

## Differential Diagnosis of Acute, Post-traumatic Shoulder Pain

Cause	Clinical Features	Imaging Findings	Collected Cases
Clavicle fracture	Pain along the clavicle; MOI: usually FOOSH	Discontinuous cortex and displaced bone fragment on XR, CT, and MR; abnormal marrow SI on MR	4
Scapular fracture	Pain along the scapula; MOI: usually severe direct blow	Discontinuous cortex and displaced bone fragment on XR, CT, and MR; abnormal marrow SI on MR	3
Humeral fracture	Pain along the anterior shoulder joint or humeral shaft; MOI: usually FOOSH	Discontinuous cortex and displaced bone fragment on XR, CT, and MR; abnormal marrow SI on MR	10
AC joint injury	Pain and deformity the AC joint; MOI: usually fall on the shoulder	Widening and/or offset along the AC joint	6
Glenohumeral joint dislocation	Pain and deformity of the shoulder	Displaced humeral head	7
Tendon tear (including RCT)	Pain of the shoulder located at the involved tendon; limited shoulder abduction	None on XR; discontinuous tendon on MR or CT; abnormal SI in the tendon or muscle on MR	7 rotator cuff tears
Labral tear	Limited ROM; apprehension	None on XR; displaced labrum, fluid within the labrum on CT-arthrography, MR, and MR-arthrography	3
<b>ABBREVIATIONS</b>			
AC = acromioclavicular; FOOSH = fall on an outstretched hand; CT = computed tomography; MOI = mechanism of injury; MR = magnetic resonance; RCT = rotator cuff tear; SI = signal intensity; XR = radiography			

## Differential Diagnosis of Shoulder Pain (Not Acute, Post-traumatic)

Cause	Clinical Features	Imaging Findings	Collected Cases
<b>Bone Abnormalities</b>			
Stress fracture	Repeated local trauma; with osteolysis of the distal clavicle, often from weight lifting (bench presses or push-ups)	Focal lucency on XR and CT; reparative new bone/periostitis on XR, CT, and MR; abnormal SI on MR	3 osteolysis of the distal clavicle
Primary and metastatic bone tumors	History of malignancy; pain at the location of the tumor (may be poorly localized); night pain; severe pain not relieved by rest	Destroyed bone cortex, absent trabeculae, associated soft tissue mass on XR, CT, and MR; increased (with blastic) versus decreased (with lytic) bone density on XR, CT; abnormal bone marrow SI with MR	8
Avascular necrosis (AVN)	History of steroid use or alcohol abuse; pain at the location of the AVN (may be poorly localized)	Increased bone density on XR, CT; abnormal contour on XR, CT, and MR; abnormal marrow SI with “double line” on MR	1
Posterior glenoid deficiency			1
<b>Joint Abnormalities (AC or GH)</b>			
Osteoarthritis	Pain with motion alleviated with rest; tenderness over the joint; prior trauma; osteoarthritis of other joints	Osteophytes, joint space narrowing, subchondral sclerosis or cysts, joint effusion on XR, CT, and MR; focal articular cartilage defects on MR, CT-arthrography, and MR-arthrography	12
Rheumatoid arthritis	Loss of motion; morning stiffness; positive RF; positive anti-CCP; rheumatoid arthritis of other joints	Loss of joint space, marginal erosions on XR, CT, and MR; abnormal synovium and marrow SI on MR	
Crystal arthropathy	Acutely painful joint; crystals on joint aspiration; arthropathy of other joints	Chondrocalcinosis and/or soft tissue calcifications on XR, CT, MR; secondary osteoarthritis on XR, CT, and MR	2
Septic arthritis	Swelling; fever and elevated WBC, ESR, or CRP, WBCs on joint aspiration	Swelling from joint effusion, loss of joint space, periostitis (with osteomyelitis) on XR, CT, and MR; abnormal marrow SI on MR	1
Labral tear	History of injury or throwing; sensation of joint	None on XR; defect of the labrum on MR, MR-arthrography, or CT-	6

	instability	arthrography	
<b>Extra-articular Soft Tissue Abnormalities</b>			
Adhesive capsulitis	Decreased range of motion; history of prior injury with immobilization of the shoulder	Reduced capacity of the joint at arthrography; enhancing proliferative synovium on MR	
Bursitis	Pain and swelling at the location of the bursa; relief of pain with intra-bursal injection of anesthetic	Usually none on XR; fluid in the bursa on MR, CT, and US	1
Rotator cuff tear	History of specific injury; decreased range of motion; weakness especially on abduction (supraspinatus tendon tear)	Acute: None on XR; extravasation of injected contrast material into the subacromial-subdeltoid bursa at arthrography; direct visualization of the defect on US and MR Chronic: Secondary bony remodeling and GH degenerative changes on XR, CT, and MR; direct visualization of the defect on US and MR	13
Proximal biceps tendon tear	History of injury; weakness in elbow flexion; contracted appearance of the biceps	None on XR; direct visualization of the defect on US and MR (absent intra-articular tendon from tendon retraction)	
Tendinitis (including calcific tendinitis)	Pain at the location of the inflamed tendon	Calcifications of the tendon on XR and CT; tendon swelling, abnormal tendon signal and peritendinous fluid on US and MR	11 calcific tendinitis; 2 biceps tendinopathy
Ligament abnormalities	Pain at the location of the affected ligament	Calcification on XR and CT; abnormal SI or absence on MR or MR-arthrography	
Impingement syndrome	Pain with abduction; limited range of motion	Downward sloping or spur formation along the lateral/anterior acromion, reduced acromioclavicular distance on XR, CT, and MR	1
Quadrilateral space syndrome	Shoulder pain and arm paresthesias with overhead activity	None on XR; atrophy of the teres minor on MR	1
Parsonage Turner Syndrome	Sudden onset of pain and weakness	None on XR and CT; denervation changes of abnormal muscle SI on MR	1
Chest tumors	Smoking, cough (especially with hemoptysis), history of malignancy	Mass in the visualized lung on XR, CT, or MR	2
<b>SHOULDER PAIN WITH NO IMAGING FINDINGS ON SHOULDER IMAGING STUDIES</b>			
Cervical disc disease; myocardial ischemia; gallbladder disease; subphrenic abscess; dissecting aortic aneurysm; gastritis; peptic ulcer disease; splenic rupture			
<b>ABBREVIATIONS</b>			

AC = acromioclavicular joint; AVN = avascular necrosis; CBC = complete blood count; CCP = cyclic citrullinated peptide; CT = computed tomography; ESR = erythrocyte sedimentation rate; GH = glenohumeral joint; MR = magnetic resonance; RF = rheumatoid factor; SI = signal intensity; XR = radiography; US = ultrasound;

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