able to cooperate or participate in therapy sessions	▪ Patient able to meet new challenges ▪ Clinical decision making used to identify problems; recommend solutions ▪ Issues identified by family/patient, not dictated by condition
Critical period for skill acquisition or potential regression based on development or condition	▪ Extremely critical period based on condition	▪ Critical period	▪ Not in a critical period ▪ Related to life stage or medical condition changes	▪ Specific challenges identified by patient/caregiver ▪ Need for specific adaptive equipment or strategy
Need for clinical decision making/problem solving from licensed therapist	▪ Requires clinical skills of licensed therapist ▪ Very limited amount of therapy program can be	▪ Requires clinical skills and problem solving of a licensed therapist for most of program	▪ Clinical skills and problem solving required to assess condition status ▪ Home program updates ▪ Home program can be safely	▪ Home program carried out ▪ independently by patient/caregiver ▪ Clinical skills and problem

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	safely performed by patient/caref giver		performed by patient/caregiver	solving by therapist needed for specific challenge identified by patient/careg iver
Level of support necessary to assist patient in attaining goals, attending therapy, compliance, etc.	▪ High level of support required to attain goals ▪ Minimal or no contribution by patient/care giver	▪ High level of support required to attain goals ▪ Patient/care giver able to participate, but not independent ly	▪ Minimal support required to address factors that may impede ability to progress towards goals.	▪ Support is needed only to address specific challenges identified by patient/careg iver ▪ Associated with life changes

Habilitative Phases and treatment Guidelines

Chronic with Improve -ment	▪ Medical condition is stable ▪ Slow rate of attainment of goals, and/or does not regress for reasons unrelated to the disease process, changes may be monthly ▪ Changes may be monthly ▪ Equipment may need intermittent modification or adaptation ▪ Home program may require periodic modification by a therapist	▪ Bi-monthly to quarterly (1-6 times per year)	▪ Improve skill development ▪ Teach compensatory techniques ▪ Caregiver training ▪ Home program update	▪ Generally applies to mild chronic neurological impairments that demonstrate progress, e.g., Hypotonia, lack of coordination
Chronic with	▪ Condition may be stable or degenerating	▪ One session every 3-6	▪ Caregiver training for medical, functional or	▪ Generally for issues of positioning,

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possible decline	▪ No functional changes ▪ Have new challenges or specific issues that require the skilled knowledge of a therapist to problem solve possible options ▪ Have a need for newly available assistive technology	months or as necessary (1-4 times per year)	adaptive equipment needs	splinting and contracture or wound management and ▪ development assessments

Definitions

Habilitation (NAIC):

"Health care services that help a person keep, *learn* or improve skills and functioning for daily living. Examples include therapy for a child who isn't walking or talking at the expected age. These services may include physical and occupational therapy, speech-language pathology and other services for people with disabilities in a variety of inpatient and/or outpatient settings." *(76 Fed. Reg. 52,442; 76 Fed. Reg. 52,475)*

Habilitation (Medicaid):

"Services designed to assist individuals in acquiring, retraininga nd improving the self-help, socialization, and adaptive skills necessary to reside successfully in home and community based settings." *Social Security Act, Section 1915 (c)(5)(A).*

Rehabilitation (NAIC):

"Health care services that help a person keep, *get back* or improve skills and functioning for daily living that have been lost or impaired because a person was sick, hurt or disabled. These services may include physical and occupational therapy, speech-language pathology and psychiatric rehabilitation services in a variety of inpatient and/or outpatient settings." *(76 Fed. Reg. 52,442; 76 Fed. Reg. 52,475*

Goal/Outcome	Examples of Interventions
Aerobic capacity/endurance	Aquatic programs, gait and locomotor training , walking programs
Access to household and community activities	Body mechanics, postural stabilization, developmental activities, neuromuscular education, perceptual training, sensory training, neuromotor development training, flexibility exercises, gait and locomotion training

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Independence in self-care	Training in bed mobility, transfers, bathing, dressing, grooming, toileting and developmental activities.
Prescription, application, and training in use of adaptive equipment	▪ Written or augmentative communication devices ▪ Environmental controls ▪ Assistive devices: crutches, canes, walkers, wheelchairs, scooter boards ▪ Power devices: motorized wheelchairs and scooters ▪ Adaptive devices: seating systems, raised toilet seats, grab bars; supine, prone, or dynamic standers ▪ Orthotic devices: braces, shoe inserts, splints ▪ Prosthetic limbs ▪ Protective devices: cushions, helmets ▪ Supportive devices: compression garments, collars
Improved respiration	Breathing strategies and techniques to maximize ventilation, positioning, movement, and exercises to improve function
Improved oral-motor skills	Teach strategies and techniques for feeding, eating, biting, chewing, swallowing, and drinking.
Improved joint integrity and mobility	Flexibility exercises, stretching, massage, joint/soft tissue mobilization
Improved motor function	Biofeedback, electrical muscle stimulation (EMS), neuromuscular electrical stimulation (NMES), transcutaneous electrical nerve stimulation (TENS)
Improved sensory modulation	Sensory integration techniques, deep pressure, sensory diet, weighted vest, vestibular stimulation
Home Programs	Home programs are indispensable elements of PT/OT intervention, augmenting the effects of therapy and promoting functional application of acquired skills.T hese programs are developed by the PT and OT and are implemented by parents and caregivers.T hey may also be self-directed based on the child's developmental maturity and skill level. During the times of direct treatment, the home program serves as an adjunct to treatment, and requires regular review and updating. During periods when little or no functional changes occur, the home program serves to sustain the child's structural and functional status.

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Home Medical Equipment

- Compression vests
- Protective gear
- Orthotics/Prosthetics
- Wheelchairs with seating systems
- Gait assistive devices

Self-Management Techniques

- Family/caregiver training in adaptive strategies
- Family/caregiver training in therapeutic interventions

Adjuncts to Physical/Occupational Therapy Management in ASD

- Educational and community based programs
- Respite Care
- Behavioral intervention
- Vocational services
- Nutritionists
- Psychologists
- Speech-Language Pathologists
- Audiologists

Autism Mandates

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Congenital Muscular Torticollis

Synonyms

- Wry neck
- Postural torticollis
- Sternocleidomastoid torticollis
- Idiopathis generalized dystonia
- Infantile torticollis

Definition

Congenital muscular torticollis (CMT) is a postural deformity detected at birth or shortly after birth, primarily resulting from unilateral shortening and fibrosis of the sternocleidomastoid muscle (SCM). Infants with CMT display head tilt to one side, which is often combined with rotation of the head to the opposite side. CMT is estimated to occur in one infant of every 300 live births. Plagiocephaly is reported as a coexisting impairment in 80% to 90.1% of children with CMT.

Patient History

The pathophysiology and etiology of sternocleidomastoid impairment in CMT is still unknown. Prominent theories related to the cause of sternocleidomastoid impairment in CMT include intrauterine crowding, muscle trauma during a difficult delivery, soft tissue compression leading to compartment syndrome, and congenital abnormalities of soft tissue differentiation within the SCM muscle. In cultures where young infants sleep in the supine position, unilateral compression of the skull base will occur in the child with torticollis if there is rotation of the chin away from the shortened muscle. Unilateral shortening of the SCM causes the young infant to consistently position the head on the occiput contralateral to the tight SCM while unloading the occiput on the ipsilateral side. With continued unilateral weight bearing, the skull base and cranium will deform so that the vertex view reveals a parallelogram-shaped head. Craniofacial asymmetry is noted in varying degrees in infants referred for treatment of torticollis.

Specific Considerations

- Rule out red flags (require medical management).
- Identify co-morbidities requiring medical management, and those that affect therapy management.
- Determine if trauma-related; determine nature and extent of traumatic event.

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Red Flag	Possible Consequence or Cause
Sudden onset torticollis	Trauma
Posterior fossa tumor	Cancer
Hemiplegia	Subarachnoid hemorrhage; meningitis
Abnormal alignment of the cervical vertebrae	Potential for spinal cord compression
Abnormal vertebral structure	Klippel-Feil Syndrome, hemivertebrae
Fracture and/or dislocation of any vertebrae	Unstable spine

Patient Presentation

Children with CMT will present with the following:

- Shortening of the SCM
- Neck held in side flexion and rotation to the opposite side
- Plagiocephaly
- Facial deformities

Children with CMT can be assigned to one of three clinical subgroups:

- Children with a palpable swelling or pseudotumor of the sternocleidomastoid (SCM),
- Children with SCM tightness but no tumor, and
- Children with all the features of muscular torticollis without muscle tightness or tumor.

Objective Findings

Specific Examination Considerations

(Karmel-Ross 1997)

1. History

- Birth/delivery
- Presence of skull or facial asymmetry at birth
- Feeding difficulties
- Onset of torticollis and/or phagiocephaly

2. Pain Assessment-use an appropriate pain scale
3. Postural assessment

- Examine the entire spine, look for cervical and/or thoracolumbar scoliosis
- Postural asymmetry during functional developmental tasks as compensatory patterning indicating asymmetrical strength

4. Athrometrics

- Cranial shape

5. Range of motion

- Cervical
- Upper and lower extremity

6. Strength Test

- Cervical strength in flexion, extension and lateral flexion (lateral flexion strength typically tested as head righting emerges)

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- Presence of overactive head and trunk righting reactions typically present as compensatory balance reactions

7. Palpation

- SCM
- Trapezius
- Scalenes

8. Inspection of the skin of the neck:

- Look for asymmetry of skin folds and skin condition

9. Visual function test

- Midline visual focus
- Ocular alignment

10. Lower extremity screen

- Asymmetry
- Hip clunk
- Leg length discrepancy

11. Neurological screen

- Test for Asymmetrical Tonic Neck Reflex (ATNR)
- Abnormal muscle tone
- Presence of clonus
- Absence of midline orientation after 3 months of age
- Presence of head held in side flexion and rotation to same side

12. Developmental screen

- Observe infant's ability to perform age appropriate motor skills
- Tolerance for prone positioning

13. Family routines

- Assess family routines and positions throughout the day

Differential Diagnoses

- Clavical Fracture
- Brachial plexus palsy
- Sandifer's Syndrome
- Klippel-Feil Syndrome
- C1-C2 rotary subluxation
- Cervical scoliosis
- Hemivertebrae
- Ocular dysfunction
- CNS tumor
- Hydromyelia
- Arnold Chiari
- Osteoblastoma

Physical/Occupational Therapy Management

Therapy must show measurable functional progress.

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Requirements for Physical/Occupational Therapy Visits

1. 0-36 months of age
2. Presence of torticollis
3. Cervical lateral flexion and/or rotation limitations is greater than 5 degrees
4. Absence of improvement with current management
5. Palpable mass of the sternocleidomastoid
6. Presence of plagiocephaly
7. Unable to maintain head and body positions
8. Risk factors for developmental delay
9. Feeding problems

Treatment frequency and duration must be based on:

- Severity of clinical findings,
- Presence of complicating factors,
- Natural history of condition, and
- Expectation for functional improvement
- Ability of the parents to carry out the home program

Treatment Methods (Fradette et al. 2011)

Strategies frequently used in the conservative management of infants with torticollis include:

- Manual stretching of the affected muscle groups
- Specific handling and positioning strategies
- Active and passive neck ROM exercises
- Neurodevelopmental approach to encourage symmetry of postures and transitional movements
- Gross Motor Development
- Family/care-giver education, monitoring and support
- Comprehensive home program

Discharge Criteria

- Discharged is appropriate when the infant has full passive range of motion within 5 degrees of the nonaffected side, symmetrical active movement patterns throughout the passive range, age appropriate motor development, no visible head tilt, and the parent/caregivers understand what to monitor as the child grows.
- Patient is discharged when the parent/care-giver can continue management of symptoms with an independent home program.
- Therapy is discontinued when the patient is unable to progress towards outcomes because of medical complications, or other personal circumstances.
- Therapy is discontinued when the patient is no longer objectively demonstrating benefit from therapy.

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Follow-up Screening

A follow-up screening should be done 3-12 months following discharge to evaluate positional preference, the structural and movement symmetry of the neck, face, head, and trunk, hips, upper and lower extremities, and developmental milestones

Referral Guidelines

Refer patient to their pediatrician or the following specialist for evaluation of alternative treatment options if:

- Visual dysfunction is observed refer to Ophthalmology
- Hip screen is failed refer to Orthopedics
- Neurological screen is failed refer to neurology
- Patient presents with bony end feel, refer to Orthopedics
- Improvement does not meet above guidelines, or improvement has reached a plateau refer to pediatrician

Management/Intervention

Treatment of the infant with torticollis is guided by the age of the infant, the severity of the torticollis, the abilities of the parents to perform the exercises and repositioning procedures, the diagnosis of plagiocephaly, and the presence of associated neuromuscular or orthopedic impairments.

Congenital Muscular Torticollis Classification (Kaplan et al. 2013)

	Early Mild	Early Moderate	Early Severe	Late Mild	Late moderate	Late Severe	Late Extreme
Age at the time of presentation	0-6 months	0-6 months	0-6 months	7-9 months	10-12 months	7-12 months	7-12 months
Degree of Cervical Rotation Tightness	<15 degrees	15-30 degrees	>30 degrees	<15 degrees	<15 degrees	>15 degrees	> 7 months with SCM mass or >30 degrees

Goals/Outcomes

1. Age-appropriate active and passive range of motion of cervical and trunk movements if possible;
2. Prevention of contractures or further loss of motion in infants with SCM nodules or significant fibrosis;
3. Symmetry of shape in the face, head, and neck;

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4. Development of postural reactions in all directions;
5. Centered upright posture of the head and neck without persistent tilt to the involved side; and
6. Symmetry of gross motor patterns throughout development.

Home Program

The home program should be incorporated into the family's routines and include: ways to handle, feed, carry, and position the baby; activities to encourage midline head and trunk postures; and gentle active and/or passive cervical range-of-motion exercises opposite to the torticollis posture and away from the plagiocephalic, flattened side. (Kamel Ross 1997, Emery 1994) Parental compliance is mandatory for successful outcomes. (Persing et al., 2003) Torticollis posture could reappear during periods of growth. The SCM on the involved side may not grow at the same rate as on the uninvolved side, creating a risk of return of contracture. During periods of illness, teething, and acquisition of new motor functions, regression to the torticollis posture could occur.

Interventions

(Kaplan et al, 2013)

Interventions with Level II or Moderate Evidence:

1. Neck passive range of motion
   - Manual stretching is the most commonly reported form of treatment, however, there are no consistent formulae reported to determine the intensity nor consensus on the technique.
2. Neck and trunk active range of motion
   - Strengthening cervical and trunk muscles can be achieved through active range of motion during positioning, handling, carrying the infant while feeding, anf through isolating the weaker muscles.
3. Development of symmetrical movement
   - Developmental exercises should be used to promote symmetrical movement in weight-bearing postures and to prevent the development of impaired movement patterns in prone, sitting, crawling and walking.
4. Environmental adaptations
   - Adaptations to the environment can be incorporated into the home program such as alternating the infants position in the crib and changing table, minimizing the amount of time spent in a car seat and infant carrier and placing toys on the affected side.
5. Parent/caregiver education
   - Parents and caregivers should be educated on “tummy time” or prone play, positioning and handling to encourage symmetry, and minimizing time spent in car seats and carriers to avoid plagiocephaly.

Interventions with Limited Level II Evidence

1. Microcurrent

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- Low intensity alternating current applied superficially at a level not perceived by the patient.

2. Myokinetic Stretching

Interventions with Level III Evidence

1. Kinesiological taping (KT)
   - Refers to the use of stretchable tape to support muscles, to provide sensory feedback

Intervention with level IV Evidence

- The TAMO approach promotes problem solving and movement exploration during treatment, emphasizing light touch and the infant's responses to gravity and support surfaces.

Interventions with Level V Evidence

- The Tubular Orthosis for Torticollis (TOT) collar is used as an adjunct to conservative treatment of infants with CMT aged 4-4.5 months who demonstrate adequate head control in supported sitting, and who demonstrate more than 5 to 6 degrees of head tilt.

Interventions without Evidence of Efficacy

- The following approaches are reported in the literature, but have been shown not to provide any additional benefit or have not been studied systematically:
  1. Manual therapy
  2. Soft Tissue Massage
  3. Craniosacral Therapy
  4. Total Motion Release
  5. Feldenkrais

Other interventions:

(Burstein 1998, Cheng 2000 and 2001, Luther 2002, Stassen 2000)

1. Botulinum toxin (Botox) could enhance the effectiveness of stretching on the side of the contracture and allow strengthening of overstretched and weakened muscles on the opposite side of the neck.
2. Surgery is indicated if symptoms persist after 1 year of age despite conservative treatment. An alternate criterion reported for surgical intervention is the presence of residual deficits in rotation range of greater than 15° of rotation after at least 6 months of controlled manual exercises. Children who enter conservative treatment at older ages are more likely to require surgical release of the SCM.
3. Postoperative physical therapy consisting of range-of-motion exercises is recommended after surgical release of the SCM. A cervical collar could also be included in the postoperative management.

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Recommended Frequency of Treatment:

No specific recommendation of intensity of treatment is appropriate for all cases. Regardless of severity, if PT treatment is initiated, passive stretching and active positioning should be frequently performed throughout each day by the parent/caregiver and with responses to treatment regularly evaluated for effectiveness. The episode of care ranges from 1.5 month to a maximum of 6 months of conservative care.

Home and Self-Care Techniques

The parents can be taught to use medical equipment and administer self-care at their residence.

Home Medical Equipment

- Cervical orthoses
- Cranial remolding orthoses

Self-Care Techniques

- Passive stretching exercises
- Parent holding positions
- Positioning
- Strengthening activities

Alternatives/Adjuncts to Physical/Occupational Therapy Management

- Surgery
- Opthamology
- Orthopedic
- Neurology

Autism Mandates

1. Centers for Medicare & Medicaid Services (CMS) Informational Bulletin. Clarification of Medicaid coverage of services to children. July 7, 2014. http://www.medicaid.gov/Federal-Policy-Guidance/Downloads/CIB-07-07-14.pdf
2. National Conference of State Legislatures (NCLS), Insurance coverage for autism. August,2 012. http://www.ncsl.org/research/health/autism-and-insurance-coverage-state-laws.aspx

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Neuromuscular Disorders

Definition

Persons diagnosed in the developmental period with static or progressive neuromuscular impairments that threaten structural integrity or functional capabilities. Examples of neuromuscular impairments include developmental disorders, spina bifida, cerebral palsy, cerebellar ataxia, developmental dyspraxia, visual-perceptual dysfunction, muscular dystrophy, hemophilia, spinal muscle atrophies, metabolic diseases with sensory motor impairment, and traumatic brain injuries with sensory motor impairment.

Medically based therapy provided for periodic functional issues, may focus on post-surgical follow up, mobility, hand or upper extremity function, activities of daily living, feeding, assistive technology, contracture management, or wound management, and other areas where measurable and significant progress is expected to occur towards specific, and usually functional goals within a two to six month period.

History

Specific Aspects of History

- Patient must be deemed medically stable to participate in therapy
- Identify co-morbidities requiring medical management and those that affect therapy management
- If post-surgical, determine any precautions or limitations
- Identify past treatment history
- Clarify caregiver knowledge-base and skills

Presentation

- Clumsiness during play
- Delayed motor skills
- Delayed oral motor skills
- Impaired arousal, attention, and cognition
- Impaired locomotion
- Impaired sensatory integration
- Impaired vestibular integration
- Impaired visual skills

Subjective Findings

- When appropriate, interview child/adolescent, include family and/or caregiver to determine issues with regard to health, growth, development, environment or social context.
- Subjective assessment of the impact of the physical or functional deficits

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- Subjective assessment of the direction and rate of change (i.e., progressive improvement or deterioration, daily, weekly, or monthly changes)
- Determine present use of equipment and/or assistive devices

Objective Findings

Specific Aspects of Examination for Pediatric/Child and Adolescent
The evaluation should take into account relevant information about the child and family such as developmental status, cognition, language, behavior, family issues and related health issues, including past, concurrent, or anticipated medical or surgical interventions.

A. Aerobic Capacity and Endurance
   - Cardiovascular signs and symptoms in response to increased oxygen demands with exercise or activity.
   - Pulmonary signs and symptoms in response to increased oxygen demands with exercise or activity.

B. Arousal, Attention, and Cognition
   - Arousal and attention
   - Cognition, including ability to process commands
   - Communication
   - Motivation
   - Orientation to person, place, time, and situation.
   - Recall, including memory and retention

C. Skin Characteristics
   - Including blistering, continuity of skin color, dermatitis, hair growth, mobility, nail growth, sensation, temperature, texture, and turgor.

D. Musculoskeletal Assessment
   - Range of motion: active and passive
   - Alignment: trunk and limbs
   - Joint integrity: joint, capsular, and ligamentous status
   - Functional muscle strength
   - Postural alignment and position (static and dynamic), including symmetry and deviation from midline

E. Motor Control and Motor Learning
   - Qualitative assessment of movement: isolated control; presence of abnormal or unusual movements, or synergistic patterns.
   - as measured by coordination screens, motor impairment tests, motor proficiency tests, observation, fine and gross motor control tests, finger dexterity tests, manipulative ability tests.

F. Neuromotor Development and Sensory integration
   - Acquisition and evolution of motor skills, including age-appropriate development as measured by activity indexes, developmental inventories and questionnaires, infant and toddler motor assessments, learning profiles, motor function tests, motor proficiency assessments and neuromotor assessments
   - Sensorimotor integration, including postural, equilibrium, and righting reactions as measured by behavioral assessment scales, motor and processing skill tests,

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observation, postural challenge tests, sensory profiles and visual perceptual skill tests
- Muscle Tone: resting muscle tone; spectrum includes varying degrees of exaggerated, reduced, or fluctuating stiffness
- Reflex status: integration, persistence, or re-emergence of primitive reflexes; emergence of mature reflexes; deep tendon reflexes; clonus
- Coordination: timing, grading, and smoothness of movement; presence of tremulousness, dysmetria

G. Gait, Locomotion and Balance
- Kinetic analysis of gait deviations; analysis of temporal issues; e.g. cadence, speed, and smoothness of forward progression; functional capabilities and safety issues (e.g. community or household; terrain, stairs, slopes)
- Fit, use, and appropriateness of orthotic and assistive devices
- Assessment of alternative forms of locomotion e.g. rolling and crawling
- Assessment of need for mobility equipment

H. Equipment
- Assessment of current equipment: State of repair and fit; functional use; appropriateness to existing environmental challenges
- Assessment of need for other equipment to meet existing or emerging environmental challenges

I. Pre-vocational and Vocational Assessment
- Sensorimotor, perceptual, or adaptive skills related to performing independent living or vocational tasks.
- Environmental issues related to independent living or vocational tasks

American Academy of Pediatrics Developmental Milestones

Developmental milestones are a set of functional skills or age-specific tasks that most children can do at a certain age range. Although each milestone has an age level, the actual age when a normally developing child reaches that milestone can vary. Every child is unique!

One Month:

- Makes jerky, quivering arm thrusts
- Brings hands within range of eyes and mouth
- Moves head from side to side while lying on stomach
- Head flops backward if unsupported
- Keeps hands in tight fists
- Strong reflex movements
- Focuses 8 to 12 inches (20.3 to 30.4 cm) away
- Eyes wander and occasionally cross
- Prefers the human face to all other patterns
- Hearing is fully mature
- Recognizes some sounds
- May turn toward familiar sounds and voices

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Newborn Reflexes:

The following are some of the normal inborn reflexes you will see your baby perform during her first weeks. Not all infants acquire and lose these reflexes at exactly the same time.

Reflex	Age When Reflex Appears	Age When Reflex Disappears
Moro Reflex	Birth	2 months
Sucking reflex	Birth	3-4 months
Rooting	Birth	4 months
Tonic neck reflex	Birth	5-7 months
Palmar grasp	Birth	5-6 months
Plantar grasp	Birth	9-12 Months

Three Months:

- Raises head and chest when lying on stomach
- Supports upper body with arms when lying on stomach
- Stretches legs out and kicks when lying on stomach or back
- Opens and shuts hands
- Pushes down on legs when feet are placed on a firm surface
- Brings hand to mouth
- Takes swipes at dangling objects with hands
- Grasps and shakes hand toys
- Follows moving objects
- Recognizes familiar objects and people at a distance
- Starts using hands and eyes in coordination
- Turns head toward direction of sound

Seven Months:

- Rolls both ways (front to back, back to front)
- Sits with, and then without, support of her hands
- Supports her whole weight on her legs
- Reaches with one hand
- Transfers object from hand to hand
- Uses raking grasp (not pincer)
- Develops full color vision
- Distance vision matures
- Ability to track moving objects improves
- Responds to own name
- Begins to respond to “no”
- Distinguishes emotions by tone of voice
- Responds to sound by making sounds
- Uses voice to express joy and displeasure
- Babbles chains of consonants
- Explores with hands and mouth
- Struggles to get objects that are out of reach

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Twelve Months:

- Gets to sitting position without assistance
- Crawls forward on belly by pulling with arms and pushing with legs
- Assumes hands-and-knees position
- Creeps on hands and knees supporting trunk on hands and knees
- Gets from sitting to crawling or prone (lying on stomach) position
- Pulls self up to stand
- Walks holding onto furniture
- Stands momentarily without support
- May walk two or three steps without support
- Uses pincer grasp
- Bangs two cubes together
- Puts objects into container
- Takes objects out of container
- Lets objects go voluntarily
- Pokes with index finger
- Tries to imitate scribbling
- Explores objects in many different ways (shaking, banging, throwing, dropping)
- Finds hidden objects easily
- Looks at correct picture when the image is named
- Imitates gestures
- Begins to use objects correctly (drinking from cup, brushing hair, dialing phone, listening to receiver)
- Finger-feeds himself
- Extends arm or leg to help when being dressed

Two Years:

- Walks alone
- Pulls toys behind her while walking
- Carries large toy or several toys while walking
- Begins to run
- Stands on tiptoe
- Kicks a ball
- Climbs onto and down from furniture unassisted
- Walks up and down stairs holding on to support
- Scribbles spontaneously
- Turns over container to pour out contents
- Builds tower of four blocks or more
- Might use one hand more frequently than the other

Three to Four Years:

- Hops and stands on one foot up to five seconds
- Goes upstairs and downstairs without support
- Kicks ball forward
- Throws ball overhand

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- Catches bounced ball most of the time
- Moves forward and backward with agility
- Copies square shapes
- Draws a person with two to four body parts
- Uses scissors
- Draws circles and squares
- Begins to copy some capital letters
- Dresses and undresses

Four to Five Years:

- Stands on one foot for ten seconds or longer
- Hops, somersaults
- Swings, climbs
- May be able to skip
- Copies triangle and other geometric patterns
- Draws person with body
- Prints some letters
- Dresses and undresses without assistance
- Uses fork, spoon, and (sometimes) a table knife
- Usually cares for own toilet needs

Standardized Pediatric Tests

Objective testing must be used to establish baseline measurements of deficits. Periodic reassessment of deficits is required to demonstrate progress.

Sample Tests

Balance Tests

Assessment	Description	Resource
6-Minute Walk Test (6MWT)	Measures exercise capacity in children ages 4-11 years who have chronic cardiac or respiratory disease.	Lammers, A. E., A. A. Hislop, Y. Flynn, S.G. Haworth. 2007. “The 6-minute walk test: normal values for children of 4-11 years of age.” Department of PaediatricCardiology, Great Ormond Street Hospital for Children, UK
Faces Pain Scale-Revised	Faces Pain Scale-Revised Self-assesses pain severity for children ages 4-16 years.	Hicks CL, CL.vonBaeyer, P. Spafford, I.van Korlaar and B. Goodenough. 2001. “The Faces Pain Scale - Revised: Toward a common metric in pediatric pain measurement.” Pain 93:173−83.
Functional Reach Test	Examines dynamic balance in children ages 3-5 years.	Norris, R.A., E. Wilder, and J. Norton. 2008. “The Functional Reach Test in 3-to 5- Year-Old Children Without Disabilities.” Pediatric Physical

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		Therapy 20(1):47−52.
Modified Time Upand Go (Modified TUG)	Measures anticipatory standing balance and walking.	Williams, E. N. et al. 2005. Developmental Medicine and Child Neurology 47:518−24.
Pediatric Berg Balance Scale	Measures functional balance for school-age children with mild to moderate motor impairments.	Franjoine, M.R., J. Gurther, and M. J.Taylor. 2003. “Pediatric Balance Scale: A Modified Version of the Berg Balance Scale for the School-Age Child with Mild to Moderate Motor Impairment.” Pediatric Physical Therapy 15(2):114−20.
Pediatric Clinical Test of Sensory Integration and Balance (PCTSIB or Foam and Dome)	Provides information about the ability to stand upright under several sensory conditions.	Crowe, T. K., J. C. Dietz, P. K. Richardson, and S. L. Westcott. 1994. “Test-Retest Reliability of the Pediatric Clinical Test of Sensory Interaction for Balance.” Physical and Occupational Therapy in Pediatrics 14:1.
Standardized Walking Obstacle Course (SWOC)	Measures functional ambulation for children with and without disabilities who walk without an assistive device.	Held, S., K. M. Kott, and B.L. Young. 2006. “Standardized Walking Obstacle Course (SWOC): Reliability and Validity of a New Functional Measurement Tool for Children.” Pediatric Physical Therapy 18(1):23−30.
Timed Up and Down Stairs (TUDS)	Measures functional mobility for children with and without cerebral palsy ages 8-14 years.	Zaino, C., V. GMarchese, and S. L. Westcott. 2004. “Timed Up and Down Stairs Test: Preliminary Reliability and Validity of a New Measure of Functional Mobility.” Pediatric Physical Therapy 16(2):90−8.

Developmental Tests

Assessment	Description	Resource
Bruininks-Osteretsky Test of Motor Proficiency, Second Edition (BOT-2)	Assesses motor functioning of children ages 4-21 years in areas of fine motor control, manual coordination, body coordination, strength and agility.	Pearson, San Antonio, TX
Test of Gross Motor Development-2 (TGMD-2)	Measures twelve gross motor skills ages 3 -10 years to identify children who are significantly behind their peers in gross motor development.	Ulrich, D.A. 2000. “The Test of Gross Motor Development” 2nd ed. PRO-ED, Inc.
Movement Assessment Battery	Screens/identifies motor competence for children in three age ranges: 3-6;	Pearson, San Antonio, TX

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for Children, Second Edition (MABC-2)	7-10; and 11-16 years. Eight items tested for each age group in three areas: manual dexterity, ball skills, and static and dynamic	
Peabody Developmental Motor Scales (PDMS-2), Second Edition	Measures gross and fine motor skills from birth-6 years.	Pearson, San Antonio, TX

Functional Tests

Assessment	Description	Resource
Pediatric Evaluation of Disability Inventory (PEDI)	Measures capability and performance of functional activities in self-care, mobility, and social function in children from 6 months - 7.5 years.	Pearson, San Antonio, TX
Gross Motor Function Measure (GMFM)	Evaluates change in gross motor function in children with cerebral palsy and describes current level of motor function.	Bjornson, K. F, C. S. Graubert, V. L Buford, et al. 1998. “Validity of the Gross Motor Function Measure.” Pediatric Physical Therapy 10(2):43−47.
Gross Motor Function Measure (GMFM-88 and GMFM-66)	Measures change in gross motor function in children with cerebral palsy ages 5 months - 16 years. Also valid for assessment of children with Down Syndrome and children recovering from TBI.	Russell, D., P. L. Rosenbaum, L. M. Avery, and M. Lane. 2002.
Motor Function Measure Scale for Neuromuscular Diseases (MFM)	Measures motor function for individuals with neuromuscular diseases ages 6-62 years.	Berard, C., C. Payan, I. Hodgkinson, J.Fermanian. 2005. “A motor function measure scale for neuromuscular diseases.” The MFM Collaborative Study Group. Neuromuscular Disorders 15:463−70.
Functional Independence Measure (WEE FIM II)	Measures the need for assistance and the severity of disability in children ages 6 months - 7 years. Eighteen items measure functional performance in three domains.	Uniform Data System for Medical Rehabilitation, NY

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Sensorimotor Tests

Assessment	Description	Resource
Developmental Test of Visual-Motor Integration, 6th Edition (VMI),	VMI assess the extent to which individuals can integrate their visual and motor abilities. Includes norms for ages 2-18.	Keith E. Beery, PhD, Norman A. Buktenica, and Natasha A. Beery
Motor-Free Visual Perception Test (MVPT)	The MVPT-3 assesses an individual's visual perceptual ability with no motor involvement needed to make a response. It is especially useful with those who may have learning, motor, or cognitive disabilities. The test can be used for ages 4-70.	Ronald P. Colarusso, Ed.D., and Donald D. Hammill, Ed.D.
Sensory Integration and Praxis Test (SIPT)	The SIPT has 17 subtests, which fall into six categories of sensory processing and motor function: form and space, visual motor, tactile discrimination, vestibular-proprioceptive processing, bilateral integration and sequencing and praxis.	A. Jean Ayres, PhD, 1989
Test of Visual Perceptual Skills (Non-motor, TVPS)	This format is ideal for children who may have impairments in motoric, speech, hearing, neurological, or cognitive functions. The Third Edition covers the age range 4 through 18. The TVPS-3 will enable the clinician to make a comprehensive diagnosis of a child's perceptual abilities separate from motor skills	Western Psychology Services, CA

Admission Criteria

- For those aspects of sensorimotor function for which there are standardized tests, significant dysfunction is commonly indicated by performance that is moderately to severely delayed or 1.5 standard deviations or more below the mean (Coolmanet al., 1998).
- Findings indicate a periodic functional skills issue, in which a specific goal is likely to be obtained in a generally predictable time frame.
- Anatomical and physiological changes related to growth and development
- Identified deficit can be measured and progress demonstrated throughout the treatment plan.
- Home program development, education and training
- Patient or caregiver training in medical, functional or adaptive equipment

Discharge Criteria

Termination of therapy services should occur when:

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- Episode goals have been reached for that functional level
- The family chooses not to continue therapy
- When therapy services no longer produce a functional and measurable outcome
- Lack of progress in a reasonable time-frame
- When care is repetitive, skilled therapy services are no longer required and the caregiver/patient can continue with the home program
- improvements that can be attributed to only maturation is not an indication for ongoing treatment.

Definitions

Habilitation (NAIC):

"Health care services that help a person keep, learn or improve skills and functioning for daily living. Examples include therapy for a child who isn't walking or talking at the expected age. These services may include physical and occupational therapy, speech-language pathology and other services for people with disabilities in a variety of inpatient and/or outpatient settings." (76 Fed.Reg. 52,442; 76 Fed. Reg. 52,475)

Habilitation (Medicaid):

"Services designed to assist individuals in acquiring, retraining andimproving the self-help, socialization, and adaptive skills necessary to reside successfully in home and community based settings." Social Security Act, Section 1915 (c)(5)(A).

Rehabilitation (NAIC):

"Health care services that help a person keep, get back or improve skills and functioning for daily living that have been lost or impaired because a person was sick, hurt or disabled. These services may include physical and occupational therapy, speech-language pathology and psychiatric rehabilitation services in a variety of inpatient and/or outpatient settings." (76 Fed.Reg. 52,442; 76 Fed. Reg. 52,475)

Treatment Intensity and Frequency Guidelines

Treatment intensity in a pediatric is a function of the potential for improvement, required skill level of the person delivering the intervention, and the amount of clinical decision making necessary to implement the intervention (see below). Briefly, the four treatment models for a pediatric setting include:

1. *Intensive therapy model*.
   - Patient has potential for rapid progress towards goals. Rapid changes in condition necessitate frequent changes in treatment. Appropriate for patients in an extremely critical period for skill acquisition related to development or medical condition.
2. *Weekly/frequent therapy model*.
   - Patient demonstrates continuous progress towards established goals. Requires frequent intervention for a limited duration to achieve

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functional skills or requires frequent revisions or updates of home program. Treatment may be 1-2 times per week or 2-3 times per month

3. *Periodic/monthly therapy model*.
   - Appropriate for patients not in a critical period for skill acquisition or at risk of regression.
4. *Consultative therapy model*.
   - Appropriate when expertise is needed to identify problems or recommend a solution for a specific issue.

(Baileset al., Pediatric Phys Ther, 2008)

Clinical Factor	Intensive Mode (daily treatment or more)	Weekly/ Bimonthly mode	Periodic (monthly or less often)	Consultative Episodic or as needed
Potential to participate and benefit from the therapy process	▪ Rapid functional progress or potential for rapid decline ▪ Critical medical condition with risk of loss of function ▪ Almost daily changes in condition	▪ Patient shows continuous progress towards goals	▪ Patient shows slow rate of goal achievement in identified areas ▪ Does not regress ▪ Patient may not be able to cooperate or participate in therapy sessions	▪ Patient able to meet new challenges ▪ Clinical decision making used to identify problems; recommend solutions ▪ Issues identified by family/patient, not dictated by condition
Critical period for skill acquisition or potential regression based on development or condition	▪ Extremely critical period based on condition	▪ Critical period	▪ Not in a critical period ▪ Related to life stage or medical condition changes	▪ Specific challenges identified by patient/caregiver ▪ Need for specific adaptive equipment or strategy
Need for clinical decision	▪ Requires clinical skills of	▪ Requires clinical skills and	▪ Clinical skills and problem solving	▪ Home program carried out ▪ independently by

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making/problem solving from licensed therapist	licensed therapist ▪ Very limited amount of therapy program can be safely performed by patient/carefgiver	problem solving of a licensed therapist for most of program	required to assess condition status ▪ Home program updates ▪ Home program can be safely performed by patient/caregiver	patient/caregiver ▪ Clinical skills and problem solving by therapist needed for specific challenge identified by patient/caregiver
Level of support necessary to assist patient in attaining goals, attending therapy, compliance, etc.	▪ High level of support required to attain goals ▪ Minimal or no contribution by patient/caregiver	▪ High level of support required to attain goals ▪ Patient/caregiver able to participate, but not independently	▪ Minimal support required to address factors that may impede ability to progress towards goals.	▪ Support is needed only to address specific challenges identified by patient/caregiver ▪ Associated with life changes

Habilitative Phases and treatment Guidelines

Chronic with Improve-ment	▪ Medical condition is stable ▪ Slow rate of attainment of goals, and/or does not regress for reasons unrelated to the disease process, changes may be monthly ▪ Changes may be monthly ▪ Equipment may need intermittent modification or adaptation ▪ Home program may require periodic modification by a	Bi-monthly to quarterly (1-6 times per year)	▪ Improve skill development ▪ Teach compensatory techniques ▪ Caregiver training ▪ Home program update	Generally applies to mild chronic neurological impairments that demonstrate progress, e.g., Hypotonia, lack of coordination

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	therapist			
Chronic with possible decline	▪ Condition may be stable or degenerating No functional changes ▪ Have new challenges or specific issues that require the skilled knowledge of a therapist to problem solve possible options ▪ Have a need for newly available assistive technology	One session every 3-6 months or as necessary (1-4 times per year)	Caregiver training for medical, functional or adaptive equipment needs	Generally for issues of positioning, splinting and contracture or wound management and development assessments

Physical/Occupational Therapy Management/Intervention

Therapy resources are most responsibly allocated when they are driven by their potential to improve function and not simply by the existence of a diagnosis. Best practice PT and OT avoids learned helplessness and dependence on therapy. It fosters the child's competence in his or her environment, prevents secondary complications and disability, and uses home programs and other community resources to promote independence (CoolmanR et al., 1998).

Therapy services will be periodic and episodic to address specific functional problems related to emerging issues of health, growth, development, environment, and family context. Frequency and duration of treatment typically diminishes with age but new issues may emerge over the lifespan. Treatment is appropriate when it has the potential to improve the child's functional level within 4-6 months. Treatment also may be appropriate in a child with a progressive disorder when it has potential to prevent loss of a functional skill, or enhance the adaptation to such functional loss (Coolman R et al.,1998 and APTA Guide to physical therapy practice.).

Goal/Outcome	Examples of Interventions
Aerobic capacity/endurance	Aquatic programs, gait and loco-motor training , walking and wheelchair propulsion programs
Access to household and community activities	Body mechanics, postural stabilization, developmental activities, neuromuscular education, perceptual training, sensory training, neuromotor development training, flexibility exercises, gait and locomotion training
Independence in self-care	Training in bed mobility, transfers, bathing, dressing, grooming, toileting and developmental activities.
Prescription, application, and training in use of	▪ Written or augmentative communication devices ▪ Environmental controls

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adaptive equipment	▪ Assistive devices: crutches, canes, walkers, wheelchairs, scooter boards ▪ Power devices: motorized wheelchairs and scooters ▪ Adaptive devices: seating systems, raised toilet seats, grab bars; supine, prone, or dynamic standers ▪ Orthotic devices: braces, shoe inserts, splints ▪ Prosthetic limbs ▪ Protective devices: cushions, helmets ▪ Supportive devices: compression garments, collars,
Improved respiration	Breathing strategies and techniques to maximize ventilation, positioning, movement, and exercises to improve function
Improved oral-motor skills	Teach strategies and techniques for feeding, eating, biting, chewing, swallowing and drinking.
Improved joint integrity and mobility	Flexibility exercises, stretching, massage, joint/soft tissue mobilization
Improved motor function	Biofeedback, electrical muscle stimulation (EMS), neuromuscular electrical stimulation (NMES), transcutaneous electrical nerve stimulation (TENS)
Reduce edema, lymphedema, or effusion	Compression bandaging, compression garments, taping, total contact casting, vasopneumatic compression devices, gravity-assisted compression devices
Home Programs	Home programs are indispensable elements of PT/OT intervention, augmenting the effects of therapy and promoting functional application of acquired skills. These programs are developed by the PT and OT and are implemented by parents and caregivers. They may also be self-directed based on the child's developmental maturity and skill level. During the times of direct treatment, the home program serves as an adjunct to treatment, and requires regular review and updating. During periods when little or no functional changes occur, the home program serves to sustain the child's structural and functional status.

Home Medical Equipment

- Orthotics/Prosthetics
- Wheelchairs with seating systems
- Gait assistive devices
- Compression devices/serial casts/slings and wraps
- Protective gear

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Self-Management Techniques

- Family/caregiver training in adaptive equipment and strategies
- Family/caregiver training in therapeutic interventions
- Adjuncts to Physical/Occupational Therapy Management
- Orthotists
- Educational and community based programs
- Respite Care
- Behavioral intervention
- Vocational services
- Nutritionists
- Psychologists
- Speech-Language Pathologists
- Audiologists

Autism Mandates

1. Centers for Medicare & Medicaid Services (CMS) Informational Bulletin. Clarification of Medicaid coverage of services to children. July 7, 2014. http://www.medicaid.gov/Federal-Policy-Guidance/Downloads/CIB-07-07-14.pdf
2. National Conference of State Legislatures (NCLS), Insurance coverage for autism. August, 2012. http://www.ncsl.org/research/health/autism-and-insurance-coverage-state-laws.aspx

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Maximal Complex Motion Necessary for Functional Activities

Shoulder Motion (in degrees)

Activity	Motion	Mean	Source
Eating	Flexion	52	Matsen1
	Abduction	22	Safaee-rad et al2
	Medial rotation	18	Safaee-rad et al
	Horizontal adduction	87	Matsen
Drinking with a cup	Flexion	43	Safaee-rad et al
	Abduction	31	Safaee-rad et al
	Medial rotation	23	Safaee-rad et al
Washing axilla	Flexion	52	Matsen
Combing hair	Horizontal adduction	104	Matsen
	Abduction	112	Matsen
	Horizontal adduction	54	Matsen
Maximal elevation	Flexion/abduction	148	Matsen
Maximal reaching up back	Horizontal adduction	55	Matsen
	Extension	56	Matsen
	Horizontal abduction	69	Matsen
Reaching perineum	Extension	38	Matsen
	Horizontal abduction	86	Matsen

Elbow Motion (in degrees)

Activity	Flexion Range Min-Max	Pronation	Supination	Source
Use telephone	43-136	41	23	Morrey3
Rise from chair	21-95	34	-10	Morrey
Open door	24-57	35	24	Morrey
Read newspaper	78-104	49	-7	Morrey
Pour pitcher	36-59	43	22	Morrey
Put glass to mouth	49-130	10	13	Morrey
Drink from cup	78-129	-4	31	Safaee-rad et al
Cut with knife	89-107	42	-27	Morrey
Eat with form	85-128	11	52	Morrey
Eat with spoon	101-123	23	59	Safaee-rad et al

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Wrist Motion (in degrees)

Activity	Extension Min-Max	Ulnar Deviation Min-Max	Source
Put glass to mouth	11-24		Brumfield4
Drink from a glass	2-22	5-20	Ryu5
Drink from handled cup	-8-6	8-16	Safaee-rad et al
Eat with a fork	3-18	3 to -5	Safaee-rad et al
Feeding tasks: fork, spoon, cup	-7-21	19 to -2	Cooper6
Cut with a knife	-30 to -5	12-27	Ryu
Pour from pitcher	-20-22	12-32	Ryu
Turn doorknob	-40-45	-2-32	Ryu
Use a telephone	-15-40	-10-12	Ryu
Turn steering wheel	-15-45	-17-27	Ryu
Rise from chair	-10-60	5-30	Ryu

Wrist Motion during Personal Care (in degrees)

Activity	Extension	Flexion	Ulnar Deviation	Radial Deviation	Source
Hand to top of head	-	21	16	-	Ryu
Hand to Occiput	-	10	10	-	Ryu
Hand to front of chest	-	25	-	5	Ryu
Hand to sacrum	-	20	48	-	Ryu
Hand to foot	0.9	-	9	-	Ryu

Finger and Thumb Motion during 11 Functional Activities (in degrees)

(Holding a telephone, can, fork, scissors, toothbrush, and hammer, using a zipper and comb, turning a key, printing with a pen, and unscrewing a jar)
Source:

1. Totten, PA, and Flinn-Wagner, S: Functional evaluation of the hand. In Stanley, BG, and Trbuzi, SM (eds): Concepts in Hand Rehabil. FA Davis, Philadelphia, 1992.
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Motion	Range	Mean	SD
Finger MCP flexion	33-73	61	(12)
PIP flexion	36-86	60	(12)
IP flexion	20-61	39	(14)
Thumb MCP flexion	10-32	21	(5)
IP flexion	20-43	18	(5)

Hip Flexion (in degrees)

	Livingston, et al7	McFayden and Winter8	Protopapadaki et al9
Activity	Range	Mean	Mean
Walking on level surfaces	0-30	44	-
Ascending stairs	0-66	60	65
Descending stairs	0-45	66	49
Sitting	-	90-112	-
Squatting	-	115	-
Stooping	-	125	-
Putting on socks	-	120 flex, 20 abd, 20 lateral rot.	-

Knee Flexion (in degrees)

	Jevsevar et al Mean age=5310	Livingston et al Women 19-26 yrs	Laubenthal et al Men mean age=2511	Rowe et al Mean age=6712
Motion	Mean	Mean Range	Mean Range	Mean
Walk on level surfaces	63			65
Ascend stairs	93	2-105	0-83	80
Descend stairs	87	1-107	0-83	78
Rise from chair	90			90
Sit in chair			0-93	91
Tie shoes			0-106	
Lift object from the floor			0-117	
Put on socks			0-117	

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Ankle Motion (in degrees)

Motion	Gait Level Surfaces	Stair Ascent	Stair Descent
Dorsflexion	0-10 (Murray)	14-27 (Livingston et al)	21-36 (Livingston et al)
Plantarflexion	15-30 (Murray)¶0-31 (Ostrosky et al)	23-30 (Livingston et al)¶15-25 (McFayden and Winter)	424-31 (Livingston et al)¶40 (Protopadaki et al)

Cervical Motion (in degrees)

Motion	Range	Source
Looking up (flexion)	40-50	Bennett and Associates13
Looking over the shoulder (rotation)	60-70	Bennett and Associates

Lumbar Motion (in degrees)

Motion	Gait Level Surfaces	Stair Ascent
Sit to stand	35	Hsieh and Pringle14
Stand to sit	42	Hsieh and Pringle
Putting on socks	57	Hsieh and Pringle
Picking up objects from floor	60	Hsieh and Pringle

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Diagnosis Codes

General Medical Rehabilitation	ICD-10 Codes
Benign Paroxysmal Positional Vertigo	H81.09, H81.01, H81.02, H81.03, H81.399, H81.13, H81.12, H81.11, H81.10, H81.23, H81.22, H81.21, H81.20, H81.319; H81.313, H81.312, H81.311, H81.49, H81.43, H81.42, H81.41, H83.09, H83.03, H83.02, H83.01, R42
Pelvic Pain Syndrome	K59.09; K59.00, K59.2, N30.30, N30.31, N36.44, N36.43, N36.42, N36.41, N36.8, N36.9, N39.3, N39.41, N39.42, N41.1, N41.9, N81.84, N81.82, N81.83, N81.89, N81.9, N89.3, N88.9, N94.1, N94.2, N94.89, N94.819, N94.818, R10.2
Rheumatoid Arthritis Hip, Knee, Foot, Ankle, Shoulder & Hand	L30.5, M32.10, M06.9, M06.861, M06.862, M06.869, M06.871, M06.872, M06.879, M06.88, M06.89, M13.0, M13.10, M13.111, M13.112, M13.119, M13.121, M12.9
Urinary Incontinence	G83.4, N31.1, N31.2, N31.8, N32.8, N32.81, N32.89, N32.9, N31.9, N36.44, N81.84, R15.0, R15.1, R15.2, R15.9, R30.0, R30.9, R33.9, R35.0, R35.1, R35.8, R32, N39.41, N39.3, N39.46, N39.45, N39.490, R39.81
Lymphedema	R42, Q82.0, R60.0, R60.1, R60.9, I97.2, I97.89, R60.9; I89.0, I89.1, I89.8, I89.9
Neurological Rehabilitation	**ICD-10 Codes**
Acquired Brain Injury	C71.0, C71.9, C72.0, D33.2, D33.4, D33.7, D33.9, D43.2, C43.4, D49.5, F07.81, G04.81, G04.89, G04.90, G04.91, G80.8, G80.9, G81.00, G81.01, G81.02, G81.03, G81.04, G81.10, G81.11, G81.12, G81.13, G81.14, G81.90, G81.91, G81.92, G81.93, G81.94, G91.8, G91.9, G92, G93.0, G93.1, G93.2, G93.40, G93.41, G93.49, G93.5, G93.6, I60.7, I60.8, I60.9, I61.8, I61.9, I62.00, I62.01, I62.02, I62.03, I62.1, I62.9, I63.0, I63.30, I63.40, I63.50, G45.9, I67.848, G46.0, G46.1, G46.2, G46.3, G46.4, G46.8, I67.81, I67.82, I67.83, I67.89, I67.9, I67.1, I67.2, I67.3, I67.4, I67.7, I679.890, I69.891, I69.893, I69.898, I69.90, I69.91, I69.931, I69.932, I69.933, I69.934, I69.939, I69.951, I69.952, I69.953, I69.954, I69.959, I69.961, I69.962, I69.963, I69.964, I69.965, I69.969, I69.898, I69.998, I69.90, Q04.5, Q04.6, Q04.8, R41.4, S06.0X0, S06.0X1, S06.0X0A, S06.330A,D,S; S06.331A,D,S; S06.270A,D,S, S06.360A,D,S; S06.890A,D,S; S069X9S, S09.8XXA,D,S; S09.90XA,D,S; Z86.73
Impaired Mobility	B91, G14, G00.8, G00.9, G31.89, G31.9, G20, G10, G11.1, G11.2, G11.3, G11.4, G11.8, G11.9, G21.1, G12.20, G12.21, G12.22, G12.29, G12.8, G12.9, G32, G32.81, G32.89, G35, G37.0, G37.1, G37.3, G37.8, G37.9, G58.7, G58.8, G58.9, G60.3, G60.8, G60.9, G61.0, G61.8, G61.81, G61.89, G61.9, G62.0, G62.1, G62.2, G62.8,

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	E13.64, G62.89, G62.9, G63, G64, G65.0, G65.1, G65.2, G70.00, G70.01, G70.1, G61.81, G72.81, G72.89, G72.9, I69.990, I69.993, I69.998, M13.0, M13.10, R26.0, R26.1, R26.2, R26.81, R26.89, R26.9, R27.0, R27.8, R27.9, M24.20, M60.009, M62.50, M62.81, M62.89, M62.9
Complex Regional Pain Syndrome (CRPS)	G90.09, G90.3, G90.4, G99.0, G90.50, G90.511, G90.512, G90.513, G90.59, G90.529, G90.9, G56.40, G56.41, G56.42
Spinal Cord Injury	G95.89, G95.9, S14.101A, S14.102A, S14.103A, S14.104A, S34.109A, S34.101A, S34.102A, S34.103A, S34.104A, 34.105A, S32.10XA, S32.2XXA, S34.131A, S34.132A, S34.139A, S34.3XXA, S32.10XB, S32.2XXB, S14.109A, 12.9XXA, S24.109A, S22.009A, 34.109A, S32.009A, S32.10XA, S32.009B, S14.10S, S24.109S, S34.109S, S34.139S, S14.101A, S14.102A, S14.103A, S14.104A, S14.155A, S14.156A, S14.157A, S14.158A, S14.105A, S14.106A, S14.107A, S14.108A, S24.101A, S24.102A, S24.103A, S24.104A, S24.153A, S24.154A, S34.109A, S34.139A, S34.3XXA, S34.139A, S14.109A, S24.109A, S34.109A, S34.139A
Orthopedic-Cervical Disc Radicular	**ICD-10 Codes**
Cervical, Brachial Neuritis or Radiculitis	G54.2, G54.9, G55
Cervical, Intervertebral Disc Syndrome	M50.20, M50.21, M50.22, M50.23, M50.30, M50.31, M50.32, M50.33, M50.80, M50.00, M50.01, M50.02, M50.03, M50.10, M50.10, M50.11, M50.12, M50.13, M50.20, M53.0, M53.1, M53.2X1, M53.2X2, M53.2X3, M53.2X4, M53.80, M53.81, M53.82, M53.83, M53.84, S14.2XXA, S14.2XXD, S14.2XXS, S14.3XXA, S14.3XXD, S14.3XXS, S14.4XXA, S14.4XXD, S14.4XXS
Cervical, Post Surgical Syndrome	M24.80, M50.20, M50.21, M50.22, M50.23, M50.30, M50.31, M50.32, M50.33, M50.80, M48.00, M48.01, M48.02, M48.03, M48.04
Stenosis-Cervical/ Thoracic Spine	M48.00, M48.01, M48.02, M48.03, M48.04, M43.8X1, M43.8X2, M43.8X4, M43.8X9, M53.80, M53.81, M53.82, M53.83, M53.84, M59.39
Orthopedic-Cervical Non-Specific	**ICD-10 Codes**
Head, Neck, and Upper Back Dysfunction	G44.209, G44.219, G44.229, G43.001, G43.009, G43.101, G43.109, G43.701,G43.709, G43.711, G43.719, G43.801, G43.801, G43.809, G43.811, G43.819, G43.901, G43.909, G43.911, G43.919, M47.811, M47.81, M47.813, M47.814, M47.819, M47.891, M47.892, M47.893, M47.894, M47.10, M47.11, M47.12, M47.13, M47.14, M47.20, M47.21, M47.22, M47.23, M47.24, M50.20, M50.21, M50.22, M50.23, M50.30, M50.31, M50.32, M50.33, M50.80, M50.81, M50.82, M50.83,

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	M50.90, M51.34, M50.00, M50.01, M50.02, M50.03, M50.10, M50.10, M50.11, M50.12, M50.13, M50.14, M51.04, M46.40, M54.2, M53.0, M43.6, M54.00, M54.01, M54.02, M54.03, M54.04, M53.80, M53.81, M53.82, M53.83, M53.84, M48.00, M48.01, M48.02, M48.04, M99.00, M99.01, M99.02, M99.08, G44.1, S12.9XXA, S12.9XXD, S12.9XXS, S22.009A, S22.009B, S22.009D, S22.009G, S22.009K, S22.009S, S22.49XA, S22.49XB, S22.49XD, S22.49XG, S22.49XK, S22.49XS, S13.111A, S13.111D, S13.111S, S13.4XXA, S13.4XXD, S13.4XXS, S23.3XXA, S23.3XXD, S23.3XXS, S23.41XA, S23.21XD, S23.41XS
Orthopedic-General	**ICD-10 Codes**
Compartment Syndrome	M79.A11, M79.A12, A79.A19, M79.A21, M79.A21, M79.A22, M79.A29, M79.A3, M79.A9, T90.8XXA, T79.8AXXD, T79.8XXS, T79.9XXA, T79.9XXD, T79.9XXS, T79.A, T79.A0XA, T79.A0XD, T79.A11A, T79.A11D, T79.A11S, T79,A12A, T79.A12D, T79.A12S, T79.A19A, T79.A19D, T79.A19S, T79.A21A, T79.A21D, T79.A21S, T79.A22A, T79.A22D, T79.A29A, T79.A29D, T79.A29S, T79.A3XA, T79.A3XD, T79.A3XS, T79.A9XA, T79.A9XD, T79.A9XS
Musculoskeletal Disorders	A48.0, C49.10, C49.11, C49.12, C43.59, D03.51, D03.59, C46.60, D03.60, D03.62, C43.70, D03.70, D03.71, D03.72, D21.11, D21.12, D21.20, D21.21, D21.22, D21.3, D21.4, D21.5, D21.6, D21.9, D23.5, D23.60, D23.61, D23.62, D23.70, D23.71, D23.72, D04.5, D04.60, D04.61, D04.62, D04.70, D04.71, D04.72, D49.2, M83.9, G89.11, G89.12, G89.18, G89.21, G89.22, G89.28, G89.29, G89.3, G89.4, M67.88, M67.89, M67.90, M75.30, M75.40, M75.80, M75.100, M75.50, M75.20, M75.110, M75.80, M60.9, M79.1, M79.7, M81.0, M81.8, M89.00, I70.269, I83.009, I83.019, I83.029, I83.209, L03.019, L03.029, L03.039, L03.049, L03.221, L03.222, L03.319, L03.329, L03.119, 03.129, L03.317, L51.0, L51.9, L51.8, L93.0, L93.2, L40.0, L40.1, L40.8, L94.0, L94.3, L91.0, L89.90, L89.009, L89.819, L89.899 L90.5, L98.8, M32.10, M34.0, M34.9, M35.00, M35.10, M33.90, M72.6, S41.109A, S51.809A, S51.009A, S61.509A, S61.409A, S61.429A, S66.929A, S61.409A, S61.209A, S61.229A, S66.529A, S41.009A, S41.029A, S68.019A, S68.029A, S68.519A, S68.529A, S68.119A, S68.192A, S68.619A, S68.629A, S58.119A, S58.129A, S58.919A, S58.929A, S68.419A S68.429A, S68.719A, S68.729A, S71.009A, S71.109A, S71.029A, S71.129A, S76.929A, S71.009A, S71.109A, S81.009A, S81.809A. S91.009A, S81.029A, S81.829A, S91.029A, S86.929A, S96.929A, S91.309A, S91.329A, S96.929A, S91.109A, S91.129A, S96.929A, S91.209A, S71.009A, S71.029A, S98.119A, S98.129A, S98.139A, S98.149A, S98.219A, S98.229A, S98.019A, S98.029A, S98.319A, S98.329A, S98.919A, S98.922A, S98.911A, S98.929A, S98.921A, S98.912A, S88.119A, S88.129A, S78.019A, S78.029A, S78.119A, S78.129A, S78.919A, S78.929A, S88.019A, S88.029A, S47.9XXA, S57.80XA, S57.00XA, S67.20XA, S67.30XA, S67.00XA, S67.10XA, S47.9XXA, S47.9XXA, S77.10XA,

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	S77.00XA, S87.80XA, S87.00XA, S97.80XA, S97.00XA, S97.109XA, S77.20XA, T20.30XA, T20.70XA, T20.39XA, T20.79XA, T21.30XA, T21.70XA, T21.39XA, T21.79XA, T22.30XA, T22.30XD, T22.30XS, T22.319A, T22.319D, T22.319S, T22.329A, T22.329D, T22.329S, T22.339A, T22.339D, T22.339S, T22.349A, T22.349D, T22.349S, T22.359A, T22.359D, T22.359S, T22.369A, T22.369D, T22.369S, T22.399A, T22.399D, T22.399S, T23.309A, T23.309D, T23.309S, T23.329A, T23.329D, T23.329S, T23.319A, T23.319D, T23.319S, T23.339A, T23.339D, T23.339S, T23.349A, T23.349D, T23.349S, T23.359A, T23.369D, T23.369S, T23.369A, T23.369D, T23.369S, T23.379A, T23.379D, T23.379S, T24.309A, T24.309D, T24.309S,T24.319A, T24.319D, T24.319S, T24.329A, T24.329D, T24.329S, T24.339A, T24.339D, T24.339S, T25.309A, T25.309D, T25.309S, T25.319A, T25.319D, T25.319S, T25.329A, T25.329D, T25.329S, T25.339A, T25.339D, T25.339S, T30.0, T33.529A, T33.529D, T33.529S, T33.839A, T33.839D, T33.839S, T33.829A, T33.829D, T33.829S, T33.90XA, T33.90XD, T33.90XS, T33.99XA, T33.99XD, T33.99XS, T34.529A, T34.529D, T34.529S, T34.829A, T34.829D, T34.829S, T34.90XA, T34.90XD, T34.90XS, T34.99XA, T34.99XD, T34.99XS, T69.029A, T69.029D, T69.029S, T69.1XXA, T69.1XXD, T69.1XXS, T87.9, T87.30, T87.40, T87.89, T81.30XA, T81.30XD, T81.30XS, T81.32XA, T81.32XD, T81.32XS, T81.31XA, T81.31XD, T81.31XS, T81.33XA, T81.33XD, T81.33XS
Myositis Ossificans	M40.00, M40.209, M41.20, M41.00, M96.5, M41.30, M41.80, M41.9, M40.10, M40.50, M43.8X9, M41.40, M41.50
Osteitis Pubis	M85.30
Temporomandibular Joint Dysfunction	M26.50, M26.51, M26.52, M26.53, M26.54, M26.55, M26.56, M26.57, M26.59, M26.60, M26.69, M26.61, M26.62, M26.63, M27.8, M27.9
Orthopedic-Knee	**ICD-10 Codes**
Anterior Cruciate Ligament (ACL) Reconstruction, Knee	M23.205, M23.219, M23.319, M23.229, M23.329, M23.239, M23.305, M23.339, M23.269, M23.202, M23.249, M23.349, M23.259, M23.359, M23.369, M23.009, M23.40, M22.40, M23.50, M23.8X9, M23.90 M23.50, M23.51, M23.52, M23.8X1, M23.8X2, M23.8X9, M23.90, M23.91, M23.92, M23.90, M23.91, M23.92
Knee Pain and Dynsfunction	M15.0, M15.1, M15.2, M15.3, M15.4, M15.8, M15.9, M17.10, M17.11, M17.12, M17.2, M19.071, M19.072, M19.079, M17.30, M17.31, M17.32, M17.4, M17.5, M17.9, M19.271, M19.272, M19.279, M17.30, M17.31, M17.32, M17.4, M17.5, M17.9, M19.90, M19.91, M19.92, M19.93, M15.0, M15.1, M15.2, M15.3, M15.4, M15.8, M15.9, M16.50, M16.51, M16.52, M16.6, M16.7, M16.9, M17.31, M17.32, M17.4, M17.5, M17.9, M19.90, M19.91, M19.92, M19.93, M12.561, M12.562, M12.569, M12.861, M12.862, M12.869, M12.871, M12.872, M12.879, M12.88, M12.89, M12.9, M23.40, M23.41, M23.42 , M22.40, M22.41, M22.42, M23.50, M23.51, M23.52, M23.8X1, M23.8X2, M23.8X9,

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	M23.90, M23.91, M23.92, M24.361, M24.362, M24.369, M24.461, M24.462, M24.469, M24.661, M24.662, M24.669, M23.50, M23.51, M23.52, M23.8X1, M23.8X2, M23.8X9, M25.461, M25.462, M25.469, M25.561, M25.562, M25.569, M25.661, M25.662, M25.669, R29.891, R29.898, M25.831, M25.832, M25.839, M25.841, M25.842, M25.869, M25.9, M70.50, M70.51, M70.52, M76.891, M76.892, M76.899, M76.40, M76.41, M76.42, M76.50, M76.51, M76.52, M70.40, M70.41, M70.42, M76.899, M76.891, M76.892, M70.40, M70.41, M70.42, M70.50, M70.51, M70.52, M71.20, M71.21, M71.22, M66.251, M66.252, M66.259, M66.261, M66.262, M66.229, M67.50, M93.20, M94.20, S83.006A, S83.006D, S83.006S, S83.104A, S83.104D, S83.104S, S83.105A, S83.105D, S83.105S, S83.106A, S83.106D, S83.106S, S83.124A, S83.124D, S83.124S, S83.125A, S83.125D, S83.125S, S83.126A, S83.126D, S83.126S, S83.412D, S83.412S, S83.422A, S83.422D, S83.422S, S83.429A, S83.429D, S83.429S, S83.411A, S83.411D, S83.411S, S83.412A, S83.412D, S83.412S, S83.419A, S83.419D, S83.419S, S83.501QA, S83.501D, S83.501S, S83.502A, S83.502D, S83.502S, S83.509A, S83.509D, S83.509S, S83.8X1A, S83.8X1D, S83.8X1S, S83.8X2A, S83.8X2D, S83.8X2S, S83.8X9A, S83.8X9D, S83.8X9S, S83.90XA, S83.90XD, S83.90XS, S83.90XA, S83.90XD, S83.90XS, S83.91XA, S83.91XD, S83.91XS, S83.92XA, S83.92XD, S83.92XS, S80.10XA, S80.10XD, S80.10XS, S80.11XA, S80.11XD, S80.11XS, S80.12XA, S80.12XD, S80.12XS, S89.80XA, S89.80XD, S89.80XS, S89.81XA, S89.81XD, S89.81XS, S89.82XA, S89.82XD, S89.82XS
Knee, Tear, Lateral, or Medial Meniscus	M23.200, M23.201, M23.202, M23.204, M23.205, M23.206, M23.207, M23.209, M23.211, M23.212, M23.219, M23.311, M23.312, M23.319, M23.221, M23.222, M23.229, M23.321, M23.322, M23.329, M23.231, M23.232, M23.249, M23.300, M23.301, M23.302, M23.303, M23.304, M23.305, M23.306, M23.307, M23.309, M23.32, M23.322, M23.329, M23.261, M23.262, M23.269, M23.200, M23.201, M23.202, M23.203, M23.204, M23.205, M23.206, M23.207, M23.209, M23.241, M23.242, M23.259, M23.341, M23.342, M23.349, M23.351, M23.352, M23.359, M23.361, M23.369, M23.005, M23.000, M23.001, M23.002, M23.003, M23.004, M23.006, M23.007, M23.009, M23.40, M23.41, M23.42, M23.50, M23.51, M23.52, M23.8X1, M23.8X2, M23.8X9, M23.90, M23.91, M23.92, S83.219A, S83.219D, S83.219S, S83.249A, S83.249D, S83.249S, S83.289A, S83.289D, S83.289S, S83.209A, S83.209D, S83.209S, S83.30XA, S83.30XD, S83.30XS, S83.31XA, S83.31XD, S83.31XS, S83.32XA, S83.32XD, S83.32XS
Total Knee Arthroplasty, Osteoarthritis Knee	M15.0, M15.1, M15.2, M15.3, M15.4, M15.8, M15.9, M17.10, M17.11, M17.12, M17.2, M17.30, M17.31, M17.32, M17.4, M17.5, M17.9, Z96.651, Z96.652, Z96.653, Z96.659

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Orthopedic-Lower Extremity	ICD-10 Codes
Ankle Foot Pain	M19.90, M19.91, M19.92, M19.93, M24.171, M24.172, M24.173, M24.174, M24.175, M24.176, M24.571, M24.572, M24.753, M24.754, M24.755, M24.756, M24.671, M24.672, M24.673, M24.674, M24.675, M24.676, M24.871, M24.872, M24.873, M24.874, M24.875, M24.876, M25.071, M25.072, M25.073, M25.074, M25.075, M25.076, M25.08, M25.571, M25.572, M25.579, M25.671, M25.672, M25.673, M25.674, M25.675, M25.676, M25.871, M25.872, M25.879, M25.9, M76.50, M76.51, M76.52, M76.60, M76.61, M76.62, M76.821, M76.822, M76.829, M77.30, M77.31, M77.32, M65.871, M65.872, M65.879, M65.88, M65.89, M65.9, M20.10, M20.11, M20.12, M77.50, M77.51, M77.52, M77.8, M77.9, M67.00, M67.01, M67.02, S83.90XA, S83.90XD, S83.90XS, S83.91XA, S83.91XD, S83.91XS, S83.92XA, S83.92XD, S83.92XS, S93.401A, S93.401D, S93.401S, S93.402A, S93.402D, S93.402S, S93.409A, S93.409A, S93.409D, S93.409S, S96.911A, S96.911D, S96.911S, S96.912A, S96.912D, S96.912S, S96.919A, S96.919D, S96.919S, S93.421A, S93.421D, S93.421S, S93.422A, S93.422D, S93.422S, S93.429A, S93.429D, S93.429S, S93.411A, S93.411D, S93.411S, S93.412A, S93.412D, S93.412S, S93.419A, S93.419D, S93.419S, S93.431A, S93.431D, S93.431S, S93.432A, S93.432D, S93.432S, S93.439A, S93.439D, S93.439S, S86.011A, S86.011D, S86.011S, S86.012A, S86.012D, S86.012S, S86.019A, S86.019D, S86.019S, S93.601A, S93.601D, S93.601S, S93.602A, S93.602D, S93.602S, S93.609A, S93.609D, S93.609S, S90.30XA, S90.30XD, S90.30XS, S90.31XA, S90.31XD, S90.31XS, S90.32XA, S90.32XD, S90.32XS, S90.00XA, S90.00XD, S90.00XS, S90.01XA, S90.01XD, S90.01XS, S90.02XA, S90.02XD, S90.02XS
Ankle, Ligament, Reconstruction, and Repair	S93.401A, S93.401D, S93.401S, S93.402A, S93.402D, S93.402S, S93.409A, S93.409A, S93.409D, S93.409S, S96.911A, S96.911D, S96.911S, S96.912A, S96.912D, S96.912S, S96.919A, S96.919D, S96.919S, S93.421A, S93.421D, S93.421S, S93.422A, S93.422D, S93.422S, S93.429A, S93.429D, S93.429S, S93.411A, S93.411D, S93.411S, S93.412A, S93.412D, S93.412S, S93.419A, S93.419D, S93.419S, S93.431A, S93.431D, S93.431S, S93.432A, S93.432D, S93.432S, S93.439A, S93.439D, S93.439S, S86.011A, S86.011D, S86.011S, S86.012A, S86.012D, S86.012S, S86.019A, S86.019D, S86.019S
Ankle Tendon Repair	M66.361, M66.362, M66.369, M66.871, M66.872, M66.879, M66.8, M66.89, M66.9, S93.401A, S93.401D, S93.401S, S93.402A, S93.402D, S93.402S, S93.409A, S93.409A, S93.409D, S93.409S, S86.011A, S86.011D, S86.011S, S86.012A, S86.012D, S86.012S, S86.019A, S86.019D, S86.019S, S93.601A, S93.601D, S93.601S, S93.602A, S93.602D, S93.602S, S93.609A, S93.609D, S93.609S
Calcaneus Fracture	S92.009A, S92.009B, S92.009D, S92.009G, S92.009K, S92.009P, S92.009S, S92.009A, S92.009B, S92.009D, S92.009G, S92.009K,

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	S92.009P, S92.009S
Femoral Shaft Fracture, with ORIF	S72.90XA, S72.90XD, S72.90XS, S72.309A, S72.309B, S72.309C, S72.309D, S72.309E, S72.21XD, S72.22XD, S72.23XD, S72.24XD, S72.25XD, S72.26XD, S72.301D, S72.302D, S72.309D, S72.309E, S72.321D, S72.322D, S72.323D, S72.324D, S72.325D, S72.326D, S72.331D, S72.332D, S72.333D, S72.334D, S72.335D, S72.336D, S72.341D, S72.342D, S72.343D, S72.344D, S72.345D, S72.346D, S72.351D, S72.352D, S72.353D, S72.354D, S72.355D, S72.356D, S72.361D, S72.362D, S72.363D, S72.364D, S72.365D, S72.366D, S72.391D, S72.392D, S72.399D, S72.401D, S72.402D, S72.409D, S72.409E, S72.411D, S72.412D, S72.413D, S72.413E, S72.414D, S72.415D, S72.416D, S72.416E, S72.421D, S72.422D, S72.423D, S72.424D, S72.425D, S72.426D, S72.431D, S72.432D, S72.433D, S72.434D, S72.435D, S72.436D, S72.441D, S72.442D, S72.443D, S72.443E, S72.444D, S72.445D, S72.446D, S72.446E, S72.451D, S72.452D, S72.453D, S72.453E, S72.454D, S72.455D, S72.456D, S72.456E, S72.457D, S72.461D, S72.462D, S72.463D, S72.463E, S72.464D, S72.465D, S72.466D, S72.466E, S72.471D, S72.472D, S72.479D, S72.491D, S72.492D, S72.499D, S72.449E, S72.8X1D, S72.8X2D, S72.8X9D, S72.90XD, S72.90XE, S72.91XD, S72.92XD, S79.001D, S79.002D, S79.009D, S79.011D, S79.012D, S72.019D, S79.091D, S79.092D, S79.099D, S79.101D, S79.102D, S79.109D, S79.111D, S79.112D, S79.119D, S79.121D, S79.122D, S79.129D, S79.131D, S79.132D, S79.139D, S79.141D, S79.142D, S79.149D, S79.191D, S79.192D, S79.199D
Hallux Rigidus, Pre- and Post Surgical	M20.10, M20.11, M20.12, M20.20, M20.21, M20.22, M20.40, M20.41, M20.42, M20.5X1, M20.5X2, M20.5X9, Q66.80, Q66.81, Q66.82, Q66.89, Q66.9
Hip Pain	G90.09, G90.3, G90.4, G57.00, G57.01, G57.02, G57.10, G57.11, G57.12, G57.20, G57.21, G57.22, G57.80, G57.81, G57.82, G57.90, G57.91, G57.92, G58.8, G58.9, G60.0, G60.1, G60.2, G60.3, G60.8, G60.9, M75.00, M75.01, M75.02, M77.50, M77.51, M77.52, M77.8, M77.9, M65.80
Hip Fracture, Closed, With or Without ORIF	M87.050, M87.051, M87.052, M87.059, S32.409A, S32.409B, S32.409D, S32.409G, S32.409K, S32.409S, S32.501A, S32.501B, S32.501D, S32.502A, S32.502B, S32.502D, S32.509A, S32.509B, S32.509D, S42.293A, S42.293B, S42.293D, S42.296A, S42.296B, S42.296D, S72.019A, S72.023A, S72.026A, S72.033A, S72.036A, S72.043A, S72.046A, S72.099A, S72.019B, S72.019C, S72.033B, S72.036B, S72.033C, S72.036C, S72.023B, S72.023C, S72.026B, S72.026C, S72.043B, S72.043C, S72.046B, S72.046C, S72.099B, S72.099C, S72.099A, S72.099B, S72.099C, S72.099D, S72.099E, S72.099G, S72.099A, S72.099B, S72.099C, S72.099D, S72.099E, S72.099G, S72.099A, S72.099B, S72.099C, S72.099D, S72.099E, S72.099F, S72.143A, S72.143B, S72.143C, S72.143D, S72.143E, S72.143G, S72.143H, S72.46A, S72.46B, S72.46C, S72.46D,

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	S72.46E, S72.46G, S72.46H, S72.23XA, S72.23XB, S72.23XC, S72.23XD, S72.23XE, S72.23XG, S72.23XH, S72.26XA, S72.26XB, S72.26XC, S72.26XD, S72.26XE, S72.26XG, S72.26XH, S72.009A, S72.009B, S72.009C, S72.009D, S72.009E, S72.00F, S72.413A, S72.413B, S72.413C, S72.413D, S72.413E, S72.413F, S72.413G, S72.413H, S72.416A, S72.416B, S72.416C, S72.416D, S72.416E, S72.416F, S72.416G, S72.416H, S73.004A, S72.004D, S72.004S, S73.005A, S72.005D, S72.005S, S73.006A, S72.006D, S72.006S, S33.2XXA, S33.2XXD, S33.2XXS, S72.002D, S72.009D, S72.011D, S72.012D, S72.019D, S72.019E, S72.021D, .S72.022D, S72.023D, S72.023E, S72.024D, S72.025D, S72.026D, S72.026E, S72.031D, S72.032D, S72.033D, S72.033E, S72.043D, S72.035D, S72.036D, S72.036E, S72.041D, S72.042D, S72.043D, S72.043E, S72.044D, S72.045D, S72.046D, S72.046E, S72.051D, S72.052D, S72.059D, S72.061D, S72.062D, S72.063D, S72.064D, S72.065D, S72.066D, S72.091D, S72.092D, S72.099D, S72.099E, S72.101D, S72.102D, S72.109D, S72.112D, S72.113D, S72.114D, S72.115D, S72.116D, S72.121D, S72.122D, S72.123D, S72.124D, S72.125D, S72.126D, S72.131D, S72.132D, S72.133D, S72.134D, S72.135D, S72.136D, S72.141D, S72.142D, S72.143D, S72.144D, S72.145D, S72.146D, S32.301D, S32.302, S32.309D, S32.311D, S32.312D, S32.313D, S32.475D, S32.476D, S32.481D, S32.482D, S32.483D, S32.484D, S32.485D, S32.486D, S32.491D, S32.492D, S32.499D, S32.501D, S32.502D, S32.509D, S32.511D, S32.512D, S32.519D, S32.591D, S32.592D, S32.599D, S32.611D, S32.612D, S32.415D, S32.416D, S32.421D, S32.422D, S32.423D, S32.424D, S32.425D, S32.525D, S32.426D, S32.431D, S32.432D, S32.433D, S32.434D, S32.435D, S32.314D, S32.315D, S32.316D, S32.391D, S32.392D, S32.399D, S32.401D, S32.402D, S32.409D, S32.411D, S32.412D, S32.436D, S32.41D, S32.42D, S32.43D, S32.44D, S32.445D, S32.446D, S32.451D, S32.452D, S32.453D, S32.454D, S32.455D, S32.456D, S32.461D, S32.462D, S32.463D, S32.464D, S32.465D, S32.466D, S32.471D, S32.472D, S32.473D, S32.474D, S32.613D, S32.614D, S32.615D, S32.616D, S32.691D, S32.629D, S32.699D
Hip, Total Replacement	M00.059, M00.159, M00.259, M00.859, M15.0, M15.3, M15.8, M15.9, M18.90, M19.91, M19.92, M19.93, S32.9XXA, S32.9XXB, S32.9XXD, S32.9XXG, S32.9XXK, S32.9XXS, S72.009A, S72.009B, S72.009C, S72.009D, S72.009E, S72.00F, Z96.641, Z96.642, Z96.643, Z96.649
Lower Extremity, Amputation with Subsequent Prosthesis, AKA, & BKA	S88.11A, S88.111D, S88.11S, S88.119A, S88.119D, S88.119S, S88.129A, S88.129D, S88.129S, S88.112A, S88.112D, S88.112S, S88.121A, S88.121D, S88.121S, S88.122A, S88.122D, S88.122S, S78.011A, S78.011D, S78.011S, S78.012A, S78.012D, S78.012S, S78.019A, S78.019D, S78.019S, S78.021A, S78.021D, S78.021S, S78.022A, S78.022D, S78.022S, S78.029A, S78.029D, S78.029S, S78.119A, S78.119D, S78.119S, S78.121A, S78.121D, S78.121S, S78.122A, S78.122D, S78.122S, S78.129A, S78.129D, S78.129S,

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	S78.991A, S78.991D, S78.991S, S78.912A, S78.912D, S78. 912S, S88.019A, S88.019D, S88.019S, S88.011A, S88.011D, S88.011S, S88.012A, S88.012D, S88.012S, S88.021A, S88.021D, S88.021S, S88.0212A, S88.022D, S88.022S, S88.029A, S88.029D, S88.029S, S88.111A, S88.111D, S88.111S, S88.1112A, S88.112D, S88.112S, S88.911A, S88.911D, S88.911S, S88.912A, S88.912D, S88.912S, S88.919A, S88.919D, S88.919S , Z89.431, Z89.432, Z89.439, Z89.441, Z89.442, Z89.449, Z89.511, Z89.512, Z89.519, Z89.521, Z89.522, Z89.529, Z89.611, Z89.612, Z89.619, Z89.621, Z89.622, Z89.629
Metatarsalgia	M77.40, M77.41, M77.42, S93.621A, S93.621D, S93.621S, S93.622A, S93.622D, S93.622S, S93.629A, S93.629D, S93.629S, S93.529A, S93.529D, S93.529S
Morton's Neuroma	G57.60, G57.61, G57.62
Plantar Fasciitis	M72.2, M62.89, M62.9, M72.8, M72.9, M72.2
Shin Splints	M86.9
Tarsal Tunnel Syndrome With and Without a Release	G57.50, G57.51, G57.52
Tarsal/Metatarsal Fracture, Post-Cast Removal or ORIF	M84.376A, M84.376D, M84.376G, M84.376K, M84.376P, M84.376S, M84.379A, M84.379D, M84.379G, M84.379K, M84.379P, M84.379S, S92.009A, S92.009B, S92.009D, S92.009G, S92.009K, S92.009P, S92.009S, S92.909A, S92.909B, S92.109A, S92.109B, S92.309A, S92.309B, S92.209A, S92.209B, S92.223A, S92.226A, S92.233A, S92.236A, S92.243A, S92.246A, S92.309A, S92.309B, S92.209A, S92.209B, S92.309A, S92.309B
Tibia Fracture, Post-ORIF	S92.309A, S92.309B, S82.109A, S82.109B, S82.109C,S82.109D, S82.109E, S82.109F, S82.109G ,S82.109H, S82.839A, S82.839B, S82.839C,S82.839D, S82.839E, S82.839F, S82.839G, S82.839H, S82.101A, S82.101B, S82.101C, S82.101D, S82.101E, S82.101F, S82.101G, S82.101H, S82.831A, S82.831B, S82.831C, S82.831D, S82.831E, S82.831F, S82.831G, S82.831H, S82.102A, S82.102B, S82.102C, S82.102D, S82.102E, S82.102F, S82.102G, S82.102H, S82.832A, S82.832B, S82.832C, S82.832D, S82.832E, S82.832F, S82.832G, S82.832H, S82.209A, S82.209B, S82.209C, S82.209D, S82.209E, S82.209F , S82.409A, S82.409B, S82.409C, S82.409D, S82.409E, S82.409F , S82.209B, S82.209C, S82.409B, S82.409C, S82.201B, S82.202B, S82.401B, S82.402B, S82.201A, S82.201B, S82.201C, S82.201D, S82.401A, S82.401B, S82.401C, S82.401D, S82.201A, S82.202A, S82.401A, S82.402A, S82.201B, S82.201C , S82.401B, S82.401C , S82.201B, S82.401B, S82.202B, S82.402B, S82.90XA, S82.90XB, S82.90XC, S82.90XD, S82.90XE, S82.90XF, S82.90XG,S82.90XH, M84.463A, M84.463D, M84.463G, M84.463K, M84.463P,M84.463S, M84.464A, M84.464D, M84.464G, M84.464K,

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	M84.464P, M84.464S, M84.469A, M84.469D, M84.469G, M84.469K, M84.469P, M84.469S
Tibial Plateau Fractures with ORIF	S82.109A, S82.109B, S82.109C, S82.109D, S82.109E, S82.109F, S82.109G, S82.109H, S82.801A, S82.401A, S82.202A, S82.402A
Tibialis Tendinitis	M76.829, M76.821, M76.822
Tri-malleolar, Fracture, Post-Cast Removal	S82.53XA, S82.56XA, S82.63XA, S82.66XA, S82.63XB, S82.63XC, S82.66XB, S82.66XC, S82.843A, S82.846A, S82.843B, S82.843C, S82.846B, S82.846C, S82.853A, S82.856A, S82.853B, S82.853C, S82.856B, S82.856C, S82.899A
Turf Toe	S93.601A, S93.601D, S93.601S, S93.602A, S93.602D, S93.602S, S93.609A, S93.609D, S93.609S, S93.529A, S93.529D, S93.529S, S93.524A, S93.524D, S93.524S, S93.525A, S93.525D, S93.525S, S93.526A, S93.526D, S93.526S
Orthopedic-Lumbosacral Disc Radicular	**ICD-10 Codes**
Lumbar Intervertebral Disc Syndrome	M51.26, M51.27, M51.9, M51.34, M51.35, M51.36, M51.37, M51.34, M51.35, M51.36, M51.37, M51.9, M50.00, M51.04, M51.05 , M51.06, M46.47, M51.86, M51.87
Lumbar Post Surgery Syndrome	M51.26, M51.27, M51.9, M51.34, M51.35, M51.36, M51.37, M51.34, M51.35, M51.36, M51.37, M51.9, M51.06, M96.1, M96.1, M48.06, S12.000D, S12.001D, S12.01XD , S12.02XD, S12.030D, S12.031D, S12.040D, S12.041D, S12.090D, S12.091D, S12.100D, S12.101D, S12.110D, S12.111D, S12.112D, S12.120D, S12.121D, S12.130D, S12.131D, S12.14XD, S12.150D, S12.151D, S12.190D, S12.191D, S12.200D, S12.201D, S12.230D, S12.231D, S12.24XD, S12.250D, S12.251D, S12.290D, S12.291D, S12.300D, S12.301D, S12.330D, S12.331D, S12.34XD, S12.350D, S12.351D, S12.390D, S12.391D, S12.400D, S12.401D, S12.430D, S12.431D, S12.44XD, S12.450D, S12.451D, S12.490D, S12.491D, S12.500D, S12.501D, S12.530D, S12.531D, S12.54XD, S12.550D, S12.551D, S12.590D, S12.591D, S12.600D, S12.601D, S12.630D, S12.631D, S12.64XD, S12.650D, S12.651D, S12.690D, S12.691D, S12.9XXD, S22.000D, S22.001D, S22.002D, S22.008D, S22.009D, S22.010D
Lumbar Radiculopathy and Sciatica	G54.1, G54.4, G57.00, M54.30, M54.14, M54.15, M54.16, M54.17, M54.89, M54.9, M43.8X9, M53.9
Lumbar Spinal Stenosis	M48.06
Orthopedic-Lumbosacral Non- Specific	**ICD-10 Codes**
Back Pain and Dysfunction	G06.1, M46.1, M47.817, M51.36, M51.37, M51.9, M51.06, M46.40, M51.9, M46.47, M51.86, M51.87, M57.5, M54.89, M54.9, M43.27, M43.28, M53.2X7, M53.3, M53.3, M54.08, M43.8X9, M53.9,

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	M48.50XA, M80.08XA, M84.48XA, M84.68XA, M99.03, M99.04, Q76.2, S32.009A, S32.10XA, S32.2XXA, S83.509A, S33.6XXA, S33.9XXA, S33.5XXA, S33.8XXA
Orthopedic Shoulder	**ICD-10 Codes**
Shoulder Pain	M24.111, M24.112, M24.119, M24.311, M24.312, M24.319 , M24.411, M24.419, M24.412, M24.511, M24.512, M24.519, M24.811, M24.812, M24.819, M24.9 , M24.611, M24.612, M24.619 , M75.00, M75.01, M75.02 , M75.100, M75.101, M75.102, M75.50, M75.51, M75.52, M75.30, M75.31, M75.32, M75.20, M75.21, M75.22, M75.80, M75.81, M75.82 , M65.20, M71.40, S43.006A, S43.006D, S43.00, S43.004A, S43.005A, S43.005D, S43.005S, S43.016A, S43.016D, S43.016S, S43.014A, S43.014D, S43.014S, S43.015A, S43.015D, S43.015S , S43.026A, S43.026D, S43.026S, S43.024A, S43.024D, S43.024S, S43.025A, S43.025D, S43.25S, S43.101A, S43.101D, S43.101S, S43.102A, S43.102D, S43.102S, S43.109A, S43.109D, S43.109S, S43.004A, S43.004D, S43.004S, S43.005A, S43.005D, S43.005S, S43.005A, S43.005D, S43.005S, S43.006A, S43.006D, S43.006S, S43.014A, S43.014D, S43.014S, S43.015A, S43.015D, S43.015S, S43.016A, S43.016D, S43.016S , S43.80XA, S43.40XD, S43.40XS, S43.81XA, S43.81XD, S43.81XS, S43.82XA, S43.82XD, S43.82XS, S43.421A, S43.421D, S43.421S, S43.422A, S43.422D, S43.422S, S43.429A, S43.429D, S43.429S
Arthroscopic Procedure of the Shoulder	M75.30, M75.40, M75.80 , S43.421A, S43.421D, S43.421S, S43.422A, S43.422D, S43.422S, S43.429A, S43.429D, S43.429S, S43.431A, S43.431D, S43.431S, S43.432A, S43.432D, S43.432S, S43.439A, S43.439D, S43.439S
Dislocation of the Shoulder	S43.006A, S43.006D, S43.00, S43.004A, S43.005A, S43.005D, S43.005S, S43.016A, S43.016D, S43.016S, S43.014A, S43.014D, S43.014S, S43.015A, S43.015D, S43.015S, S43.026A, S43.026D, S43.026S, S43.024A, S43.024D, S43.024S, S43.025A, S43.025D, S43.25S, S43.101A, S43.101D, S43.101S, S43.102A, S43.102D, S43.102S, S43.109A, S43.109D, S43.109S, S43.004A, S43.004D, S43.004S, S43.005A, S43.005D, S43.005S, S43.005A, S43.005D, S43.005S, S43.006A, S43.006D, S43.006S, S43.014A, S43.014D, S43.014S, S43.015A, S43.015D, S43.015S, S43.016A, S43.016D, S43.016S
Rotator Cuff Tear Repair, with and without Distal Clavicle	M75.100, M75.101, M75.102, M75.50, M75.51, M75.52, S43.421A, S43.421D, S43.421S, S43.422A, S43.422D, S43.422S, S43.429A, S43.429D, S43.429S
Shoulder, Total Joint Replacement	M19.011, M19.012, M19.019 , M19.211, M19.212, M19.219, M19.91, M19.92, M19.93, Z96.611, Z96.612, Z96.619

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Orthopedic-Upper Extremity	ICD-10 Codes
Carpal Fracture, Closed and Open, Post- Cast Removal	S62.109A, S62.109B, S62.109D, S62.109G, S62.109K, S62.109P, S62.109S, S62.143A, S62.143B, S62.143D, S62.143G, S62.143K, S62.143P, S62.143S, S62.146A, S62.146B, S62.146D, S62.146G, S62.146K, S62.146P, S62.146S , S62.153A, S62.153B, S62.153D, S62.153G, S62.153K, S62.153P, S62.153S, S62.156A, S62.156B, S62.156D, S62.156G, S62.156K, S62.156P, S62.156S, S62.101A, S62.101B, S62.101D, S62.101G, S62.101K, S62.101P, S62.101S, S62.102A, S62.102B, S62.102D, S62.102G, S62.102K, S62.102P, S62.102S, S62.109A, S62.109B, S62.109D, S62.109G, S62.109K, S62.109P, S62.109S, S63.033A, S63.033D, S63.033S, S63.034A, S63.034D, S63.034S, S63.036A, S63.036D, S63.036S, S63.054A, S63.054D, S63.054S, S63.055A, S63.055D, S63.055S, S63.056A, S63.056D, S63.056S, S63.511A, S63.511D, S63.511S, S63.512A, S63.512D, S63.512S, S63.519A, S63.519D, S63.519S, S63.8X1A, S63.8X1D, S63.8X1S, S63.8X2A, S63.8X2D, S63.8X2S, S63.8X9A, S63.8X9D, S63.8X9S
Carpal Tunnel Syndrome With and Without Release	G56.00, G56.01, G56.02
Cubital Tunnel, Ulnar Nerve Entrapment	G56.20, G56.21, G56.22, G56.40, G56.41, G56.42, G58.7, G58.8, S62.146, G58.9, G56.90, G56.91, G56.92
Dupuytren's Contracture Post-Release	M65.30, M65.319, M72.0, Q79.8, Q79.9
Elbow Dislocation	S53.004A, S53.004D, S53.004S, S53.005A, S53.005D, S53.005S, S53.006A, S53.006D, S53.006S, S53.104A, S53.104D, S53.104S, S53.105A, S53.105D, S53.105S, S53.106A, S53.106D, S53.106S, S53.014A, S53.014D, S53.014S, S53.015A, S53.015D, S53.015S, S53.016A, S53.016D, S53.016S, S53.114A, S53.114D, S53.114S, S53.115A, S53.115D, S53.115S, S53.116A, S53.116D, S53.116S, S53.024A, S53.024D, S53.024S, S53.025A, S53.025D, S53.025S, S53.026A, S53.026D, S53.026S, S53.134A, S53.134D, S53.134S, S53.135A, S53.135D, S53.135S, S53.136A, S53.136D, S53.136S, S53.144A, S53.144D, S53.144S, S53.145A, S53.145D, S53.145S, S53.146A, S53.146D, S53.146S, S53.094A, S53.094D, S53.094S, S53.095A, S53.095D, S53.095S, S53.096A, S53.096D, S53.096S, S53.194A, S53.194D, S53.194S, S53.195A, S53.195D, S53.195S, S53.196A, S53.196D, S53.196S, S53.006A, S53.106A, S51.009A
Elbow Fracture, Closed, Post-Cast Removal	S42.301A, S42.301B, S42.301D, S42.301G, S42.301K, S42.301P, S42.301S, S42.302A, S42.302B, S42.302D, S42.302G, S42.302K, S42.302P, S42.302S, S42.309A, S42.309B, S42.309D, S42.309G, S42.309K, S42.309P, S42.309S, S52.123A, S52.123B, S52.123C,

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	S52.123D, S52.123E, S52.123F, S52.123G, S52.126A, S52.126B, S52.126C, S52.126D, S52.126E, S52.126F, S52.126G, S52.133A, S52.133B, S52.133C, S52.133D, S52.133E, S52.133F, S52.133G, S52.136A, S52.136B, S52.136C, S52.136D, S52.136E, S52.136F, S52.136G, S52.109A, S52.109B, S52.109C, S52.109D, S52.109E, S52.109F, S52.109G, S52.109G, S52.189A, S52.189B, S52.189C, S52.189D, S52.189E, S52.189F, S52.189G, S59.109A, S59.109D, S59.109G, S59.109K, S59.109P, S59.109S, S59.101A, S59.101D, S59.101G, S59.101K, S59.101P, S59.101S, S59.102A, S59.102D, S59.102G, S59.102K, S59.102P, S59.102S, S52.009A, S52.009B, S52.009C, S52.009D, S52.009E, S52.009F, S52.009G , S52.023B, S52.023C, S52.026B, S52.026B, S52.026C, S53.491A, S53.491D, S53.491S, S53.492A, S53.492D, S53.492S, S53.499A, S53.499D, S53.499S, S53.401A, S53.401D, S53.401S, S53.402A, S53.402D, S53.402S, S53.409A, S53.409D, S53.409S, S56.911A, S56.911D, S56.911S, S56.912A, S56.912D, S56.912S, S56.919A, S56.919D, S56.919S
Elbow Fracture, with ORIF	S42.201A, S42.201B, S42.201D, S42.201G, S42.201K, S42.201P, S42.201S, S42.202A, S42.202B, S42.202D, S42.202G, S42.202K, S42.202P, S42.202S, S42.209A, S42.209B, S42.209D, S42.209G, S42.209K, S42.209P, S42.209S, S42.291A, S42.291B, S42.291D, S42.291G, S42.291K, S42.291P, S42.291S, S42.292A, S42.292B, S42.292D, S42.292G, S42.292K, S42.292P, S42.292S, S42.293A, S42.293B, S42.293D, S42.293G, S42.293K, S42.293P, S42.293S, S42.294A, S42.294B, S42.294D, S42.294G, S42.294K, S42.294P, S42.294S, S42.295A, S42.295B, S42.295D, S42.295G, S42.295K, S42.295P, S42.295S, S42.296A, S42.296B, S42.296D, S42.296G, S42.296K, S42.296P, S42.296S, S42.301A, S42.301B, S42.301D, S42.301G, S42.301K, S42.301P, S42.301S, S42.302A, S42.302B, S42.302D, S42.302G, S42.302K, S42.302P, S42.302S, S42.309A, S42.309B, S42.309D, S42.309G, S42.309K, S42.309P, S42.309S, S42.391A, S42.391B, S42.391D, S42.391G, S42.391K, S42.391P, S42.391S, S42.392A, S42.392B, S42.392D, S42.392G, S42.392L, S42.392P, S42.392S, S42.399A, S42.399B, S42.399D, S42.399G, S42.399K, S42.399P, S42.399S, S42.301A, S42.301B, S42.301D, S42.301G, S42.301K, S42.301P, S42.301S, S42.302A, S42.302B, S42.302D, S42.302G, S42.302K, S42.302P, S42.302S, S42.309A, S42.309B, S42.309D, S42.309G, S42.309K, S42.309P, S42.309S, S42.401A, S42.401B, S42.401D, S42.401G, S42.401K, S42.401P, S42.401S, S42.402A, S42.402B, S42.402D, S42.402G, S42.402K, S42.402P, S42.402S, S42.409A, S42.409B, S42.409D, S42.409G, S42.409K, S42.409P, S42.409S , S42.471A, S42.471B, S42.471D, S42.471G, S42.471K, S42.471P, S42.471S, S42.472A, S42.472B, S42.472D, S42.472G, S42.472K, S42.472P, S42.472S, S42.473A, S42.473B, S42.473D, S42.473G, S42.473K, S42.473P, S42.473S, S42.474A, S42.474B, S42.474D, S42.474G, S42.474K, S42.474P,

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	S59.019D, S59.021D, S59.022D, S59.029D, S59.031D, S59.032D, S59.039D, S59.041D, S59.042D, S5 S59.112D 9.049D, S59.091D, S59.092D, S59.099D, S59.101D, S59.102D, S59.109D, S59.111D, S59.119D, S59.121D, S59.122D, S59.129D, S59.131D, S59.132D, S59.139D, S59.141D, S59.142D, S59.149D, S59.191D, S59.192D, S59.199D, S59.201D, S59.202D, S59.209D, S59.211D, S59.212D, S59.219D, S59.221D, S59.222D, S59.229D, S59.231D, S59.232D, S59.239D, S59.241D, S59.242D, S59.249D, S59.291D, S59.292D, S59.299D, S62.001D, S62.002D, S62.009D, S62.011D, S62.012D, S62.013D, S62.014D, S62.015D, S62.016D, S62.021D, S62.022D, S62.023D, S62.024D, S62.025D, S62.026D, S62.031D, S62.032D, S62.033D, S62.034D, S62.035D, S62.036D, S62.101D, S62.102D, S62.109D, S62.111D, S62.112D, S62.113D, S62.114D, S62.115D, S62.116D, S62.121D, S62.122D, S62.123D, S62.124D, S62.125D, S62.126D, S62.131D, S62.132D, S62.133D, S62.134D, S62.135D, S62.136D, S62.141D, S62.142D, S62.143D, S62.145D, S62.146, S62.51D, S62.152, S62.153D, S62.154D, S62.155D, S62.156D, S62.161D, S62.162D, S62.163D, S62.164D, S62.165D, S62.166D, S62.171D, S62.172D, S62.173D, S62.174D, S62.175D, S62.176D, S62.181D, S62.182D, S62.183D, S62.184D, S62.185D, S62.186D, S62.201D, S62.202D, S62.209D, S62.211D, S62.212D, S62.213D, S62.221D, S62.222D, S62.223D, S62.224D, S62.225D, S62.226D, S62.231D, S62.232D, S62.233D, S62.234D, S62.235D, S62.236D, S62.241D, S62.242D, S62.243D, S62.244D, S62.245D, S62.246D, S62.251D, S62.252D, S62.253D, S62.254D, S62.255D, S62.256D, S62.291D, S62.292D, S62.299D, S62.300D, S62.301D, S62.302D, S62.303D, S62.304D, S62.305D, S62.306D, S62.307D, S62.308D, S62.309D, S62.310D, S62.311D, S62.312D, S62.313D, S62.314D, S62.315D, S62.316D, S62.317D, S62.318D, S62.319D, S62.320D, S62.321D, S62.322D, S62.323D, S62.324D, S62.325D, S62.326D, S62.327D, S62.328D, S62.329D, S62.330D, S62.331D, S62.332D, S62.333D, S62.334D, S62.335D, S62.3356, S62.337D, S62.338D, S62.339D, S62.340D, S62.341D, S62.342D, S62.343D, S62.344D, S62.345D, S62.346D, S62.347D, S62.348D, S62.349D, S62.350D, S62.351D, S62.352D, S62.353D, S62.354D, S62.355, S62.356D, S62.357D, S62.358D, S62.359D, S62.360D, S62.261D, S62.362D, S62.363D, S62.354D, S62.365D, S62.366D, S62.367D, S62.368D, S62.369D, S62.390D, S62.391D, S62.392D, S62.393D, S62.394D, S62.395D, S62.396D, S62.397D, S62.298D, S62.399D, S62.501D, S62.502D, S62.509D, S62.511D, S62.512D, S62.513D, S62.514D, S62.515D, S62.516D, S62.521D, S62.522D, S62.523D, S62.524D, S62.525D, S62.526D, S62.600D, S62.601D, S62.602D, S62.603D, S62.604D, S62.605D, S62.606D, S62.607D, S62.608D, S62.609D, S62.610D, S62.611D, S62.612D, S62.613D, S62.614D, S62.615D, S62.616D, S62.617D, S62.618D, S62.619D, S62.620D, S62.621D, S62.622D, S62.623D, S62.624D, S62.625D, S62.626D, S62.627D,

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	S62.628D, S62.629D, S62.630D, S62.631D, S62.632D, S62.633D, S62.634D, S62.635D, S62.636D, S62.637D, S62.638D, S62.639D, S62.640D, S62.641D, S62.642D, S62.643D, S62.644D, S62.645D, S62.646D, S62.647D, S62.648D, S62.649D, S62.650D, S62.651D, S62.652D, S62.653D, S62.654D, S62.655D, S62.656D, S62.657D, S62.658D, S62.659D, S62.660D, S62.661D, S62.662D, S62.663D, S62.664D, S62.665D, S62.666D, S62.667D, S62.668D, S62.669D, S62.90XD, S62.91XD, S62.92XD
Elbow Sprain/Strain	M19.031, M19.032, M19.039, M19.90, M19.91, M19.92, M19.93, M24.831, M24.832, M24.839, M24.831, M24.832, M24.839, M25.531, M25.532, M25.539, M25.631, M25.632, M25.639, M25.721, M25.722, M25.729, S53.431A, S53.431D, S53.431S, S53.432A, S53.432D, S53.432S, S53.439A, S53.439D, S53.439S, S53.421A, S53.421D, S53.421S, S53.422A, S53.422D, S53.422S, S53.429A, S53.429D, S53.429S, S53.491A, S53.491D, S53.491S, S53.492A, S53.492D, S53.492S, S53.499A, S53.499D, S53.499S, S53.401A, S53.401D, S53.401S, S53.402A, S53.402D, S53.402S, S53.409A, S53.409D, S53.409S, S56.911A, S56.911D, S56.911S, S56.912A, S56.912D, S56.912S, S56.919A, S56.919D, S56.919S, S50.00XA, S50.00XD, S50.00XS, S50.01XA, S50.01XD, S50.01XS, S50.02XA, S50.02XD, S50.02XS
Elbow, Collateral Ligament Reconstruction	S53.431A, S53.431D, S53.431S, S53.432A, S53.432D, S53.432S, S53.439A, S53.439D, S53.439S, S53.401A, S53.401D, S53.401S, S53.402A, S53.402D, S53.402S, S53.409A, S53.409D, S53.409S, S56.911A, S56.911D, S56.911S, S56.912A, S56.912D, S56.912S, S56.919A, S56.919D, S56.919S
Elbow, Radial Nerve Entrapment, With and Without Surgical	G56.80, G56.81, G56.82, G56.90, G56.91, G56.92, G58., G58.9 , S44.11XA, S44.11XD, S44.11XS, S44.12XA, S44.12XD, S44.12XS, S44.20XA, S44.20XD, S44.20XS, S54.11XA, S54.11XD, S54.11XS, S54.12XA, S54.12XD, S54.12XS, S54.20XA, S54.20XD, S54.20XS, S64.11XA, S64.11XD, S64.11XS, S64.12XA, S64.12XD, S64.12XS, S64.20XA, S64.20XD, S64.20XS
Elbow, Ulnar Nerve Transposition	G56.20, G56.21, G56.22
Hand, Trigger Finger, With and Without Release	M65.30, M65.311, M65.312, M65.319, M65.841, M65.842, M65.849, S66.526A, S66.526D, S66.526S, S66.527A, S66.527D, S66.527S, S66.528A, S66.528D, S66.528S, S66.529A, S66.529D, S66.529S
Lateral Epicondylitis with and without Fascial Release	M77.00, M77.01, M77.02 , M77.10, M77.11, M77.12 , M70.20, M70.21, M70.22
Medial Epicondylitis	M77.00, M77.01, M77.02
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Phalanges, Post	S62.001A, S62.001B, S62.001D, S62.001G, S62.001K, S62.001P,

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ORIF, Post Cast Removal, Navicular, Metacarpal	S62.001S, S62.002A, S62.002B, S62.002D, S62.002G, S62.002K, S62.002P, S62.002S, S62.009A, S62.009B, S62.009D, S62.009G, S62.009K, S62.009P, S62.009S, S62.161A, S62.161B, S62.161D, S62.161G, S62.161K, S62.161P, S62.161S, S62.162A, S62.162B, S62.162D, S62.162G, S62.162K, S62.162P, S62.162S, S62.163A, S62.163B, S62.163D, S62.163G, S62.163K, S62.163P, S62.163S, S62.164A, S62.164B, S62.164D, S62.164G, S62.164K, S62.164P, S62.164S, S62.165A, S62.165B, S62.165D, S62.165G, S62.165K, S62.165P, S62.165S, S62.166A, S62.166B, S62.166D, S62.166G, S62.166K, S62.166P, S62.166S, S62.308A, S62.308B, S62.308D, S62.308G, S62.308K, S62.308P, S62.308S, S62.309A, S62.309B, S62.309D, S62.309G, S62.309K, S62.309P, S62.309S, S62.232A, S62.232B, S62.232D, S62.232G, S62.232K, S62.232P, S62.232S, S62.233A, S62.233B, S62.233D, S62.233G, S62.233K, S62.233P, S62.233S, S62.234A, S62.234B, S62.234D, S62.234G, S62.234K, S62.234P, S62.234S, S62.235A, S62.235B, S62.235D, S62.235G, S62.235K, S62.235P, S62.235S, S62.236A, S62.236B, S62.236D, S62.236G, S62.236K, S62.236P, S62.236S, S62.318A, S62.318B, S62.318D, S62.318G, S62.318K, S62.318P, S62.318S, S62.319A, S62.319B, S62.319D, S62.319G, S62.319K, S62.319P, S62.319S, S62.348A, S62.348B, S62.348D, S62.348G, S62.348K, S62.348P, S62.348S, S62.349A, S62.349B, S62.349D, S62.349G, S62.349K, S62.349P, S62.349S, , S62.338A, S62.338B, S62.338D, S62.338G, S62.338K, S62.338P, S62.338S, S62.339A, S62.339B, S62.339D, S62.339G, S62.339K, S62.339P, S62.339S, S62.368A, S62.368B, S62.368D, S62.368G, S62.368K, S62.368P, S62.368S, S62.369A, S62.369B, S62.369D, S62.369G, S62.369K, S62.369P, S62.369S , S62.501A, S62.501B, S62.501D, S62.501G, S62.501K, S62.501P, S62.501S, S62.502A, S62.502B, S62.502D, S62.502G, S62.502K, S62.502P, S62.502S, S62.507A, S62.507B, S62.507D, S62.507G, S62.507K, S62.507P, S62.507S, S62.608A, S62.608B, S62.608D, S62.608G, S62.608K, S62.608P, S62.608S, S62.232A, S62.232B, S62.232D, S62.232G, S62.232K, S62.232P, S62.232S, S62.233A, S62.233B, S62.233D, S62.233G, S62.233K, S62.233P, S62.233S, S62.234A, S62.234B, S62.234D, S62.234G, S62.234K, S62.234P, S62.234S, S62.235A, S62.235B, S62.235D, S62.235G, S62.235K, S62.235P, S62.235S, S62.236A, S62.236B, S62.236D, S62.236G, S62.236K, S62.236P, S62.236S, S62.232A, S62.232B, S62.232D, S62.232G, S62.232K, S62.232P, S62.232S, S62.233A, S62.233B, S62.233D, S62.233G, S62.233K, S62.233P, S62.233S, S62.234A, S62.234B, S62.234D, S62.234G, S62.234K, S62.234P, S62.234S, S62.235A, S62.235B, S62.235D, S62.235G, S62.235K, S62.235P, S62.235S, S62.236A, S62.236B, S62.236D, S62.236G, S62.236K, S62.236P, S62.236S, S62.90XA, S62.90XB, S62.90XD, S62.90XG, S62.90XK, S62.90XP, S62.90XS, S62.91XA, S62.91XB, S62.91XD, S62.91XG, S62.91XK, S62.91XP, S62.91XS, S62.501A, S62.501B,

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Proximal Humeral Fracture, Open, Post- ORIF	M84.421A, M84.421D, M84.421G, M84.421K, M84.421P, M84.421S, M84.422A, M84.422D, M84.422G, M84.422K, M84.422P, M84.422S, M84.429A, M84.429D, M84.429G, M84.429K, M84.429P, M84.429S, S42.201A, S42.201B, S42.201D, S42.201G, S42.201K, S42.201P, S42.201S, S42.202A, S42.202B, S42.202D, S42.202G, S42.202K, S42.202P, S42.202S, S42.209A, S42.209B, S42.209D, S42.209G, S42.209K, S42.209P, S42.209S, S42.212A, S42.212B, S42.212D, S42.212G, S42.212K, S42.212P, S42.212S, S42.213A, S42.213B, S42.213D, S42.213G, S42.213K, S42.213P, S42.213S, S42.215A, S42.215B, S42.215D, S42.215G, S42.215K, S42.215P, S42.215S, S42.216A, S42.216B, S42.216D, S42.216G, S42.216K, S42.216P, S42.216S, S42.301A, S42.301B, S42.301D, S42.301G, S42.301K, S42.301P, S42.301S, S42.302A, S42.302B, S42.302D, S42.302G, S42.302K, S42.302P, S42.302S, S42.309A, S42.309B, S42.309D, S42.309G, S42.309K, S42.309P, S42.309S, S42.391A, S42.391B, S42.391D, S42.391G, S42.391K, S42.391P, S42.391S, S42.392A, S42.392B, S42.392D, S42.392G, S42.392K, S42.392P, S42.392S, S42.399A, S42.399B, S42.399D, S42.399G, S42.399K, S42.399P, S42.399S, S42.411A, S42.411B, S42.411D, S42.411G, S42.411K, S42.411P, S42.411S, S42.412A, S42.412B, S42.412D, S42.412G, S42.412K, S42.412P, S42.412S, S42.413A, S42.413B, S42.413D, S42.413G, S42.413K, S42.413P, S42.413S, S42.414A, S42.414B, S42.414D, S42.414G, S42.414K, S42.414P, S42.414S, S42.415A, S42.415B, S42.415D, S42.415G, S42.415K, S42.415P, S42.415S, S42.416A, S42.416B, S42.416D, S42.416G, S42.416K, S42.416P, S42.416S, S42.101D, S42.102D, S42.109D, S42.111D, S42.112D, S42.113D, S42.114D, S42.115D,S42.116D, S42.121D, S42.122D, S42.123D, S42.124D, S42.125D, S42.126D, S42.131D,S42.132D, S42.133D, S42.134D, S42.135D, S42.136D, S42.141D, S42.142D, S42.143D, S42.144D, S42.145D, S42.146D, S42.151D, S42.152D,

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Thoracic Outlet Syndrome	G54.0, G53.3
Wrist Fracture, Distal Radius or Ulna (Post-ORIF)	S52.309A, S52.309B, BS52.309C, S52.309D, S52.309E, S52.309F, S52.309G. S52.209A, S52.209B, S52.209C, S52.209D, S52.209E, S52.209F, S52.209G, S52.90XA, S52.90XB, S52.90XC, S52.90XD, S52.90XE, S52.90XF, S52.90XG, S52.539A, S52.539B, S52.539C, S52.539D, S52.539E, S52.539F, S52.539G, S52.549A, S52.549B, S52.549C, S52.549D, S52.549E, S52.549F, S52.549G, S52.609A, S52.609B, S52.609C, S52.609D, S52.609E, S52.609F, S52.509A, S52.609A, S52.509B, S52.609C, S52.90XA, S52.90XB, S52.90XC, S62.101A, S62.101B, S62.101D, S62.101G, S62.101PK, S62.101P, S62.101S, S62.102A, S62.102B, S62.102D, S62.102G, S62.102K, S62.102P, S62.102S, S62.109A, S62.109B, S62.109D, S62.109G, S62.109K, S62.109P, S62.109S, S62.109B, S62.90XA, S62.90XB, S62.90XD, S62.90XG, S62.90XK, S62.90XP, S62.90XS, S62.91XA,

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Wrist Tenosynovitis, Radial Styloid or de Quervain's	M24.141, M24.142, M24.149, M24.641, M24.642, M24.649, M24.841, M24.842, M24.849, M24.9, M25.441, M24.442, M25.449, M79.641, M79.642, M79.643, M79.644, M79.645, M79.646, R29.898 M25.841, M25.842, M25.849, M25.9, M65.4, M67.432, M67.432, M67.439, M67.441, M67.442, M67.449, M66.231, M66.232, M66.241, M66.242, M66.249, M65.841, M65.842, M65.849
Wrist, Ulnar Nerve Entrapment, Post-Op Release	G56.20, G56.21, G56.22, S64.00XA, S64.00XD, S64.00XS, S64.01XA, S64.01XD, S64.01XS, S64.02XA, S64.02XD, S64.002XS
Pediatric	**ICD-10 Codes**
Congenital Muscular Torticollis	Q67.2, Q67.3, Q67.4, Q68.0, M43.6, P15.8
Neuromuscular Disorders	F93.8, F93.8, F94.0, F90.8, F81.0, R48.0, F81.0, F81.81, G80.1, G80.2, G80.0, G80.8, G80.2, G80.8, G80.9, G82.50, G82.51, G82.52, G82.53, G82.54, G93.1, G93.2, G93.5, G93.6, G93.9, R26.2, Q05.4, Q07.01, Q07.02, Q07.03, Q05.0, Q05.1, Q05.2, Q05.8, Q05.5, Q05.6, Q05.7, Q99.8, Q99.9, R27.0, R27.8, R27.9, R29.5, S14.101A, S14.102A, S14.103A, S14.104A, S24.101A, S24.102A, S34.109A, S34.139A, S34.3XXA, S14.109A, S24.109A, S34.109A, S34.139A
Autism Spectrum Disorder	F84.0, F84.2, F84.3, F84.5, F84.3, F84.5, F84.8, F84.9

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