

# SHOULDER MRI

## OSSEOUS OUTLET

- Acromion**: Type I flat, II curved, III hooked (spur), IV convex (@sagittal); Lateral downsloping or low lying acromion w/ respect to clavicle (@coronal)
- AC** (degen arthrosis, capsular hypertrophy, inf spurring, mass effect on musculotend jct, geysir synovial cyst)
- CAL**=Coracoacromial ligament hypertrophy (@sagittal)—mimics inferior acromial spur
- CCL**=Coracoclavicular lig (trapezoid lig—ant & lat to conoid lig which is more imp) along coracoclavicular interval: best seen on cor and sag
- Os Acromiale** @axial (fused by age25)
- Muscle overdevelopment (hypertrophy)

## ROTATOR CUFF (sag and cor T2 FS not PD FS)—look for intact fat plane btwn acromion and rotator cuff on cor T1

- don't have synovial sheath; Magic angle 1cm prox to insert supraspin (short TE T1/PD/GRE, except T2)
- Tendinopathy/Tendinosis (SIT inserts on Greater Tub and Subscapularis inserts Lesser Tub)
  - Supraspinatus** (ant-sup) and deltoid abduct; **infraspinatus** (post-sup) and **teres minor** (post-inf) ext rot; **subscapularis** (ant) int rot
  - Foot plate and adjacent bare area (medial) on greater tuberosity
  - conjoined tendons of supra and infraspinatus
  - Tendinopathy vs Partial tear (undersurface or articular surface>bursal surface; rim-rem=distally at bony attachment site)
  - Full thickness tear (focal perforation)
  - Interstitial /longitudinal tear or delamination (intramuscular cyst)
  - Complete tear (partially displacement or retraction of musculotendinous jct which should be just lat to AC jt)
  - Massive cuff tear
  - SUBSCAPULARIS**: 4tendons (superior tendinous slip aka biceps stabilizer; upper intramuscular tendon; remaining intramuscular tendon; muscular insertion)
- HADD** (near supraspin; darker than tendon; blooms on GRE)
- Degen cystic** changes at greater tuberosity
- Bursa** Subacromial/Subdeltoid vs Subcoracoid (not comm w/ jt but comm w/ subacr/subdelt bursa 20%; inf to coracoid; ant to subscap tendon)←not same as subscapularis recess
- Rotator interval** (@sagittal btwn supraspin&subscap) contains biceps; CHL+SGHL forms biceps pulley; patulous/torn if athroscopy/disloc
- Muscular atrophy** (@T1 fatty infiltration “marbled”): disuse vs denervation (acute>2wks to 1year=edema; chronic>1year=fatty atrophy)

## LABRUM/CAPSULE (@PD FS cor and axial)—triangular>rounded; myxoid degen with aging

- Anterior labrum** (describe signal abnl, location, extent, assoc biceps anchor abnl, assoc cartilaginous abnl)
  - Biceps labral sulcus or art cartilage undercutting = seen on coronal; sublabral recess or sublabral foramen = seen on axial
  - SLAP** (extend post beyond biceps insertion on sup labrum; look for detached labrum; torn biceps-labral anchor; partial/full thick tear)
    - Bankart (complete detached anterior-inferior labrolig complex w/ torn periosteum; loss of triangular shape and incr signal)
    - Perthes (nondisplaced tear of the anteroinferior labrum; similar to ALPSA but labrum is scarred down to its original site)
    - ALPSA** (periosteal sleeve avulsion + labrolig complex displaced medially; periosteum stripped but not torn off; lot of scar if chronic)
    - GLAD** (non-displaced anteroinferior labral tear w/ chondral defect from impaction-type injury)
- Posterior labrum** (6-11o'clock)= Reverse bankart and Bennett (calc of posterior joint capsule or IGHL)←post labrum may be nl blunted
- Paralabral cyst (more common with posterior labral tear)
- Glenohum lig** @axial and sagittal (labrolig complex; SGHL curvilinear along coracoid ant to biceps, MGHL post to subscap tendon and absent in 30% w/o BUFORD, IGHL most imp with ant/post band ax pouch/recess)
- Adhesive capsulitis <7cc (small capsular recess, decr jt capacity, thickened serrated capsule>4mm, thick IGHL at ax pouch or CHL in rot int)
- ABER** view good for inferior labrum (ant is on opposite side as coracoid)—posterosuperior (relaxed) and anteroinferior (under tension) labrum; may diagnose Perthes; also eval undersurface of supraspinatus and infraspinatus; can look for posterior subluxation b/c under tension; can diagnose “posterior-superior internal impingement” (which includes post labral tear, greater tub cystic changes, undersurface tear of IS)

## BONE/CARTILAGE (cartilage best on PD FS)

### -**Marrow signal**

- Cartilage** (hyaline): thinning, fraying or superficial fibrillation, partial thickness defect, full-thickness defect
- Bankart** (ant-inf) / **Hillsach's** (on top 3 axial views posterolaterally at or above coracoid) vs Reverse Bankart (post) / Trough (anteromed)

- Humeral head subluxation (acromiohumeral interval)
- Capsular laxity (Type III medial capsular insertion >1cm medial to labrum @axial)
- Subcoracoid impingement (if distance btwn coracoid and humeral head is <1cm on axial with edema or cystic changes of lesser tuberosity)
- Greater tuberosity**: horizontal facet (sup-ant)=supraspinatus; oblique facet (middle)=supra/infraspinatus; posterior/vertical facet (inf)=teres minor
- Glenoid bare spot (kids 10-20yo only): range in size from 2.5-9mm; usually center of glenoid
- Little league shoulder (proximal lateral humeral physis BM edema; widening of physis; +/- metaphyseal fragmentation)

### **LH Biceps tendon (axial and cor)**

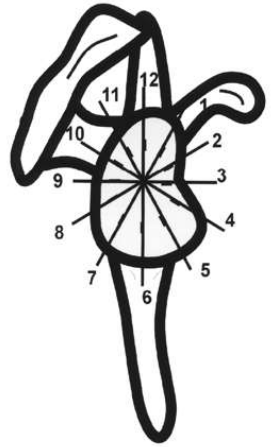
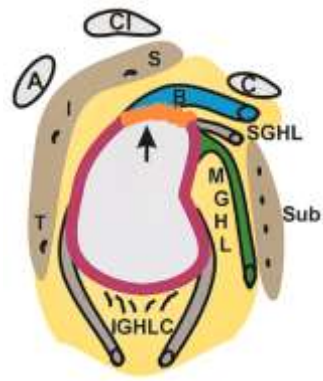
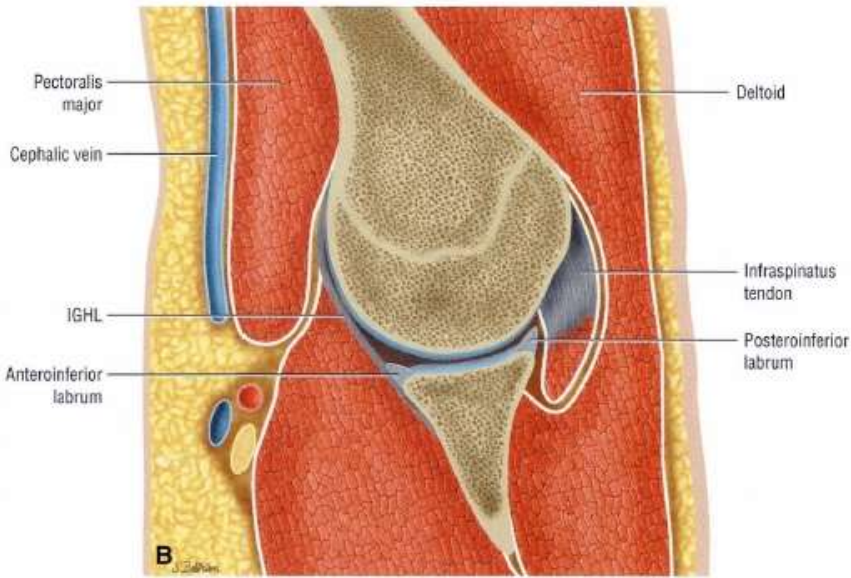
- (long head in bicipital groove → rotator interval → under supraspinatus → sup labrum “biceps-labral complex/anchor” @supraglenoid tubercle —seen on anterior slices on coronal; short head of biceps → coracoid)
- Tendinopathy vs tenosynovitis (remember comm. w/ joint) vs tear (assoc w/ supraspinatus tears); focal stenosing tenosynovitis (loc fluid+septa)
  - Located within Rotator interval (medial and lateral aspects of coracohumeral lig and the SGHL keep it in place)
  - Sublux vs disloc (perched vs anteromed vs medial; biceps located deep vs sup to subscap), empty bicipital groove (BICEPS PULLEY medially=subscap+ SGHL/medial CHL and laterally=lateral CHL)
  - Postop: tenotomy (cut) vs tenodesis (re-attach)

### **MISC**

- Effusion
- Loose body (subscap recess)
- Avulsion of IGHL=HAGL/BAGHL (bony avulsion)
- Suprascapular notch** (SS,IS) vs Spinoglenoid notch (IS) nerve entrapment
- Parsonage turner (acute viral brachial neuritis with multiple muscle edema SS, IS, deltoid)
- Quadrilateral space syn** (located post axilla; btwn teres major/minor and long head triceps; axillary nerve; fatty atrophy deltoid, teres minor)
- Adenopathy or Chest wall / Pulmonary lesion
- Deltoid muscle/tendon slip (inserts on acromion)
- Post-op shoulder (anchors, metal shaving, scar, granulation tissue=lowT1/hiT2 during 1<sup>st</sup> year)
- PECTORALIS MAJOR: clavicular head (sup; arises from medial 1/3 to 2/3 of clavicle) and sternal head (inf and deep; arises from manubrium/sternum/ribs) of pec major unite to form bilaminar tendon; tendon is curvilinear low-signal band inserting onto the lateral ridge of the bicipital groove of proximal humerus; injury may only involve clavicular or sternal head or both; low or high-grade partial tear vs complete tear; location=at myotendinous jct vs partial/complete periosteal stripping/avulsion at humeral insertional site w/ or w/o retraction
- PECTORALIS MINOR: origin 3/4/5<sup>th</sup> anterior ribs and insertion is coracoid process of scapula

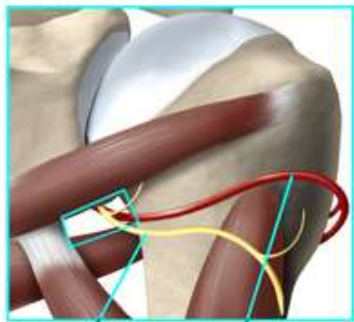
### **Glenohumeral instability** (prefer MR arthrogram)

- Glenoid: labral abnl (bankart, perthes, or ALPSA), shallow/dysplastic glenoid
  - Capsular: thickened; laxity/tear (type III ant capsule inserts >1cm med to labrum capsular @axial)
  - Humeral: HAGL or BHAGL
  - Rotator interval abnormality
  - Prior dislocation; deficient or torn GHL
- TUBS=traumatic unidirectional bankart surgery; AMBRI=atraumatic multidir bilat rehab inf capsular shift



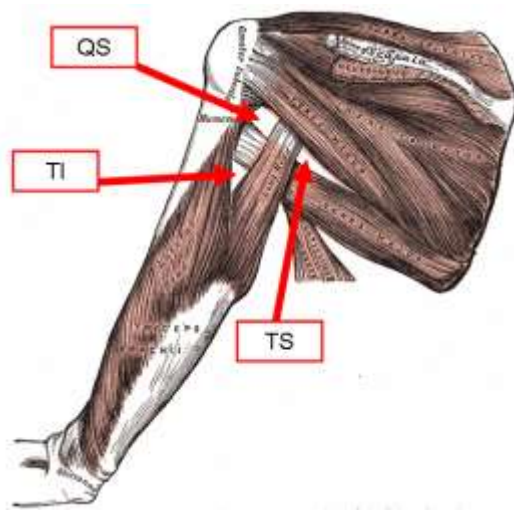
### Quadrilateral Space

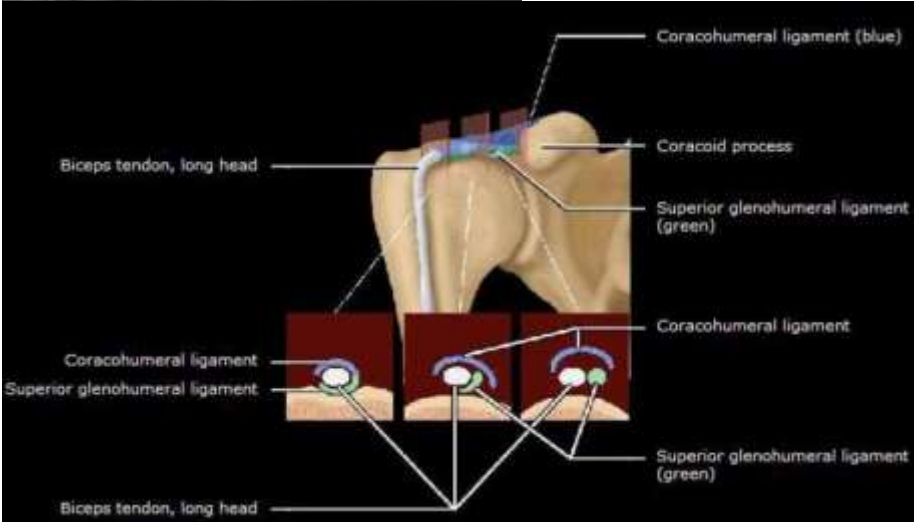
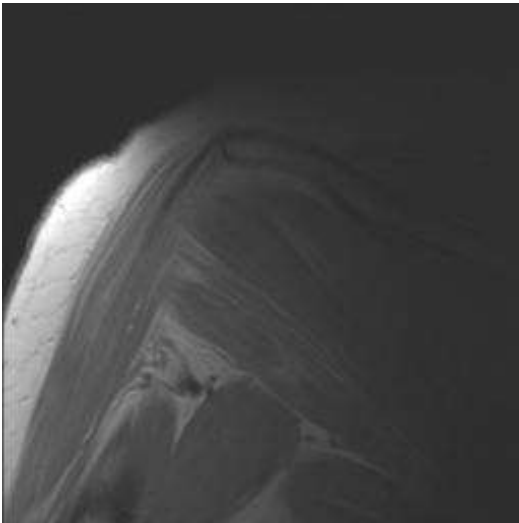
Scapula, posterior view  
Humerus

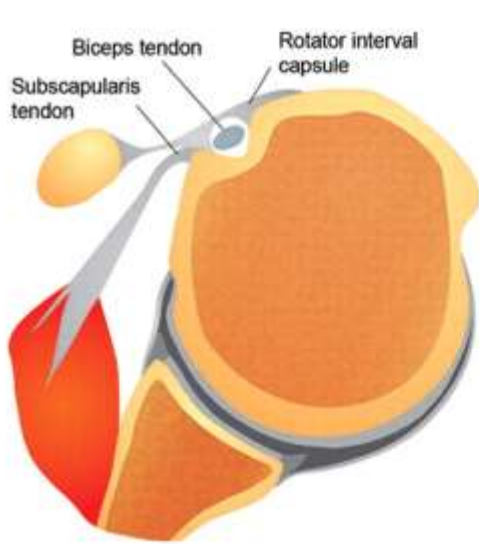


Axillary nerve  
Posterior circumflex artery

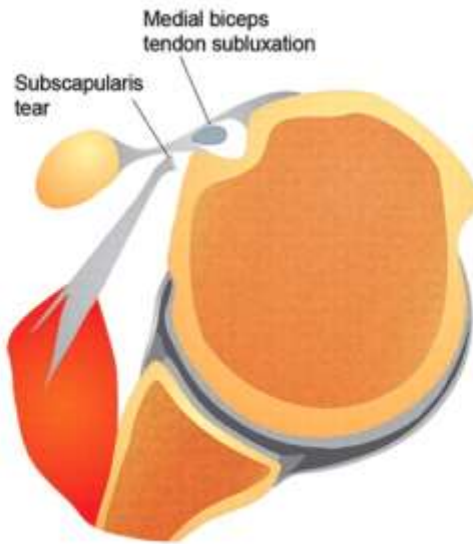
### ABER



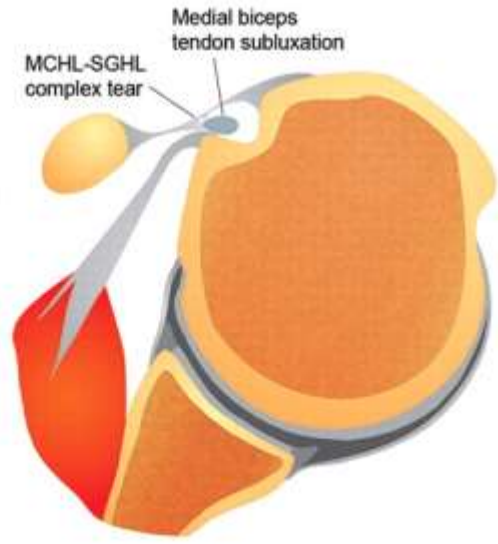




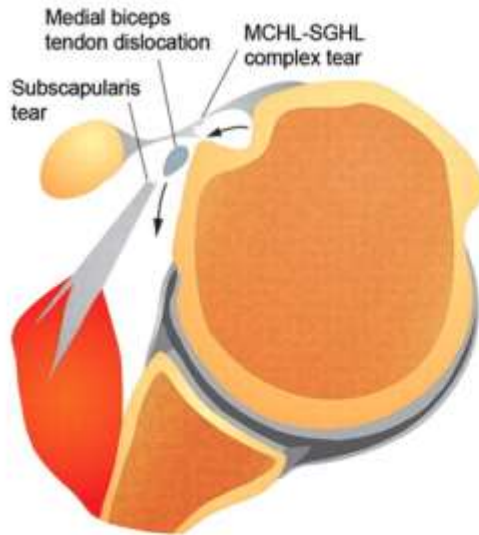
Normal



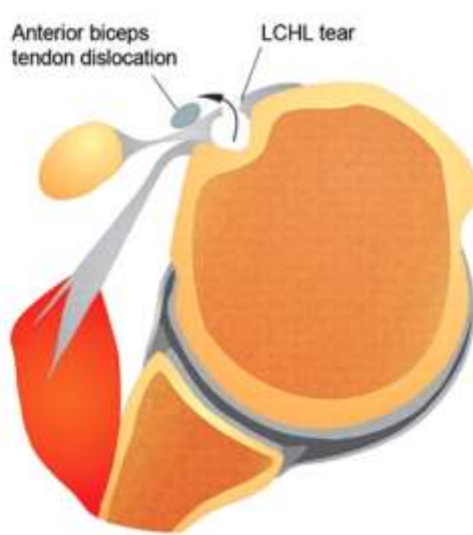
Type 1



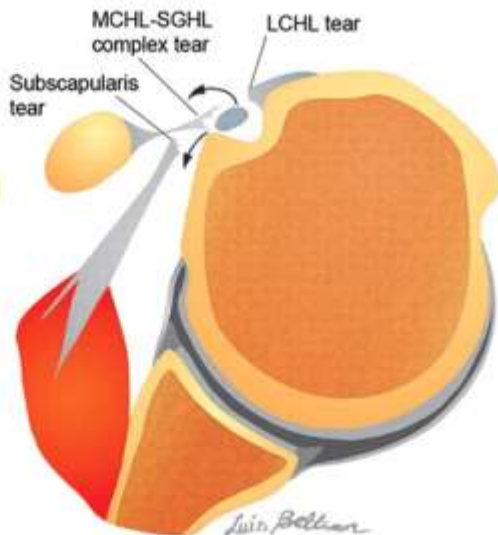
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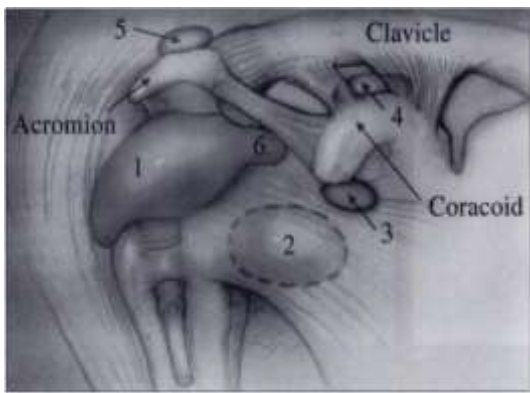
Type 3



Type 4



Type 5



Tendon anatomy:  
Microfibers/subfibrils → fibers → fascicles/bundles → tendon

