

# 2024 Napa Primary Care Conference

## Shoulder Problems

**Jason D. Brayley, MD**



Trusted Team Physicians for the Sacramento Kings

# Shoulder Problems - Outline

- Review relevant anatomic considerations of the shoulder joint
- Discuss common shoulder issues affecting athletes and active patients across the age spectrum
- Review appropriate evaluation and treatment recommendations



# Shoulder Problems - Disclosures

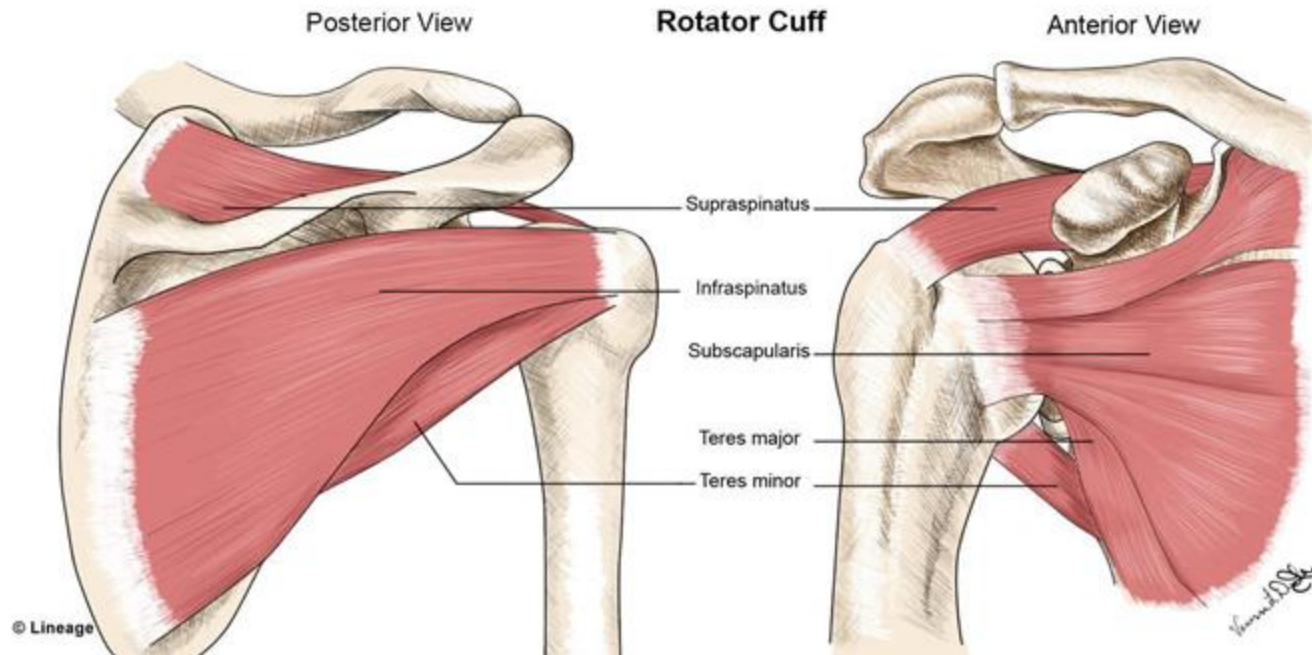
- I have nothing to disclose

# Shoulder Problems - History

- Invaluable in investigation of shoulder problems
- Specific sport/activity
- Acute injury vs chronic/overuse
- Increase with activity/improve with rest?
- Sensation of instability?
- Weakness
- Pain
- Crepitation
- Radicular/myelopathic symptoms (“schneck”)

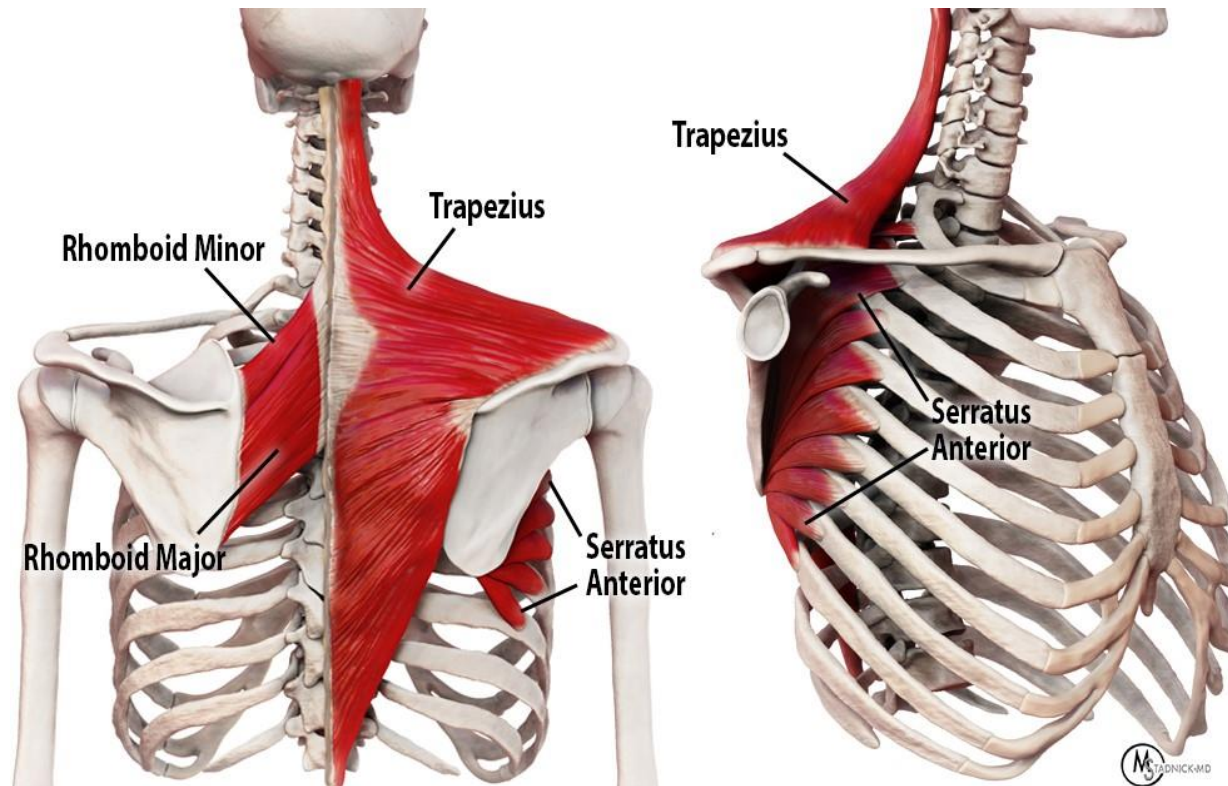


# Anatomic Considerations – Rotator Cuff



- Supraspinatus: primarily abduction
- Infraspinatus: primarily external rotation
- Subscapularis: primarily internal rotation
- Teres Minor: primarily external rotation

# Anatomic Considerations – Scapular Stabilizers



- Rhomboids: Retract, elevate, and rotate scapula
- Trapezius: Stabilize scapula, lateral flexion/extension of head
- Serratus Anterior: Scapular protraction/upward rotation

# Acute vs. Overuse Injury

- **Acute Injury:** acute traumatic event, single traumatic event
  - Fractures
  - Sprains/Strains
  - Ligament tears
- **Acute on Chronic Injury:** Acute injury on top of a pre-existing injury that reduces threshold for injury
- **Overuse Injury:** Chronic injury related to repetitive high levels of physiologic stress without sufficient recovery time.



# Shoulder Exam

- Inspect - swelling, bruising, atrophy, winging
- Palpation – where does it hurt?
- Range of Motion
- Special Tests
- Summary – shoulders are complicated joint, with high potential for referred pain. Stepwise approach, use all the information to your advantage





# Shoulder Problems – Inspection/Observation

- Inspect for obvious deformities
- Abnormalities in humeral head position, clavicular alignment, AC/SC joints, scapular rhythm/winging
- Atrophy
- Appearance of the skin



# Shoulder Exam

Resisted ER – infraspinatus



Resisted IR (or belly press) -  
subscapularis



# Shoulder Exam

Empty can (drop arm) –  
Supraspinatus (often + with RTC  
impingement)



# Shoulder Exam

## Impingement Testing

Neer's



Hawkins



# Shoulder Exam

AC joint – Cross Over



# Shoulder Exam

## Speed



## Yergason



# Shoulder Exam

## Labrum Assessment

O'Brian's



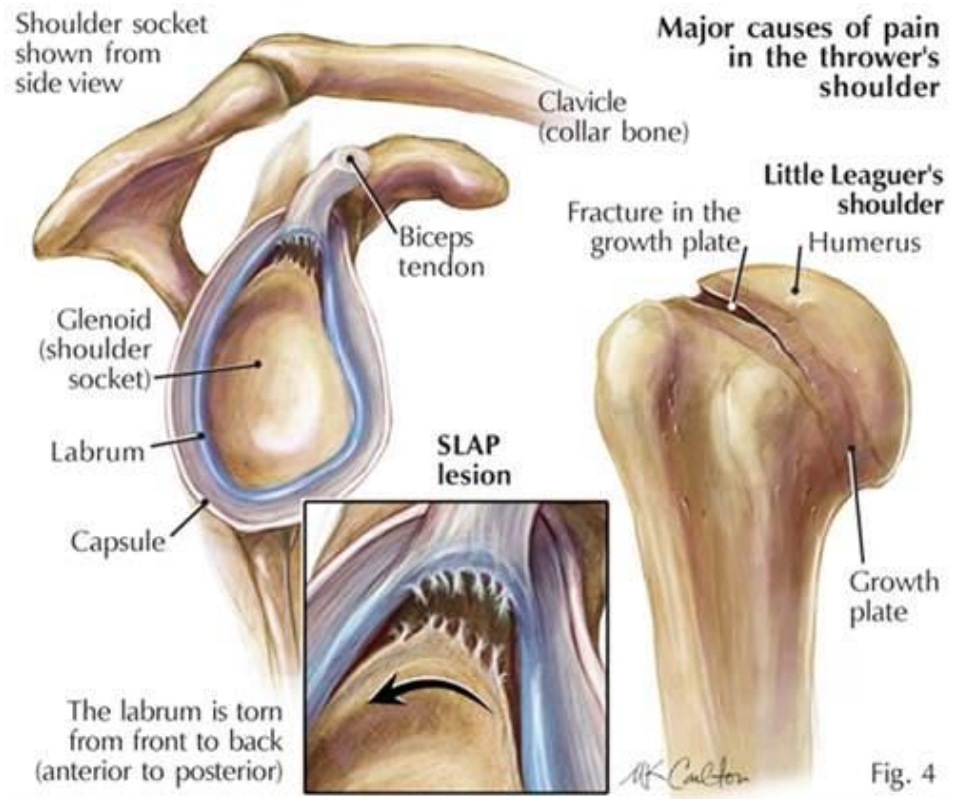
Crank





# Problems of the Shoulder

- Little League Shoulder
- Shoulder Instability
- AC separation
- Labral injury
- Rotator cuff impingement
- Rotator cuff tears
- Shoulder OA
- Greater tuberosity fractures
- Calcific RTC tendinopathy
- Cervical Radiculopathy





# Case 1

- Robert is a 13 y/o RHD baseball player
- Presents with 4 months of shoulder pain
- Year-round “select” level player
- Initially with pain only after practice
- Now pain is present with every throw
- Pain is in the back and side of shoulder
- Tournament in 2 weeks
- Family asking what are we going to do?!



# Little League Shoulder

- Symptoms - Little League Shoulder
  - Gradual onset of pain in throwing shoulder
  - Localized to proximal humerus during throwing
  - Average age 14
  - Average duration of symptoms *8 months*



# Little League Shoulder

- Mechanism - Little Leaguer's Shoulder
  - Growing bones are vulnerable to injury from repetitive microtrauma (weakness of the growth plate compared to the attached muscles)
  - Once the growth plates fuse, the athlete is more likely to injure ligaments and tendons
  - Overuse injuries occur when tissue breakdown exceeds repair
  - ***Young thrower's safe and successful development straddles a fine line between overuse and appropriate use***



# Little League Shoulder

- Mechanism - Little Leaguer's Shoulder
  - Position played (pitcher, catcher, outfield, 3<sup>rd</sup> base, shortstop)
  - Higher than recommended number of throws
  - Nine to 12 months of play in a year
  - Poor pitching mechanics
  - Throwing pitches too advanced for age

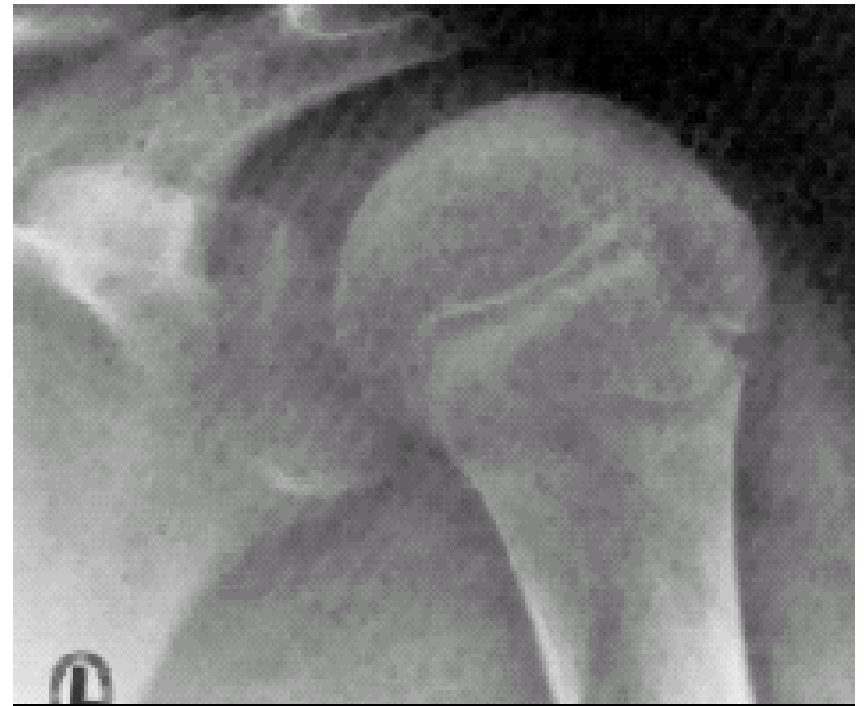


# Xray – Little League Shoulder

- Same as elbow – eval for widening of growth plate, other fx, avulsion (greater trochanter), etc
- Comparison can be helpful if widening felt to be present
- Contralateral helpful to show athlete/parents



# Little League Shoulder



# Little League Shoulder

- Guidelines for returning to throwing:
  - Longer period of rest—No throwing for 2-3 months
  - Think of it as Salter Harris 1 fracture
  - Full, painless ROM
  - Full strength
  - During period of rest, work on conditioning, core strengthening
  - Gradual return to throwing after rest
  - No apprehension or discomfort in the cocking phase of throwing



# Youth Sports Injury Statistics

- High School athletes account for *2 million injuries*, 500,000 doctor visits, and 30,000 hospitalizations per year
- 3.4 million athletes under age 14 receive medical treatment for sports injuries every year
- Overuse injuries are responsible for nearly half of all middle/high school injuries
- Twenty percent of children ages 8 to 12 and 45 percent of those ages 13 to 14 will have arm pain during a single youth baseball season
- ***Since 2000 there has been a fivefold increase in the number of serious shoulder and elbow injuries among youth baseball and softball players***

*-From Stop Sports Injuries: Keeping Kids in the Game for Life*



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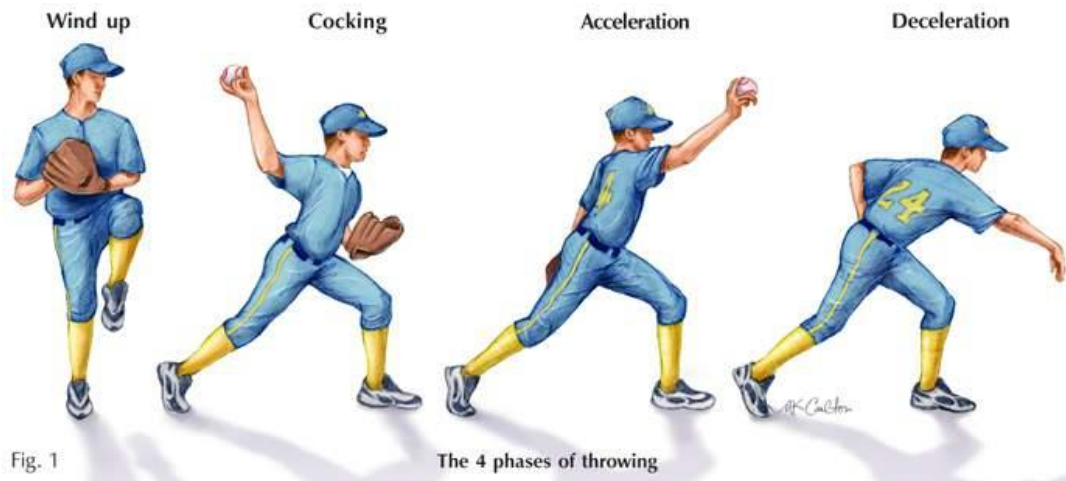


# Biomechanics - *Why Do Injuries Happen?*

- Young athlete tissues are in “transition”
  - Kids are “skeletally immature”
  - Growth plates
  - Unique characteristics
- Young athlete tissues are at risk
  - Growing muscles, tendons, ligaments, and bones react different than adult tissues
  - Healing capabilities are different than adults



# Biomechanics

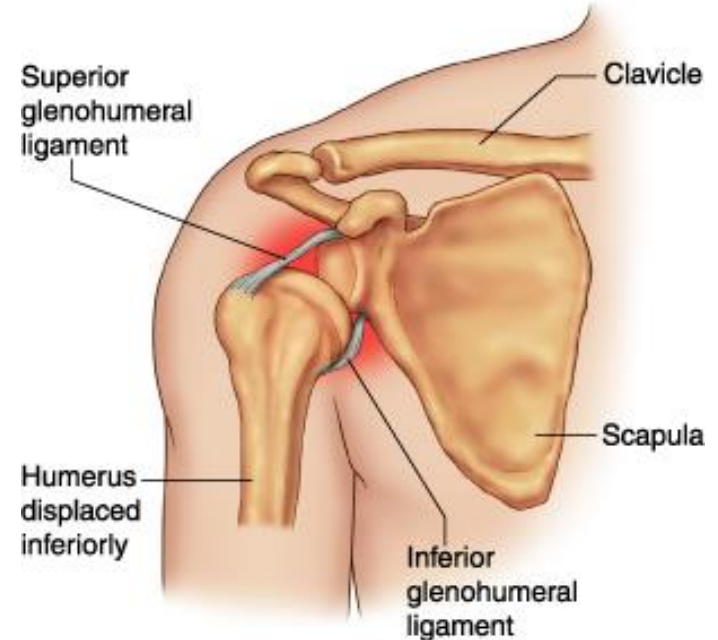


## Case 2

- 17 y/o water polo athlete
- L shoulder pain with abnormal “shift”
- RHD
- No trauma
- Occurs when swimming hard, sometimes during “dry land”
- No limitations in ROM
- Denies neurovascular symptoms
- By history... subluxation vs dislocation?

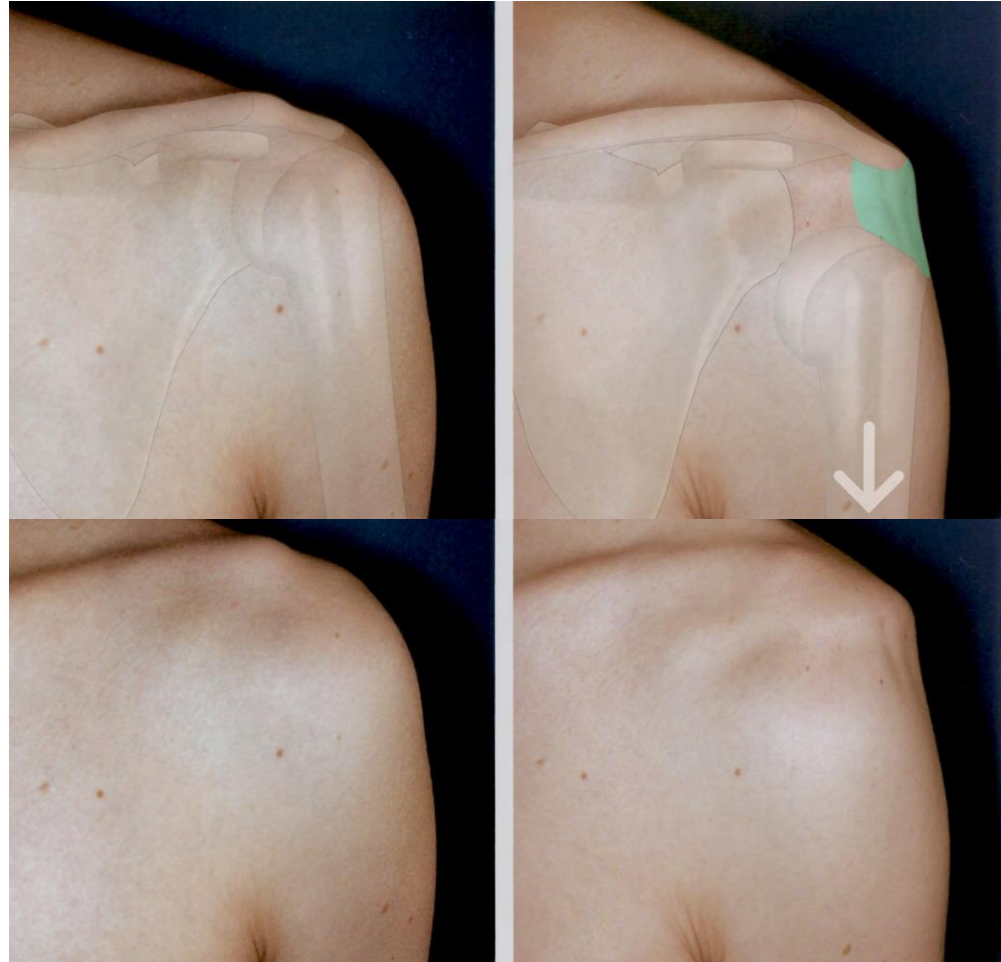
# Injuries of the Shoulder - Instability

- Stability relies on ligaments and rotator cuff action
- Inferior glenohumeral ligament
  - Chronic stretching can cause “functional incompetence”
  - Causes rotator cuff to work harder
  - Can fatigue or tear
- Subluxation vs Dislocations
  - Consider dominant arm



# Shoulder Instability - Exam

- **Sulcus**
- Anterior/Posterior translation
- Apprehension



# Shoulder Instability - Exam

- Sulcus
- **Anterior/Posterior translation**
- Apprehension





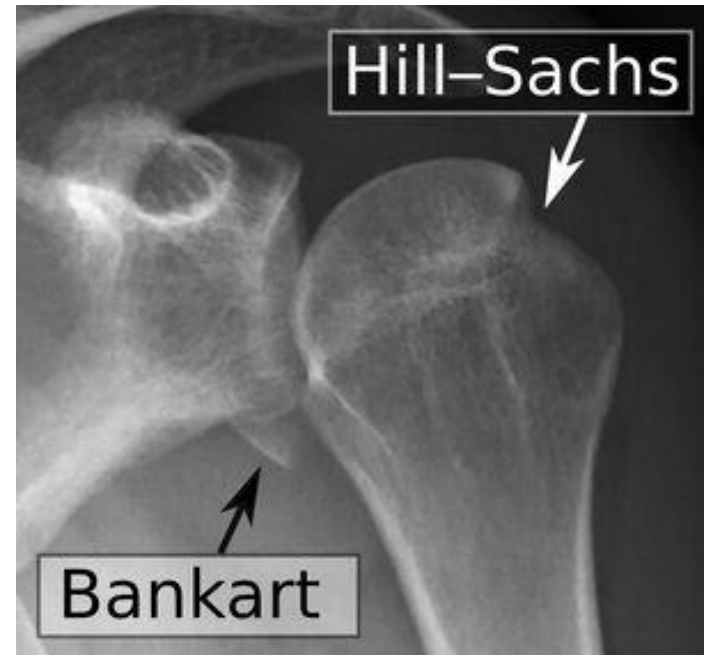
# Shoulder Instability - Exam

- Sulcus
- Anterior/Posterior translation
- **Apprehension**



# Glenohumeral Dislocation

- Anterior dislocation – most common
- Usually from arm forced into abduction/ER
- Subluxation – partial dislocation that has reduced





# Treatment

- Reduction
  - On Field
  - Rare in office
- Xray
- Immobilize (Typically short term)
- Rehab
- Consider MRI arthrogram with dislocation, low threshold for Orthopedic Surgery consultation (especially young, xray abnormal)



# Recurrence/Treatment

- Most do not need operation
  - Except:
    - Recurrent dislocation
    - Fracture
    - RTC/Labrum/other injury
- Age recurrence

— 12-22yo	70%
— 23-29yo	59%
— 29-40yo	23%



# Return to Play

- Usually 6-8 weeks
- Usually require injured shoulder strength 95% of other side and full ROM (don't forget “maintenance” rehab)
- Braces of questionable help (football maybe)



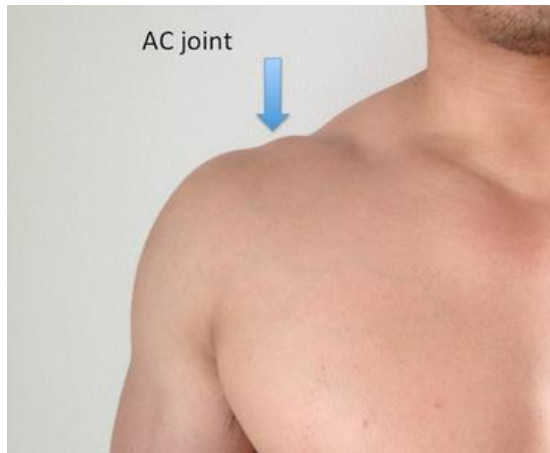
## Case 3

- 14 year-old male is seen after being thrown down by his brother to the ground while wrestling.
- Arm tucked against chest, lands “directly on shoulder”
- He has pain immediately and has a high school wrestling playoff tomorrow
- They are family friends of yours and want to know if he can be cleared to wrestle

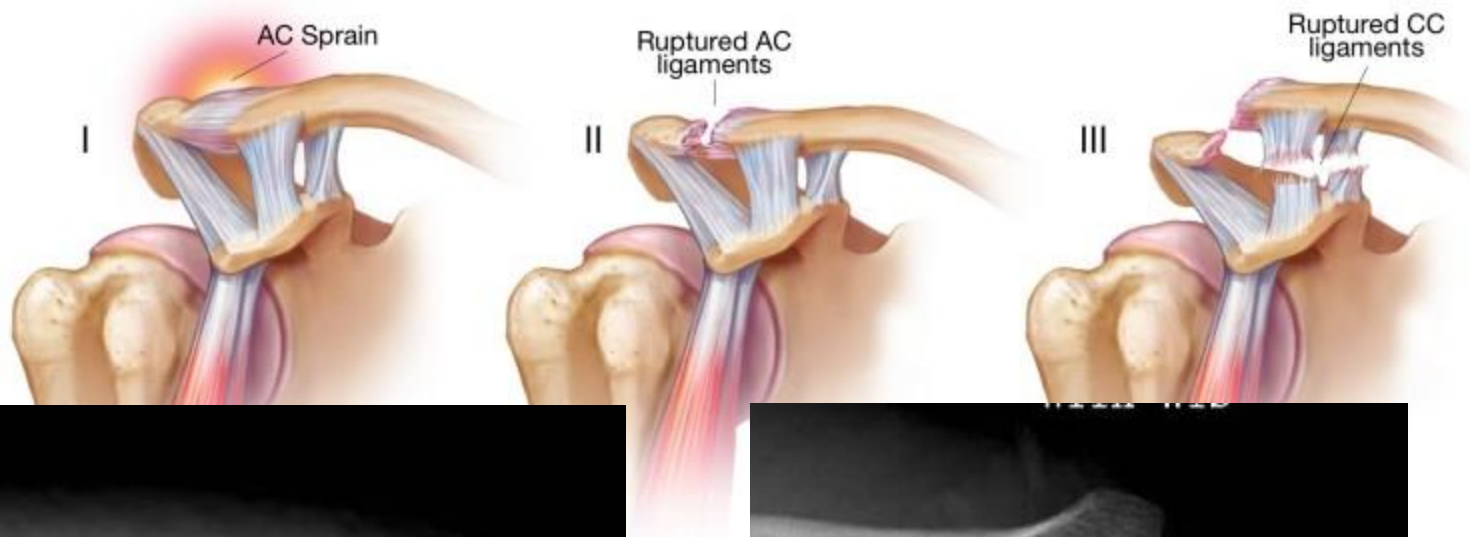


# Physical Exam

- Tenderness and prominence of AC Joint
- No ttp over the clavicle
- No crepitus
- Full ROM
- Pain with resisted FF/Abd, but able to resist
- No ttp over neck and full rom



# AC separation



# Acute Decision Making – AC joint injuries

- If Yes to the following:
  - Nondisplaced/no focal clavicular pain to palpation
  - Full ROM of shoulder
  - Full strength compared to other side
  - Neurovascularly intact
  - Risk of return to play and worsening of injury discussed with kid AND parents
  
- If No to any of the above:
  - Make sure imaging is reviewed
  - Avoid further contact/play/working out until assessed



# AC joint injuries: Treatment

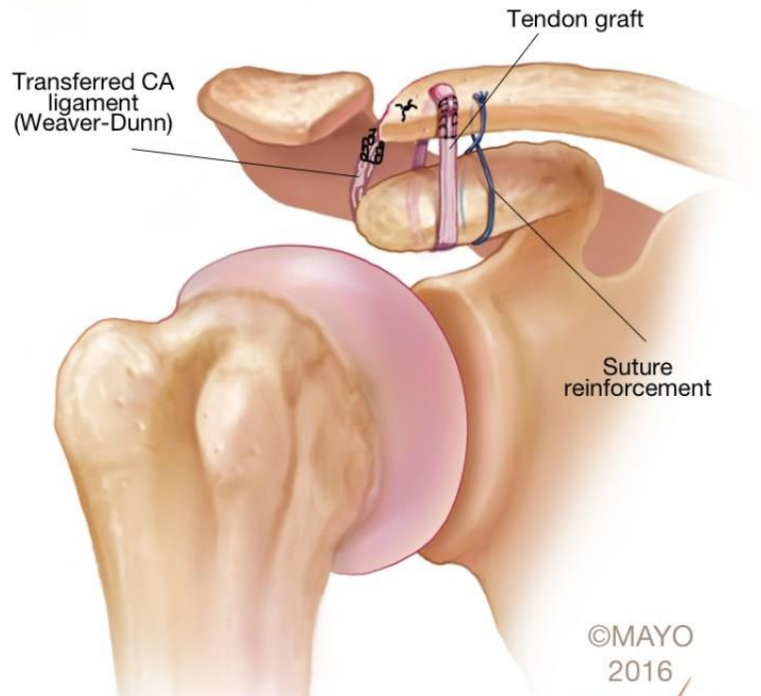
- Sling for comfort or displaced
- Ice/Nsaids acutely
- Rest-No contact in practice until pain free
- Extra Padding for play
- Range of Motion/Strengthening exercises





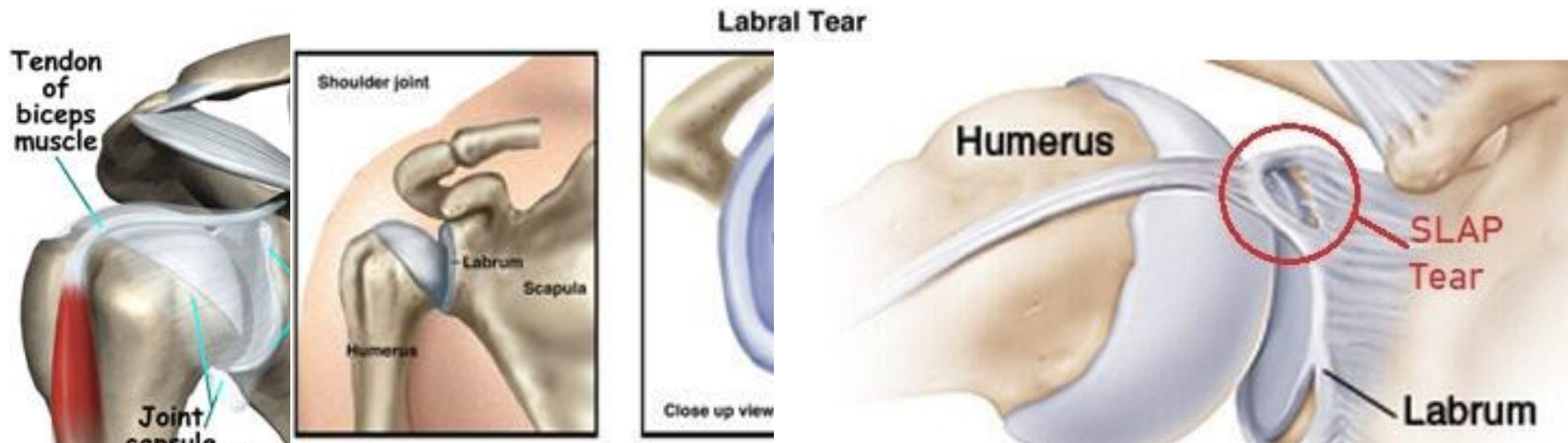
# AC Joint - Referral

- Surgery
  - Not indicated for grade 1 and 2
  - Debatable for grade 3 (scar vs deformity)
  - Yes for grade 4, 5, 6
    - If the clavicle is forward/backwards/downwards – referral needed



# Injuries of the Shoulder - Labrum

- Repetitive microtrauma results in fraying or tearing
- Sudden injury/trauma
- Disruption of biceps anchor
  - Pain and anterior-inferior translation of humeral head when completely detached
  - Can occur alone, or with instability/cuff pathology



# Injuries of the Shoulder - exam

- O' Brian's test:
  - Arm adducted, internal rotation, resisted superior motion of affected arm
- Crank Test:



# Injuries of the Shoulder - Labrum

- Rest
  - Labral pain often recurs despite rest
  - In season options?
- Rehab: never bad early option
- Surgery
  - Labral repair
  - Labral debridement



## Case 4

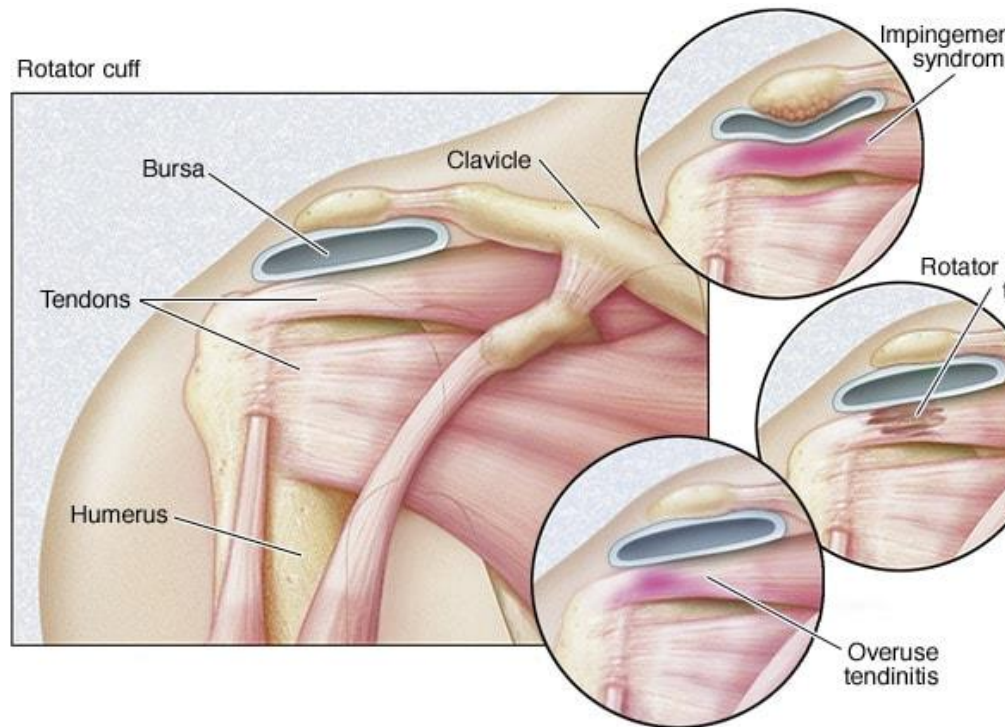
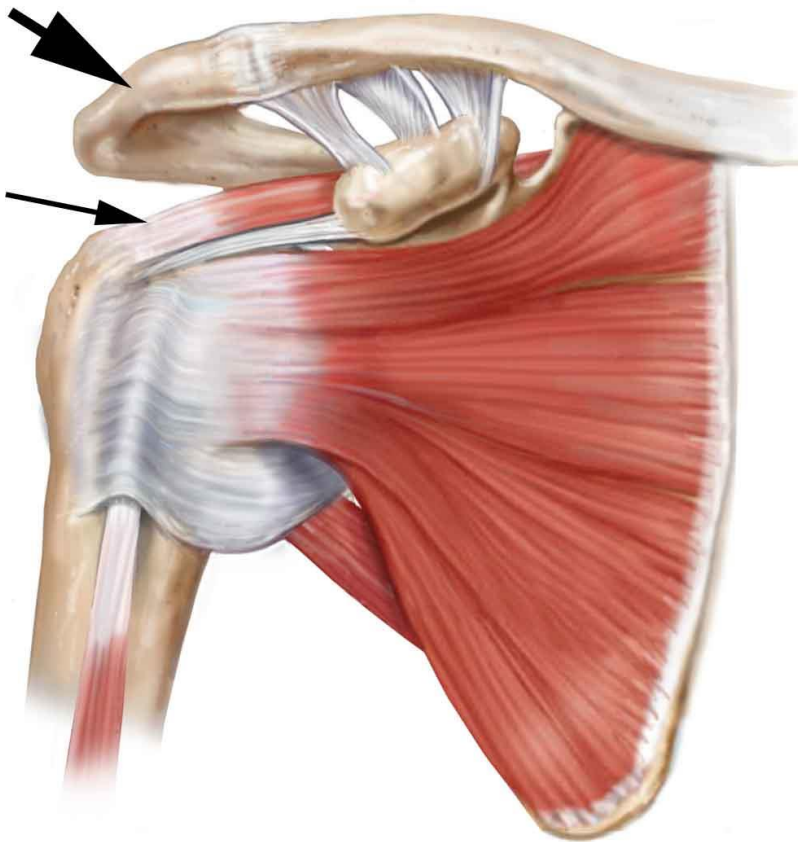
- 49 y/o softball player with shoulder pain while throwing
- Worse with overhead motion and release
- No hx of trauma
- Pain reaching overhead, putting on clothing, pressure at night
- Pain currently resolves by next day
- No treatment thus far
- +Neer's/Hawkin's testing, no instability





# Injuries of the Shoulder - RTC impingement

- RTC (supraspinatus/bicep tendon) impinge against undersurface of acromion/CC ligament

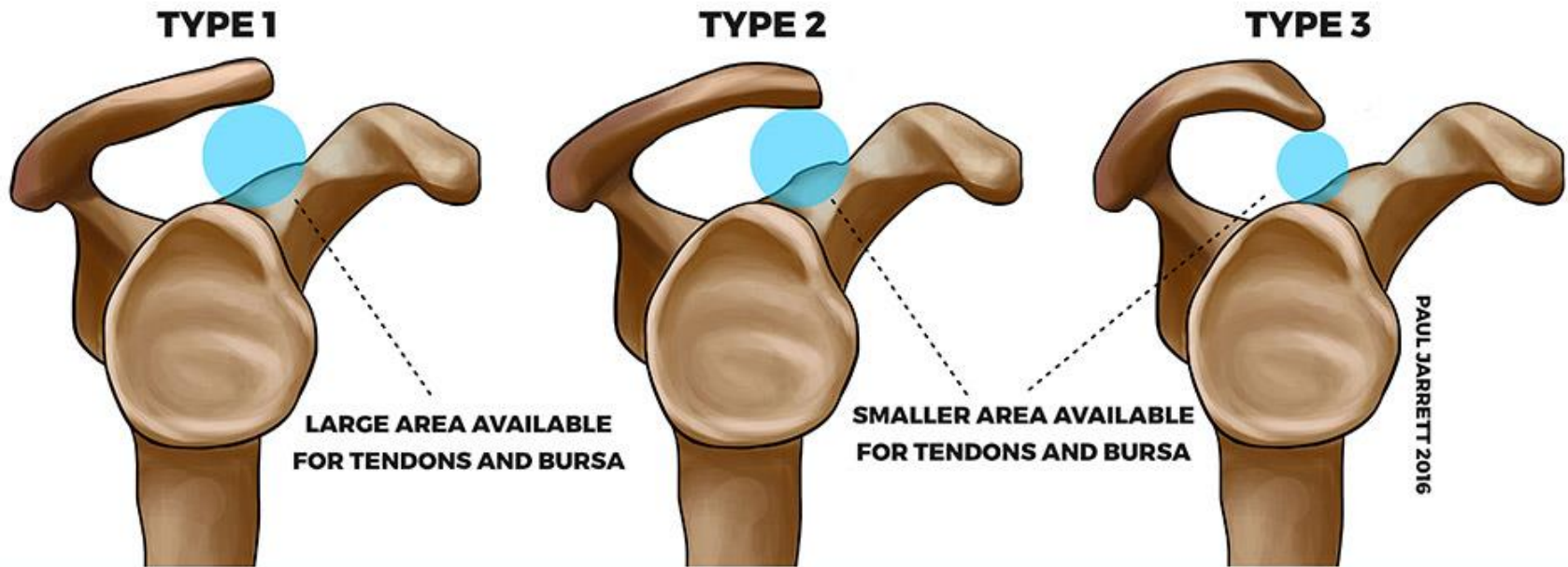


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# Injuries of the Shoulder - RTC impingement

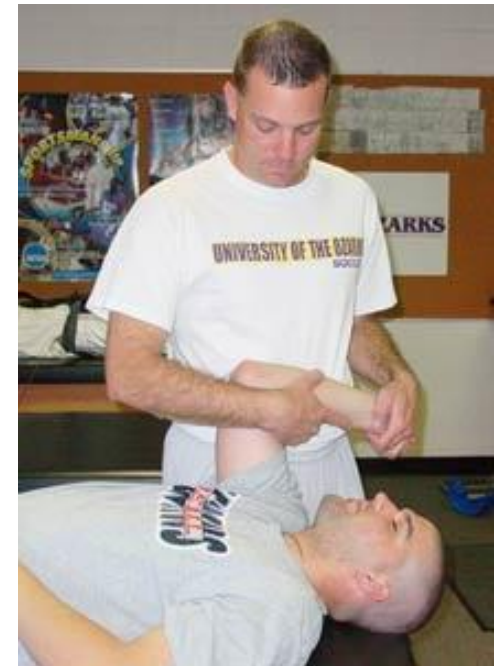
- **Predisposing factors:**
  - Repetitive overhead motion above horizontal plane
    - Tendency toward mechanical/technical errors

## ACROMIAL TYPES



# Injuries of the Shoulder - RTC

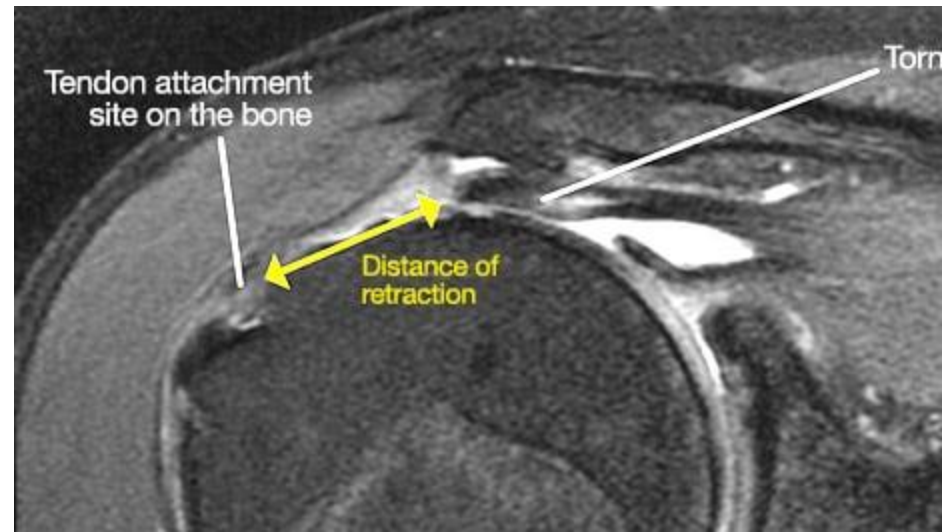
- **Rest**
- Rehab
  - Restore ROM (range of motion)
  - Strengthen cuff and scapular stabilizers
  - Maintain conditioning
  - Throwing program
- Anti-inflammatories
- Possibly steroid injection
- Surgery (very rare in young athlete)





# Injuries of the Shoulder – RTC Tears

- Most common site of injury: within supraspinatus tendon at its insertion into greater tuberosity of humerus
- Acute: indirect force on abducted arm or direct blow to lateral shoulder (acute pain/weakness)
- Chronic: neglected longstanding tendinitis that leads to thinning of rotator cuff and ultimate rupture
  - >45 y/o with long history of shoulder pain that has progressed to significant pain, weakness, loss of motion



# Injuries of the Shoulder – RTC Tears

- Rotator cuff tears:
  - drop arm + (supraspinatus)
  - belly press + (subscapularis)
  - Speed with no strength/popeye arm (biceps)
  - unable to ER arm (infraspinatus)



# Shoulder problems – AC/GH DJD

- **Acromioclavicular joint DJD:**
  - focal pain at AC joint
  - pain with adduction of arm across chest
  - pain control, IA steroid, distal clavicular resection
- **Glenohumeral Joint DJD:**
  - over age 70 most common
  - often history of trauma
  - gradual pain, stiffness/limited motion
  - pain often diffuse
  - physical therapy
  - oral pain medications
  - IA steroid injections
  - joint replacement



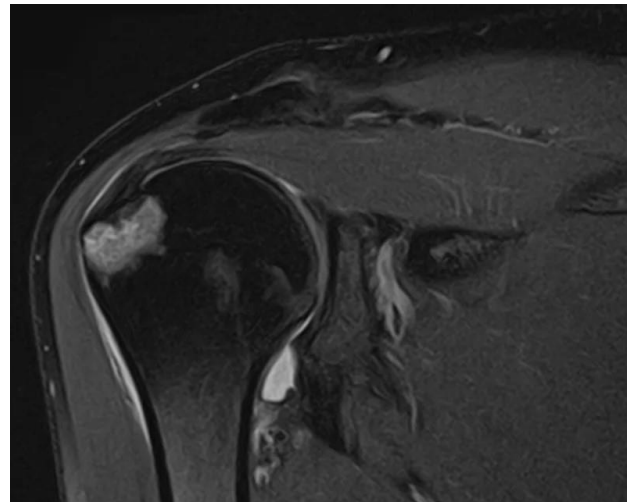
Normal left shoulder

Left shoulder with osteoarthritis



# Injuries of the Shoulder – Greater Tuberosity Fractures

- Proximal humerus fractures are common in older patients with osteoporotic bone (ground-level fall on an outstretched arm)
- Diagnosis typically with radiographs of the shoulder (sometimes MRI)
- Treatment with sling immobilization for minimally displaced fractures(<1cm), surgical fixation versus arthroplasty indicated in more complex and displaced fractures.



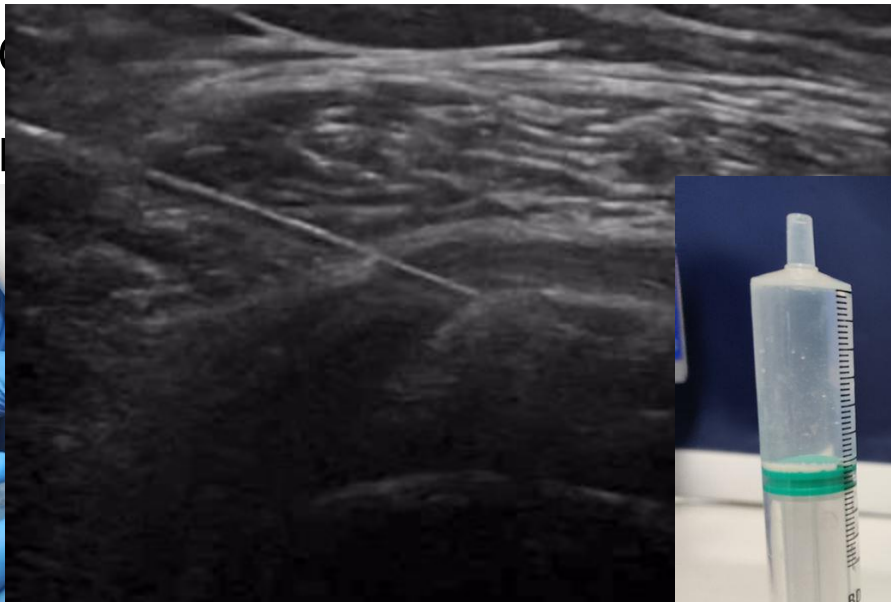
# Shoulder – Calcific Tendinopathy

- Calcification and tendon degeneration near the rotator cuff insertion, most commonly leading to shoulder pain with decreased range of motion.
- Diagnosis can be made radiographically, showing calcium deposits overlying the rotator cuff insertion.



# Shoulder – Calcific Tendinopathy

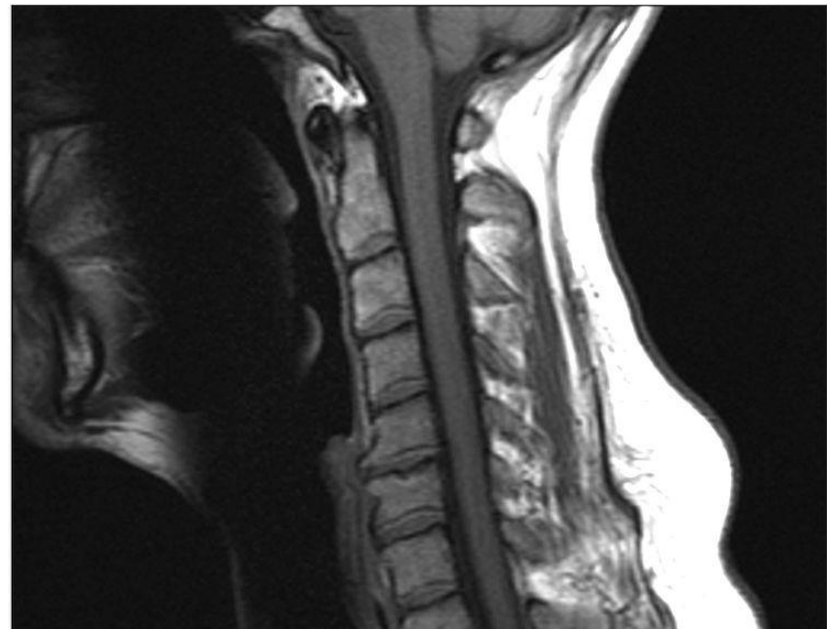
- More common in age 30-60, supraspinatus, women
- Associated with diabetes, hypothyroidism
- Calcium hydroxylapatite
- Presents similar to rotator cuff tear





# Shoulder – Don't forget C-Spine!

- Shoulder/upper extremity pain with normal joint exam
- May present with pain, tingling/numbness, strength loss
- Assess bicep/tricep/deltoid/forearm/hand strength, reflexes
- Think about dermatome map
- If any irregularities, C-spine xrays, consider MRI



# Resources

- STOP Sports Injuries:
  - <http://www.stopsportsinjuries.org/baseball-injury-prevention.aspx>
- MLB Pitchsmart:
  - <http://m.mlb.com/pitchsmart/>
- OSU throwers 10:
  - [https://osuwmcdigital.osu.edu/sitetool/sites/sportsmedicinepublic/documents/rehab\\_protocols/Throwers\\_Ten\\_Exercises\\_2010.pdf](https://osuwmcdigital.osu.edu/sitetool/sites/sportsmedicinepublic/documents/rehab_protocols/Throwers_Ten_Exercises_2010.pdf)





# Thank you!



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