

2011 Imaging Criteria

Magnetic Resonance Imaging (MRI), Shoulder^(1*RIN, 2, 3, 4)

ICD-9-CM: 88.94
 CPT: 73221, 73222, 73223
 I/O Setting: Outpatient

INDICATION(S)

- 100 Chronic monarticular joint pain
- 200 Suspected intra-articular loose body
- 300 Suspected acute rotator cuff tear
- 400 Suspected chronic rotator cuff tear/tendonitis
- 500 Suspected avascular necrosis (osteonecrosis), humeral head
- 600 Suspected osteomyelitis
- 700 Suspected labral tear

- 100 Chronic monarticular joint pain **[All]**⁽⁵⁾
 - 110 Symptoms at shoulder **[One]**
 - 111 Joint pain
 - 112 Locking
 - 120 Findings at shoulder **[Two]**
 - 121 Pain with passive ROM
 - 122 Limited ROM
 - 123 Tenderness
 - 124 Crepitus⁽⁶⁾
 - 130 Shoulder x-ray nondiagnostic for etiology of pain⁽⁷⁾
 - 140 Continued Sx/findings **after** Rx **[Both]**⁽⁸⁾
 - 141 NSAID **[One]**⁽⁹⁾
 - 1 Rx ≥ 4 wks
 - 2 Contraindicated/not tolerated⁽¹⁰⁾
 - 142 OT/PT ≥ 6 wks⁽¹¹⁾
- 200 Suspected intra-articular loose body **[All]**⁽¹²⁾
 - 210 Symptoms at shoulder **[One]**
 - 211 Joint pain
 - 212 Locking
 - 220 Findings at shoulder **[Two]**
 - 221 Pain with passive ROM
 - 222 Limited ROM
 - 223 Clicking

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- 224 Crepitus⁽⁶⁾
- 230 Shoulder x-ray nondiagnostic for loose body
- 300 Suspected acute rotator cuff tear **[All]**^(13, 14)
 - 310 Traumatic event by Hx⁽¹⁵⁾
 - 320 Shoulder pain⁽¹⁶⁾
 - 330 Findings by PE **[All]**
 - 331 Weakness of shoulder abduction^(17, 18)
 - 332 Passive ROM normal/passive ROM > active ROM⁽¹⁹⁾
 - 333 Subacromial tenderness⁽²⁰⁾
 - 340 Shoulder x-ray nondiagnostic for etiology of Sx/findings⁽⁷⁾
- 400 Suspected chronic rotator cuff tear/tendonitis **[All]**^(14, 21, 22)
 - 410 Shoulder pain⁽²³⁾
 - 420 Findings by PE **[All]**⁽²⁴⁾
 - 421 Pain/weakness on resisted shoulder abduction/rotation⁽²⁵⁾
 - 422 Passive ROM normal/passive ROM > active ROM⁽¹⁹⁾
 - 423 Tenderness over rotator cuff
 - 430 Shoulder x-ray nondiagnostic for etiology of Sx/findings⁽⁷⁾
 - 440 Continued Sx/findings **after** Rx **[All]**
 - 441 NSAID **[One]**⁽²⁶⁾
 - 1 Rx ≥ 3 wks
 - 2 Contraindicated/not tolerated⁽¹⁰⁾
 - 442 OT/PT ≥ 6 wks⁽²⁷⁾
 - 443 Subacromial corticosteroid injection **[One]**⁽²⁸⁾
 - 1 Ineffective
 - 2 Contraindicated/not tolerated/refused
 - 444 Activity modification ≥ 6 wks⁽²⁹⁾
- 500 Suspected avascular necrosis (osteonecrosis), humeral head **[All]**⁽³⁰⁾
 - 510 Shoulder pain
 - 520 Pain with passive ROM
 - 530 Shoulder x-ray nondiagnostic for avascular necrosis
- 600 Suspected osteomyelitis **[Both]**
 - 610 Findings **[One]**⁽³¹⁾
 - 611 ESR > 30 mm/hr
 - 612 Temperature > 100.4 F(38.0 C)
 - 613 WBC > 10,000/cu.mm(10x10⁹/L)
 - 614 Blood culture positive
 - 615 C-reactive protein > 10 mg/L

- 620 Shoulder x-ray nondiagnostic for osteomyelitis

- 700 Suspected labral tear **[All]**⁽³²⁾
 - 710 Shoulder injury by Hx⁽³³⁾
 - 720 Anterior shoulder pain interferes with ADLs⁽³⁴⁾
 - 730 Shoulder popping/clicking/catching by Hx⁽³⁵⁾
 - 740 Positive crank test/anterior slide test/active compression test^(36, 37, 38)
 - 750 Shoulder x-ray nondiagnostic for etiology of pain⁽⁷⁾
 - 760 Continued Sx/findings **after** Rx **[Both]**
 - 761 NSAID **[One]**⁽²⁶⁾
 - 1 Rx ≥ 4 wks
 - 2 Contraindicated/not tolerated⁽¹⁰⁾
 - 762 OT/PT ≥ 4 wks⁽³⁹⁾

Notes

(1)-RIN:

For suspected bone tumor, see the "Magnetic Resonance Imaging (MRI), Extremity" criteria subset.

(2)

MRI has largely replaced arthrogram as a means of nonarthroscopic joint assessment. MRI offers the advantages of excellent soft tissue contrast and multiplanar imaging. It does not expose the patient to ionizing radiation and eliminates the need for intra-articular contrast (Crawford et al., Br Med Bull 2007; 84: 5-23).

(3)

MR arthrography (i.e., introduction of contrast agent into the joint prior to MRI) significantly improves the ability to visualize many of the intra-articular structures or abnormalities. It is useful for the assessment of patients with a previous repair or pre-existing pathology and instability.

(4)

The following are examples of relative and absolute contraindications to the use of magnetic resonance imaging:

- Implanted devices that are electrically or magnetically activated (e.g., cardiac pacemakers, automatic cardioverter defibrillators, drug infusion pumps, cochlear implants)
- Ferromagnetic metal objects (e.g., cerebral aneurysm clips, intraocular metallic foreign body, prostheses, screws)
- Pregnancy, first trimester
- Renal insufficiency in cases when magnetic resonance imaging is performed with gadolinium-based contrast

(5)

Chronic monarticular pain, with or without prior trauma, may be caused by intra-articular loose bodies, chondromalacia, or chondral defects. Chronic pain in more than one joint may represent a systemic rheumatic disorder which may be diagnosed by clinical evaluation and blood tests.

(6)-DEF:

Crepitus is a sometimes audible, or sometimes palpable, grating sensation caused by two irregular cartilage surfaces moving relative to each other. It can be appreciated when the joint is extended or flexed.

(7)

X-ray should be performed to exclude fracture, dislocation, or tumor as possible causes of the patient's symptoms.

(8)

The listed treatments may have occurred at any time in the course of the illness. External joint support is important adjunctive therapy in most cases. A sling may be used to rest the joint but, to prevent capsulitis, should only be used intermittently.

(9)-POL:

It is a matter of local medical policy whether to accept acetaminophen or analgesics as substitutes for NSAIDs.

(10)

Contraindications to NSAIDs may be absolute (e.g., pregnancy, history of allergic reaction) or relative (e.g., anticoagulant use, history of PUD).

(11)

This criterion includes exercise therapy by provider instruction to the patient, as well as supervised training through formal OT or PT. Exercise may not be appropriate if symptoms have been present for a long period of time and exercise has been attempted previously, or if symptoms are severe on presentation.

(12)

Loose bodies in synovial joints are formed by several mechanisms, including trauma with fracture, joint disintegration from degeneration, and synovial proliferation. Examples of loose bodies include osteochondritis dissecans fragments, chondral fragments, and calcified loose bodies. Loose bodies that are stable or attached to a synovial membrane, recess, or bursa tend to be asymptomatic and can be treated conservatively. Loose bodies that move within the joint cavity can become trapped between the articular surfaces causing pain, limited motion, locking, and effusion (Dubberley et al., J Bone Joint Surg Br 2005; 87(5): 684-686).

(13)

An acute rotator cuff tear may result from a sudden episode of trauma (e.g., blunt trauma, fall, strenuous overhead lifting). In patients with preexisting rotator cuff disease, minor trauma can rupture an already compromised tendon or rotator cuff defect, and

can cause a full or partial thickness tear. Although uncommon, acute disruption of a healthy rotator cuff may occur with significant trauma.

(14)

MRI is considered to be the more precise test compared to arthrogram for diagnostic imaging of the rotator cuff because of its exceptional soft tissue contrast and multiplanar imaging capability. MR arthrogram may be more sensitive than conventional MRI for evaluating the tear size and features (Rudzki and Shaffer, *Clin Sports Med* 2008; 27(4): 691-717; Toyoda et al., *Clin Orthop Relat Res* 2005; 439: 109-115; Miniaci and Salonen, *Orthop Clin North Am* 1997; 28(1): 43-58). MRI has largely replaced arthrogram as a means of shoulder joint assessment, partly because it is noninvasive, painless, and does not involve ionizing radiation. CT arthrogram or arthrogram, however, can provide similar information when MRI is not available or not feasible. Ultrasound may also be used to diagnosis rotator cuff pathology. It is operator-dependent but is becoming more widely used.

(15)

A traumatic event may be a major trauma (e.g., motor vehicle accident, fall) or a sudden pain, felt for example, while lifting a heavy object.

(16)

Patients with an acute rotator cuff tear complain of severe pain radiating from the shoulder down the lateral arm to the elbow.

(17)

Patients with an acute rotator cuff tear experience weakness of shoulder abduction which is especially prominent when the arm is abducted to 90 degrees; this maneuver functionally isolates the rotator cuff muscles and is therefore useful in evaluating such patients (McFarland et al., *Clin Sports Med* 2008; 27(4): 553-578). However, severe pain or muscle spasm may prevent full patient effort on strength testing, thereby limiting the motor evaluation. For such patients, re-evaluation in a few days after pain has subsided is essential.

(18)

Patients with complete tears may not be able to abduct the arm against even minimal resistance.

(19)

Passive ROM (i.e., measuring the limits of manipulation by the examiner with no patient effort) may be painful, but is usually normal unless adhesive capsulitis or glenohumeral arthritis is also present (Curtis and Wilson, *Orthop Clin North Am* 1996; 27(4): 763-781).

(20)

Palpation of the rotator cuff at the subacromial area elicits tenderness.

(21)

Rotator cuff tendonitis is the most common cause of shoulder pain, often resulting from repetitive injury or overuse. Inflammation of the rotator cuff tendons (i.e., supraspinatus, infraspinatus, subscapularis, and teres minor) and the surrounding subacromial bursa frequently develops secondary to impingement of these structures beneath the acromion process. Therefore, this condition is sometimes referred to as subacromial bursitis or impingement syndrome, each term stressing a different aspect of the pathophysiology.

(22)

This indication addresses Stages I, II, and III rotator cuff syndrome, impingement syndrome, and subacromial bursitis. Generally, rotator cuff tears occur in a tendon already weakened by age-related degenerative changes, poor blood supply, or repetitive subacromial impingement. The tendon tear may result from cumulative subacromial overuse or from an acute injury that enlarges an existing rotator cuff defect or ruptures the compromised tendon. Impingement of the rotator cuff due to cumulative trauma has been implicated as a predisposing factor in the majority of chronic tears (Matava et al., *Am J Sports Med* 2005; 33(9): 1405-1417; McConville and Iannotti, *J Am Acad Orthop Surg* 1999; 7(1): 32-43).

(23)

Rotator cuff pain is localized over the deltoid region and radiates to the lateral arm above the elbow. Typically, the pain is exacerbated by overhead activities, especially lifting overhead and moving against resistance, but may also occur at rest. Shoulder pain at night, often awakening the patient from sleep, is common.

(24)

Crepitus may also be detected in patients with rotator cuff tendonitis.

(25)

Patients with chronic rotator cuff tear or tendonitis usually experience increased pain with resisted shoulder abduction and rotation (McFarland et al., *Clin Sports Med* 2008; 27(4): 553-578). Weakness during these maneuvers is common as well, although the

assessment of rotator cuff weakness is commonly confounded by patient discomfort. However, a small subset of patients with chronic tears is actually pain-free and demonstrates only weakness.

(26)-POL:

NSAIDs are preferred for the treatment of this condition because of their anti-inflammatory effect. It is a matter of local medical policy whether to accept acetaminophen or other analgesics as alternatives for NSAIDs.

(27)

OT or PT, initiated early, is an important component in the management of rotator cuff disorders. The initial goals of exercise therapy include reducing pain and inflammation, and restoring normal shoulder ROM, then progressive strengthening of the shoulder muscles within a pain-free range and proprioceptive training (Frontera et al., *Essentials of physical medicine and rehabilitation*. 2nd ed. 2008). The decision to recommend a home (i.e., unsupervised) therapy program or supervised OT or PT is a matter of clinical judgment.

(28)

Occasional local corticosteroid injection into the subacromial space may be beneficial for patients with rotator cuff disorders (Wolf et al., *Am J Sports Med* 2007; 35(6): 1007-1016; Buchbinder et al., *Cochrane Database Syst Rev* 2003; (1): CD004016). It has been demonstrated that rotator cuff surgery outcomes may be compromised if more than 3 injections are given during a 2 month period (Mantone et al., *Orthop Clin North Am* 2000; 31(2): 295-311).

(29)

Activity modification for chronic rotator cuff disorders involves limiting activities that provoke or aggravate symptoms. These include: excessive, repetitive shoulder abduction, flexion, or external rotation (e.g., overhead reaching, lifting above the shoulder, pushing, pulling, reaching backwards); and forceful use of the shoulder at end-range position (e.g., turning the wheel of a vehicle without power steering).

(30)-DEF:

Avascular necrosis, (i.e., aseptic necrosis, osteonecrosis), is a degenerative condition of focal bone causing progressive pain and bony collapse. Numerous medical conditions predispose toward avascular necrosis, including alcoholism, chronic corticosteroid use, sickle cell disease, pancreatitis, trauma, SLE, and radiation therapy.

(31)

If the patient is immunocompromised, fever may not be present and the WBC may be unchanged or low.

(32)-DEF:

The labrum is a fibrocartilaginous ligament forming the margin of the glenoid cavity of the shoulder joint that serves to broaden and deepen the cavity and gives attachment to the long head of the biceps brachii.

(33)

The superior labral complex provides dynamic stability to the shoulder. Injury to the superior labrum can occur from a variety of mechanisms including a fall onto an outstretched arm, traction injuries, and overhead throwing (Bedi and Allen, *Clin Sports Med* 2008; 27(4): 607-630).

(34)

Activities of daily living (ADLs) are frequently divided into those simple activities relating to basic self-care and those that involve more complex interactions with others and the environment (called instrumental activities of daily living or IADLs). This criterion includes both types of activity. Whether a condition is of sufficient severity to interfere with ADLs or IADLs is somewhat subjective. There should be an indication that symptoms impede the patient's ability to effectively work, shop, manage at home, care for family members, or tend to personal hygiene.

(35)

The physical exam for SLAP lesions is nonspecific. There are a number of tests that have been used in the diagnosis of SLAP lesions, but no single test or combination of tests has been shown to be able to consistently detect SLAP lesions (Bedi and Allen, *Clin Sports Med* 2008; 27(4): 607-630). However the combination of a history of shoulder popping, clicking, or catching, exacerbated by overhead activity and a positive crank or anterior slide test is suggestive of a labral tear (Dodson and Altchek, *J Orthop Sports Phys Ther* 2009; 39(2): 71-80; Walsworth et al., *Am J Sports Med* 2008; 36(1): 162-168).

(36)

A positive crank test is elicited when a patient has a reproduction of symptoms, including pain, popping, or catching when the humerus is internally and externally rotated while axial compression is applied to the shoulder that is elevated to 160 degrees (Walsworth et al., *Am J Sports Med* 2008; 36(1): 162-168).

(37)

In the anterior slide test, the patient sits with hands on the waist while the examiner stabilizes the scapula and clavicle with one hand and applies an anterior-superior force at the elbow with the other. A test is considered positive if a pain or pop is localized to the anterior shoulder or if the patient's symptoms are reproduced (Walsworth et al., *Am J Sports Med* 2008; 36(1): 162-168)

(38)

In the active compression test (or O'Brien test), the patient assumes a position of internal or external rotation of the arm while the examiner provides downward pressure. The patient resists the downward pressure. A test is considered positive if the pain is localized to the glenohumeral joint with internal rotation, and the pain is lessened with external rotation (Dodson and Altchek, *J Orthop Sports Phys Ther* 2009; 39(2): 71-80; Walsworth et al., *Am J Sports Med* 2008; 36(1): 162-168).

(39)

PT or OT may be prescribed in the treatment of shoulder instability or dislocation. Therapy usually follows a period of immobilization and will focus on activity modification to decrease risk of re-injury (e.g., overhead throwing activities), increasing the strength of the muscles supporting the shoulder joint, and improving shoulder ROM if necessary (Dodson and Altchek, *J Orthop Sports Phys Ther* 2009; 39(2): 71-80; Gibson et al., *J Hand Ther* 2004; 17(2): 229-242). Therapy may also address neuromuscular control and proprioception via an exercise program (Karatsolis and Athanasopoulos, *J Bodywork and Movement Therapies* 2006; 10: 211-219).