AmeriHealth Caritas Louisiana

National Imaging Associates, Inc.	
Clinical guidelines **UPPER EXTREMITY MRI** **(Hand, Wrist, Arm, Elbow, Long bone, or Shoulder MRI)**	**Original Date: September 1997**
CPT Codes: 73218, 73219, 73220, 73221, 73222, 73223, +0698T	**Last Revised Date: ~~March 2022~~May 2023**
Guideline Number: NIA_CG_057-3	**Implementation Date: January 202~~3~~4**

GENERAL INFORMATION

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- ***Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.***

INDICATIONS FOR UPPER EXTREMITY MRI (HAND, WRIST, ARM, ELBOW or SHOULDER) (Plain radiographs must precede MRI evaluation)

Some indications are for MRI, CT, or MR or CT Arthrogram. More than one should not be approved at the same time.

If an MR Arthrogram fits approvable criteria below, approve as MRI.

Joint or muscle pain without positive findings on an orthopedic exam as listed above, after x-ray completed[1, 2] (does not apply to young children).

- **Persistent joint or musculotendinous pain unresponsive to conservative treatment*, within the last 6 months which includes active medical therapy (physical therapy, chiropractic treatments, and/or physician-supervised exercise**), of at least four (4) weeks, OR**

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- With progression or worsening of symptoms during the course of conservative treatment

Joint specific approvable provocative orthopedic examination tests and suspected injuries

Note: With a positive orthopedic sign, an initial x-ray is always preferred. However, it is not required to approve advanced imaging. **A positive sign is weakness or pain. Any test that suggests joint instability requires further imaging (list is not all inconclusive)**

- ~~Shoulder[1-4]~~
  - ~~Any positive test listed~~
    - ~~Rotator cuff weakness[5]~~

Shoulder[3-6]

- **Rotator cuff weakness on exam**
- **Subscapularis tendon tear**
  - **Belly press off test**
  - **Napoleon test**
  - Bear Hug test
  - Internal rotation lag~~Belly press~~
  - **Lift-off** test
- **Supraspinatus tendon tear**
  - Drop Arm~~ test~~
  - Full Can test
    - ~~Hornblower's sign~~
    - **Empty Can (aka Jobe or** ~~Internal rotation lag~~ ~~sign~~
  - Supraspinatus test~~ (aka Empty Can Test)~~**)**
  - **Hawkins or Neer test[7] (only** when ~~positive because of~~**ordered by an orthopedic surgeon if there is clear documentation in the records that an actual rotator cuff tear is suspected, and NOT just for the evaluation of impingement)**
- **Infraspinatus / Teres Minor / Biceps tendon tear**
  - **External rotation lag sign at 0 and 90 degrees**
  - **Pain or** weakness **with resisted external rotation testing**
- ~~Elbow[6,7]~~
  - ~~Any positive test listed~~
    - ~~Valgus stress~~
    - ~~Varus stress~~
  - **Hornblower test**
  - **Popeye sign (if acute finding or for evaluation of surgical correction)**
- **Labral tear/ Instability**
  - **Grind test**
  - **Clunk test**
  - **Crank test, Compression-rotation test**

- **O'Brien's test**
- **Anterior load and shift**
- **Apprehension test**
- **Posterior load and shift test**
- **Jerk Test**
- **Sulcus sign**

Elbow[8, 9]

- **Biceps tendon**
  - **Bicipital aponeurosis (BA) flex test**
  - **Biceps squeeze test**
  - **Hook test**
  - **Passive forearm pronation test**
  - **Reverse Popeye sign (if acute finding or for evaluation of surgical correction)**
- Instability
  - Posterolateral rotatory drawer test
  - **Tabletop relocation test**
  - Valgus stress
  - Varus stress
  - Milking maneuver
  - Push-up test

~~Popeye sign~~

Wrist[~~8, 9~~10, 11]

- ~~Any positive~~**Lunotriquetral ligament**
  - **Derby relocation** test~~listed~~
  - Reagan test (lunotriquetral ballottement test)
- **TFCC tear**
  - **Press test**
  - **Ulnar foveal sign/test**
  - **Ulnocarpal stress test**
- **Scaphoid ligament**
  - Watson test (scaphoid shift test)
  - Scapholunate ballottement test
  - ~~Reagan test (lunotriquetral ballottement test)~~
  - ~~Snuff box pain (after initial x-ray)~~

~~**Joint or muscle pain without positive findings on an orthopedic exam as listed above,** after x-ray completed~~[10, 11]

- ~~Persistent joint or musculotendinous pain unresponsive to conservative treatment*, within the last 6 months which includes active medical therapy (physical therapy, chiropractic treatments, and/or physician-supervised exercise**),of at least four (4) weeks, **OR**~~

- ~~With progression or worsening of symptoms during the course of conservative treatment~~

Tendon or Muscle Rupture after x-ray (not listed above)

- **High clinical suspicion of a specific tendon rupture based on mechanism of injury and physical findings (i.e., triceps or pectorals tendon rupture)**

Shoulder Dislocations[~~12, 13~~12, 13]

- Recurrent
- First time in any of the situations below that increase the risk or repeated dislocation
  - Glenoid or humeral bone loss on x-ray
  - **Bankart lesion on radiographs**[14]
  - **14-40 year-old**[15]
  - **> 40 with exam findings concerning for rotator cuff tear (i.e., weakness on exam)**

Bone Fracture or Ligament Injury

- **Suspected occult scaphoid fracture with snuffbox pain after initial x-ray**
- **Non scaphoid suspected occult, stress or insufficiency fracture with a negative initial x-ray**[16-18]
  - Repeat x-rays in 10-14 days if negative or non-diagnostic
- **Pathologic fracture on x-ray or CT**[19]
- **Suspected ligamentous/tendon injury with known fractures on x-ray/CT that may require surgery**

Fracture Nonunion

- Nonunion or delayed union as demonstrated by no healing between two sets of x-rays. If a fracture has not healed by 4-6 months, there is delayed union. Incomplete healing by 6-8 months is nonunion. **CT is the preferred study** [20]

Osteochondral Lesions (defects, fractures, osteochondritis dissecans) and x-ray completed[21-24]

- Clinical suspicion based on mechanism of injury and physical findings

Loose bodies or synovial chondromatosis and after x-ray or ultrasound completed

- **In the setting of joint pain or mechanical symptoms** [25]

Osteonecrosis (e.g., Avascular necrosis (AVN))[26-28]

- **To further characterize a prior abnormal x-ray or CT suggesting osteonecrosis**

- Normal x-rays but symptomatic and high-risk (e.g., glucocorticosteroid use, renal transplant recipient, glycogen storage disease, alcohol abuse,[29] sickle cell anemia[30])
- Known osteonecrosis to evaluate a contralateral joint after initial x-rays

  - ~~Joint prosthesis14-35 year-old competitive contact sport athlete~~

~~Extremity Mass~~

~~• Mass or lesion after non-diagnostic x-ray or ultrasound[14]~~

/replacement

- Suspected joint prosthesis loosening or dysfunction, (i.e., pseudotumor formation) after initial x-rays [31, 32]

Extremity Mass[33]

- Mass or lesion after non-diagnostic x-ray or ultrasound[14] CT is better than MRI to evaluate mass calcification or bone involvement and may complement or replace MRI[34]
  - If superficial mass**,** then ultrasound is the initial study
  - If deep mass, then x-ray is the initial study
- Vascular malformations
  - After initial evaluation with ultrasound and results will change management[35]
  - Inconclusive ultrasound
  - For preoperative planning
    - MRA is also approvable
  - Follow up after treatment/embolization

Known Primary Cancer of the Extremity~~15-19~~36-40

- ~~Cancer~~Initial staging primary extremity tumor

~~• Cancer restaging~~

- Follow-up of known primary cancer of patient undergoing active treatment within the past year or as per surveillance imaging guidance for that cancer
- Signs or symptoms ~~of~~or imaging findings suspicious for recurrence
- Suspected metastatic disease with signs/symptoms and after initial imaging with radiographs

Further evaluation of indeterminate or questionable findings on prior imaging (unless follow up is otherwise specified within the guideline):

- For initial evaluation of an inconclusive finding on a prior imaging report (i.e., x-ray, ultrasound or MRI) that requires further clarification

- One follow-up exam of a prior indeterminate MR/CT finding to ensure no suspicious interval change has occurred. (No further surveillance unless specified as highly suspicious or change was found on last follow-up exam.)

Infection of Bone ~~or Joint~~[20-22], Joint or Soft tissue abscess[41-43]

- Abnormal x-ray or ultrasound
- Negative x-ray or ultrasound but with a clinical suspicion of infection based on either of the following:
    - Signs and symptoms of joint or bone infection include:
        - Pain and swelling
        - Decrease range of motion
        - Fever
    - Laboratory findings of infection include any of the following:
        - Elevated ESR or CRP
        - Elevated white blood cell count
        - Positive joint aspiration
- Ulcer (diabetic, pressure, ischemic, traumatic) with signs of infection (redness, warm, swelling, pain, discharge which may range from white to serosanguineous) that is not improving despite treatment and bone, or deep infection is suspected
    - ~~Increased suspicion if size or temperature increases, bone is exposed/positive probe-to-bone test, new areas of breakdown, new smell[23]~~
    - Increased suspicion if size or temperature increases, bone is exposed/positive probe-to-bone test, new areas of breakdown, new smell[44]

~~**Osteonecrosis (e.g., Avascular necrosis (AVN))**[24-26]~~

- ~~Abnormal x-ray~~

Pre-operative/procedural evaluation

- Pre-operative evaluation for a planned surgery or procedure

Post-operative/procedural evaluation

- When imaging, physical or laboratory findings indicate joint infection, delayed or non-healing or other surgical/procedural complications.

- ~~Normal x-rays but symptomatic and high-risk (e.g., glucocorticosteroid use, renal transplant recipient, glycogen storage disease, alcohol abuse,[27] sickle cell anemia[28])~~

For evaluation of known or suspected autoimmune disease (e.g., rheumatoid arthritis)[~~29, 30~~45, 46]

- Further evaluation of an abnormality or non-diagnostic findings on prior imaging

- Initial imaging of a single joint for diagnosis or response to therapy after plain films and appropriate lab tests (e.g., RF, ANA, CRP, ESR)
- **To determine change in treatment or when diagnosis is uncertain prior to start of treatment**
- Follow-up to determine treatment efficacy in the following:
    - Early rheumatoid arthritis
    - Advanced rheumatoid arthritis if x-ray and ultrasound are equivocal or ~~noncontributory~~**non-contributory**

Foreign Body[47]

~~**Bone Fracture or Ligament Injury**~~

- ~~Suspected stress or insufficiency fracture with a negative initial x-ray[31-33]~~
    - ~~Repeat x-rays in 10-14 days if negative or non-diagnostic~~
- ~~Pathologic fracture on x-ray[34]~~
- ~~Intraarticular fractures that may require surgery~~
- ~~Suspected scaphoid fracture with negative x-rays~~
- ~~Nonunion or delayed union as demonstrated by no healing between two sets of x-rays. If a fracture has not healed by 4-6 months, there is delayed union. Incomplete healing by 6-8 months is nonunion.[35]~~
- ~~Clinical suspicion based on mechanism of injury and physical findings and x-ray completed~~
    - ~~TFCC (triangular fibrocartilage complex) injury[36, 37]~~
    - ~~SLAP (superior labral anterior to posterior complex) lesions[4]~~

    ~~Note: Imaging approvable in the setting of known trauma; otherwise, active conservative therapy is recommended (see background).~~

~~**Osteochondral Lesions** (defects, fractures, osteochondritis dissecans) and x-ray completed[38-41]~~

- ~~Clinical suspicion based on mechanism of injury and physical findings~~
- ~~Loose bodies or synovial chondromatosis seen on x-ray or ultrasound~~
    - ~~In the setting of joint pain[42]~~

~~**Foreign Body**[43]~~

- Indeterminate x-ray and ultrasound

~~**Tendon or Muscle Rupture after x-ray**[44-46]~~

- ~~Clinical suspicion based on mechanism of injury and physical findings (i.e., Popeye, Hook, Yergasons sign)~~

Peripheral Nerve Entrapment (e.g., carpal tunnel)[47-51][48-52]

- Abnormal electromyogram or nerve conduction study

- Abnormal x-ray or ultrasound
- Clinical suspicion and failed 4 weeks conservative treatment including at least two of the following (active treatment with physical therapy is not required):
    - Activity modification
    - Rest, ice, or heat
    - Splinting or orthotics
    - Medication

Brachial Plexopathy~~52, 53~~53, 54

- If mechanism of injury or EMG/NCV studies are suggestive
- Chest MRI is preferred study, but neck and/or shoulder (upper extremity) MRI ~~can~~may be ~~ordered~~approved depending on the suspected location of injury

Pediatrics

- Chronic Recurrent Multifocal Osteomyelitis after initial work-up (labs (i.e. CRP/ESR and x-ray).[55] (Whole body Bone Marrow MRI is more appropriate when multiple joints requested see NIA_CG_059)

~~**Pre-operative/procedural evaluation**~~

- ~~Pre-operative evaluation for a planned surgery or procedure~~

~~**Post-operative/procedural evaluation**~~

~~When imaging, physical or laboratory findings indicate joint infection, delayed or non-healing or other surgical/procedural complications~~

- ~~**Joint prosthesis** loosening or dysfunction, x-rays non-diagnostic[54, 55]~~

BACKGROUND

Magnetic resonance imaging shows the soft tissues and bones. With its multiplanar capabilities, high contrast, and high spatial resolution, it is an accurate diagnostic tool for conditions affecting the joint and adjacent structures. MRI can positively influence clinicians' diagnoses and management plans for patients with conditions such as primary bone cancer, fractures, abnormalities in ligaments/tendons/cartilage, septic arthritis, and infection/inflammation.

OVERVIEW

***Conservative Therapy** – (musculoskeletal) should include a multimodality approach consisting of a combination of active and inactive components. Inactive components such as rest, ice, heat, modified activities, medical devices, (including crutches, immobilizer, metal braces,

orthotics, rigid stabilizer, or splints, etc. and not to include neoprene sleeves), medications, injections (bursal, and/or joint, not including trigger point), and diathermy, can be utilized. Active modalities may consist of physical therapy, a physician-supervised home exercise program**, and/or chiropractic care.

****Home Exercise Program - (HEP)** – the following two elements are required to meet guidelines for completion of conservative therapy:

- Information provided on exercise prescription/plan AND
- Follow up with member with information provided regarding completion of HEP (after suitable 4-week period), or inability to complete HEP due to physical reason- i.e., increased pain, inability to physically perform exercises. (Patient inconvenience or noncompliance without explanation does not constitute "inability to complete" HEP).

~~**Rotator Cuff Tears –** 3.0 Tesla MRI has been found valuable for the detection of partial thickness rotator cuff tendon tears and small rotator cuff tendon tears. It is especially useful in detecting the partial tears due to increased spatial resolution. Increased spatial resolution results in precise measurements of rotator cuff tendon tears in all 3 planes, and it also reduces acquisition time which reduces motion artifacts. 3.0 Tesla makes it possible to adequately evaluate tendon edges and avoid underestimation of tears. MRI is less invasive than MR arthrography, and it is faster and less expensive. MRI may be useful in the selection of patients that may benefit from arthroscopy.~~

~~**MRI and Occult Fractures** – Magnetic resonance imaging may help to detect occult fractures of the elbow when posttraumatic elbow effusions are shown on radiographs without any findings of fracture. Effusions may be visualized on radiographs as fat pads, which can be elevated by the presence of fluid in the joint caused by an acute fracture. MRI may be useful when effusions are shown on radiographs without a visualized fracture, but there is a clinical suspicion of a lateral condylar or radial head fracture.~~

~~**MRI and Avascular Necrosis –** Sports, such as racquetball and gymnastics, may cause repeated microtrauma due to the compressive forces between the radial head and capitellum. Focal avascular necrosis and osteochondritis dissecans of the capitellum may result. MRI can be used to evaluate the extent of subchondral necrosis and chondral abnormalities. The images may also help detect intraarticular loose bodies.~~

~~**MRI and Acute Osseous Trauma** – Many elbow injuries result from repetitive microtrauma rather than acute trauma, and the injuries are sometimes hard to diagnose. Non-displaced fractures are not always evident on plain radiographs. When fracture is suspected, MRI may improve diagnostic specificity and accuracy. T1-weighted images can delineate morphologic features of the fracture.~~

MRI and Brachial Plexus – MRI is the only diagnostic tool that accurately provides high resolution imaging of the brachial plexus. The brachial plexus is formed by the cervical ventral rami of the lower cervical and upper thoracic nerves which arise from the cervical spinal cord, exit the bony confines of the cervical spine, and traverse along the soft tissues of the neck, upper chest, and course into the arms.

~~**Adhesive Capsulitis a.k.a. Frozen Shoulder**[56-58] – MRI is the preferred modality for imaging after a failure of improvement with active conservative therapy. Affected patients have impaired range of shoulder motion with forward flexion, abduction, and external and internal rotation which may be associated with pain. Clinically, it can be distinguished from rotator cuff pathology, where passive range of motion is preserved, or neoplasm which may also have associated fever or weight loss. Treatment is with a combination of intracapsular steroid injection and active conservative care. Anti-inflammatory medications are also given to facilitate active treatment. When nonsurgical management, including anti-inflammatory medication, active care (physical therapy, a supervised home exercise program or manipulations), and injections, have failed to provide relief of symptoms by 9 to 12 months, surgical intervention is indicated, but this represents the minority of patients.~~

~~**Shoulder Impingement, Non-Traumatic Shoulder Instability, and Glenoid Labral tears –** require active conservative therapy and x-ray (orthopedic signs listed below):~~

- ~~Shoulder Impingement – Hawkin's, Neer's, Painful arc, Load and shift, and Yocum tests~~
- ~~Non-Traumatic Shoulder Instability – Sulcus, Surprise, Anterior or Posterior draw, Apprehension, Anterior slide, Clunk, Crank, Empty can, HERI (hyperextension-internal rotation) tests~~
- ~~Glenoid labral tear (i.e., SLAP lesion) – Apprehension, Relocation, Surprise, Jobe's, O'Brien's, Superior labral, Anterior slide, Jerk, Compression rotation, Crank tests~~

The American Academy of Pediatrics "Choosing Wisely" Guidelines advise against ordering advanced imaging studies (MRI or CT) for most musculoskeletal conditions in a child until all appropriate clinical, laboratory and plain radiographic examinations have been completed. **"**History, physical examination, and appropriate radiographs remain the primary diagnostic modalities in pediatric orthopedics, as they are both diagnostic and prognostic for the great majority of pediatric musculoskeletal conditions. Examples of such conditions would include, but not be limited to, the work up of injury or pain (spine, knees, and ankles), possible infection, and deformity. MRI examinations and other advanced imaging studies frequently require sedation in the young child (5 years old or less) and may not result in appropriate interpretation if clinical correlations cannot be made. Many conditions require specific MRI sequences or protocols best ordered by the specialist who will be treating the patient. If you believe findings warrant additional advanced imaging, discuss with the consulting orthopedic surgeon to make sure the optimal studies are ordered."~~59~~56

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POLICY HISTORY

Date	Summary
May 2023	• Updated: ○ Orthopedic signs ○ References • Added: ○ Indeterminate findings on prior imaging and follow up surveillance ○ Vascular malformations ○ Known AVN to evaluate contralateral side ○ Statement regarding clinical indications not addressed in the guideline ○ Popeye sign, reverse Popeye sign • Modified: ○ Background sections ○ CRMO • Removed: ○ Additional Resources
March 2022	• Simplified orthopedic sign section to include only the most robust signs and removed Table 1 • Clarified the Supraspinatus Test • Moved the section recommending active conservative care for shoulder impingement, non-traumatic shoulder instability and glenoid labral tears to the background information section • Removed occult wrist ganglion section • Added Snuff box pain after initial x-ray to wrist section and Popeye sign to Elbow section
~~November 2021~~	~~• Added +0698T~~
~~May 2021~~	~~• Additional signs for rotator cuff tear that are considered useful~~ ~~• Removed signs for impingement, shoulder instability and glenoid labral tear since active conservative therapy should be done first~~ ~~• Added section about impingement, nontraumatic shoulder instability and glenoid labral tear requiring active conservative therapy~~ ~~• Added information for the following: shoulder dislocation; suspected bone infection in the setting of ulcers and neuropathy; brachial plexopathy; treatment for rheumatoid arthritis~~
~~May 2020~~	~~• Expanded the list of orthopedic signs and Added note: With a positive orthopedic sign, an initial x-ray is always preferred. However, it is not required to approve advanced imaging.~~

	• ~~Added information about adhesive capsulitis~~ • ~~Clarified that if an MR Arthrogram fits approvable criteria, approve as MRI.~~ • ~~Revised the information about an evaluation of an extremity mass.~~
~~May 2019~~	• ~~Added initial statement about approvals: 'Some indications are for MRI, CT, or MR or CT Arthrogram. More than one should not be approved at the same time'.~~ • ~~Expanded Extremity mass indications including peripheral lymphadenopathy; and mass with increased risk for malignancy~~ • ~~Added indications for foreign body and peripheral nerve entrapment~~ • ~~Modified Known Cancer indication to be more broad – 'cancer staging, cancer restaging, signs or symptoms of recurrence'~~ • ~~Expanded sections for bone fracture and infection of bone or joint to include list of signs or symptoms and laboratory findings (elevated ESR or CRP, elevated white blood cell count, positive joint aspiration)~~

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ADDITIONAL RESOURCES

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Reviewed / Approved by NIA Clinical Guideline Committee

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~~**GENERAL INFORMATION**~~

- ~~*It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*~~

~~**Disclaimer:** Magellan Healthcare service authorization policies do not constitute medical advice and are not intended to govern or otherwise influence the practice of medicine. These policies are not meant to supplant your normal procedures, evaluation, diagnosis, treatment and/or care plans for your patients. Your professional judgement must be exercised and followed in all respects with regard to the treatment and care of your patients. These policies apply to all Magellan Healthcare subsidiaries including, but not limited to, National Imaging Associates ("Magellan"). The policies constitute only the reimbursement and coverage guidelines of Magellan. Coverage for services varies for individual members in accordance with the terms and conditions of applicable Certificates of Coverage, Summary Plan Descriptions, or contracts with governing regulatory agencies. Magellan reserves the right to review and update the guidelines at its sole discretion. Notice of such changes, if necessary, shall be provided in accordance with the terms and conditions of provider agreements and any applicable laws or regulations.~~