Shoulder Impingement Syndrome

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UPPER LIMB AND HAND SURGEON

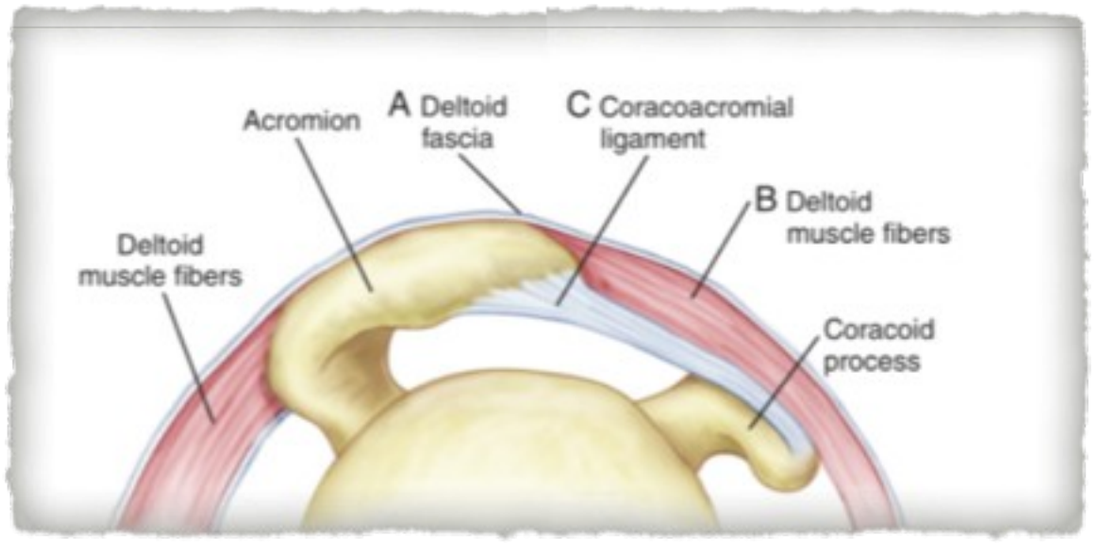
JORDANIAN ROYAL MEDICAL SERVICES

Ali is a 45-year-old male
He presented with a six-month history of gradually worsening pain in his right shoulder. The pain is primarily located on the lateral aspect of the shoulder and is exacerbated by overhead activities, such as reaching for objects on high shelves. He reports difficulty sleeping on his right side due to discomfort. There is no history of trauma, but he mentions that his shoulder feels weak during certain movements.

Differential Diagnosis ?

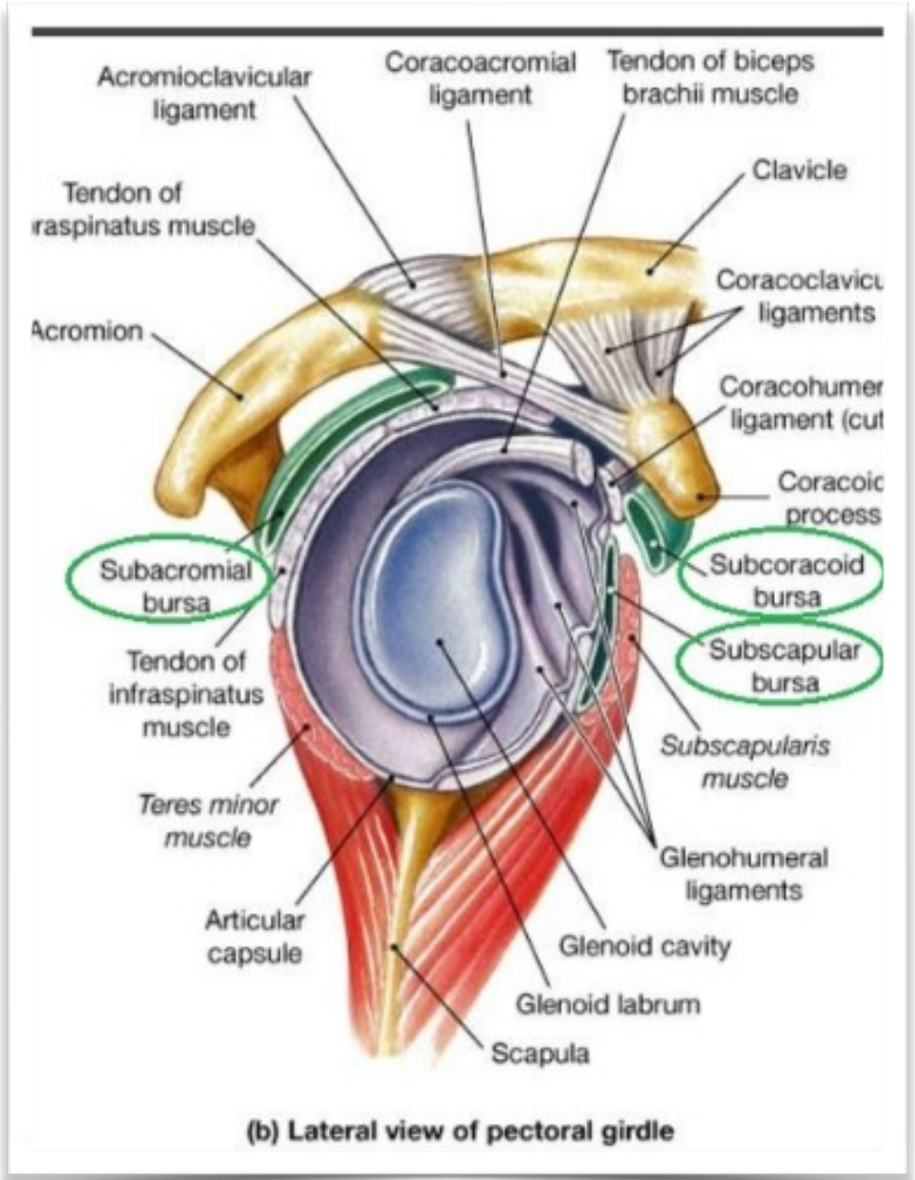
- Rotator Cuff Tear
- Adhesive Capsulitis
- Biceps Tendonitis
- Shoulder Arthritis
- Acromioclavicular (AC) Joint Arthritis
- Labral Tear
- Cervical Radiculopathy

Neer, 1972 defined Shoulder impingement as compression and mechanical abrasion of the supraspinatus tendon as it passes beneath the coracoacromial arch during elevation of the arm.



- The rotator cuff tendons, the subacromial bursa, the biceps tendon, and the proximal humerus all pass beneath the coraco-acromial arch.

- Any acquired or congenital process that narrows the space available for these structures can cause subacromial impingement.

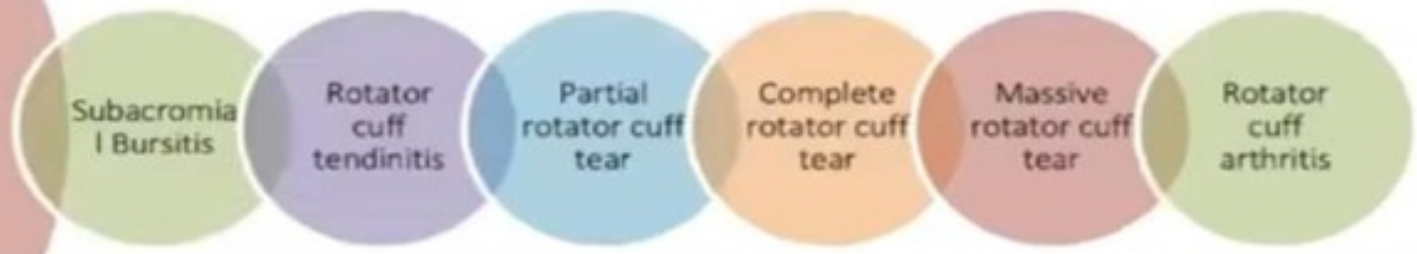


(b) Lateral view of pectoral girdle

Shoulder Impingement

- Subacromial Bursitis
- Rotator cuff tendinitis
- Partial rotator cuff tear
- Complete rotator cuff tear
- Massive rotator cuff tear
- Rotator cuff arthritis

Shoulder Impingement



1- Subacromial Impingement
   - Primary
   - Secondary

2- Subcoracoid Impingement

3- Internal (Glenoid) Impingement
- ASI (Antero-Superior Impingement)
- PSGI (Postero-superior glenoid Impingement)

Diagnosis

physical examination

positive Neer

positive Hawkins

supplemented with MRI

Primary subacromail impingement

- Primary Subacromial Impingement can be:

- **Instrinsic**:- The structures passing beneath the coracoacromial arch enlarge resulting in abutment against the arch.

  - Thickening of the rotator cuff
  - Calcium deposition
  - Thickening of subacromial bursa

Primary subacromail impingement

- **Extrinsic**:-When the space available for the rotator cuff is diminished; examples include

i. Subacromial spurring

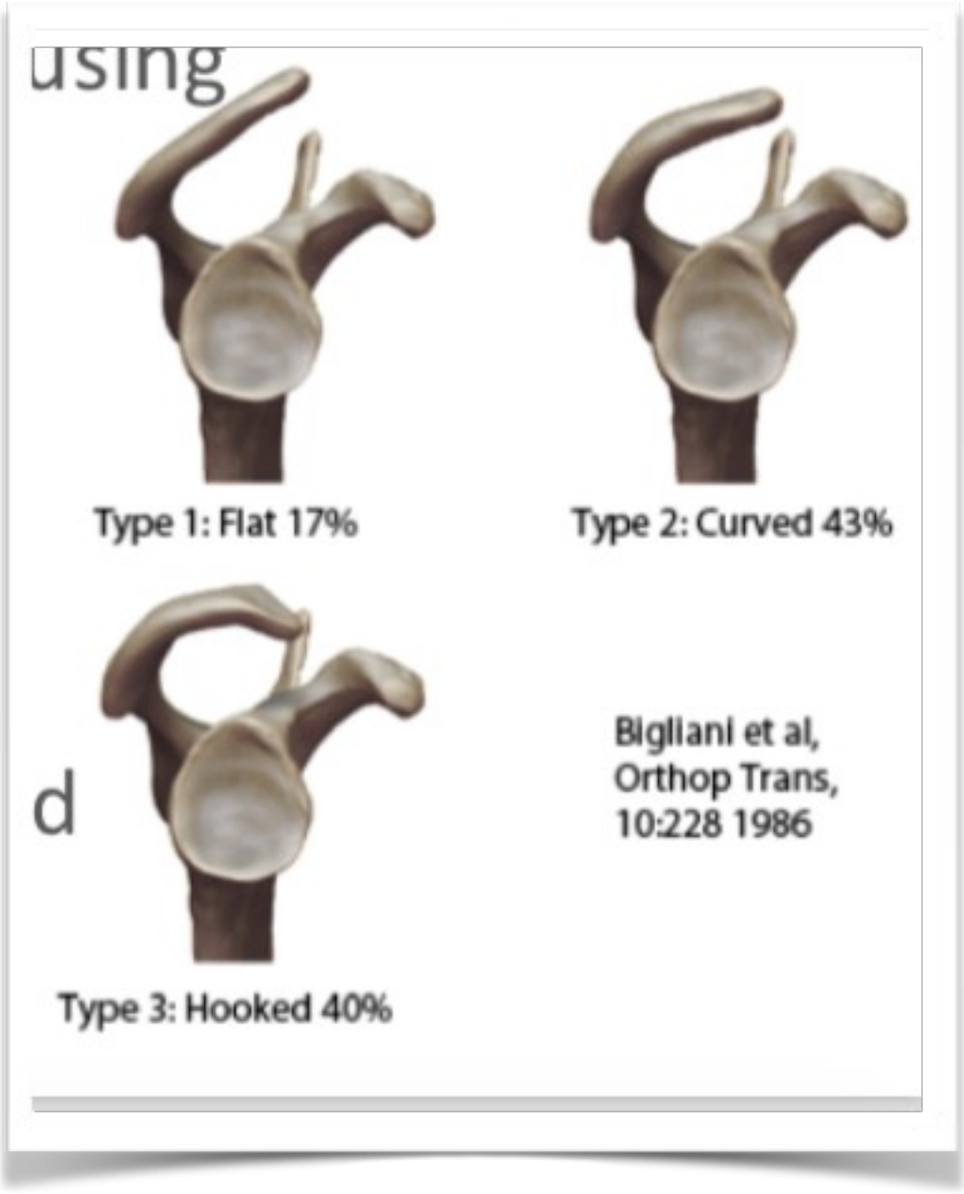
ii. Acromial fracture or pathological os acrominale

iii. Osteophytes off the undersurface of the acromioclavicular joint

iv. Exostosis at the greater tuberosity

Primary subacromail impingement

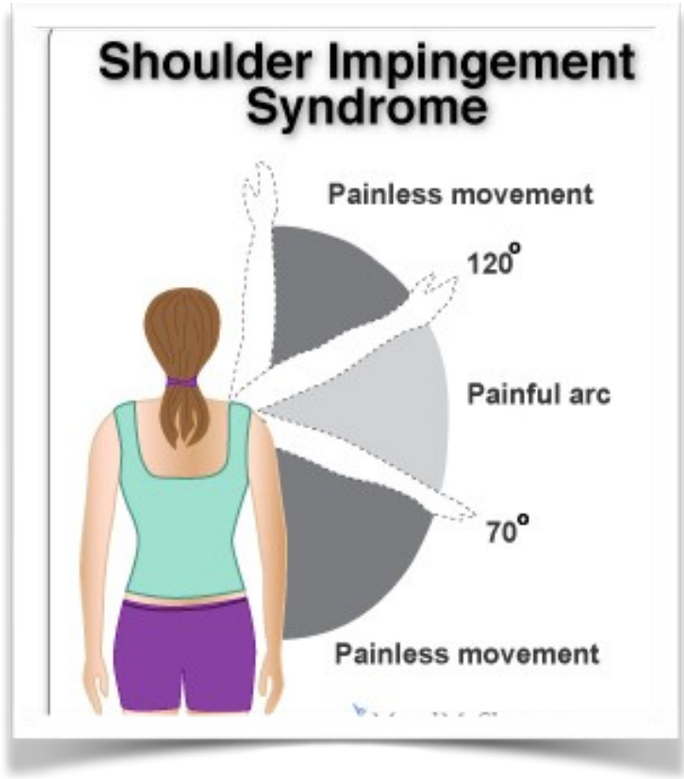
- Acromial morphology has been implicated as contributing to impingement
- Bigliani, Morrison, and April described three types of acromion morphology
- 70% of full-thickness RC tears in type III acromion



Presentation?

Clinical Evaluation

- Usually in patients >40 yo
- Pain in the anterior or front of the shoulder
- Pain is aggravated by overhead activities (brushing hair, reaching shelves)
- Painful arc between 60-120 degrees of abduction
- Pain increase at night and preventing the patient from sleeping on the affected side



Physical examination?

Impingment Signs

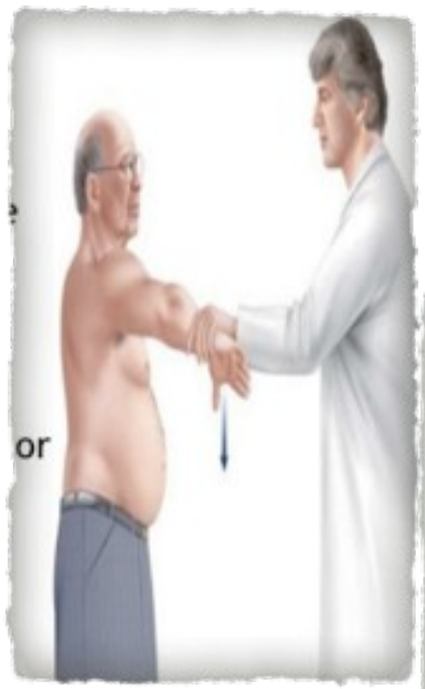
- Neer test:

- Hawkin test

Examination of Integrity of the Rotator Cuff

Supraspinatus

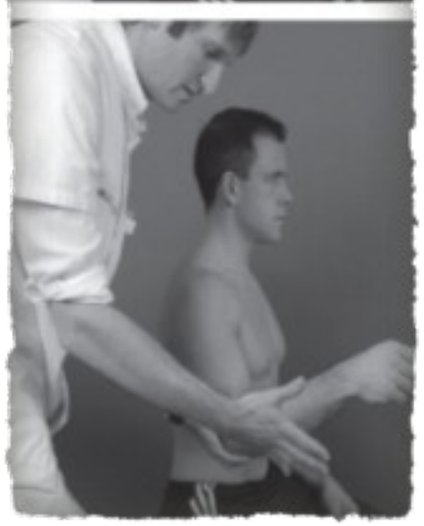
- Jobe test (empty can test)
- Drop arm test



Examination of Integrity of the Rotator Cuff

Infraspinatus :

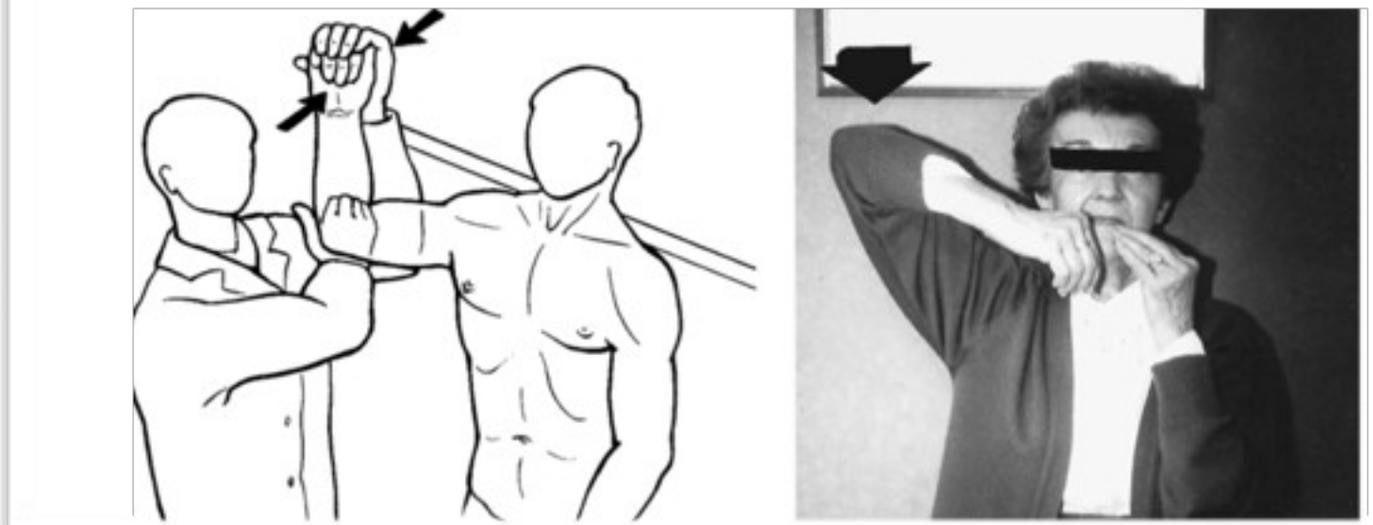
- Resisted external rotation with arm by side
- Drop sign
- External rotation lag test



Examination of Integrity of the Rotator Cuff

Teres minor:

- Hornblower (patte test)



Examination of Integrity of the Rotator Cuff

- Subacapularis:
- Lift off test
- Internal rotation lag sign
- Belly press test

Workup?

Radiological evaluation

- At least 3 views

A. True shoulder AP view (Grashey view):

Provide a true AP view of the shoulder without overlap

Show the profile position of the humeral head and glenoid..

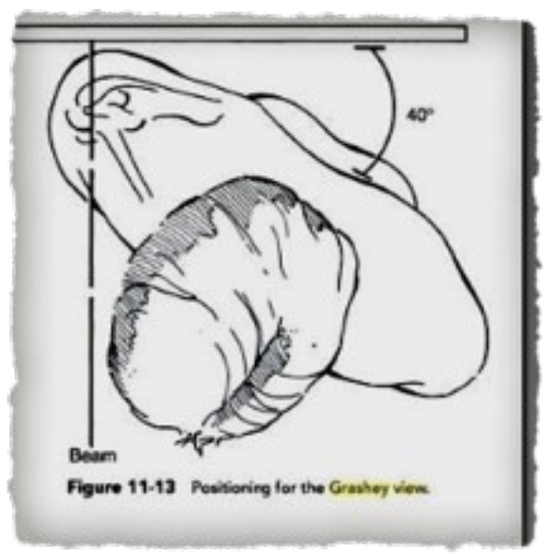
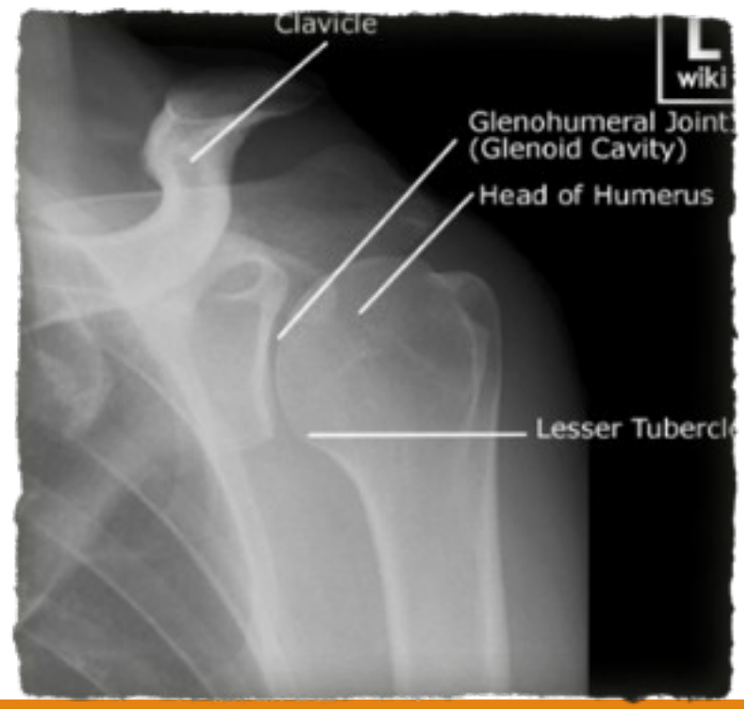


Figure 11-13 Positioning for the Grashey view.

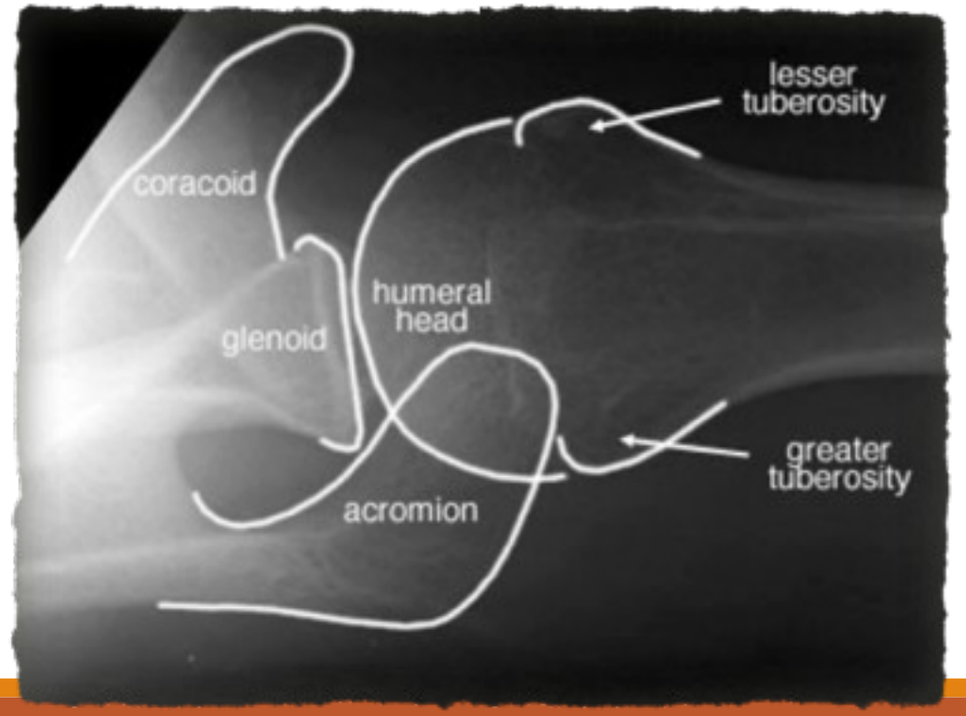


Radiological evaluation

B. Axillary view:

The true lateral view of the shoulder

Detect abnormalities of the glenoid, humeral head, coracoid process, and acromion



Radiological evaluation

C. Supraspinatus outlet view:

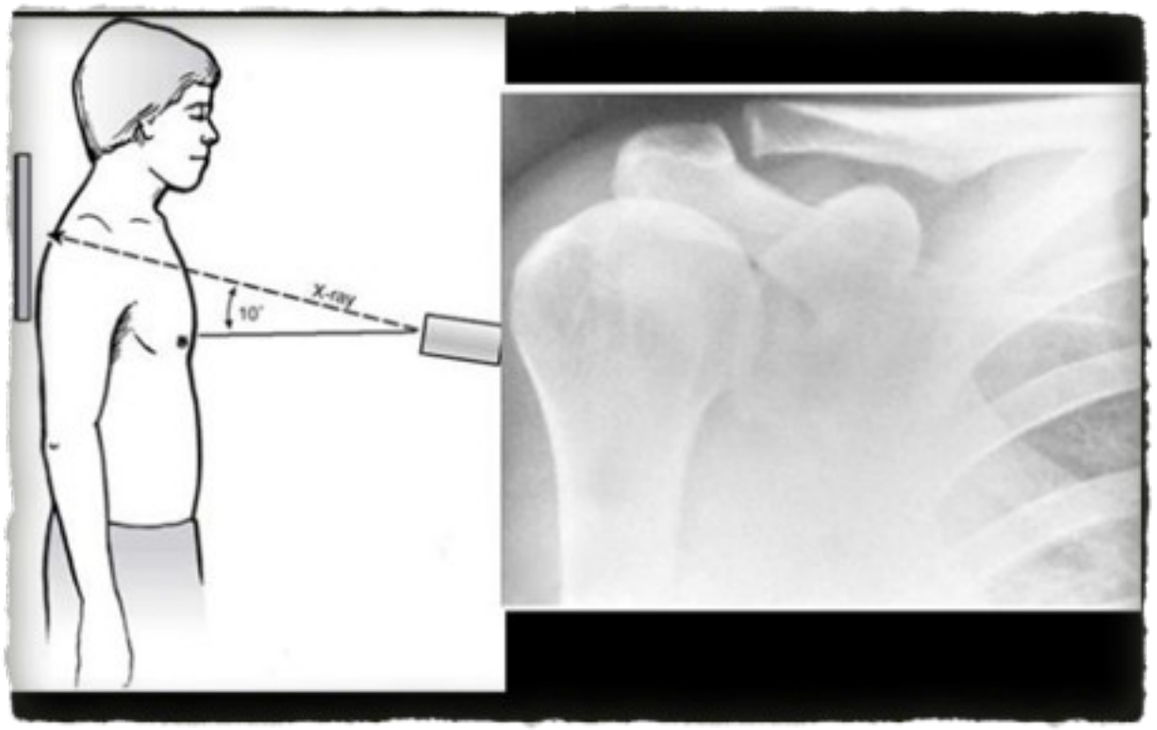
Provide a profile view of the acromion, helps to detect abnormalities of the acromion and coracoacromial arch

Patient is erect with the anterior aspect of the affected shoulder against the X-ray plate with the other shoulder rotated out 40 degrees, the x-ray beam is directed 20 degrees caudally

Radiological evaluation

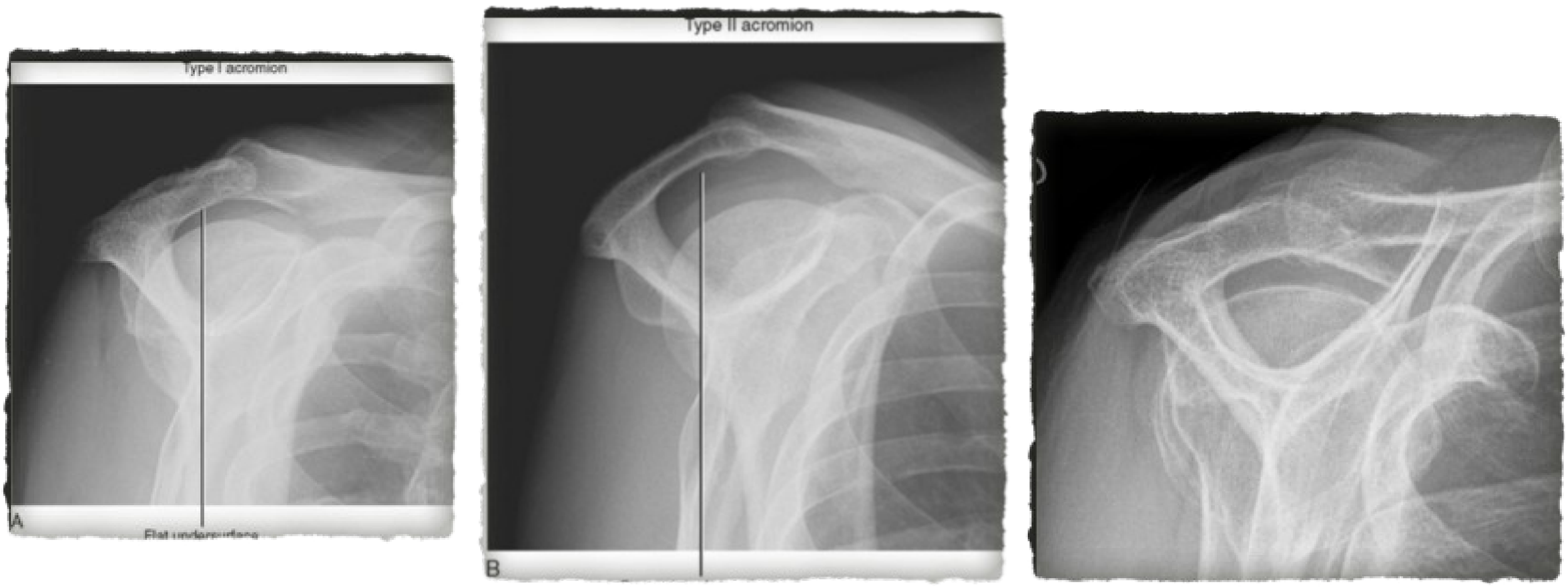
- Zanca View:

Helps in detection any abnormalities of the AC joint



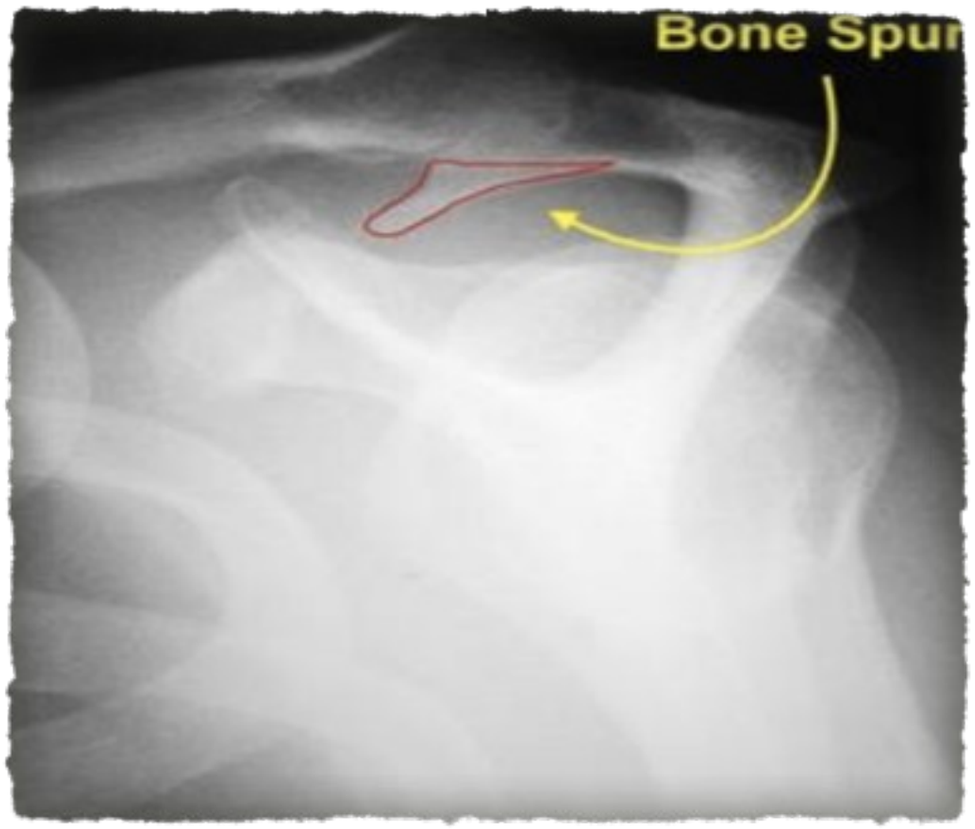
Radiographic finding in Impingement syndrome

- Detection of the shape of acromion



Radiographic finding in Impingement syndrome

- Acromial spurs



Radiographic finding in Impingement syndrome

- Keel Acromion

Acromial spur running from anterior acromion to the mid acromion. Rather than the regular spur that runs from medial to lateral

Radiographic finding in Impingement syndrome

- Calcifications

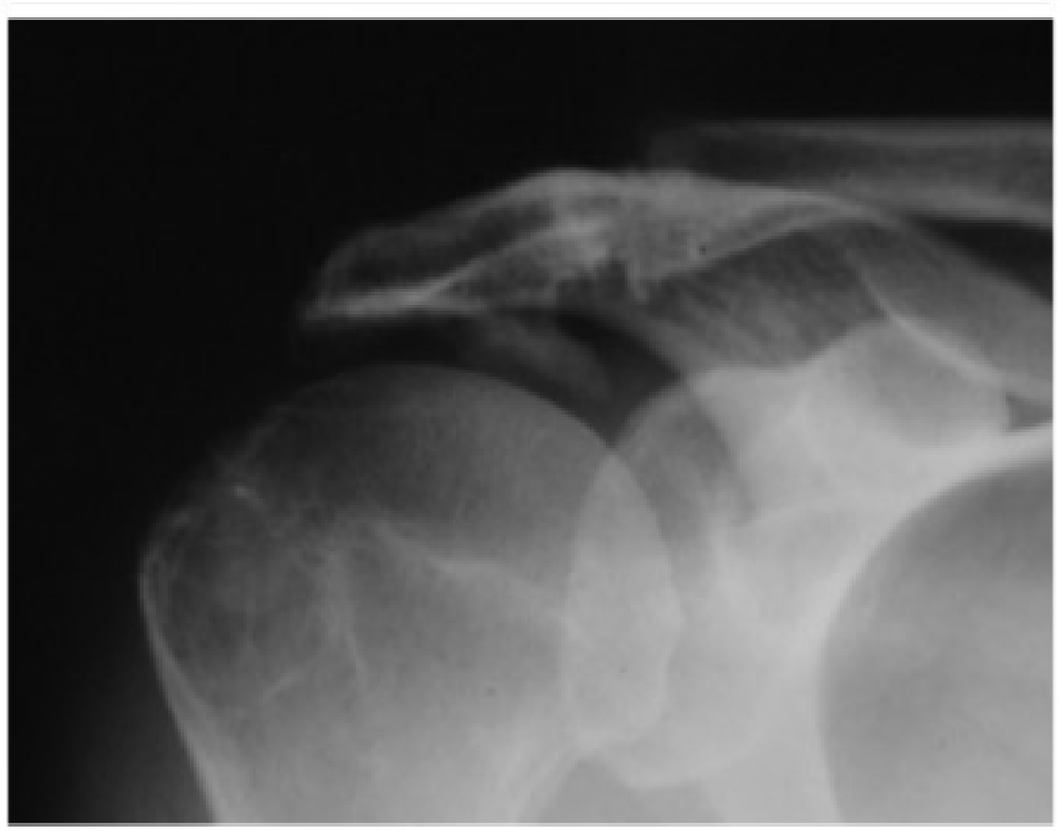
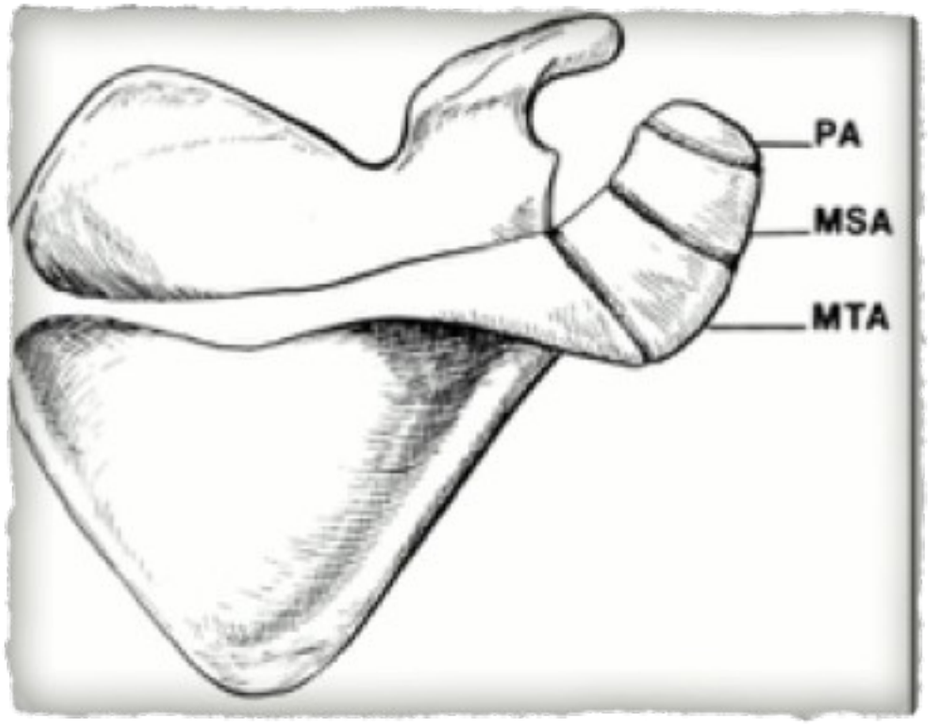


Figure 10-3 Coracoacromial ligament ossification.

Radiographic finding in Impingement syndrome

- Os acromiale



Radiographic finding in Impingement syndrome

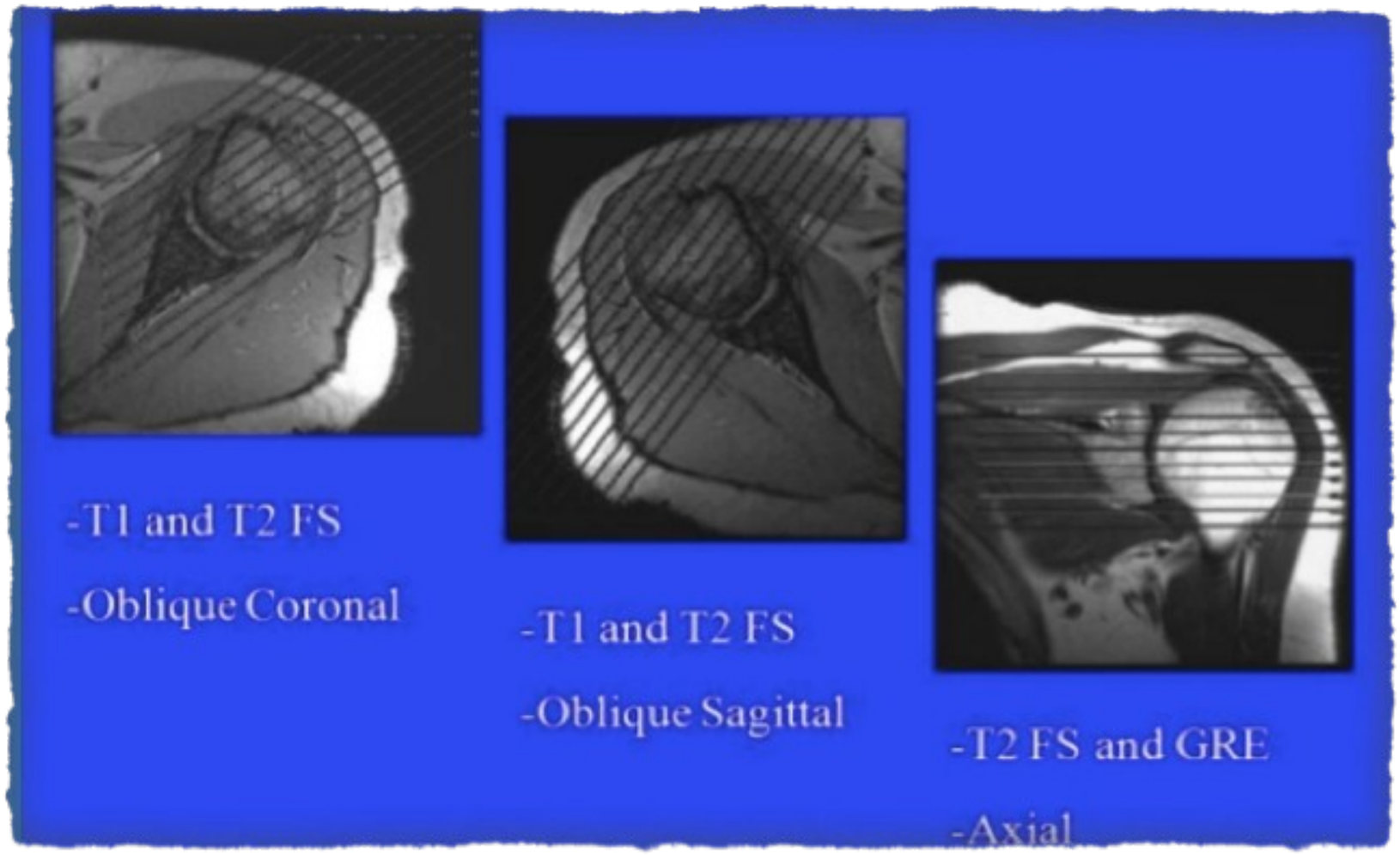
- Osteophytes from the Acromio-clavicular joint

MRI

- MRI is now the most commonly used test for evaluation for sub-acromial space and rotator cuff pathology.
- It is highly accurate and shows detailed anatomical information, including:
  - size and shape of glenoid,
  - rotator cuff tears
  - status of the rotator cuff muscles.
  - tendinopathy are well visualized by MRI.
- A patient with symptoms of subacromial impingement may show increased signal in the supraspinatus tendon on T2-weighted MRI consistent with tendinopathy; increased fluid in the subacromial bursa also is a sign of subacromial impingement.
- Fatty replacement of the supraspinatus muscle and the supraspinatus fossa indicates chronic pathology.

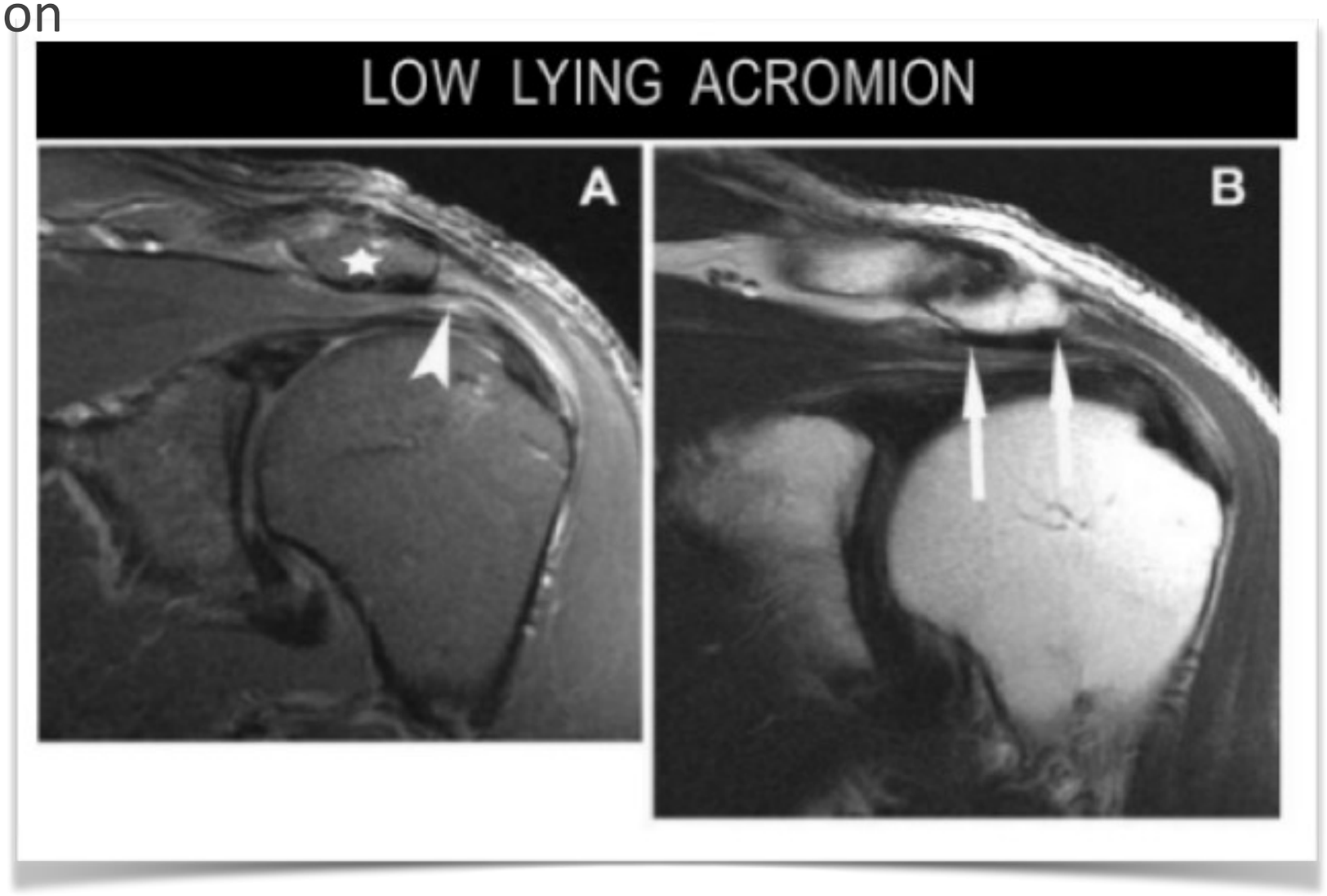
MRI

- MRI protocol for shoulder evaluation:



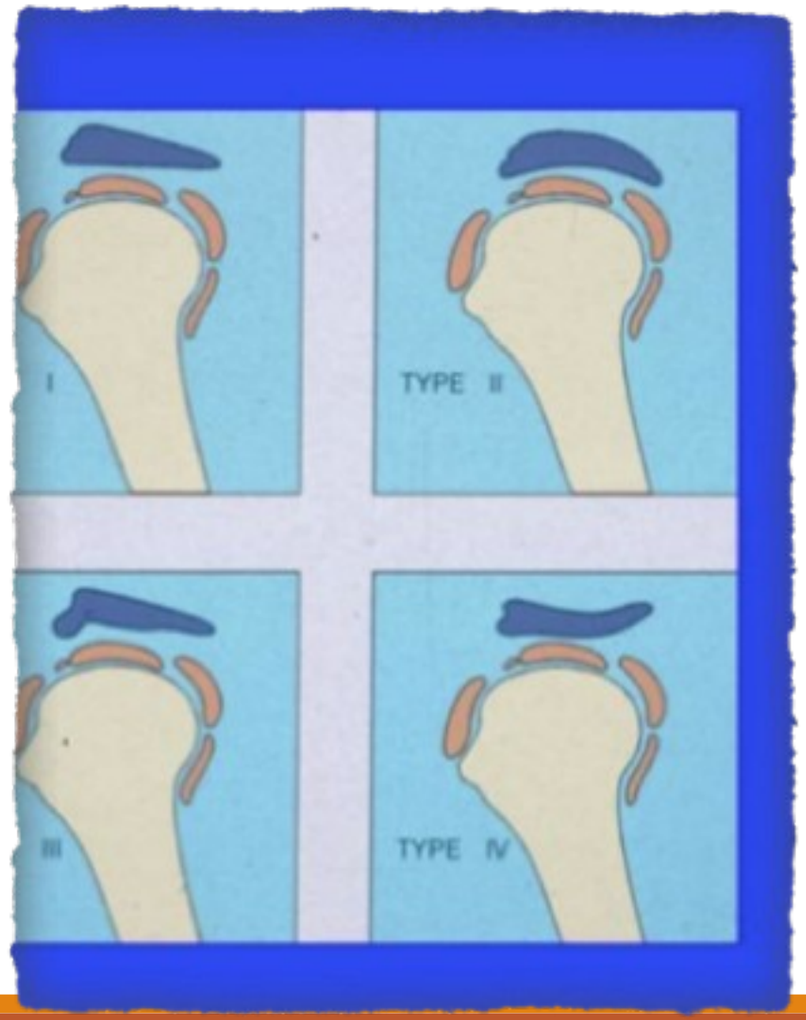
MRI

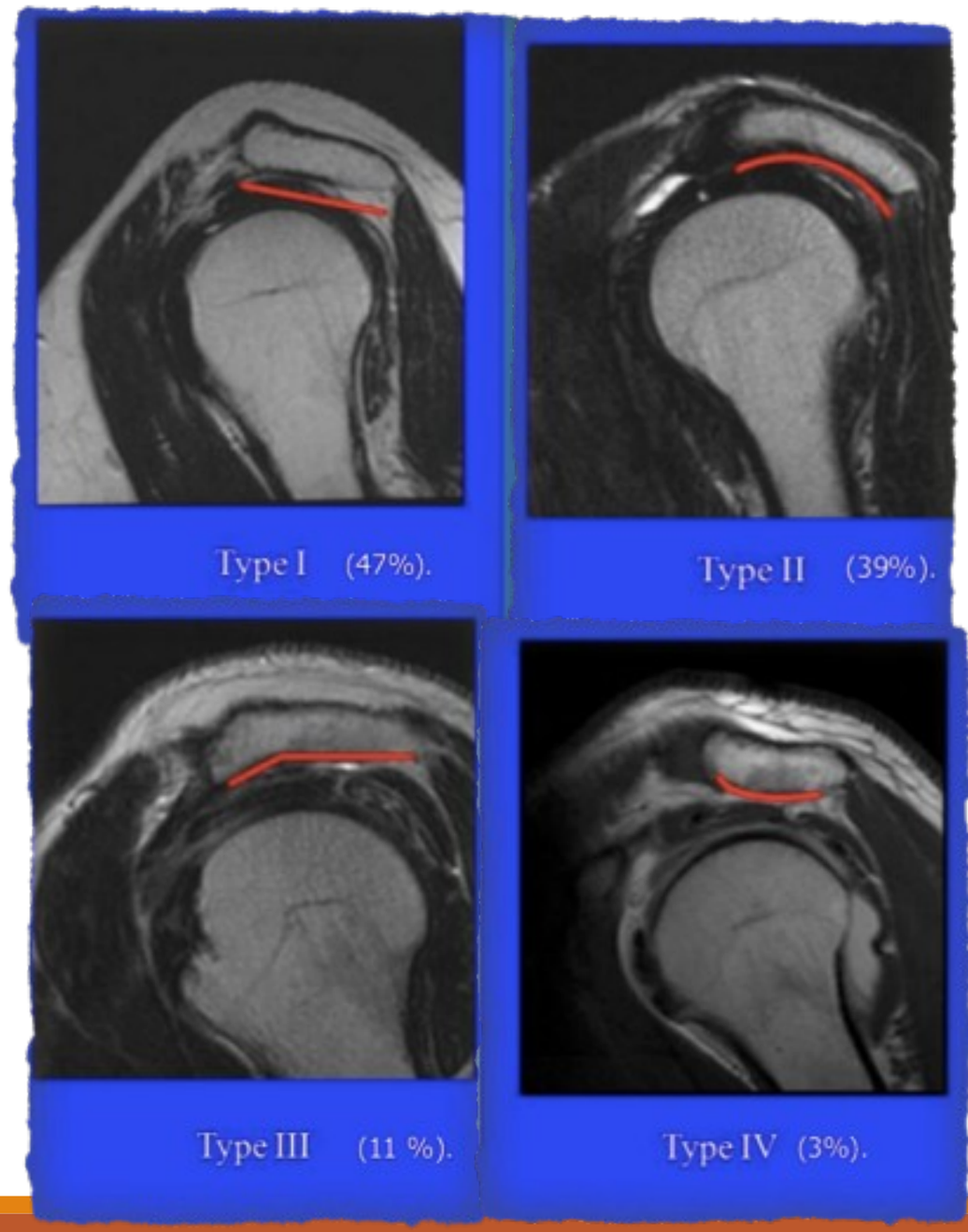
- Acromial position



MRI finding in subacromial Impingement

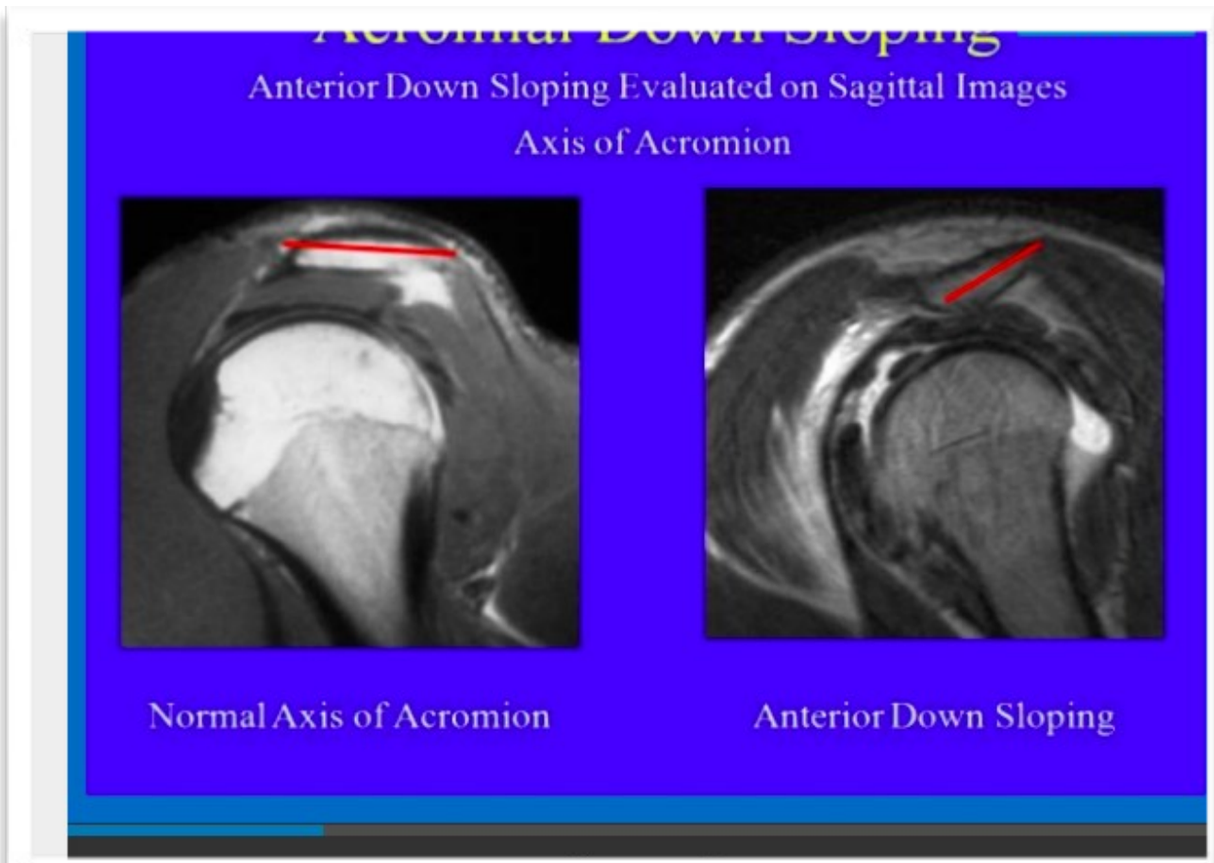
- Acromial type:

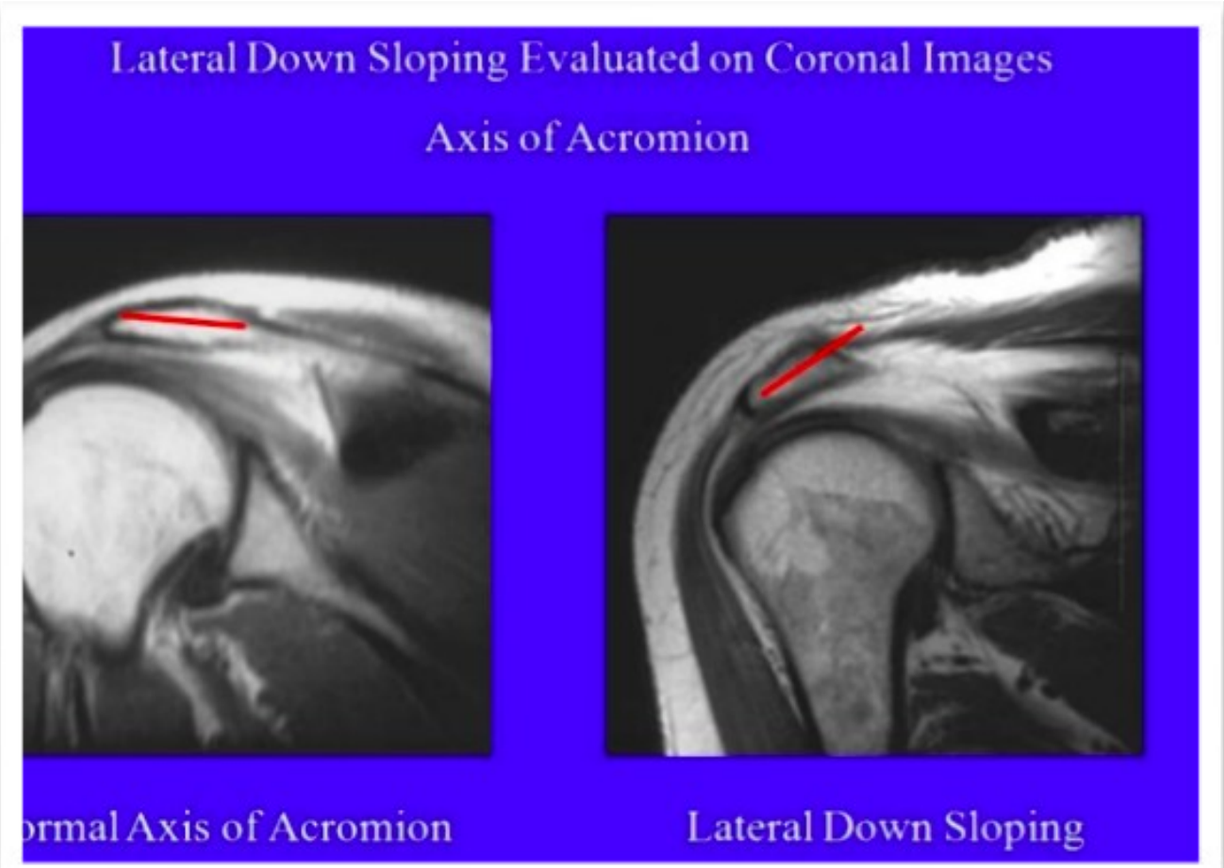




MRI finding in subacromial Impingement

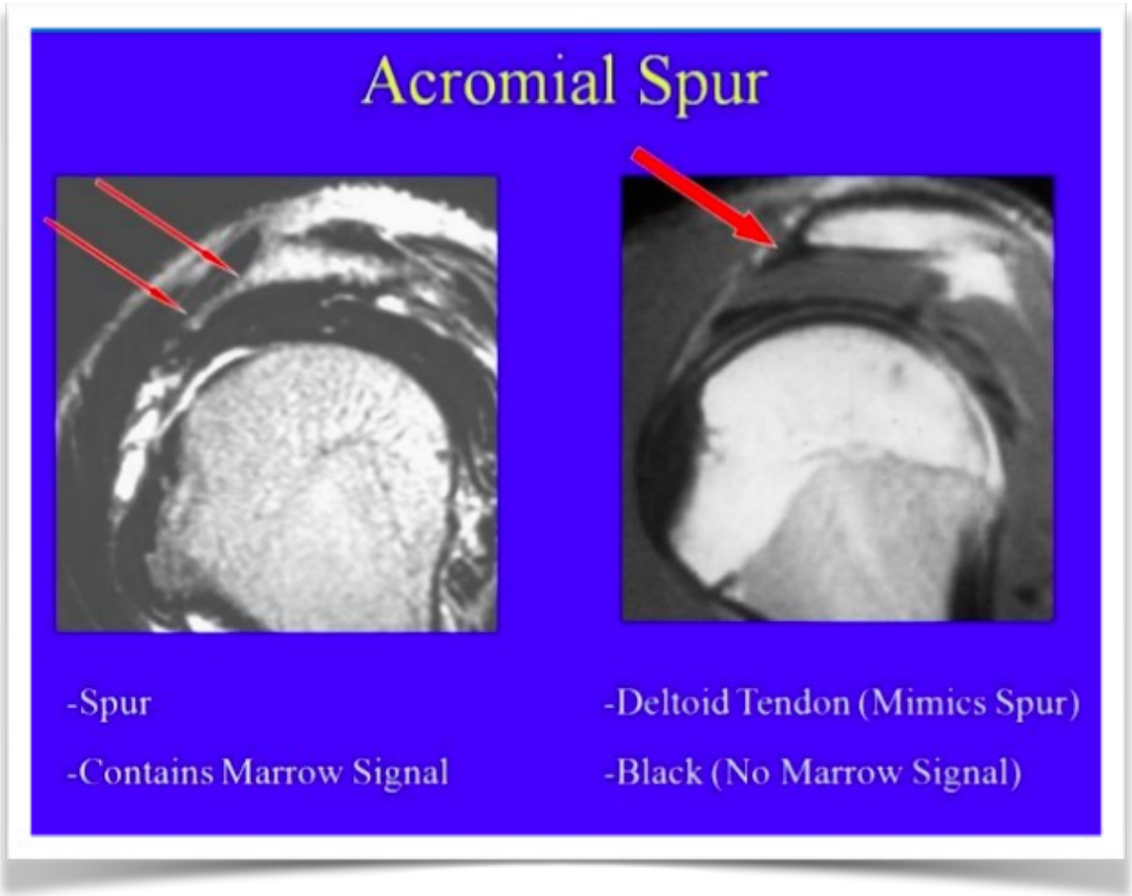
- Acromial anterior and lateral slopping

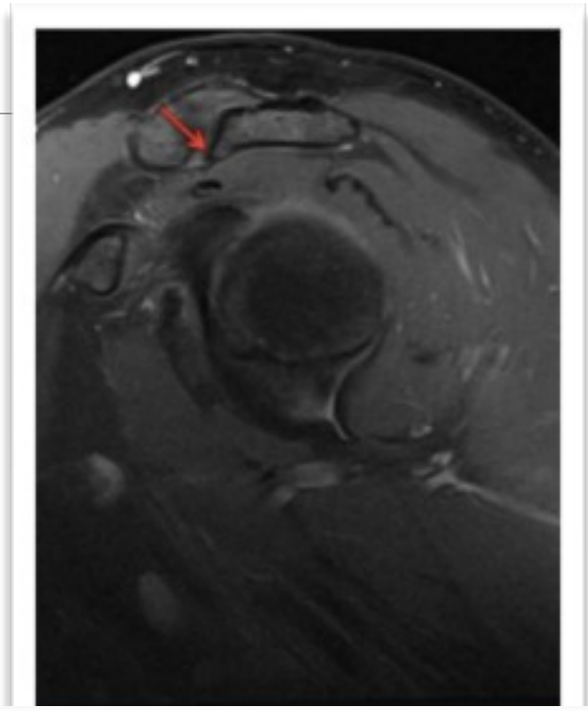


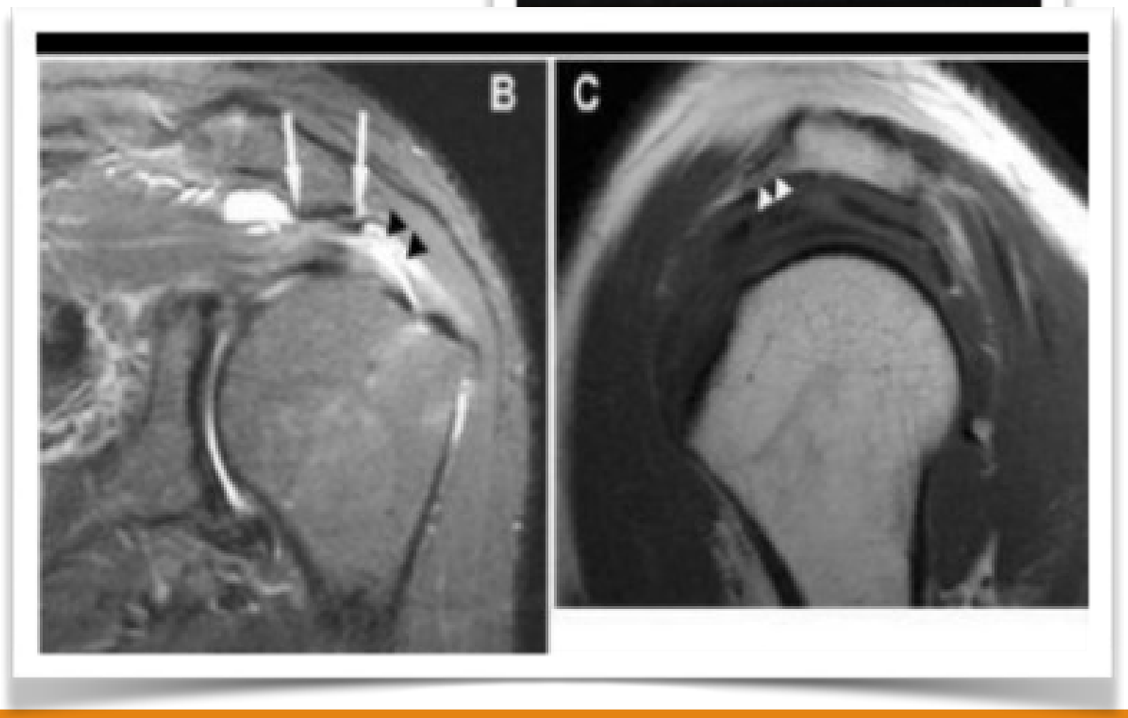


MRI finding in subacromial Impingement

- Acromial spur

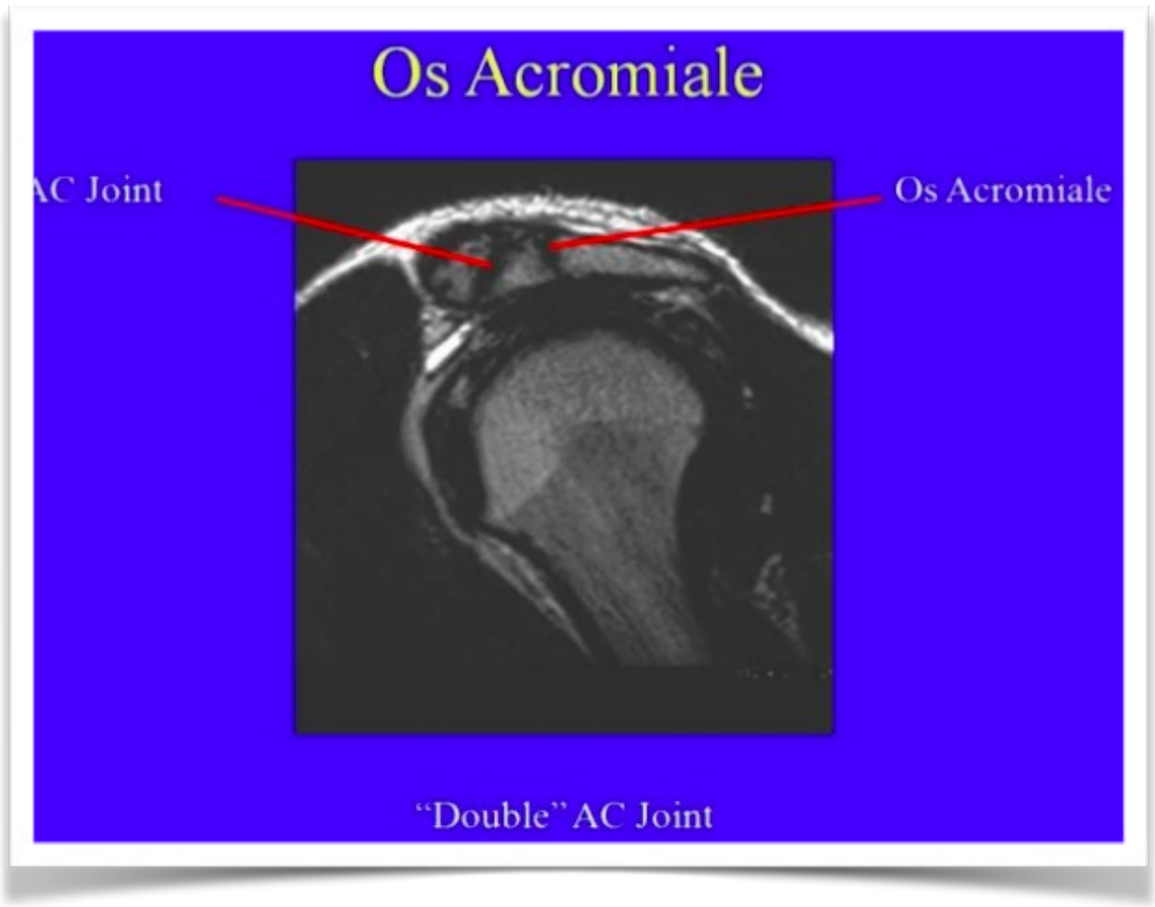


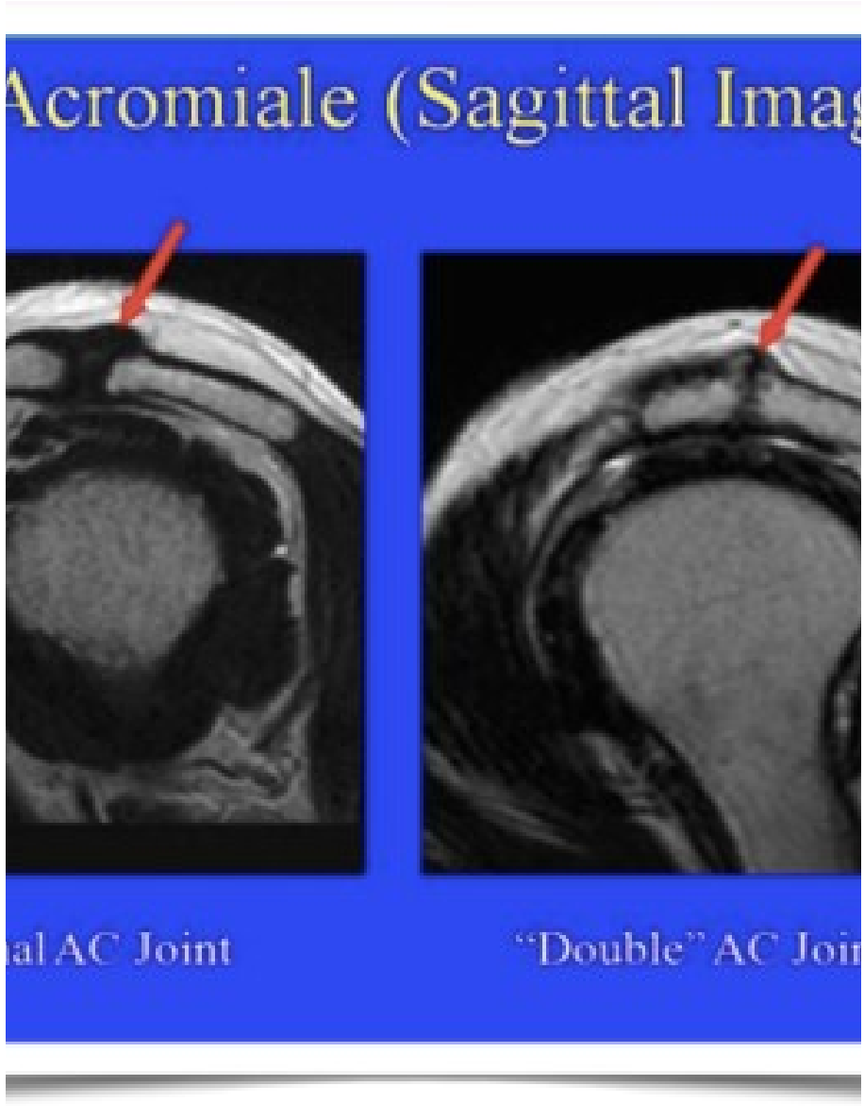




MRI finding in subacromial Impingement

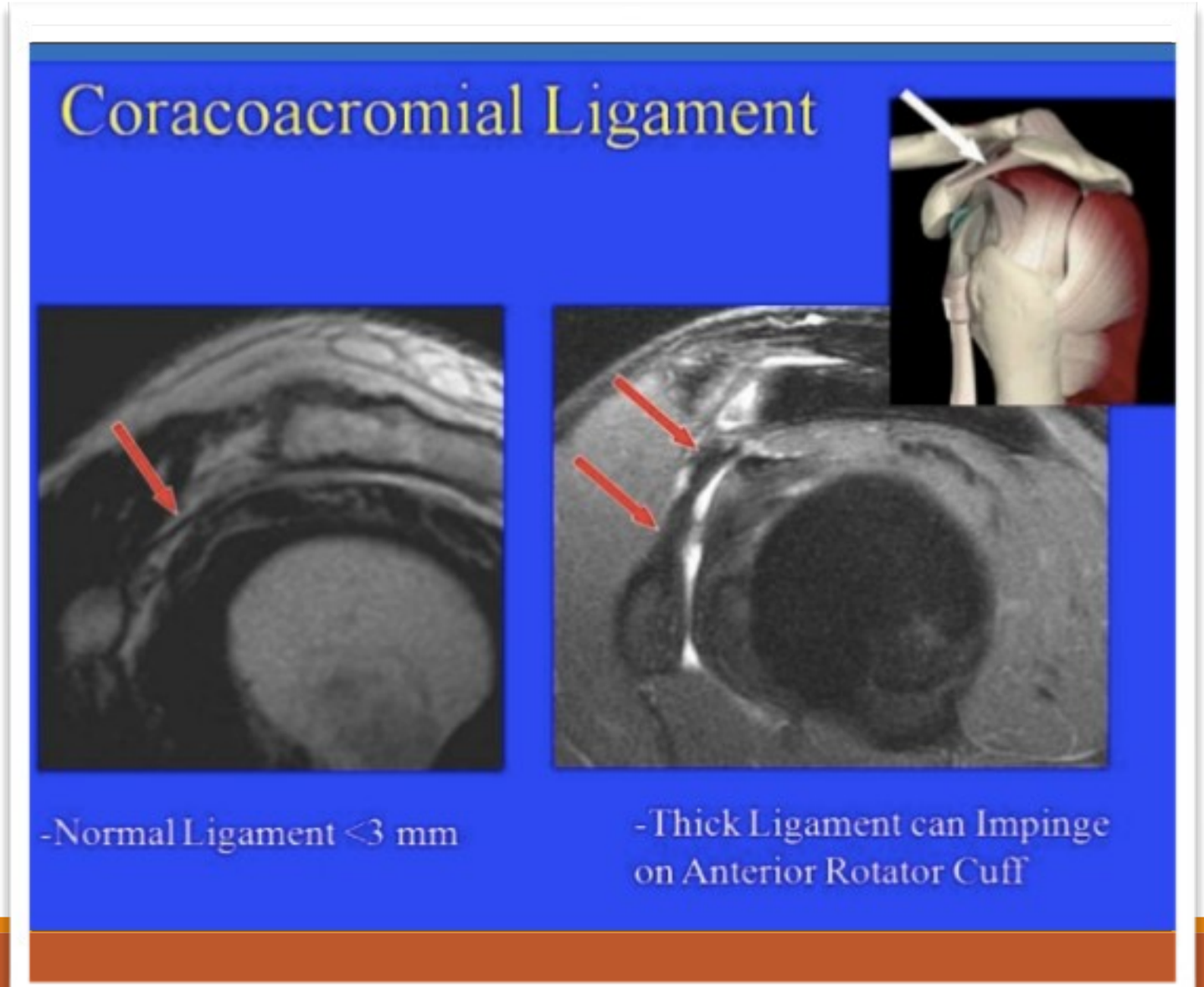
- OA- Acromiale





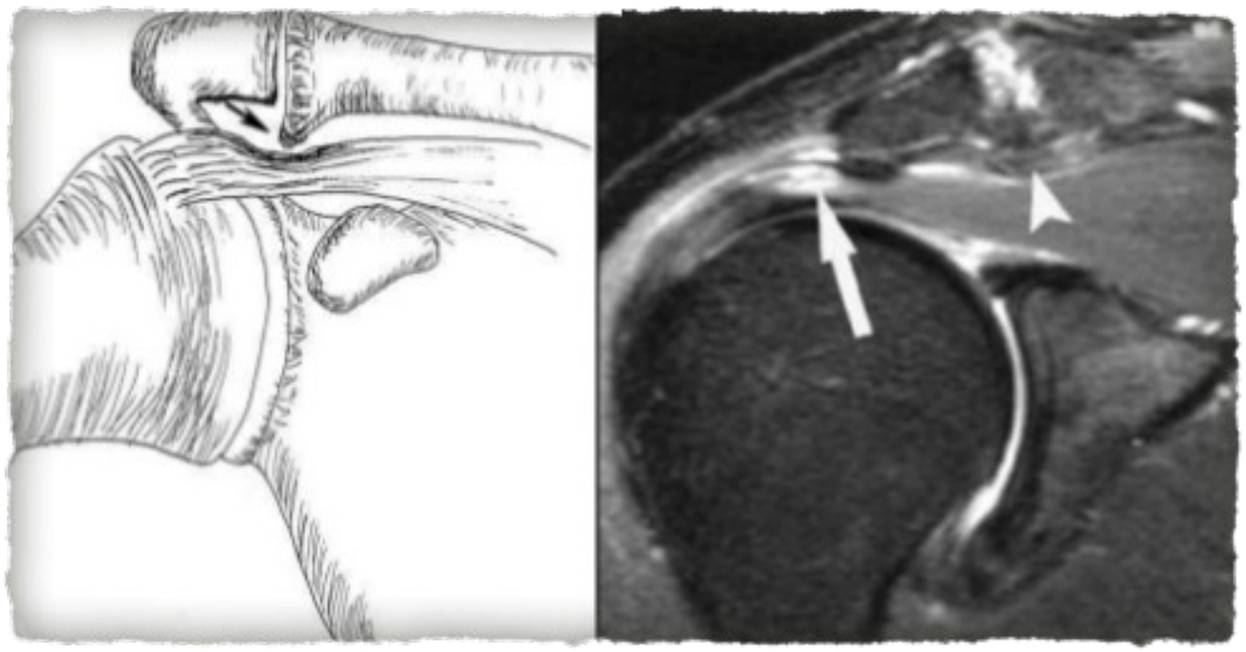
MRI finding in subacromial Impingement

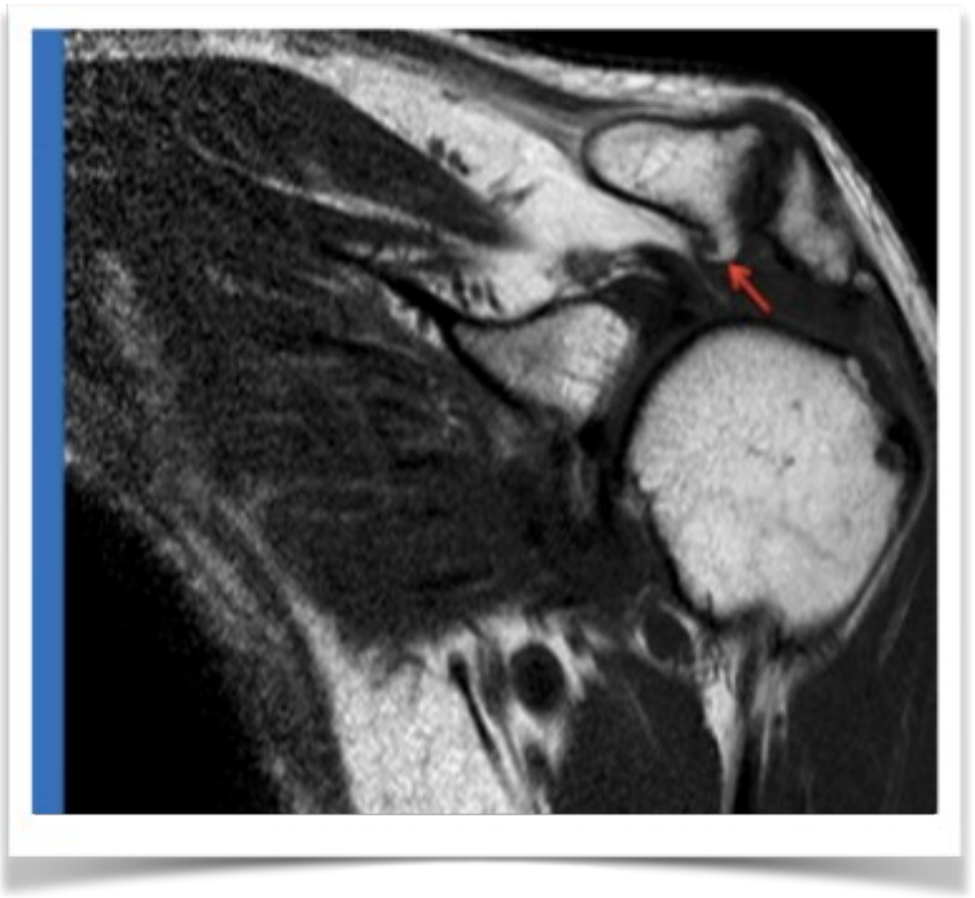
- Thickened coracoacromial ligament



MRI

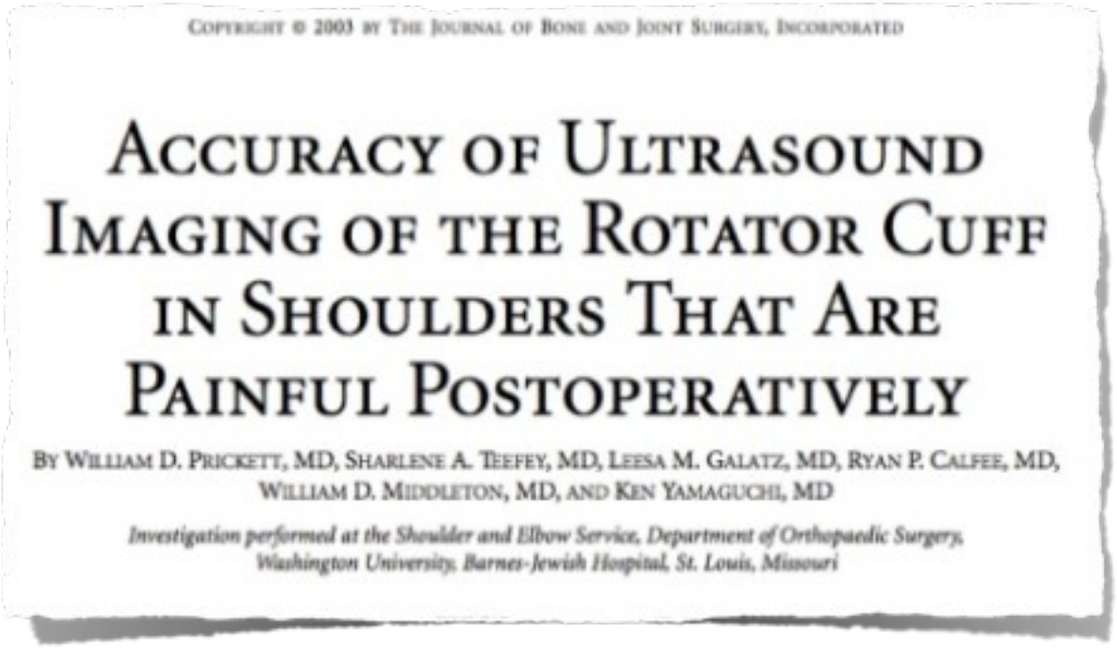
- Acromiocalvicular joint





Shoulder Ultrasonography

- Shoulder ultrasonography provides a cheap, simple, and dymanic office based evaluation of the shoulder
- Also US can be used in guided injection of the subacromial space, biceps tendon and AC joint
- US guided hydrodilation can be used in Frozen shoulder



Accuracy of Ultrasound Imaging of the Rotator Cuff in Shoulders That Are Painful Postoperatively

By William D. Prickett, MD, Sharlene A. Teefey, MD, Leesa M. Galatz, MD, Ryan P. Calfee, MD, William D. Middleton, MD, and Ken Yamaguchi, MD

Investigation performed at the Shoulder and Elbow Service, Department of Orthopaedic Surgery, Washington University, Barnes-Jewish Hospital, St. Louis, Missouri

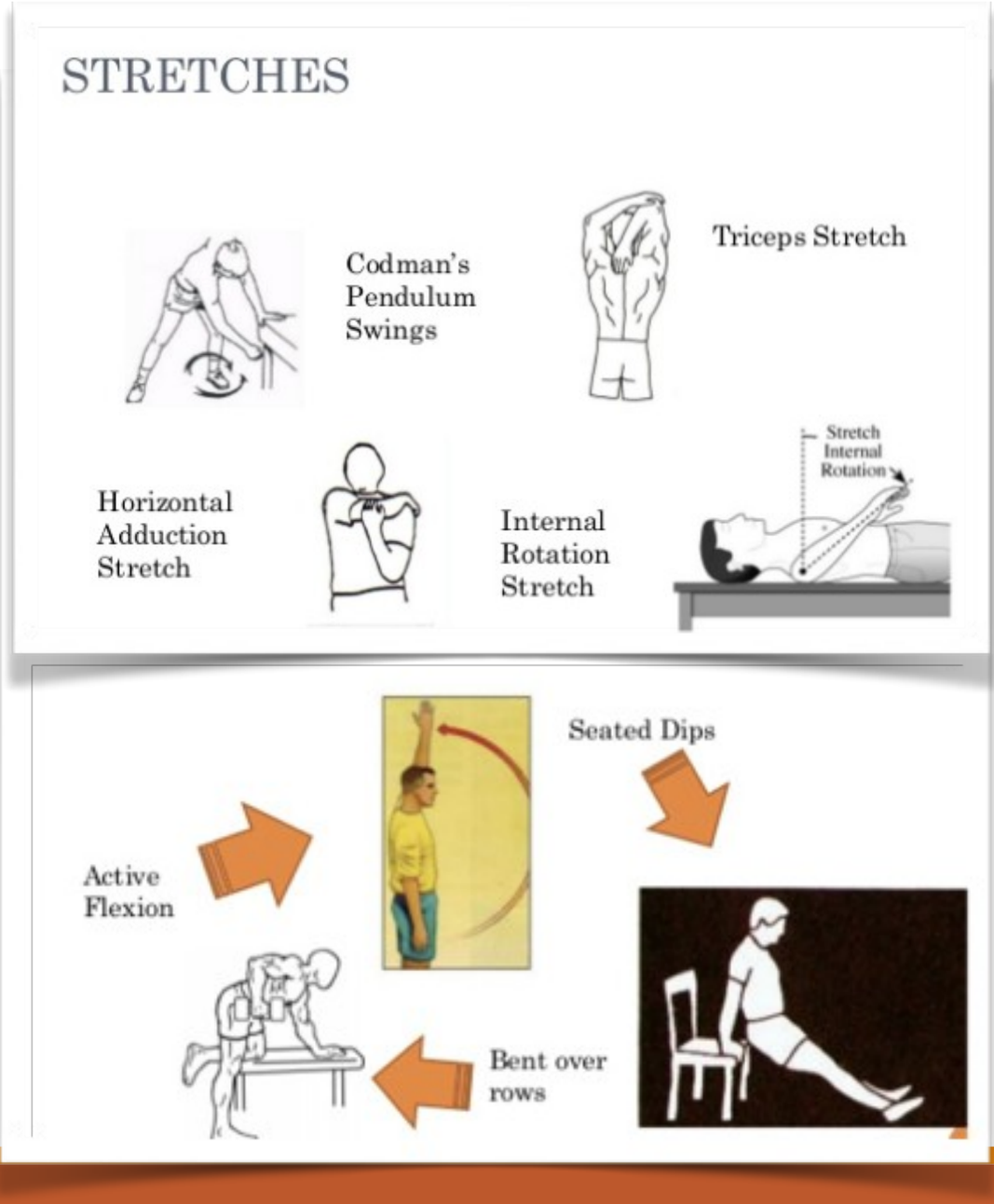
Shoulder Ultrasonography

Management ?

Management of primary Subacromial Impingement

Non Surgical Treatment:

- Modification of activity with temporary cessation of overhead activities
- Anti-inflammatory medications. one or at most two subacromial cortisone injections,
- A physical therapy program focusing on stretching for full shoulder motion and strengthening the rotator cuff.



Management of primary Subacromial Impingement

Surgical Treatment:

- The goal of surgery is to remove the impingement and create more subacromial space for the rotator cuff
- Indicated if there is no improvement after 6 months of conservative treatment
- Operative intervention should be directed to the specific lesion

Management of primary Subacromial Impingement

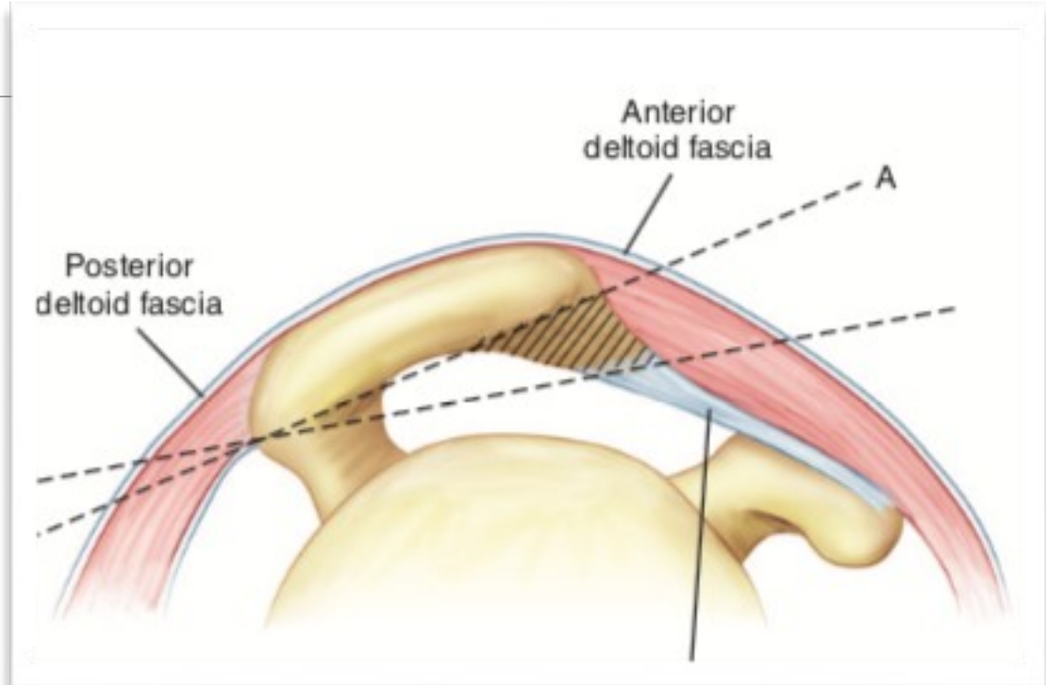
- The surgical treatment of impingement syndrome can be open or Arthroscopic

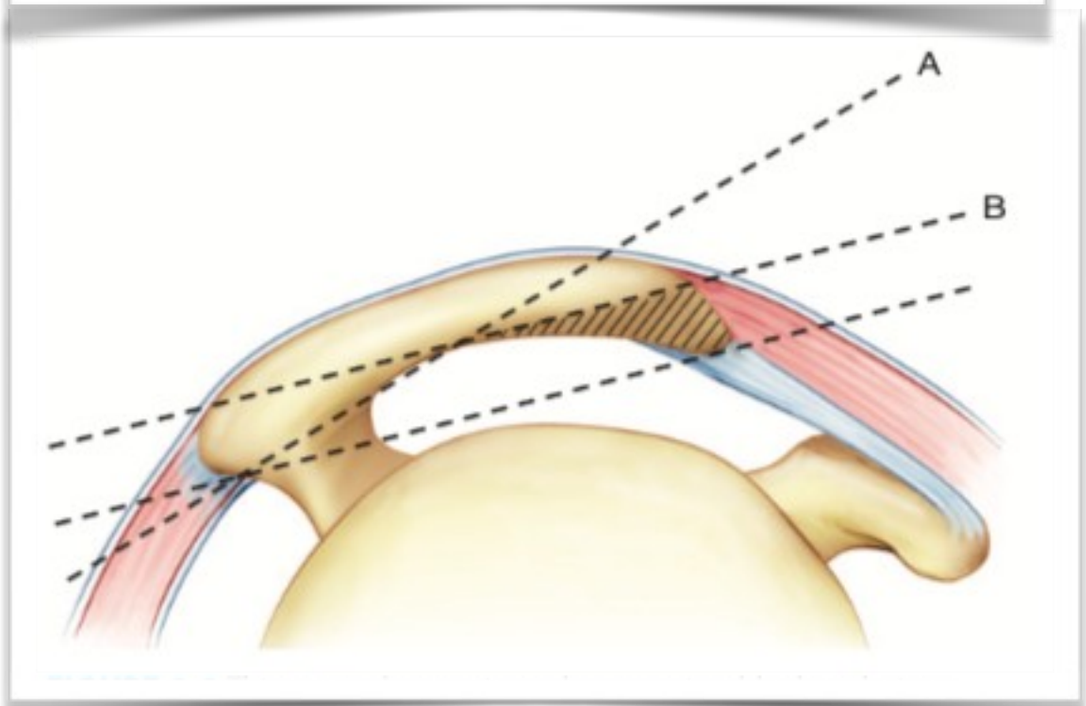
Preoperative planning

- The shape and thickness of acromion determine the appropriate decompression technique either :

A. Limited anterior resection technique

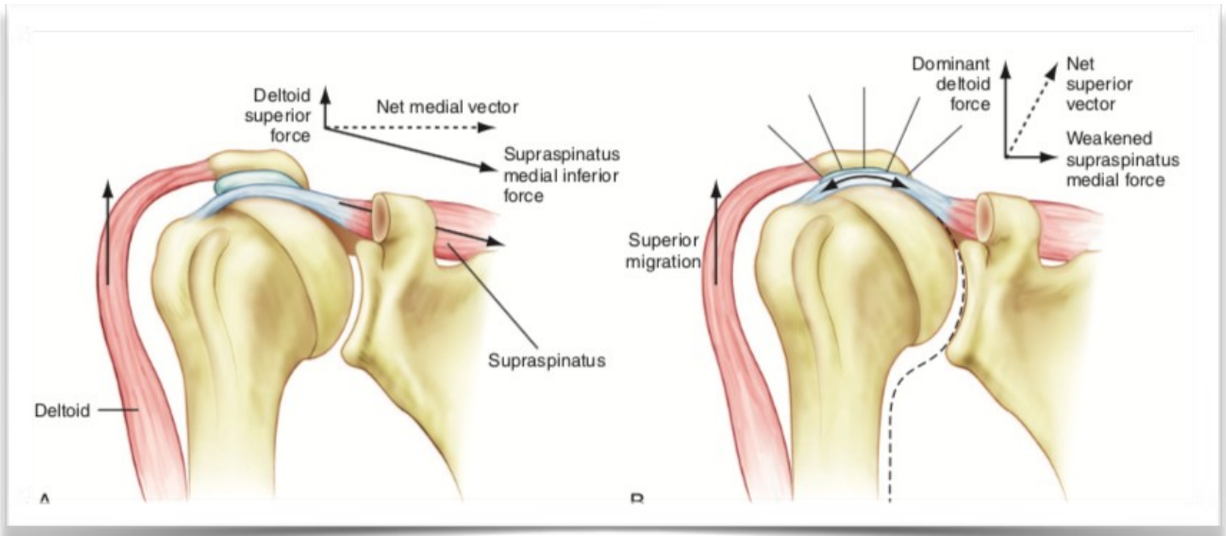
B. Cutting block technique





Secondary Subacromial Impingement

- Jobe and associates 1989, originated the concept of secondary subacromial impingement.
- Combined weakness in the RC muscles (functional instability) with a glenohumeral joint capsule and ligaments that are loose (micro-instability).
- This combination allows a superior motion of the humeral head and as a consequence narrowing of the subacromial space



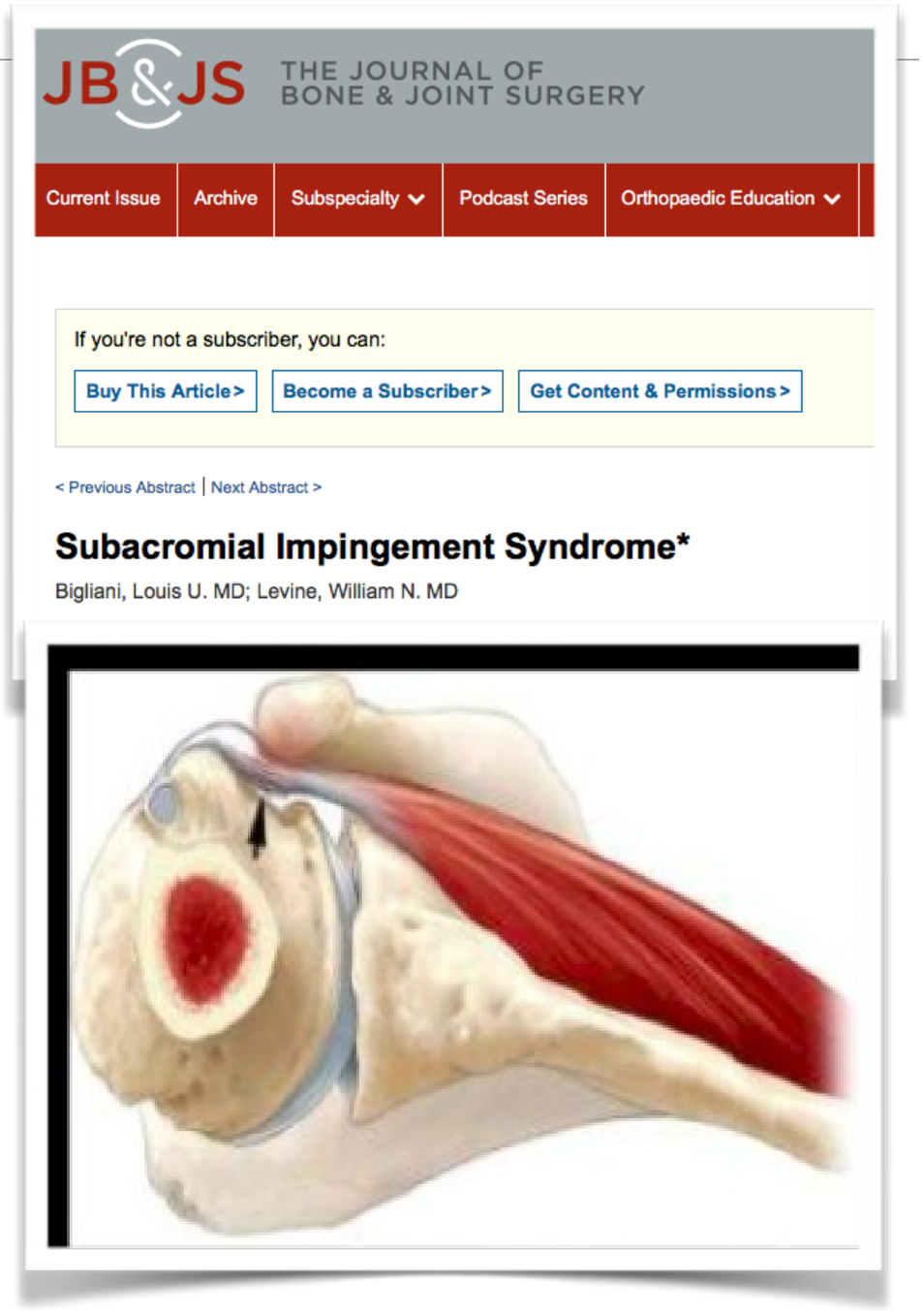
Secondary Subacromial Impingement

- Secondary impingement is more prevalent in a younger patient population actively involved in overhead sports activities and should be suspected when the bony architecture is unremarkable.
- Treatment should be directed towards the glenohumeral micro-instability.

Extra reading

Subcoracoid Impingement

- Bigliani et al. 1997 introduced the concept of coracoid impingement
- Subcoracoid space: Interval between the tip of the coracoid and the humeral head (the coracohumeral interval).
- Normal coracohumeral interval: 8.4- 11.0mm and should be large enough to accommodate the subscapularis tendon, bursa and and the rotator interval tissues .
- Subcoracoid stenosis: Narrowing of the Subcoracoid space with a coracohumeral interval of less than 6mm.

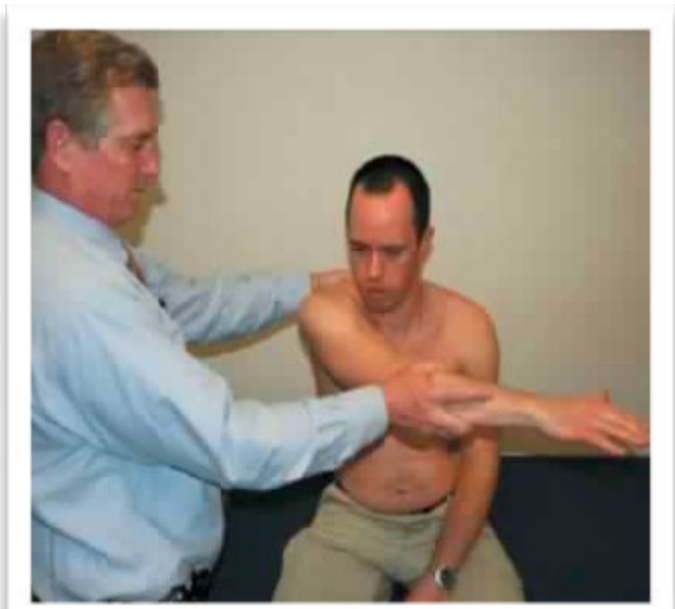


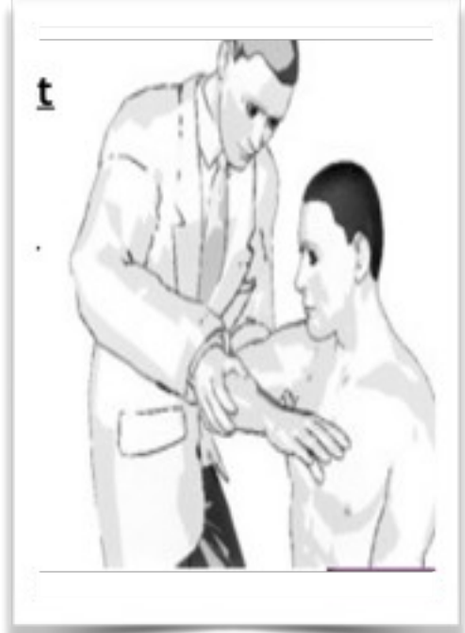
Subcoracoid Impingement

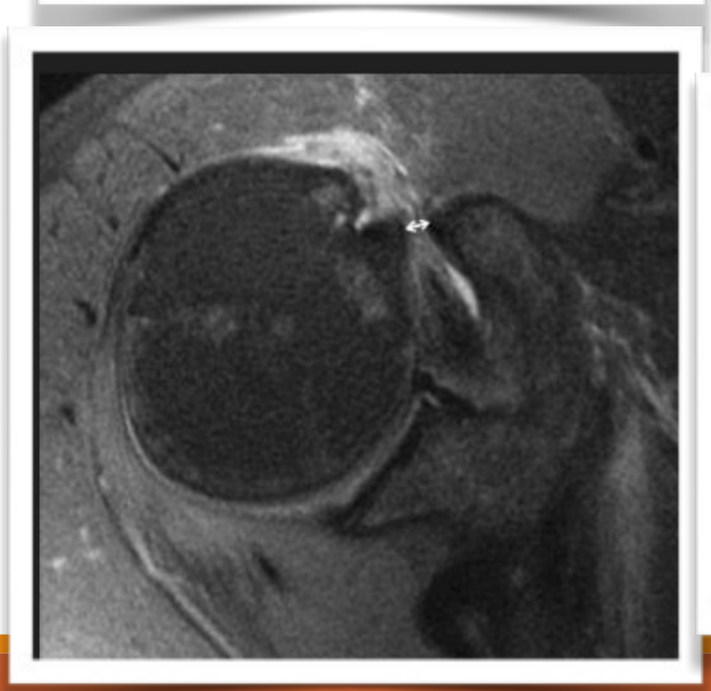
- Subcoracoid impingement may be Idiopathic due to enlargement or mal-direction of the coracoid process, traumatic fracture of coracoid or lesser tuberosity, Space occupying lesion as ganglion or calcification or Iatrogenic post surgery involving coracoid process

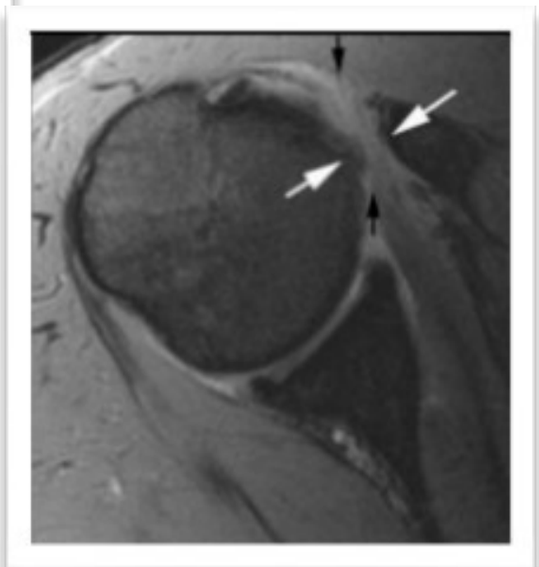
Subcoracoid Impingement

- Presentation is anterior shoulder pain that increase by elevation and rotation of the arm
- Clinically: tenderness over the coracoid process
- Positive Gerber Sign
- MRI: Increase the intensity of subacapularis tendon with decrease the coracohumeral distance.



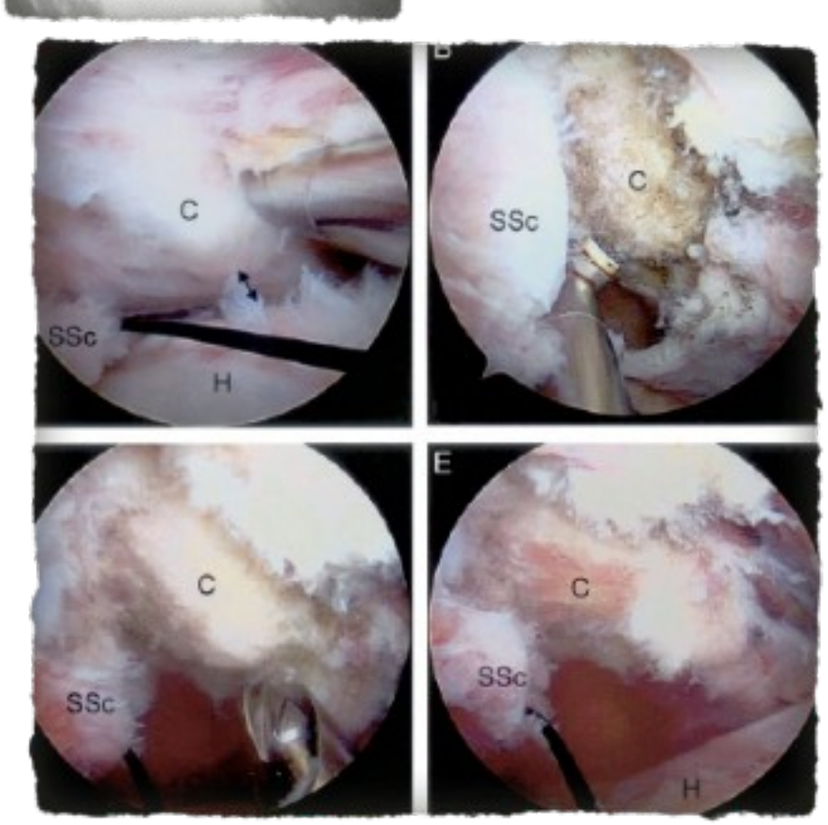


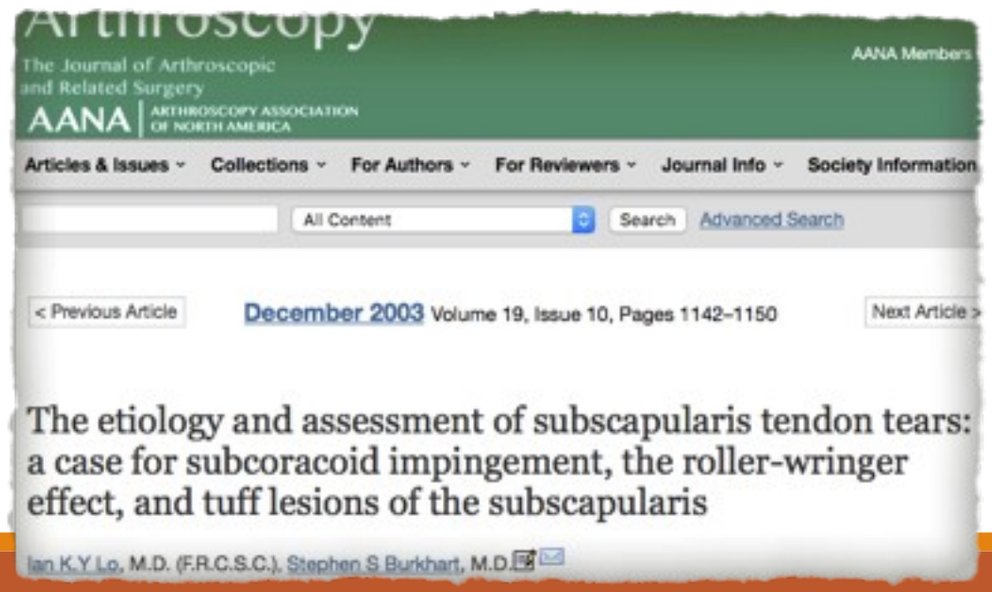




Management of Subcoracoid Impingement

- Usually resistant to conservative Surgical treatment is usually warranted.
- Surgical treatment involves a coracoplasty (removing a portion of the coracoid process) with debridement or repair of the subscapularis tear.



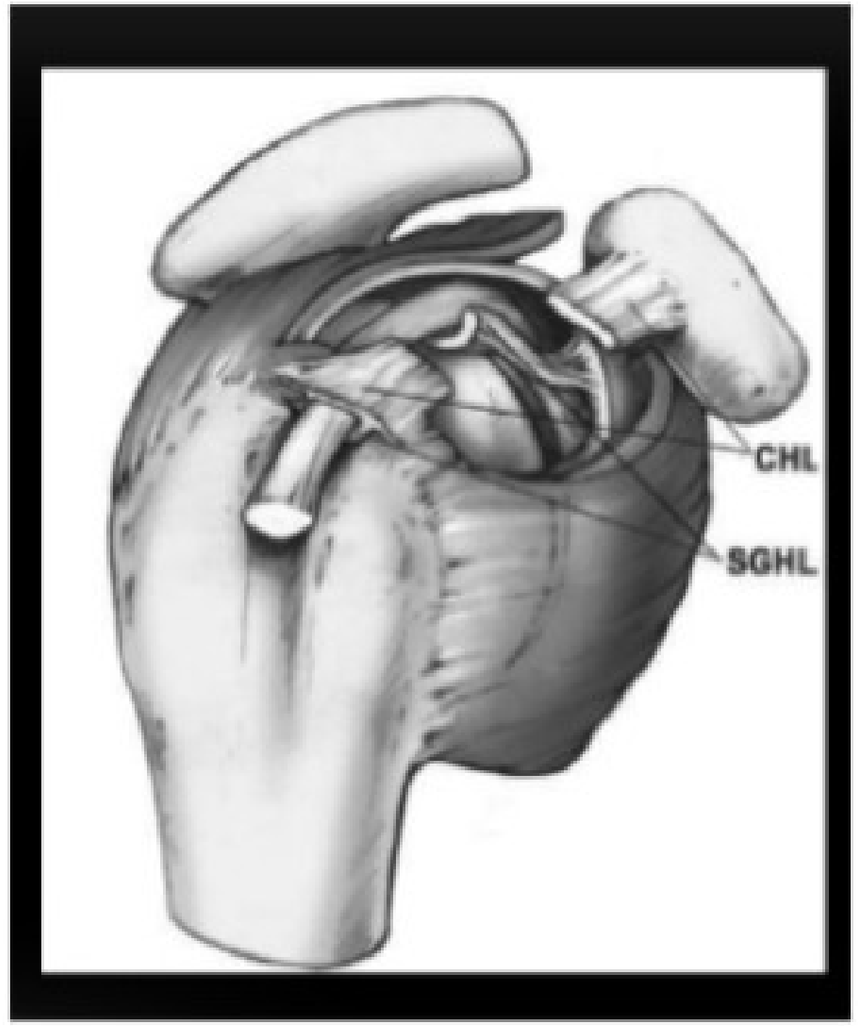


Internal glenoid Impingement

in brief

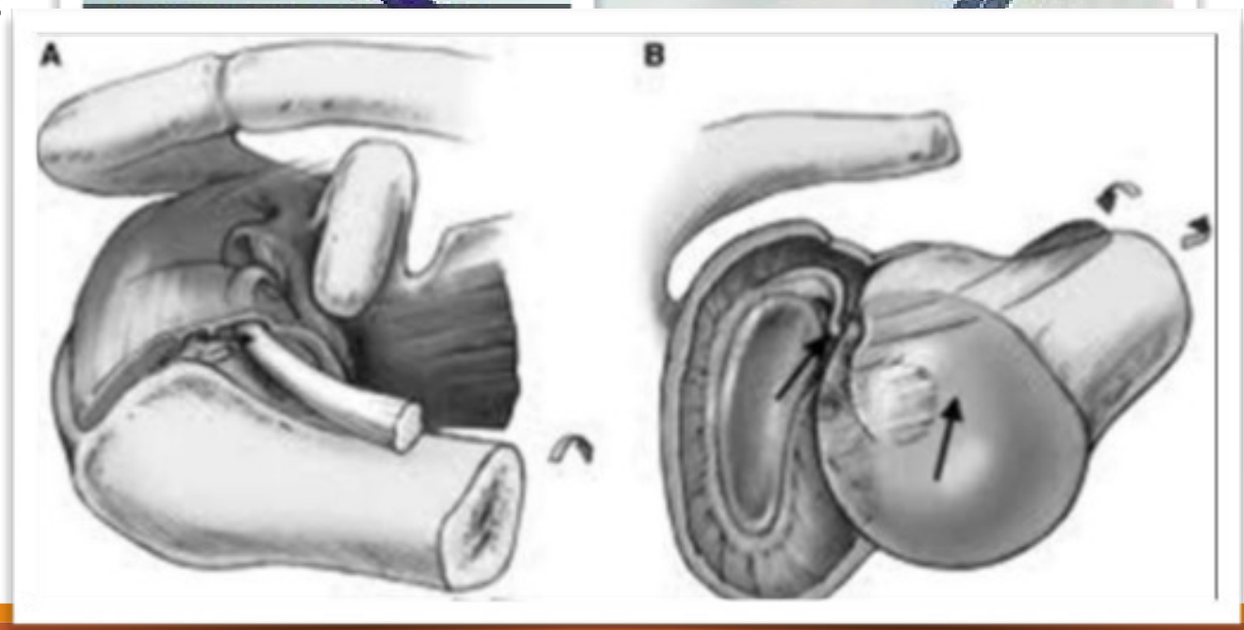
A. Antero-Superior Impingement:

- Injury to the LHB pulley system
- The pulley system is formed of the coracohumeral ligament, the Superior glenohumeral system, fibers of subscapularis and supraspinatus
- This pulley system protect and stabilize the biceps tendon in its intra-articular position



Antero-superior glenoid Impingement

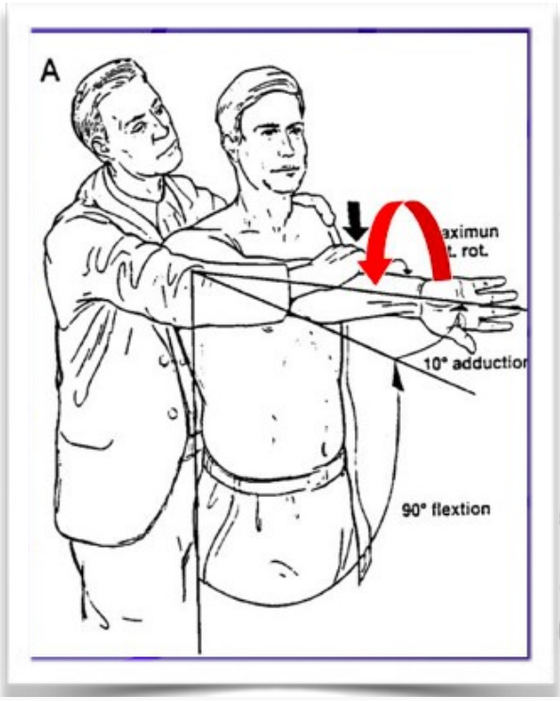
- Common in swimmers due to repetitive forced elevation, adduction and internal rotation of the shoulder
- Injury to the shoulder pulley leads to medial subluxation of the LHB, superior migration of the humeral head>>antero-superior impingement



Antero-superior glenoid Impingement

- Clinically presented by anterior shoulder pain with positive O'Brein test
- Clinical tests and imaging are not specific for ASI.

ASI is best determined by dynamic evaluation in arthroscopy also surgical treatment guidelines are are not well established it is usually treated as part of other associated injuries




Knee Surg Sports Traumatol Arthrosc (2010) 18:1688–1693
DOI 10.1007/s00167-010-1232-z

SHOULDER

Anterior-superior internal impingement of the shoulder: an evidence-based review

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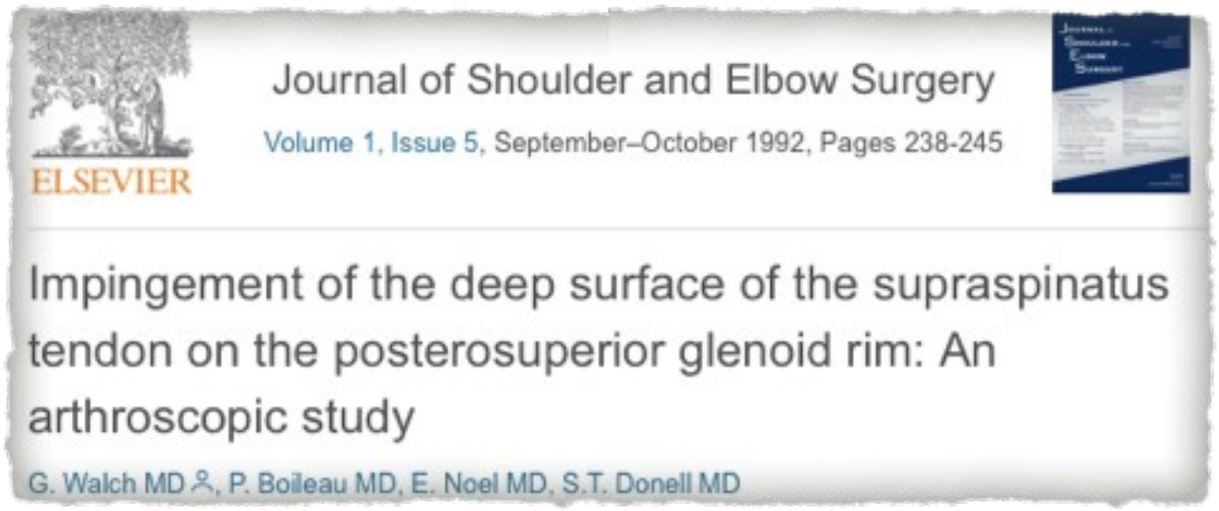
Internal glenoid Impingement

in brief

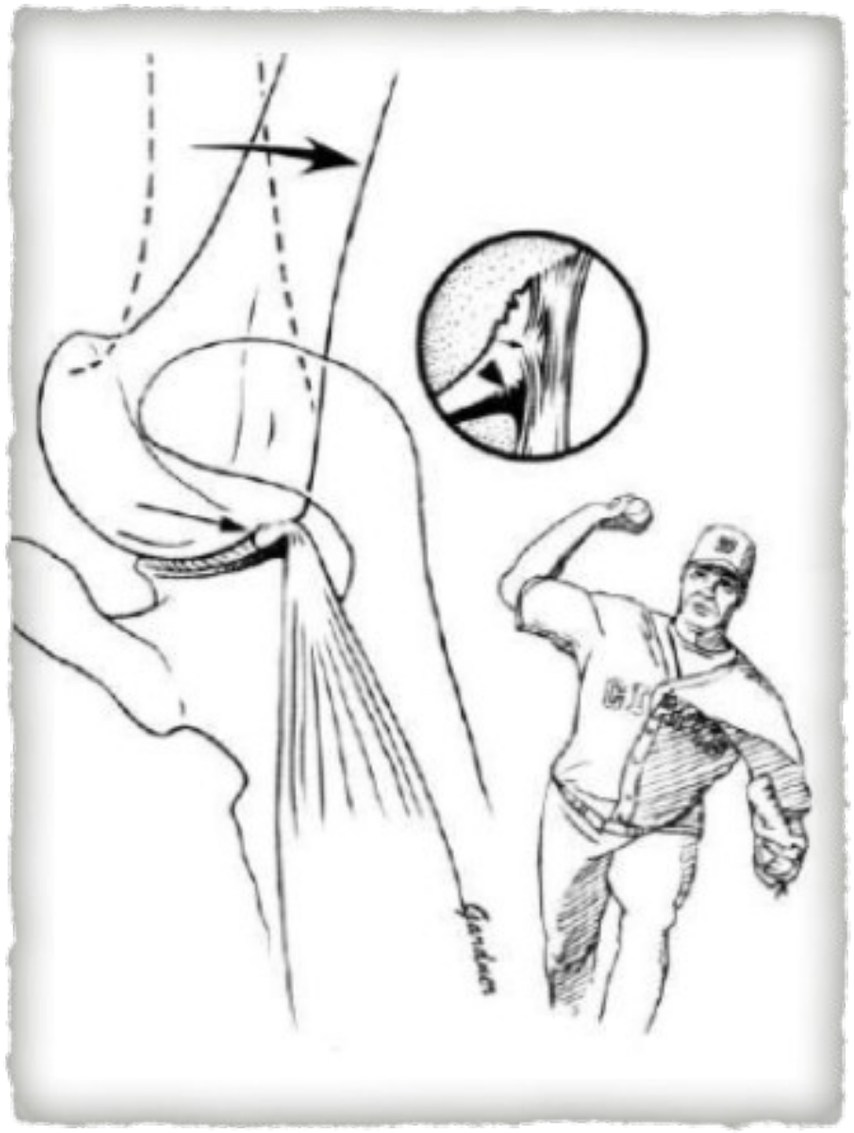
B. Postero-superior glenoid impingement (PSGI):

- Walch el al. 1992 described this condition in overhead throwing athlete
- Repetitive forceful extreme abduction external rotations (ABER) in the late cocking phase of throwing leads to impaction of the undersurface of supraspinatus and infraspinatus with the poster-superior glenoid rim
- This leads to tendon degernation and tearing of the postersuperior glenoid labrum



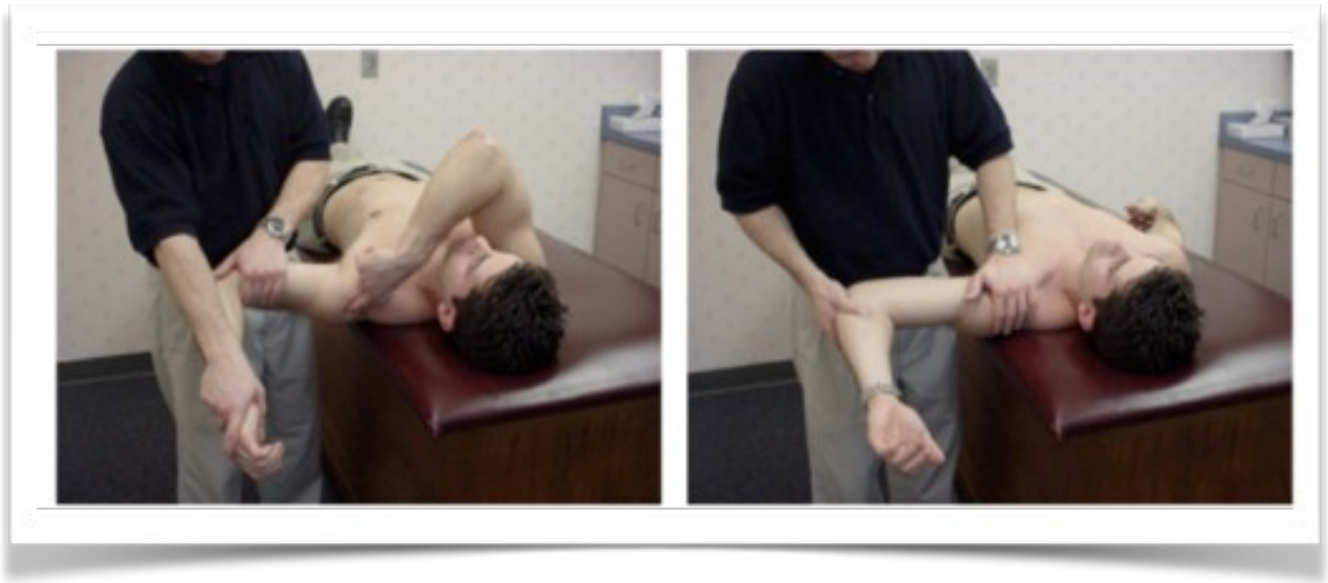
Postero-superior glenoid impingement (PSGI)

- Typically patient is an overhead athlete presented with posterior shoulder occurying while playing specially in the late cocking phase.



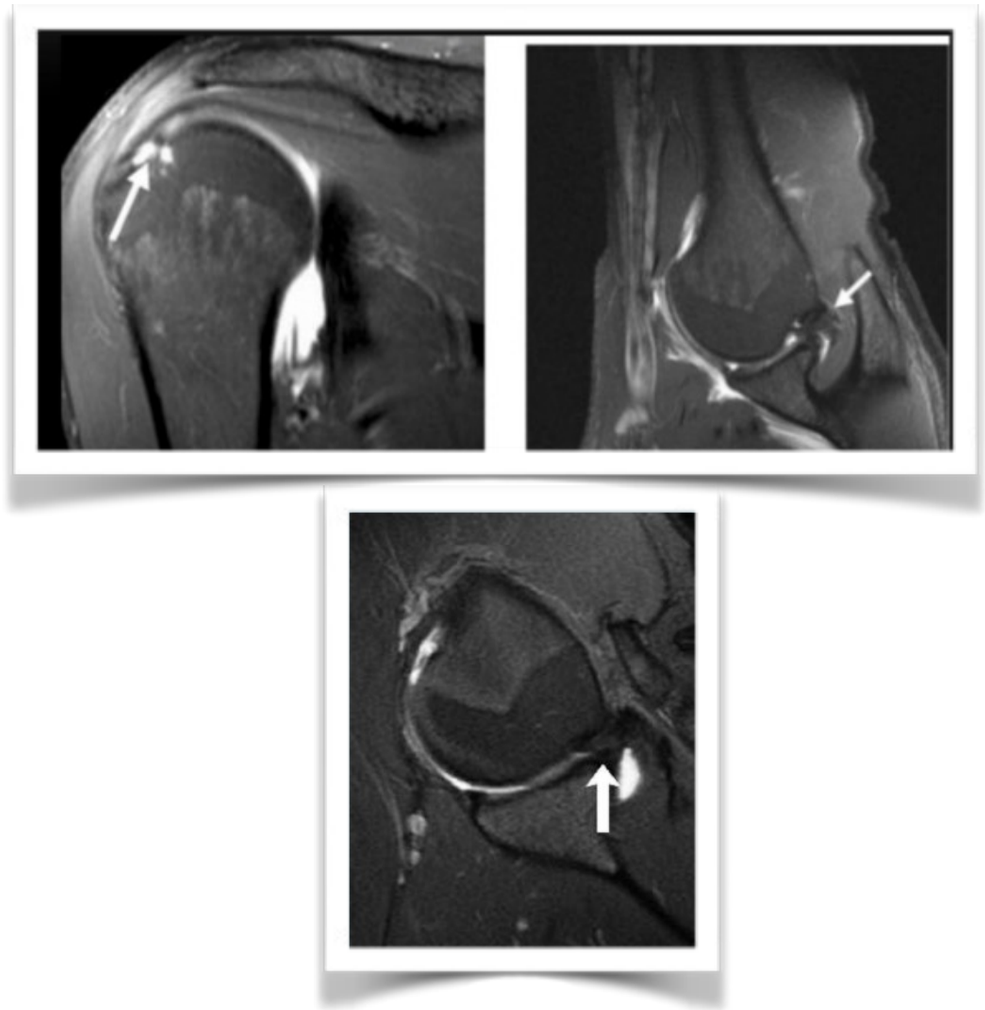
Postero-superior glenoid impingement (PSGI)

- Clinically; posterior glenoid tenderness, negative Neer test and O'brein test
- Positive Internal Impingement test
- Relocation test = positive



Postero-superior glenoid impingement (PSGI)

- MRI: Tearing of the posterior fibers of supraspinatus and anterior fibers of infraspinatus with fraying and tearing of the poster superior glenoid rim with cystic changes in the greater tuberosity
- Non surgical treatment include rest, avoid overhead athletic activity, posterior capsular stretching exercises
- If symptoms persist: Arthroscopic debridement, Arthroscopic Arthrolysis of posterior capsule, repair of rotator cuff tear



Take home messages

- Subacromial impingement syndrome is a common presentation in Orthopedic practice however other causes of shoulder pain should be taken in consideration

- Obtain three pre-operative views : True shoulder AP, Axillary view, and Outlet view

- The Aim of arthroscopic subacromial decompression is to convert a pathologyical coracoacromial arch into a physiology arch

Thank you