



# CLINICAL GUIDELINES

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## Musculoskeletal Imaging Policy

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eviCore healthcare Clinical Decision Support Tool Diagnostic Strategies: This tool addresses common symptoms and symptom complexes. Imaging requests for individuals with atypical symptoms or clinical presentations that are not specifically addressed will require physician review. Consultation with the referring physician, specialist and/or individual's Primary Care Physician (PCP) may provide additional insight.

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## MUSCULOSKELETAL IMAGING GUIDELINES

### **MS-1~GENERAL GUIDELINES**

- ✓ A clinical evaluation within 60 days is required before advanced imaging can be considered and should include a relevant history and physical examination, appropriate laboratory studies, and non-advanced imaging modalities.
  - Other meaningful contact (telephone call, electronic mail or messaging) by an established patient can substitute for a face-to-face clinical evaluation.
  - A “clinical diagnosis” for many musculoskeletal bone, joint and soft tissue pain, and injury disorders are based on a relevant history, physical examination, and plain x-ray.
- ✓ Prior to advanced imaging consideration, an X-ray must be performed after the current episode of symptoms started or changed for all musculoskeletal conditions, unless otherwise noted in the guidelines.
- ✓ Physician-directed non-surgical care may include rest, ice, compression, and elevation (R.I.C.E), non-steroidal anti-inflammatories (NSAIDs), narcotic and non-narcotic analgesic medications, oral or injectable corticosteroids, viscosupplementation injections; a physician-directed home exercise program, cross-training, and/or physical medicine, or immobilization by splinting/casting/bracing.
- ✓ Orthopedic specialist evaluation can be helpful in determining the need for advanced imaging.
  - The need for repeat advanced imaging should be carefully considered and may not be indicated if prior imaging has been performed.
  - Serial advanced imaging, whether CT or MRI, for surveillance of healing or recovery from musculoskeletal disease is not supported by the medical evidence in the majority of musculoskeletal conditions.

#### **Practice Note:**

- ✓ The Category III code used to describe computer-assisted navigation in orthopedic surgery with CT/MRI image guidance is: +0055T.
  - Computer-assisted navigation (CAN) in orthopedic procedures describes the use of computer-enabled tracking systems to facilitate alignment in a variety of surgical procedures and verification of an intended implant placement.
  - Code +0055T is intended to be used in addition to the code for the primary surgical procedure.
  - CT/MRI imaging acquisition for preoperative planning, in the absence of written payer instructions, is not to be reported with a diagnostic CT or MRI code

## MUSCULOSKELETAL IMAGING GUIDELINES

### **MS-2~Imaging Techniques**

#### **Plain X-Ray**

- ✓ Should be done prior to advanced imaging in all musculoskeletal conditions/disorders, unless otherwise noted in the guidelines, to rule out those situations that do not often require advanced imaging, such as osteoarthritis, acute/healing fracture, dislocation, osteomyelitis, acquired/congenital deformities, and tumors of bone amenable to biopsy or radiation therapy (in known metastatic disease), etc.

#### **MRI or CT**

- ✓ Magnetic Resonance Imaging (MRI) is often the preferred advanced imaging modality in musculoskeletal conditions because it is superior in imaging the soft tissues and can also define physiological processes in some instances [e.g. edema, loss of circulation (AVN), and increased vascularity (tumors)].
- ✓ Computed Tomography (CT) is better at imaging bone and joint anatomy; thus, it is useful for studying complex fractures (particularly of the joints), dislocations, and assessing delayed union or non-union of fractures if plain X-rays are equivocal. CT may be the procedure of choice in patients who cannot have MRI, such as those with pacemakers.

#### **Contrast Issues**

- ✓ Most musculoskeletal imaging (MRI or CT) is without contrast, except for the following:
  - Tumors and osteomyelitis (without and with contrast)
  - MRI arthrography (with contrast only)
  - MRI for rheumatoid arthritis (contrast as requested)

#### **Positron Emission Tomography (PET)**

- ✓ At the present time, there is inadequate evidence to support the medical necessity of PET for the routine assessment of musculoskeletal disorders. It should be considered experimental or investigational and will be forwarded to Medical Director Review.

See also: **MS-16~Total Joint Prosthesis**

#### **References**

1. ACR Appropriateness Criteria, Musculoskeletal Imaging topics.
2. ACR—SPR—SSR Practice Guideline for the performance of radiography of the extremities. Amended 2014..
3. Hsu, W. and T. M. Hearty (2012). Radionuclide Imaging in the Diagnosis and Management of Orthopaedic Disease. *Journal of the American Academy of Orthopaedic Surgeons* 20(3): 151-159.
4. Kayser R, Mahlfeld K, Heyde CE. Partial rupture of the proximal Achilles tendon: a differential diagnostic problem in ultrasound imaging. *Br J Sports Med.* 2005; 39:838-842.

## MUSCULOSKELETAL IMAGING GUIDELINES

### **MS-3~3D RENDERING**

- ✓ Indications for musculoskeletal 3-D image post-processing for preoperative planning when conventional imaging is insufficient for:
  - Complex fractures/dislocations (comminuted or displaced) of any joint.
  - Spine fractures, pelvic/acetabulum fractures, intra-articular fractures.
- ✓ The code assignment for 3-D rendering depends upon whether the 3-D post-processing is performed on the scanner workstation (CPT<sup>®</sup> 76376) or on an independent workstation (CPT<sup>®</sup> 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 appropriate 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
- ✓ The 3-D rendering codes require concurrent supervision of image post-processing 3-D manipulation of volumetric data set and image rendering. Certain health plan payers do not reimburse separately for 3-D rendering while others may have differing indication/limitation criteria. In these cases, individual plan coverage policies may take precedence over eviCore guidelines.

**MS-4~Avascular Necrosis (AVN)/Osteonecrosis**

**MS-4.1 AVN**

- ✓ MRI without contrast when *suspected* AVN/osteonecrosis, with negative or equivocal plain x-ray(s).
- ✓ Patients with acute lymphoblastic leukemia and known or suspected osteonecrosis should be imaged according to guidelines in: **PACONC-3.2 Acute Lymphoblastic Leukemia**
- ✓ Known or suspected osteonecrosis in long-term cancer survivors should be imaged according to guidelines in: **PACONC-19.4 Osteonecrosis in Long Term Cancer Survivors**

**Practice Notes**

- Ficat Stage 0, I, II for suspected AVN of the hip;
- Lichtman Stage 1, 2 for suspected AVN of the lunate;
- Cruess Stage I, II for suspected AVN of the humeral head;
- Modified Ficat and Arlet Stage 0, 1, 2 for suspected AVN of the talus;
- Modified Ficat and Arlet Stage 0, I, II for suspected AVN of the distal femur.

**References**

1. *ACR Appropriateness Criteria*<sup>®</sup>, *Chronic Hip Pain*, 2011.
2. Calder JD, Hine AL, Pearse MF, Revell PA. The relationship between osteonecrosis of the proximal femur identified by MRI and lesions proven by histological examination. *J Bone Joint Surg Br*. 2008, 90:154-158.
3. Karantanas AH, Drakonaki EE. The role of MR imaging in avascular necrosis of the femoral head. *Semin Musculoskelet Radiol*. 2011; 15(3):281-300.

**MS-5~Fracture and Dislocation**

**MS-5.1 Acute**

- ✓ CT or MRI without contrast is appropriate, if one of the following is present:
  - Complex (comminuted or displaced) fracture/dislocation on plain film.
    - CT is preferred unless it is associated with neoplastic disease when MRI without/with contrast is preferred unless MRI contraindicated.

Patient initially presents to the requesting provider with a documented history of an acute traumatic event at least two weeks prior with a negative X-ray at the time of this face-to-face encounter and a clinical suspicion for an occult/stress/insufficiency fracture (see below in **MS-5.2**)

- Suspected osteochondral fracture can also be considered for MRI arthrogram, or CT arthrogram

**MS-5.2 Suspected Occult/Stress/Insufficiency Fracture/Stress Reaction and Shin Splints**

- ✓ For suspected hip, femur, tibia, calcaneus, periprosthetic, sacral, navicular, or scaphoid occult/stress/insufficiency fractures, MRI or CT without contrast can be performed if the initial evaluation of history, physical exam and either plain X-ray or bone scan fail to establish a definitive diagnosis.
- ✓ For stress reaction, advanced imaging is not medically necessary for surveillance for “return to play” decisions of a stress reaction identified on an initial imaging study.
- ✓ MRI or CT without contrast can be performed for all other suspected occult/stress/insufficiency fractures if repeat plain X-rays remain negative after a minimum of 2 weeks of conservative treatment.
- ✓ For suspected shin splints, MRI of the lower leg without contrast (CPT<sup>®</sup> 73718) is appropriate if failure of a 6 week trial of conservative treatment.

**MS-5.3 Other Indications**

- ✓ CT or MRI without contrast is appropriate after recent (within 30 days) plain X-ray if one of the following is present:
  - Concern for delayed union or non-union of fracture or joint fusions.
  - As part of pre-operative evaluation for a planned surgery of a complex fracture/dislocation.

**References**

1. ACR Appropriateness Criteria<sup>®</sup>, Stress (fatigue/insufficiency) fracture, including sacrum, excluding other vertebrae, 2011.
2. ACR Appropriateness Criteria<sup>®</sup>, Chronic hip pain, 2011.
3. ACR Appropriateness Criteria<sup>®</sup>, Acute hand and wrist trauma, 2008.
4. ACR Appropriateness Criteria<sup>®</sup>, Chronic ankle pain, 2009.

5. Harris GD and Hughes BC. Deciphering your patient's leg pain. *Emerg Med* 2006;38(6):24-30.
6. Daffner RH, Weissman BN, Appel M, Bancroft L. et al. *ACR Appropriateness Criteria®*, *Stress (fatigue/insufficiency) fracture, including sacrum, excluding other vertebrae*. 2011.
7. Greene WB (Ed.). *Essentials of Musculoskeletal Care*. 3<sup>rd</sup> Ed. Rosemont, IL, American Academy of Orthopaedic Surgeons, 2005, pp.568-570.
8. Galbraith RM, Lavalley ME. Medial tibial stress syndrome: conservative treatment options. *Curr Rev Muscuolskelet Med*. 2009; 2:127-133.
9. Boks SS, Vroegindewij D, Kroes BW, Bernsen RMD et al. MRI follow-up of posttraumatic bone bruises of the knee in general practice. *AJR*. 2007; 189: 556-562.



**MS-6~FOREIGN BODY**

**MS-6.1 Foreign Body – Foot**

- ✓ X-ray is the initial imaging study for foreign bodies in the foot.
  - Ultrasound examination (CPT<sup>®</sup> 76882) is the preferred imaging modality for non-radiopaque foreign bodies in the foot.
  - MRI (contrast as requested) can be approved after plain X-rays rule out the presence of radiopaque foreign bodies.

**References**

1. ACR Appropriateness Criteria<sup>®</sup>, Acute Trauma to the Foot, 2010.
2. Chan C, Salam GA. Splinter removal. *Am Fam Physician*.2003;67(12):2557-2562.
3. Peterson JJ, Bancroft LW, Kransdorf MJ. Wooden foreign bodies: imaging appearance. *AJR* 2002; 178(3):557-562.

**MS-7~GANGLION CYSTS**

**MS-7.1 Ganglion Cysts – General**

- ✓ MRI without contrast is appropriate for occult ganglions (smaller cysts that remain hidden under the skin; suspected, but not palpable on physical examination) or cysts/masses in atypical anatomic locations.
  - Advanced imaging is not indicated for ganglions that can be diagnosed by history and physical examination.
- ✓ X-ray is the initial imaging study for Ganglion Cysts.

**References**

1. Rubin DA, Weissman BN, Appel M, Arnold E. ACR Appropriateness Criteria<sup>®</sup>: Chronic Wrist Pain. Last review date 2012.
2. Freire V, Guerini H, Campagna R, Moutounet L et al. Imaging of hand and wrist cysts: a clinical approach. *AJR*, 2012; 199: W618-W628.
3. Vo P, Wright T, Hayden F, Dell P, et al. Evaluating dorsal wrist pain: MRI diagnosis of occult dorsal wrist ganglion. *J Hand Surg Am*. 1995; 20: 667-670.

**MS-8~Gout/Calcium Pyrophosphate Deposition Disease (CPPD)  
(Pseudogout/Chondrocalcinosis)**

**MS-8.1 Gout General**

Early stages of gout can be diagnosed clinically since radiographic findings are not present early in the disease course.

- ✓ MRI without and with contrast is indicated for gouty tophus, which can mimic an infectious or neoplastic process.

**MS-8.2 CPPD (pseudogout /chondrocalcinosis) General**

- ✓ CPPD can often be diagnosed from plain X-rays; advanced is generally not necessary.

**References**

1. Hsu CY, Shih TT, Huang KM, Chen PQ, Sheu JJ, Li YW. Tophaceous gout of the spine: MR imaging features. *Clin Radiol*. 2002; 57(10):919.
2. Schumacher HR Jr, Becker MA, Edwards NL, Palmer WE, et al. Magnetic resonance imaging in the quantitative assessment of gouty tophi. *Int J Clin Pract*. 2006; 60(4):408.
3. McQueen FM, Doyle A, Reeves Q, Gao A. Bone erosions in patients with chronic gouty arthropathy are associated with tophi but not bone oedema or synovitis: new insights from a 3 T MRI study. *Rheumatology*. 2014; 53: 95-103.
4. Dore RK. Gout: What primary care physicians want to know. *J Clin Rheumatol*. 2008; 14(5 Suppl):S47-S54.
5. Eggebeen AT. Gout: an update. *Am Fam Physician*. 2007; 76(6):801-808.
6. Burns C, Wortmann RL. Chapter 44. Gout. In: Imboden JB, Hellmann DB, Stone JH, eds. *CURRENT Diagnosis & Treatment: Rheumatology*. 3rd ed. New York: McGraw-Hill; 2013. <http://www.accessmedicine.com/content.aspx?aID=57273972>. Accessed July 14, 2015.

**MS-9~Infection/Osteomyelitis**

**MS-9.1 Infection – General**

- ✓ MRI without and with contrast after plain X-ray(s) and:
  - Plain film(s) are negative and soft tissue or bone infection (osteomyelitis) is not responding to surgical or non-surgical care; *or*
  - Plain film(s) are positive for osteomyelitis, and the extent of infection into the soft tissues and any skip lesions require evaluation.
- ✓ CT without and with contrast can replace an MRI:
  - To assess the extent of bony destruction from osteomyelitis; CT can guide treatment decisions.
  - For pre-operative planning
  - If MRI is contraindicated

**MS-9.2 Septic Joint**

- ✓ Analysis of joint fluid is most often sufficient to diagnose a septic joint. An MRI of the joint, without/with contrast is appropriate 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
  - MRI without and with contrast is appropriate after plain x-rays if the arthrocentesis is diagnostic and if there is a confirmed septic joint, to evaluate the extent of infection into the soft tissues and any skip lesions that would require evaluation.

**Reference**

1. Coakley G, Mathews C, Field M, et al. BSR & BHPR, BOA, RCGP and BSAC guidelines for management of the hot swollen joints in adults. *Rheumatology*. 2006; 45:1039-1041.
2. Karchevsky M, Schweitzer ME, Morrison WB, Parellada JA. MRI findings of septic arthritis and associated osteomyelitis in adults. *AJR*, 2004;182.
3. Green WB (Ed.). *Essentials of Musculoskeletal Care*. 3<sup>rd</sup> Ed. Rosemont, IL, American Academy of Orthopaedic Surgeons, 2005, p.918.

4. Staheli LT. *Fundamentals of Pediatric Orthopedics*. 4<sup>th</sup> Ed. Philadelphia, Lippincott Williams & Wilkins, 2008, pp.110-111.
5. ACR Appropriateness Criteria<sup>®</sup>, Suspected Osteomyelitis-Diabetic Patient, 2012.

**MS-10~SOFT TISSUE MASS or LESION OF BONE**

**MS-10.1 Soft Tissue Mass**

*History and physical exam should include: location, size, duration, growing or stable, solid/cystic, fixed/not fixed to the bone, discrete or ill-defined, painful.*

- ✓ Plain X-ray should be performed initially, which could further determine the indication for the requested or other advanced imaging. If non-diagnostic, these initial X-rays can provide complementary information if advanced imaging is indicated.
- ✓ MRI without and with contrast or without contrast is appropriate for:
  - Soft tissue mass(es)
  - Known or suspected soft tissue mass in a patient with a cancer predisposition syndrome if a recent ultrasound is inconclusive. *Plain X-ray is not required for these patients.* See: **PACONC-2~Cancer Predisposition Syndromes and Screening Strategies**
- ✓ Advanced imaging is not indicated for:
  - Subcutaneous lipoma with no surgery planned
  - Ganglia (See **MS-7**)
  - Sebaceous cyst
  - Soft tissue mass(es) that has been stable for  $\geq$  1 year

**MS-10.2 Lesion of Bone**

*History and physical exam should include assessment of the following: location; size; duration; progressing or stable; discrete or ill defined; painful. Complete radiograph of the entire bone, containing the lesion of bone, is required prior to consideration of advanced imaging.*

- ✓ Many benign bone tumors have a characteristic appearance on plain X-ray and advanced imaging is not necessary. MRI without and with contrast and/or CT without and with contrast may be indicated if one of the following applies:
  - Imaging requested for preoperative planning.
  - Diagnosis uncertain based on plain X-ray appearance.
- ✓ MRI without and with contrast or without contrast is appropriate when plain X-ray reveals an osteochondroma with clinical concern of malignant transformation.
- ✓ For Paget's Disease, MRI without and with contrast can be considered if the diagnosis (based on plain X-rays and laboratory studies) is in doubt or if malignant degeneration is suspected (occurs in up to 10% of the cases).

## **Practice Notes**

The medical necessity and appropriateness or type of advanced imaging studies for lesions of bone are often best determined through consultation with an orthopaedic surgical oncologist.

## **References**

1. ACR Practice Guideline. ACR-SSR Practice Guideline for the Performance and Interpretation of Magnetic Resonance Imaging (MRI) of Bone and Soft Tissue Tumors. Revised 2010.
2. *ACR Appropriateness Criteria*<sup>®</sup>, Soft tissue masses, 2009.
3. *ACR Appropriateness Criteria*<sup>®</sup>, Primary bone tumors, 2009.
4. Schneider D, Hofmann MR, Peterson JA. Diagnosis and treatment of Paget's Disease of Bone. *Am Fam Physician*. 2002; 65:2069-2072.
5. Theodorou DJ, Theodorou SJ, Kakitsubata Y. Imaging of Paget Disease of bone and its musculoskeletal complications: review. *AJR*, 2012; 196: S64-S75.

**MS-11~Muscle/Tendon Unit Injuries/Diseases**

**MS-11.1 Muscle/Tendon Unit Injuries/Diseases**

Refer to **MS-19** for clinical suspicion of a partial or complete rotator cuff tear.

- ✓ X-ray is the initial imaging study for Muscle/Tendon Unit Injuries.
- ✓ MRI without contrast can be considered for a suspected partial tendon rupture of a specific (named) tendon.
- ✓ MRI without contrast can be performed on complete tendon ruptures for pre-operative planning (for example, Achilles tendon ruptures, posterior tibial tendon rupture, humeral attachment of the pectoralis major, proximal and distal biceps tendon rupture, patellar ligament/tendon rupture, proximal/distal hamstring tendon rupture).
- ✓ MRI is NOT needed for muscle belly strains/muscle tears.

**MS-11.2 Compartment Syndrome**

- ✓ Advanced imaging is not indicated. Diagnosis is made clinically and by direct measurement of compartment pressure and is a surgical emergency.

**References**

1. *ACR Appropriateness Criteria®*, *Chronic ankle pain*, 2009.
2. Greene WB (Ed.). *Essentials of Musculoskeletal Care*. 3<sup>rd</sup> Ed. Rosemont, IL, Academy of Orthopaedic Surgeons, 2005, p.452.
3. Kayser R, Mahlfeld K, Heyde CE. Partial rupture of the proximal Achilles tendon: a differential diagnostic problem in ultrasound imaging. *Br J Sports Med*. 2005; 39:838-842.



**MS-12~OSTEOARTHRITIS**

**MS-12.1 Osteoarthritis**

- ✓ Plain X-rays are performed initially, which most often will reveal “characteristic joint space narrowing and osteophytic spurring.”
- ✓ CT without contrast is appropriate for preoperative planning in arthrodesis surgery and in joint replacement surgery when congenital, post-traumatic or otherwise acquired deformities.
- ✓ See **MS-1** and **MS-3** for information on Computer-Assisted Musculoskeletal Surgical Navigation Procedures. Pre-operative advanced imaging studies (e.g., CT, MRI) associated with customized joint replacement procedures are considered experimental, investigational or unproven.
- ✓ MRI arthrogram or CT arthrogram is appropriate when joint sparing/salvage reconstructive surgery is planned for the following:
  - Suspected concomitant labral tear of the shoulder (see **MS-19**)
  - Suspected concomitant labral tear of the hip (see **MS-24**)
  - Suspected concomitant internal derangement of the knee (see **MS-25**)
  - Suspected concomitant rotator cuff tear of the shoulder (see **MS-19**)

**References**

1. *ACR Appropriateness Criteria*®, *Chronic hip pain*, 2008.
2. Manek NJ and Lane NE. Osteoarthritis: Current concepts in diagnosis and management. *Am Fam Physician* 2000 March; 61(6):1795-1804.
3. Greene WB (Ed.). *Essentials of Musculoskeletal Care*. 3<sup>rd</sup> Ed. Rosemont,IL, American Academy of Orthopaedic Surgeons, 2005, p. 84.

**MS-13~OSTEOCHONDRITIS DISSECANS**

**MS-13.1 Osteochondritis Dissecans**

- ✓ MRI or CT without contrast can be performed after plain X-ray(s):
  - If osteochondral fracture fragment is displaced, *or*
  - To evaluate healing if follow-up plain X-rays are equivocal after 8 weeks of failed conservative treatment.

**References**

1. ACR Practice Guideline. ACR-SSR Practice Guideline for the Performance and Interpretation of Pediatric Magnetic Resonance Imaging (MRI). Revised 2011.
2. *ACR Appropriateness Criteria*®, *Non traumatic knee pain*, 2008.
3. ACR Practice Guideline. ACR-SSR Practice Guideline for the Performance and Interpretation of Magnetic Resonance Imaging (MRI) of the elbow. Revised 2011.

## DISEASE/ INJURY CATEGORY (ALPHABETICAL ORDER)

### **MS-14~OSTEOPOROSIS**

- ✓ Quantitative CT (CPT<sup>®</sup> 77078) can be approved for screening when DXA scanner is unavailable or known to be inaccurate for ANY of the following populations:
  - Woman, age  $\geq 65$  years
  - Woman, age  $< 65$  years whose 10-year fracture risk is equal to or greater than that of a 65-year-old Caucasian woman without additional risk factors (i.e., a 9.3% 10-year risk for any osteoporotic fracture) as determined by FRAX score.
  - Man, age  $> 50$  years with at least one factor related to an increased risk of osteoporosis (i.e., age  $> 70$ , low body weight, weight loss  $> 10\%$ , physical inactivity, corticosteroid use, androgen deprivation therapy, hypogonadism and previous fragility fracture).

**Note:** Repeat screening quantitative computed tomography (QCT) can be approved no sooner than every two years. X-Ray is not required for MS-14.

- ✓ Quantitative CT scan (CPT<sup>®</sup> 77078) can be approved for non-screening/monitoring when DXA scanner is unavailable or known to be inaccurate for ANY of the following circumstances:
  - Multiple healed compression fractures
  - Significant scoliosis
  - Advanced arthritis of the spine due to increased cortical sclerosis often with large marginal osteophytes
  - Follow-up in cases where QCT was the original study
  - Obese patient over the weight limit of the dual-energy X-ray absorptiometry (DXA) exam table
  - Severely obese patients (BMI  $> 35\text{kg/m}^2$ )
  - Extremes in body height (i.e., very large and very small patients)
  - Patients 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 non-screening/monitoring QCT can be approved no earlier than one year following a change in treatment regimen, and only when the results will directly impact a treatment decision.

### **References**

1. American College of Radiology. Osteoporosis and Bone Mineral Density, ACR Appropriateness Criteria, last review date 2016.
2. American Association of Clinical Endocrinologists (AACE) Menopause Guidelines Revision Task Force. American Association of Clinical Endocrinologists medical guidelines for clinical practice for the diagnosis and treatment of postmenopausal osteoporosis.
3. National Osteoporosis Foundation (NOF). Clinician's guide to prevention and treatment of osteoporosis.
4. U.S. Preventive Services Task Force (USPSTF). Screening for osteoporosis. January 2011

**MS-15~Rheumatoid Arthritis (RA) and Inflammatory Arthritis**

*Prior to advanced imaging, a physical exam and appropriate laboratory studies (for example: Lyme titers, RA factor, sedimentation rate, C-reactive protein (CRP), and antinuclear antibody (ANA)), joint fluid analysis and plain X-rays should be performed.*

- ✓ MRI without contrast or MRI without and with contrast is appropriate for the most symptomatic joint, or of the dominant hand or wrist, in the following situations:
  - 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 patients 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 should NOT be considered for routine follow-up of treatment.

**MS-15.1 Pigmented Villonodular Synovitis (PVNS)**

- ✓ MRI extremity, any joint, without contrast, or CT arthrography if MRI contraindicated.

**References**

1. Rubin DA, Weissman BN, Appel M, Arnold E, Bencardino JT, Fries IB, Hayes CW, Hochman MG, Jacobson JA, Luchs JS, Math KR, Murphey MD, Newman JS, Scharf SC, Small KM, Expert Panel on Musculoskeletal Imaging. ACR Appropriateness Criteria® chronic wrist pain. [online publication]. Reston (VA): American College of Radiology (ACR); 2012. 13 p.
2. Boutry N, Morel M, Flipo RM, Demondion X, Cotten A. Early rheumatoid arthritis: a review of MRI and sonographic findings. *AJR*. 2007; 189:1502-1509.
3. Murphey MD, Rhee JH, Lewis RB, Fanburg-Smith JC. Pigmented villonodular synovitis: radiologic-pathologic correlation. *Radiographics*. 2008; 28:1493-1518.
4. Conaghan P, Edmonds J, Emery P, et al. Magnetic resonance imaging in rheumatoid arthritis: summary of OMERACT activities, current status, and plans. *Journal of Rheumatology* 2001; 28(5):1158-1161.
5. Ostergaard M, McQueen FM, Bird P, et al. Magnetic resonance imaging in rheumatoid arthritis--advances and research priorities. *Journal of Rheumatology* 2005; 32(12):2462-2464.
6. The use of MRI in early RA. *Rheumatology*. 2008; 47(11):1597-1599.
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8. Cohen SB, Potter H, Deodhar A, et al. Extremity magnetic resonance imaging in rheumatoid arthritis: updated literature review. *Arthritis Care & Research*. 2011; 63(5):660-665.

9. Singh JA, Furst DE, Bharat A, et al. 2012 update of the 2008 American College of Rheumatology recommendations for the use of disease-modifying antirheumatic drugs and biologic agents in the treatment of rheumatoid arthritis. *Arthritis Care & Research*. 2012; 64(5):625-639.
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**MS-16~TOTAL JOINT PROSTHESIS**

**MS-16.1 Total Joint Prosthesis - General**

- ✓ CT or MRI without contrast is appropriate with a high suspicion for a periprosthetic fracture and a negative plain X-ray (see also **MS-5.2**).

MRI hip without contrast (CPT<sup>®</sup> 73721) and ultrasound (CPT<sup>®</sup> 76881) are both appropriate for the diagnosis of ALVAL (aseptic lymphocytic-dominated vasculitis-associated lesion) pseudotumors surrounding metal-on-metal (MoM) hip prostheses. One of these two imaging modalities can be approved, but not both. See also **MS-10.1**

- ✓ MRI hip without contrast (CPT 73721) or ultrasound (CPT 76881) are both appropriate for Metal-On-Metal (MoM) Hip Prostheses that are considered high risk for implant performance issues from THA cup-neck impingement and subsequent ALTR with Co and Cr ion levels greater than 10 ppb.

*Note: PET is under investigation, but also has decreased specificity because it is positive in most cases of aseptic loosening. According to Love et al. (2004), “F-FDG imaging is less accurate than, and is not a suitable replacement for, leukocyte/marrow imaging (bone scan with Indium labeled WBC’s) for diagnosing infection of the failed joint replacement”.*

**References**

1. ACR Appropriateness Criteria: Imaging after total hip arthroplasty, 2015. <https://acsearch.acr.org/docs/3094200/Narrative>
2. Toms AD, Davidson D, Masri BA, Duncan CP. Management of peri-prosthetic infection in total joint arthroplasty. *J Bone Joint Surg Br.* 2006; 88(2):149-155.
3. Love C, Marwin SE, Tomas MB, et al. Diagnosing infection in the failed joint replacement: A comparison of coincidence detection <sup>18</sup>F-FDG and <sup>111</sup>In-labeled leukocyte/<sup>99m</sup>Tc-sulfur colloid marrow imaging. *J Nucl Med* 2004; 45(11):1864-1871. *ACR Appropriateness Criteria, Imaging after total knee arthroplasty*, 2011.
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5. Nawabi DH, Gold S, Lyman SL, et al. MRI predicts ALVAL and tissue damage in metal-on-metal hip arthroplasty. *Clin Orthop Relat Res*, 2014;472:471-481.

**MS-17~LIMB LENGTH DISCREPANCY**

**MS-17.1 Limb Length Discrepancy**

- ✓ Requests will be sent to Medical Director Review. Either plain radiographic or “CT scanogram,” both reported with CPT<sup>®</sup> 77073, is appropriate to radiographically evaluate limb length discrepancy due to congenital anomalies, acquired deformities, growth plate (physeal injuries or surgery), or inborn errors of metabolism.

**Reference**

1. Leitzes A, Potter HG, Amaral T, et. al. Reliability and accuracy of MRI scanogram in the evaluation of limb length discrepancy. *Journal of Pediatric Orthopaedics*. 2005; 25(6):747-749.

**DISEASE/ INJURY CATEGORY (ALPHABETICAL ORDER)**

**MS-18~Anatomical Area Tables – General Information**

The imaging guidelines for each anatomical area are presented in table format. The table below includes a description of how each column header should be utilized for each guideline **MS-19** through **MS-27**.

<b>Condition</b>	<b>X-Ray?</b>	<b>Conservative Treatment</b>	<b>Advanced Imaging</b>	<b>Comments</b>
Patient's condition	Is an initial plain X-ray required before advanced imaging can be approved?  (Yes or No)	Is a failure of 6 weeks of provider-guided conservative treatment, within the past 12 weeks, required?  (Yes or No)	The appropriate advanced imaging indicated for this condition. In some scenarios, advanced imaging may not be indicated.	Additional comments related to the condition.



## ANATOMIC AREAS

### **MS-19~Shoulder**

Condition	X-Ray?	Conservative Treatment	Advanced Imaging	Comments
<b>General Shoulder Pain</b>	Yes	Yes	MRI shoulder without contrast (CPT® 73221)	
<b>Symptomatic Loose Bodies</b>	Yes	No	MRI shoulder without contrast (CPT® 73221)	
<b>Impingement</b>	Yes	Yes	MRI shoulder without contrast (CPT® 73221)	
<b>Tendonitis/Bursitis</b>	Yes	Yes	MRI shoulder without contrast (CPT® 73221)	
<b>Tendon Rupture (Biceps Long Head)</b>	Yes	No	MRI shoulder without contrast (CPT® 73221) when clinical exam is inconclusive due to inability to visualize a “Popeye” sign clinically or for preoperative planning	
<b>Tendon Rupture (Pectoralis Major/Minor)</b>	Yes	No	MRI upper extremity, any joint (shoulder), without contrast (CPT® 73221) or MRI chest without contrast (CPT® 71550) when clinical exam is inconclusive or for preoperative planning	
<b>Shoulder Rotator Cuff Tear</b>	Yes	Yes*	MRI shoulder without contrast (CPT® 73221) or shoulder arthrography (CPT® 73040) or CT upper extremity (shoulder) with contrast (CPT® 73201) Plain or CT arthrogram is indicated if there is contraindication to MRI.	*Conservative treatment is not required with an acute shoulder injury and consideration of surgery.
<b>Partial Tendon Rupture</b>	Yes	No	MRI upper extremity, any joint (shoulder), without contrast (CPT® 73221) for a suspected partial tendon rupture of a specific named tendon not otherwise specified	MRI is <i>NOT</i> needed for muscle belly strains/muscle tears

<b>Shoulder Labral Tear (e.g. SLAP, ALPSA, HAGL)</b>	Yes	No*	MRI shoulder with contrast (arthrogram) (CPT <sup>®</sup> 73222) <i>or</i> MRI shoulder without contrast (CPT <sup>®</sup> 73221)	*Signs and symptoms of shoulder labral tears include mechanical symptoms such as popping, clicking, and catching
<b>Shoulder Dislocation, Subluxation, or Hill-Sachs lesions</b>	Yes	Yes*	CT shoulder without contrast (CPT <sup>®</sup> 73200) to evaluate Hill-Sachs lesions or posterior dislocation and <i>or</i> MRI shoulder with contrast (arthrogram) (CPT <sup>®</sup> 73222) in patients 40 years of age or younger with a first time dislocation and in patients with recurrent dislocations. *Conservative treatment is not required for first time dislocation in patients 40 years of age or younger; conservative treatment is also not required for patients with recurrent dislocations.	
<b>Frozen Shoulder Adhesive Capsulitis</b>	Yes	Yes	Advanced imaging is rarely indicated	Requests will be forwarded to Medical Director.
<b>Osteoarthritis</b>	Yes	Yes	CT shoulder without contrast (CPT <sup>®</sup> 73200) and <i>or</i> MRI without contrast (CPT <sup>®</sup> 73221) for pre-op planning for a shoulder arthroplasty	
<b>Acromioclavicular (AC) Separation</b>	Yes	No	MRI shoulder without contrast (CPT <sup>®</sup> 73221) to rule out possible rotator cuff tear following AC separation	
<b>Sternoclavicular (SC) Dislocation</b>	Yes	No	CT Chest without contrast (CPT <sup>®</sup> 71250) if posterior SC dislocation is evident or suspected	
<b>Post-Operative Shoulder Surgery for Impingement, Rotator Cuff Tear, and/or Labral Tear</b>	Yes	Yes	MRI shoulder without contrast (CPT <sup>®</sup> 73221) in symptomatic individuals or MRI shoulder without and with contrast (arthrogram) (CPT <sup>®</sup> 73222) or CT arthrogram (CPT <sup>®</sup> 73201) if MRI contraindicated.	Other requests for advanced imaging will be forwarded to Medical Director Review.
<b>Post-Operative Shoulder Joint Arthroplasty Surgery</b>	Yes	No	CT shoulder without contrast (CPT <sup>®</sup> 73200) in symptomatic patients with suspicion for aseptic loosening/fracture or In-111 WBC and Tc-99m sulfur colloid scan with suspicion for infection or CT arthrogram (CPT <sup>®</sup> 73201) with possible rotator cuff tear.	Other requests for advanced imaging will be forwarded to Medical Director Review.

## **References**

1. McDonald LS, Dewing CB, Shupe PG, Provencher MT. Disorders of the proximal and distal aspects of the biceps muscle. *J Bone Joint Surg.* 2013; 95:1235-1245.
2. Woodward TW, Best TM. The painful shoulder: Part II. Acute and chronic disorders. *Am Fam Physician.* 2000; 61(11):3291-3300.
3. Bradley M, Tung G, Green A. Overutilization of shoulder magnetic resonance imaging as a diagnostic screening tool in patients with chronic shoulder pain. *J Shoulder Elbow Surgery.* 2005; 14(3):233-237.
4. Fongemie AE, Buss DD, Rolnick SJ. Management of shoulder impingement syndrome and rotator cuff tears. *Am Fam Physician.* 1998; 57(4):667-674.
5. Greene WB (Ed.). *Essentials of Musculoskeletal Care.* 3<sup>rd</sup> Ed. Rosemont, IL, American Academy of Orthopaedic Surgeons, 2005, p.212.
6. Wheelless CR. Sternoclavicular Joint Injury, Updated January 3, 2013. [http://www.wheelsonline.com/ortho/sternoclavicular\\_joint\\_injury](http://www.wheelsonline.com/ortho/sternoclavicular_joint_injury).
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8. Hovelius L, Olofsson A, Sandstrom B, Augustini BG, et al. Nonoperative treatment of primary anterior shoulder dislocation in patients forty years of age and younger: a prospective twenty-five year follow-up. *J Bone Joint Surg.* 2008; 90:945-52.
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11. Magee T. 3-T MRI of the shoulder: is MR arthrography necessary? *AJR.* 2009:192: 86-92.
12. Werner BC, Brockmeier SF, Miller MD. Etiology, diagnosis, and management of failed SLAP repair. *J Am Acad Orthop Surg.* 2014; 22:554-565.
13. Rehman A, Robinson P. Sonographic evaluation of injuries of the pectoralis muscles. *AJR,* .2005; 184:1205-1211.
14. ACR Appropriateness Criteria<sup>®</sup>. Imaging after shoulder arthroplasty, 2016.

## ANATOMIC AREAS

### **MS-20~ELBOW**

Condition	X-Ray?	Conservative Treatment	Advanced Imaging	Comments
<b>General Elbow Pain</b>	Yes	Yes	MRI elbow without contrast (CPT <sup>®</sup> 73221)	
<b>Symptomatic Loose Bodies</b>	Yes	No	MRI elbow without contrast (CPT <sup>®</sup> 73221)	
<b>Tendonitis</b>	Yes	Yes	MRI elbow without contrast (CPT <sup>®</sup> 73221)	
<b>Lateral or Medial Epicondylitis-Tendonitis (Tennis Elbow)</b>	Yes	Yes*	MRI elbow without contrast (CPT <sup>®</sup> 73221) following a recent X-ray, recent diagnostic MSK ultrasound, after *6 months of conservative treatment or for preop planning.	All other requests will be forwarded to Medical Director review.
<b>Osteochondritis Dissecans</b>	Yes	Yes	MRI elbow without contrast (CPT <sup>®</sup> 73221) <i>or</i> CT elbow (CPT <sup>®</sup> 73200) without contrast.	See also <b><u>MS-13</u></b>
<b>Ruptured Biceps Insertion at Elbow</b>	Yes	No	MRI elbow without contrast (CPT <sup>®</sup> 73221) when clinical exam is inconclusive or for preoperative planning.	
<b>Ruptured Triceps Insertion at Elbow</b>	Yes	No	MRI upper extremity, any joint (elbow), without contrast (CPT <sup>®</sup> 73221) when clinical exam is inconclusive or for preoperative planning.	
<b>Partial Tendon Rupture</b>	Yes	No	MRI upper extremity, any joint (elbow) without contrast (CPT <sup>®</sup> 73221) for a suspected partial tendon rupture of a specific named tendon not otherwise specified.	MRI is <i>NOT</i> needed for muscle belly strains/muscle tears.
<b>Trauma</b>	Yes	No	MRI elbow without contrast (CPT <sup>®</sup> 73221) <i>or</i> CT without contrast (CPT <sup>®</sup> 73200) when surgery is being considered.	
<b>Ulnar Collateral Ligament (UCL) Tear</b>	Yes	No	MRI elbow arthrogram (CPT <sup>®</sup> 73222) following acute or repetitive elbow trauma.	
<b>Post-Operative</b>	Yes	Yes	CT upper extremity (elbow) (CPT <sup>®</sup> 73200) in symptomatic post-op patients following surgical treatment of complex fractures <i>or</i> MRI elbow without contrast (CPT <sup>®</sup> 73221) in symptomatic post-op patients following soft-tissue surgery.	Other requests for advanced imaging will be forwarded to Medical Director Review.

## **References**

1. McDonald LS, Dewing CB, Shupe PG, Provencher MT. Disorders of the proximal and distal aspects of the biceps muscle. *J Bone Joint Surg.* 2013; 95:1235-1245.
2. Torp-Pedersen TE, Torp-Pedersen ST, Qvistgaard E, et al. Effect of glucocorticosteroid injections in tennis elbow verified on colour Doppler ultrasonography: evidence of inflammation. *Br J Sports Med.* 2008; 42(12):978-982.
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4. Greene WB (Ed.). *Essentials of Musculoskeletal Care.* 3<sup>rd</sup> Ed. Rosemont, IL, American Academy of Orthopaedic Surgeons, 2005, pp. 279-280.
5. ACR Appropriateness Criteria<sup>®</sup>, *Chronic elbow pain*, 2011.
6. Bruce JR, Andrews JR. Ulnar collateral ligament injuries in the throwing athlete. *J Am Acad Orthop Surg.* 2014; 22:315-325.

## ANATOMIC AREAS

### **MS-21~WRIST**

Condition	X-Ray?	Conservative Treatment	Advanced Imaging	Comments
<b>General Wrist Pain</b>	Yes	Yes	MRI wrist without contrast (CPT <sup>®</sup> 73221)	
<b>Tendonitis</b>	Yes	Yes	MRI wrist without contrast (CPT <sup>®</sup> 73221)	
<b>Kienbock's Disease (avascular necrosis of the lunate)</b>	Yes	No*	*If normal appearance of the lunate on plain X-ray (Lichtman Stage 1, 2), MRI wrist without contrast (CPT <sup>®</sup> 73221).	See also <b><u>MS-4.1</u></b>
<b>Suspected Navicular/Scaphoid Fracture</b>	Yes	No	MRI wrist without contrast (CPT <sup>®</sup> 73221) when suspected based on history and physical exam.	See also <b><u>MS-5.2</u></b>
<b>Distal Radioulnar Joint (DRUJ) Instability</b>	Yes*	No	MRI of both wrists without contrast (CPT <sup>®</sup> 73221) <i>or</i> CT upper extremity (both wrists) without contrast (CPT <sup>®</sup> 73200) of wrists in neutral supination and pronation.	*Standard PA and true lateral wrist X-rays are mandatory with clenched fist PA view with forearm pronation.
<b>Complex Distal Radius/Ulna Fracture</b>	Yes	No*	CT wrist without contrast (CPT <sup>®</sup> 73200)	*When surgery is being considered.
<b>Carpal Tunnel Syndrome</b>	No*	No	MRI wrist without contrast (CPT <sup>®</sup> 73221) for surgical planning when a soft tissue mass is identified on physical examination and/or ultrasound.	*Clinical diagnosis is often confirmed with electrodiagnostic studies. Refer to <b><u>PN-2</u></b>
<b>Intrinsic Ligament/Triangular Fibrocartilage Complex (TFCC) Injuries</b>	Yes	Yes	MRI wrist with contrast (arthrogram) (CPT <sup>®</sup> 73222)	
<b>Complete Rupture of a Specific Named Tendon Not Otherwise Specified</b>	Yes	No	MRI upper extremity, any joint (wrist), without contrast (CPT <sup>®</sup> 73221) for preoperative planning.	
<b>Partial Tendon Rupture</b>	Yes	No	MRI upper extremity, any joint (wrist), without contrast (CPT <sup>®</sup> 73221) for a suspected partial tendon rupture of a specific	MRI is NOT needed for muscle belly strains/muscle tears.

			named tendon not otherwise specified.	
<b>Post-Operative</b>	Yes	Yes	CT upper extremity (wrist) without contrast (CPT <sup>®</sup> 73200) in symptomatic patients following surgery for navicular/scaphoid fractures and complex distal radius/ulna fractures <b>or</b> MRI wrist with contrast (arthrogram) (CPT <sup>®</sup> 73222) in symptomatic patients following DRUJ or TFCC surgery.	Other requests for advanced imaging will be forwarded to Medical Director review.

### **References**

1. Bruno MA, Weissman BN, Kransdorf MJ, Adler R et al. ACR Appropriateness Criteria<sup>®</sup>: Acute Hand and Wrist Trauma. Last review date 2013.
2. Rubin DA, Weissman BN, Appel M, Arnold E. ACR Appropriateness Criteria<sup>®</sup>: *Chronic Wrist Pain*. Last review date 2012.
3. Hayter CL, Gold SL, Potter HG. Magnetic resonance imaging of the wrist: bone and cartilage injury. *J Magn Reson Imaging*. 2013;37(5):1005-19.
4. Pruitt DL, Gilula LA, Manske PR, Vannier MW: Computed tomography scanning with image reconstruction in evaluation of distal radius fractures. *J Hand Surg Am*. 1994;19(5):720-727.
5. Magee T. Comparison of 3-T MRI and arthroscopy of intrinsic wrist ligament and TFCC tears. *AJR*. 2009;192: 80-85.
6. Lee RK, Ng AW, Tong CS, Griffith JF, Tse WL, Wong C, Ho PC. Intrinsic ligament and triangular fibrocartilage complex tears of the wrist: comparison of MDCT arthrography, conventional 3-T MRI, and MR arthrography. *Skeletal Radiol*. 2013;42:1277-85.
7. Pahwa S, Srivastava DN, Sharma R, Gamanagatti S, Kotwal PP, Sharma V. Comparison of conventional MRI and MR arthrography in the evaluation wrist ligament tears: A preliminary experience. *Indian J Radiol Imaging*. 2014. 3:259-67.

## ANATOMIC AREAS

### **MS-22~HAND**

Condition	X-Ray?	Conservative Treatment	Advanced Imaging	Comments
<b>General Hand Pain</b>	Yes	Yes	MRI upper extremity, other than joint (Hand) without contrast (CPT <sup>®</sup> 73218) or MRI upper extremity, any joint (Finger), without contrast (CPT <sup>®</sup> 73221).	
<b>Tendonitis</b>	Yes	Yes	MRI upper extremity (Hand) without contrast (CPT <sup>®</sup> 73218) or MRI upper extremity, any joint without contrast (CPT <sup>®</sup> 73221).	
<b>Occult Fracture</b>	Yes	No	Advanced imaging guided by <b><u>MS-5</u></b>	
<b>Complex Fracture</b>	Yes	No	CT upper extremity (hand) without contrast (CPT <sup>®</sup> 73200) when plain X-ray shows a complex fracture.	
<b>Ulnar Collateral Ligament (UCL) Thumb Injury</b>	Yes	No	MRI upper extremity, any joint, (CPT <sup>®</sup> 73221), if rule out for Stener lesion or complete tear of UCL of the thumb MCP joint.	Also called “Gamekeepers Thumb”
<b>Complete Rupture of a Specific Named Tendon not Otherwise Specified</b>	Yes	No	MRI upper extremity, other than joint (hand) without contrast (CPT <sup>®</sup> 73218) for pre-operative planning.	
<b>Partial Tendon Rupture</b>	Yes	No	MRI Upper Extremity, other than joint (hand), without contrast (CPT <sup>®</sup> 73218) for a suspected partial tendon rupture of a specific named tendon not otherwise specified.	MRI is <i>NOT</i> needed for muscle belly strains/muscle tears.
<b>Post-Operative</b>	Yes	Yes	CT upper extremity (hand) without contrast (CPT <sup>®</sup> 73200) or MRI upper extremity (hand) without contrast (CPT <sup>®</sup> 73218) in symptomatic post-op patients following surgical treatment for complex hand fractures <i>or</i> following soft-tissue surgery.	Other requests for advanced imaging will be forwarded to Medical Director review.



## **References**

1. Bruno MA, Weissman BN, Kransdorf MJ, Adler R et al. ACR Appropriateness Criteria®: *Acute Hand and Wrist Trauma*. Revised 2013.
2. Hayter CL, Gold SL, Potter HG. Magnetic resonance imaging of the wrist: Bone and cartilage injury. *J Magn Reson Imaging*. 2013; 37(5):1005-19.

## ANATOMIC AREAS

### **MS-23~PELVIS**

Condition	X-Ray?	Conservative Treatment	Advanced Imaging	Comments
<b>General Pain-Pelvis</b>	Yes	Yes	MRI pelvis without contrast (CPT <sup>®</sup> 72195) <i>or</i> MRI lower extremity (any joint) without contrast (CPT <sup>®</sup> 73721) RT and/or LT hip.	
<b>Tendonitis</b>	Yes	Yes	MRI pelvis without contrast (CPT <sup>®</sup> 72195) <i>or</i> MRI lower extremity (any joint) without contrast (CPT <sup>®</sup> 73721) RT and/or LT hip.	
<b>Low Energy / Insufficiency Fracture</b>	Yes	No	MRI pelvis without contrast (CPT <sup>®</sup> 72195)	See also <b><u>MS-5.2</u></b>
<b>Complex Fracture/Dislocation - Pelvis, Sacrum and Acetabulum</b>	Yes	No	CT pelvis without contrast (CPT <sup>®</sup> 72192)	Additionally, 3D rendering may be appropriate for pre-operative planning. See <b><u>MS-3</u></b>
<b>Sacro-iliac (SI) Joints, Coccydynia and Sacroiliitis</b>	Yes	Yes	Advanced imaging guided by: <b><u>SP-10</u></b> and <b><u>SP-5.2 (coccydynia)</u></b>	See also: <b><u>SP-10</u></b> and <b><u>SP-5.2 (coccydynia)</u></b>
<b>Complete Rupture of a Specific Named Tendon</b>	Yes	No	MRI pelvis without contrast (CPT <sup>®</sup> 72195) for pre-operative planning.	
<b>Partial Tendon Rupture</b>	Yes	No	MRI Pelvis without contrast (CPT <sup>®</sup> 72195) for a suspected partial tendon rupture of a specific named tendon not otherwise specified.	MRI is <i>NOT</i> needed for muscle belly strains/muscle tears.
<b>Post-Operative</b>	Yes	Yes	CT pelvis without contrast (CPT <sup>®</sup> 72192) in symptomatic patients following surgery for complex pelvic ring/acetabular fractures.	Other requests for advanced imaging will be forwarded to Medical Director review.

### **References**

1. Daffner RH, Weissman BN, Appel M, Bancroft L. et al. ACR Appropriateness Criteria<sup>®</sup>, *Stress(fatigue/insufficiency) fracture, including sacrum, excluding other vertebrae*. 2011.
2. Mehta S, Auerbach JD, Born CT, Chin KR. Sacral fractures. *J Am Acad Orthop Surg*. 2006; 14:656-665.

## ANATOMIC AREAS

### **MS-24~HIP**

Condition	X-Ray?	Conservative Treatment	Advanced Imaging	Comments
<b>General Hip Pain</b>	Yes	Yes	MRI lower extremity, any joint (hip) without contrast(CPT <sup>®</sup> 73721)	
<b>Symptomatic Loose Bodies</b>	Yes	No	MRI lower extremity, any joint (hip) without contrast (CPT <sup>®</sup> 73721)	
<b>Tendonitis</b>	Yes	Yes	MRI lower extremity, any joint (hip) without contrast (CPT <sup>®</sup> 73721)	
<b>Hip Abductor Tear/Avulsion</b>	Yes	No	MRI hip without Contrast (CPT <sup>®</sup> 73721)	
<b>Complete Rupture of a Specific Named Tendon</b>	Yes	No	MRI Lower Extremity, any joint (hip) without contrast (CPT <sup>®</sup> 73721) for pre-operative planning	
<b>Partial Tendon Rupture</b>	Yes	No	MRI Lower Extremity, any joint (hip) without contrast (CPT <sup>®</sup> 73721) for a suspected partial tendon rupture of a specific named tendon not otherwise specified.	MRI is <i>NOT</i> needed for muscle belly strains/muscle tears.
<b>Suspected Occult Hip Fracture</b>	Yes	No	MRI hip without contrast (CPT <sup>®</sup> 73721); <i>or</i> CT hip without contrast (CPT <sup>®</sup> 73700) when suspected and X-ray is negative for fracture.	See also <b><u>MS-5.2</u></b>
<b>Osteoarthritis</b>	Yes	Yes	CT hip without contrast (CPT <sup>®</sup> 73700) for preoperative planning in patients undergoing total hip replacement.	See also: <b><u>MS-1</u></b> <b><u>MS-3</u></b> <b><u>MS-12</u></b>
<b>Avascular Necrosis (AVN)</b>	Yes	No	MRI hip without contrast (CPT <sup>®</sup> 73721) when suspected and plain X-ray is negative or equivocal.	No further advanced imaging if plain X-ray is positive for AVN. See also <b><u>MS-4</u></b>

<b>Labral Tear</b>	Yes	No	MRI hip without and with contrast (CPT <sup>®</sup> 73723) <i>or</i> MRI hip with contrast (MRI arthrogram) (CPT <sup>®</sup> 73722) <i>or</i> CT hip with contrast (arthrogram) (CPT <sup>®</sup> 73701) if MRI contraindicated.	
<b>Femoroacetabular Impingement</b>	Yes	Yes	MRI hip without contrast (CPT <sup>®</sup> 73721) or with contrast (arthrogram) (CPT <sup>®</sup> 73722) in addition to CT hip without contrast (CPT <sup>®</sup> 73700) for preop planning for cam type femoroacetabular impingement.	
<b>Piriformis Syndrome</b>	No*	Yes	MRI pelvis without contrast (CPT <sup>®</sup> 72195) <i>or</i> CT pelvis without contrast (CPT <sup>®</sup> 72192) for preoperative planning.	*EMG/NCV may confirm the diagnosis. Refer to <b><u>PN-2</u></b>
<b>Post-Operative</b>	Yes	Yes	MRI hip with Contrast (arthrogram) (CPT <sup>®</sup> 73722) in symptomatic patients following surgery for labral tears and femoroacetabular impingement; CT hip without contrast (CPT <sup>®</sup> 73700) or MRI hip without contrast (CPT <sup>®</sup> 73721) in symptomatic patients following surgery for hip fracture and/or hip avascular necrosis.	Other requests for advanced imaging will be forwarded to Medical Director Review.

### **Coding Notes**

- Unilateral hip MRI is reported as CPT<sup>®</sup>73721.
- Bilateral hip MRI can be identified in several different ways on the claim.
  - eviCore will approve two separate codes (CPT<sup>®</sup>73721 x 2).
  - However, providers are urged to check for individual payer preferences regarding bilateral modifier use.

### **References**

1. ACR Appropriateness Criteria<sup>®</sup>, *Chronic hip pain*, 2011.
2. ACR Appropriateness Criteria<sup>®</sup>, *Avascular necrosis of the hip*, 2009.
3. Greene WB (Ed.). *Essentials of Musculoskeletal Care*. 2<sup>nd</sup> Ed. Rosemont, IL, American Academy of Orthopaedic Surgeons, 2001,p. 295.

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## ANATOMICAL AREAS

### **MS-25~KNEE**

Condition	X-Ray?	Conservative Treatment	Advanced Imaging	Comments
<b>General Knee Pain</b>	Yes	Yes	MRI lower extremity, any joint (knee) without contrast (CPT <sup>®</sup> 73721)	
<b>Symptomatic Loose Bodies</b>	Yes	No	MRI lower extremity, any joint (knee) without contrast (CPT <sup>®</sup> 73721)	
<b>Tendonitis</b>	Yes	Yes	MRI lower extremity, any joint (knee) without contrast (CPT <sup>®</sup> 73721)	
<b>Complex Knee Fracture</b>	Yes	No	CT knee without contrast (CPT <sup>®</sup> 73700)	See also <b><u>MS 5</u></b>
<b>Meniscus Tear</b>	Yes	No*	MRI knee without contrast (CPT <sup>®</sup> 73721) *In absence of conservative treatment, at least 2 of following 4 criteria must be met: 1) Positive McMurray's or positive Thessaly test, 2) twisting or acute injury of the knee, 3) locked knee/inability to fully extend the knee, <b>or</b> 4) knee effusion	
<b>Ligament Tear</b>	Yes	No	MRI knee without contrast (CPT <sup>®</sup> 73721) if any of the following signs are positive in comparison to the normal knee: <ul style="list-style-type: none"> <li>• Anterior drawer</li> <li>• Lachman</li> <li>• Pivot shift test</li> <li>• Posterior drawer</li> <li>• Posterior sag test</li> <li>• Valgus stress test;</li> <li>• Varus stress test</li> </ul>	
<b>Osteoarthritis</b>	Yes	Yes	MRI knee without contrast (CPT <sup>®</sup> 73721) when clinical presentation consistent with symptomatic meniscus tear; CT knee without contrast (CPT <sup>®</sup> 73700) for preoperative planning for knee arthroplasty when congenital, post-traumatic or otherwise acquired deformities	Additionally, 3D rendering may be appropriate for pre-operative planning. See also: <b><u>MS-1</u></b> <b><u>MS-3</u></b> <b><u>MS-12</u></b>

			exist of the patella, distal femur and/or proximal tibia.	
<b>Patellar Dislocation</b>	Yes	No	MRI knee without contrast (CPT <sup>®</sup> 73721) with acute knee injury, consideration of surgery and concern for osteochondral fracture or loose osteochondral fracture fragment.	
<b>Patellofemoral Instability/Tracking Disorder</b>	Yes	Yes	MRI knee without contrast (CPT <sup>®</sup> 73721) if consideration for surgery.	
<b>Anterior Knee Pain Syndrome</b>	Yes	Yes	MRI knee without contrast (CPT <sup>®</sup> 73721)	
<b>Baker's Cyst</b>	Yes	Yes	Ultrasound (CPT <sup>®</sup> 76881 or CPT <sup>®</sup> 76882) is the initial imaging study. MRI knee without contrast (CPT <sup>®</sup> 73721) for preop planning.	See also <b><u>PVD-7.5</u></b>
<b>Plica (Symptomatic Synovial Plica/Medial Synovial Shelf)</b>	Yes	Yes	MRI knee without contrast (CPT <sup>®</sup> 73721)	
<b>Hemarthrosis</b>	Yes	No	MRI knee without contrast (CPT <sup>®</sup> 73721) for clinical suspicion of cruciate ligament tear or patellofemoral dislocation, <b>or</b> CT knee without contrast (CPT <sup>®</sup> 73700) for clinical suspicion of non-displaced intra-articular fracture.	
<b>Complete Rupture of the Distal Quadriceps Tendon or Patellar Ligament</b>	Yes	No	MRI lower extremity, joint (knee) without contrast (CPT <sup>®</sup> 73721) for pre-operative planning.	
<b>Partial Tendon Rupture</b>	Yes	No	MRI Lower Extremity, any joint (knee) without contrast (CPT <sup>®</sup> 73721) for a suspected partial tendon rupture of a specific named tendon not otherwise specified.	MRI is <b>NOT</b> needed for muscle belly strains/muscle tears.
<b>Post-Operative</b>	Yes	Yes	MRI knee with contrast (arthrogram) (CPT <sup>®</sup> 73722) or MRI knee without contrast (CPT <sup>®</sup> 73721) in symptomatic patients following surgery for meniscus tears and reconstruction of the anterior cruciate	Other requests for advanced imaging will be forwarded to Medical Director Review.

			ligament; CT knee without contrast (CPT® 73700) in symptomatic patients following surgery for fracture/dislocation.	
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**ANATOMICAL AREAS**

**MS-26~ANKLE**

<b>Condition</b>	<b>X-Ray?</b>	<b>Conservative Treatment</b>	<b>Advanced Imaging</b>	<b>Comments</b>
<b>General Ankle Pain</b>	Yes	Yes	MRI ankle without contrast (CPT® 73721)	
<b>Symptomatic Loose Bodies</b>	Yes	No	MRI ankle without contrast (CPT® 73721)	
<b>Complex Fracture</b>	Yes	No	CT ankle without contrast (CPT® 73700)	
<b>Ankle Sprain, Including Avulsion Fracture</b>	Yes	Yes	MRI ankle without contrast (CPT® 73721), <i>or</i> CT without contrast (CPT® 73700)	
<b>High Ankle Sprain</b>	Yes	No	MRI ankle without contrast (CPT® 73721)	
<b>Suspected Osteochondral Injury</b>	Yes	No	MRI ankle without contrast (CPT® 73721), <i>or</i> MRI ankle with contrast (arthrogram) (CPT® 73722), <i>or</i> CT ankle with contrast (arthrography) (CPT® 73701).	
<b>Anterior Impingement Anterior-Lateral Impingement Posterior Impingement (e.g., Os Trigonum Syndrome)</b>	Yes	Yes	MRI ankle without contrast (CPT® 73721) <i>or</i> MRI ankle with contrast (arthrogram) (CPT® 73722), <i>or</i> CT ankle with contrast (arthrogram) (CPT® 73701).	
<b>Tendonitis</b>	Yes	Yes	MRI ankle without contrast (CPT® 73721) for suspected posterior tibial dysfunction, peroneal tendon or subluxation, Achilles tendonitis	
<b>Ruptured Achilles Tendon</b>	Yes	No	MRI ankle without contrast (CPT® 73721) for preoperative evaluation	

Continued . . .

ANATOMICAL AREAS

**MS-26~ANKLE *Continued . . .***

Condition	X-Ray?	Conservative Treatment	Advanced Imaging	Comments
<b>Complete Rupture - Tear of a Specific Named Tendon</b>	Yes	No	MRI lower extremity, any joint (ankle) without contrast (CPT® 73721) for pre-operative planning.	
<b>Partial Tendon Rupture</b>	Yes	No	MRI lower extremity, any joint (ankle), without contrast (CPT® 73721) for a suspected partial tendon rupture of a specific named tendon not otherwise specified.	MRI is <i>NOT</i> needed for muscle belly strains/muscle tears.
<b>Instability</b>	Yes	Yes	MRI ankle without contrast (CPT® 73721) <i>or</i> MRI ankle with contrast (arthrogram) (CPT® 73722) for preoperative evaluation.	
<b>Post-Operative</b>	Yes	Yes	MRI ankle without contrast (CPT® 73721) in symptomatic patients following surgery for ligament/tendon injuries; CT ankle without contrast (CPT® 73700) for symptomatic patients following surgery for complex fractures.	Other requests for advanced imaging will be forwarded to Medical Director review.

**One Study/Area Only**

In foot and ankle advanced imaging, studies are frequently ordered of both areas. This is unnecessary since ankle MRI will image from above the ankle to the mid- metatarsal area. **Only one CPT® code should be reported.**

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**ANATOMICAL AREAS**

**MS-27~FOOT**

Condition	X-Ray?	Conservative Treatment	Advanced Imaging	Comments
<b>General Foot Pain</b>	Yes	Yes	MRI foot without contrast (CPT <sup>®</sup> 73718)	
<b>Complex Fractures</b>	Yes	No	CT foot without contrast (CPT <sup>®</sup> 73700)	
<b>Plantar Plate Disorders, Including Turf Toe Injuries</b>	Yes	Yes	MRI lower extremity, (foot), without contrast (CPT <sup>®</sup> 73718) <i>or</i> MRI lower extremity, any joint (Hallux MTP joint), without contrast (CPT <sup>®</sup> 73721)	
<b>Sesamoid Disorders</b>	Yes	Yes	MRI Lower extremity other than joint without contrast (CPT <sup>®</sup> 73718) <i>or</i> CT foot without contrast (CPT <sup>®</sup> 73700)	
<b>Lisfranc Tarsometatarsal Fracture or Dislocation</b>	Yes	No	CT foot without contrast (CPT <sup>®</sup> 73700) <i>or</i> MRI foot without contrast (CPT <sup>®</sup> 73718) when suspected	
<b>Navicular Stress Fracture</b>	Yes	No	MRI foot without contrast (CPT <sup>®</sup> 73718), <i>or</i> CT foot without contrast (CPT <sup>®</sup> 73700)	See also <b><u>MS-5.2</u></b>
<b>Tendonitis</b>	Yes	Yes	MRI foot without contrast (CPT <sup>®</sup> 73718)	
<b>Complete rupture/tear of a specific named tendon</b>	Yes	No	MRI lower extremity (foot), other than joint, without contrast (CPT <sup>®</sup> 73718) for pre-operative planning.	
<b>Partial Tendon Rupture</b>	Yes	No	MRI Lower Extremity, (foot), without contrast (CPT <sup>®</sup> 73718) for a suspected partial tendon rupture of a specific named tendon not otherwise specified.	MRI is <i>NOT</i> needed for muscle belly strains/muscle tears.
<b>Morton's Neuroma</b>	Yes	Yes	MRI foot without and with contrast (CPT <sup>®</sup> 73720) for preoperative planning.	

**Continued . . .**

ANATOMICAL AREAS

**MS-27~FOOT *Continued* . . .**

Condition	X-Ray?	Conservative Treatment	Advanced Imaging	Comments
<b>Plantar Fasciitis</b>	Yes	Yes*	MRI foot without contrast (CPT® 73718) for preoperative planning.	*Non-Surgical Conservative treatment is for 6 months or more.
<b>Suspected Plantar Fascia Rupture or Tear</b>	Yes	Yes	MRI foot without contrast (CPT® 73718)	
<b>Calcaneal Insufficiency/Stress Fracture</b>	Yes	No	MRI foot without contrast (CPT® 73718)	See also <b><u>MS 5.2</u></b>
<b>Diabetic Foot Infection</b>	Yes	No	MRI foot without and with contrast (CPT® 73720) for suspected osteomyelitis or deep infection when plain X-ray is negative.	See also <b><u>MS 9.1</u></b>
<b>Tarsal Tunnel Syndrome</b>	Yes	Yes	MRI ankle without contrast (CPT® 73721) <i>or</i> CT without contrast (CPT® 73700) for pre-op planning if mass/lesion is suspected as etiology of entrapment.	
<b>Tarsal Coalition</b>	Yes	Yes	MRI ankle without contrast (CPT® 73721) <i>or</i> CT without contrast (CPT® 73700) for preoperative planning.	
<b>Sinus Tarsi Syndrome</b>	Yes	Yes	MRI ankle without contrast (CPT® 73721) if diagnosis is unclear or for preoperative evaluation.	
<b>Post-Operative</b>	Yes	Yes	MRI foot without contrast (CPT® 73718) in symptomatic patients following surgery for conditions including the tendons, ligaments and plantar plate CT foot without contrast (CPT® 73700) in symptomatic patients following surgery for complex fractures, sesamoid fractures and subtalar arthrodesis.	Other requests for advanced imaging will be forwarded to Medical Director review.

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## ANATOMIC AREAS

### **MS-28~NUCLEAR MEDICINE**

- ✓ Nuclear Medicine
  - Nuclear medicine studies may be used in the evaluation of some musculoskeletal disorders, and other rare indications exist as well:
    - Bone scan (CPT<sup>®</sup> 78315 or CPT<sup>®</sup> 78320) is indicated for evaluation of suspected loosening of orthopedic prostheses when recent plain x-ray is nondiagnostic
    - Nuclear medicine bone marrow imaging (CPT<sup>®</sup> 78102, CPT<sup>®</sup> 78103, or CPT<sup>®</sup> 78104) is indicated for detection of ischemic or infarcted regions in sickle cell disease
    - Triple phase bone scan (CPT<sup>®</sup> 78315) is indicated for evaluation of complex regional pain syndrome or reflex sympathetic dystrophy
    - Bone scan (CPT<sup>®</sup> codes: 78300, 78305, 78306, 78315, or 78320) is indicated for evaluation of suspected frostbite
    - Bone scan (CPT<sup>®</sup> codes: 78300, 78305, 78306, or 78320) is indicated for evaluation of Paget's disease.
- ✓ Bone scan is indicated for evaluation of suspected fracture when two x-rays are negative at least 10 days apart, using any of the following CPT code combinations:
  - CPT<sup>®</sup> 78300, CPT<sup>®</sup> 78305, or CPT<sup>®</sup> 78306 as a single study
  - See **PEDMS-2.5 Stress/Occult Fracture** for bone scan indications
- ✓ Bone scan (CPT<sup>®</sup> 78315 or CPT<sup>®</sup> 78320) is indicated for evaluation of suspected stress fracture when two x-rays are negative at least 10 days apart.
- ✓ Bone scan (CPT<sup>®</sup> codes: 78300, 78305, 78306, 78315, or 78320) is indicated for evaluation of suspected myositis ossificans.
- ✓ SPECT bone scan (CPT<sup>®</sup> 78320) can be approved if osteoid osteoma is suspected
- ✓ Radionuclide bone scan (CPT<sup>®</sup> codes: 78300, 78305, or 78306) may be indicated in setting of a non-focal exam, especially in younger and non-verbal children. Due to relatively high radiation exposure, bone scan is reserved for high suspicion cases with negative radiographs. It is a preferred examination in a child with implanted hardware or devices precluding MRI.
- ✓ Bone scan (CPT<sup>®</sup> codes: 78300, 78305, 78306, or 78320) is complimentary to plain radiographs, and may be used when the skeletal survey is negative but clinical suspicion remains high.

- ✓ Any of the following studies are indicated for initial evaluation of suspected osteomyelitis as well as evaluation of response to treatment in established osteomyelitis:
  - Bone scan (one of CPT<sup>®</sup> codes: 78300, 78305, 78306, or 78315)
  - Nuclear Bone Marrow imaging (one of CPT<sup>®</sup> codes: 78102, 78103, or 78104)
  - Radiopharmaceutical inflammatory imaging (one of CPT<sup>®</sup> codes: 78805, 78806, or 78807)
- ✓ Bone scan (one of CPT<sup>®</sup> codes: 78300, 78305, 78306, or 78315) is indicated for initial evaluation of suspected osteomyelitis as well as evaluation of response to treatment in established osteomyelitis.
- ✓ SPECT bone scan (CPT<sup>®</sup> 78320) is indicated for evaluation of facet arthropathy in patients with ankylosing spondylitis, osteoarthritis, or rheumatoid arthritis.