SHOULDER ULTRASOUND

Howard Pinchcofsky, M.D.
Among the most common MSK US exams

- Very standard compared to other joints
- High spatial resolution and high frequency US transducers allow rotator cuff to be easily evaluated
- US is more accurate than MR when assessing postoperative rotator cuffs, although MR arthrography is more sensitive
- Need to be aware of radiographs if available
- Use highest frequency that allows good evaluation of structure of interest
- Keep structure of interest in center of monitor and pay attention to the focal zone position
- Examiner and patient are ideally both seated on stools facing each other
- Examiner should be positioned so that scanning arm is comfortably near examiner while scanning. The hand may be cupped to hold the transducer in position on the patient.
Long head of biceps tendon
Subscapularis tendon
Acromioclavicular joint
Supraspinatus tendon
Infraspinatus tendon
Teres minor tendon
Posterior superior labrum
Suprascapular notch
Spinoglenoid groove
BONY LANDMARKS

- Greater tuberosity
- Lesser tuberosity
- Bicipital groove (formed by greater and lesser tuberosity)
- Superior facet of humeral head
- Middle facet of humeral head
- Anatomic neck
Normal tendons have organized, fibrillar echotexture.

Tendons demonstrate anisotropy. When the ultrasound beam is oriented perpendicular to the tendon, tendons are relatively echogenic. Otherwise, they are hypoechoic.

May need to toggle or heel-toe the transducer to distinguish between anisotropy and tears.
» Thickened, hypoechoic-tendinosis
» Thinned-usually at least partial thickness tear
» Absent or retracted-full-thickness tear
» Tenosynovitis-in the shoulder, this is only associated with the long head of biceps tendon. Will see fluid, often with hypertrophic synovium and vascularity surrounding the tendon. Alternatively fluid may simply have decompressed from glenohumeral joint.
» Attritional tendinosis-some individuals use this term to describe thinned tendons to differentiate them from surgical cases. These tendons may technically be torn; however, they are not surgical cases.
Long head of biceps tendon
Longitudinal split tear—within the substance of the long head of biceps tendon, extending along the long axis. Two thin tendons are seen in bicipital groove.

Full thickness—generally retracted distally in the bicipital groove. At sonography, bicipital groove is empty.
Subscapularis tendon
- Usually involves superior, articular surface fibers of subscapularis tendon.
- Can be full-thickness.
- Subscapularis tendon is at least partially torn when long head of biceps tendon is medially dislocated or subluxed.
Shift the transducer medially, still along the long axis of the subscapularis tendon. Find the coracoid process, and observe the bursa as it glides underneath.
Acromioclavicular joint
Supraspinatus tendon
- Full thickness-either retracted or nondisplaced.
- Articular surface-tear contacts articular cartilage, but not bursal surface.
- Bursal surface-tear contacts subacromial subdeltoid bursa, but not articular surface.
- Intrasubstance-tear is confined to the substance of the tendon. This pattern is the least common.

PATTERNS OF TEARING SUPRASPINATUS AND INFRASPINATUS
Tears often involve the posterior supraspinatus and anterior infraspinatus.

Tears may be located primarily in the supraspinatus.

Isolated infraspinatus tears are rare.
SECONDARY FINDINGS OF ROTATOR CUFF TEARS

- Greater tuberosity is irregular
- If acute, will see fluid in subacromial subdeltoid bursa or adjacent to articular surface tear
- If chronic, fluid will often not be present
- May see scar tissue filling in chronic tears
- Will often have rotator cuff muscle atrophy
- Bursal dipping is often present
Calcific tendinosis
Scan acromion at the level of the supraspinatus. Instruct the patient to abduct the arm, first with the palm facing down, then with the palm facing back.

Should see subacromial subdeltoid bursa sliding beneath the acromion.

If bursa catches underneath the acromion, patient may report a click.
Infraspinatus tendon
Glenohumeral joint injection
Visualize the humeral head and infraspinatus tendon while the patient internally and externally rotates the shoulder.

DYNAMIC MANEUVER
Supraspinous fossa/suprascapular notch
Spinoglenoid groove
Humeral head defects
Initial postoperative period mimics tendinosis
Generally looking for obvious, large tears
Can find postoperative changes in the humeral head
Tendons begin to revert to normal appearance starting 6-9 months postoperatively
SCANNING PROTOCOL

- LHBT-static and dynamic SAX then LAX, proximal to distal
- Subscapularis tendon-static and dynamic LAX then SAX, superior to inferior, proximal to distal
- Subcoracoid impingement-dynamic
- AC joint, dynamic is optional
- Supraspinatus tendon-Crass, static and dynamic, LAX then SAX, anterior to posterior, proximal to distal; repeat with modified.
- Subacromial impingement-dynamic
- Infraspinatus-static then dynamic, LAX
- Posterior superior labrum
- Suprascapular notch and spinoglenoid groove
- Rotator cuff muscle atrophy-LAX or SAX; use split screen to compare with contralateral side.