Don't Shoulder the Burden: Demystifying Physical Exam of the Shoulder

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DISCLOSURES

I have no personal or financial interests to declare.

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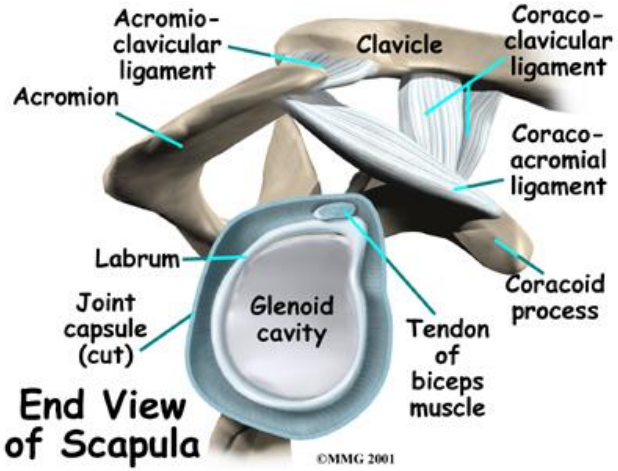
SLAP Tears

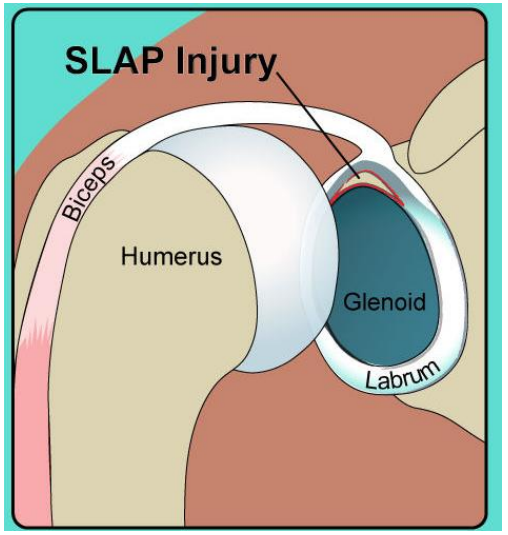
SLAP = "superior labrum anterior to posterior"

- *(tear of the superior labrum)*

Anatomy review

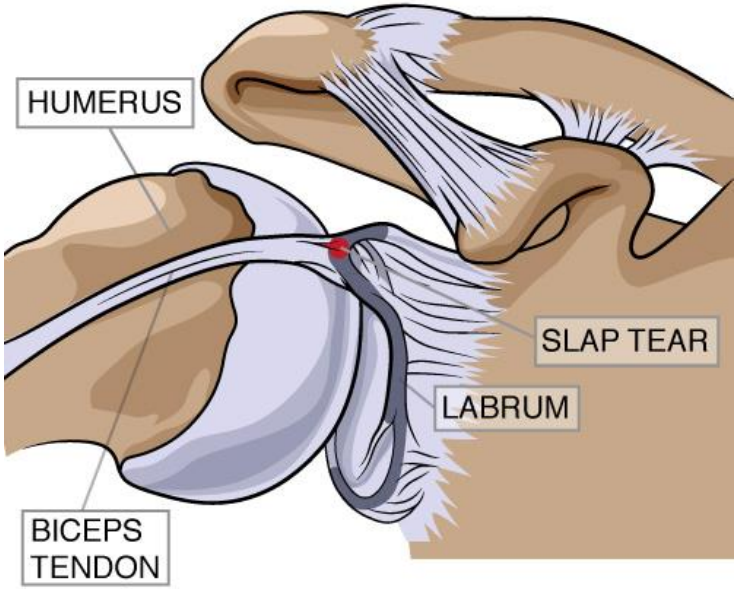
- *labrum like a "bumper" anteriorly & posteriorly*
- ***superior labrum is the anchor for the biceps tendon***





SLAP Tears

- *SLAP tear: a disruption of the biceps tendon anchor*



SLAP Tears

Two Mechanisms of Injury

1. ***traumatic*** *(acute injury)*
   - *from fall with arm outstretched*
   - *catching oneself from falling (traction injury)*

2. ***degenerative*** *(overuse)*
   - *repetitive throwing ("peelback" mechanism)*

SLAP Tears

- *Anterior pain*
  - *worse with overhead motion or throwing*
- *TTP in the bicipital groove*
- *pain/weakness with arm & forearm flexion*

SLAP Tears

1. *Special Test:* **Speed's Test**

A. Speed's test:
To perform the "Speed's" test, the patient forward flexes the shoulder about 30 degrees against the clinician's resistance while keeping the elbow fully extended and the arm fully supinated.

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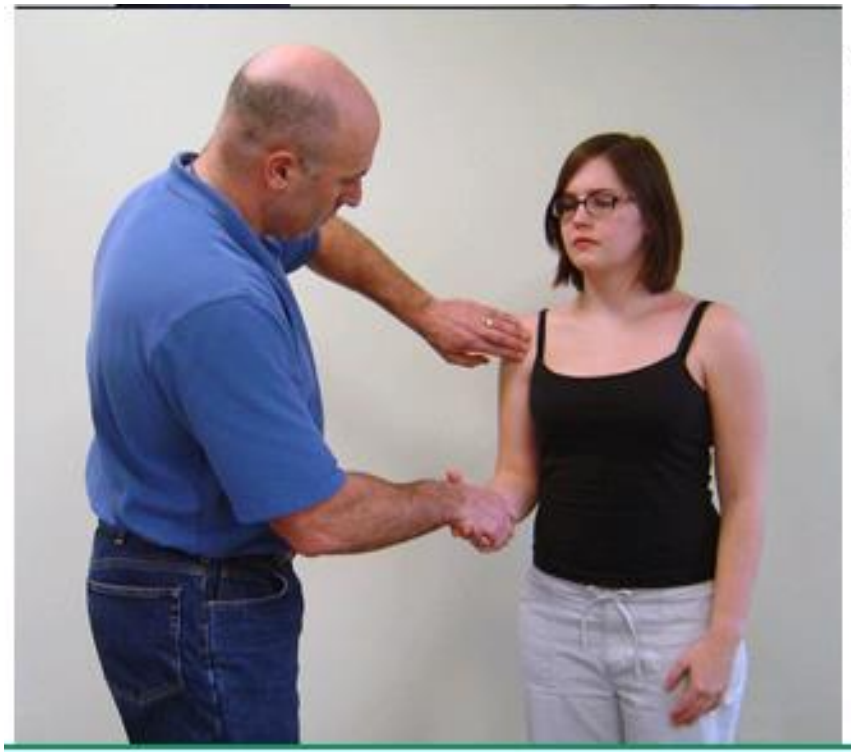
SLAP Tears

2. *Special Test:* **Yergason's Test**



B. Yergason's test:
To perform the "Yergason's" test, the patient holds her arm adducted with the elbow flexed to 90 degrees and the arm fully pronated. While they hold hands, the patient attempts to supinate while the examiner resists.

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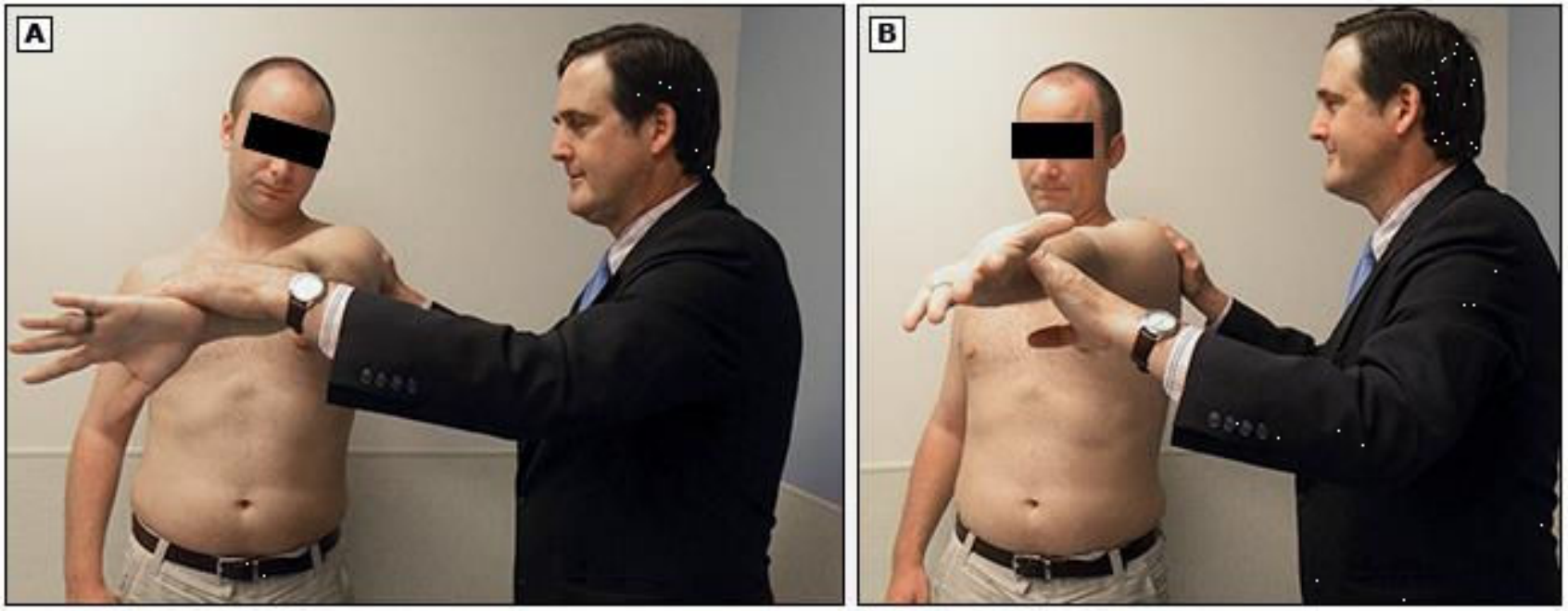
SLAP Tears

3. *Special Test:* **O'Brien's Test**



The active compression test is used to help diagnose SLAP lesions of the shoulder labrum. It is performed first with the patient's thumb pointed down (image A) and then with the thumb up (image B).

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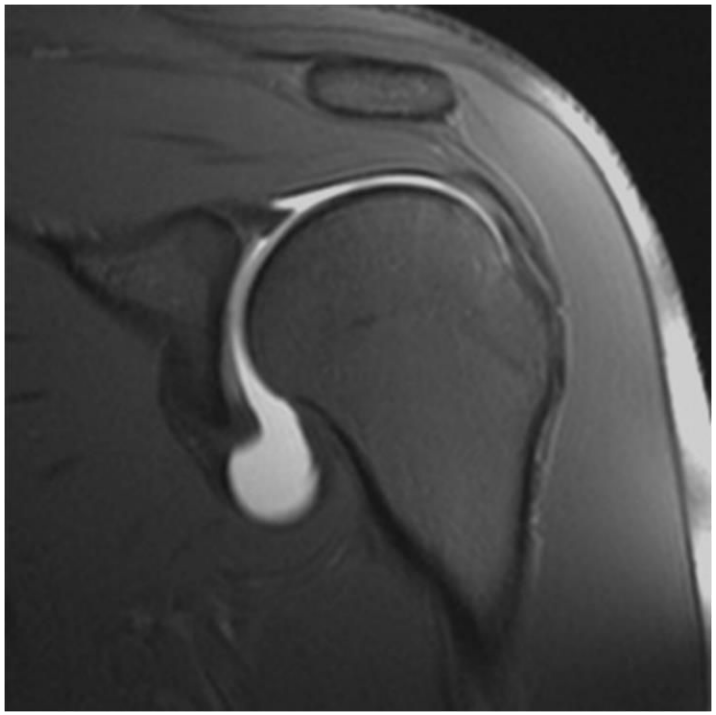
SLAP Tears



Normal

SLAP Tear, grade II

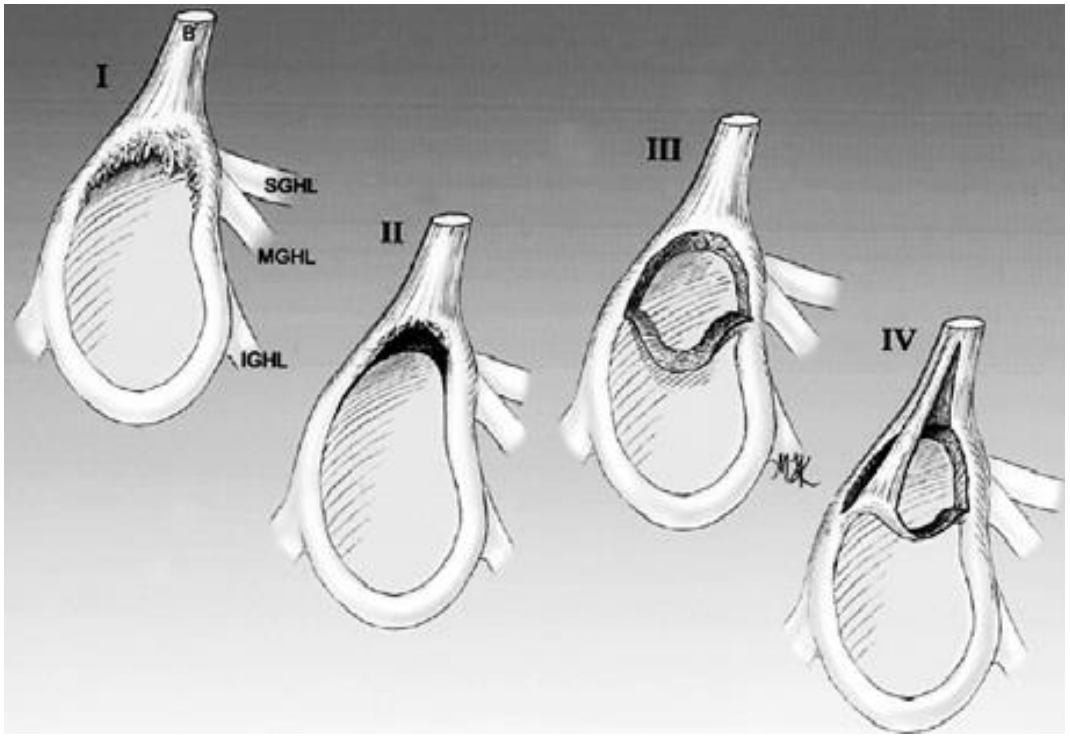
SLAP Tears

Normal

SLAP Tear, grade II

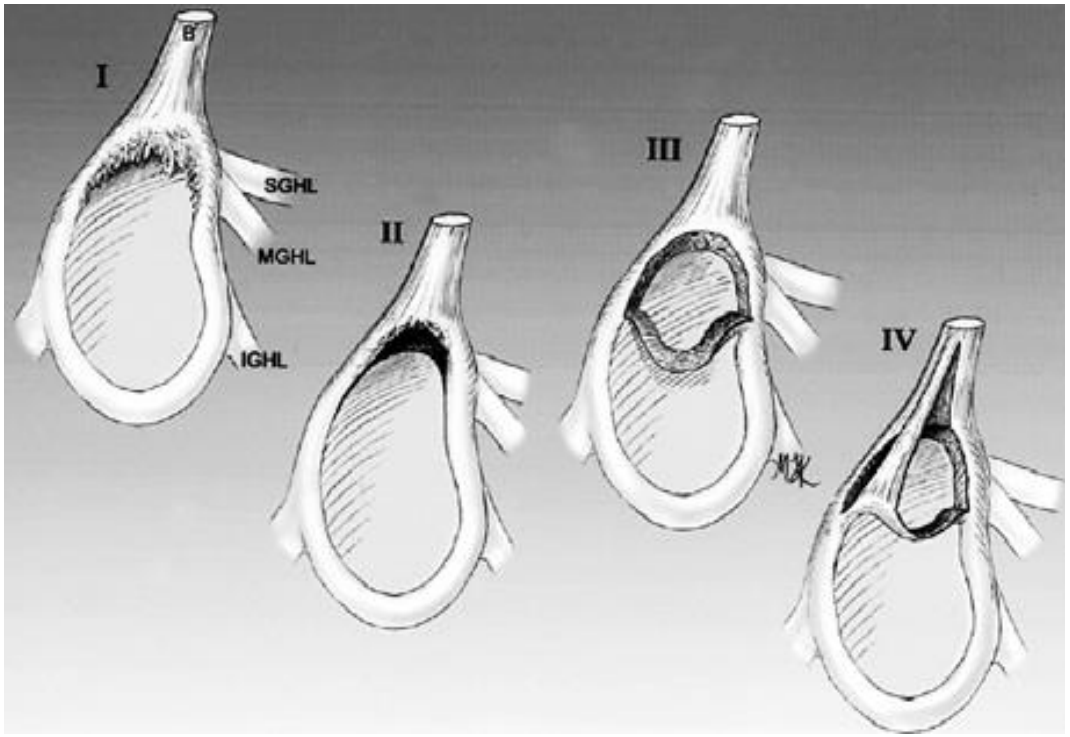
SLAP Tears

Classification
Type I: *fraying of the labrum near biceps insertion*
Type II: *avulsion/detachment of superior labrum & biceps anchor*
Type III : *bucket-handle tear of superior labrum, but biceps anchor intact*
Type IV: *bucket-handle tear of superior labrum that extends into biceps tendon*

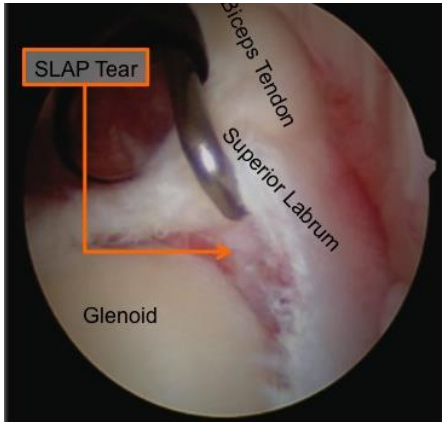


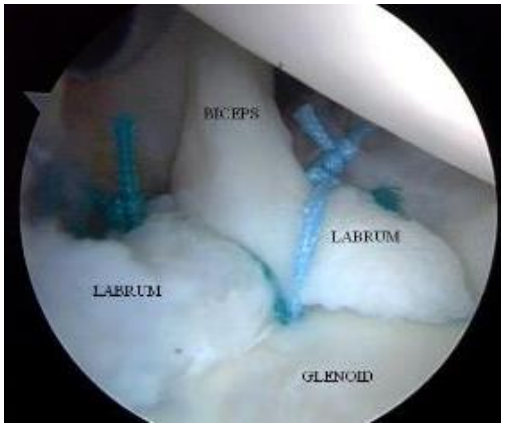
SLAP Tears

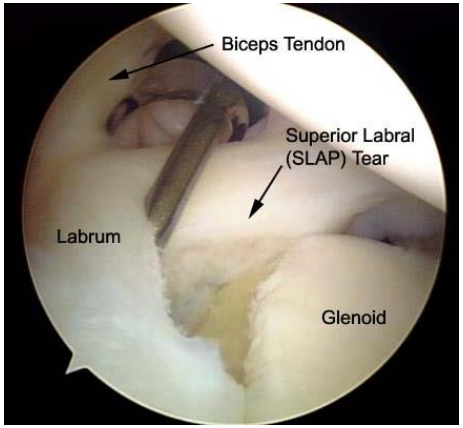
	Treatment	Recovery
Type I	*Debridement*	*Fast (~2 weeks)*
Type II	*Repair (sutures/anchors)*	*Slow (12 weeks)*
Type III	*Debridement*	*Fast (~2 weeks)*
Type IV	*Repair (sutures/anchors)*	*Slow (12 weeks)*

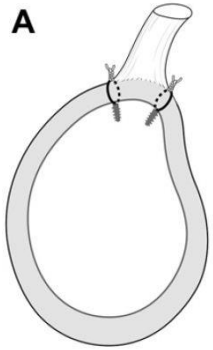


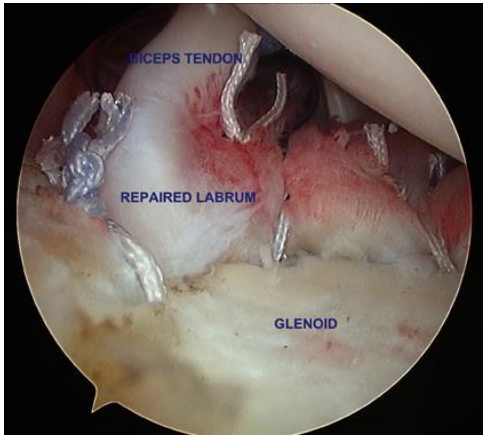
SLAP Tears


SLAP Tear
Biceps Tendon
Superior Labrum
Glenoid


BICEPS
LABRUM
LABRUM
GLENOID

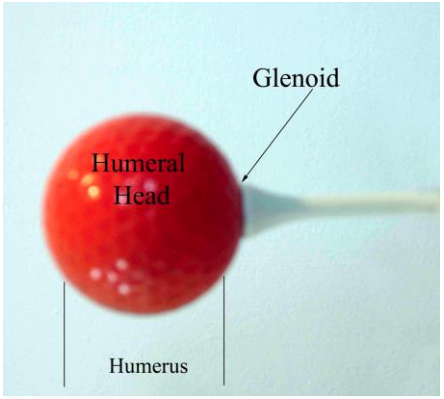

Biceps Tendon
Superior Labral
(SLAP) Tear
Labrum
Glenoid

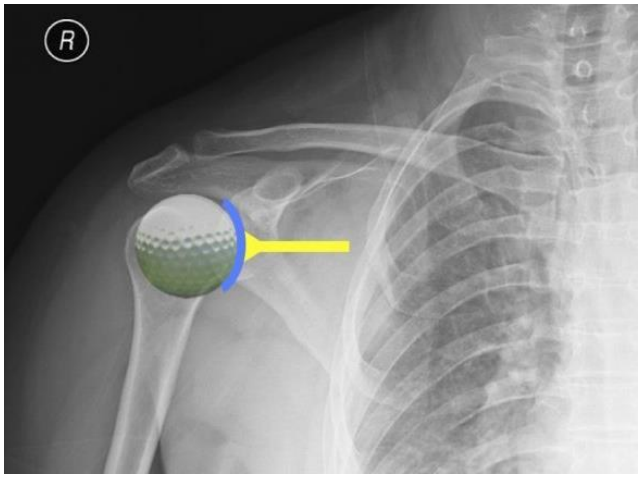

A

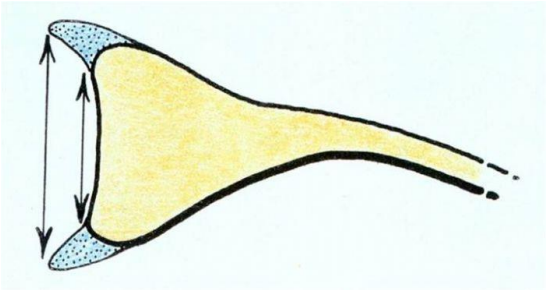

BICEPS TENDON
REPAIRED LABRUM
GLENOID

Instability

- *anatomy review*
  - *glenoid normally shallow, the **labrum deepens it***

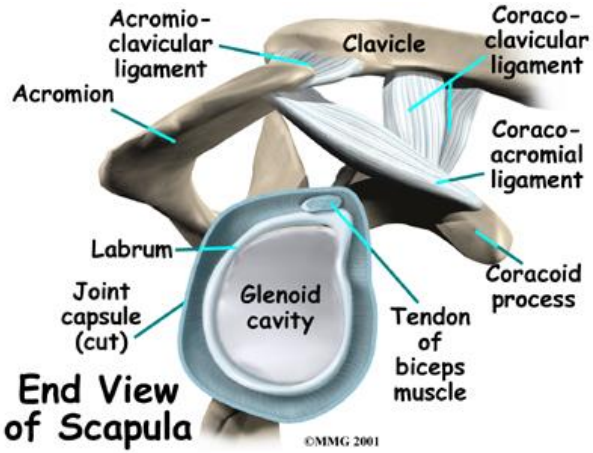


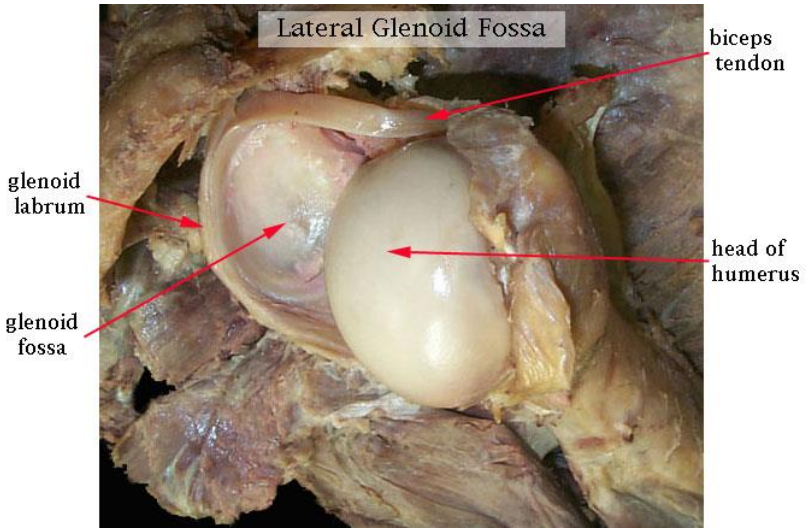


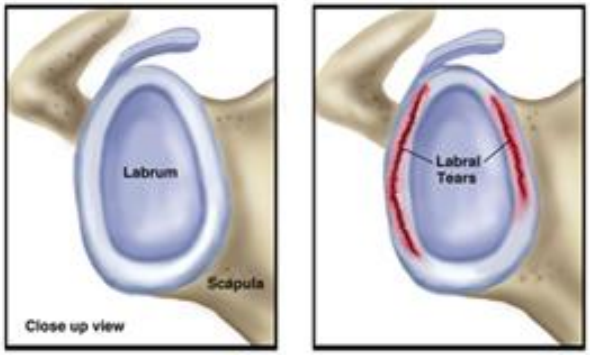


Instability

- *anatomy review*
  - *labrum is a "bumper"*

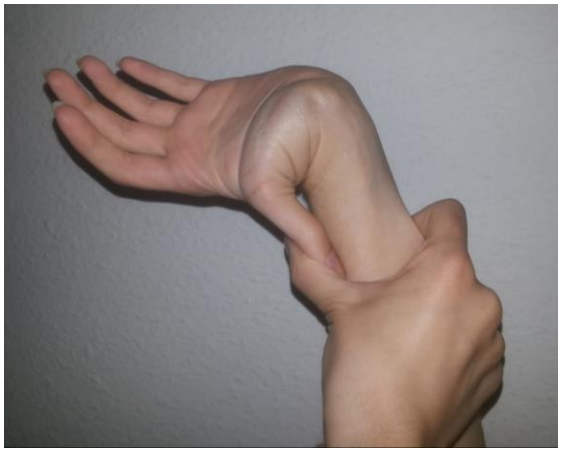


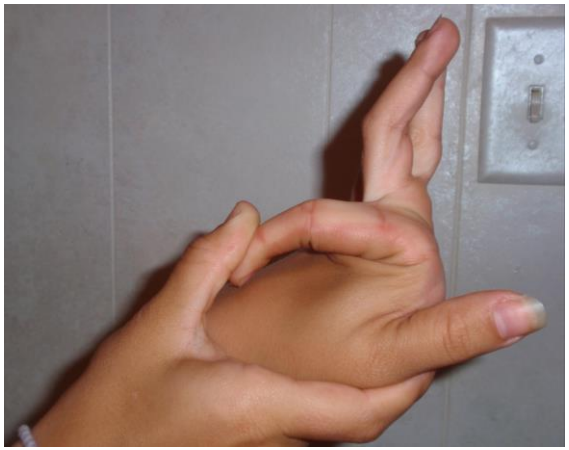




Instability

- *Key point:*
  - **Instability ≠ Laxity**
    - *laxity: normal, physiologic "looseness" of a joint*
    - *instability: pathologic "looseness", ± pain*





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Instability

Two overall types

1. *Atraumatic/Congenital*

   (from inherent, excessive ligament laxity)

2. *Traumatic Tear*

   (from labral tear, secondary to a glenohumeral dislocation/subluxation)

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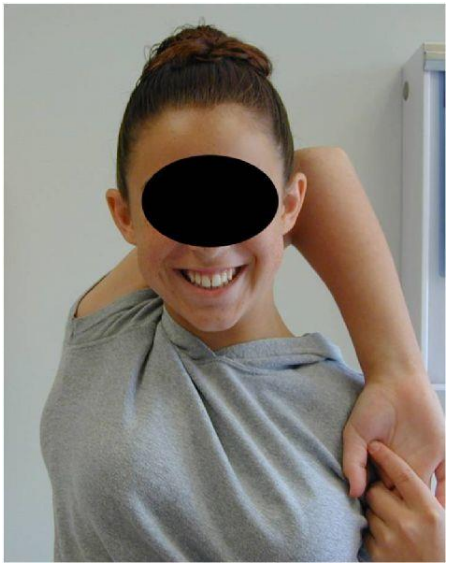
Instability: Atraumatic/Congenital

- *aka **multi-directional instability***

- *predisposition:*
  - *Ehlers-Danlos*
  - *Marfan*
  - *swimmers?*



Instability: Atraumatic/Congenital

- *Excessive ROM*
  - *loose in all directions*
- *Strength typically unaffected*
- *Special test: Sulcus sign*
- *Treatment: conservative!*
  - ***Rotator cuff strengthening***
  - *(NOT surgery)*

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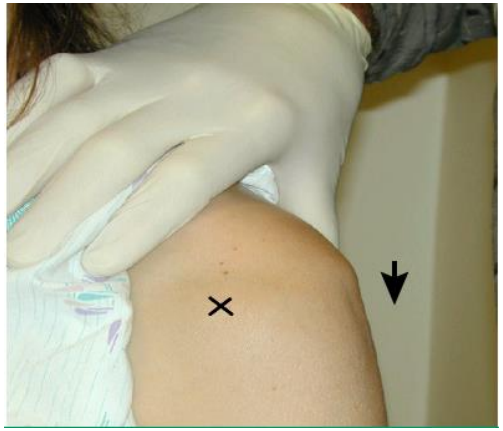
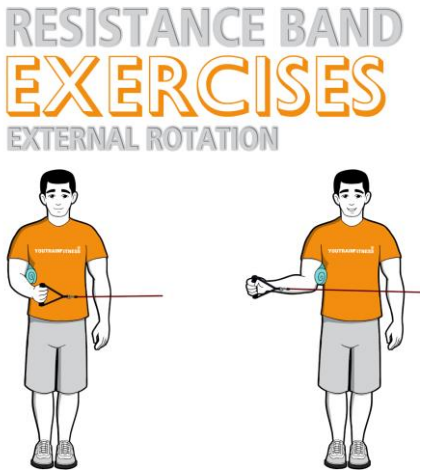


Instability: Atraumatic/Congenital

Instability: Atraumatic/Congenital

Treatment: conservative!

- ***Rotator cuff strengthening***
- *(NOT surgery)*



Instability: Traumatic Tear

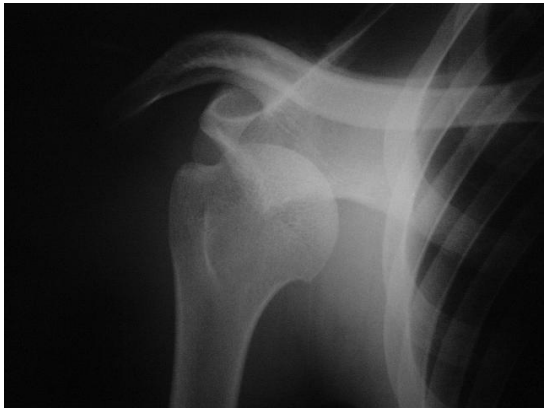
Anterior GH Dislocation

- *most common type of GH dislocation*
- *obtain X-rays pre and post reduction*

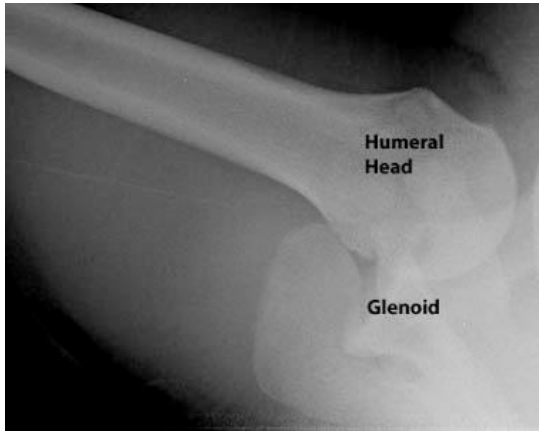
AP showing reduction

- *Emergent Tx: reduce the dislocation*
- *Ortho Follow-up: only if instability*
  - *is there a labral tear?*

Lateral showing reduction



AP showing dislocation



Lateral showing dislocation

Instability: Traumatic Tear

Posterior GH Dislocation

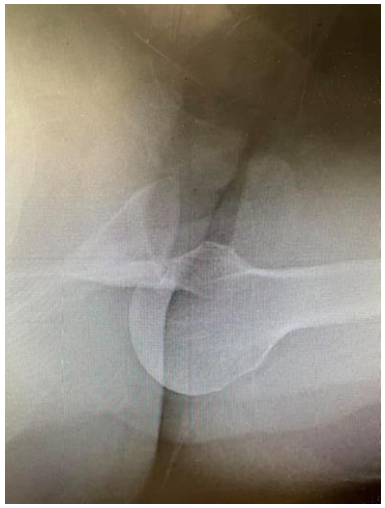
- *less common*
- *still obtain X-rays pre and post reduction*

- *Emergent Tx: reduce the dislocation*
- *Ortho Follow-up: only if instability*
  - *is there a labral tear?*

AP showing reduction

Lateral showing reduction

AP showing dislocation



Lateral showing dislocation

Instability: Traumatic Tear

- *Likelihood of repeated dislocation?*

  (in first time dislocator)
  - *age <20: recurrence rate 75-100%*
  - *age >40: recurrence rate <10%*

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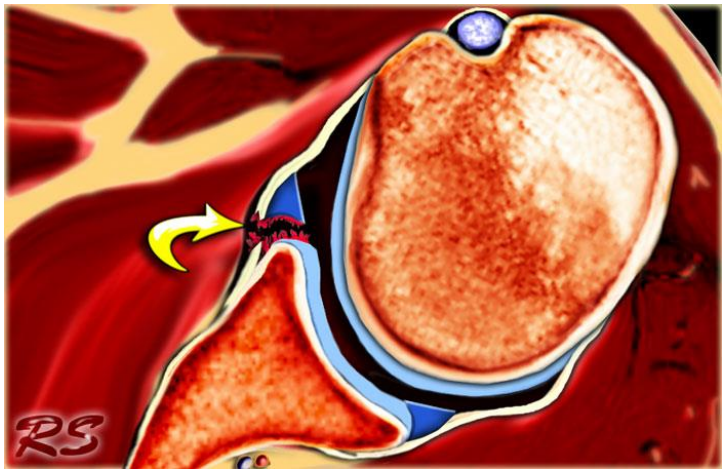
Instability: Traumatic Tear

- *History of **anterior** dislocation/subluxation?*
  - *likely tore **anterior** labrum*
  - *"Bankart tear"*

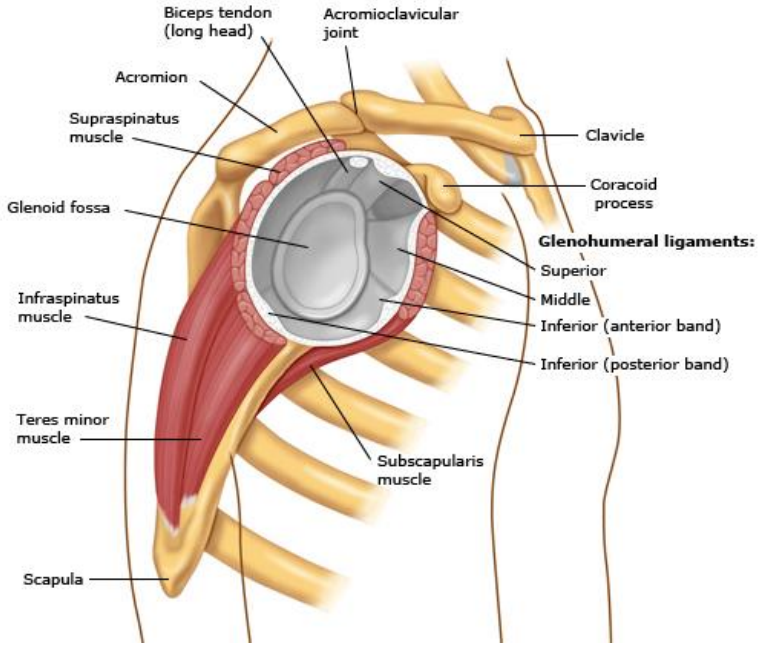
- *History of **posterior** dislocation/subluxation?*
  - *likely tore **posterior** labrum*
  - *"reverse Bankart tear"*



Instability: Traumatic Tear

- *History*
  - *c/o "going out of place" (instability)*
    - *subluxes on its own*
    - *subluxes during sleep*
  - *mechanical symptoms? (clicking/catching)*

- *Physical Exam*
  - *Range of motion?*
  - *Strength?*



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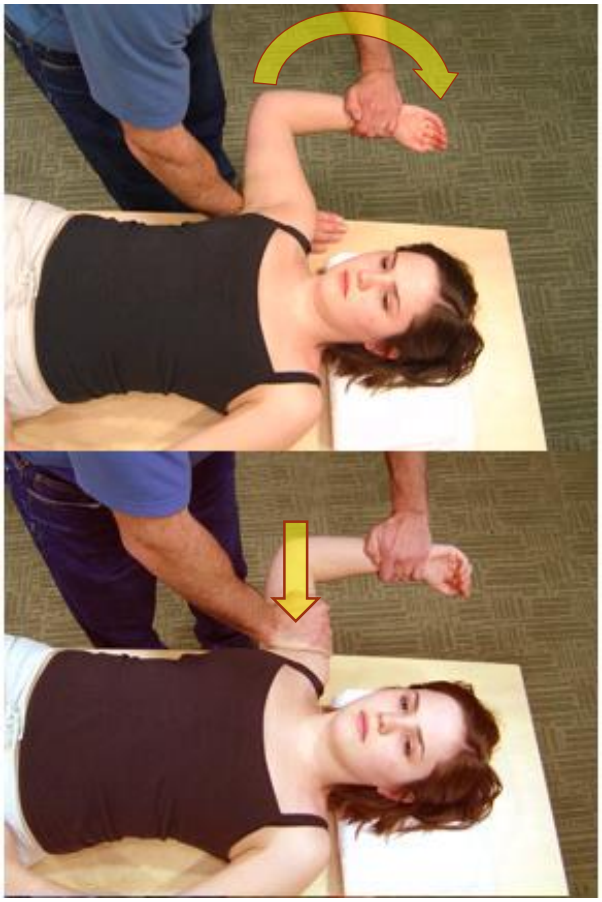
Instability: Traumatic Tear

- *Special Tests (for anterior instability)*
  - *Anterior Apprehension Test*
  - *(Jobe) Relocation test*



A. Apprehension test:
To perform this test, the patient places the symptomatic arm in the throwing position. Next, the clinician braces the posterior shoulder with one hand while using the other hand to push back on the wrist with steady pressure, thereby increasing the abduction and external rotation of the shoulder. Any sensation of impending dislocation at any time on the part of the patient constitutes a positive test.

B. Relocation test:
The relocation test is begun at the end of the apprehension test. Forced abduction and external rotation are stopped and the clinician moves the hand that was bracing the posterior shoulder to the anterior shoulder. The examiner pushes the humerus posteriorly. Relief of pain or of the sensation of impending dislocation on the part of the patient represents a positive test.

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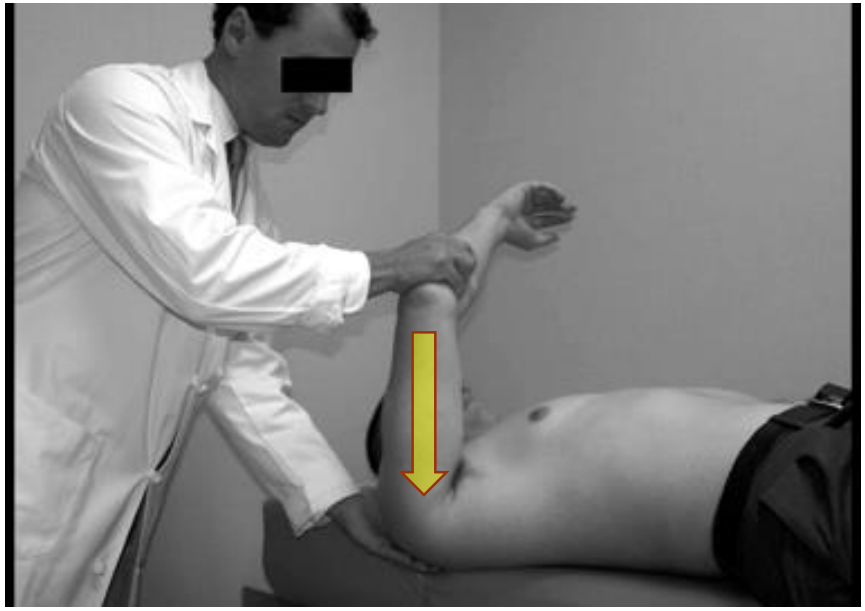
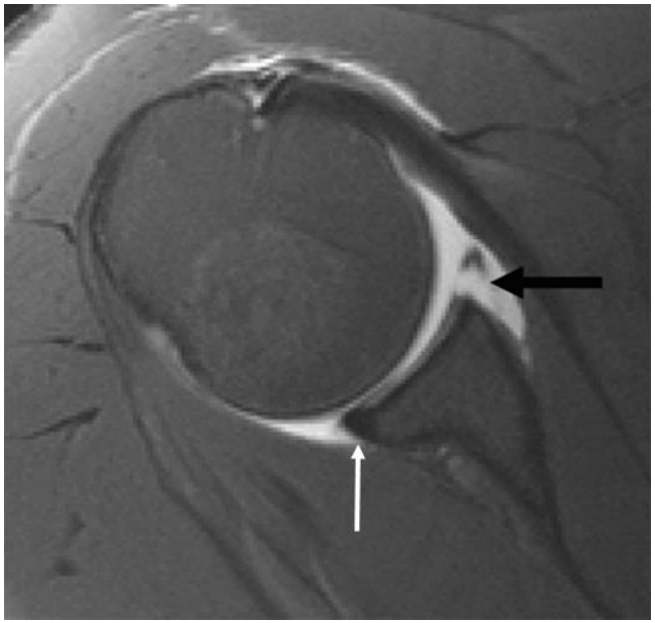
Instability: Traumatic Tear

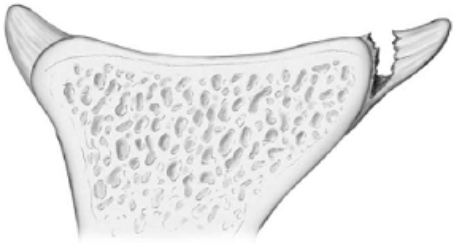
- *Special Tests (for posterior instability)*
  - *Posterior Drawer test*



Instability: Traumatic Tear

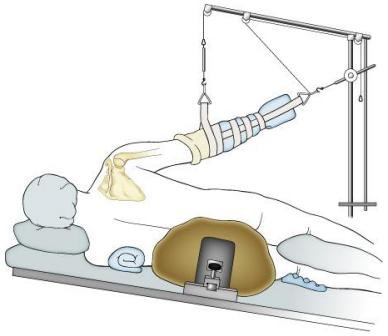
- *Imaging*
  - *X-rays: may show "bony Bankart"*
  - *MRI arthrogram: imaging of choice*



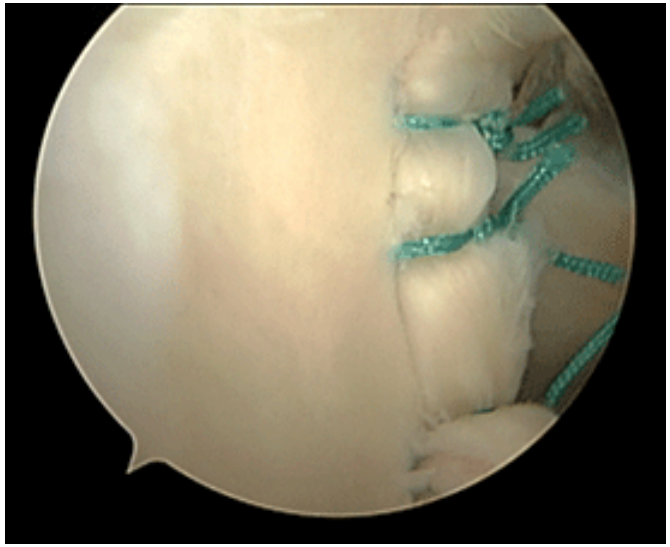


- *Treatment: surgery (labral repair)*

Instability: Traumatic Tear



- *Surgery: labral repair*
  - *aka Bankart repair or reverse Bankart repair*

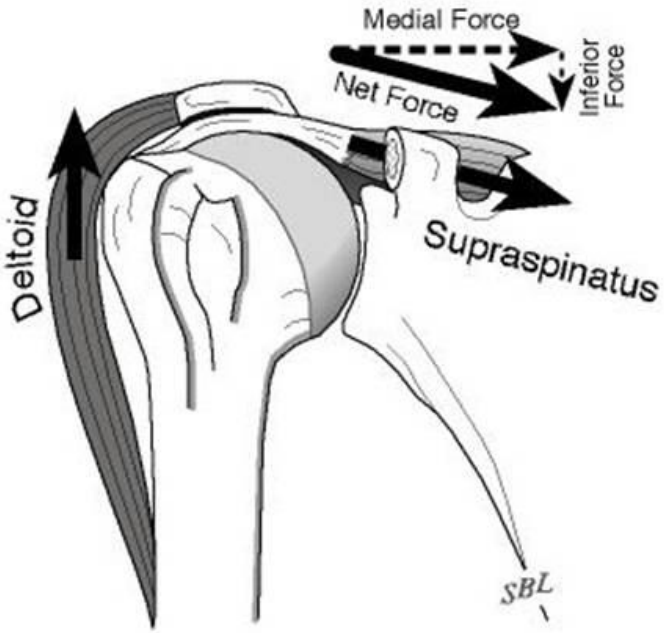


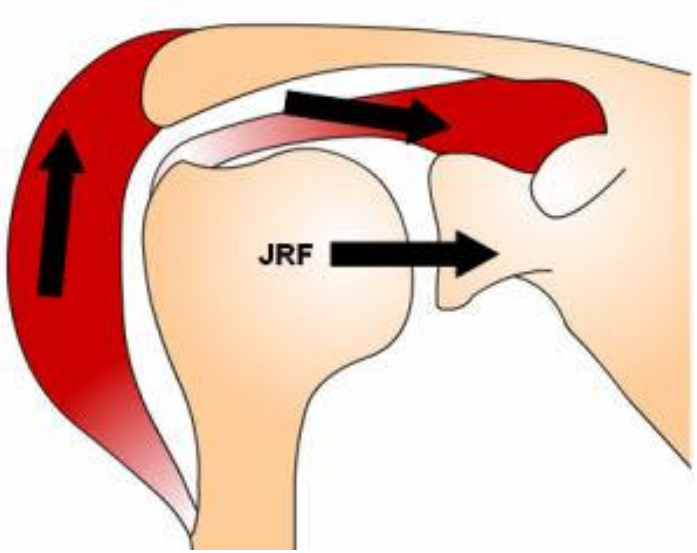
Instability: Labral Tears - SUMMARY

	SLAP Tear	Bankart & Reverse Bankart Tears
What's the chief complaint?	*PAIN*	*INSTABILITY*
What's the MOI?	*trauma or repetitive stress*	*trauma*
Surgical indication?	*PAIN*	*INSTABILITY*

Rotator Cuff Disease

Biomechanics



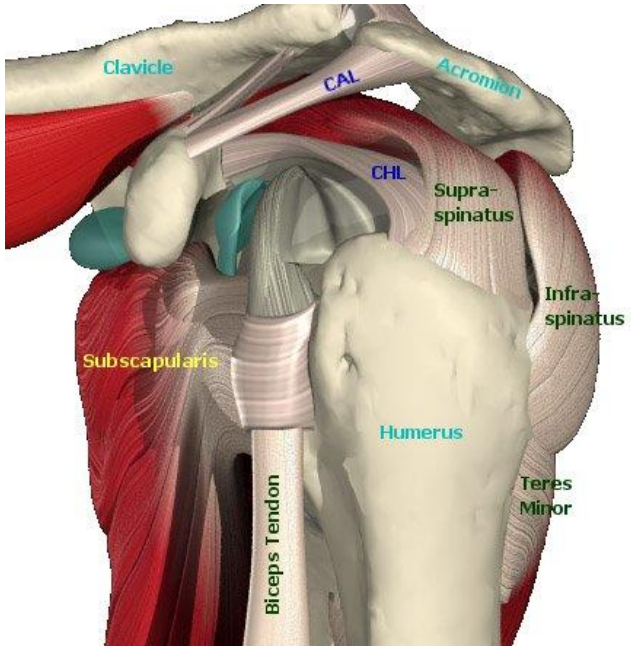


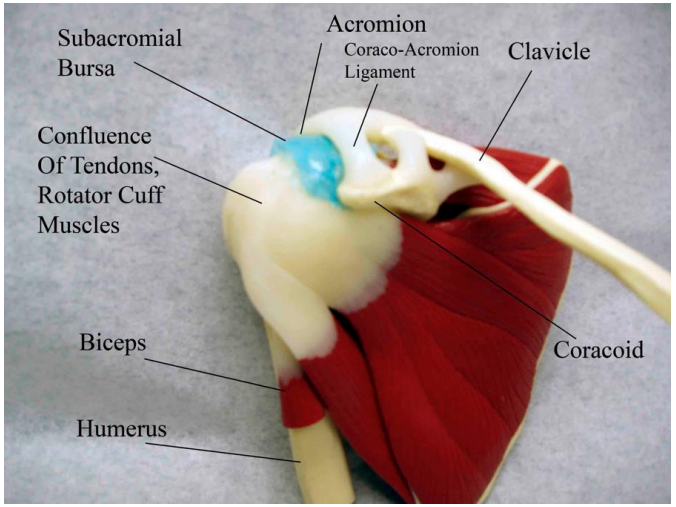
- *during abduction, RTC actually* **depresses** *the humeral head*

Rotator Cuff Disease

Anatomy

- *sub-acromial space* → *sub-acromial bursa*

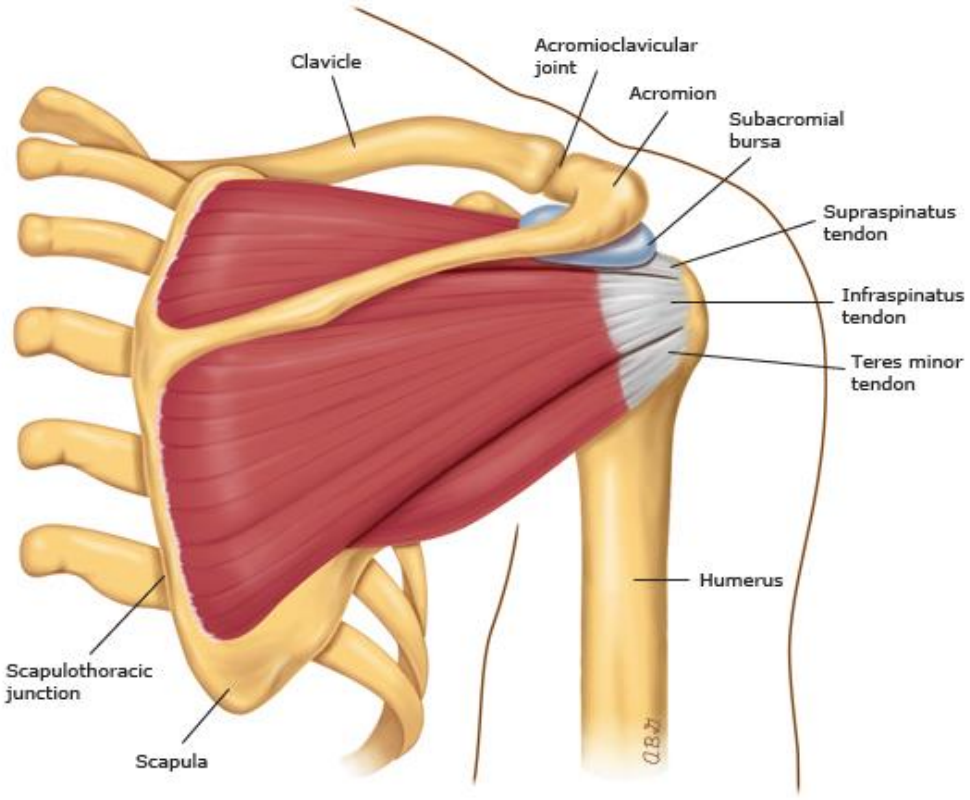




Rotator Cuff Disease

Physiology - rotator cuff

- *a "cuff" of tissue*
- *provides* **dynamic** *stabilization*



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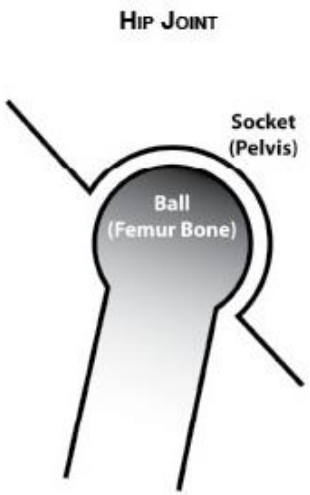
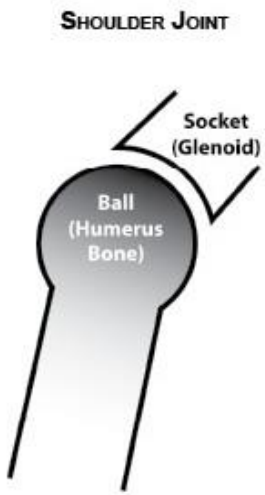
Rotator Cuff Disease



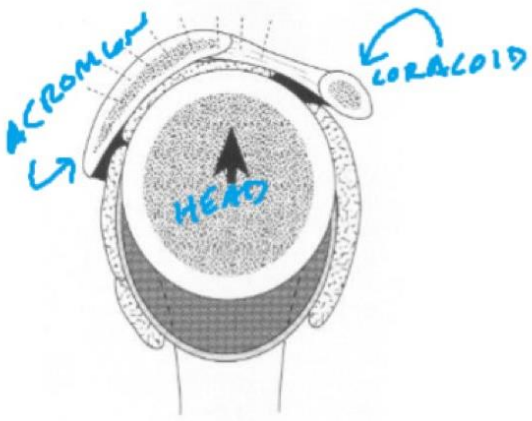


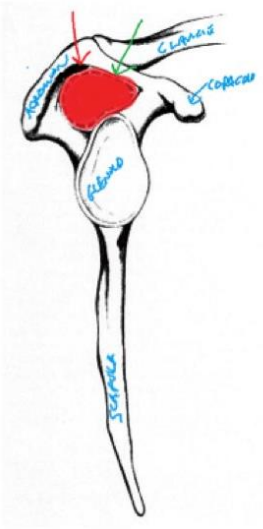
Hip joint	Shoulder Joint
the "socket" (acetabulum) is deep & cup-like	*the "socket" (glenoid fossa) is small & shallow*
femoral head is very spherical and fits snugly within acetabulum	*humeral head is rounded, but not as ball-like as femoral head*
5 large, strong surrounding ligaments	*thin, wimpy supporting ligaments*
more stable joint	*less stable joint*
difficult to dislocate	*easy to dislocate*
less ROM available	*lots of ROM available*

Rotator Cuff Disease

*Majority of rotator cuff tears are **degenerative** (overuse)*

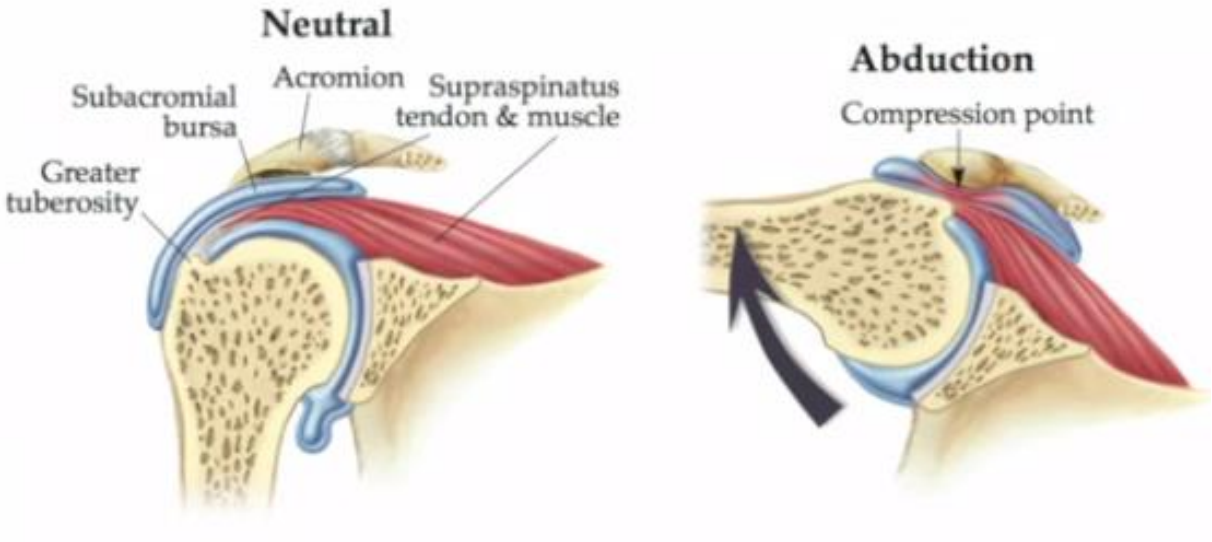
- *Inflammation over time*
- *Accumulation of microtears in tendon*
- *Repetitively impinged (pinched) and irritated*





Rotator Cuff Disease

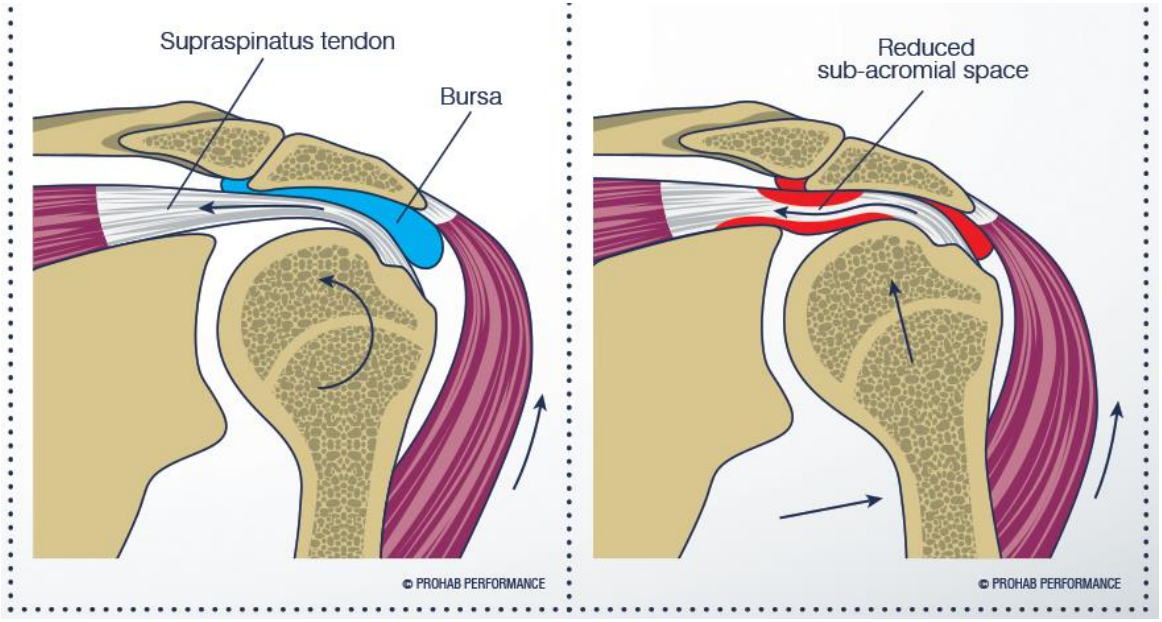
*Without the **dynamic stabilization** of the RTC, we would all get "secondary impingement" eventually*



Rotator Cuff Disease

Secondary Impingement: pinching of the rotator cuff (mostly the supraspinatus) due to excessive humeral head movement

- *cause: weak RTC muscles*



Rotator Cuff Disease

Primary Impingement: pinching of the rotator cuff (mostly the supraspinatus) due to anatomic abnormality

- *causes: acromion shape, inflamed SA bursa*

Type I

Flat

Type II

Gentle curve

Type III

Sharply beaked/hooked

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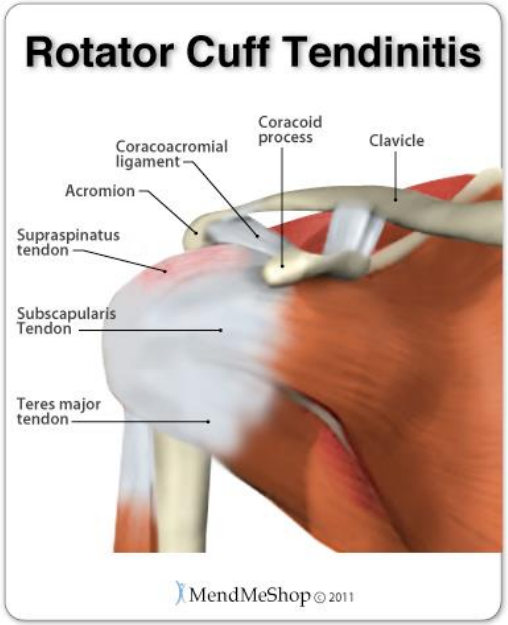
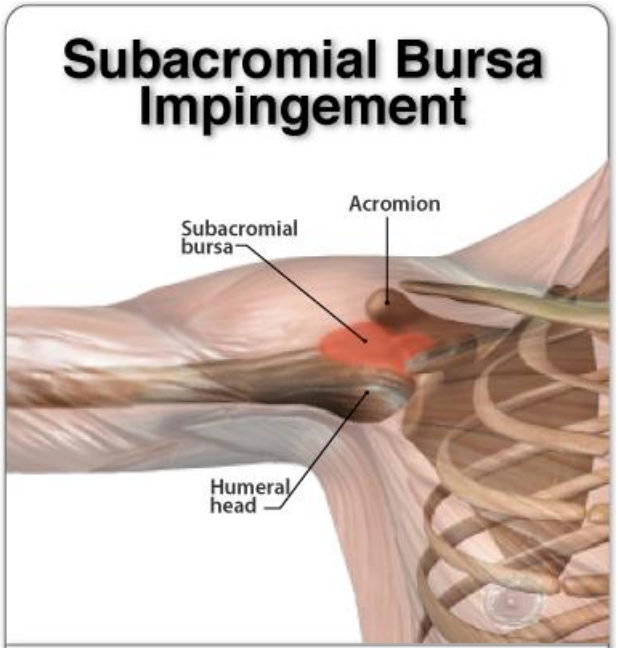
Rotator Cuff Disease

Early *(may never progress)*	**Progression**	**Progression**	**End Stage**
Impingement *Subacromial Bursitis* *RTC Tendonitis*	*Partial RTC Tear*	*Complete RTC Tear*	*RTC Arthropathy*

Rotator Cuff Disease

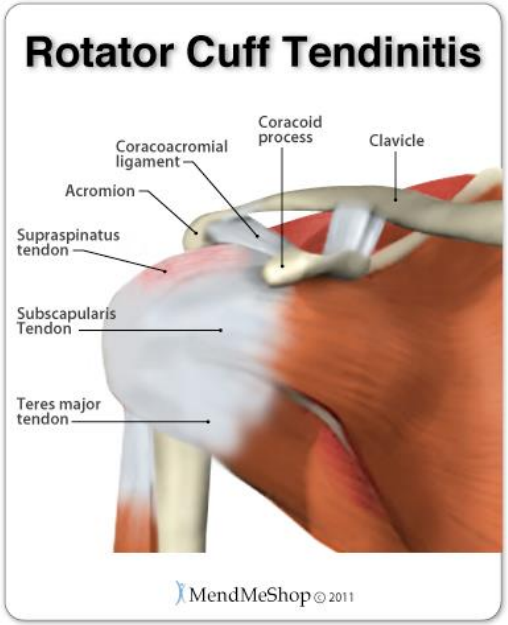
- *Impingement/Subacromial Bursitis/RTC Tendonitis*
  - ***inflammation*** *of the subacromial bursa/RTC tendons*

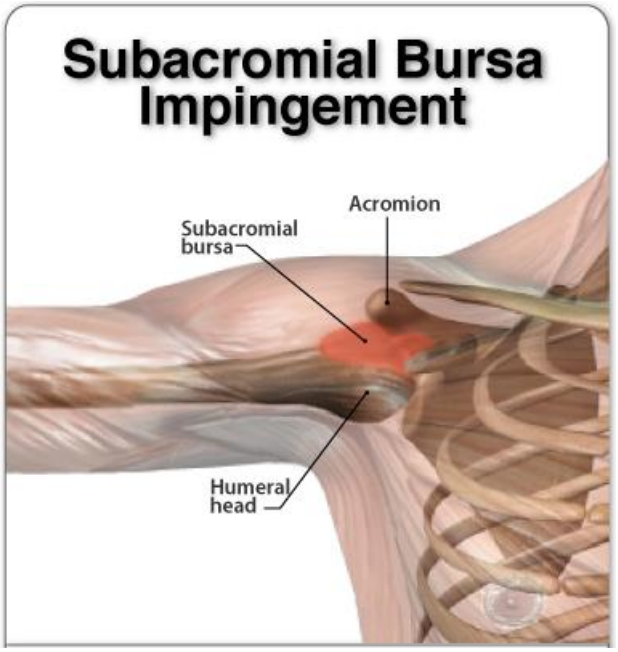




Rotator Cuff Disease

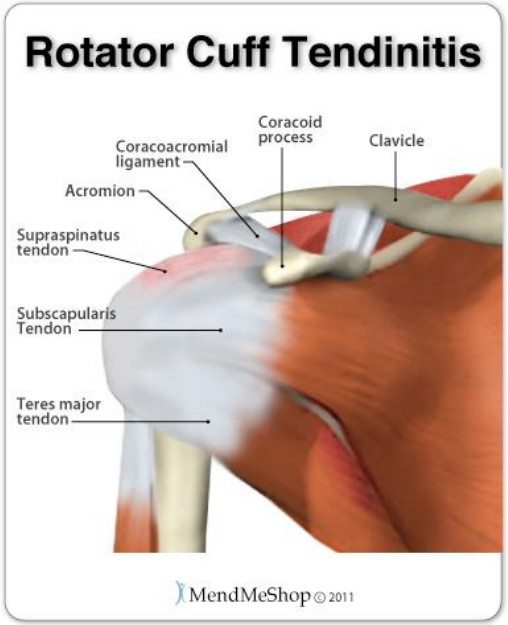
- *Impingement/Subacromial Bursitis/RTC Tendonitis*
  - ***insidious*** *onset*
  - *anterior/lateral pain*
  - *worse with* ***overhead*** *movements (occupation/sport?)*

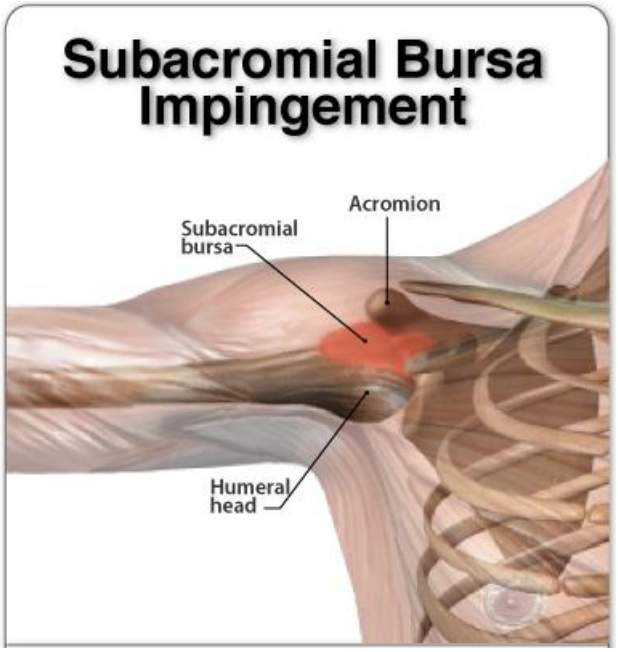




Rotator Cuff Disease

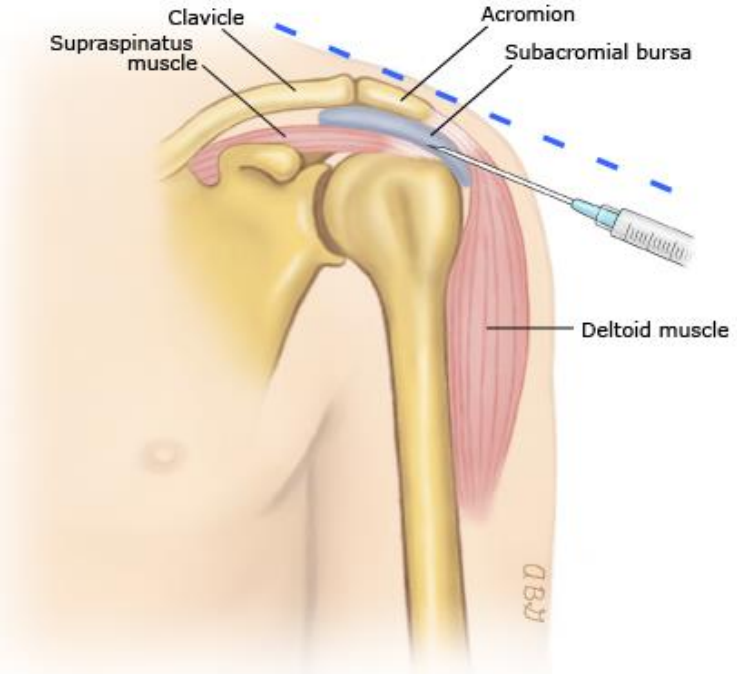
- *Impingement/Subacromial Bursitis/RTC Tendonitis*
  - *physical exam: positive **impingement** signs*
  - *physical exam: no **strength** deficits*





Rotator Cuff Disease

- *Treatment*
  - *analgesics/NSAIDS*
  - *no sling - relative rest*
  - *therapeutic exercises – RTC strengthening!*
  - ***subacromial** corticosteroid injection*



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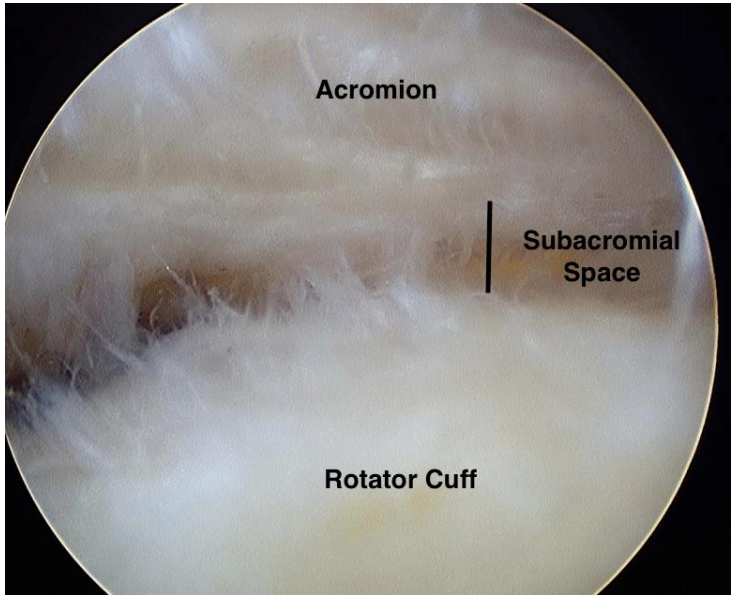
Rotator Cuff Disease

- *Treatment:*
  - ***Acromioplasty*** *for primary impingement*



Rotator Cuff Disease

Early *(may never progress)*	**Progression**	**Progression**	**End Stage**
Impingement *Subacromial Bursitis* *RTC Tendonitis*	*Partial RTC Tear*	*Complete RTC Tear*	*RTC Arthropathy*

Rotator Cuff Disease

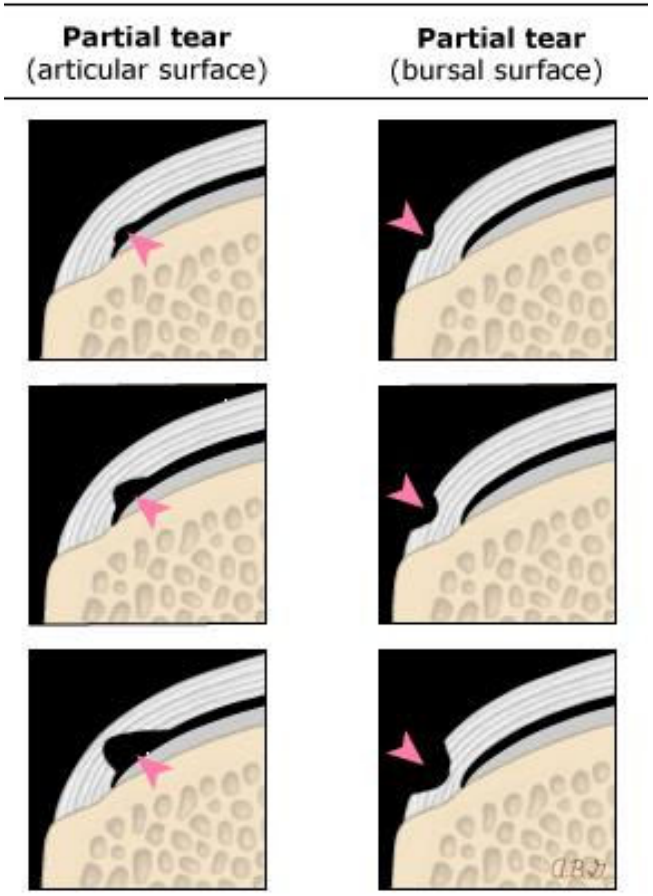
Rotator Cuff Tears (degenerative)

- *dull, achy pain*
- *night pain – sometimes patient wakes from sleep*

Rotator Cuff Disease

Rotator Cuff Tears (degenerative)

- *Partial-thickness tear*
  - *articular sided*
  - *bursal sided*



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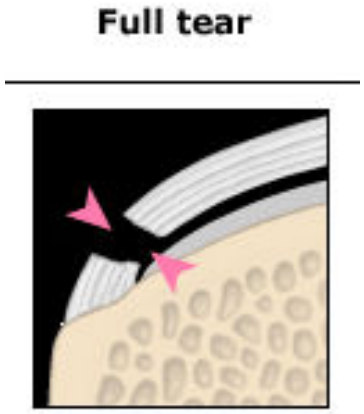
Rotator Cuff Disease

Rotator Cuff Tears (degenerative)

- *Complete (full thickness) tear*



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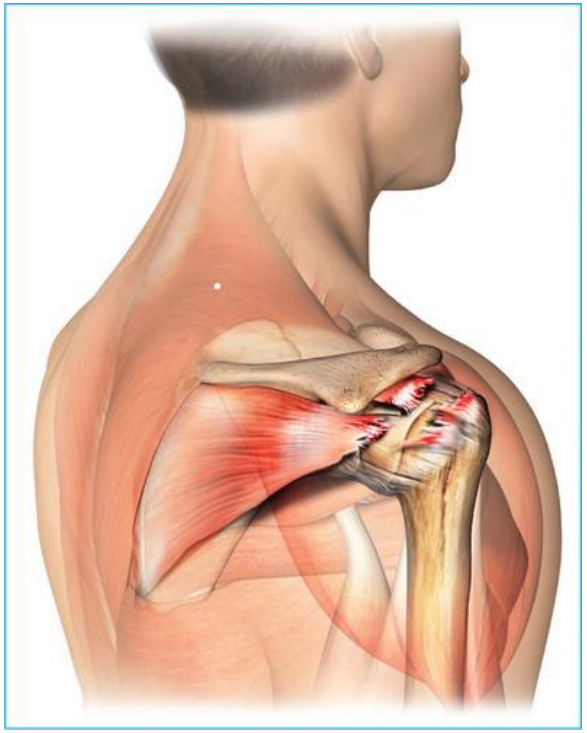
Rotator Cuff Disease

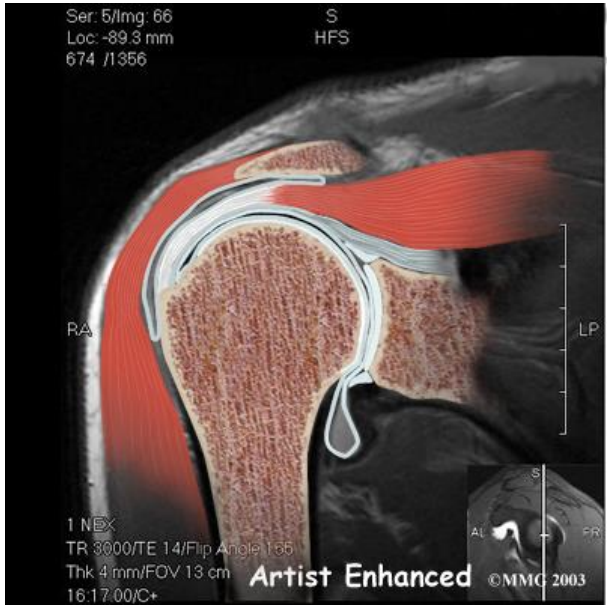
Rotator Cuff Tears (degenerative)

- *Massive tear*
  - *multiple tendons*
  - *retraction*
  - *fatty atrophy*

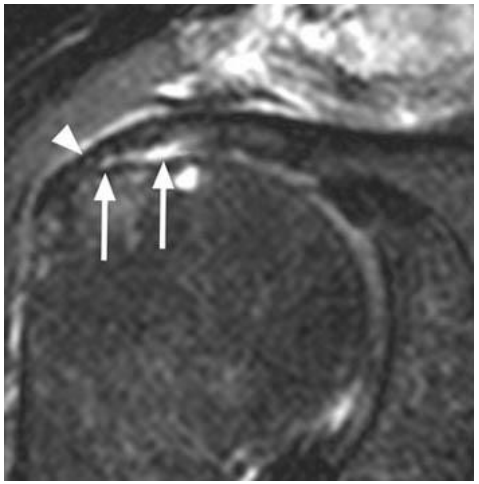


Rotator Cuff Disease

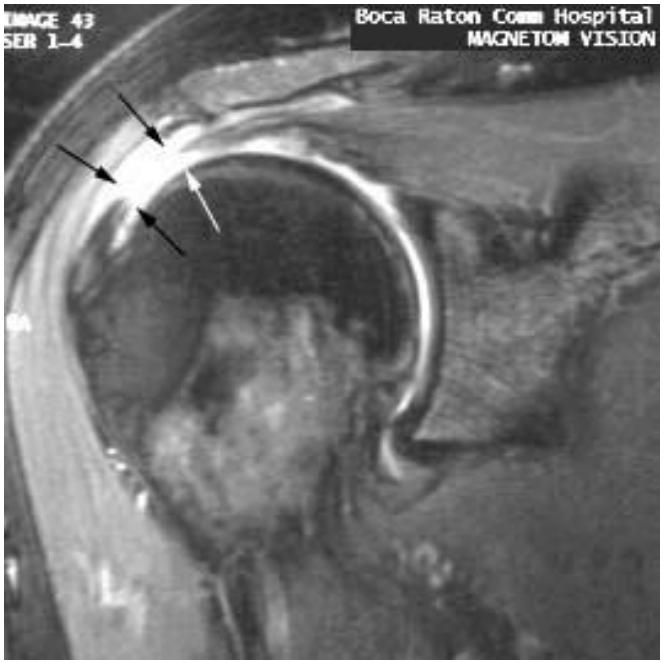
- *Imaging:*
  - *X-rays*
    - *helpful to show morphology of acromion*
  - *MRI arthrogram (enhanced with gadolinium)*
    - *to assess for actual RTC tear*



Rotator Cuff Disease

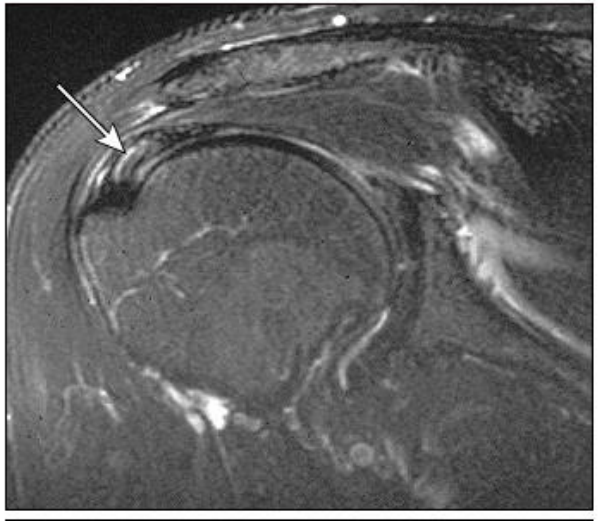


Rotator Cuff Disease

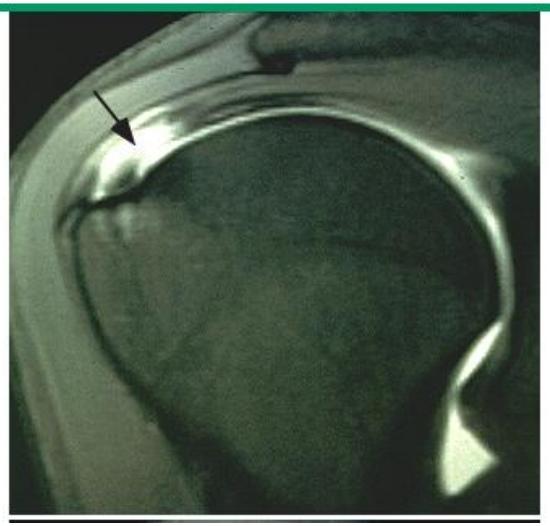


Rotator Cuff Disease

Partial rotator cuff tear on magnetic resonance imaging



Full thickness rotator cuff tear on magnetic resonance arthrography



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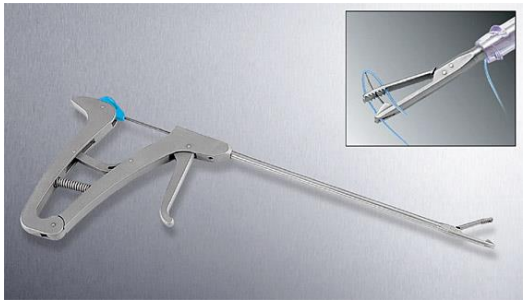
Rotator Cuff Disease

Treatment

- ***Partial Thickness*** *RTC tears*
  - *conservative measures*
    - *analgesics/NSAIDS*
    - *no sling - relative rest*
    - *therapeutic exercises, especially RTC strengthening!*
    - *subacromial corticosteroid injection*

(i.e., treat it the same as subacromial bursitis/impingement)

Rotator Cuff Disease



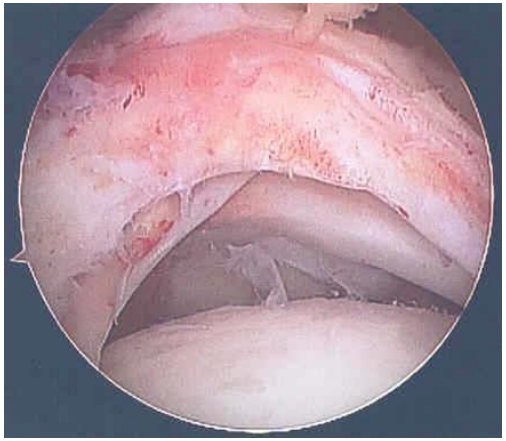
Treatment

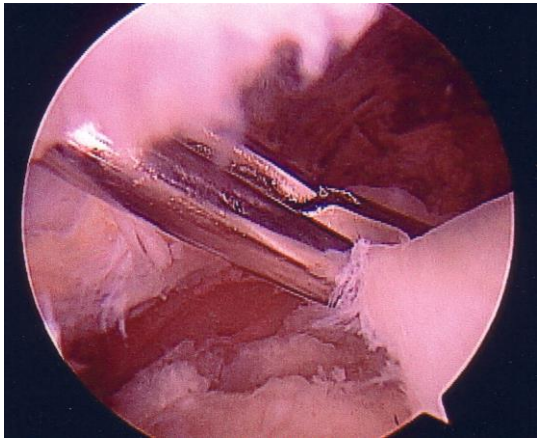
- ***Full Thickness*** *RTC Tears*
  - *Surgery: arthroscopic RTC repair*
  - *also for partial tears that have failed conservative Tx*

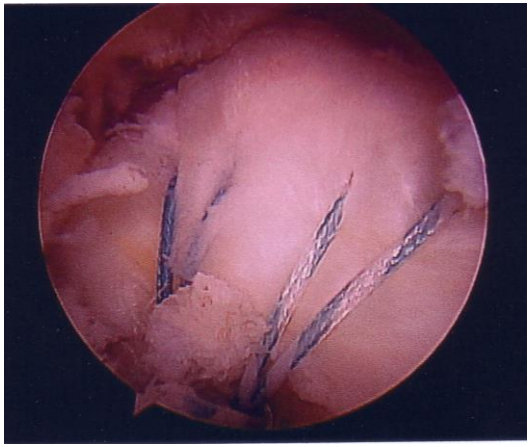
  - *"Double row repair"*

"Beach Chair position"

Rotator Cuff Disease





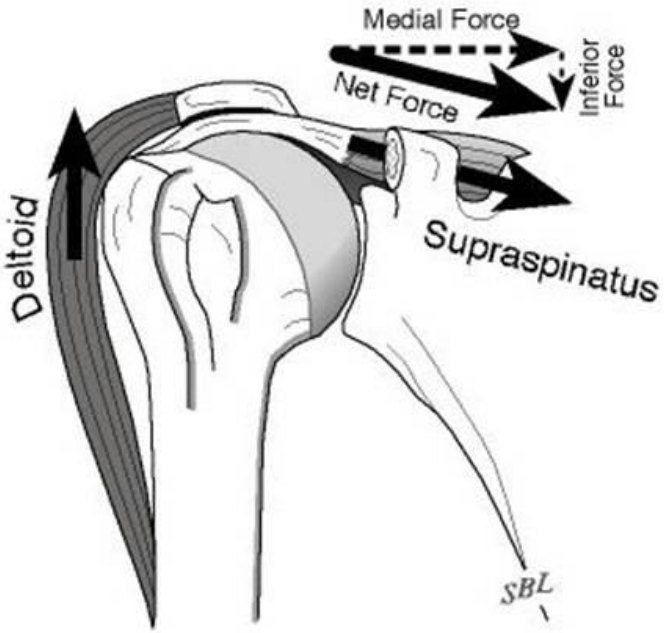


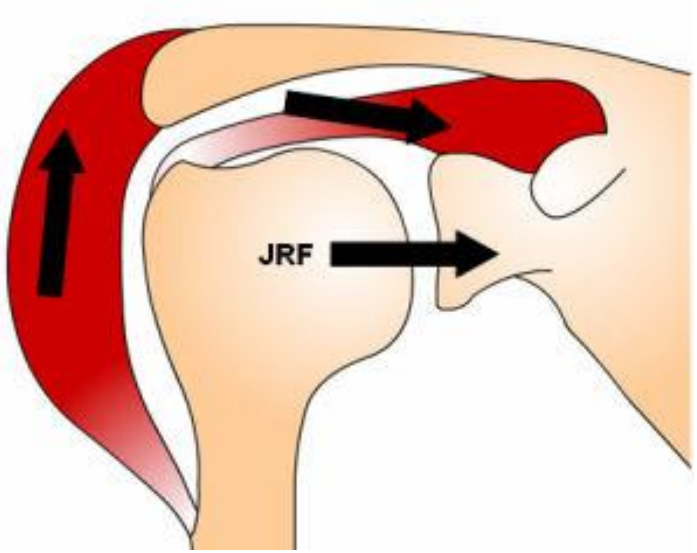
Rotator Cuff Disease

Early *(may never progress)*	**Progression**	**Progression**	**End Stage**
Impingement *Subacromial Bursitis* *RTC Tendonitis*	*Partial RTC Tear*	*Complete RTC Tear*	*RTC Arthropathy*

Rotator Cuff Disease

- *Remember…*



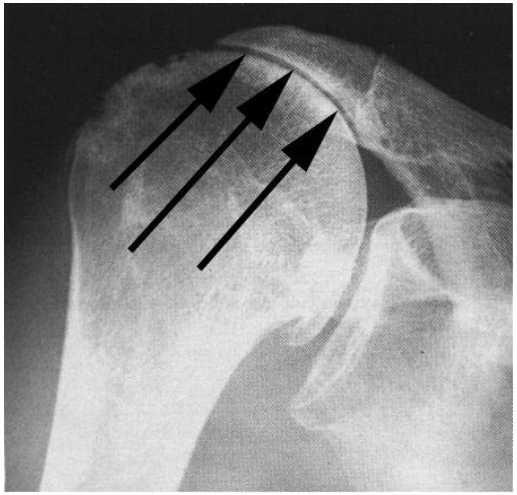


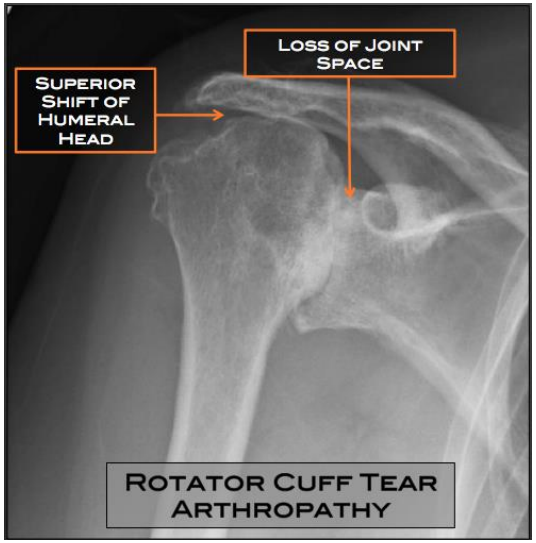
Rotator Cuff Disease

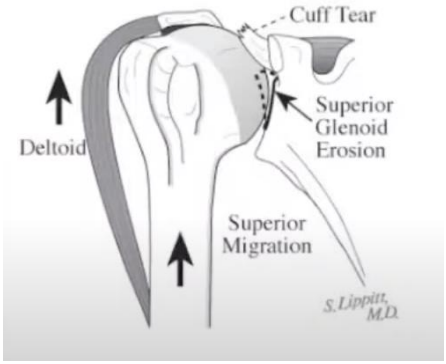
- *Rotator cuff arthropathy*
  - *the result of a chronic rotator cuff tear*

Rotator Cuff Disease

- *Rotator cuff arthropathy*
  - *the result of a chronic rotator cuff tear*

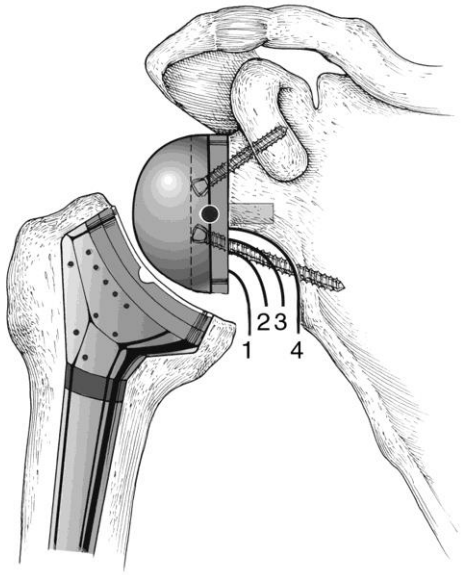






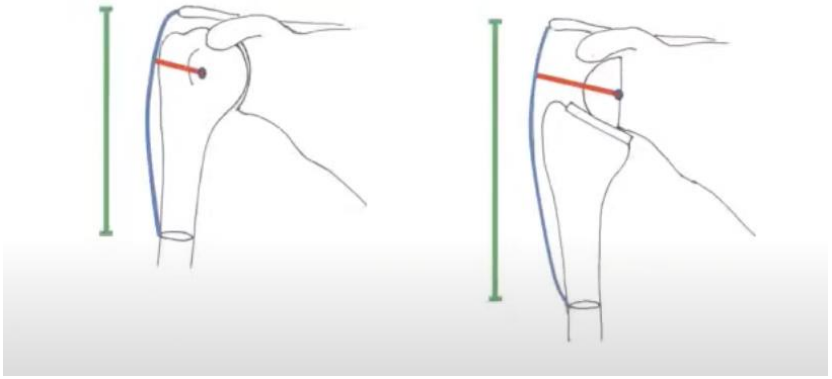
Rotator Cuff Disease

- *Rotator cuff arthropathy treatment:*
  - ***Reverse*** *total shoulder arthroplasty*



Rotator Cuff Disease

- *Rotator cuff arthropathy treatment:*
  - ***Reverse*** *total shoulder arthroplasty*



Anatomic *Reverse TSA*

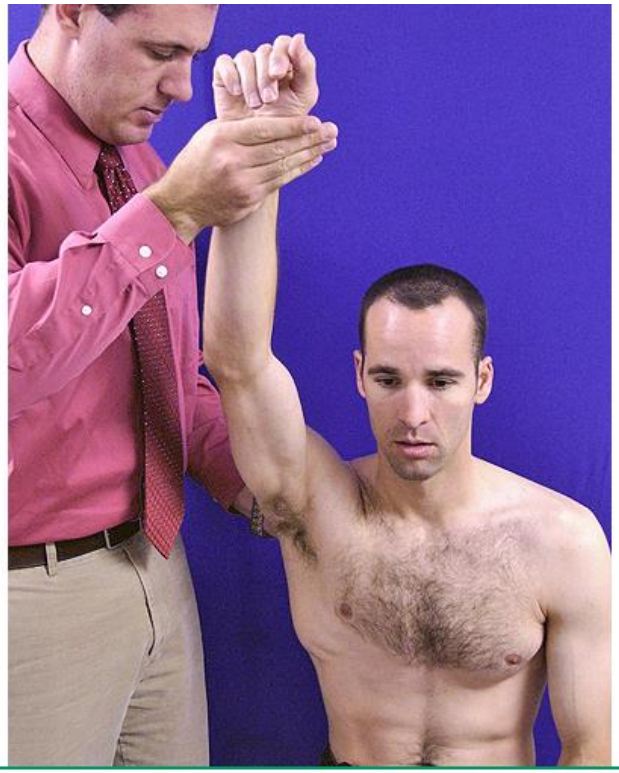
Rotator Cuff Disease

Early *(may never progress)*	Progression	Progression	End Stage
Impingement *Subacromial Bursitis* *RTC Tendonitis*	*Partial RTC Tear*	*Complete RTC Tear*	*RTC Arthropathy*

*What about the **Special Tests**???*

Rotator Cuff Disease

- *Special Tests*
  - ***1. Neer Impingement test***



The "passive painful arc maneuver" shown above involves passively flexing the glenohumeral joint while simultaneously preventing shoulder shrugging. The test is often referred to as the Neer test, and is used to assess shoulder impingement.

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Rotator Cuff Disease

- *Special Tests*
  - ***2. Hawkins-Kennedy test***

The Hawkins Kennedy test is used to assess shoulder impingement. In this test the clinician stabilizes the shoulder with one hand and, with the patient's elbow flexed at 90 degrees, internally rotates the shoulder using the other hand. Shoulder pain elicited by internal rotation represents a positive test.

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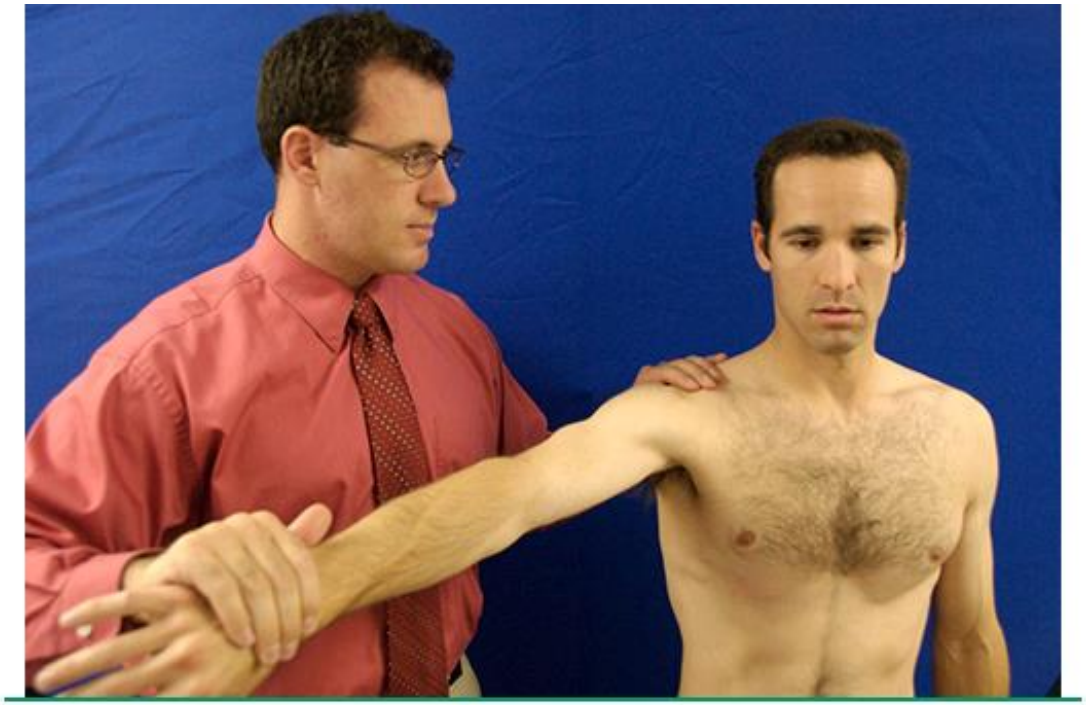
Rotator Cuff Disease

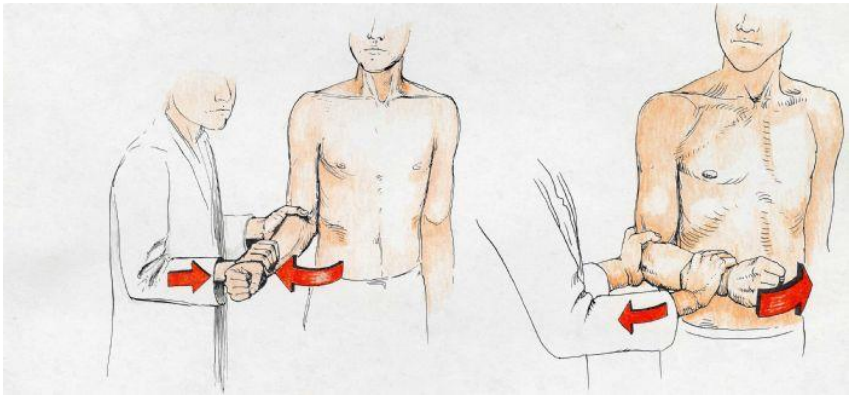
- *Special Tests*
  3. **"Empty can" (supraspinatus) test**



Jobe's test (or the "empty can" test) assesses supraspinatus function. The patient places a straight arm in about 90 degrees of abduction and 30 degrees of forward flexion, and then internally rotates the shoulder completely. The clinician then attempts to adduct the arm while the patient resists. Pain without weakness suggests tendinopathy; pain with weakness is consistent with tendon tear.

Rotator Cuff Disease

- *Special Tests*
  - ***4. External rotation (infraspinatus) test***

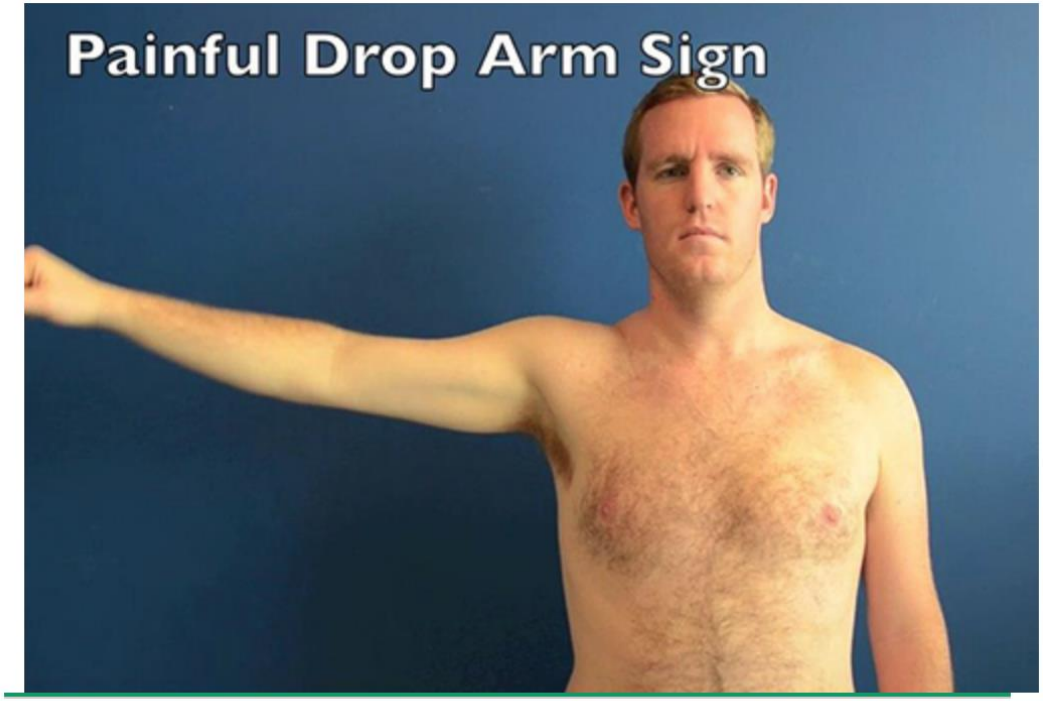


The infraspinatus muscle is primarily responsible for external rotation of the shoulder. The muscle can be tested by having the patient attempt to externally rotate against resistance, as shown in the photograph above. The shoulder is held in adduction and the elbow bent to 90 degrees during testing.

Images from UpToDate © 2019

Rotator Cuff Disease

- *Special Tests*
  - ***5. Drop arm test***



The drop arm test assesses the ability of the patient to lower his or her arms from a fully abducted position. A positive test occurs when the patient is unable to lower the affected arm with the same smooth coordinated motion as the unaffected arm.

Rotator Cuff Disease

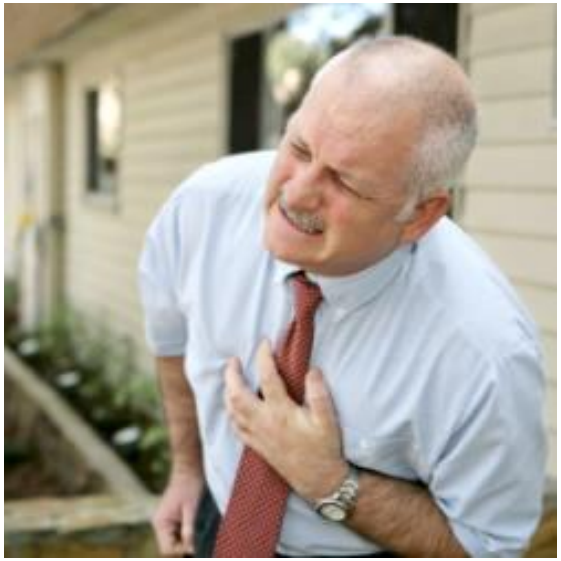
Putting it all together:

	Subacromial Bursitis RTC Tendonitis Primary/Secondary Impingement	Partial RTC Tear	Complete RTC Tear
Pain w/ overhead movement?	*YES*	*YES*	*YES*
Night pain?	*MAYBE*	*YES*	*YES*
Neer Impingement Test	*YES*	*YES*	*YES*
Hawkins-Kennedy Test	*YES*	*YES*	*YES*
Empty Can (supraspinatus) Test	*NO*	*MAYBE*	*YES*
ER (infraspinatus) Test	*NO*	*MAYBE*	*YES*
Drop Arm Test	*NO*	*NO*	*MAYBE*

Shoulder (Other)

- *Past medical history*
  - *referred pain in left shoulder?*
  - *cardiac? acute coronary syndrome?*

  - *abdominal trauma?*
  - *Kehr's sign = ruptured spleen?*



Shoulder SUMMARY

Special Tests	
Yergason's Test	*SLAP tear*
Speed's Test	
O'Brien's Test	
Anterior Apprehension Test	*Anterior Labral Tear/Instability*
(Jobe) Relocation test	
Posterior Drawer test	*Posterior Labral Tear/Instability*
Neer Impingement test	*Bursitis/Tendonitis/Impingement*
Hawkins-Kennedy test	
Empty Can (supraspinatus) Test	*Rotator Cuff Tear*
ER (infraspinatus) Test	
Drop Arm Test	

Citations

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