CIGNA MEDICAL COVERAGE POLICIES - RADIOLOGY

Musculoskeletal Imaging Guidelines

Effective Date: February 02, 2027

Instructions for use

The following coverage policy applies to health benefit plans administered by Cigna. Coverage policies are intended to provide guidance in interpreting certain standard Cigna benefit plans and are used by medical directors and other health care professionals in making medical necessity and other coverage determinations. Please note the terms of a customer's particular benefit plan document may differ significantly from the standard benefit plans upon which these coverage policies are based. For example, a customer's benefit plan document may contain a specific exclusion related to a topic addressed in a coverage policy.

In the event of a conflict, a customer's benefit plan document always supersedes the information in the coverage policy. In the absence of federal or state coverage mandates, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of:

1. The terms of the applicable benefit plan document in effect on the date of service
2. Any applicable laws and regulations
3. Any relevant collateral source materials including coverage policies
4. The specific facts of the particular situation

Coverage policies relate exclusively to the administration of health benefit plans. Coverage policies are not recommendations for treatment and should never be used as treatment guidelines.

This evidence-based medical coverage policy has been developed by EviCore, Inc. Some information in this coverage policy may not apply to all benefit plans administered by Cigna.

These guidelines include procedures EviCore does not review for Cigna. Please refer to the **Cigna CPT code list** for the current list of high-tech imaging procedures that EviCore reviews for Cigna.

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General Guidelines (MS-1.0)

MS.GG.0001.0
v1.0.2027

These musculoskeletal (MSK) imaging guidelines are intended for the further investigation of non-spinal, MSK conditions or concerns (e.g., shoulder, elbow, wrist, hand, arm, pelvis, hip, knee, ankle, leg, foot). Imaging guidelines for spinal conditions or concerns are located in **Spine Imaging Guidelines.**

General Criteria

Before any request for advanced diagnostic imaging of musculoskeletal concerns will be considered, ALL of the following must be complete and clearly documented. The following criteria apply to all requests for advanced imaging; details, or exceptions, will be provided within each specific section throughout the guideline:

- There must be an in-person clinical evaluation, as well as a clinical re-evaluation following any required conservative care as outlined throughout the guideline.
- An in-person clinical evaluation that includes a complete relevant medical history, physical examination, appropriate laboratory studies and initial non-advanced imaging (e.g., plain radiographs) should have been completed after the current episode of symptoms began. The in-person clinical evaluation may be, at least, either the initial or the re-evaluation.
    - Prior to advanced imaging consideration, the results of plain x-rays performed after the current episode of symptoms started or changed need to be available to the provider that is requesting the advanced imaging.
- When necessary, clinical re-evaluation is required prior to consideration of advanced diagnostic imaging to document failure of clinical improvement following a trial of provider-directed treatment after the current set of symptoms or physical exam findings started or changed as follows:
    - A documented trial of conservative care lasting at least six weeks in duration
    - A clinical re-evaluation or documentation of other meaningful contact (e.g., email, telephone, video consult) with the provider's office following the initial evaluation
    - Details will be in the specific criteria sections throughout this publication regarding when conservative treatment is required.

Repeat, Serial or Multiple Studies

The need for repeat or serial advanced imaging, whether CT or MRI, should be considered carefully and may not be medically necessary. This includes serial imaging for surveillance of healing or recovery from musculoskeletal disease. In the majority of

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musculoskeletal conditions, the medical evidence (i.e., documentation) does not support the need for repeat imaging.

In hand and wrist advanced imaging, as well as in foot and ankle imaging, studies are frequently ordered of both areas. This is not medically necessary since wrist imaging will capture from above the wrist to the mid-metacarpal area, and ankle imaging will capture from above the ankle to the mid-metatarsal area. Only one CPT® code per area should be reported.

Health Equity Considerations

Health equity is the highest level of health for all people; health inequity is the avoidable difference in health status or distribution of health resources due to the social conditions in which people are born, grow, live, work, and age. Social determinants of health are the conditions in the environment that affect a wide range of health, functioning, and quality of life outcomes and risks. Examples include safe housing, transportation, and neighborhoods; racism, discrimination and violence; education, job opportunities and income; access to nutritious foods and physical activity opportunities; access to clean air and water; and language and literacy skills.

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Evidence Discussion (MS-1)

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Advanced imaging is typically not necessary for the initial evaluation of individuals with a musculoskeletal complaint. A diagnosis can often be made based on a detailed history, physical examination, appropriate laboratory tests and/or plain radiographs or initial ultrasound (US) (American College of Radiology, n.d.; Karel et al., 2015; Garner et al., 2023; Alfuraih et al., 2022; Davis et al., 2015). Many individuals' complaints can improve within a few weeks to months with conservative care.

The American College of Radiology Appropriateness Criteria recommended that x-rays, or US in a few select scenarios, be used as the initial imaging modality for most musculoskeletal complaints (American College of Radiology, n.d.; Garner et al., 2023). These initial images can be helpful in determining if a course of conservative treatment is recommended. In some instances, the initial x-rays or US may help determine a diagnosis or that more advanced images or procedures are appropriate (Cuff et al., 2020). If conservative treatment is unsuccessful or more advanced study is needed, the initial images can be helpful in determining the next course of action (Cuff et al., 2020; Pompan, 2011). These initial images can be helpful in pre-operative planning when surgery is being considered (American College of Radiology, n.d.; Garner et al., 2023).

Advanced imaging can often demonstrate abnormalities that have no relevance to the individuals' symptoms. Studies have shown that advanced imaging of asymptomatic middle age individuals commonly demonstrate musculoskeletal abnormalities that do not affect their quality of life (Schwartzberg et al., 2016). Focusing on incidental findings can lead to overtreatment through unnecessary referral to medical specialists or unneeded medical procedures. Advanced imaging can have additional risks to the individual beyond those of initial plain images. There are risks associated with additional exposure to radiation. There can also be complications due to implantable devices or metallic foreign bodies in the individual. Risk mitigation needs to be weighed when advanced imaging is being considered, especially in relation to repeat or serial advanced imaging (Watson & Yu, 2023).

In many instances for musculoskeletal complaints, current evidence has supported the recommendation of obtaining initial plain x-rays, or US when appropriate, and having the individual follow a course of provider directed conservative care prior to seeking advanced imaging studies (American College of Radiology, n.d.). The potential clinical benefit of starting conservative care and not needing advanced images or additional procedures may outweigh the potential harm of a brief delay of obtaining said imaging. It may also help to reduce the risk of unnecessary exposures to radiation/chemicals associated with the advanced imaging techniques (Pompan, 2011; Watson & Yu, 2023).

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Imaging Techniques (MS-2)

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Musculoskeletal Imaging Guidelines

Imaging Techniques (MS-2)

MS.IM.0002.0
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Plain Radiograph

Plain radiographs (x-ray) are often the initial imaging for musculoskeletal conditions. The results of plain x-rays performed after the current episode of symptoms started or changed need to be available to the provider requesting advanced imaging, unless otherwise noted, to rule out those situations that do not often require advanced imaging, such as osteoarthritis, acute/healing fracture, dislocation, osteomyelitis, and bone tumor amenable to biopsy or radiation therapy (in known metastatic disease). Unless otherwise noted in the guidelines, x-rays should be performed before requesting advanced imaging.

Magnetic Resonance Imaging

Magnetic resonance imaging (MRI) is often a preferred advanced imaging modality in MSK conditions because it can be superior in visualizing the soft tissues and physiological processes happening due to an injury or medical condition. As MRI uses magnetic fields, it does not expose the individual to ionizing radiation and may be a better choice when exposure is a concern. However, individuals with implanted devices may not be able to undergo MRI.

Currently there is inadequate scientific evidence to support the necessity of positional MRI (also referred to as dynamic, weight-bearing, standing, or kinetic MRI) and delayed gadolinium enhanced MRI of cartilage (dGEMRIC). These imaging modalities should be considered not medically necessary.

Computed Tomography

Computed tomography (CT) is preferred for imaging cortical bone anatomy. It is useful for studying complex fractures, dislocations, and assessing delayed union or non-union of fractures when x-rays are equivocal. CT can also be the imaging choice in individuals who cannot undergo an MRI.

Positional CT (also referred to as weight-bearing or cone beam CT) may be useful in imaging of the foot and ankle. Requests for positional CT for the foot and ankle are subject to the same condition-specific criteria as contained throughout this guideline publication. Positional CT of anatomic areas other than the foot and ankle are considered not medically necessary.

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Ultrasound

Ultrasound (US) uses sound waves to produce images that can be used to evaluate a variety of musculoskeletal disorders. US is highly operator dependent and proper training and experience are required to perform consistent, high-quality evaluations.

Contrast Issues

Most musculoskeletal imaging (MRI or CT) is completed without contrast media; however, contrast may be useful and will be indicated throughout the condition-specific criteria in these guidelines. Some examples may be tumors, osteomyelitis, infection, arthrograms, detection of rheumatoid arthritis. For individuals with contrast contraindication, the corresponding advanced imaging without contrast may be approved as an alternative. However, in some cases, the non-contrast study may not provide as adequate evaluation of the condition of concern and would therefore not be considered medically necessary.

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3D Rendering (MS-3)

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3D Rendering (MS-3.1)

MS.TD.0003.1
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Criteria

3-D image post-processing of conventional images is considered medically necessary for preoperative planning when conventional imaging is insufficient for the following:

- Complex fractures (comminuted or displaced)/dislocations of any joint
- Spine fractures, pelvic/acetabulum fractures, intra-articular fractures
- Preoperative planning for other complex surgical cases

The code assignment for 3-D rendering depends upon whether the 3-D post-processing is performed on the scanner workstation (CPT® 76376) or on an independent workstation (CPT® 76377)

- 2-D reconstruction (i.e., reformatting axial images into the coronal plane) is considered part of the tomography procedure, is not separately reportable, and does not meet the definition of 3-D rendering.
- It is not considered medically necessary to report 3-D rendering in conjunction with CTA and MRA because those procedure codes already include the post-processing.
- In addition to the term "3-D," the following terms may also be used to describe 3-D post-processing:
  - Maximum intensity projection (MIP)
  - Shaded surface rendering
  - Volume rendering
- Additionally - If multiple CPT codes are performed for the same indication on the same day, one 3-D rendering code is required. If they are performed on separate days, 3-D rendering codes are required for each study on each day.
- The 3-D rendering codes require concurrent supervision of image post-processing 3-D manipulation of volumetric data set and image rendering.

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Evidence Discussion (MS-3)

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In some complex clinical scenarios, initial and conventional advanced images alone may not sufficiently reveal bony displacement and other incongruities. Accurate radiographic characterization of complex fractures and injuries is important for appropriate treatment decisions. The American College of Radiology, in multiple of their Appropriateness Criteria (ACR) publications, supports the use of 3D image post-processing of conventional images of complex fractures and injuries when said images are insufficient to visualize bone displacement and/or incongruity, and further clarification will aid in treatment decisions (Bartolotta et al., 2024; Chen et al., 2024; Laur et al., 2024).

Evidence has shown that 3D modeling can improve the accuracy of fracture classification. In a cohort study comparing the use of 2D CT images alone or combined with 3D segmentation or 3D models, both trauma surgeons and residents were more accurate with their classification of proximal humerus fractures when they used digital 3D models (Dauwe et al., 2022). In a systematic review, inter- and intra-observer agreement in proximal humeral fracture classification increased as image technology advanced from radiographs to 2D CT to 3D CT (Bougher et al., 2020). Fracture gaps of 100µm were identified at a consistent rate of 80-100% in CT images with displacements of up to 400µm visible in digital 3D models. However, rates were dependent on CT technology and post-processing effects of rendering; thus original CT images should still be used along with any 3D rendering for verification of fractures prior to surgery (Bittner-Frank et al., 2025).

In their Appropriateness Criteria for acute trauma to the hand and wrist, the ACR supports the use of 3D rendering as a visualization tool for more accurate preoperative planning in the management of some complex surgical procedures (Torabi et al., 2018). Additional evidence demonstrated the utility of 3D rendering in preoperative planning for various complex musculoskeletal conditions. In a retrospective study of the planning of reinforcement cages for total-hip replacement revision surgery, 3D templating accurately predicted cage size in 29/27 surgeries, compared to only 15/27 using conventional 2D templating (Winter et al., 2023). 3D preoperative planning for reverse total shoulder arthroplasty has been shown to result in minimal deviation of the procedure from the plan with high levels of agreement in screw angle, length and prosthetic component size (Lilley et al., 2022). In a comparison of 2D versus 3D preoperative planning in total hip arthroplasty, 3D templating was found to result in higher accuracy restoration of native joint mechanics (Fontalis et al., 2024).

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References (MS-3)

MS.TD.0003.0

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Arthritis and Joint Degeneration (MS-12)

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Osteoarthritis (MS-12.1)

MS.OT.0012.1
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Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning of osteoarthritis. See specific details below regarding any requirements for conservative care prior to requesting advanced imaging.

Non-surgical and surgical treatment planning, other than joint replacement

- Osteoarthritis - CT without contrast for further investigation of osteoarthritis is considered medically necessary when ALL of the following apply:
  - Requested for treatment planning, AND
  - Congenital or significant atypical post-traumatic arthritic deformities are identified on plain x-ray, AND
  - The aforementioned deformities require further evaluation of their clinical significance, AND
  - The request is related to the shoulder, elbow, wrist, hip, knee, or ankle
- Reconstructive joint sparing/salvage surgery planning - MRI arthrogram or CT arthrogram for joint sparing/salvage reconstructive surgery planning is considered medically necessary for the following:
  - Suspected concomitant rotator cuff tear of the shoulder
  - Suspected concomitant labral tear of the shoulder or hip
  - Suspected concomitant internal derangement of the knee

Joint replacement planning, non-customized-to-patient (not for intra-operative navigation)

- **Elbow, wrist, hip, knee or ankle** - CT without contrast of the elbow (CPT® 73200), wrist (CPT® 73200), hip (CPT® 73700 or 72192), knee (CPT® 73700) or ankle (CPT® 73700) for non-customized-to-patient joint replacement planning (prior to surgery/not for intra-operative navigation) is considered medically necessary when ALL of the following apply:
  - Initial x-rays have been performed after the current episode of symptoms started or changed and results are available to the requesting provider AND

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  - Congenital or significant atypical post-traumatic arthritic deformities are identified on plain x-ray AND
  - The aforementioned deformities require further evaluation of their clinical significance
- **Shoulder** - CT without contrast (CPT® 73200) and MRI without contrast (CPT® 73221) of the shoulder for non-customized-to-patient joint replacement planning (prior to surgery/not for intra-operative navigation) is considered medically necessary when ALL of the following apply:
  - Initial x-rays have been performed after the current episode of symptoms started or changed and results are available to the requesting provider

Joint replacement planning and intraoperative navigation, customized-to-patient

- CT without contrast or MRI without contrast of the **shoulder, elbow, wrist, hip, knee, or ankle** for customized-to-patient joint replacement surgery planning and intraoperative navigation (e.g., MAKOplasty) is considered medically necessary when ALL of the following apply:
  - Initial x-rays have been performed after the current episode of symptoms started or changed and results are available to the requesting provider AND
  - The joint replacement surgery has been approved or does not require prior authorization
- The preoperative imaging listed above is considered not medically necessary if any of the following are deemed not medically necessary, not a covered benefit, or experimental, investigational, or unproven by the health plan:
  - Joint replacement surgery
  - Customized-to-patient implant
  - Computer assisted surgical navigation (e.g. MAKOplasty)
- See: Unlisted **Procedures/Therapy Treatment Planning (Preface-4.3)** in the Preface Imaging Guidelines

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Inflammatory Arthritis (MS-12.2)

MS.OT.0012.2
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning of inflammatory arthritis (e.g., Gout, Pseudogout, Pigmented Synovitis, Rheumatoid arthritis).

Gout/Pseudogout

CT without contrast, MRI without contrast, or MRI without and with contrast of the area of interest is considered medically necessary for investigation of suspected gout/ pseudogout when ALL of the following are met:

- Initial plain x-ray to rule out other potential disease processes
- Infection or neoplasm is in the differential diagnosis for soft-tissue tophi

Pigmented Villonodual Synovitis (PVNS)

Results of plain x-rays performed after the current episode of symptoms started or changed need to be available to the requesting provider prior to requesting advanced imaging for PVNS

MRI without contrast of the affected joint, or CT with contrast if MRI contraindicated, is considered medically necessary for the investigation of PVNS following plain x-rays.

Rheumatoid Arthritis

Plain x-ray, physical exam, and appropriate laboratory studies are required prior to advanced imaging for rheumatoid arthritis

- Results of plain x-rays performed after the current episode of symptoms started or changed need to be available to the requesting provider
- Examples of appropriate laboratory studies may include: Lyme titers, rheumatoid factor (RF), anti-cyclic citrullinated peptide (anti-CCP), sedimentation rate (ESR), C-reactive protein (CRP), and antinuclear antibody (ANA), joint fluid analysis

MRI without contrast OR MRI without and with contrast is considered medically necessary for investigation of rheumatoid arthritis in the most symptomatic joint, or of the dominant hand or wrist, in ALL of the following situations:

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- When diagnosis is uncertain prior to initiation of drug therapy
- To study the effects of treatment with disease modifying anti-rheumatic drug (DMARD) therapy
- To identify seronegative RA individuals that might benefit from early DMARD therapy
- To determine change in treatment, such as:
  - Switching from standard DMARD therapy to tumor necrosis factor (TNF) therapy.
  - Changing to a different TNF drug therapy, then one MRI (contrast as requested) of a single joint can be performed.
  - Addition of other treatments, including joint injections
- MRI is considered not medically necessary for routine follow-up of treatment

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Evidence Discussion (MS-12)

MS.OT.0012.0
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Current ACR appropriateness criteria for chronic pain in the shoulder, knee, and hip all recommended plain x-ray as the initial image of choice when investigating suspected osteoarthritis (OA) (Fox et al., 2018; Jawetz et al., 2022; Nacey et al., 2022). Advanced imaging is typically not necessary for the initial evaluation of OA; a diagnosis can be made based on history, physical exam and plain x-rays (Henry-Blake et al., 2023). For most individuals diagnosed with OA, treatment does not rely on advanced imaging findings, and many can improve with conservative care (Brophy & Fillingham, 2022; Michener et al., 2023; U.S. Department of Veterans Affairs & U.S. Department of Defense, 2020; van Doormaal et al., 2020).

When individuals with OA poorly respond to conservative care or there is a concern for concomitant joint pathology, advanced imaging may be able to identify additional sources of symptoms (Deshpande et al., 2016). MRI is generally considered the next appropriate imaging study for chronic joint pain when x-rays are inconclusive or further investigation is warranted. CT may be appropriate in specific situations to provide additional bony detail for treatment planning or when MRI is contraindicated (Fox et al., 2018; Jawetz et al., 2022; Nacey et al., 2022).

Plain x-rays are typically sufficient for preoperative planning for the majority of patients undergoing joint replacement surgery. However, for those with congenital or significant atypical post-traumatic arthritic deformities, CT scan can be of value for further evaluation/planning (Shi et al., 2019). Advanced imaging will also be required prior to the replacement surgery if there will be the use of custom implants, patient specific instrumentation or computer assisted navigation (O'Connor & Kransdorf, 2013).

The American College of Radiology (ACR) Appropriateness Criteria for Chronic Extremity Joint Pain-Suspected Inflammatory Arthritis, Crystalline Arthritis, or Erosive Osteoarthritis (revised 2022) has recommended plain radiography as the initial imaging study for chronic extremity joint pain where crystalline arthritis is suspected (Subhas et al., 2022). X-ray sensitivity can be lower than other imaging modalities, however they may contain sufficient findings for the diagnosis of gout or calcium pyrophosphate deposition disease (CPPD). The benefits to using x-rays as an initial imaging study is to potentially avoid the need for further testing, treatment delays. Early onset gout/pseudogout may not be evident on any imaging, so reliance on a complete clinical history, evaluation and synovial fluid testing is important in any initial examination when gout/pseudogout is suspected (Richette et al., 2020).

Advanced imaging is typically not required for the evaluation of patients with suspected crystalline arthropathy. The presence of monosodium urate crystals or calcium

pyrophosphate crystals on synovial fluid microscopy can be definitive of a diagnosis of gout. However, additional imaging can be helpful in the evaluation of an individual's symptoms when differential diagnoses are suspected (Richette et al., 2020).

Significant advances in imaging have made the visualization of gout/pseudogout much better than in previous years, especially when using US and CT technology. The 2018 EULAR recommendations stated that US offers the best potential for diagnosis of gout and dual-energy CT is showing great promise in its utility when compared to other imaging options (Richette et al., 2020). Research since those recommendations have added more support that US and dual-energy CT are modalities of choice. A small cross-sectional study demonstrated that US is more specific in detecting early stage gout and that both US and CT have similar accuracy for middle and late stage disease identification (Zhang et al., 2020). A systematic review in 2022 of 28 studies determined that the sensitivity and specificity for US to detect gout was 84% and 84% respectively for both early and late staged, and for dual-energy CT to be 89% and 91% for chronic gout (75% and 85% for earlier staged disease) (Shang et al., 2022). A 2019 meta-analysis found that dual-energy CT was only less sensitive for as early as 6 weeks since the start of symptoms (Gamala et al., 2019). In 2018, two systematic reviews analyzing the accuracy of and comparing dual energy CT other imaging modalities concluded it was better than x-ray or normal CT and equal to US in diagnosing gout (Ramon et al., 2018; Yu et al., 2018). There is limited evidence to lend any support of the utility of other advanced image options in the investigation of gout/pseudogout. The most recent ACR recommended that CT with contrast or MRI of any method are usually not appropriate when investigating gout/pseudogout (Subhas et al., 2022). The 2018 EULAR recommendations are similar, that while MRI has some ability to detect crystalline deposit there is limited research in the diagnostic utility of the images, especially when compared to other imaging options (Richette et al., 2020). The utility of MRI may change as research and technology continue to advance.

The ACR Appropriateness Criteria for Chronic Extremity Joint Pain-Suspected Inflammatory Arthritis, Crystalline Arthritis, or Erosive Osteoarthritis (revised 2022) recommended plain radiography as the initial imaging study for chronic extremity joint pain where Rheumatoid arthritis (RA) is suspect (Subhas et al., 2022). Clinical and laboratory assessment of RA remains the cornerstone of diagnosis and determining a response to treatment (Kgoebane et al., 2018). Inconclusive or non-diagnostic imaging results can be further evaluated with advanced imaging. MRI allows assessment of all structures as well as bone edema and baseline bone edema on low and high field MRI in patients with early RA is predictive of future radiographic damage (Cohen et al., 2011). Joints and bones in the hand are often affected in RA and assessing changes in these joints can help in therapy monitoring (Schleich et al., 2015). MRI and US play important roles in detecting subclinical disease in patients with inflammatory arthritis. These modalities have higher sensitivity in detecting subclinical synovitis, tenosynovitis, osteitis, and early erosive disease compared with physical exam and xray, therefore

useful in early diagnosis and evaluating response to treatment (Terslev & Østergaard, 2021).

Investigation of Pigmented Villonodular Synovitis (PVNS) may be further aided with advanced imaging. Radiographs are non-specific and may appear normal 20% of the time but joint effusion, soft-tissue swelling, extrinsic erosion of bone, absence of calcification, preservation of joint space, and/or normal bone mineralization may be seen in diffuse intraarticular PVNS. Localized form my appear normal on plain radiographs (Murphey et al., 2008). MRI may be necessary for diagnosis (Gouin & Noailles, 2017). A retrospective review of 122 histologically confirmed PVNS cases demonstrated that MRI was helpful in obtaining a correct diagnosis 83% of the time (Ottaviani et al., 2011). MRI is also optimal for demonstrating the relationship of extraarticular lesions to the tendon sheath to suggest the diagnosis (Murphey et al., 2008).

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Capsular/Synovial and Meniscal Dysfunction (MS-29)

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Capsular/Synovial and Meniscal Dysfunction (MS-29.1)

MS.CS.0029.1
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Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning for capsular and/or synovial dysfunction. See specific details below regarding any requirements for conservative care prior to requesting advanced imaging.

- Initial plain x-ray imaging of the suspected area must first be performed after the current episode of symptoms started or changed and results available to the requesting provider.
- A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed, **EXCEPT** as noted below

When the above criteria has been met, the following advanced imaging is considered medically necessary:

- **Shoulder**
  - Labral tear or dysfunction (e.g., SLAP, ALPSA, HAGL) – CT with contrast (CPT®73201), MRI without contrast (CPT®73221), or MRI with contrast (CPT®73222).
  - Adhesive capsulitis (frozen shoulder) – MRI without contrast (CPT®73221)
- **Hip**
  - Labral tear or dysfunction - CT with contrast (CPT® 73701), MRI without contrast (CPT® 73721), or MRI with contrast (CPT® 73722)
- **Knee**
  - Hemarthrosis, non-traumatic or spontaneous – MRI without contrast (CPT® 73721)
    - **trial of conservative care not required**
  - Hemarthrosis, traumatic – see specific section related to the tissue trauma (e.g., fracture, joint stability, ligament, osteochondral injury, etc)
  - Meniscus tear - MRI without contrast (CPT® 73721), or CT with contrast (CPT® 73701) if MRI cannot be performed, is considered medically necessary for further investigation of suspected meniscal tear when all of the following have been met:

- Plain x-rays have been performed after the beginning of the current episode of symptoms started
- A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed OR at least 2 of the following 4 criteria met:
  - positive McMurray's, Thessaly, or Apley's compression test
  - twisting or acute injury of the knee
  - locked knee: inability to fully extend knee on exam in comparison to the opposite knee
  - knee effusion
- For degenerative meniscal tear - MRI without contrast (CPT® 73721) is considered medically necessary for further investigation of suspected degenerative meniscus tear in an individual with osteoarthritis when all of the following have been met:
  - Plain x-rays have been performed after the beginning of the current episode of symptoms started
  - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed

◦ Synovial Plica or Medial Shelf – MRI without contrast (CPT® 73721)

Musculoskeletal Imaging Guidelines

Evidence Discussion (MS-29)

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Advanced imaging of synovial joint symptoms is typically not recommended as an initial diagnostic study. Research has demonstrated that asymptomatic individuals may commonly have tears or other findings on advanced images of capsular and synovial tissues (e.g., labrum, capsule, synovial lining) (Schwartzberg et al., 2016; Vahedi et al., 2019). Abnormal findings could lead to a cascade of unnecessary treatment or even surgery as asymptomatic tissues typically do not require any treatment. The American College of Radiology (ACR) Appropriateness criteria recommended that plain x-ray is the initial imaging study for investigation of joint pain (Fox et al., 2018; Jawetz et al., 2023; Laur et al., 2025; Nacey et al., 2023). When initial x-rays are inconclusive or conservative care does not result in amelioration, more advanced images may be necessary.

Both CT and MRI technology, when necessary, may be useful for further investigation of labral tear at either the shoulder or hip. MR arthrography is considered the standard for labral imaging due to its high sensitivity and improved soft tissue contrast. However, there may be times, such as with acute trauma, effusion and pain, that MRI without contrast is preferred (Jawetz et al., 2023; Laur et al., 2025; Nacey et al., 2023). MRI without contrast can show if capsular thickening is present in the investigation of suspected adhesive capsulitis at the shoulder. It has a relatively high sensitivity for detection of adhesive capsulitis. The introduction of contrast fluid within the rotator interval or along the axillary recess can create limitations in detecting findings of adhesive capsulitis, for this reason MRA is not recommended as next imaging when investigating adhesive capsulitis (Nacey et al., 2023).

When additional investigation of knee pain is appropriate following initial x-rays and possible conservative care, MRI without contrast is the recommended next image for suspicion of capsular or synovial pathology. MRI has been demonstrated to show the presence of medial plica (Fox et al., 2018). Further evaluation of suspected hemarthrosis may involve the use of advanced imaging to help identify the cause of bleeding, especially in recurring cases (Sasho et al., 2008; van Vulpen et al., 2018).

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Foreign and Loose Bodies (MS-6)

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Foreign and Loose Bodies (MS-6.1)

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Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning.

Foreign Body

CT without contrast or MRI without contrast or MRI without and with contrast for further investigation of foreign bodies is considered medically necessary after plain x-rays have ruled out the presence of radiopaque foreign bodies as follows:

-
- CT without contrast is recommended when plain x-rays are negative and a radiopaque foreign body is still suspected
- MRI without and with contrast is an alternative to CT for assessing the extent of infection associated with a suspected foreign body

Loose Body

When the initial x-rays have been taken and the results are available to the provider, advanced imaging of symptomatic loose bodies in a joint is considered medically necessary as follows:

- **Shoulder** - MRI without contrast (CPT®73221)
- **Elbow** - CT without contrast (CPT® 73200) , CT with contrast (CPT® 73201), MRI without contrast (CPT® 73221) or MRI with contrast (CPT® 73222)
- **Hip** - MRI without contrast (CPT® 73721)
- **Knee** - MRI without contrast (CPT® 73721) or CT Knee with contrast (arthrogram) (CPT® 73701) if MRI cannot be performed
- **Ankle** - MRI without contrast (CPT® 73721)

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Evidence Discussion (MS-6)

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Initial x-rays are recommended as a first imaging examination following acute trauma or when evaluating infection of the musculoskeletal system and there is suspicion of foreign objects or loose bodies (Gorbachova et al., 2019; Pierce et al., 2022; Torabi et al., 2018). X-rays are highly sensitive to embedded radiopaque materials, especially metals. X-rays provide an excellent overview of the anatomic area of interest allowing for a better overall assessment of symptoms (Jarraya et al., 2014).

When a foreign body is not visualized on x-rays, ultrasound may be helpful to further evaluation (Gorbachova et al., 2019; Pierce et al., 2022; Torabi et al., 2018). Ultrasound has high sensitivity and specificity in detecting radiolucent objects like wood, and plastic. It has also been demonstrated as useful in detecting glass and metal (Alfuraih et al., 2022; Davis et al., 2015; Jarraya et al., 2014). Ultrasound is widely available, accessible, and does not involve ionizing radiation. Ultrasound can also help to evaluate complications of foreign body such as infections and vascular or tendon injuries. Ultrasound does have limitations, such as, visualization will be limited to more superficial tissue depths and variability of the technology available during the assessment may limit image quality (Alfuraih et al., 2022; Davis et al., 2015).

More advanced imaging may be necessary when suspected bodies are out of the range of ultrasound or are not clearly visualized on x-ray and ultrasound. CT has been shown as useful in detecting wood, aluminum, copper and some glass (Alfuraih et al., 2022). MRI is recommended when there is suspicion of infection or soft tissue and osseous change in relation to a foreign or loose body (Pierce et al., 2022. MRI is better than CT in the assessment of infection, however it was found to be less sensitive to actually visualizing a foreign body. There may also be image artifacts on an MRI if there are metallic foreign bodies (Alfuraih et al., 2022; Jarraya et al., 2014).

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Fractures (MS-5)

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Acute Fractures (MS-5.1)

MS.FX.0005.1
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning.

CT without contrast of the area of interest is considered medically necessary for an acute complex fracture when the initial plain x-ray findings demonstrate a complex (comminuted, displaced, or intra-articular) fracture with or without dislocation.

MRI without or MRI without and with contrast of the area of interest is considered medically necessary for an acute complex fracture when the initial plain x-ray findings demonstrate a complex (comminuted, displaced or intraarticular) fracture and there is known or suspected association of the fracture with neoplastic disease or there is a contraindication to CT.

For known or suspected Lisfranc (tarsometatarsal) fracture (with or without dislocation), CT or MRI without contrast of the foot is considered medically necessary for further investigation when the following apply:

- Initial plain x-rays have been obtained and results are available to the ordering provider
- For known or suspected Lisfranc dislocation, or ligament injury (without fracture) see: J**oint Instability and Dysfunction (MS-30.1)** for dislocation or **Ligament and Fascia Injury (MS-31.1)** for ligament injury

For osteochondral fracture or osteochondral injury, see: **Osteochondral Lesions and Fractures (MS-13.1)**

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Occult, Stress, Insufficiency Fracture or Reaction (MS-5.2)

MS.FX.0005.2
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning. See specific details below regarding any requirements for conservative care prior to requesting advanced imaging.

MRI without contrast is considered medically necessary for suspected **hip/femoral neck, tibia, pelvis/sacrum, tarsal navicular, proximal fifth metatarsal, or scaphoid** occult/stress/insufficiency fractures, and suspected **atypical femoral shaft** fractures **related to bisphosphonate use** when ALL of the following apply:

- The initial evaluation, history, and physical exam fails to establish a definitive diagnosis AND
- The initial plain x-ray findings are negative or equivocal
- CT without contrast can be performed as an alternative to MRI for suspected occult/ insufficiency fractures of the pelvis/hip and suspected atypical femoral shaft fractures related to bisphosphonate and suspected occult fractures of the scaphoid

CT or MRI without contrast of the area is considered medically necessary for the investigation of all other suspected occult/stress/insufficiency fractures when ANY of the following apply, except as otherwise noted:

- Initial plain x-rays obtained a minimum of 14 days after the onset of symptoms are non-diagnostic for fracture OR
- Repeat plain x-rays remain non-diagnostic for fracture after a minimum of 10 days of provider-directed conservative treatment
- **For Tarsal navicular stress/occult fracture** - MRI Foot without contrast (CPT® 73718)
    - CT Foot without contrast (CPT® 73700) for follow-up of healing fractures
    - X-ray results are available to the requesting provider
-

MRI without contrast (CPT® 73718) is considered medically necessary for suspicion of shin splints when both of the following are met:

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- Initial plain x-ray results are available to the requesting provider AND
- A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed

For **stress fracture follow-up** imaging for "return to play" evaluation at least 3 months after the initial imaging study, MRI without contrast of the area of interest is considered medically necessary

For **stress reaction surveillance** or "return to play" decisions, advanced imaging is not considered medically necessary regarding a stress reaction identified on an initial imaging study.

Periprosthetic fractures related to joint replacement see: **Joint Replacement Post-Operative Follow-Up (MS-16.1)**

Other Indications (e.g., Delayed Union, Preoperative) (MS-5.3)

MS.FX.0005.3
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning.

CT or MRI without contrast after recent (within 30 days) plain x-ray is considered medically necessary if ONE of the following is present:

- Concern for delayed union or non-union of fracture, osteotomy, or joint fusions
- Part of preoperative evaluation for a planned surgery of a complex fracture with or without dislocation

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Evidence Discussion (MS-5)

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It is widely accepted that the initial imaging for a patient with a suspected fracture should be plain radiographs. The American College of Radiology (ACR) has recommended plain x-ray as the initial image for a majority of both acute and chronic musculoskeletal pain situations, including suspected fractures (American College of Radiology, n.d.). When the initial x-rays are negative or unclear, yet fracture is still suspected, the ACR has recommended CT as the next method of investigation as it can provide detailed information on bony structure and allow for further evaluation and treatment planning (American College of Radiology, n.d.). MRI may be an alternative image to CT in a situation where CT is contraindicated or there has been complex and/or extensive trauma and surrounding tissues also need to be evaluated (Bartolotta et al., 2024; Laur et al., 2024; Taljanovic et al., 2019).

The American College of Radiology also recommended that x-rays should be the initial imaging for a suspected stress fracture. Initial x-rays may not identify the fracture, and if there is continued suspicion, repeat x-ray imaging in 10-14 days is supported (Morrison et al., 2024). Repeat radiographs may show osseous reaction confirming the presence of an occult or stress fracture. However, if repeat x-rays remain negative and there is still suspicion of an occult or stress fracture, MRI is recommended as it has been shown to be the most sensitive and specific imaging modality for workup of suspected stress injuries (Morrison et al., 2024; Wright et al., 2016). In addition, there exists a subset of occult/stress/insufficiency fractures that have an increased risk of fracture progression, delayed healing, non-union and avascular necrosis. For these high-risk injuries, advanced imaging is recommended if initial x-rays are negative or indeterminate as these injuries require early diagnosis and immediate treatment (Blood et al., 2015; McInnis & Ramey, 2016; Morrison et al., 2024).

The evaluation of patients with chronic stress syndromes (e.g., shin splints) includes a detailed history, physical examination, and plain x-rays (Morrison et al., 2024). Many individuals can improve with conservative care. If the individual fails to respond to an adequate trial of conservative care, MRI is recommended as the next imaging option for further investigation (Galbraith & Lavallee, 2009).

For the assessment of bony healing, serial x-ray imaging is usually sufficient. However, if there are still concerns for delayed union or non-union, CT scanning can provide detail as to the presence or absence of bridging callus. MRI can also assist in the evaluation of bone healing.

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Infection (MS-9)

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General Infection/Osteomyelitis (MS-9.1)

MS.OI.0009.1
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning.

MRI without contrast, MRI without and with contrast, CT without contrast, or CT with contrast of the affected area for further investigation of infection is considered medically necessary after plain x-ray(s) have been obtained in the following scenarios:

- Plain x-ray(s) do not demonstrate infection, AND
- Plain x-ray(s) do not suggest alternative diagnoses such as neuropathic arthropathy (see **Charcot Joint (MS-9.2)**) or fracture, AND
- Soft tissue or bone infection (osteomyelitis) is suspected

OR

- Plain x-ray(s) are positive for infection, AND
- The extent of infection into the soft tissues and any skip lesions require evaluation

For individuals with **diabetic foot infections** after plain x-rays - as a compliment to plain x-ray - MRI without and with contrast (CPT® 73720), MRI without contrast (CPT® 73718), CT without contrast (CPT® 73700) or CT with contrast (CPT® 73701)

For individuals with suspected spinal infections please use the spine imaging guidelines, see: **Red Flag Indications (SP-1.2)**

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Charcot and Septic Joint (MS-9.2)

MS.OI.0009.2
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning. See specific details below regarding any requirements for conservative care prior to requesting advanced imaging.

Charcot Joint

Following the initial x-ray and the documented failure of the required 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed, the following advanced imaging is considered medically necessary for the investigation of suspected Charcot joint:

- Charcot ankle - MRI without contrast (CPT® 73721)
- Charcot foot - MRI without contrast (CPT® 73718) or MRI without and with contrast (CPT® 73720)

Septic Joint

MRI without and with contrast, MRI without contrast, CT without contrast, CT with contrast, or Ultrasound (CPT® 76881 or CPT® 76882) of the affected joint for further investigation of joint sepsis is considered medically necessary when **standard or image-guided arthrocentesis is contraindicated, unsuccessful, or non-diagnostic**, and the clinical documentation satisfies ALL of the following criteria:

- History and physical examination findings [One of the following]:
  - Development of an acutely hot and swollen joint (<2 weeks)
  - Decreased range of motion due to pain
  - Documented fever
- Laboratory tests [One of the following]:
  - Leukocytosis
  - Elevated ESR or C-reactive protein
  - Analysis of the joint fluid is non-diagnostic
- Plain x-ray of the joint - Results of plain x-rays performed after the current episode of symptoms started or changed need to be available to the requesting provider

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MRI without and with contrast, MRI without contrast, CT without contrast, or CT with contrast of the affected joint to evaluate the extent of infection into the soft tissues and any skip lesions that would require evaluation is considered medically necessary after plain x-rays if **the arthrocentesis is diagnostic and if there is a confirmed septic joint.** Results of plain x-rays performed after the current episode of symptoms started or changed need to be available to the requesting provider.

For the criteria for further investigation of post-operative joint replacement septic infection please see joint specific criteria in **Joint Replacement Post-Operative Follow-Up (MS-16.1)**

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Evidence Discussion (MS-9)

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The American College of Radiology (ACR) has recommended that x-rays should be used for the initial evaluation of musculoskeletal infections, including osteomyelitis, septic arthritis, and soft tissue infection (Pierce et al., 2022). They also recommended x-rays as the initial image for the evaluation of feet in individuals with Diabetes Mellitus, which often present with symptoms consistent with infection (Baker et al., 2025). Initial radiographs can provide an excellent overview of the anatomic area of interest and can help to exclude other causes of swelling or pain (Benito et al., 2024). Radiographs can help with the interpretation of future imaging studies such as CT, MRI, US, and nuclear medicine scans.

The clinical presentation of a suspected infected area or joint has a wide differential diagnosis. Infection is primarily a clinical diagnosis based on physical examination and laboratory testing of blood and/or synovial fluid, which may require prompt arthrocentesis and culture (Benito et al., 2024; Chan et al., 2020; Ravn et al., 2023). In select situations when a full examination and initial imaging is unclear, advanced imaging may be necessary to better visual the extent of suspected infection and associated effusion or other tissue damage or injury (Benito et al., 2024; Ravn et al., 2023).

US, MRI, or CT can be appropriate as the next imaging study for suspected septic arthritis, soft tissue infection, or osteomyelitis following normal radiographs (Baker et al., 2025; Pierce et al., 2022). MRI is often the next image of choice for suspect musculoskeletal infection due to its superior contrast resolution of soft tissues which can be helpful in detecting the spread of infection (Benito et al., 2024; Ravn et al., 2023; Simpfendorfer, 2017). They may also be helpful to evaluate the adjacent soft tissues for infection. MRI is also recommended as the next image for evaluation of suspected Charcot joint of the foot. Charcot joints often present with complex symptoms including infection and potential ulceration that may be best visualized with MRI (Baker et al., 2025). US can be helpful in detecting effusion and for guiding aspiration for more superficial areas in question (Benito et al., 2024; Porrino et al., 2019). CT may also be appropriate in situations when MRI is contraindicated, such as in areas with implanted metal or suspected foreign metal, or MRI is unavailable (Benito et al., 2024; Ravn et al., 2023).

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Joint Instability and Dysfunction (MS-30)

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Joint Instability and Dysfunction (MS-30.1)

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v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required, **EXCEPT** for situations specifically listed as not required in this section, prior to requesting advanced imaging for further investigation and/or treatment planning. See specific details throughout the section regarding any requirements for when conservative care prior to requesting advanced imaging is required.

- Initial x-rays must have been performed after the current episode of symptoms started or changed and the results are available to the requesting provider

Advanced imaging for further investigation of joint instability and/or articular dysfunction is considered medically necessary as follows:

- **Shoulder**:
  - Glenohumeral dislocation/subluxation and/or Bankart or Hill-Sachs lesion – MRI with contrast (CPT®73222), MRI without contrast (CPT®73221), CT with contrast (CPT®73201) or CT without contrast (CPT®73200)
    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required in individuals over age 40 with a first time dislocation
    - Conservative treatment is not required for individuals 40 years of age or younger with a first-time dislocation, and individuals with recurrent dislocations
  - Acromioclavicular dislocation/separation when ruling out possible rotator cuff tear – MRI without contrast (CPT® 73221)
  - Sternoclavicular (SC) dislocation/separation
    - **Initial x-rays are not required**
    - For evident or suspected SC dislocations - CT chest without contrast (CPT® 71250) or CT chest with contrast (CPT® 71260)
    - For differentiating physeal injury from SC dislocation in individuals 25 years of age or younger OR planning for operative repair - MRI chest without contrast (CPT® 71550) or MRI without and with contrast (CPT® 71552)

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    - Proximal 1/3rd (one-third) clavicle fracture – CT chest with contrast (CPT® 71260), CT chest without contrast (CPT® 71250), MRI chest without contrast or MRI chest without and with contrast (CPT® 71552)
- **Wrist**:
    - Distal Radioulnar joint instability – CT of both wrists, pronated and supinated positions, without contrast (CPT® 73200)
- **Pelvis**:
    - Osteitis Pubis/ Symphysis Pubis Diastasis – MRI without contrast (CPT® 72195)
        - A documented failure of 6 weeks of provider-directed conservative treatment, including re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- **Hip**:
    - Femoroacetabular Impingement, for preoperative planning – MRI without contrast (CPT® 73721) or MRI with contrast (CPT® 73722) and CT without contrast (CPT® 73700) or CT Pelvis without contrast (CPT® 72192)
        - A documented failure of 6 weeks of provider-directed conservative treatment, including re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- **Knee**:
    - Tibiofemoral dislocation following a significant trauma to evaluate for ligament and vascular injury – MRI without contrast (CPT® 73721) and/either MRA lower extremity without and with contrast (CPT® 73725) or CTA lower extremity without and with contrast (CPT® 73706)
    - Patellar dislocation/subluxation following an acute injury with consideration of surgery and concern for osteochondral fragment – MRI without contrast (CPT® 73721) or CT without contrast (CPT® 73700)
    - Recurrent Patellar instability if consideration for surgery – MRI without contrast (CPT® 73721) or CT without contrast (CPT® 73700)
        - A documented failure of 6 weeks of provider-directed conservative treatment, including re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- **Ankle**:
    - Impingement, anterior, anterior-lateral or posterior – MRI without contrast (CPT® 73721), MRI with contrast (CPT® 73722), or CT with contrast (CPT® 73701)
        - A documented failure of 6 weeks of provider-directed conservative treatment, including re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required

- Instability, preoperative planning – MRI without contrast (CPT® 73721) or MRI with contrast (CPT® 73722)
  - A documented failure of 6 weeks of provider-directed conservative treatment, including re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required

- **Foot**:
  - Lisfranc (tarsometatarsal) dislocation, known or suspected - MRI Foot without contrast (CPT® 73718) or CT Foot without contrast (CPT® 73700)
    - For known or suspected Lisfranc ligament injury or fracture (with or without dislocation) see: **Ligament and Fascia Injury (MS-31.1)** for ligament injury or **Acute Fracture (MS-5.1)** for fracture
  - Tarsal Coalition, preoperative planning – MRI Ankle without contrast (CPT® 73721) or CT Ankle without contrast (CPT® 73700)
    - A documented failure of 6 weeks of provider-directed conservative treatment, including re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required is required
  - Sinus Tarsi Syndrome, if diagnosis is unclear of for preoperative evaluation – MRI Ankle without contrast (CPT® 73721)
    - A documented failure of 6 weeks of provider-directed conservative treatment, including re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required

Evidence Discussion (MS-30)

MS.IN.0030.0
v1.0.2027

The American College of Radiology (ACR) has recommended that x-rays be the initial image of choice for evaluation of acute and chronic joint instability symptoms (e.g., dislocation, subluxation) and articular dysfunction or abnormality (e.g., bony impingement, coalition) (Chang et al., 2018; Gorbachova et al., 2020; Jawetz et al., 2023; Laur et al., 2025; Smith et al., 2020; Torabi et al., 2019). X-rays, along with a full history and clinical examination, may be sufficient to determine a diagnosis and treatment plan. In many instances, having an individual follow a course of provider-directed conservative care may be sufficient to reduce symptoms and aid in the return of normal function (Chona et al., 2022; Lowry et al., 2024). Early advanced imaging could expose individuals to unnecessary risks and additional healthcare costs.

Some acute injuries involving significant trauma may require advanced imaging prior to conservative care. Damage to surrounding anatomy can occur that would need prompt treatment. MRI is typically recommended as the next image for many acute joint injuries as it has excellent capability in discriminating soft tissues and surrounding anatomy. CT may also be appropriate when MRI is contraindicated, unavailable or better visualization of bony alignment is required, such as in surgical planning (Gorbachova et al., 2020; Laur et al., 2025; Smith et al., 2020; Taljanovic et al., 2020; Torabi et al., 2019).

When conservative care has not been effective at improving function, or an individual presents with re-occurring and chronic problems, both MRI and CT are recommended as next images to further investigate joint instability and dysfunction (Chang et al., 2018; Jawetz et al., 2023; Lowry et al., 2024; Schmaranzer et al., 2021). MRI is recommended as useful in assessing the integrity of tissues that support the joint (e.g., labrum, capsule, ligament) and damage that may have occurred over time to chondral surfaces of both the hip and shoulder (Lowry et al., 2024; Schmaranzer et al., 2021). MRI was shown to have good inter- and intra-rater reliability in assessing patellofemoral instability (Geraghty et al., 2022).

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Ligament and Fascia Injury (MS-31)

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Ligament and Fascia Injury (MS-31.1)

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Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning. See specific details throughout the section regarding any requirements for when conservative care prior to requesting advanced imaging is required.

- Initial plain x-ray imaging of the suspected area must first be performed after the current episode of symptoms started or changed with results available to the requesting provider

Advanced imaging for further investigation of ligament and fascia injury is considered medically necessary as follows:

- **Elbow**
  - Ulnar Collateral Ligament tear, following acute or repetitive trauma (including overhead throwing athletes) – MRI without contrast (CPT® 73221), MRI with contrast (CPT® 73222) or CT with contrast (CPT® 73201)
- **Wrist**
  - Intrinsic ligament tear and/or Triangular Fibrocartilage Complex injury – MRI with contrast (CPT® 73222) or CT with contrast (CPT® 73201).
    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- **Hand**
  - Ulnar Collateral Ligament tear, if ruling out a Stener lesion or a complete ligament tear – MRI without contrast (CPT® 73218)
- **Knee**
  - Cruciate and/or collateral ligament tear – MRI without contrast (CPT® 73721)
    - A failed trial of conservative treatment is not required if any of the following signs are positive in comparison to the opposite knee:
      - Anterior Drawer
      - Lachman
      - Pivot Shift

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- Posterior Drawer or Posterior Sag
- Valgus Stress
- Varus Stress

▪ Otherwise, the documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms started is required

◦ Patellofemoral and Patellotibial ligament tear – MRI without contrast (CPT® 73721)

▪ A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required

• **Ankle**

◦ Lateral/Medial Ligament injury (e.g., sprained ankle), including avulsion fracture – MRI without contrast (CPT® 73721) or CT without contrast (CPT® 73700)

▪ A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required

◦ Syndesmosis Injury (e.g., high ankle sprain) – MRI without contrast (CPT® 73721) or CT without contrast (CPT® 73700)

• **Foot**

◦ Lisfranc (tarsometatarsal) ligament injury, known or suspected - MRI Foot without contrast (CPT® 73718) or CT Foot without contrast (CPT® 73700)

▪ For known or suspected Lisfranc dislocation injury or fracture (with or without dislocation) see: **Joint Instability and Dysfunction (MS-30.1)** for dislocation or **Acute Fracture (MS-5.1)** for fracture.

◦ Plantar Fascia

▪ Fascia tear (partial or complete) – MRI without contrast (CPT® 73718)

- A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required

▪ Fasciitis preoperative planning – MRI without contrast (CPT® 73718)

- A documented failure of provider-directed conservative treatment lasting at least 6 months or more, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required

▪ Plantar plate (e.g., Turf Toe injury) – MRI without contrast (CPT® 73718)

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- A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required

Musculoskeletal Imaging Guidelines

Evidence Discussion (MS-31)

MS.LM.0031.0
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Initial imaging of MSK injuries where ligament or fascia is suspected to be involved is typically done with plain x-rays. The American College of Radiology has recommended x-ray as the initial image for evaluation of most acute injuries (American College of Radiology, n.d.). Even in suspected ligament or fascia injury, initial x-rays can be beneficial in determining if there is damage or malalignment to bone that needs to be considered during a thorough evaluation.

A trial of conservative care following negative x-rays may be beneficial for some suspected ligament and fascia injuries prior to immediately seeking advanced imaging. Individuals that show improvement over time with conservative care could avoid the additional potential exposure and expense of advanced imaging or unnecessary treatment or surgery. In their 2018 revised Appropriateness Criteria for Acute Hand and Wrist Trauma, the ACR recommended that symptomatic individuals with negative initial x-rays may use a trial of immobilization and repeat x-rays (Torabi et al., 2019). Current injury rehabilitation guidelines have recommended that individuals with suspected lateral ankle sprains follow a 4-6 week conservative care program with advanced imaging only being performed for those with persistent symptoms despite following the whole program (Martin et al., 2021). Furthermore, guidelines also indicate that individuals with suspected plantar fascial pain usually do not require imaging studies unless they fail a comprehensive conservative care program (Koc et al., 2023).

When medically necessary, advanced imaging for ligament and fascia injury has demonstrated high accuracy. When further imaging beyond initial x-ray or ultrasound is necessary to investigate potential ligament or fascia injury, MRI is typically considered the standard next image option. ACR recommendations for imaging of the acute elbow, wrist, hand, knee, ankle and chronic foot all support MRI as the next imaging type for ligament or fascia investigation. Due to MRI's sensitivity to different tissues, it can be useful in evaluating not only ligament and fascia, but also any associated stress injury to bone or marrow, edema patterns, syndesmotic injury, meniscal involvement or other soft tissue injury (Campbell et al., 2020; Chen et al., 2024; Qamhawi et al., 2021; Smith et al., 2020; Tafur et al., 2020; Taljanovic et al., 2020; Torabi et al., 2019). Having accurate imaging of all aspects of any injury will aid in appropriate management and treatment planning.

CT imaging may also be useful in some instances, such as if MRI is contraindicated for an individual or when evaluation of bone displacement is desired. When combined with contrast, CT can be helpful in more accurate visualization of malalignment of the small and compact joints of the wrist. CT arthrography has demonstrated sensitivity and specificity equal to, or higher than, MRI or arthroscopy in detection of scapholunate and

lunotriquetral ligament injury (Torabi et al., 2019). CT imaging is supported in suspected "high-ankle" syndesmotic injury, while MRI is often still considered a better option, measurements from CT scans and displayed displacement have been demonstrated to identify syndesmotic injury seen on MRI (Tafur et al., 2020).

Musculoskeletal Imaging Guidelines

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MS.LM.0031.0

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Limb Length Discrepancy (MS-17)

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Limb Length Discrepancy (MS-17.1)

MS.LL.0017.1
v1.0.2027

Criteria

A diagnostic advanced imaging CPT code (e.g., CPT® 73700, CPT® 73701, or CPT® 73702) is considered not medically necessary for the evaluation of limb length discrepancy.

Either plain radiograph or "CT scanogram," both reported with CPT® 77073, is considered medically necessary to radiographically evaluate limb length discrepancy due to congenital anomalies, acquired deformities, growth plate (physeal injuries or surgery), or inborn errors of metabolism.

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Evidence Discussion (MS-17)

MS.LL.0017.0
v1.0.2027

The findings of recent systematic reviews support that x-ray is the most valid and reliable method for evaluation of limb length discrepancy. Advanced imaging modalities are not supported in current research as a method to evaluate leg length discrepancy. These technologies are more expensive, can have added risks such as sedation, and increased exposure to radiation. Furthermore, they can have added time it takes an individual to access the technology and may be contraindicated for some that have implantable devices. Full length, anterior-to-posterior x-ray images are recommended. Studies also reported excellent reliability using CT scanogram imaging, which may be an appropriate alternative to x-rays (Alfuth et al., 2021; Pettit et al., 2022).

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References (MS-17)

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Muscle/Tendon Unit Injuries/Diseases (MS-11)

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Musculoskeletal Imaging Guidelines

Muscle and Tendon Injuries (MS-11.1)

MS.MI.0011.1
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning. See specific details throughout the section regarding any requirements for when conservative care is required prior to requesting advanced imaging.

- Initial plain x-ray of the suspected area must first be obtained after the current episode of symptoms started or changed and results are available to the provider

Muscle belly strains/tears - Advanced imaging is considered not medically necessary. Advanced imaging will not change the treatment plan for muscle belly strains/tears. There is lack of evidence to support surgical treatment for these injuries. These injuries are nearly always treated through conservative, non-operative care.

Tendons - Advanced imaging for further investigation of tendon injury and/or pathology is considered medically necessary as follows:

- MRI without contrast for imaging tendons not located in specific joints outlined below is medically necessary when either of the following apply:
  - Suspected partial tendon tear of a specific named tendon
  - Complete tendon tear of a specific named tendon for preoperative planning
- **Shoulder**
  - Impingement – MRI without contrast (CPT®73221) or MRI with contrast (CPT®73222) or CT with contrast (CPT® 73201) if MRI is contraindicated
    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
  - Chronic tendon inflammation/irritation (e.g., tendinitis, bursitis) – MRI without contrast (CPT®73221)
    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
  - Bicep Tendon (Long Head), complete tear – MRI without contrast (CPT®73221)
    - Clinical exam must be inconclusive, or advanced imaging for preoperative planning/surgery is being considered

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- Pectoralis Major/Minor complete tear – MRI without contrast (CPT®73221) or MRI Chest without contrast (CPT®71550)
  - Clinical exam must be inconclusive or for preoperative planning
- Rotator Cuff tendon tear
  - Partial or complete tear from acute injury and surgery is being considered – MRI without contrast (CPT®73221), MRI with contrast (CPT®73222) or CT with contrast (CPT®73201)
  - Partial or complete tear – MRI without contrast (CPT®73221) or MRI with contrast (CPT®73222) or CT with contrast (CPT®73201) if MRI is contraindicated
    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- Other tendon injury or pathology not otherwise specified above, partial or complete tear – MRI without contrast (CPT®73221)
  - Specific tendon must be named for partial tendon tear
  - Complete tears must be in relation to preoperative planning of a specific named tendon

- **Elbow**
  - Chronic tendon inflammation/irritation (e.g., tendinitis, bursitis)
    - Bursitis – MRI without contrast (CPT® 73221) or MRI without and with contrast (CPT® 73223)
      - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
    - Tendinitis – MRI without contrast (CPT® 73221)
      - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
    - Epicondylitis, medial or lateral – MRI without contrast (CPT® 73221)
      - Symptoms must persist for longer than 6 months despite trial of at least 6 weeks of conservative treatment. A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
  - Bicep/Tricep insertion tendon, complete tear – MRI without contrast (CPT® 73221)

        - Clinical examination must be inconclusive or imaging is for preoperative planning
    - Other tendon injury or pathology not otherwise specified above, partial or complete tear – MRI without contrast (CPT® 73221)
        - Specific tendon must be named for partial tendon tear
        - Complete tears must be in relation to preoperative planning of a specific named tendon
- **Wrist and Hand**
    - Chronic tendon inflammation/irritation (e.g., tendinitis) – MRI without contrast (CPT® 73221 for wrist or CPT® 73218 for hand) or MRI without and with contrast (CPT® 73223 for wrist or CPT® 73220 for hand)
        - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
    - Other tendon injury or pathology not otherwise specified above, partial or complete tear – MRI without contrast (CPT® 73221 for wrist or CPT® 73218 for hand) or MRI without and with contrast (CPT® 73223 for wrist or CPT® 73220 for hand)
        - Specific tendon must be named for partial tendon tear
        - Complete tears must be in relation to preoperative planning of a specific named tendon
- **Pelvis**
    - Chronic tendon inflammation/irritation (e.g., tendinitis) – MRI without contrast (CPT® 72195) or MRI right and or left hip without contrast (CPT® 73721)
        - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
    - Tendon tear, partial or complete – MRI without contrast (CPT® 72195)
        - Specific tendon must be named
    - Athletic Pubalgia (Sports Hernia) - MRI without contrast (CPT® 72195)
        - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
    - Piriformis Syndrome – This condition is imaged according to the criteria found in the Peripheral Nerve and Neuromuscular Guidelines see: **Focal Neurophathy (PN-2.1)**
- **Hip**

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- Chronic tendon inflammation/irritation (e.g., tendinitis, bursitis) – MRI without contrast (CPT® 73721)
  - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- Abductor tear/avulsion – MRI without contrast (CPT® 73721)
- Other tendon injury or pathology not otherwise specified above, partial or complete tear – MRI without contrast (CPT® 73721)
  - Specific tendon must be named for partial tendon tear
  - Complete tears must be in relation to preoperative planning of a specific named tendon
- Piriformis Syndrome – See above in **Pelvis**

- **Knee**
  - Chronic tendon inflammation/irritation (e.g., tendinitis) – MRI without contrast (CPT® 73721)
    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
  - Quadriceps tendon (distal) complete tear, preoperative planning – MRI without contrast (CPT® 73721)
  - Other tendon injury or pathology not otherwise specified above, partial or complete tear – MRI without contrast (CPT® 73721)
    - Specific tendon must be named for partial tendon tear
    - Complete tears must be in relation to preoperative planning of a specific named tendon
- **Ankle**
  - Chronic tendon inflammation/irritation (e.g., posterior tibial tendinitis/tendinosis, peroneal tendon tendinitis/tendinosis, Achilles tendinitis/tendinosis) – MRI without contrast (CPT® 73721)
    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
  - Peroneal tendon instability (dislocation or subluxation)
    - For acute dislocation or subluxation when surgery is being considered, MRI without contrast (CPT® 73721)
    - For chronic instability, MRI without contrast (CPT® 73721)

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    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
  - Achilles Tendon, complete tear, preoperative planning – MRI without contrast (CPT® 73721)
  - Other tendon injury or pathology not otherwise specified above, partial or complete tear – MRI without contrast (CPT® 73721)
    - Specific tendon must be named for partial tendon tear
    - Complete tears must be in relation to preoperative planning of a specific named tendon
- **Foot**
  - Chronic tendon inflammation/irritation (e.g., tendinitis) – MRI without contrast (CPT® 73718)
    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
  - Tendons, partial or complete tear – MRI without contrast (CPT® 73718)
    - Specific tendon must be named for partial tendon tear
    - Complete tears must be in relation to preoperative planning of a specific named tendon

For **inflammatory muscle disease imaging**, please see either: **Muscle Diseases (PN-8.5)** in the Peripheral Nerve and Neuromuscular Disorders Imaging Guidelines or **Inflammatory Muscle Diseases (PEDMS-10.3)** in the Pediatric Musculoskeletal Imaging Guidelines.

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Compartment Syndrome (MS-11.2)

MS.MI.0011.2
v1.0.2027

Criteria

Acute - This is a surgical emergency and advanced imaging is considered not medically necessary as this diagnosis is made clinically by direct measurement of muscle compartment pressure.

Chronic/Exertional - Advanced imaging should only be considered when ruling out other potential causes of extremity pain following a plain x-ray and conservative treatment as indicated. Results of plain x-rays performed after the current episode of symptoms started or changed need to be available to the requesting provider.

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Evidence Discussion (MS-11)

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v1.0.2027

Initial evaluation of a patient with a suspected tendon injury should include an accurate history, careful examination and plain radiographs. The American College of Radiology has recommended x-ray as the initial image for evaluation of most acute and chronic injuries (American College of Radiology, n.d.). With negative x-rays, suspicion of tendon injury does not always require immediate advanced imaging. Best practice recommendations for MSK pain have stated that imaging be used selectively. Unnecessary imaging can drive up costs of care and may lead to over-medicalization of an individual's symptoms (Desmeules et al., 2025; Lin et al., 2020). Many muscle and tendon injuries can significantly improve through conservative care without advanced imaging.

After x-rays have been done, and any conservative care recommended has not resulted in a meaningful improvement of symptoms, advanced imaging may be beneficial for further assessment and treatment planning of certain muscle and tendon injuries. MRI is supported by the American College of Radiology as a next appropriate image in the evaluation of acute and chronic shoulder, elbow, wrist, hip, knee, ankle and foot injuries when initial x-rays are negative or unclear and muscle or tendon involvement is suspected (Bartolotta et al., 2024; Chang et al., 2017; Chen et al., 2024; Fox et al., 2018; Jawetz et al., 2022; Laur et al., 2024; Lugo-Pico et al., 2020; Nacey et al., 2022; Stensby et al., 2023; Taljanovic et al., 2019; Thomas et al., 2022; Torabi et al., 2018; van Dijk et al., 2016). Evidence has shown that MRI has been validated as an excellent method to evaluate the integrity of muscle and tendon, especially for instances of surgical planning, differential diagnosis or assessment of injury too deep for clear visualization by US (Bordalo et al., 2023; Courage et al., 2023).

Advanced imaging will typically not change the treatment plan for muscle belly strains/tears. These injuries are most often treated through conservative, non-operative, care. There is limited evidence to support the surgical repair of muscle belly strains/tears (Ramos et al., 2015).

Initial diagnosis of compartment syndrome is typically based on clinical presentation, perfusion pressure measurements and laboratory results. Acute compartment syndrome is considered a medical emergency for which a thorough clinical assessment and direct pressure measurements of the compartment can result in a diagnosis so the individual can quickly receive emergency care. Advanced imaging does not play a role in the diagnosis or management of this condition and may delay the time to surgical treatment (Osborn & Schmidt, 2021; Sellei et al., 2020). Chronic exertional compartment syndrome can be determined through dynamic intra-compartmental pressure measurements. These are considered gold standard for diagnosis of chronic

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compartment pressure concerns. MRI has lacked validity as a non-invasive diagnostic tool for this condition. However, MRI may be useful to rule out other possible sources of pain if plain x-rays fail to find a source (Osborn & Schmidt, 2021; van der Kraats et al., 2023).

Musculoskeletal Imaging Guidelines

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MS.MI.0011.0

v1.0.2027

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Chondral/Osteochondral Lesions (MS-13)

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Osteochondral Lesions and Fractures (MS-13.1)

MS.OC.0013.1
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning. The following must be met prior to requesting advanced imaging for further investigation and/or treatment planning of suspected osteochondral lesions or fractures (including osteochondritis dissecans):

- Initial plain x-ray imaging of the suspected area must first be performed after the current episode of symptoms started or changed
- If plain x-rays show a non-displaced osteochondral fragment, follow-up imaging should be with plain x-rays. Advanced imaging is not medically necessary

When the initial x-rays are negative and an osteochondral injury is still suspected or the x-rays and clinical examination suggest an unstable osteochondral injury, the following advanced imaging is considered medically necessary:

- **Elbow** - MRI without contrast (CPT® 73221), MRI with contrast (CPT® 73222), CT without contrast (CPT® 73200) or CT with contrast (CPT® 73201)
- **Knee** MRI without contrast (CPT® 73721), MRI with contrast (CPT® 73722), or CT with contrast (CPT® 73701)
- **Ankle** - MRI without contrast (CPT® 73721) or CT without contrast (CPT® 73700)
- **Other Joints** - MRI without contrast, MRI with contrast (arthrogram), or CT with contrast (arthrogram)
- **Follow-up of healing (including post-operative fixation)** - MRI without contrast or CT without contrast when healing cannot be adequately assessed on follow-up plain x-rays.

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Evidence Discussion (MS-13)

MS.OC.0013.0
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The American College of Radiography (ACR) has recommended that x-ray should be the first imaging test performed to evaluate joint pain suspected to be due to chondral/ osteochondral lesions (Chang et al., 2018; Fox et al., 2018; Thomas et al., 2022). Open physes have a much higher potential for healing with conservative treatment. So, radiographs may help to exclude other causes of pain and to determine skeletal maturity, which significantly affects prognosis and management of Osteochondritis Dissecans lesions (OCD). Radiographs may also be sufficient for classification of lower grade lesions avoiding unnecessary advanced imaging (Andriolo et al., 2022). In clinical practice, serial radiographs may be sufficient for monitoring healing of juvenile OCD lesions.

In individuals with radiographs positive for Osteochondritis Dissecans (OCD) or subchondral insufficiency fracture, or with negative radiographs but osteochondral fracture is still suspected, MRI may be medically necessary to further evaluate cartilage for additional injuries and for grading of osteochondral fractures and OCD (Chang et al., 2018; Fox et al., 2018; Thomas et al., 2022). MRI has a high diagnostic value for assessing the stability of lesions, especially in higher grade lesions (Andriolo et al., 2022; Hu et al., 2019). This makes MRI useful in determining the best method of treatment, be that conservative or surgical (Andriolo et al., 2022; Nammour et al., 2024). Repeat MRI is suggested only if radiographs are not diagnostic for healing and for worsening symptoms (Nammour et al., 2024). CT without contrast may be medically necessary to evaluate patients with OCD to confirm loose bodies or when MRI is not definitive (Chang et al., 2018; Fox et al., 2018; Thomas et al., 2022). MR arthrography or CT arthrography is an effective test for locating intra-articular osteochondral fragments, loose bodies and grading chondral and osteochondral lesions. A combination of x-rays and MRI or CT is recommended to best evaluate the stability of lesions (Pu et al., 2021).

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Osteonecrosis/Avascular Necrosis (MS-4)

Guideline Page

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Osteonecrosis/Avascular Necrosis (MS-4.1)

MS.AN.0004.1
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning. The following must be met prior to requesting advanced imaging for further investigation and/or treatment planning of suspected osteonecrosis (avascular necrosis):

- Initial plain x-ray imaging of the suspected area must first be performed after the current episode of symptoms started or changed

When the initial x-rays are negative or equivocal and the clinical symptoms warrant further investigation of osteonecrosis, the following advanced imaging is considered medically necessary:

- MRI without contrast, MRI without and with contrast, or CT without contrast of the area of interest

When the initial x-rays have confirmed osteonecrosis and advanced imaging is needed for further treatment planning the following advanced imaging is considered medically necessary for the follow situations:

- Shoulder - Humeral head - MRI without contrast (CPT® 73221) or CT without contrast (CPT® 73200)
- Wrist – Lunate/Scaphoid - MRI without contrast (CPT® 73221) or CT without contrast (CPT® 73200)
- Hip – Femoral head - MRI without contrast (CPT® 73721) or CT without contrast (CPT® 73700)
- Knee – Distal Femur - MRI without contrast (CPT® 73721) or CT without contrast (CPT® 73700)
- Ankle – Talus - MRI without contrast (CPT® 73721) or CT without contrast (CPT® 73700)
- Foot – Tarsal Navicular/Metatarsal head - MRI without contrast (CPT® 73718) or CT without contrast (CPT® 73700)

Individuals with acute lymphoblastic leukemia and known or suspected osteonecrosis should be imaged according to guidelines in **Acute Lymphoblastic Leukemia (PEDONC-3.2)** in the Pediatric and Special Populations Oncology Imaging Guidelines.

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Known or suspected osteonecrosis in long-term cancer survivors should be imaged according to guidelines in **Osteonecrosis in Long Term Cancer Survivors (PEDONC-19.4)** in the Pediatric and Special Populations Oncology Imaging Guidelines.

Musculoskeletal Imaging Guidelines

Evidence Discussion (MS-4)

MS.AN.0004.0
v1.0.2027

The American College of Radiology Appropriateness Criteria (ACR) for Osteonecrosis (revised 2022) has recommended radiography as the initial imaging study for clinically suspected osteonecrosis. Radiographs are less sensitive for detection of early osteonecrosis but they help to exclude other causes of extremity pain such as fracture, primary arthritis, or tumor. In late stage osteonecrosis, x-rays will also show findings of secondary osteoarthritis (Ha et al., 2022; Pierce et al., 2015). When x-rays are negative or equivocal, and osteonecrosis is still suspected, the ACR supports the use of advanced imaging to aid in further diagnosis and treatment planning (Ha et al., 2022).

Both CT and MRI are recommended as next step imaging options after plain x-rays are obtained. MRI has been shown to be both highly sensitive and specific to the detection of osteonecrosis. A 2018 meta-analysis demonstrated that MRI was 93% sensitive and 91% specific in the early detection of osteonecrosis of the femoral head (Zhang et al., 2018). A recent Delphi model to better predict femoral head collapse identified subchondral fracture as a key predictor. CT scans can provide important insights into the structural integrity of subchondral bone allowing for better treatment planning for patients with osteonecrosis (Yang et al., 2024). Preoperative CT has been shown to more clearly display the extent of articular collapse than radiographs (Lee et al., 2019). Both MRI and CT have been shown to have similar accuracy in displaying femoral head lesions in more advanced stages of osteonecrosis (ARCO stage III or greater) (Hu et al., 2015).

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MS.AN.0004.0

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Osteoporosis (MS-14)

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Osteoporosis (MS-14.1)

MS.OP.0014.1
v1.0.2027

Criteria

Initial plain x-ray imaging is not required to request advanced imaging for osteoporosis screening.

Quantitative CT (CPT® 77078) is considered medically necessary for **screening** when DXA scanner is unavailable or known to be inaccurate for ANY of the following populations:

- Women 65 years of age or older, Men 70 years of age or older
- Women less than 65 years of age who have the following additional risk factors for osteoporosis:
  - Estrogen deficiency
  - A history of maternal hip fracture that occurred after age 50 years
  - Low body mass (less than 127 lb or 57.6 kg)
  - History of amenorrhea (greater than 1 year before age 42 years)
- Women less than 65 years or men less than 70 years of age who have the following additional risk factors:
  - Current use of cigarettes
  - Loss of height, thoracic kyphosis
- Individuals of any age with the following:
  - Bone mass osteopenia or fragility fractures on imaging studies such as x-rays, CT, or MRI
  - Develop 1 or more insufficiency fractures
- Individuals 50 years of age and older who develop a wrist, hip, spine, or proximal humerus fracture with minimal or no trauma, excluding pathologic fractures.
- Premenopausal females, or males age 20 to 50 years, with risk factors known to potentially alter bone mineral density such as:
  - Chronic renal failure
  - Rheumatoid or other inflammatory arthritis
  - Eating disorders, including anorexia nervosa and bulimia
  - Organ transplantation
  - Prolonged immobilization

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  - Conditions associated with secondary osteoporosis, such as gastrointestinal malabsorption or malnutrition, sprue, osteomalacia, vitamin D deficiency, endometriosis, acromegaly, chronic alcoholism or established cirrhosis, and multiple myeloma
  - Individuals who have had gastric bypass for obesity
  - Individuals with an endocrine disorder known to adversely affect bone mineral density (e.g., hyperparathyroidism, hyperthyroidism, or Cushing syndrome)
- Individuals receiving (or expected to receive) glucocorticoid therapy for >3 months
- Hypogonadal men older than 18 years of age and men with surgically or chemotherapeutically-induced castration
- Individuals beginning or receiving long-term therapy with medications known to adversely affect BMD (e.g., anti-convulsant drugs, androgen deprivation therapy, aromatase inhibitor therapy, or chronic heparin)

NOTE: Repeat screening quantitative computed tomography (QCT) is considered medically necessary no sooner than every two years.

Quantitative CT scan (CPT® 77078) is considered medically necessary for **monitoring/ non-screening** when DXA scanner is unavailable or known to be inaccurate for ANY of the following circumstances:

- Follow-up in cases where QCT was the original study
- Multiple healed vertebral compression fractures
- Significant scoliosis
- Advanced arthritis of the spine due to increased cortical sclerosis often with large marginal osteophytes
- Obese individual over the weight limit of the dual-energy x-ray absorptiometry (DXA) exam table
- Individuals with BMI >35kg/m^2
- Extremes in body height (i.e., very large and very small individuals)
- Individuals with extensive degenerative disease of the spine
- A clinical scenario that requires sensitivity to small changes in trabecular bone density (parathyroid hormone and glucocorticoid treatment monitoring).

NOTE: Repeat monitoring/non-screening QCT is considered medically necessary no earlier than one year following a change in treatment regimen, and only when the results will directly impact a treatment decision.

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Evidence Discussion (MS-14)

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The primary diagnostic test used to screen for osteoporosis is the central dual x-ray absorptiometry (DXA) which accurately measures bone mineral density at the hip and lumbar spine. DXA accuracy and reproducibility has led to the established standards for diagnosis of osteoporosis by the World Health Organization (Akkawi & Zmerly, 2018). The USA Bone Health and Osteoporosis Foundation has recommended bone mineral density testing in all women age 65 and older and all men age 70 and older, and in postmenopausal women younger than 65 years and men aged 50-69 years based on their risk factor profile, including if they had a fracture as an adult (LeBoff et al., 2022). The American College of Radiology Appropriateness Criteria supports DXA as the primary diagnostic choice to screen women >65 years of age and men >70 years of age for osteoporosis, and for postmenopausal women <65 years of age with additional risk factors for fracture (Yu et al., 2022). Repeat bone mineral density assessments one to two years after initiating medical therapy for osteoporosis and every two years thereafter, but recognizes that testing more frequently may be warranted in certain clinical situations, and may be needed less frequently in patients without major risk factors or significant bone density loss on initial BMD testing. DEXA is currently the preferred method for monitoring treatment response (LeBoff et al., 2022).

Quantitative CT (QCT) is regarded as a secondary tool after DXA for screening for osteoporosis. QCT is highly accurate in determining tissue density within a region of interest. Indications for QCT are the same as for DXA; however, DXA is recommended as the first-line screening and follow-up test for bone density. If DXA is not available, QCT may be used as a secondary technique and for serial/follow-up purposes (Deshpande et al., 2023; LeBoff et al., 2022; Yu et al., 2022). Selected conditions in which QCT is considered superior to DXA include extremes in body height, BMI >35, clinical scenarios when an increased sensitivity to small changes in trabecular bone density is required, and in patients with advanced degenerative bony changes in the spine (Yu et al., 2022). A potential harm of Quantitative CT is increased radiation exposure (1-10mSv) as compared to <0.1mSv for DXA scan. The radiation dose for both lumbar spine and hip scanning in a DXA scan is approximately equivalent to that of a chest x-ray.

There is insufficient evidence to support the use of x-ray as a screening tool in patients suspected of having low bone mineral density. Patients whose x-rays report osteopenia and/or fragility fractures should be referred for DXA for further characterization of bone density. There is also insufficient evidence to support the current use of quantitative ultrasound as a screening tool in patients suspected of having low bone mineral density (Yu et al., 2022).

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MS.OP.0014.0

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General Pain (MS-32)

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General Pain (MS-32.1)

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Criteria

As outlined in General Guidelines (MS-1.0), initial images and physical exam are required prior to requesting advanced imaging for further investigation and/or treatment planning. See specific details throughout the section regarding any requirements for when conservative care prior to requesting advanced imaging is required. The criteria in this section applies only to general musculoskeletal pain conditions not already specified in any other section of this guideline.

- Initial plain x-ray imaging of the suspected area must first be performed after the current episode of symptoms started or changed and results are available to the requesting provider

Advanced imaging for further investigation of general musculoskeletal pain is considered medically necessary as follows:

- **Shoulder** - MRI without contrast (CPT®73221) or CT with contrast (CPT® 73201) if MRI contraindicated
  - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- **Elbow** - MRI without contrast (CPT® 73221)
  - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- **Wrist** - MRI without contrast (CPT® 73221), MRI with contrast (CPT® 73222), CT without contrast (CPT® 73200) or CT with contrast (CPT® 73201)
  - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- **Hand** - MRI without contrast (CPT® 73218) or MRI without and with contrast (CPT® 73220)
  - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required

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- **Pelvis** - MRI without contrast (CPT® 72195) or MRI right and/or left Hip without contrast (CPT® 73721)
  - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
  - Imaging for Sacroiliac and Coccygeal pain is guided by the Spine Imaging Guidelines (Sacroiliac Joint Pain/Sacroiliitis (SP-10.1) and Coccydynia without Neurological Features (SP-5.2))
- **Hip** - MRI without contrast (CPT® 73721)
  - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- **Knee** - MRI without contrast (CPT® 73721)
  - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
  - For patellofemoral pain or tracking issues where surgery is being considered - MRI without contrast (CPT® 73721) or CT without contrast (CPT® 73700)
    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- **Ankle** - MRI without contrast (CPT® 73721)
  - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- **Foot** - MRI without contrast (CPT® 73718)
  - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
  - For investigation of sesamoid disorders:
    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
    - MRI without contrast (CPT® 73718) or CT without contrast (CPT® 73700) of the foot
  - For investigation of Complex Regional Pain Syndrome (CRPS) (Type 1) at the foot:

- A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
- MRI Foot without contrast (CPT® 73718)

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Evidence Discussion (MS-32)

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General, unspecific musculoskeletal pain and trauma may not always present in a definitive manner. An individual may present with symptoms similar to multiple differential diagnoses. Imaging, as part of a comprehensive examination and assessment, can be useful in these situations to help rule-in or -out a certain diagnosis so as to develop a clinical course of action. The American College of Radiology (ACR) has recommended x-ray as the initial evaluation image for the vast majority of non-specific acute (Bartolotta et al., 2025; Chen et al., 2024; Gorbachova et al., 2020; Laur et al., 2025; Smith et al., 2020; Taljanovic et al., 2020; Torabi et al., 2019) and chronic (Chang et al., 2018; Fox et al., 2018; Jawetz et al., 2023; Nacey et al., 2023; Stensby et al., 2024; Tafur et al., 2020; Thomas et al., 2022) musculoskeletal pain. Initial x-rays may provide sufficient information, along with the clinical evaluation, to form a diagnosis. These initial images can be helpful in determining if a course of conservative treatment is recommended. In some instances, the initial x-rays or US may help determine a diagnosis or that more advanced images or procedures are appropriate (Cuff et al., 2020).

Advanced imaging can often demonstrate abnormalities that have no relevance to the individual's symptoms. Studies have shown that advanced imaging may demonstrate musculoskeletal abnormalities that do not affect their quality of life (Schwartzberg et al., 2016). Focusing on incidental findings can lead to overtreatment through unnecessary referral to medical specialists or unneeded medical procedures. Advanced imaging can have additional risks to the individual beyond those of initial plain images. There are risks associated with additional exposure to radiation. There can also be complications due to implantable devices or metallic foreign bodies in the individual. Risk mitigation needs to be weighed when advanced imaging is being considered, especially in relation to repeat or serial advanced imaging (Pompan, 2011; Watson & Yu, 2023). Musculoskeletal complaints may respond to care prior to needing advanced imaging. Current ACR guidance has recommended obtaining initial plain x-rays and having the individual follow a course of provider directed conservative care prior to seeking advanced imaging for many nonspecific complaints (Chang et al., 2018; Fox et al., 2018; Jawetz et al., 2023; Nacey et al., 2023; Stensby et al., 2024; Tafur et al., 2020; Thomas et al., 2022). The potential clinical benefit of starting conservative care and not needing advanced images or additional procedures may outweigh the potential harm of a brief delay in obtaining said imaging.

MRI is commonly recommended as the next image technology of choice (Bartolotta et al., 2025; Chang et al., 2018; Chen et al., 2024; Gorbachova et al., 2020; Fox et al., 2018; Jawetz et al., 2023; Laur et al., 2025; Nacey et al., 2023; Smith et al., 2020;

Stensby et al., 2024; Tafur et al., 2020; Taljanovic et al., 2020; Thomas et al., 2022; Torabi et al., 2019). The use of contrast media during imaging will depend on the clinical presentation and the particular tissues suspected to be injured. When x-rays are negative and there is suspicion of soft tissue involvement, MRI can be helpful to visualize tissue damage and effusion. CT may also be helpful in situations where MRI is contraindicated, or x-rays were unclear and bony involvement continues to be suspect (Bartolotta et al., 2025; Chang et al., 2018; Chen et al., 2024; Gorbachova et al., 2020; Fox et al., 2018; Jawetz et al., 2023; Laur et al., 2025; Nacey et al., 2023; Smith et al., 2020; Stensby et al., 2024; Tafur et al., 2020; Taljanovic et al., 2020; Thomas et al., 2022; Torabi et al., 2019).

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Post-Operative Follow-Up (MS-16)

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Joint Replacement Post-Operative Follow-Up (MS-16.1)

MS.PS.0016.1
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), the following must be met prior to requesting advanced imaging for further investigation and/or treatment planning of joint replacement post-op symptoms (e.g., aseptic loosening, infection, fracture, pseudotumor, implant performance):

- Plain x-ray imaging of the suspected area must first be performed after the current post-operative episode of symptoms started with results available to the requesting provider
- See specific details throughout the section regarding any requirements for when conservative care prior to requesting advanced imaging is required
- For suspected periprosthetic infection - Joint aspiration culture is the initial evaluation after plain x-ray for a painful joint replacement when periprosthetic infection is suspected
-

Advanced imaging for further investigation of joint replacement post-operative follow-up is considered medically necessary as follows:

- **Shoulder**:
  - Suspected aseptic loosening or fracture – MRI without contrast (CPT® 73221), OR CT without contrast (CPT® 73200)
  - Suspected infection with negative or inconclusive aspiration culture – MRI without contrast (CPT® 73321), MRI without and with contrast (CPT® 73223) OR CT with contrast (CPT® 73201)
  - Possible rotator cuff tear – MRI without contrast (CPT® 73221) OR CT with contrast (CPT® 73201)
  - Possible nerve injury – MRI without contrast (CPT® 73221)
- **Elbow/Wrist**:
  - Suspected aseptic loosening or fracture – CT without contrast (CPT® 73200)
  - Suspected infection with negative or inconclusive aspiration culture – MRI without contrast (CPT® 73221), MRI without and with contrast (CPT® 73223) OR CT with contrast (CPT® 73201)

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- **Hip**:
  - Suspected aseptic loosening or fracture – CT without contrast (CPT® 73700)
  - Suspected infection with negative or inconclusive aspiration culture – MRI without contrast (CPT® 73721), MRI without and with contrast (CPT® 73723), CT with contrast (CPT® 73701), OR CT without contrast (CPT® 73700)
  - Suspected particle disease (aggressive granulomatosis) after infection has been excluded – MRI without contrast (CPT® 73721), OR CT without contrast (CPT® 73700)
  - Suspected periprosthetic fracture after non-diagnostic x-ray – CT without contrast (CPT® 73700)
  - Suspected component malposition or heterotopic bone – CT without contrast (CPT® 73700)
  - Suspected metal-on-metal implant with high-risk of performance issues from cup-neck impingement and adverse local tissue reaction (ALTR, with Co and Cr ion levels greater than 10 ppb) – MRI without contrast (CPT® 73721)
  - Suspected Aseptic lymphocytic-dominated vasculitis lesion (ALVAL) pseudotumor surrounding metal-on-metal prosthesis – MRI without contrast (CPT® 73721)
  - Suspected tendinitis/bursitis, abductor injury or other soft tissue abnormality – US (CPT® 76881 or CPT® 76882) OR MRI without contrast (CPT® 73721)
    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required
  - Possible nerve injury – MRI without contrast (CPT® 73721)
- **Knee**:
  - Suspected aseptic loosening or fracture – MRI without contrast (CPT® 73721) OR CT without contrast (CPT® 73700)
  - Suspected infection with negative or inconclusive aspiration culture – MRI without contrast (CPT® 73721), MRI without and with contrast (CPT® 73723) OR CT with contrast (CPT® 73701)
  - Suspected periprosthetic fracture – MRI without contrast (CPT® 73721), OR CT without contrast (CPT® 73700)
  - Suspected osteolysis or component instability, rotation, or wear – MRI without contrast (CPT® 73721), OR CT without contrast (CPT® 73700)
  - Suspected periprosthetic soft tissue abnormality unrelated to infection (e.g. tendinopathy, arthrofibrosis, patellar clunk, impingement of nerves or soft tissue) - MRI without contrast (CPT® 73721)
    - A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed is required

- **Ankle**:
  - Suspected aseptic loosening or fracture – CT without contrast (CPT® 73700)
  - Suspected infection with negative or inconclusive aspiration culture – MRI without contrast (CPT® 73721), MRI without and with contrast (CPT® 73723) OR CT with contrast (CPT® 73701)

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General Musculoskeletal Post-Operative Follow-Up (MS-16.2)

MS.PS.0016.2
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), the following must be met prior to requesting advanced imaging for further investigation and/or treatment planning of general musculoskeletal post-operative (post-op) symptoms (e.g., fracture fixation, tendon/ligament repair, labral repair):

- Plain x-ray imaging of the suspected area must first be obtained after the current post-operative episode of symptoms started and results are available to the provider
- A documented failure of 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current post-op episode of symptoms or physical exam findings started or changed

When all of the above criteria have been met, further investigation in symptomatic individuals is considered medically necessary for post-operative follow-up as follows:

- **Shoulder**:
  - Post rotator cuff repair – MRI without contrast (CPT® 73221), MRI with contrast (CPT® 73222) OR CT with contrast if MRI contraindicated (CPT® 73201)
  - Post impingement or labral repair - MRI without contrast (CPT® 73221), MRI with contrast (CPT® 73222) OR CT with contrast if MRI contraindicated (CPT® 73201)
- **Elbow**:
  - Post complex fracture surgery – CT without contrast (CPT® 73200)
  - Post soft-tissue surgery – MRI without contrast (CPT® 73221)
- **Wrist**:
  - Post complex fracture surgery – CT without contrast (CPT® 73200)
  - Post instability and/or ligament surgery (e.g., TFCC, DRUJ instability) surgery – MRI with contrast (CPT® 73222)
- **Hand**:
  - Post soft-tissue or complex fracture surgery – MRI without contrast (CPT® 73218) OR CT without contrast (CPT® 73200)
- **Pelvis**:

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  - Post complex pelvic ring/acetabular fracture surgery – CT without contrast (CPT® 72192)
- **Hip**:
  - Fracture surgery or post-op for avascular necrosis – MRI without contrast (CPT® 73721) or CT without contrast (CPT® 73700)
  - Post Femoroacetabular Impingement or labral repairs – MRI with contrast (CPT® 73722)
- **Knee**:
  - Post fracture or dislocation surgery – CT without contrast (CPT® 73700)
  - Post ligament reconstruction or meniscus tear surgery – MRI without contrast (CPT® 73721) OR MRI with contrast (CPT® 73722)
- **Ankle**:
  - Post complex fracture surgery – CT without contrast (CPT® 73700)
  - Post ligament or tendon injury surgery – MRI without contrast (CPT® 73721)
- **Foot**:
  - Post complex fracture surgery – CT without contrast (CPT® 73700)
  - Post ligament, tendon or plantar plate surgery – MRI without contrast (CPT® 73718)

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Evidence Discussion (MS-16)

MS.PS.0016.0
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The American College of Radiology (ACR) has recommended plain x-rays as the initial study for routine follow up of asymptomatic patients and symptomatic individuals who have undergone surgery for musculoskeletal injury (Nacey et al., 2023; Roberts et al., 2022; Walker et al., 2023; Weissman et al., 2023). Plain x-rays can identify fractures and show signs of hardware loosening, wear, osteolysis or infection. Blood tests and joint aspiration with synovial fluid laboratory analysis may be sufficient to diagnosis post-surgical infection. Joint aspiration with synovial fluid analysis remains the most useful test for confirming the presence or absence of infection and identifying the causative organism (Roberts et al., 2022; Schinsky et al., 2008; Toms et al., 2006; Walker et al., 2023; Weissman et al., 2023; Zahar & Sarungi, 2021). When plain x-rays, and laboratory tests as applicable, are negative or inconclusive and there is a suspicion of post-surgical complications, advanced imaging can help to identify what may be the cause of the individual's symptoms.

When there is suspicion of a post-surgical soft tissue abnormality (e.g., tendinitis, tendinopathy, bursitis, arthrofibrosis), a course of conservative care prior to advanced imaging can allow many individuals to improve (American Academy of Orthopaedic Surgeons, 2020; Nawabi et al., 2014), thus eliminating the need for advanced imaging. This may avoid unnecessary exposure to radiation from imaging and additional costs of imaging. If there is a documented failure to improve, advanced imaging would be appropriate. Suspicion of more significant complications following joint surgery may benefit from advanced imaging without a trial of conservative care.

The ACR further recommended MRI and CT as advanced imaging options when further assessing post-surgical complications. Their recommendations vary based on the clinical scenario (Roberts et al., 2022; Walker et al., 2023; Weissman et al., 2023). Complications with implanted hardware (e.g., loosening, component rotation, hardware fracture) may greatly impair an individual's function and may lead to additional negative sequelae if not addressed in a timely manner. MRI has been identified as accurate diagnostic tools in evaluating aseptic loosening following knee replacement (Jette et al., 2020). Suspected torn rotator cuff tendons in individuals that have undergone total shoulder arthroplasty may also be difficult to diagnose without advanced imaging due to the various techniques used to release the subscapularis tendon during surgery (Roberts et al., 2022). MRI has been demonstrated to have good intra- and inter-rater reliability in determining the structural integrity of tendons following surgery (Buijs et al., 2024; Saccomanno et al., 2015). Individuals with metal-on-metal hip replacements are at risk for adverse local tissue reactions including metallosis, pseudotumor and generalized synovitis that could result in tissue damage. Prompt evaluation, including

advanced imaging, would be appropriate to best mitigate these risks (Gyftopoulos et al., 2022; Hall et al., 2020).

Musculoskeletal Imaging Guidelines

References (MS-16)

MS.PS.0016.0

v1.0.2027

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Tissue Growths, Masses and Cysts (MS-10)

Guideline Page

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Soft Tissue Mass and Morton's Neuroma (MS-10.1)

MS.ST.0010.1
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), the following must be met prior to requesting advanced imaging for further investigation and/or treatment planning of soft tissue masses and Morton's neuroma:

- Initial plain x-ray imaging of the suspected area must first be performed after the current episode of symptoms started. Results of these plain x-rays need to be available to the requesting provider
- Additional documentation of clinical features if specifically stated below
- See specific details throughout the section regarding any requirements for when conservative care prior to requesting advanced imaging is required

Soft Tissue Mass

Plain x-ray is considered medically necessary as the initial imaging study, with the exception of individuals with cancer predisposition syndrome (if there is a known or suspected soft tissue mass in an individual with a cancer predisposition syndrome, see: Screening Imaging in **Cancer Predisposition Syndromes (PEDONC-2)** in the Pediatric and Special Populations Oncology Imaging Guidelines). History and physical exam of any palpable soft tissue mass should include documentation of any one or more of the following clinical features:

- Increase in volume/size
- More than 5cm in diameter
- Painful
- Deep or subfascial location

After the initial history, exam and plain imaging have been performed and further investigation is needed the following advanced imaging is considered medically necessary for evaluation of soft tissue masses:

- MRI without and with contrast, or MRI without contrast of the area of interest (CPT® 76881 or 76882) is considered medically necessary when ANY of the following are met after plain x-ray:

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  - Soft tissue mass(es) which are increasing in volume/size, more than 5cm in diameter, painful or deep or in a subfascial location
  - Surgical planning
- CT with contrast or CT without and with contrast is appropriate when MRI is contraindicated or after a metal limiting MRI evaluation

Advanced imaging is considered not medically necessary for subcutaneous lipoma with no surgery planned

Tarsal Tunnel Syndrome soft tissue mass entrapment (Baxter's Neuropathy)

After the x-rays have been performed and results are available to the provider, and there has been failure of at least 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms or physical exam findings started or changed, the following advanced imaging is considered medically necessary for preoperative planning if mass is suspected as etiology of entrapment:

- MRI Foot without contrast (CPT® 73718)

Morton's Neuroma

After the x-rays have been performed and results are available to the provider, and there has been failure of at least 6 weeks of provider-directed conservative treatment, including clinical re-evaluation, occurring after the current episode of symptoms started, the following advanced imaging is considered medically necessary for further investigation of Morton's Neuroma for preoperative planning:

- MRI Foot without contrast (CPT® 73718) or MRI Foot without and with contrast (CPT® 73720)

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Bone Lesion (MS-10.2)

MS.ST.0010.2
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), the following must be met prior to requesting advanced imaging for further investigation and/or treatment planning of suspected abnormal bone growth or lesion:

- Initial plain x-ray imaging of the entire bone containing the lesion must first be performed after the current episode of symptoms started. Results need to be available to the requesting provider.

After the x-rays have been performed and further investigation is needed, advanced imaging is considered medically necessary for the following scenarios:

- Diagnosis uncertain based on plain x-ray appearance - MRI without contrast, MRI without and with contrast, or CT without contrast
- Imaging requested for preoperative planning – MRI without contrast, MRI without and with contrast, or CT without contrast
- Plain x-ray reveals an osteochondroma with clinical concern of malignant transformation - MRI without contrast or MRI with and without contrast
- For Paget's Disease - MRI (contrast as requested) can be considered if the diagnosis (based on plain x-rays and laboratory studies) is in doubt or malignant degeneration is suspected
    -

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Cysts (MS-10.3)

MS.ST.0010.3
v1.0.2027

Criteria

As outlined in General Guidelines (MS-1.0), the following must be met prior to requesting advanced imaging for treatment planning of soft tissue masses and cysts:

- Initial plain x-rays must be performed after the current episode of symptoms started or changed. Results need to be available to the requesting provider.

After the initial imaging has been performed and further investigation is needed for surgical planning to address ganglion or other musculoskeletal related cysts (e.g., Popliteal), the following advanced imaging is considered medically necessary:

- **Ganglion Cyst** - MRI without contrast or MRI without and with contrast
- **Popliteal (Baker's) Cyst** - MRI Knee without contrast (CPT® 73721)

Advanced imaging is considered not medically necessary for:

- Ganglia that can be diagnosed by history and physical examination
- Sebaceous cyst, as these cysts are benign and additional imaging typically will not change the treatment plan

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Evidence Discussion (MS-10)

MS.ST.0010.0
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The American College of Radiology (ACR) has recommended the use of x-rays as the initial image when evaluating suspected bone tumor. They recommended that a complete x-ray of the entire lesion-containing bone be evaluated prior to considering any advanced imaging (Ahlawat et al., 2025). Many benign bone tumors have a characteristic appearance on plain x-ray. Along with a relevant history and physical examination, x-rays may be sufficient for diagnosis and would avoid additional cost and risks associated with advanced images. If plain x-rays are equivocal, they may still direct further imaging with the correct modality. Furthermore, plain x-ray may provide complementary information to advanced imaging, allowing for a better overall interpretation. Clearly benign findings on exam (lipoma, ganglion, sebaceous cyst) do not need additional imaging prior to treatment unless the imaging was necessary for surgical management or for a possible malignancy.

When diagnostic uncertainty remains and concerns for malignant degeneration still exist, or imaging is requested for surgical planning, advanced imaging would be medically necessary. MRI is a superior modality for evaluation of many bone tumors. The ACR recommended MRI as the primary modality for advanced imaging of primary bone tumors. MRI can be useful in narrowing down differential diagnoses and in determining the need for biopsy (Ahlawat et al., 2025). CT may be appropriate when an individual presents with contraindications to MRI.

Current ACR recommendations have supported plain x-ray as an initial imaging option when evaluating individuals with suspicion of superficial soft tissue masses (Garner et al., 2023). X-ray can be helpful in visualizing soft tissue masses and aid in further management planning. It is often the modality of choice for initial imaging.

Common clinical features of soft tissue sarcoma can be helpful in the differentiation of soft tissue masses and decisions for additional biopsy. In many cases, a thorough exam, history and initial imaging may be sufficient to determine a diagnosis and management plan (Rochwerger & Mattei, 2018). When clinical findings and initial imaging is insufficient to diagnose suspicious soft tissue masses, MRI without and with IV contrast is primarily recommended as the next advanced image of choice (Garner et al., 2023; Hayes et al., 2025; Jacobson et al., 2022; Khan et al., 2020). MRI capabilities present many advantages to other imaging techniques for the use of advanced diagnostics of soft tissue masses. Improved contrast, multiplanar views, visualization of involved vascular structures and better demarcation between tissue types/levels (with the aid of contrast agents) are among the most prominent advantages to MRI (Garner et al., 2023; Hayes et al., 2025). When MRI is contraindicated, CT

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imaging without and with IV contrast can provide similarly diagnostic data as MRI and is considered an important adjunct option to MRI (Garner et al., 2023).

ACR imaging recommendations supports both plain x-ray and ultrasound as initial imaging options when evaluating individuals with suspicion of soft tissue cysts (Garner et al., 2023). While x-ray findings may not fully demonstrate a small ganglionic mass, they can still be beneficial in visualizing the surrounding anatomy and in determining the next steps for care. In a recent systematic review of 941 ganglion cyst cases, MRI and US were the most commonly reported imaging study. It was recommended that US can be a beneficial option for triage. However, it was found that MRI was much better at showing the underlying pathoanatomy of masses and their surrounding area than US when evaluating intraneural ganglion cysts (Lenartowicz et al., 2022). The utility of MRI for preoperative visibility of dorsal wrist ganglion and any associated pathoanatomy has also been demonstrated. MRI would be more useful for preoperative planning (Ferreira Branco et al., 2024).

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References (MS-10)

MS.ST.0010.0

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Procedure Codes Associated with Musculoskeletal Imaging (MS)

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Procedure Codes Associated with Musculoskeletal Imaging (MS)..... 115

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Procedure Codes Associated with Musculoskeletal Imaging (MS)

MS.GG.ProcedureCodes.A
v1.0.2027

MRI/MRA	CPT®
MRI Upper Extremity, other than joint, without contrast	73218
MRI Upper Extremity, other than joint, with contrast	73219
MRI Upper Extremity, other than joint, without and with contrast	73220
MRI Upper Extremity, any joint, without contrast	73221
MRI Upper Extremity, any joint, with contrast	73222
MRI Upper Extremity, any joint, without and with contrast	73223
MR Angiography Upper Extremity without or with contrast	73225
MRI Lower Extremity, other than joint, without contrast	73718
MRI Lower Extremity, other than joint, with contrast	73719
MRI Lower Extremity, other than joint, without and with contrast	73720
MRI Lower Extremity, any joint, without contrast	73721
MRI Lower Extremity, any joint, with contrast	73722
MRI Lower Extremity, any joint, without and with contrast	73723
MR Angiography Lower Extremity without or with contrast	73725
MRI Pelvis without contrast	72195
MRI Pelvis with contrast	72196

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MRI/MRA	CPT®
MRI Pelvis without and with contrast	72197

CT/CTA	CPT®
CT Upper Extremity without contrast	73200
CT Upper Extremity with contrast	73201
CT Upper Extremity without and with contrast	73202
CT Angiography Upper Extremity without and with contrast	73206
CT Lower Extremity without contrast	73700
CT Lower Extremity with contrast	73701
CT Lower Extremity without and with contrast	73702
CT Angiography Lower Extremity without and with contrast	73706
CT Pelvis without contrast	72192
CT Pelvis with contrast	72193
CT Pelvis without and with contrast	72194
Bone Mineral Density CT, one or more sites, axial skeleton	77078

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