Sports Medicine Symposium
Shoulder – Differential Diagnosis

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- Common acute injuries of the shoulder and elbow
- Chronic shoulder injuries in “athletes”
  - History
  - Physical exam
  - Differential diagnosis of shoulder

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Common acute injuries - Case 1

- 25 year old basketball player has him arm grabbed mid game as he's chasing a loose ball. Hears a pop as he falls to the ground. Sudden onset of pain and can't move his arm
- Arm is fixed with the shoulder at about 20 degrees of external rotation

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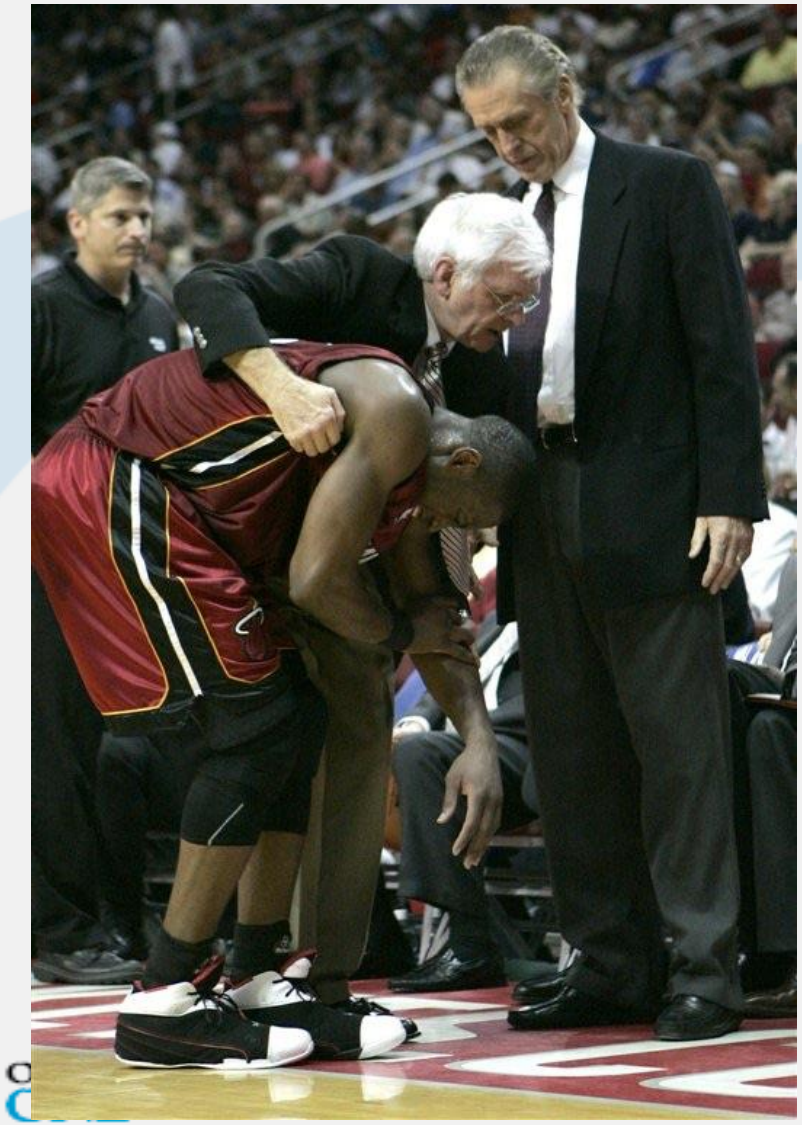
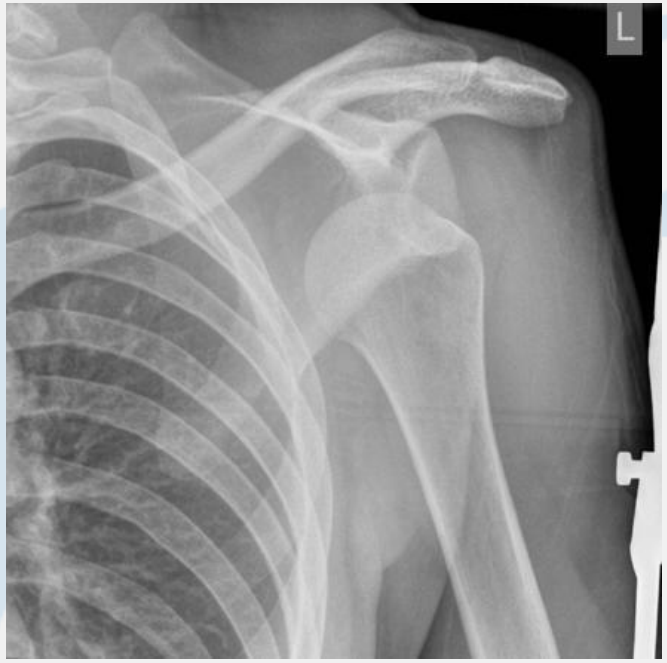
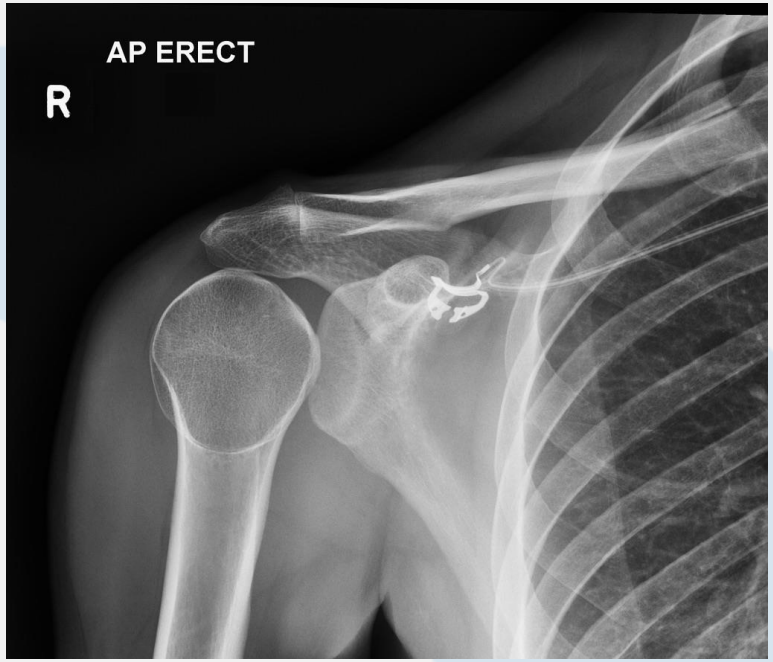
Shoulder dislocation



- Immediate exam
  - Check position of the arm
  - Inspection
    - Look for change in contour of the shoulder
  - Neurovascular exam
    - Axillary nerve
- X-ray
  - Would suggest X-ray prior to reduction
  - Evaluate for associated fracture

Immediate management - X ray





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X- ray - Axillary view

- Confirms diagnosis of dislocation
- Confirms direction of dislocation
- Aids in identifying associated fractures
- Diagnosis should not be missed with combination of a true AP, scapular Y, and an axillary view of the shoulder

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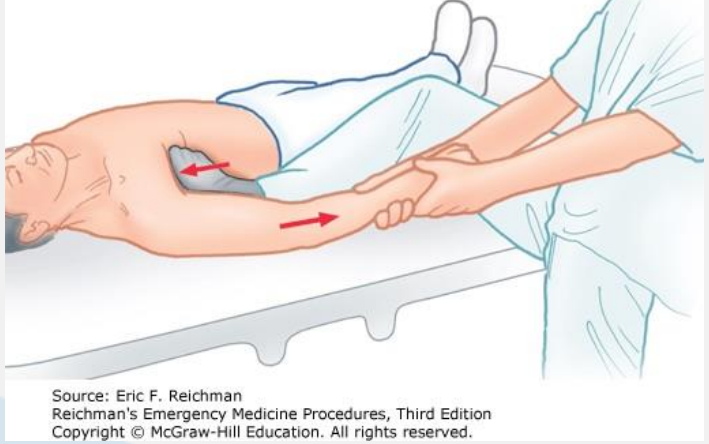
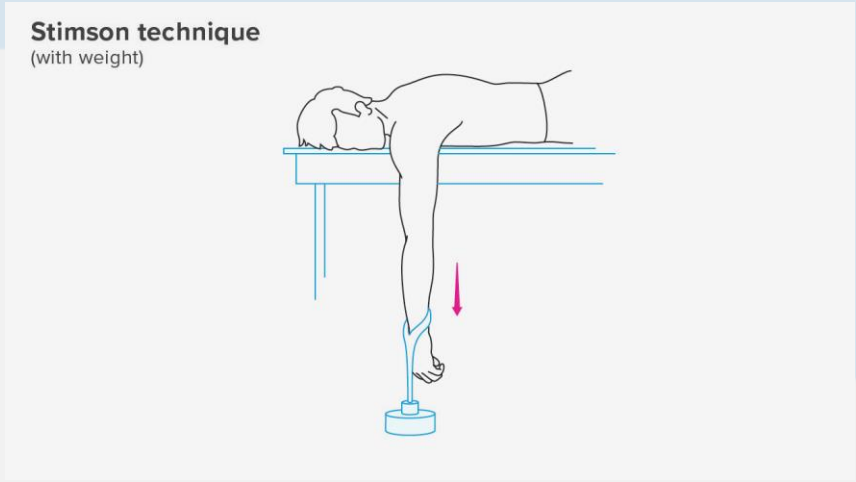
Immediate management



- Confirm diagnosis
  - r/o associated fractures
- Proceed to closed reduction
  - Local anesthetic
  - Conscious sedation
  - With adequate sedation should be fairly straightforward
- Lots of methods described



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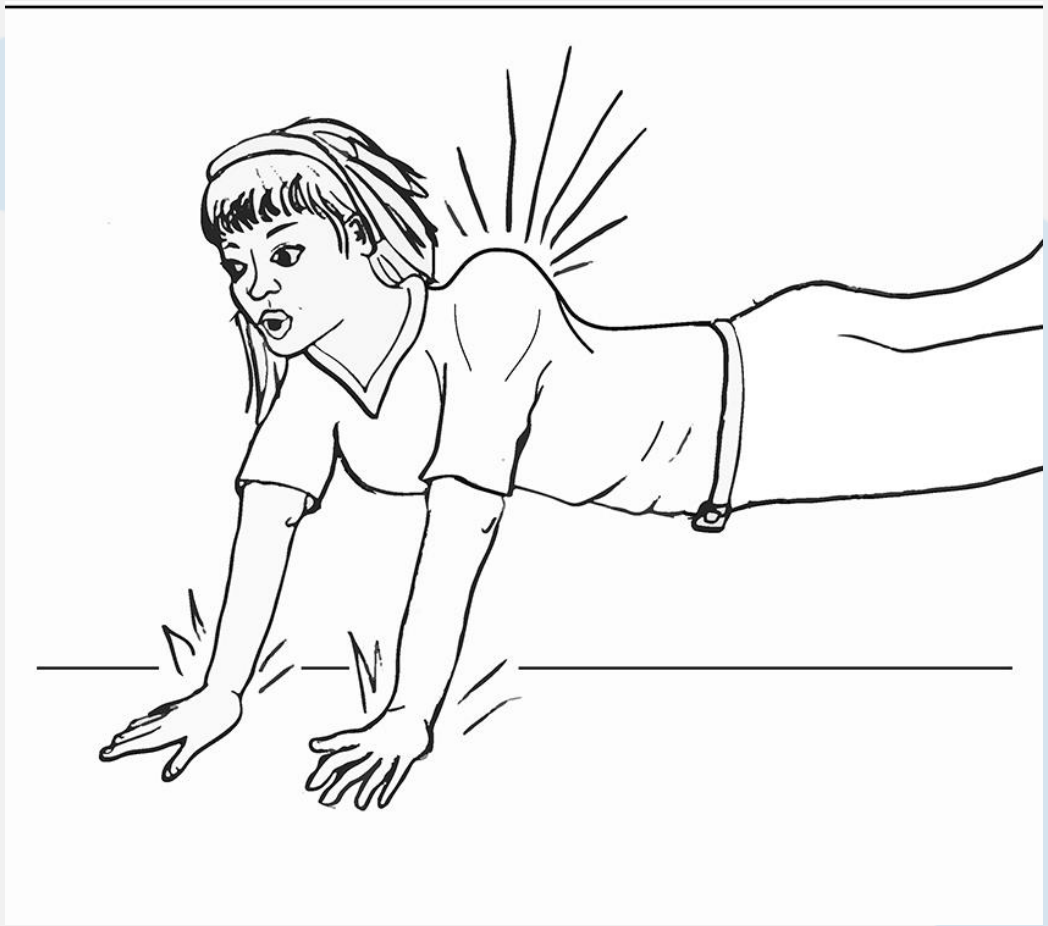
Shoulder dislocations

- Posterior
  - Associated w/ seizures
  - Athletics also though
  - Similar treatment to anterior
- Inferior
  - Luxatio erecta
  - Very rare
  - Severe soft tissue injury



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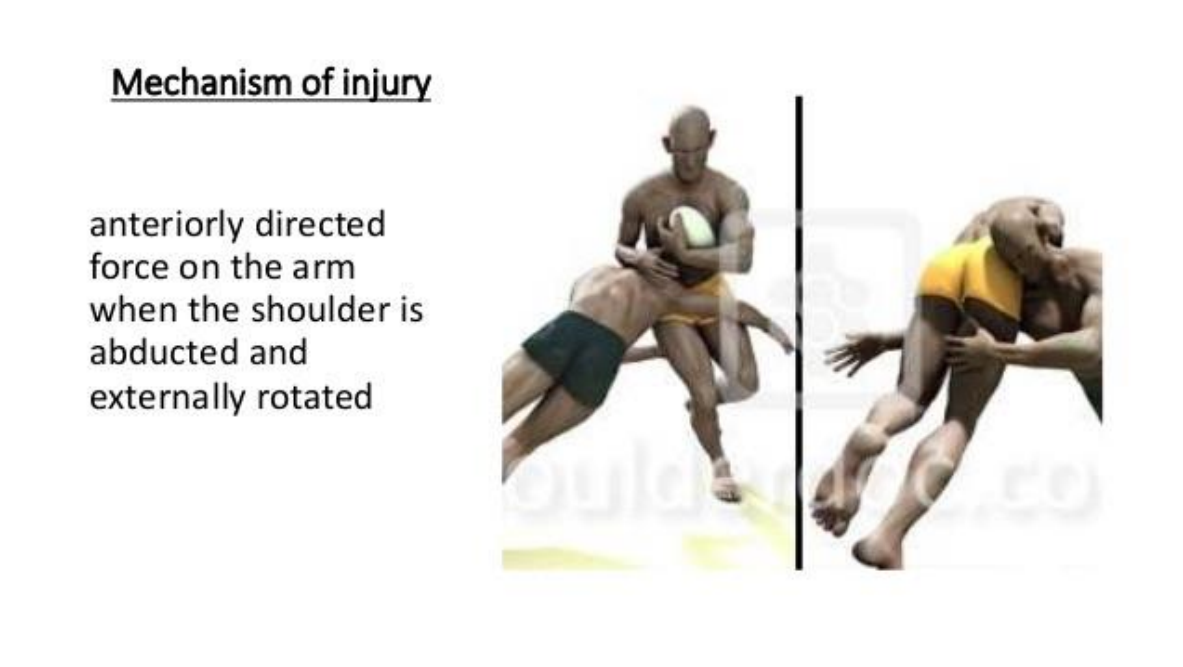
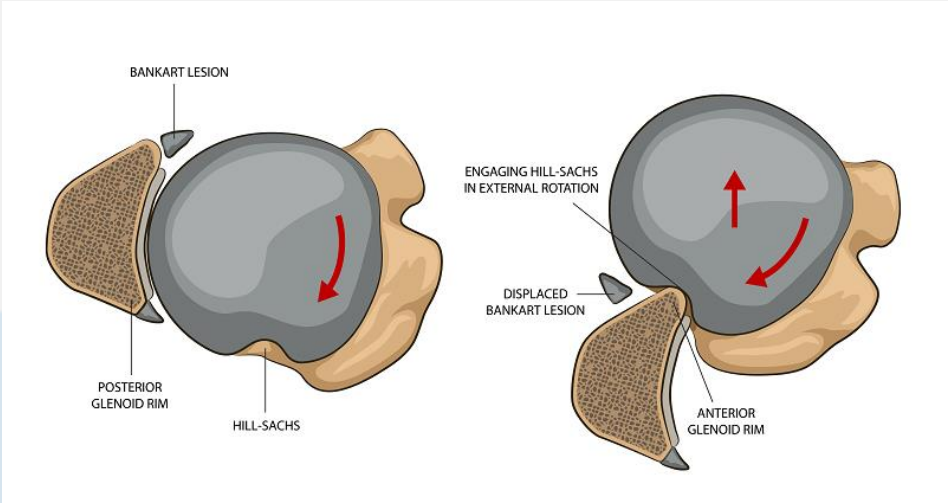
Traumatic Anterior Shoulder Dislocations

- >90% of shoulder dislocations
- Bimodal distribution
  - Age 15-30
  - Age >60
    - NV injuries
    - Rotator cuff tears
- Often sports related
  - Forced abduction/ER
    - Skiing
    - Basketball
    - Football



Associated Injuries

- Bankart lesion
  - "Essential lesion" ~95%
  - Anterior labral tear
  - Bony bankart
  - vs. HAGL lesion
- Hill Sachs lesion
  - Impaction fracture
  - Posterior humeral head
- Rotator cuff tears
  - More common in age>60



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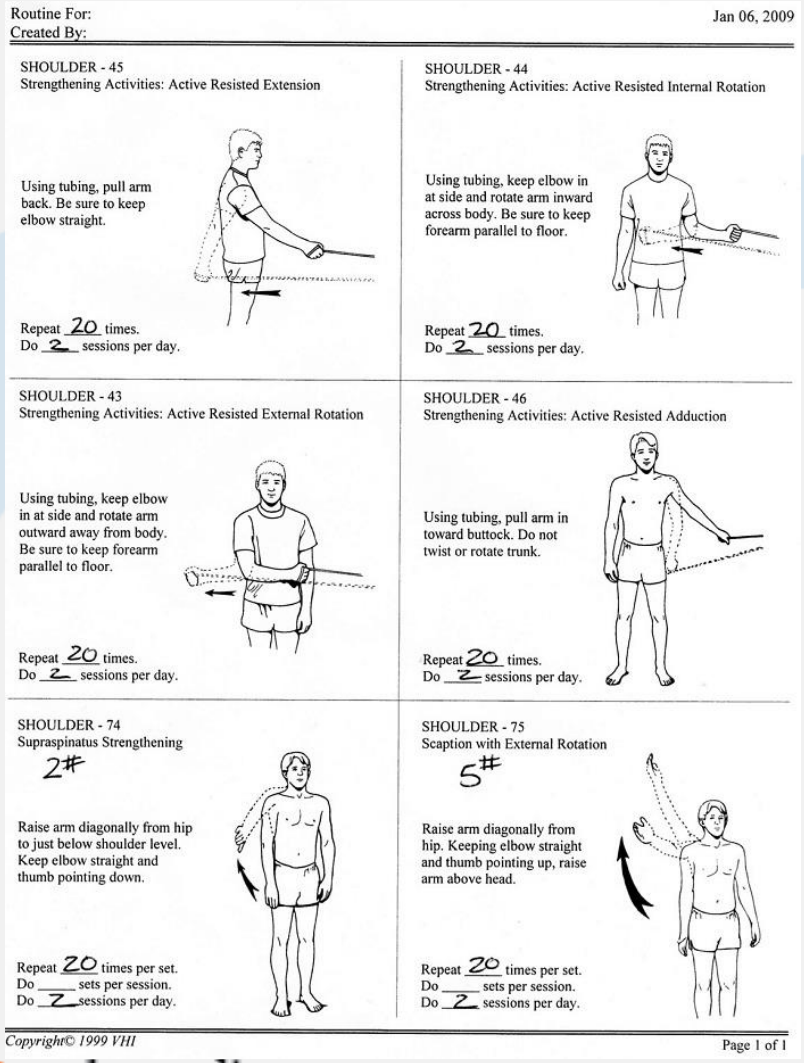
History/Physical

- History
  - How did it happen?
  - Has this happened before?
    - First time vs. recurrent
    - Prior treatment
  - Did it need reduced?
- Physical
  - ROM - limited initially
  - Strength testing
  - + apprehension

Treatment



Routine For:
Created By:

Jan 06, 2009

SHOULDER - 45
Strengthening Activities: Active Resisted Extension

Using tubing, pull arm back. Be sure to keep elbow straight.

Repeat 20 times.
Do 2 sessions per day.

SHOULDER - 44
Strengthening Activities: Active Resisted Internal Rotation

Using tubing, keep elbow in at side and rotate arm inward across body. Be sure to keep forearm parallel to floor.

Repeat 20 times.
Do 2 sessions per day.

SHOULDER - 43
Strengthening Activities: Active Resisted External Rotation

Using tubing, keep elbow in at side and rotate arm outward away from body. Be sure to keep forearm parallel to floor.

Repeat 20 times.
Do 2 sessions per day.

SHOULDER - 46
Strengthening Activities: Active Resisted Adduction

Using tubing, pull arm in toward buttock. Do not twist or rotate trunk.

Repeat 20 times.
Do 2 sessions per day.

SHOULDER - 74
Supraspinatus Strengthening
2#

Raise arm diagonally from hip to just below shoulder level. Keep elbow straight and thumb pointing down.

Repeat 20 times per set.
Do ____ sets per session.
Do 2 sessions per day.

SHOULDER - 75
Scaption with External Rotation
5#

Raise arm diagonally from hip. Keeping elbow straight and thumb pointing up, raise arm above head.

Repeat 20 times per set.
Do ____ sets per session.
Do 2 sessions per day.

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Page 1 of 1

- First time dislocation
  - Almost always nonsurgical
  - rarely operative
    - High end athletes
    - Teenagers
  - Sling x 1-3 weeks
  - Physical Therapy
    - Periscapular/RC strengthening
  - Recovery time highly variable
    - 2 weeks- 3 months
    - Return to play also variable

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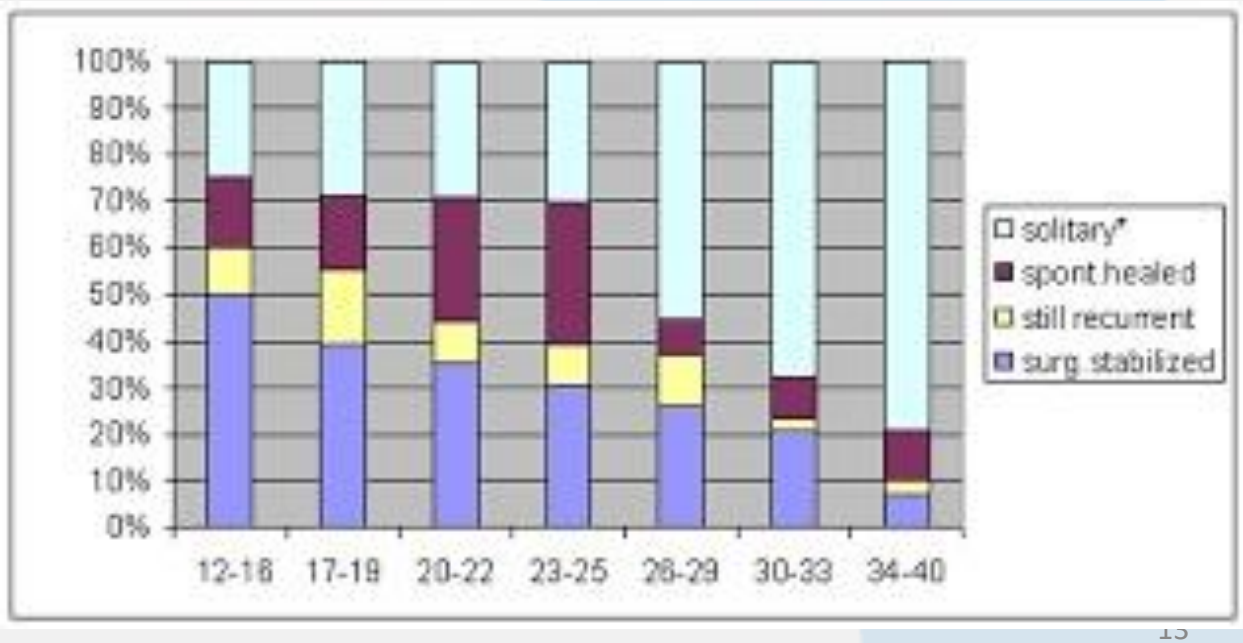
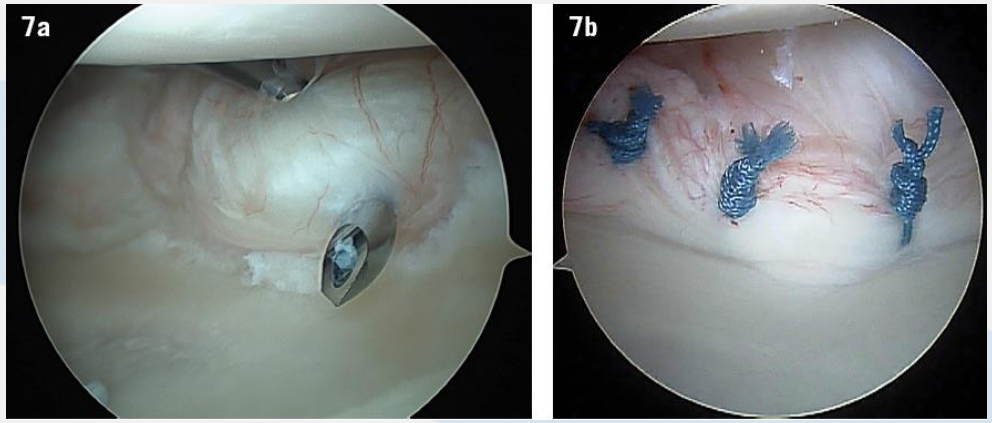
Recurrence Rate

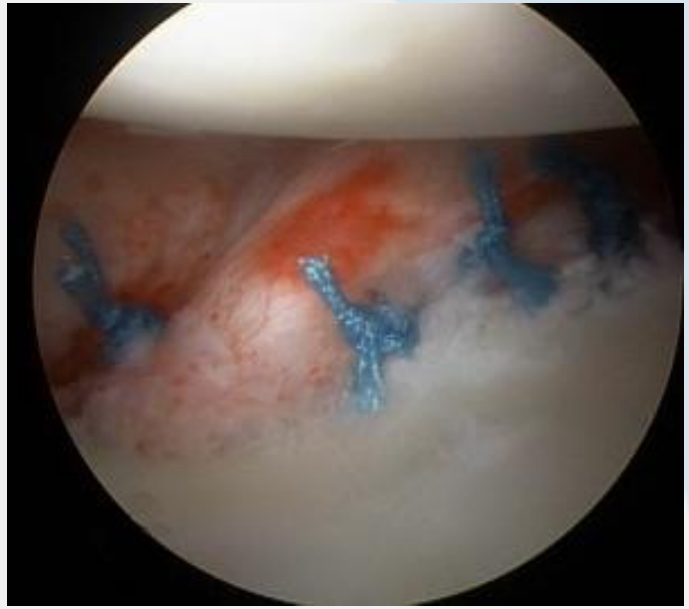
- Age
- Activity level
- Bone loss
  - Glenoid
  - Humerus
- Prior dislocations



Recurrent Instability

- Usually surgical treatment
- MRI to assess structural damage/bone loss
- Arthroscope Bankart repair most common
  - Least invasive
  - Recurrence rate ~ 13%
    - Depends on age/activity level
    - Bone loss
  - 3-6 months off sport
    - Depends on the sport
- Open Bankart repair
  - Lower recurrence, risk of stiffness
  - Contact athletes
- Latarjet
  - Severe bone loss





Case 2

- 21 yo rugby player who is tackled and lands on his shoulder.
- Immediate pain
- Can’t use arm much

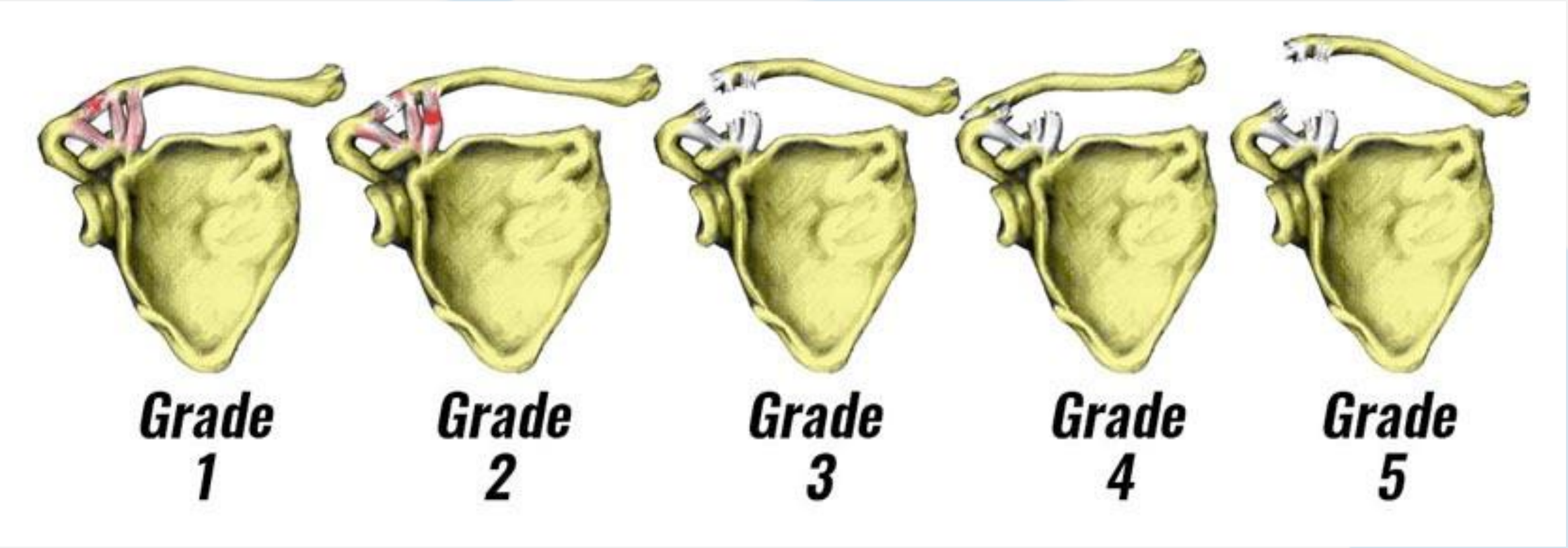
AC separation

- Caused by falling directly on the top of the shoulder
- Disruption of the acromioclavicular joint
- Varying levels of severity
- Typically younger men
- Contact sports - football, rugby, hockey

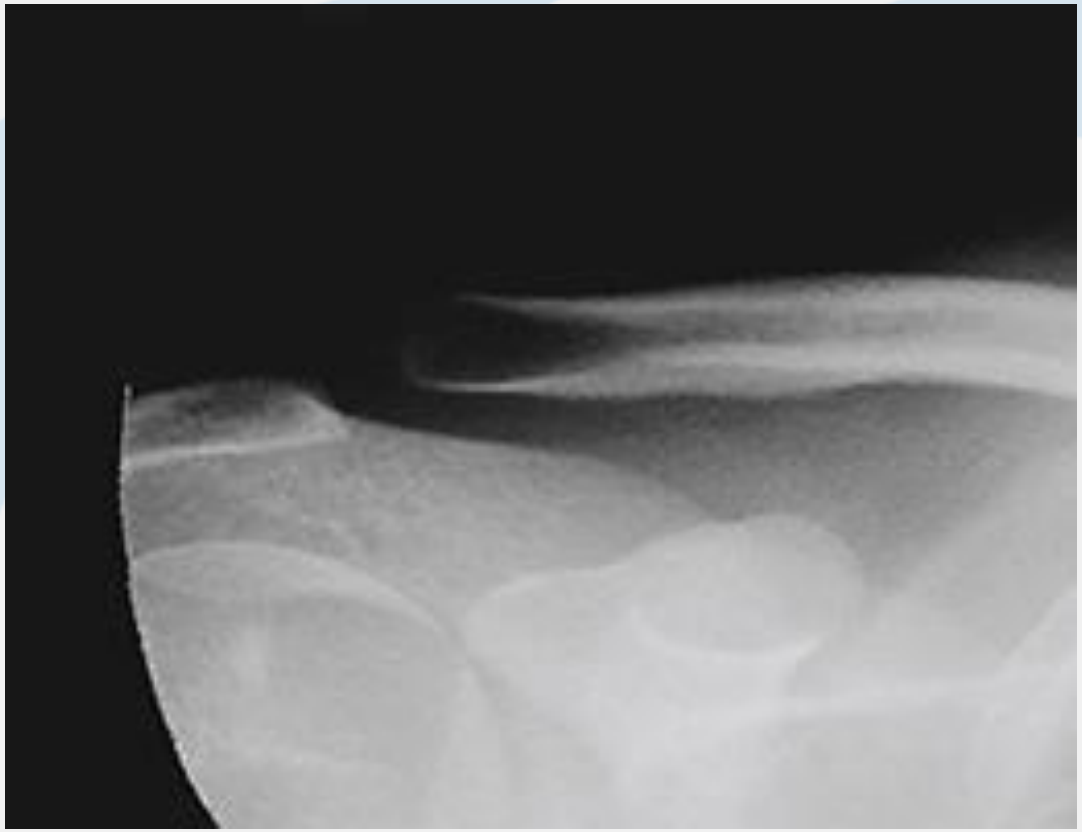
History/Physical

- History
  - Mechanism of injury
  - Location of pain
- Physical
  - AC deformity
  - Decreased ROM
  - Pain with adduction, IR
  - Pain behind back
- X-ray
  - R/o fracture
  - Check severity
- Further imaging rarely necessary

Classification



Radiographs



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Radiographs

GRADE 5

Treatment

- Varies by surgeon
- Grade 1
  - Non op
  - Sling for several days
  - Use arm once comfortable
  - About 2 weeks to recover
  - Xray normal, dx based on physical exam
    - Traumatic event
    - Pain at AC joint

- Grade 2
  - Non op
  - Sling for several days
  - Use arm once comfortable
  - About 6 weeks to recover
  - PT if necessary, but most don't need it

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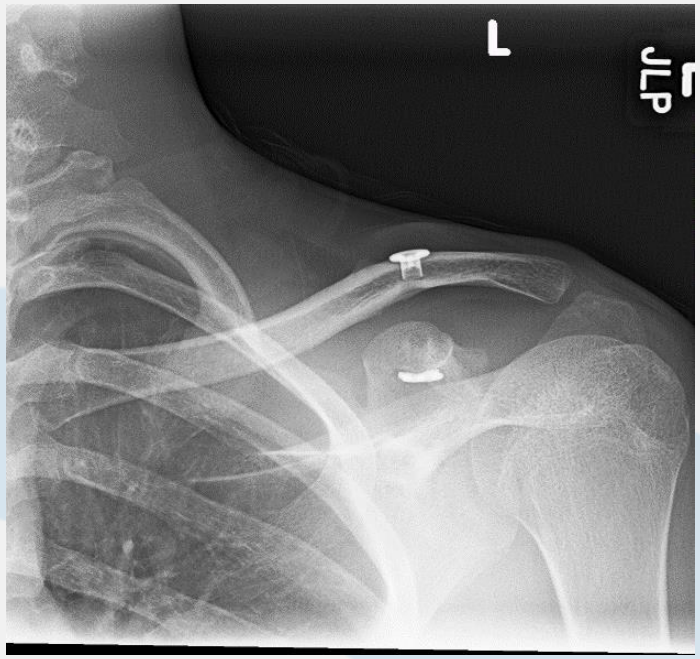
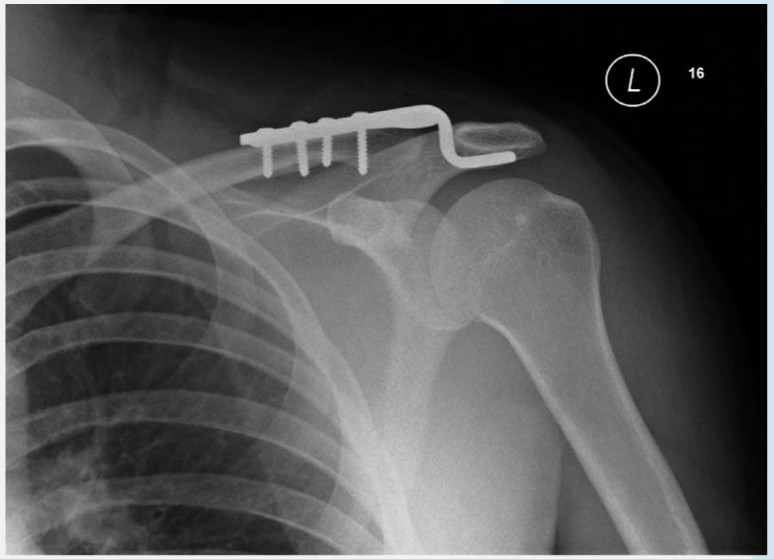
Treatment

- Grade III
  - Somewhat controversial
  - Nonsurgical for me
  - Will have clear deformity, but most will recover excellent function
  - Can make an argument to fix in the dominant arm in overhead athletes
  - Some will choose surgery due to cosmesis
- Sling for about a week
- PT for most
- Will typically take about 3 months to recover

Treatment

- Grades 4-6
  - Fairly rare
  - Surgery recommended
  - Recovery is several months with lots of rehab
  - Goal of procedure is to reduce the AC joint and hold it in place with fixation
    - Many options for this





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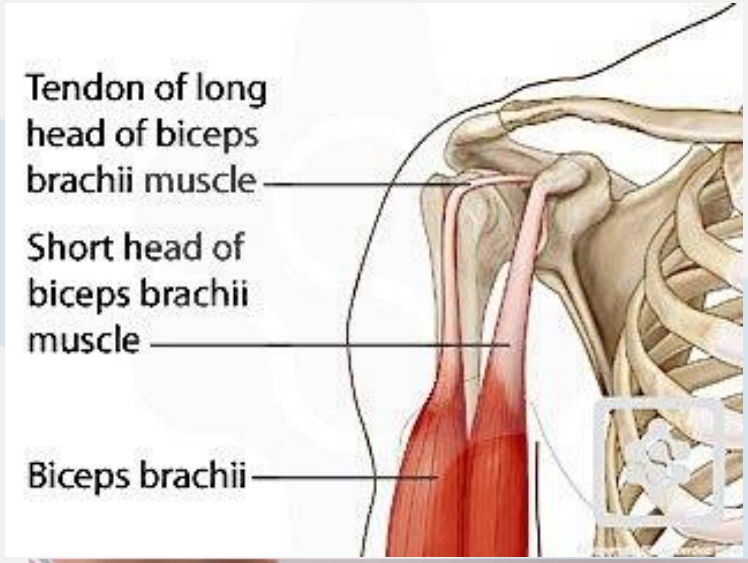
Acute bicep tear - Distal vs. proximal

- Proximal biceps rupture
  - Usually older - age > 60
  - Describe hearing a “pop”
  - Bruising within a couple days
  - Arm “looks different”
    - Popeye sign
  - Can be atraumatic or while lifting something

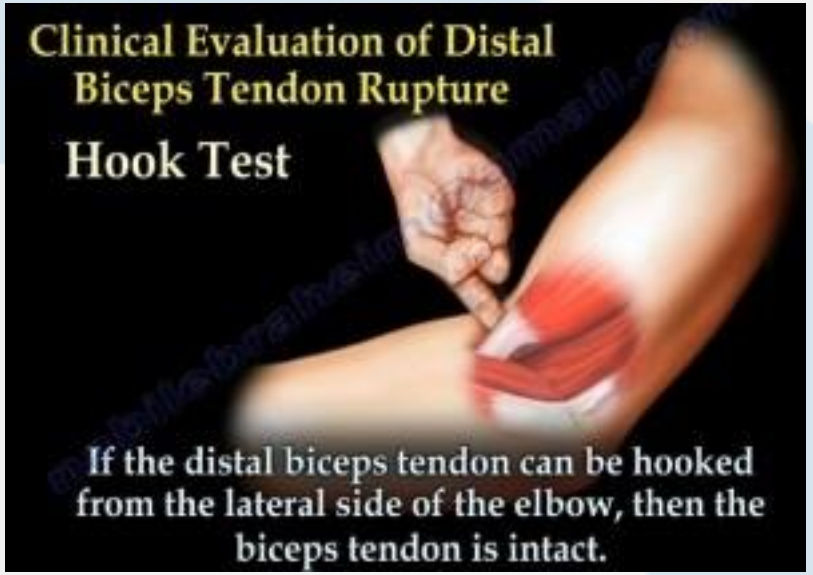


Acute bicep tear - Distal vs. Proximal

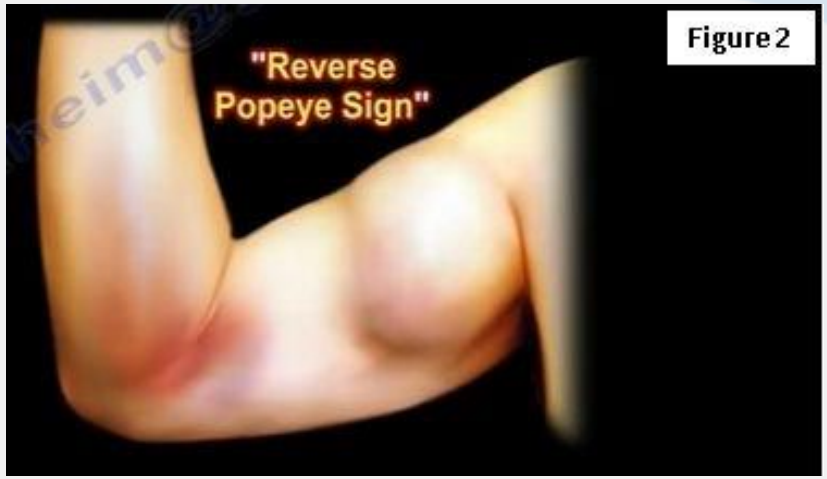
- Distal bicep rupture
  - Almost always men
  - Age typically 35-60
  - Lifting something heavy
  - Feel a pop
  - May or may not have a deformity

How to tell the difference?

- Age - distal rupture younger
- Mechanism - atraumatic will be proximal, lifting can be either
- Pain more at shoulder or elbow, where did it feel like the pop was at?
  - Both will say the bicep hurts
- Physical exam
  - Contour of the arm
  - Hook test



How to tell the difference?



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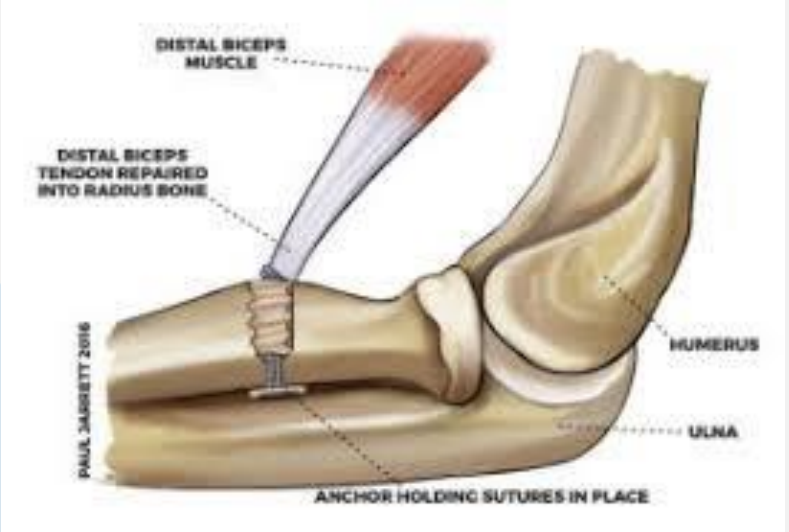
Treatment

- Proximal rupture
  - Clinical diagnosis, rarely need more imaging
  - Almost always nonsurgical
  - Minimal functional limitations
  - Cosmetic deformity
  - Usually symptoms gone within a few weeks
  - Surgery
    - Cosmetic concerns
    - ? mechanics

- Distal rupture
  - I usually get an MRI
  - Surgical Treatment in most cases
  - If nonoperative
    - 40% weakness supination
    - 30% weakness flexion
    - Usually not painful
    - Older patients
  - Much easier if surgery done within 2-3 weeks
    - Don’t wait on these

Distal Bicep repair

- Indicated in most cases
- ~3 month recovery
- Splint for ~ 2 weeks
- Then start ROM
- Therapy
- Unrestricted lifting at 3 months
- Risks
  - Neuro injury most common risk
  - Heterotopic ossification
  - Rerupture



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Evaluation of the aging athlete

- Can be a very challenging area to evaluate
- History and Physical critical
- Exam is nonspecific
- Lots of different tests, and they all seem to hurt on everybody

Differential Diagnosis

- Rotator cuff disease
  - RCT
  - Impingement/tendonitis / bursitis
- Frozen shoulder
- Glenohumeral arthritis
- Biceps tendonitis/tear
- SLAP tear
- AC joint DJD
- Shoulder Instability
- Cervical spine
  - DJD
  - Radiculopathy
- Brachial neuritis
- Scapular winging
- Calcific tendonitis
- Septic shoulder
- AVN
- Thoracic Outlet syndrome
- And many more

History

Age
- Rotator cuff disease >50
- Frozen shoulder ~40-60
- Osteoarthritis – typically >60
- Instability/SLAP tear < 40

•Location of pain
- Lateral shoulder referred down lateral arm – Most typical
- Biceps
- Anterior
- Posterior pain/trap/periscapular
  - Almost definitely from the neck

History

- Right/left handed
- Night pain
  - Good judge of severity
- Acuity
  - Acute
    - Fracture
    - Dislocation
    - Rotator cuff tear
  - Chronic
    - Rotator cuff disease
    - Biceps tendonitis
    - Osteoarthritis

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History

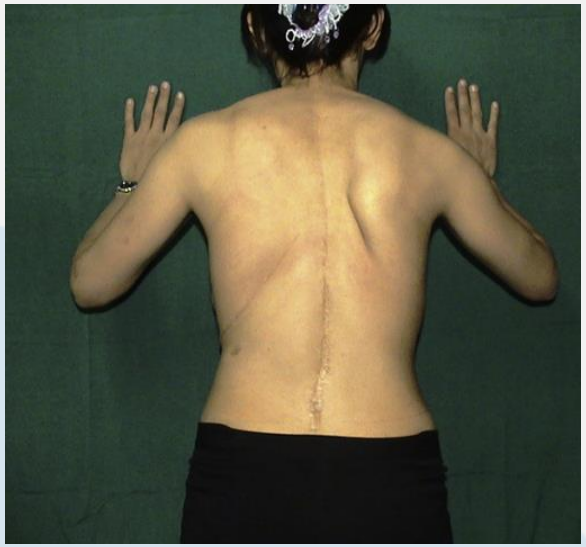
- Stiffness/decreased ROM
  - Frozen shoulder vs. DJD
- Weakness
  - Particularly overhead
- Prior instability
- Aggravating factors
  - Throwing
  - Overhead work
- Numbness/paresthesia
  - Start thinking C-spine
- Neck pain

Physical Exam

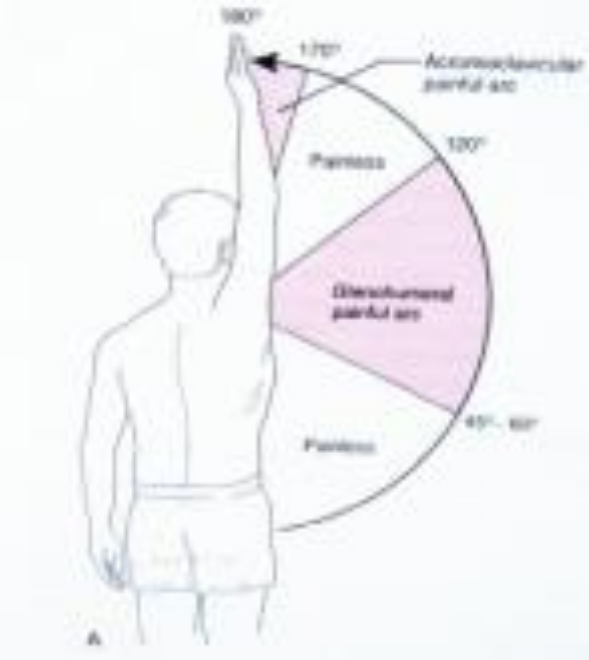
- Inspection
  - Atrophy
    - Supra/infraspinatus
      - RCT
      - Spinoglenoid cyst
      - SSN
    - Deltoid
    - Trapezius

Physical Exam

- Inspection
  - Scapular winging
    - Medial
      - Long thoracic
      - More common
    - Lateral
      - Spinal accessory
      - Complication of neck surgery



Physical Exam - ROM



- Check FF, ER at 90, ER at side, IR
- Passive loss of motion
  - Frozen shoulder
  - DJD
- Active loss only
  - Muscle weakness – RCT
  - Pseudoparalysis
- Painful arc/shrug sign

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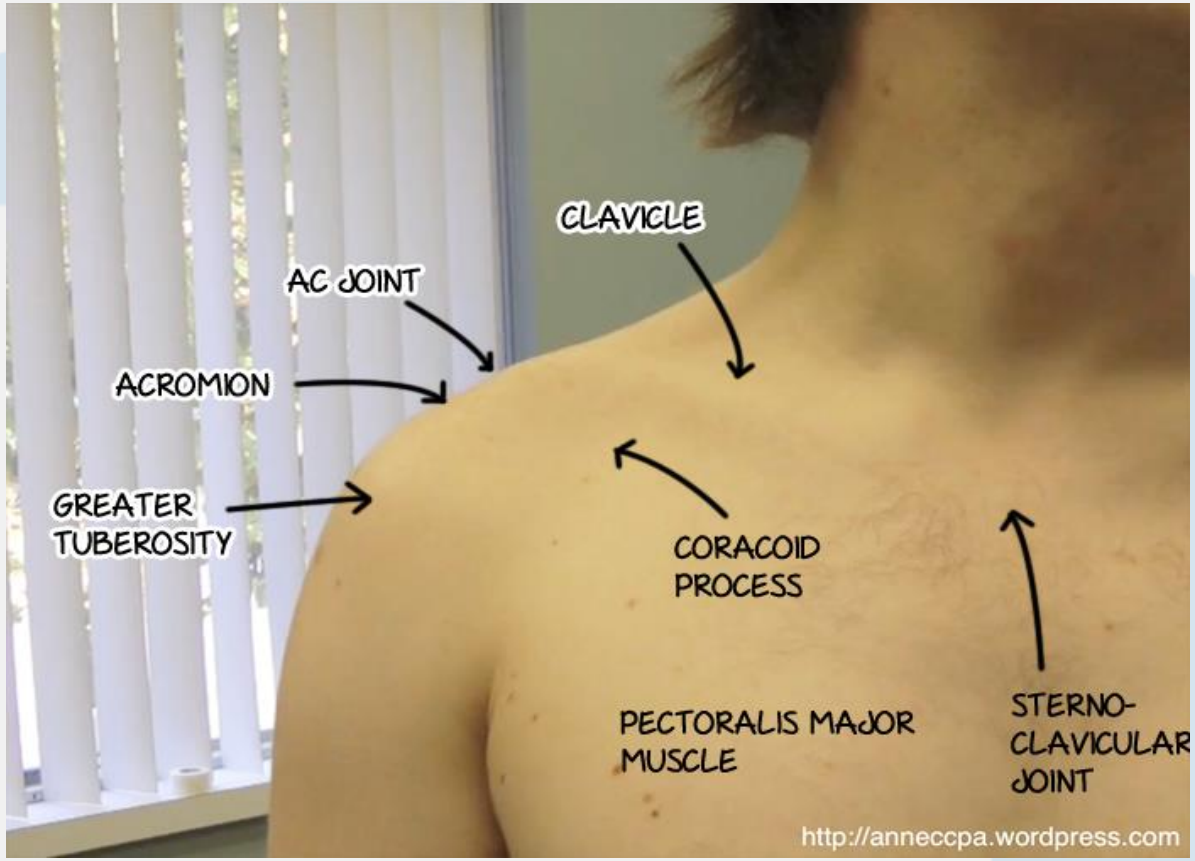
Physical Exam - Instability

- Apprehension test
  - Anterior
  - Posterior
- Sulcus sign
  - Multidirectional
- Many others

Physical Exam - Palpation

- Greater tuberosity
- AC joint
- Biceps
- Anterior joint line
- Trapezius



Physical Exam - Strength

- Rotator cuff
  - Abduction
  - ER
    - infraspinatus
  - IR
    - subscap/biceps
  - Supraspinatus
    - Empty can
- Lag signs
  - Drop arm
  - ER lag
  - Lift off lag/belly press

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Provocative Tests

Provocative maneuver	Technique	Result
Spurling maneuver	One hand is placed on top of the patient's head while stabilizing the shoulders. The neck is hyperextended and the head gently tilted towards the symptomatic site.	Pain with this maneuver may indicate cervical spine radiculopathy.
Hawkins test	The patient is seated with the shoulder in 90° of forward flexion and neutral adduction/abduction. The elbow is flexed to 90° and the examiner supports the arm as the shoulder is brought into internal rotation.	Pain with this maneuver indicates possible rotator cuff impingement.
Neer test	The examiner maximally forward flexes the shoulder with the patient's elbow in full extension and the shoulder in maximal internal rotation.	Pain indicates shoulder impingement, especially with the arm in internal rotation versus external rotation.
Speed test	With the elbow in full extension, the shoulder is forward flexed against resistance. The forearm should be in full supination.	Pain with this maneuver may indicate superior labrum from anterior to posterior (SLAP) tear
O'Brien test	The patient's shoulder is forward flexed to 90° and adducted to 45°. The shoulder is then maximally internally rotated with the elbow in full extension. The patient is asked to elevate the arm as the examiner provides downward resistance, and with the thumb/palm in a downward position.	If the thumb down/palm down position elicits more pain than with upward palm, this indicates a potential SLAP lesion.
Yergason test	With the patient's arm at the side and elbow flexed to 90°, the examiner resists supination of the patients forearm.	Pain with this maneuver may indicate proximal biceps tendon pathology.
Apprehension test	The patient lies supine on the examination table. The arm is abducted to 90° and externally rotated.	A feeling of apprehension due to a subjective sensation of instability by the patient signifies a positive test. Pain alone is not a positive test.
Relocation test	If the patient has a positive apprehension test, the examiner places a posteriorly directed force on the humeral head.	If the sense of apprehension is relieved, this a positive test and further supports the diagnosis of anterior instability.
Kim test	The patient is seated with arm in 90° of abduction. The arm is passively elevated to 100°-125° of forward flexion and the examiner applies an axial load to the elbow while a posteroinferior force is applied to the upper arm.	Pain and posterior subluxation signify a positive test.

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Shoulder vs. Cervical spine

- "Shoulder pain" is often neck pain
- Where does it hurt?
  - Shoulder – proximal lateral arm
  - Neck
    - Trapezius
    - Periscapular
    - Posterior shoulder
- Radicular symptoms
  - Numbness or tingling
  - Pain beyond the elbow

Shoulder vs. Cervical spine

- C-spine
  - Relatively pain free shoulder ROM
  - Tender over the trapezius
  - Limited neck ROM
  - Symptoms reproduced with Spurling's test
- Often difficult to determine
  - Consider diagnostic injection

Rotator Cuff Disease

- Very common
  - Up to 10% at age 50 with partial RCT or worse
  - About 50% at age 70
- Range from bursitis to rotator cuff tears
- History
  - Usually >50 yo
    - Increasing frequency with age
  - Night pain
  - Hurts proximal lateral shoulder down lateral arm
  - Usually atraumatic – gradually worsens with time
  - Difficulty with overhead activities

Impingement/bursitis/tendonopathy

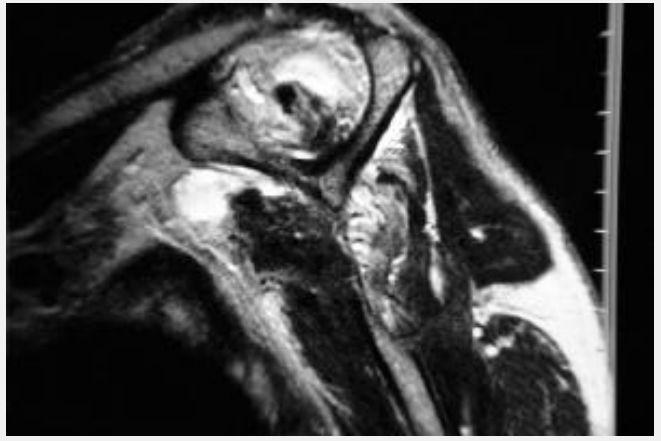
- Exam
  - Full AROM/PROM
  - Full strength
    - Might have pain with giving way
  - + impingement tests
    - Neer
    - Hawkins
    - Tender over greater tuberosity
- XR
  - Look for subchondral cysts at greater tuberosity
  - Acromial morphology

Rotator Cuff Tear

- Supra/infraspinatus
  - Weakness abd/ER
- Subscap
  - Weakness in IR
  - Belly press
  - Lift off lag
- Night pain
- Painful arc
- Shrug sign

Diagnosis

- Typically made by MRI
  - Partial vs. Full thickness tears
  - Size of tear
    - small, medium, large, massive
  - Atrophy
  - Retraction



Rotator Cuff Disease - Treatment

- My treatment algorithm
  - If normal strength, no night pain, +impingement signs
    - Injection, PT, NSAID's
    - If these fail after ~ 3 mths, MRI
  - Age < 60, weakness in abduction/ER
    - Typically MRI, if RCT, move toward surgery fairly aggressively
  - Age > 70, weakness, no trauma
    - Trying to avoid surgery
    - Cortisone, PT
    - If fail, MRI
  - Age 60-70
    - Depends on physiology and patient preference

Rotator Cuff Repair

- Surgery has high success rate (>90%)
  - Patient selection important
  - Best healing rates in younger patients and smaller tears
- Long painful recovery
  - 4-6 wks in sling
  - 3-4 months PT
  - Full recovery up to 12-15 months

Frozen Shoulder

- Global loss of motion
  - Both passive and active
  - Normally idiopathic
- History
  - Age 40-60
  - More common in women
  - Diabetics
  - Typically gradual onset
  - Can be very painful
  - Putting on a coat
  - Reaching to back seat
  - Typically proximal lateral shoulder pain

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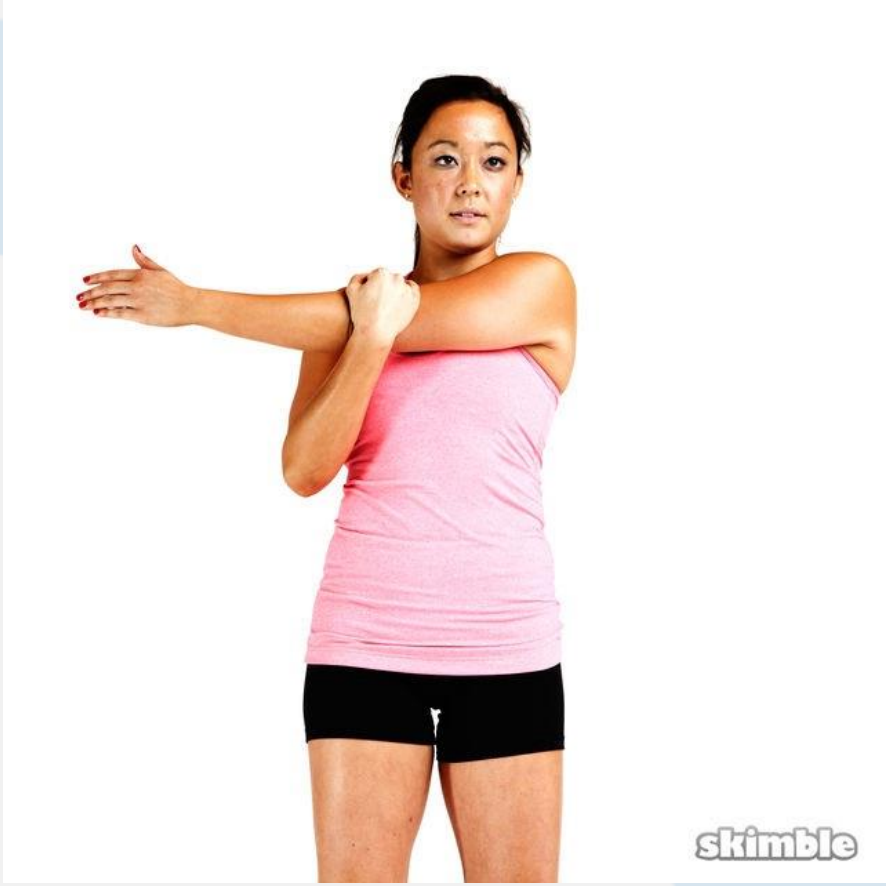
Frozen shoulder

- Diagnosis made on exam
  - Globally diminished ROM
    - Only this and DJD will do this
    - >60 yo start thinking arthritis
  - Shrug sign
  - Normal strength
    - ROM is the problem
  - Severe pain at extremes of motion
- X-ray – normal
- MRI
  - They'll want one, but don't need

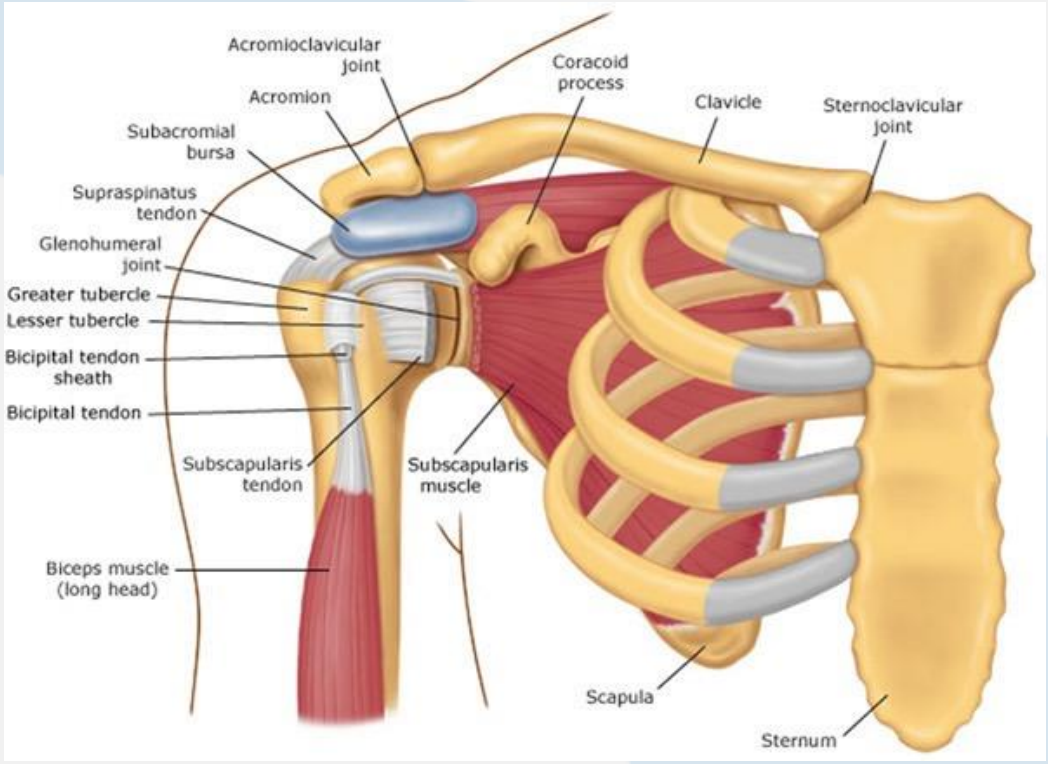
Frozen shoulder - treatment

- Physical therapy
  - Can't get better without it
  - Passive/active ROM, no strengthening
  - Vast majority will improve
- Pain control
- If fails, manipulation under anesthesia - more therapy



Biceps tendonitis/SLAP tear

- Age< 40
  - Common cause of shoulder pain
  - Throwing athletes
    - Overuse syndrome
- Age > 40
  - Degenerative change
  - Associated w/ RC disease
  - Atraumatic
- Pain anterior
  - Can refer into biceps muscle



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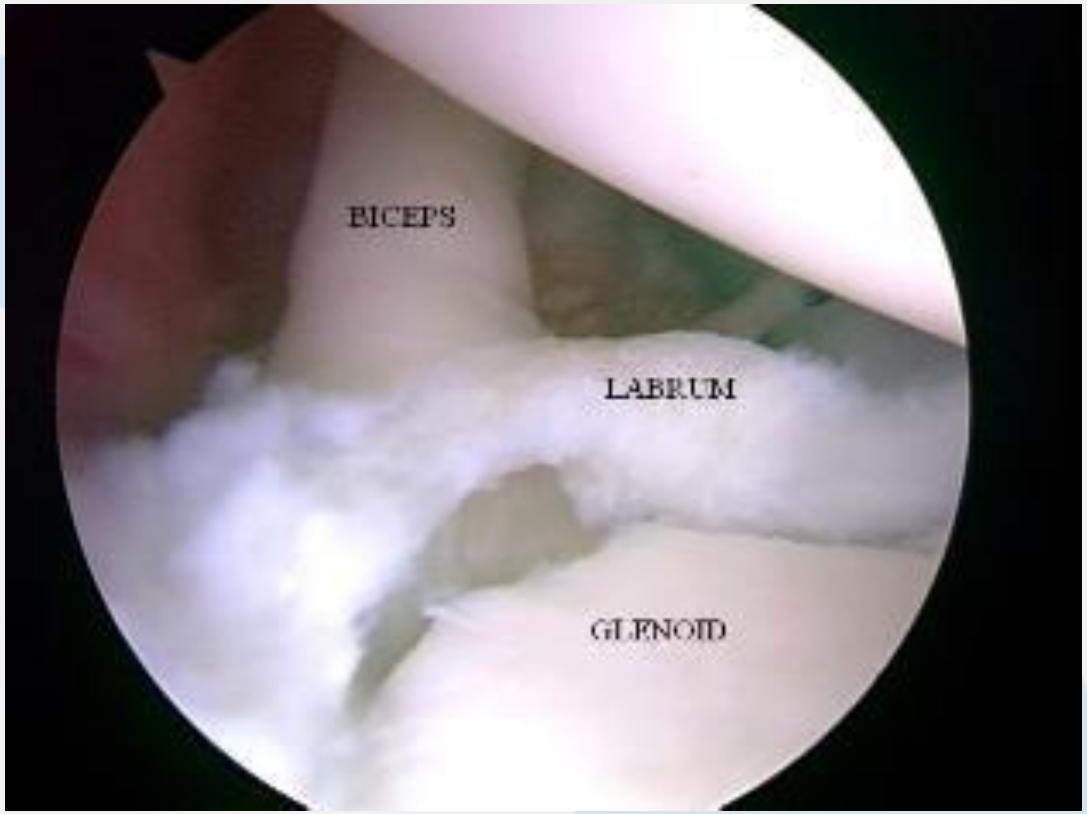
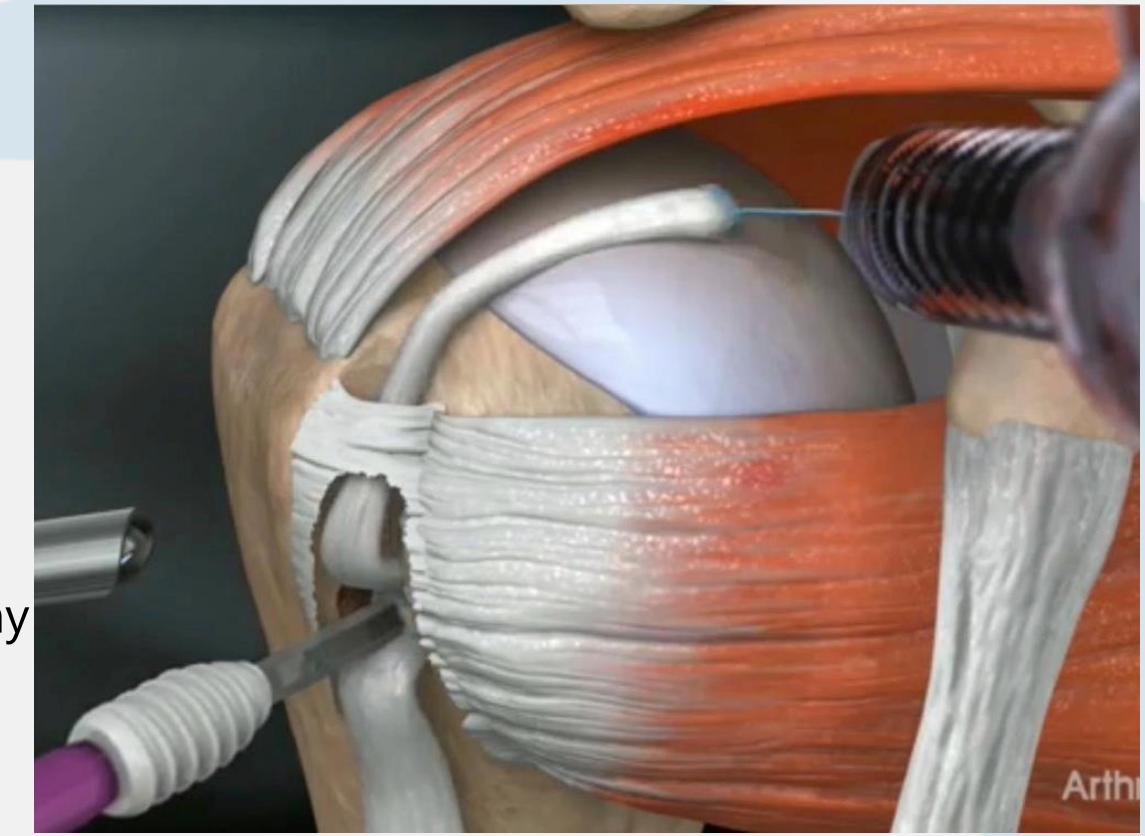
Biceps tendonitis/SLAP tear

- Exam difficult
- Tender over anterior shoulder/bicipital groove
- Pain with apprehension test
- O'brien's test
  - Worse in pronation
- Speed's/Yergasons
- XR – normal
- MRI – SLAP tears very common on MRI
  - Pathologic in younger patients
  - Common finding if > 50 yo
  - Biceps subluxation/dislocation a bigger issue



Biceps - treatment

- Tendonitis
  - Anti-inflammatories
  - PT
- SLAP tear
  - Rehab
  - Cortisone
  - Surgery
    - Age <25 - SLAP repair
    - >30 Biceps tenodesis/tenotomy
- Biceps subluxation/dislocation
  - Most likely to be surgical
  - Biceps tenodesis



AC joint pain

- Will localize pain directly at AC joint
- In younger patients will often be isolated problem
  - Osteolysis distal clavicle
  - Weightlifters
- When older associated with RC disease
- Exam
  - Crossed arm adduction
  - Pain w/ forced IR
  - Hawkin's test
- X-ray – May see bone spurs/joint narrowing at AC joint

AC joint pain

- Treatment
  - AC injection
  - PT
  - Surgery
    - Distal clavicle excision

Thank You!!!

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