

Exam and Imaging of the Shoulder



**ACSM
TEAM
PHYSICIAN
COURSE** *Part I*
AMERICAN COLLEGE of SPORTS MEDICINE

**Jacksonville, FL
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Mary Lloyd Ireland, M.D.

www.MaryLloydIreland.com

www.youtube.com/ukyortho

Menu

Physical Exam

Imaging

Labrum

Instability

MRI Literature

You May Not Have Seen It

Conclusions



**Make
the**



PHYSICAL EXAM

- **General Exam – 4 positions**
 - Standing
 - Sitting
 - Supine
 - Prone
- **Also check:**
 - Cervical & thoracic spine
 - Scapular symmetry
 - Vascular status



Is It Referred Pain?

- Neck
- Scapula
- Lung
- Ribs



What tests do I do??



SHOULDER: PRINCIPLES & INTRODUCTION

- Many **clinical tests** are named for someone. Instead of the name, think of motion of joint and forces you apply:
 - **Is it labral?**
 - Axial loading like McMurray's
 - **Is it the rotator cuff?**
 - Compressing or impinging
 - **Is it instability?**
 - Distraction of joint capsule subluxing the humeral head



Glenohumeral Examination

- Ask the patient . . .
 - Does this cause apprehension and/or pain?
 - Laxity – normal condition and symmetrical
 - Instability pathologic condition and asymmetrical
 - Can you reproduce your symptoms?



Routine Exam

- **Seated**
 - **Glenohumeral**
 - **Scapulothoracic**
- **Supine**
- **Prone**

- **Repeat equivocal parts of the exam**



Determine the primary problem— Make the primary diagnosis

- **Capsule/ligaments**
- **Labrum**
- **Rotator cuff**

Table listing provocative tests and imaging studies

- **Glenohumeral instability**
- **Rotator cuff tear**
- **Impingement**
- **Biceps**
- **SLAP**



**There are many clinical tests named after someone.
Instead of description by name:**

- **Think of the motion of joint and forces you apply:**
 - **Is it labral?**
 - (Axial loading like McMurray's)
 - **Is it the rotator cuff?**
 - (compressing or impinging)
 - **Is it instability?**
 - (distraction of joint capsule subluxing the humeral head)



Shoulder Pain Algorithm: AAOS Clinical Guideline on Shoulder Pain, in *Orthopaedic Knowledge Update: Shoulder and Elbow 2* (AAOS, 2002), p. 448-455.

- **Initial Imaging**
 - True AP in 0° external rotation
 - Lateral in scapular plane
 - Axially view
 - When imaging studies are indicated during the initial evaluation and treatment of a patient with shoulder pain, appropriate plain “x-rays” should be obtained. More sophisticated imaging studies (such as shoulder MRI, ultrasound, or arthrography) are not indicated.



Imaging

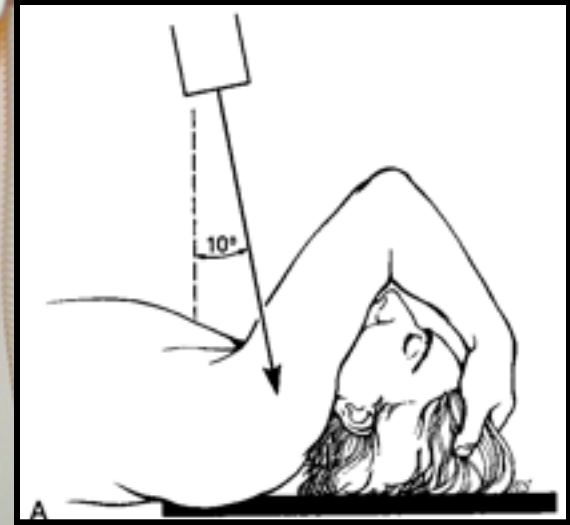
- Plain films
- Make the diagnosis by history and physical and plain films
- Institute treatment
- Re-examine
- Then special Imaging Studies



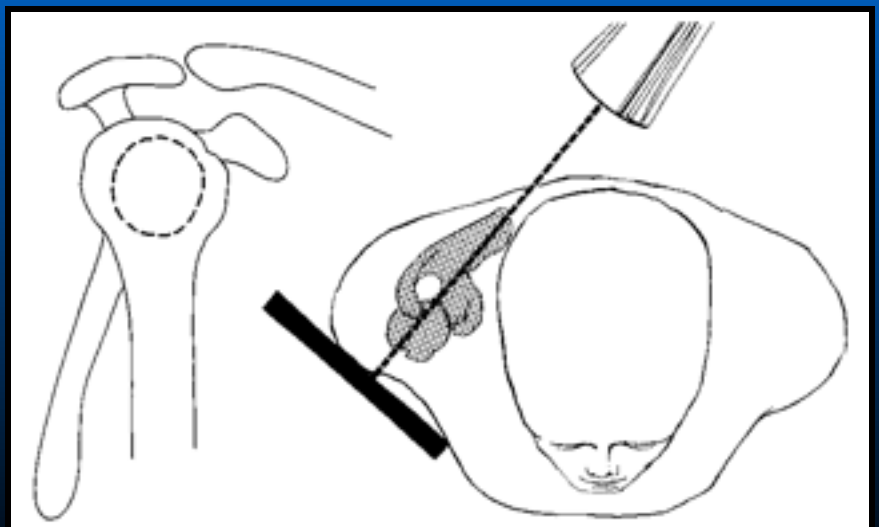
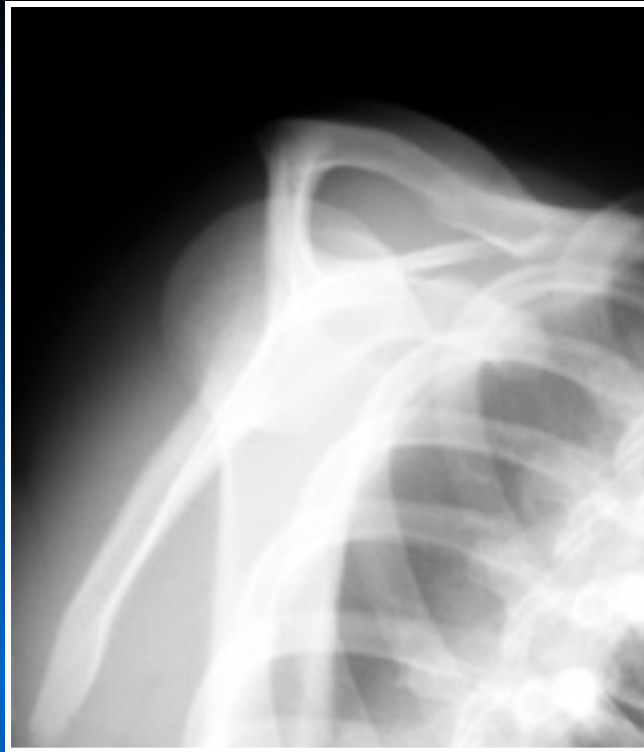
AP Internal View



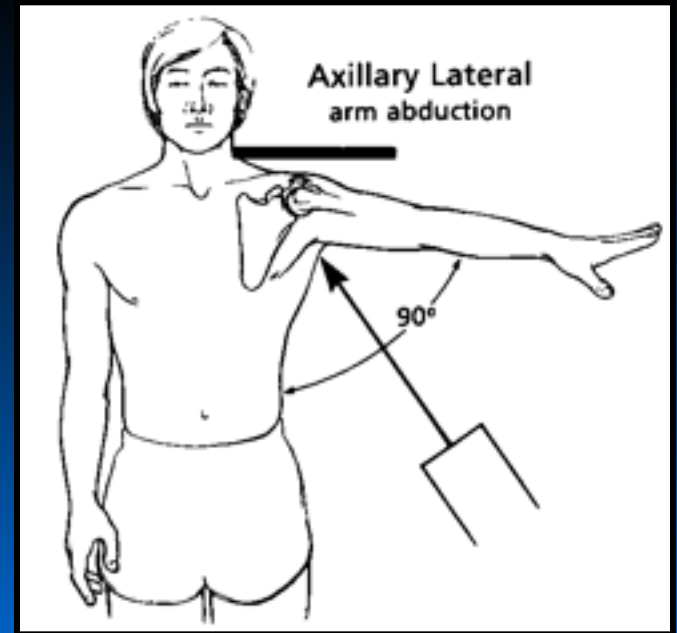
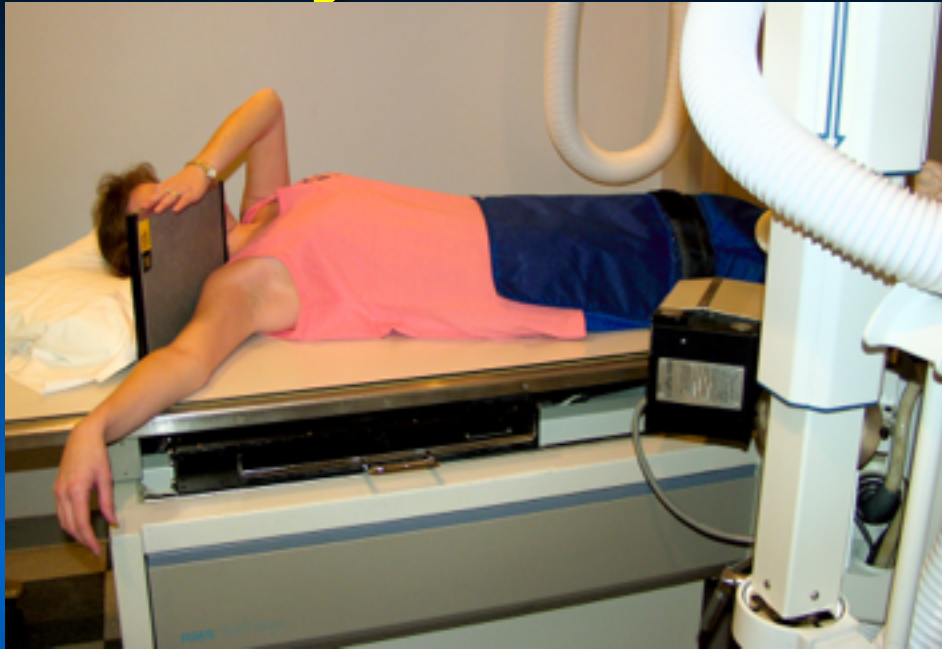
Stryker Notch View



Outlet View



Axillary Lateral View



Imaging

- **Special Studies**
 - **MRI scan**
 - With or without gadolinium
 - **CT scan**
 - **Ultrasound**



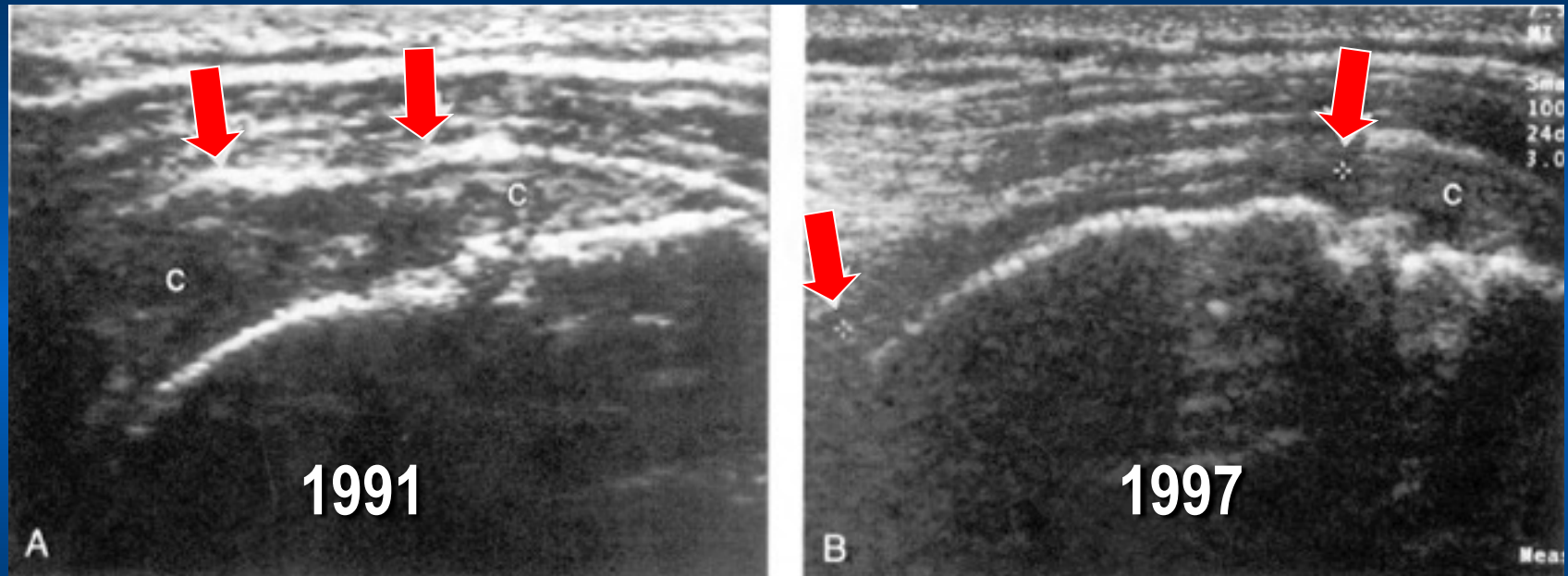
Ultrasonography

- In office
- Accurate
- Low cost

Churchill RS, Fehringer EV, Dubinsky TJ, Matsen FA,
“Rotator cuff ultrasonography: diagnostic capabilities,” *J Am Acad Orthop Surg* 2004 Jan-Feb;12(1):6-11.



Ultrasound showing symptomatic progression of previously asymptomatic rotator cuff tear.



Yamaguchi K et. al., "Natural history of asymptomatic rotator cuff tears: A longitudinal analysis of asymptomatic tears detected sonographically," *J Shoulder Elbow Surg* 2001;10:199-203.

What about ultrasound?

- Series of 50 patients underwent arthroscopy examined with 3D ultrasound with MR arthrography
- Results: Arthroscopic diagnosis: Full thickness in 40, partial 5, intact supraspinatus in 5. 3D ultrasound correctly diagnosed 35 out of 40 full-thickness and MR arthrography were 39 out of 40 full-thickness. Partial tears: Ultrasound 2 and MR 1.
- Conclusions: 3D ultrasound promising imaging comparable to MR arthrography for assessment of supraspinatus tendon tears.

Kang CH, Kim SS, Kim JH, Chung KB, Kim YH, Oh YW, et al. Supraspinatus tendon tears: comparison of 3D US and MR arthrography with surgical correlation. *Skeletal Radiol* 2009;38:1063-1069.

When Should an MRI Exam Be Obtained?

- Recent Trauma
- Difficult Physical Exam
- Physical Exam that Does not Match Clinical Symptoms
- Normal Radiographs with Significant Symptoms
- Pre-Operative Planning
- Recent MRI that was Technically Suboptimal

Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB

How Should The MRI Scan Be Performed

- Best Possible Equipment
- Dedicated Coils for the Body Part
- Contrast When Necessary
- Correct Sequences to Define Appropriate Anatomy
- Shortest Exam to Achieve Results and Keep Patient Comfortable

Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB

Contrast Administration

- **Intraarticular Contrast Gives Superior Soft Tissue Contrast and Significantly Enhances Diagnostic Capability**
- **Intravenous Contrast Useful for Post Operative Menisci and Tumors**

**Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB**

Intraarticular Contrast Injection

- **Use Sterile Technique and Fluoroscopic Guidance**
- **Mix Iodinated Contrast with Dilute Gadolinium Solution to Avoid Air Bubbles**
- **Use Enough Volume to Distend Joint**
- **Perform Injection Quickly and as Painlessly as Possible**

**Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB**

When to use contrast

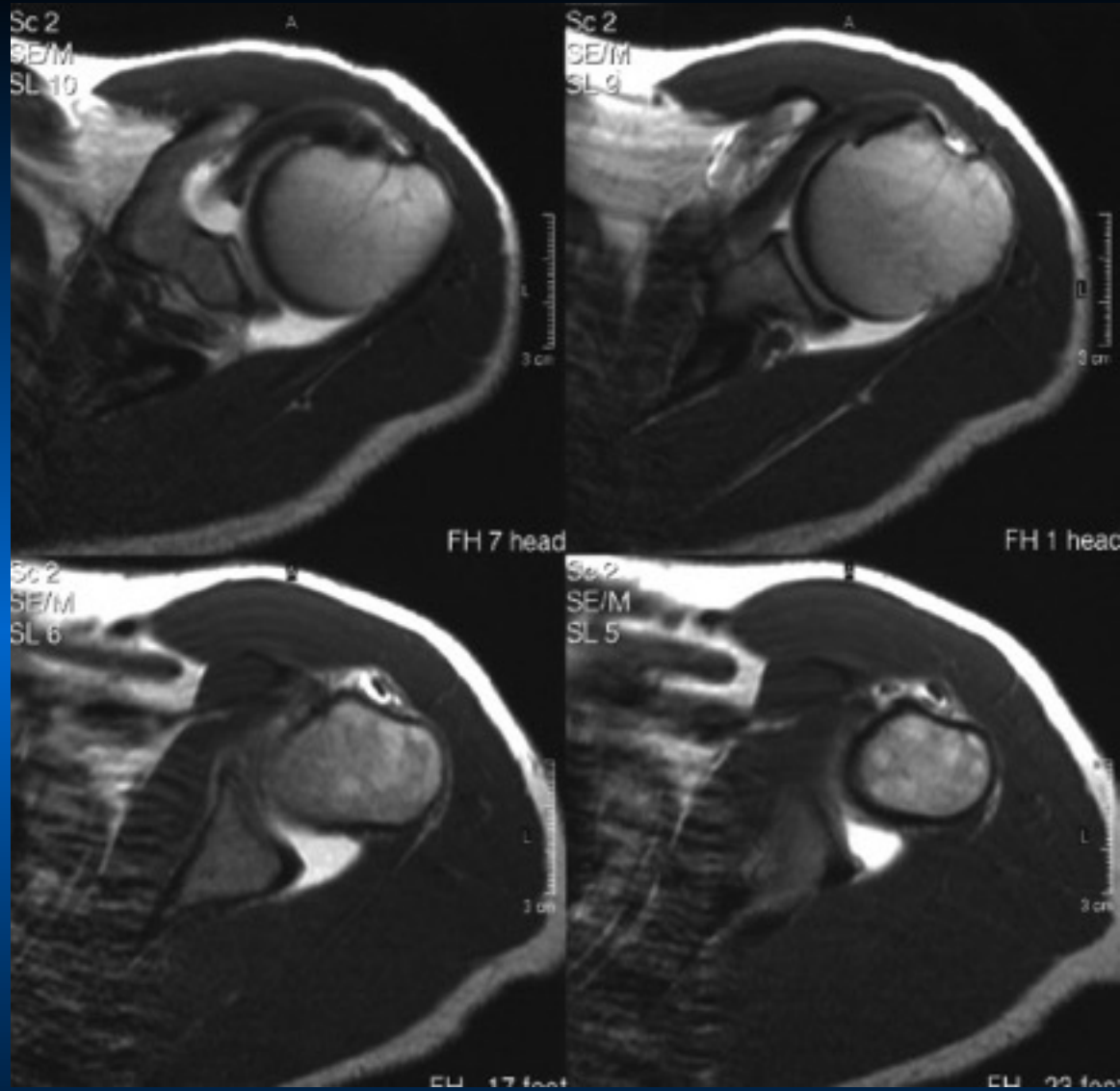
- I use it in SLAP lesions. May improve diagnosis of SLAP, missed grade of 25-5%.
- Acute dislocation instability. May use if I think there is an associated SLAP. 50% of SLAP tears are unstable.



MRI Scan with Intraarticular Gadolinium

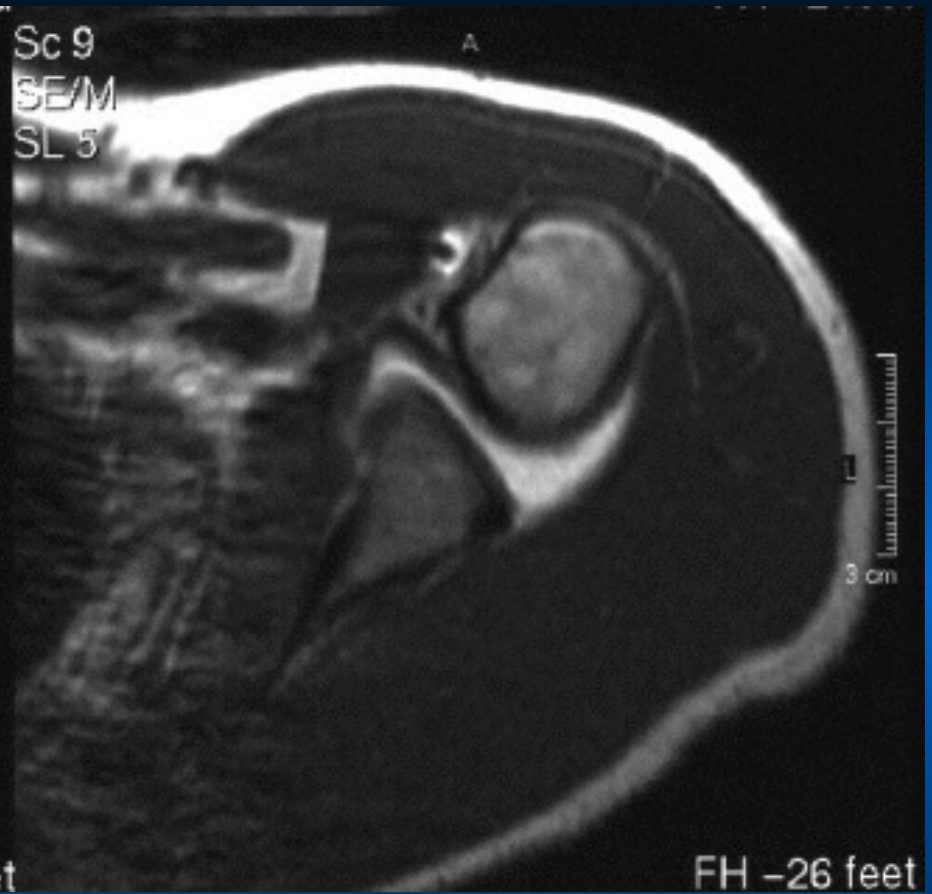
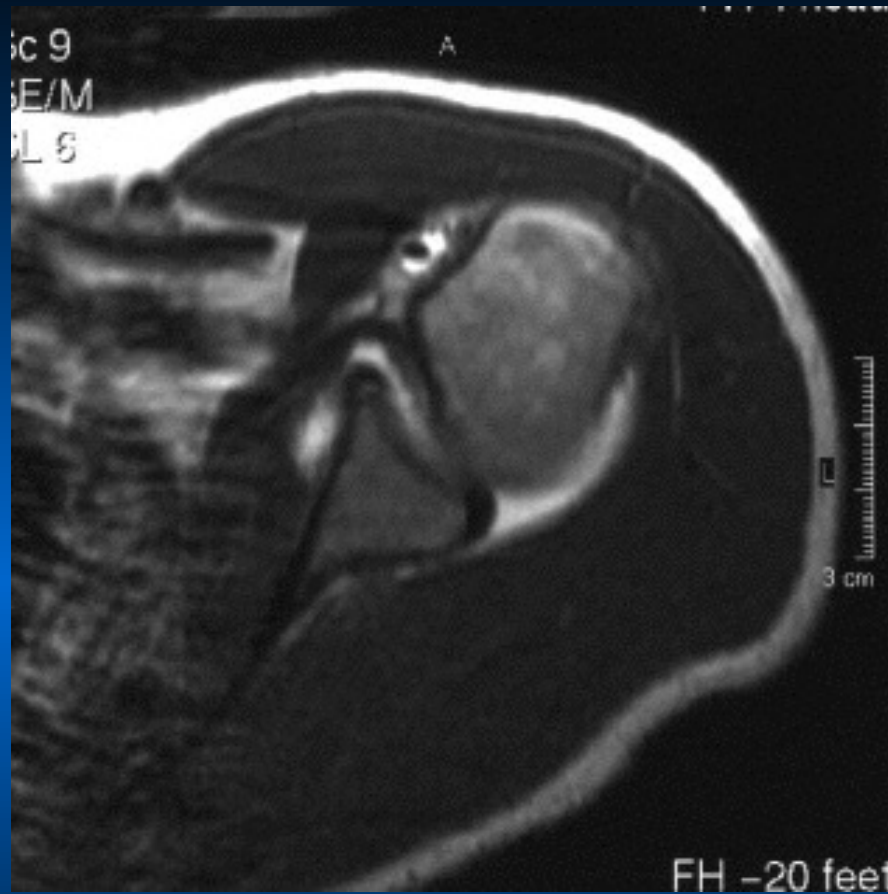
- Varying position
 - Arm at Side IR + ER
 - Thumb down and up
 - Hyper Abduction





Arm position, ER





Arm position, IR



Abducted externally rotated position to diagnose peel back--ABER view

- Advantages may not need intra-articular gadolinium to diagnose SLAP tear
- Must have method so patient will be comfortable and not move
- Recent studies show ABER view in patients with unstable SLAP lesions had posterior humeral head translation in ABER compared to neutral abduction of greater than 3 mm
- Look for humeral head position or position of the labrum and glenoid posterior-superior



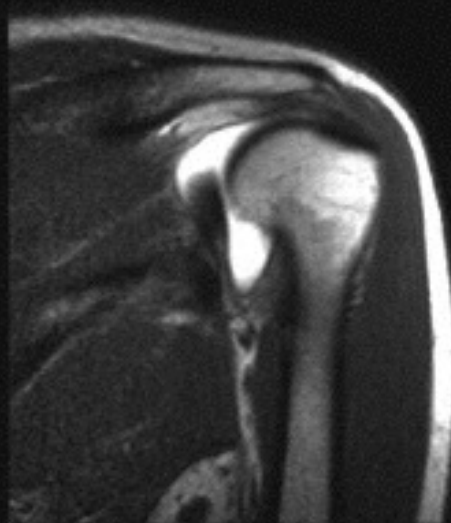


Arm position hyper-abduction, ER

ABER view

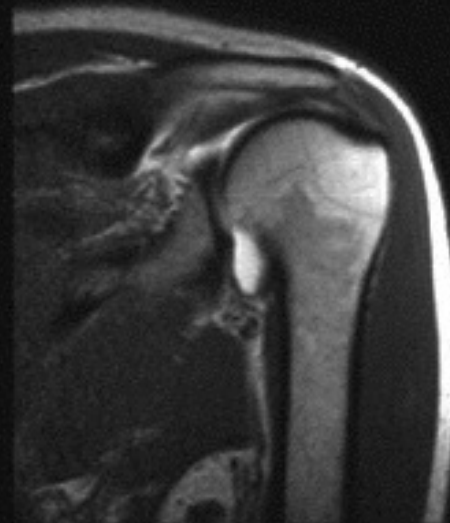


SE/M
SL 12



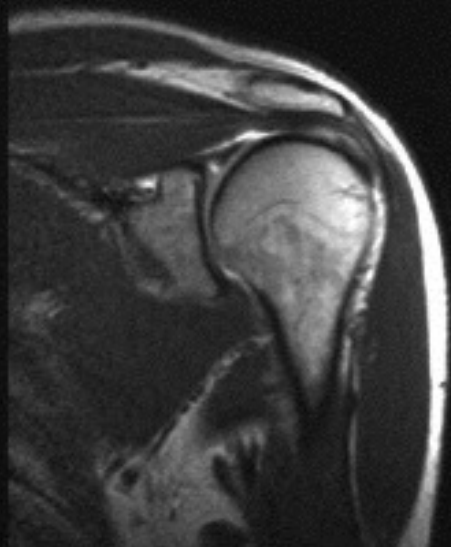
AP 50 post

SE/M
SL 11



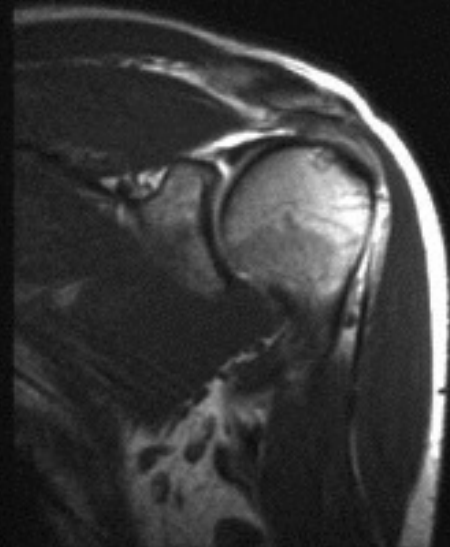
AP 46 post

Sc 4
SE/M
SL 8



AP 35 post

Sc 4
SE/M
SL 7



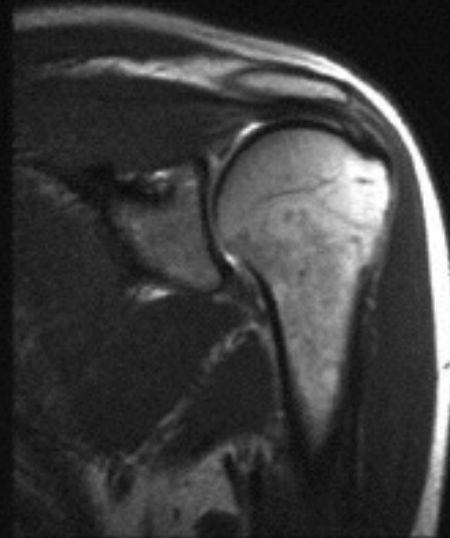
AP 31 post

Sc 4
SE/M
SL 10



AP 42 post

Sc 4
SE/M
SL 9



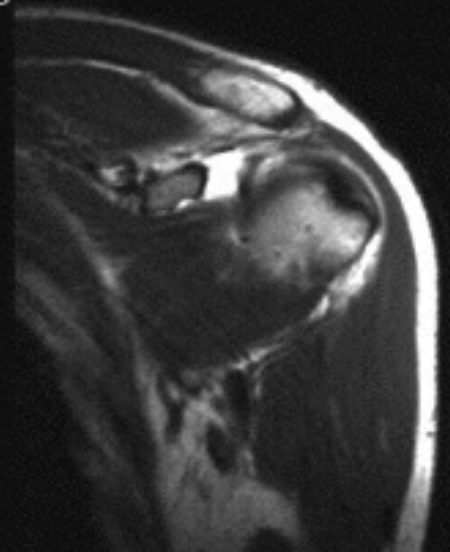
AP 39 pos

Sc 4
SE/M
SL 6



AP 28 post

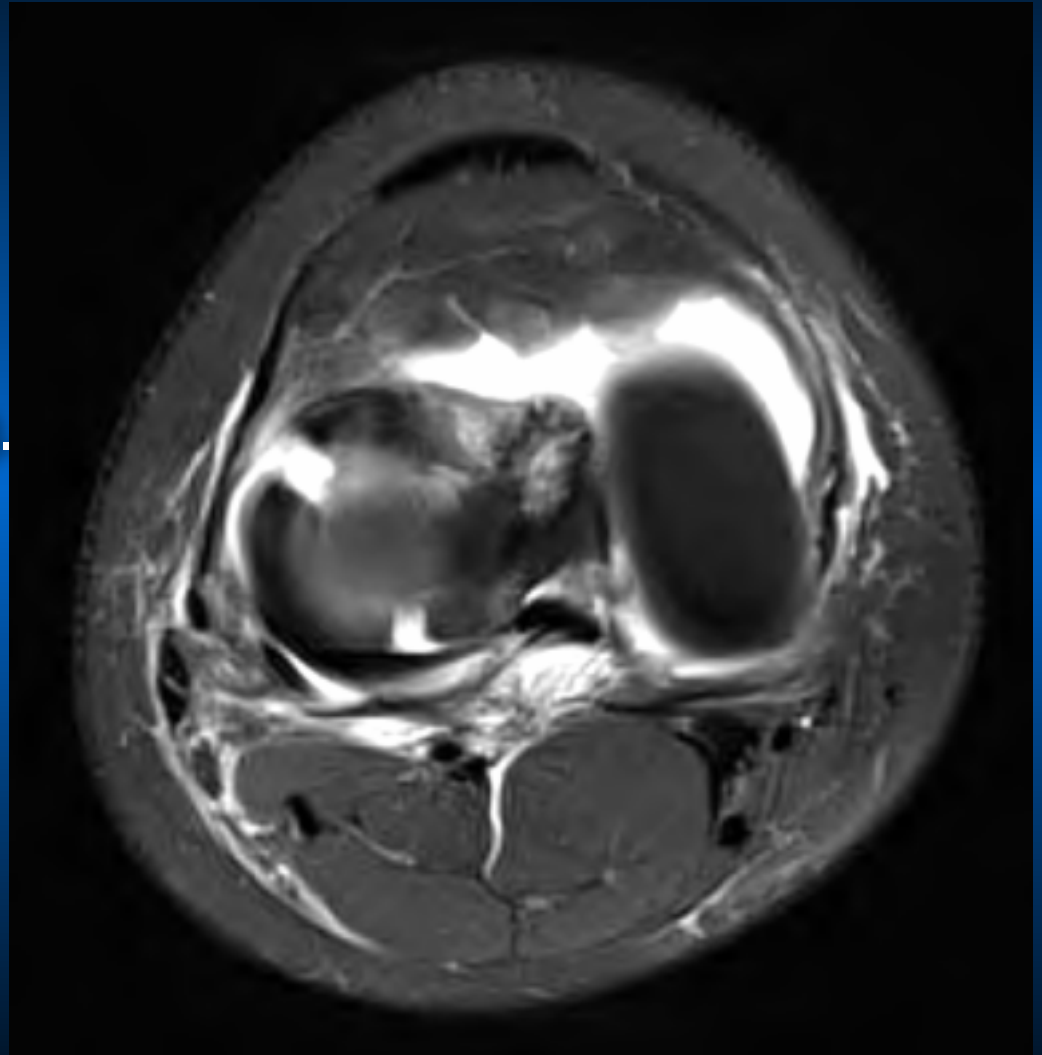
Sc 4
SE/M
SL 5



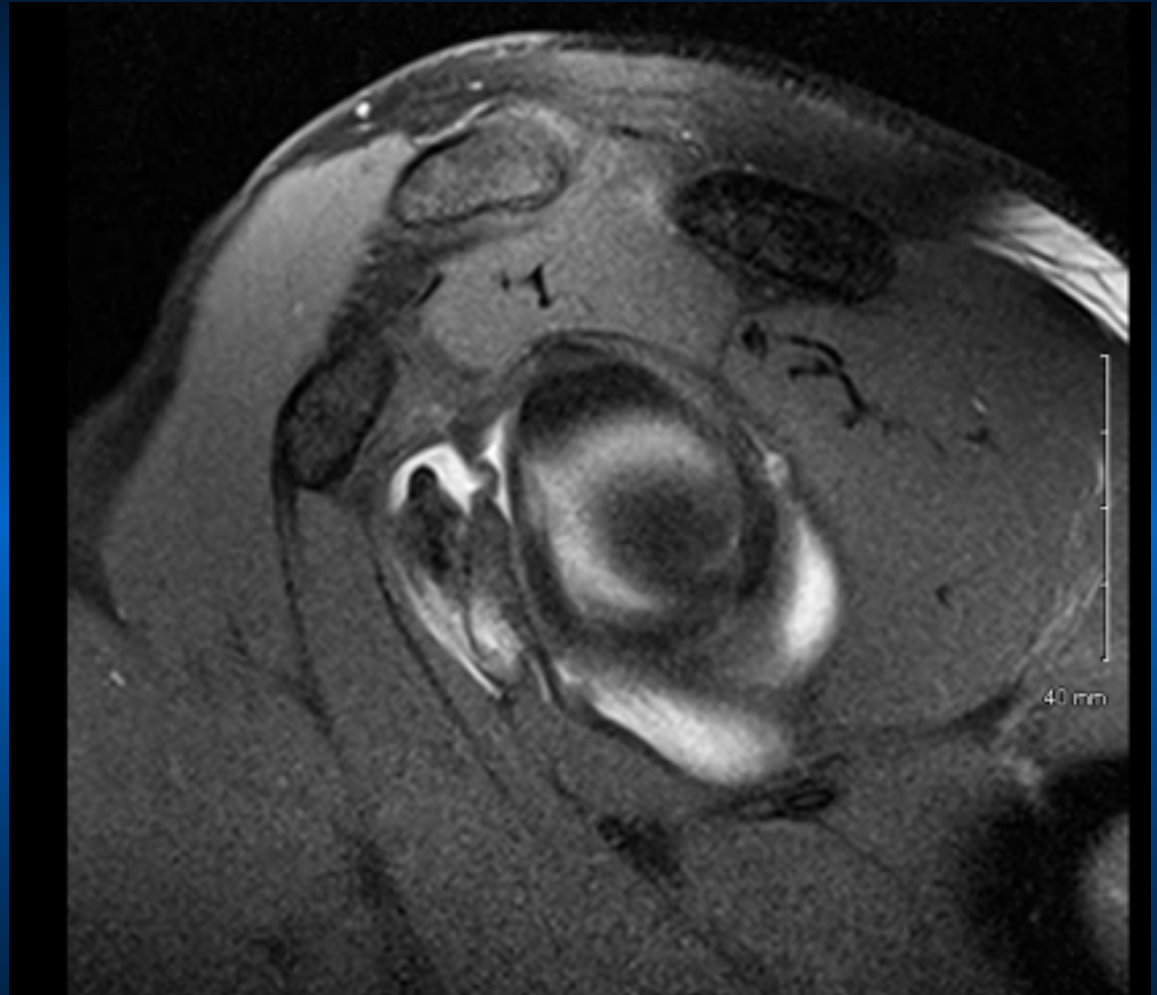
AP 24 pos

17 YO WF Right Knee

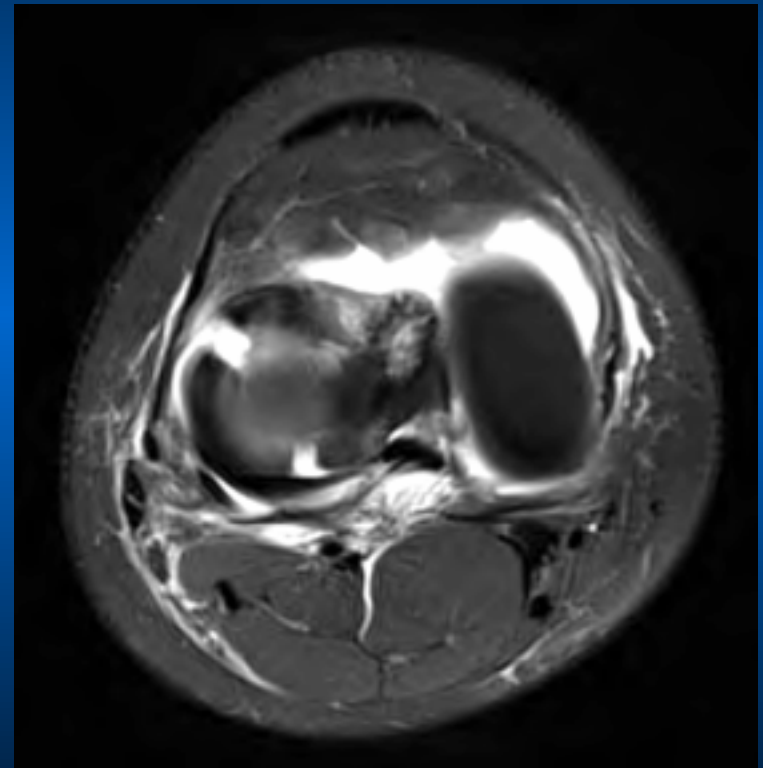
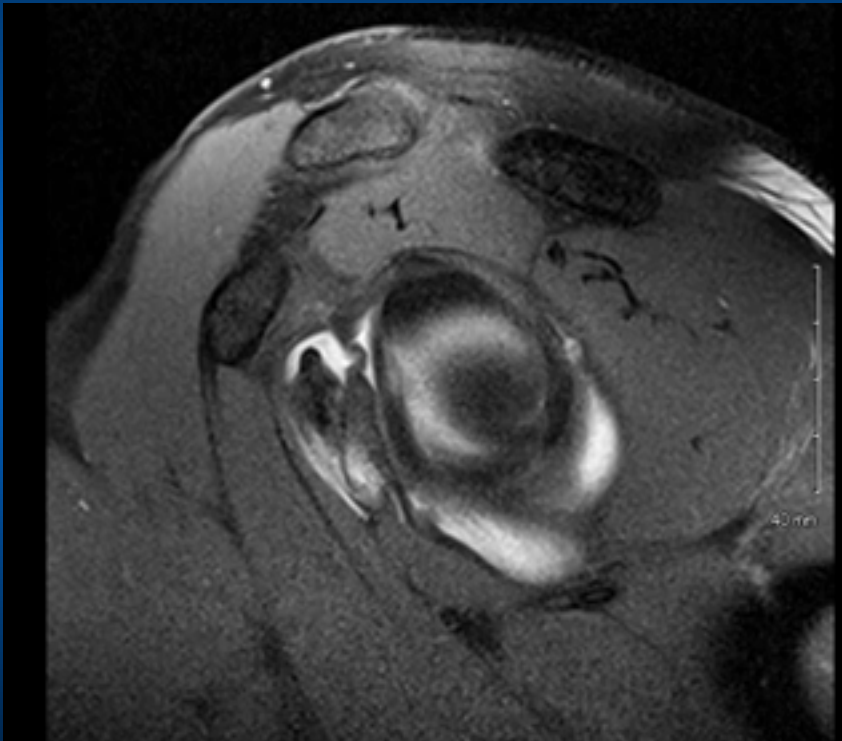
Complete radial tear of the interval horn/body junction), with a high-grade radial tear of the posterior horn/root junction seen as well (series 3, image 16).



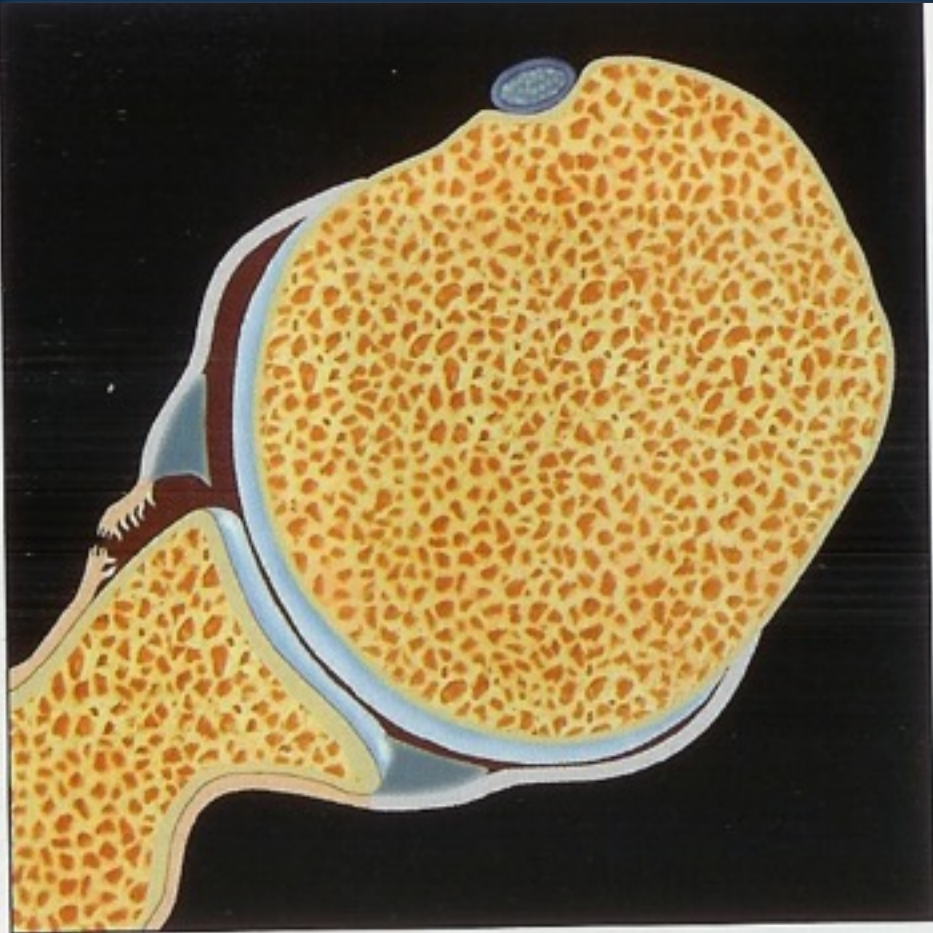
T1 SAG FS



Sagittal shoulder view for labrum like axial view for radial LMT of the knee



Bankart Lesion

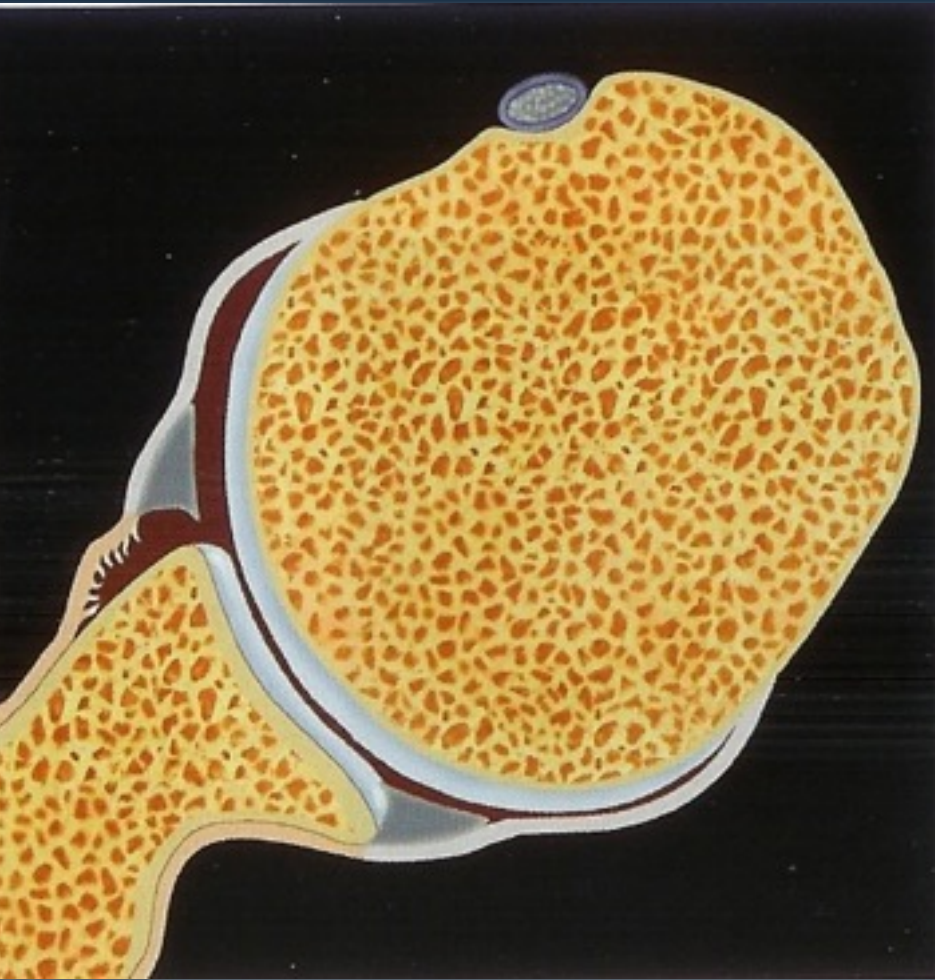


Courtesy- Stoller, Diagnostic Imaging Orthopaedics



Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB

Perthes Lesion

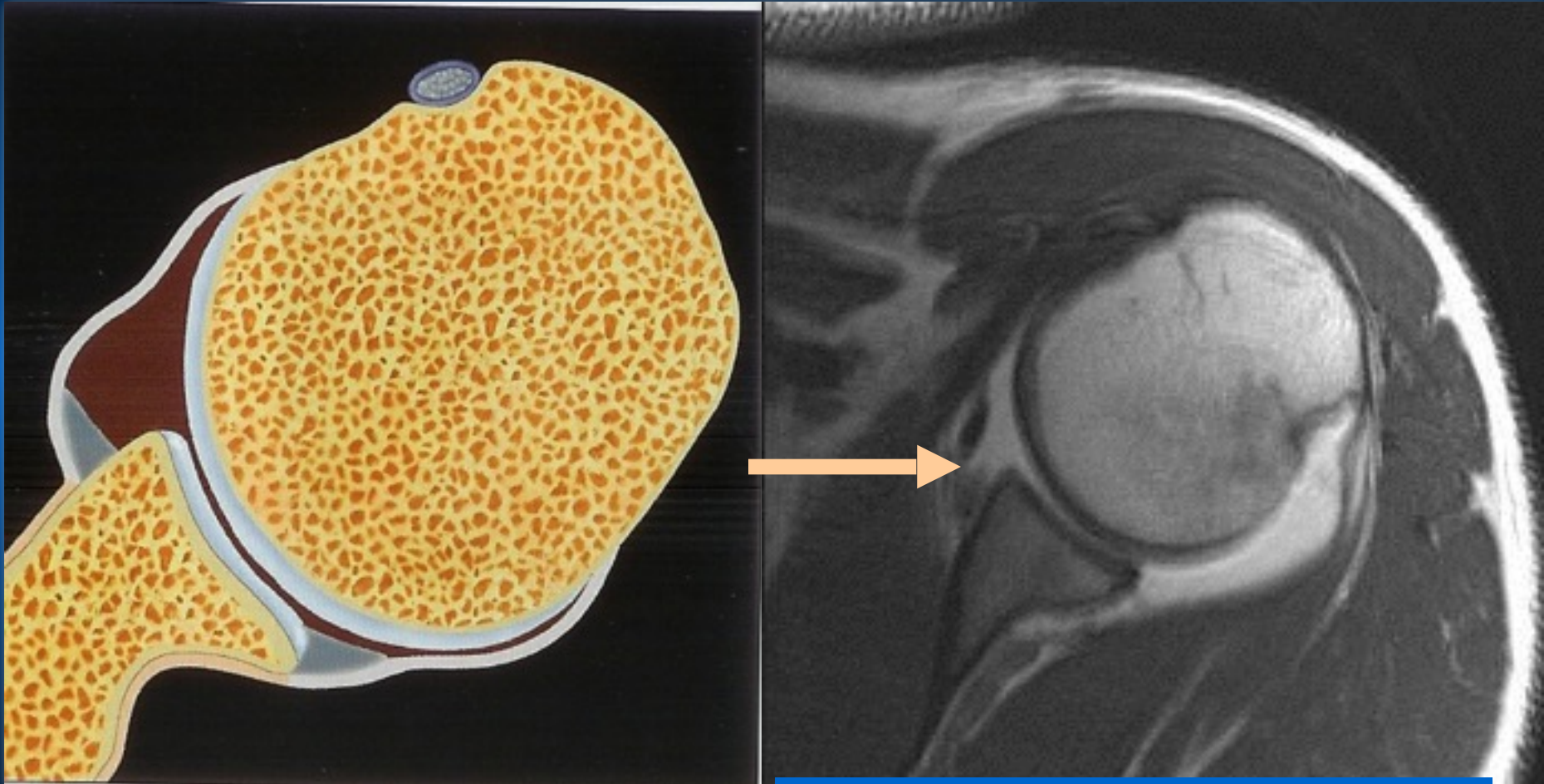


Courtesy-Stoller, Diagnostic Imaging Orthopaedics



Courtesy Martin L. Schwartz, MD
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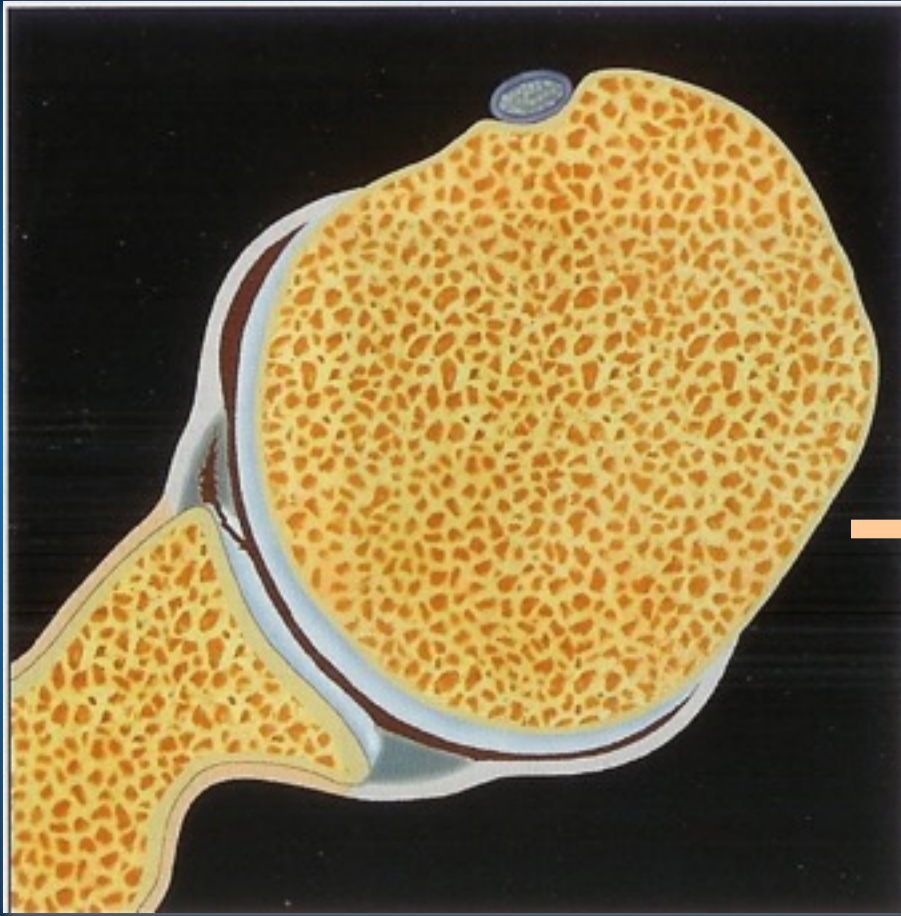
ALPSA (Anterior Labroligamentous Perosteal Sleeve Avuulsion) Lesion



Courtesy-Stoller, Diagnostic Imaging
Orthopaedics

Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB

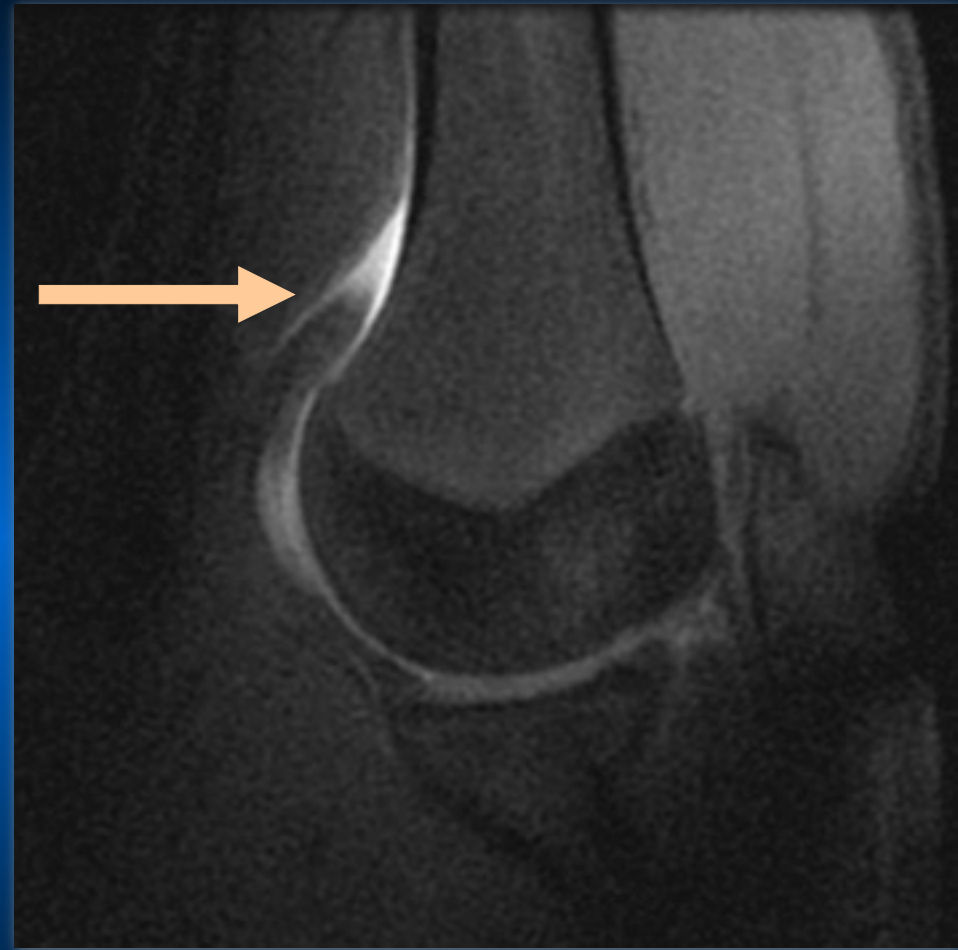
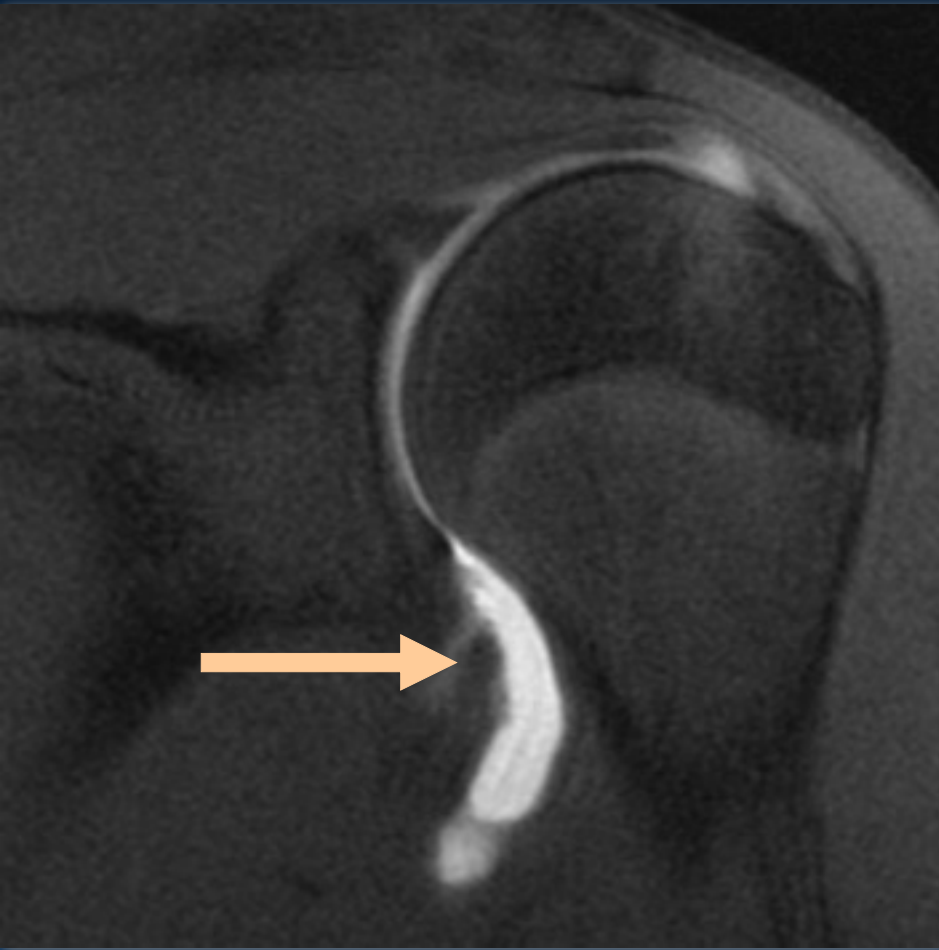
GLAD (Glenoid Labrum Articular Disruption) Lesion



Courtesy-Stoller, Diagnostic Imaging
Orthopaedics

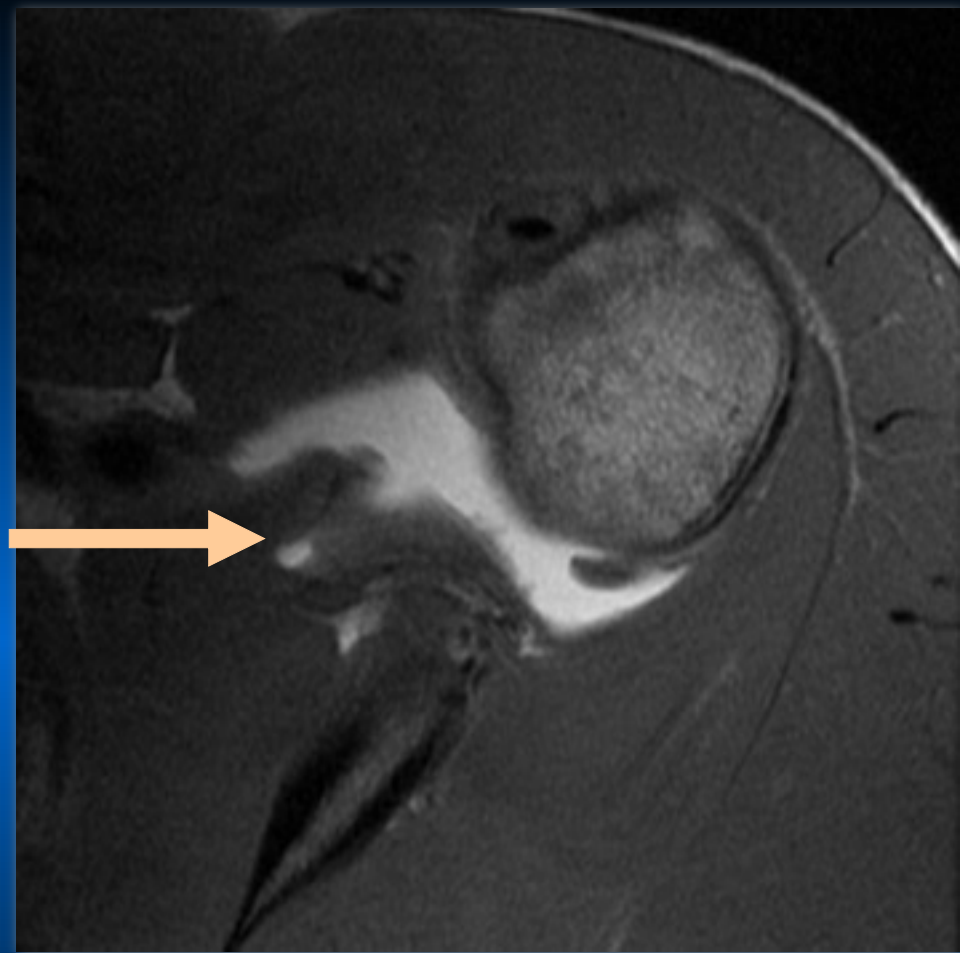
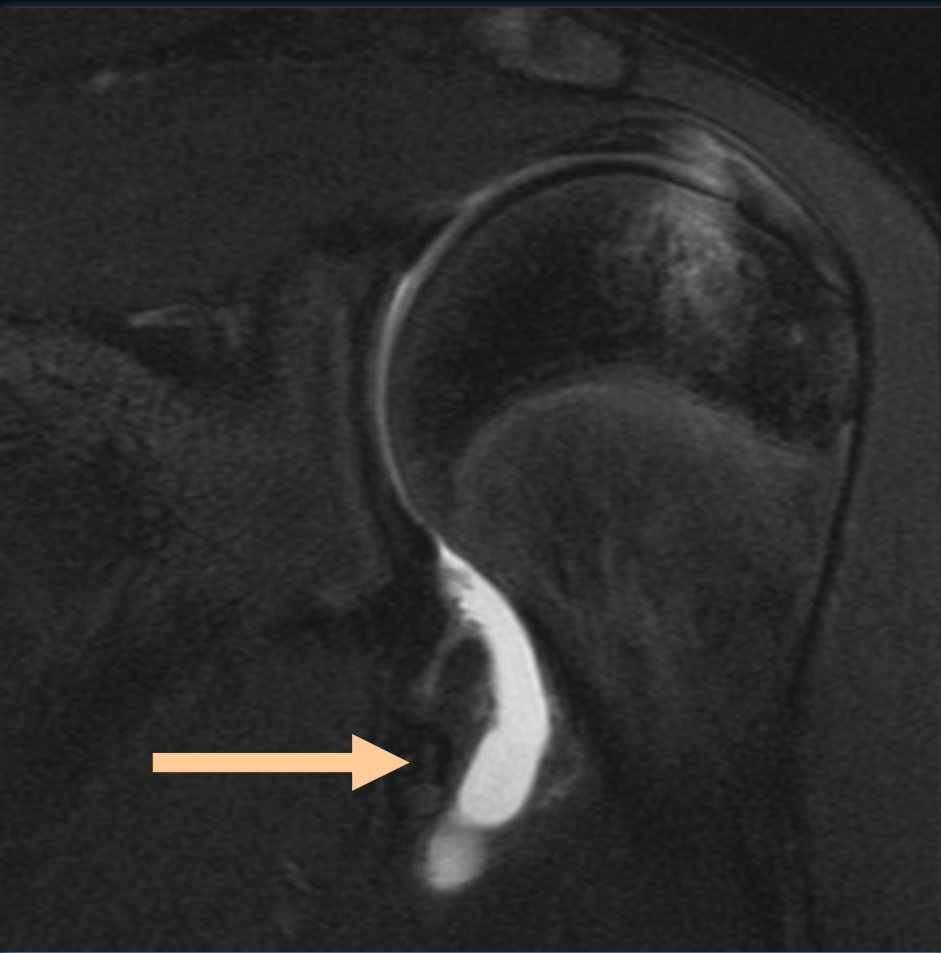
Courtesy Martin L. Schwartz, MD
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HAGL (Humeral Avuulsion of the Glenohumeral Ligament) Lesion



Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB



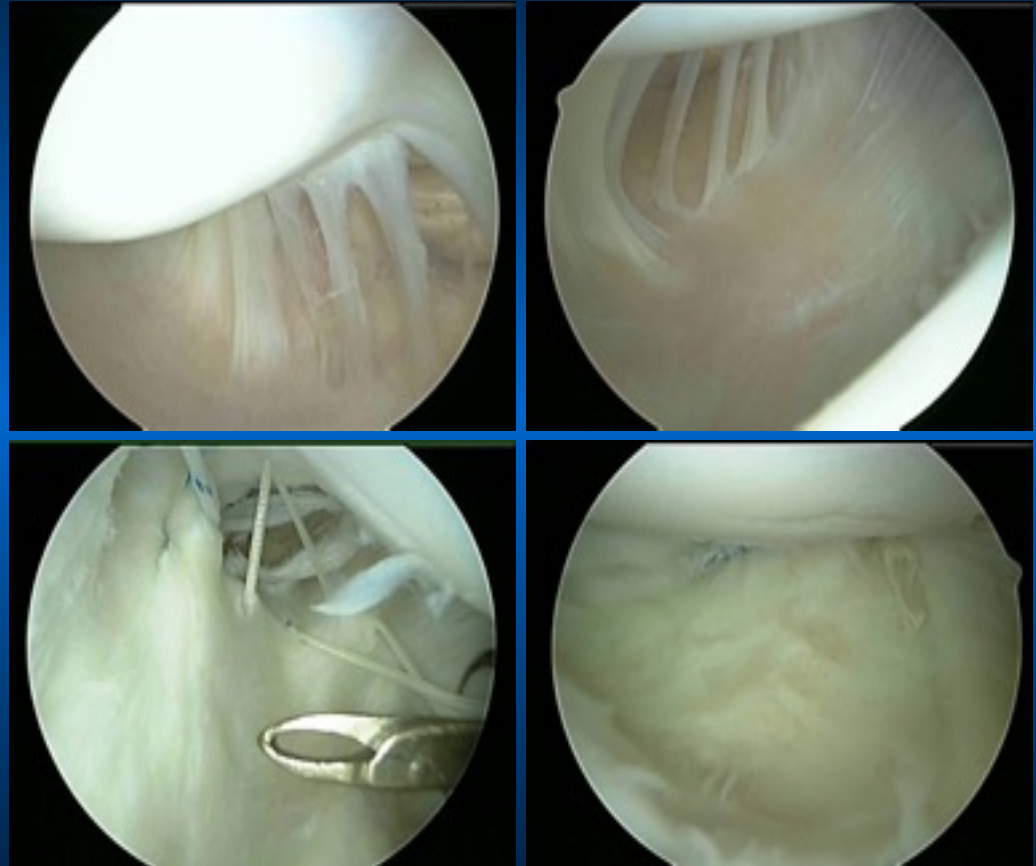


**Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB**

15 YO Basketball Athlete

- Unstable shoulder
- Anterior instability
- Normal MRI

SURPRISE!
HAGL Lesion



HAGL



Rotator Cuff Testing

- Empty can position
- Weakness in internal rotation



Subscapularis Tear

- Mechanism usually acute, one event
- Physical exam
 - Increased ER
 - Apprehension on adduction
 - Positive lift-off tests
 - Belly-press: upper subscapularis involved
 - Behind-back: lower subscapularis involved



Clinical exam: subscapularis tear

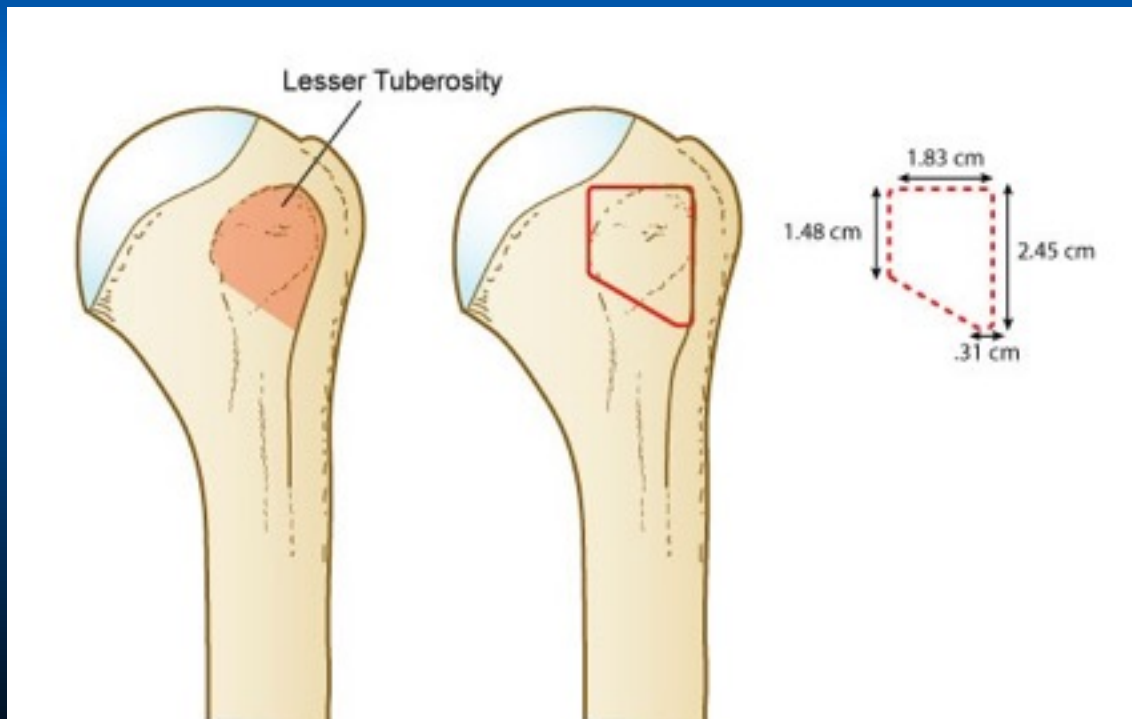


“I was unable to get my wallet out of my back pocket.”



Subscapularis Footprint

- 2.5 cm superior-to-inferior
- 1.5 cm medial-to-lateral
- Widest superiorly



Nevada analogy by
Stephen Burkhart, M.D.

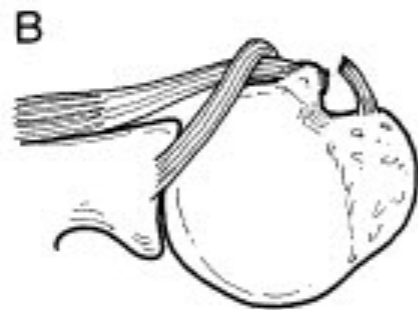
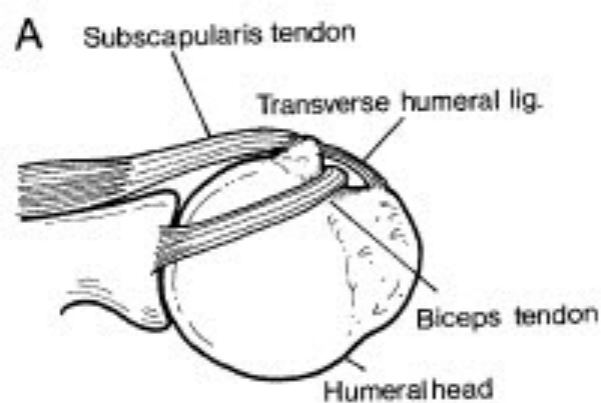
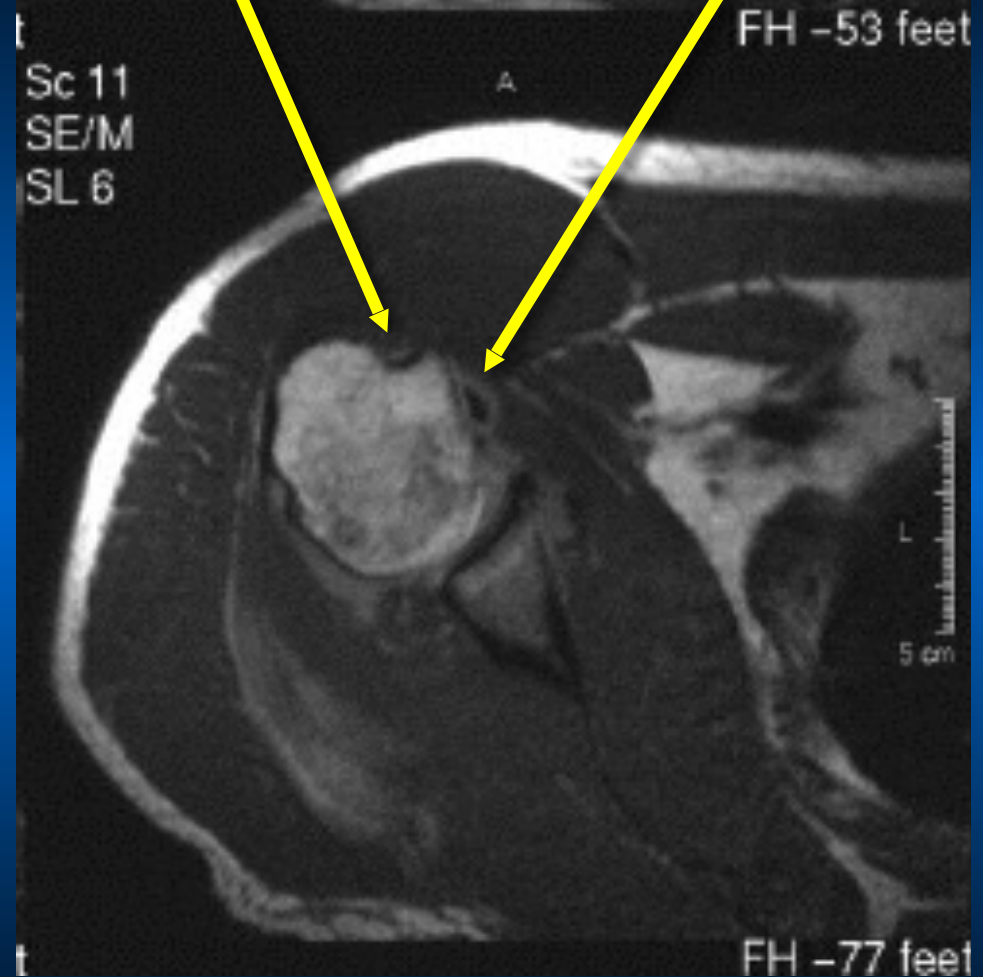


FIG 4. Superior view of right shoulder. **(A)** Normal relation of biceps tendon to bicipital groove. **(B)** Rupture of transverse humeral and coracohumeral ligaments, but no disruption of subscapularis tendon. **(C)** Tear of subscapularis tendon and coracohumeral and transverse humeral ligaments (as occasionally occurs when the humerus dislocates anteriorly. (Modified from Hitchcock HH, Bechtol CO. Observations on the role of the tendon of the long head of the biceps brachii in its causation. *J Bone Joint Surg* 1948;30A:263–273, with permission).

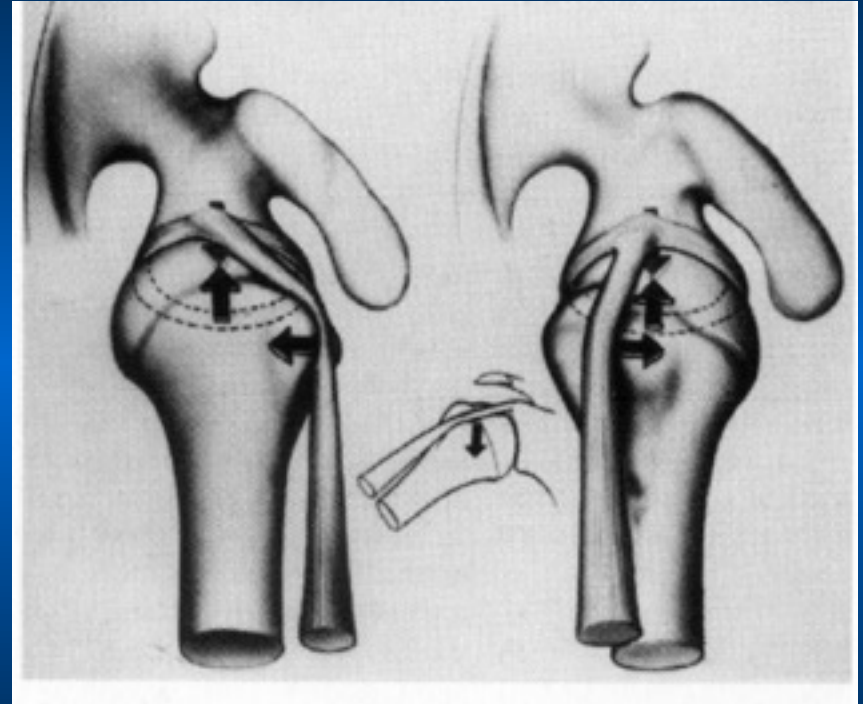
Bicipital Groove

Biceps Tendon



Function of the Biceps

- Proximally the biceps acts to stabilize the shoulder, and act as an adductor (short head), weak shoulder flexor and humeral head depressor
- Distally acts as an elbow supinator and flexor
- Important function in deceleration of throwing arm



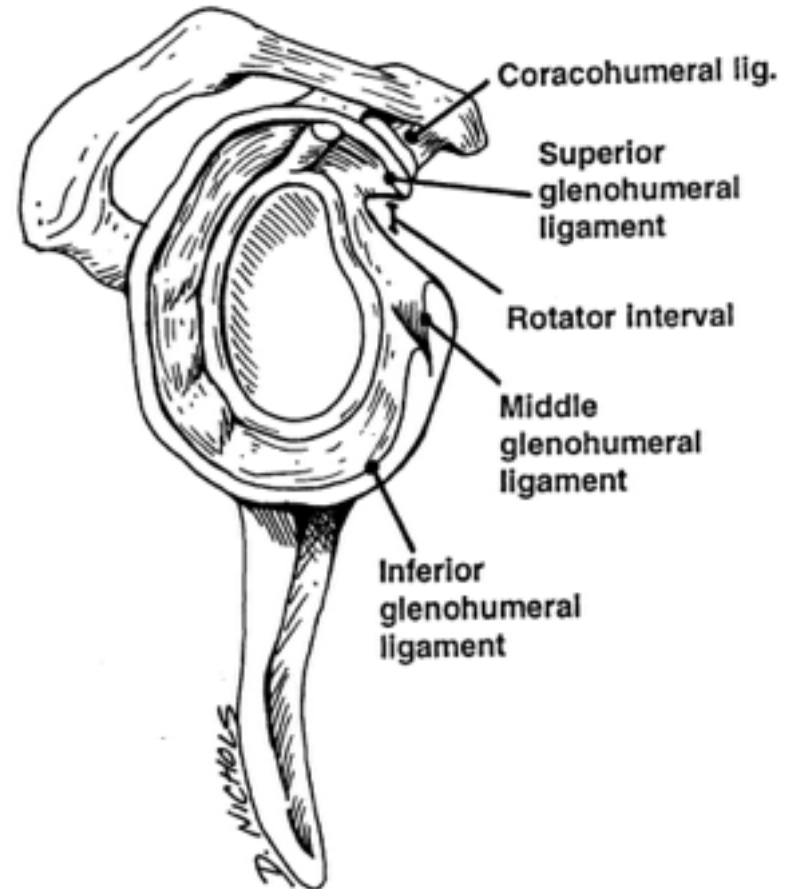
Proximal Biceps Tendon Instability and Tears

- Rarely occur in isolation
- More commonly part of spectrum of biceps dysfunction involving the tendon and associated restraints
 - Cuff tears
 - Subscapularis tears



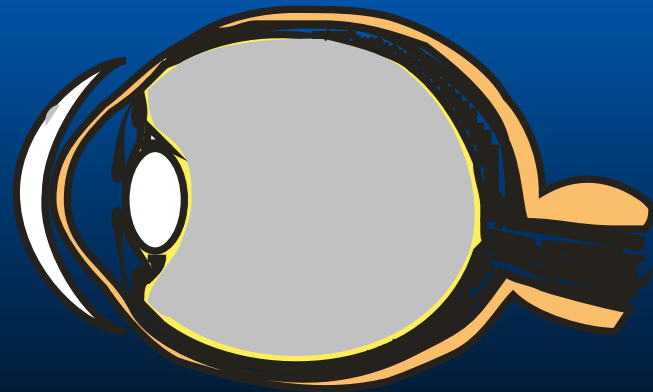
Labrum & Capsule

- Labral Function
- Stability
- Bumper
- Biceps attachment
- Shock absorber



Glenoid : Labrum

Tee : Golf Ball
Seal : Ball



O'Brien's Test



SLAP (Superior Labrum Anterior to Posterior) Lesion



Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB

Shoulder: Peel-back sign



THE THROWER'S SHOULDER

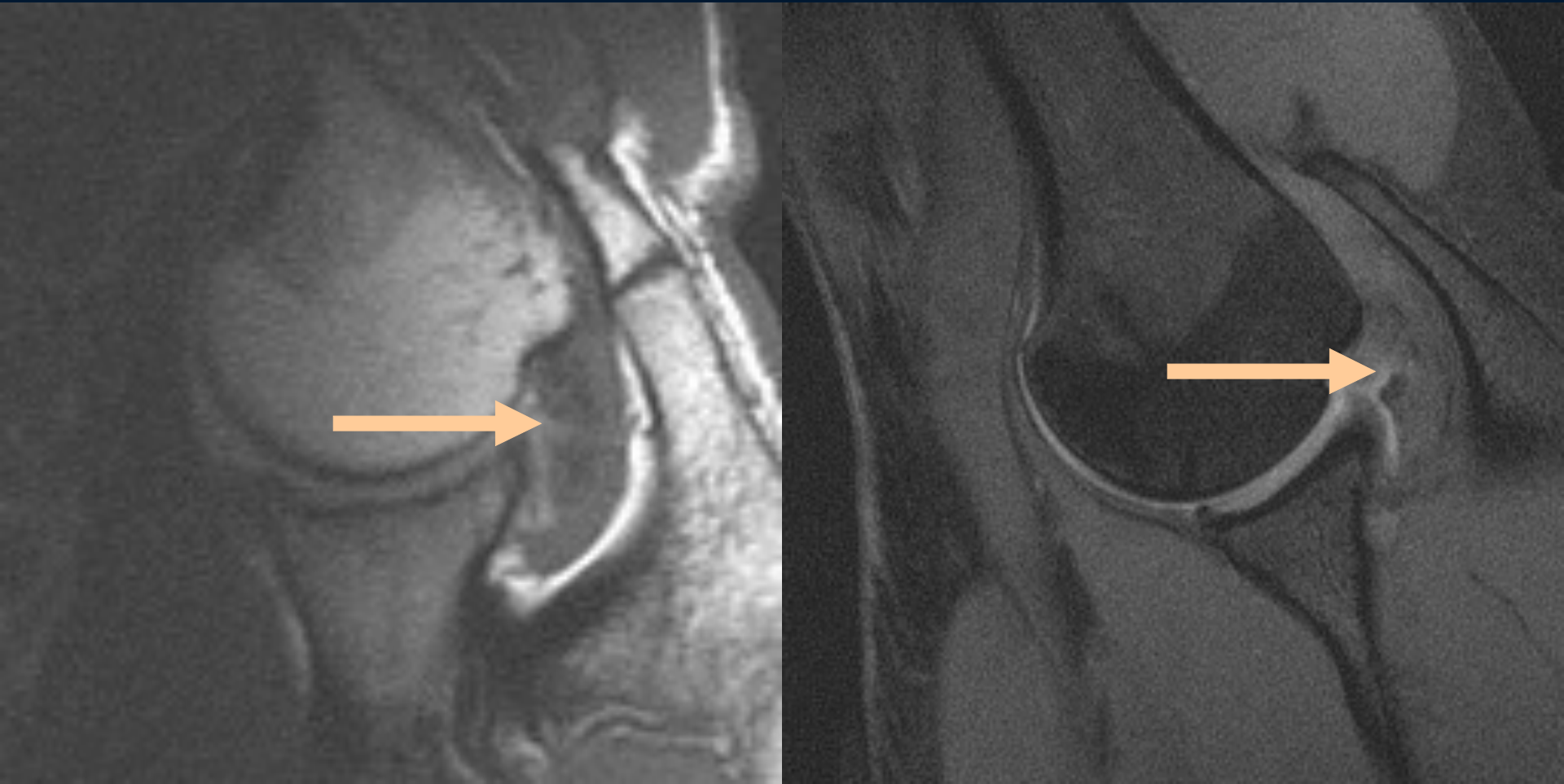
“Internal Impingement”

4 Critical Components



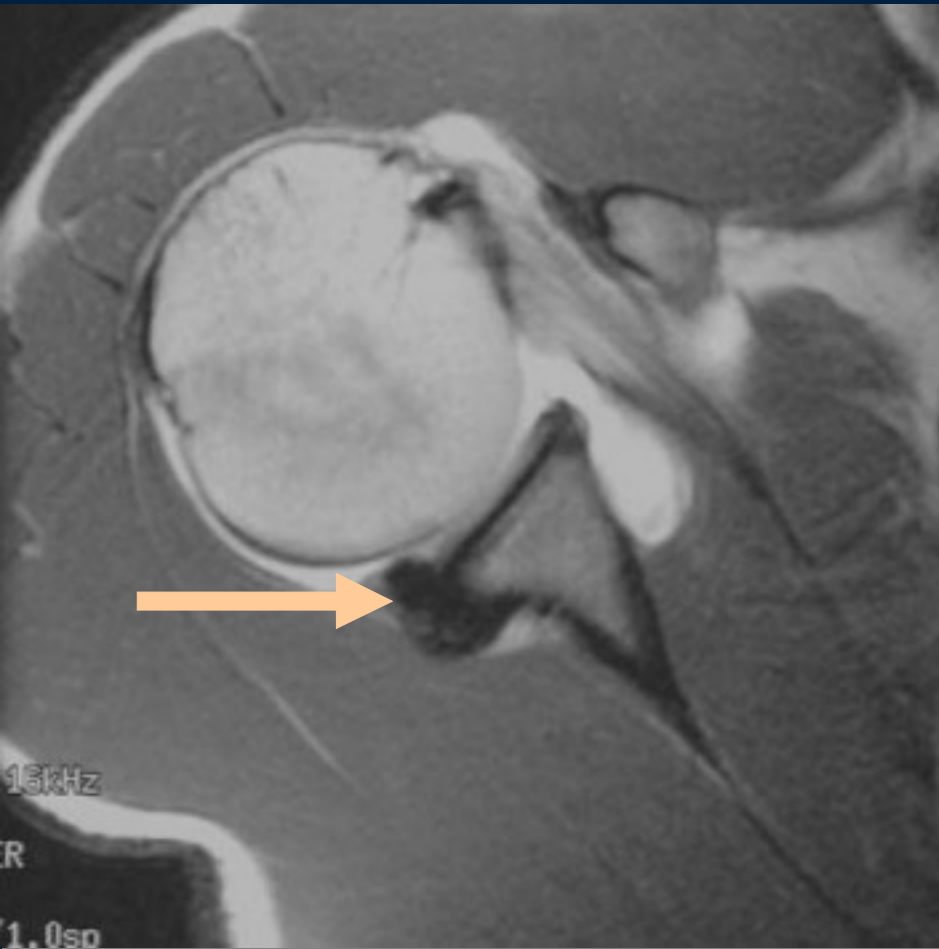
Internal Rotation Deficit

Internal Impingement on ABER (ABduction External Rotation) View



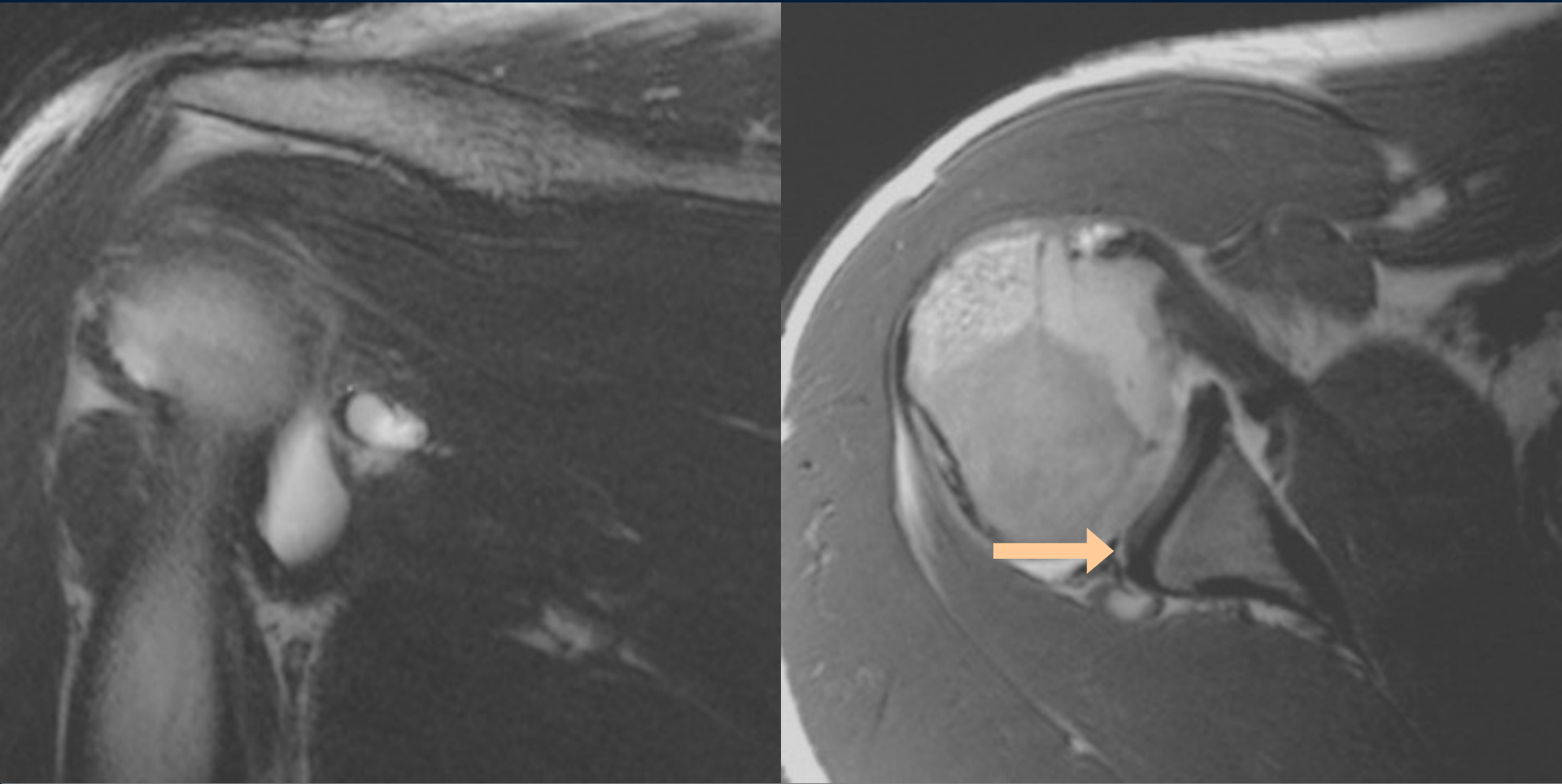
Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB

Bennett Lesion (Thrower's Exostosis)



Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB

Labral Tear With Paralabral Cyst



Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB

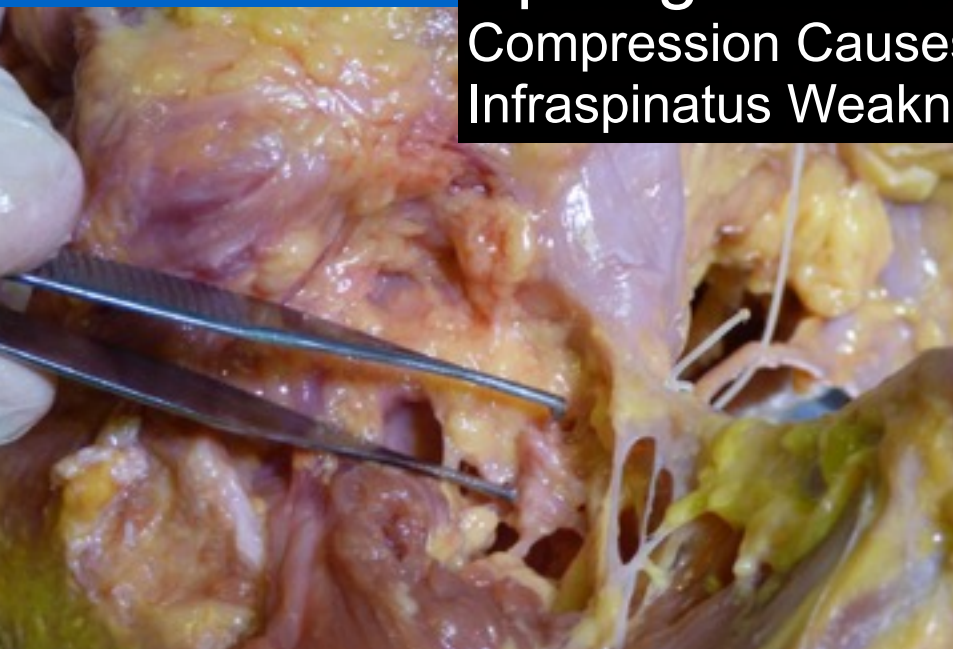
Suprascapular Notch

Compression Causes
Supraspinatus and Infraspinatus Weakness



Spinoglenoid Notch

Compression Causes
Infraspinatus Weakness only



Correlation of arm position and anatomic restraints to testing (Anterior glenohumeral ligament (AGH) capsule)

Arm Position	Primary Restraint	Secondary Restraint
0°	AGH: Superior and Middle	Posterior capsule
45°	AGH: Middle	Posterior capsule inf. Anterior, inferior GH Ligament
90°	AGH: Inferior	Middle Glenohumeral Post. Ligament posterior capsule

Shoulder Stability



Shoulder Stability Tests

© 2005 Ky. Sports Medicine

Instability

- Treatment anterior
 - Anterior dislocation x1
 - Immobilization consider arthroscopy in young high-demand athletes
 - MRI helpful
- Surgery
 - Arthroscopic
 - Open

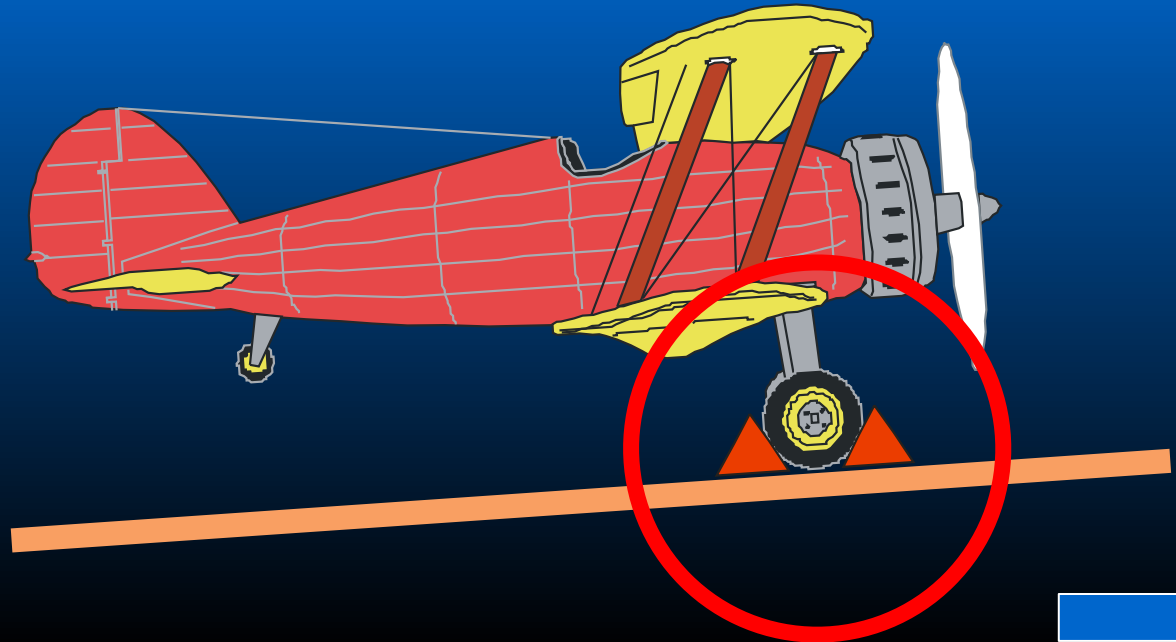
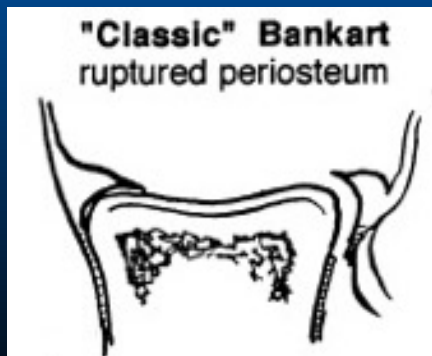
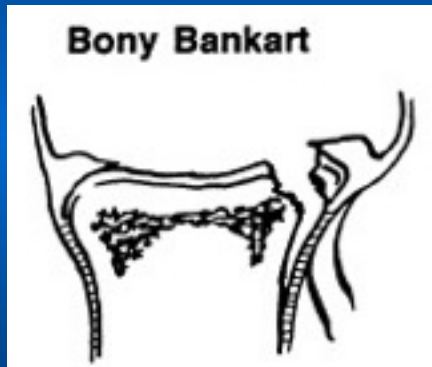
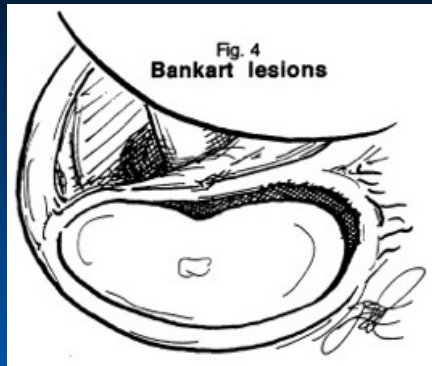


Instability

- Labral tears
 - Avulsion
 - Degenerative
- Capsular insufficiency
- Define pathologic direction
 - Anterior
 - Classic Bankart lesion
 - Labral avulsion anterior-inferior
 - Posterior
 - Multidirectional

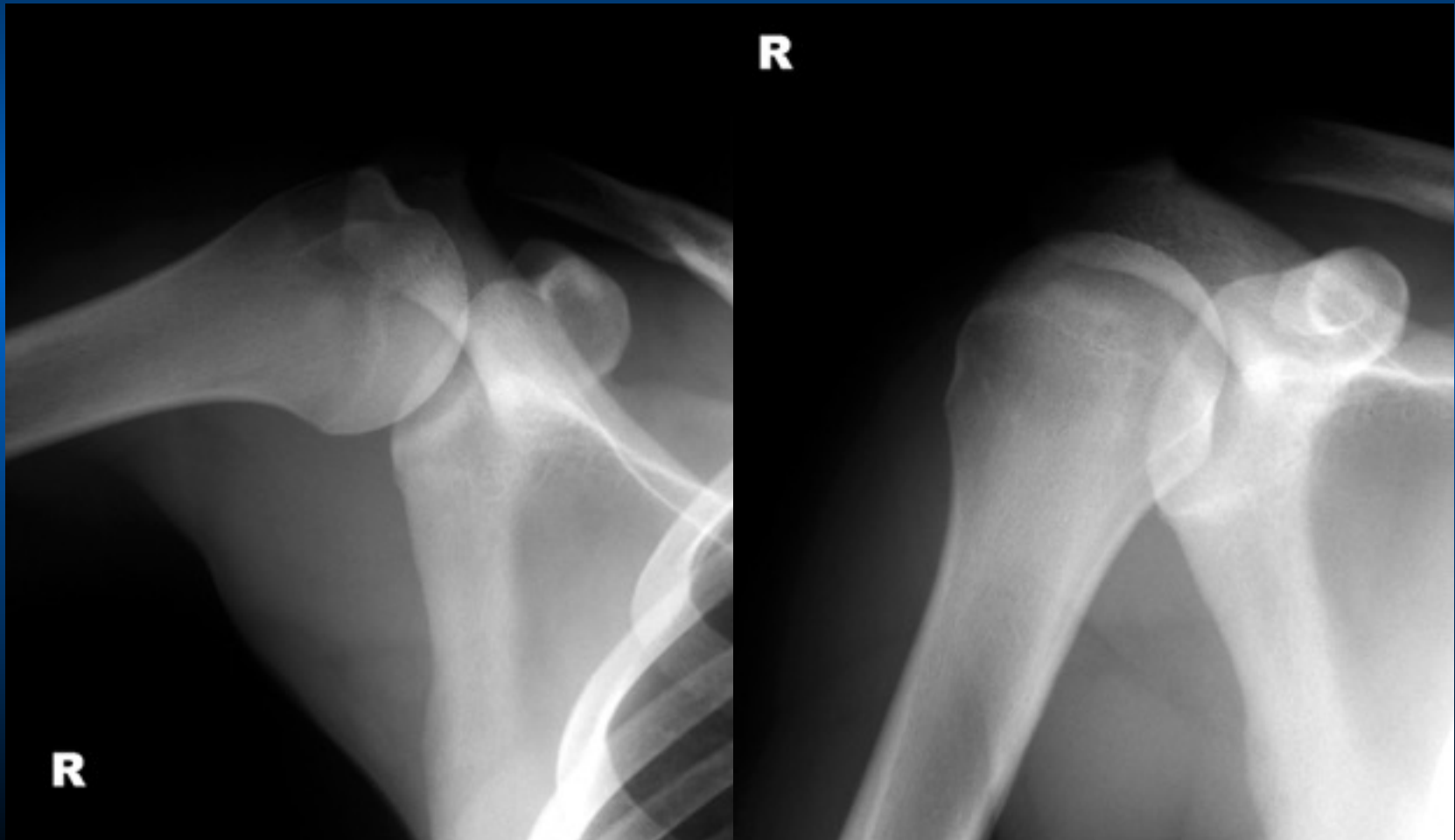


Surgical Stabilization



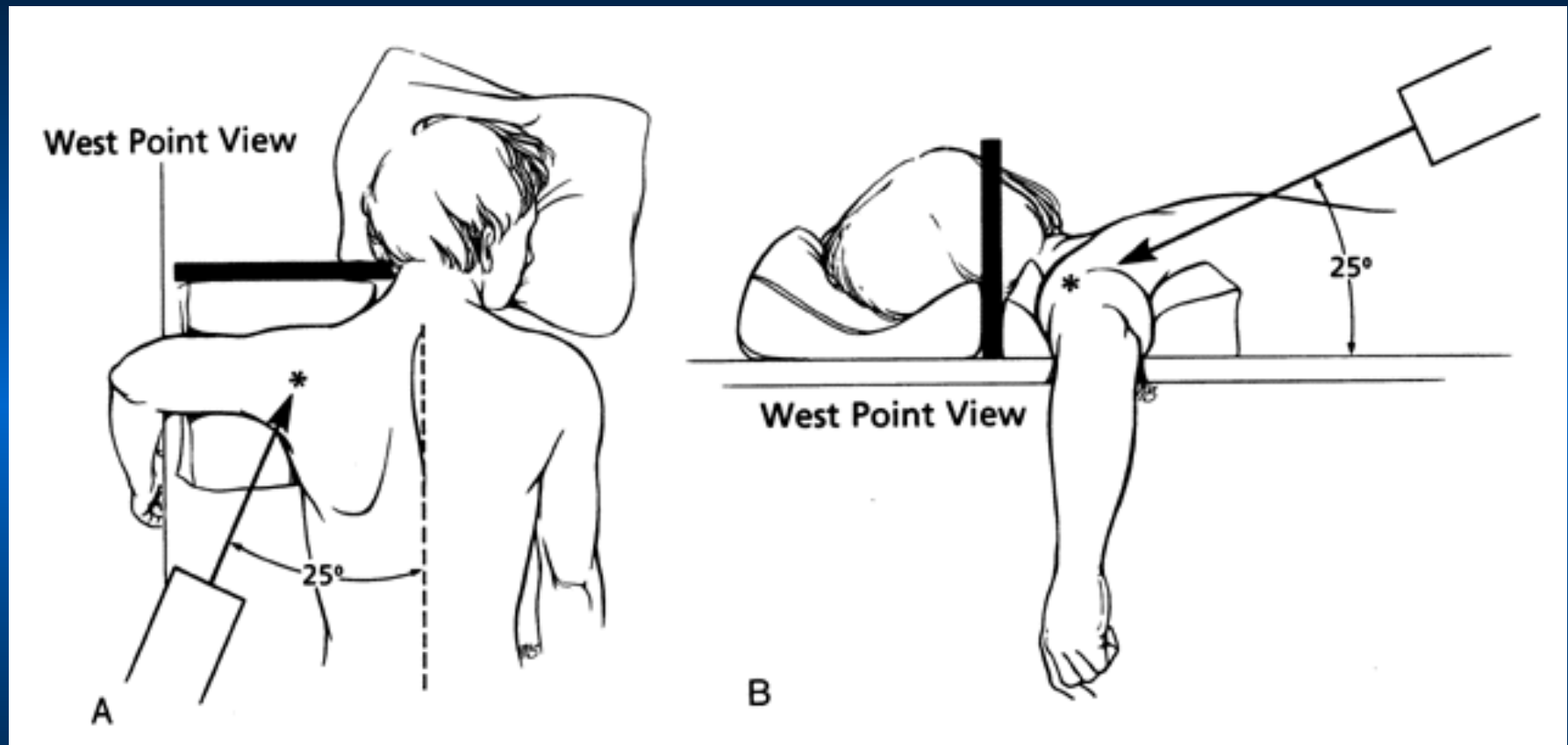
Clinic Radiographs

- Confirm humeral head radiolucency consistent with Hill-Sachs lesion



R

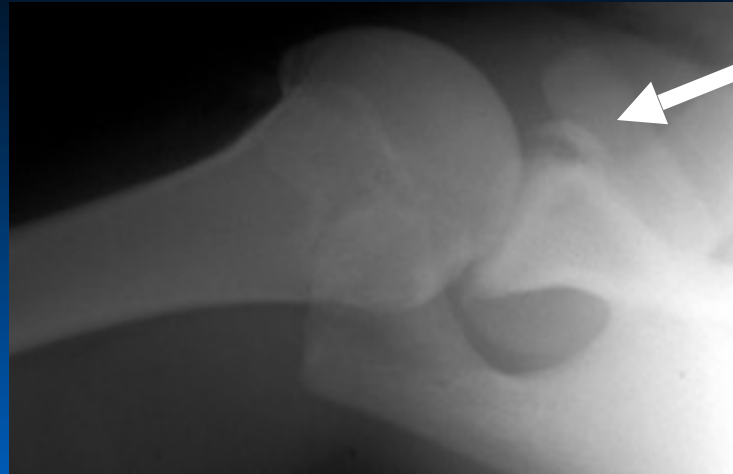




(From Rockwood CA, Matsen FA. The Shoulder, Vol. 1, 1990, Fig. 5-12, p. 185)

Axial view:

Externally
rotated



Internally
rotated



Look for Hill-Sachs and Bankart lesion. Arthroscopic excision of bone and mobilization of AIGHL and anterior repair performed

Prone Posterior Instability Test



Shoulder Palpation Crank Tests



Shoulder Palpation, Tests

© 2005 Ky. Sports Medicine

Posterior Instability Test



**S/P Open anterior shoulder reconstruction
Multi-Directional Instability, bilateral shoulders.**



More symptomatic on operated right side.



Multi-Directional Instability

- Voluntary posterior direction - symptomatic





18 YO Right-Hand-Dominant Discus Thrower

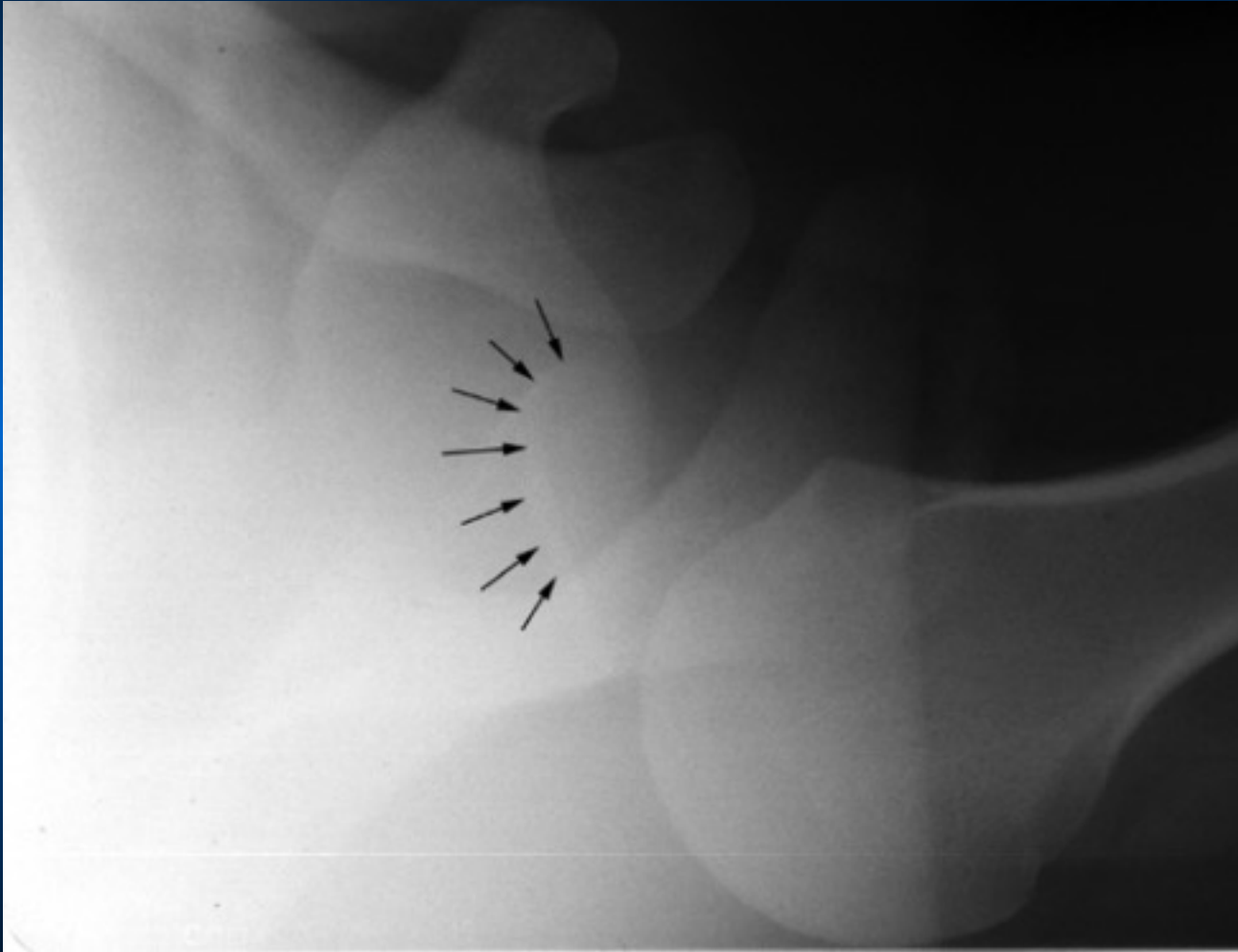
- Threw the discus
- Felt pop, pain, inability to move her arm
- Went to the emergency room

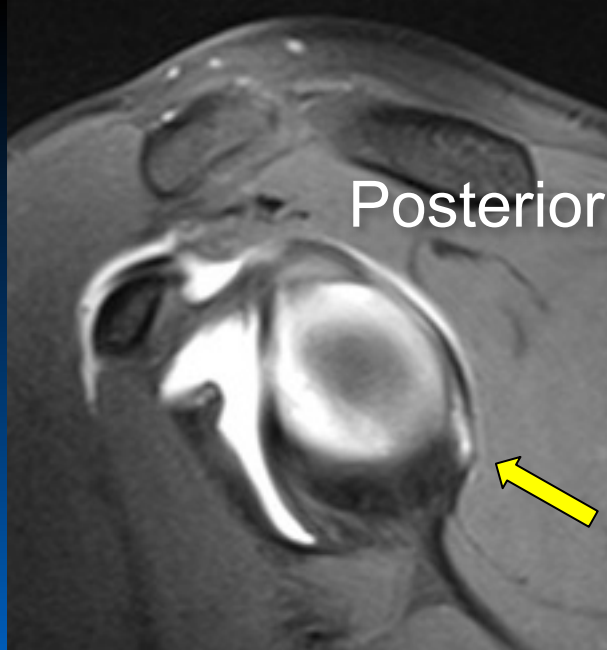
Posterior Dislocation

- X-rays showed humeral head posteriorly dislocated on axillary view
- This direction of dislocation still is missed in emergency rooms

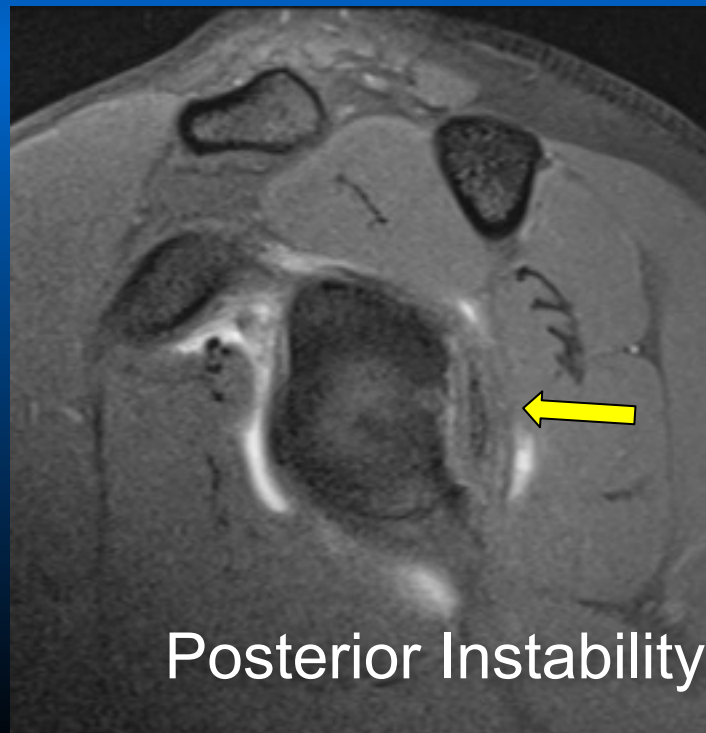
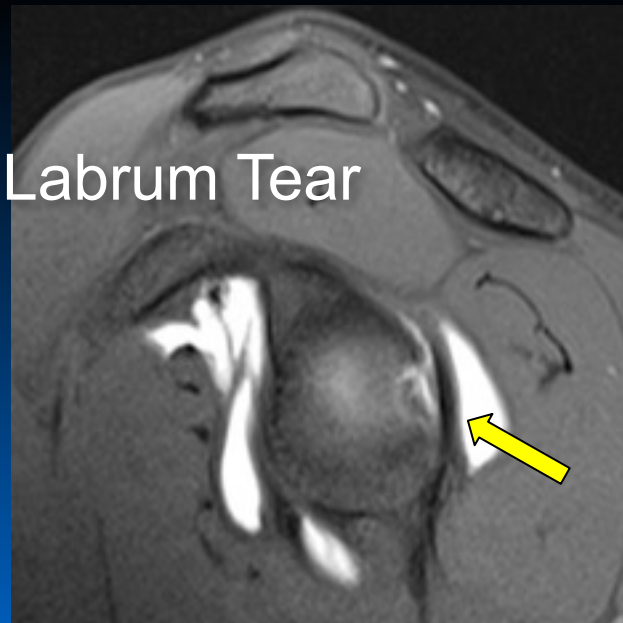


Posterior Dislocation

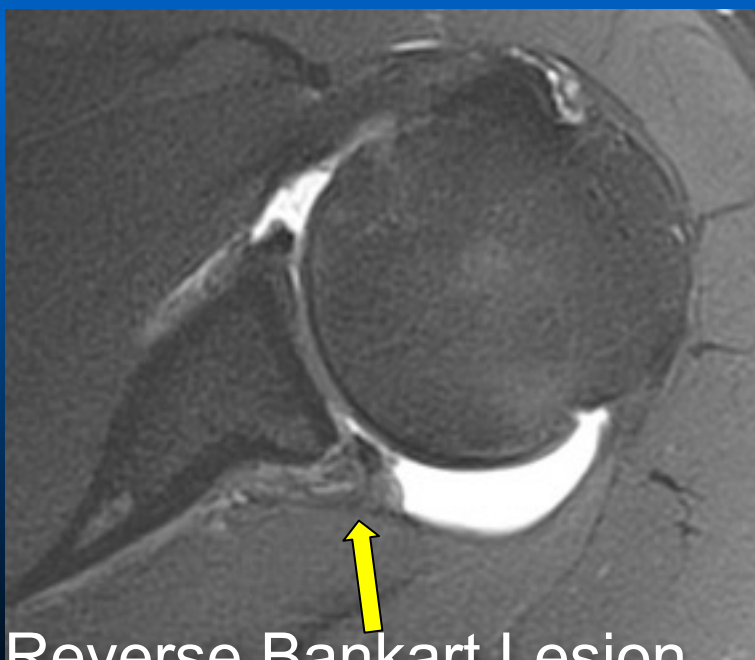




Posterior Labrum Tear



Posterior Instability



Reverse Bankart Lesion



EUA Severe Posterior Instability



Literature review MRI scans and athletes



MR imaging shoulder and the wrist in asymptomatic elite athletes

Fredericson M, Ho C, Waite B, Jennings F, Peterson J, Williams C, et al. Magnetic resonance imaging abnormalities in the shoulder and wrist joints of asymptomatic elite athletes. PM R 2009;1:107-116

Division 1A athletes:
Volleyball players (12)
Swimmers (6)

Fredericson M, Ho C, Waite B, Jennings F, Peterson J, Williams C, et al. Magnetic resonance imaging abnormalities in the shoulder and wrist joints of asymptomatic elite athletes. PM R 2009;1:107-116

Asymptomatic MR changes of the shoulder in swimmers and volleyball players and the wrist in gymnastics, similar to those where intervention of rest or surgery is necessary.

Swimmers have moderate change in the labrum (83%), ligamentous abnormalities (67%); volleyball – moderate (50%) and

Fredericson M, Ho C, Waite B, Jennings F, Peterson J, Williams C, et al. Magnetic resonance imaging abnormalities in the shoulder and wrist joints of asymptomatic elite athletes. PM R 2009;1:107-116

Gymnasts: wrist ligaments (40% mild, 60% moderate), tendons (53% mild, 47% moderate), cartilage (60% mild, 33% moderate, 7% severe), cysts/fluids (80%), carpal tunnel changes (53%)

Fredericson M, Ho C, Waite B, Jennings F, Peterson J, Williams C, et al. Magnetic resonance imaging abnormalities in the shoulder and wrist joints of asymptomatic elite athletes. PM R 2009;1:107-116

Baseball Player Study

- 545 baseball players underwent MRs of shoulder and elbow, junior high school, high school collegiates players.
- Results: Junior high school sustained a high proportion of OCD compared to high school and college.
- High school, college were more like to have UCL injuries or SLAP tears in junior high. Pitchers, outfielders would more often have UCL injuries. Taller and heavier players were more likely to have UCL injuries and SLAP tear in high school and junior high school than in the control group.

Han KJ, Kim JK, Lim SK, Park JY, Oh KS. The effect of physical characteristics and field position on the shoulder and elbow injuries of 490 baseball players: confirmation of diagnosis by magnetic resonance imaging. Clin J Sport Med 2009;19:271-276.

MRI scans and assessment of detection of Hill-Sachs lesion and Bankart lesion – 87 patients – 55 intra-articular contrast (63%), 32 no contrast (67%).

- MRs interpreted by two radiologists and correlated with the operative report and images at arthroscopy
- Cartilage injuries were detected in 55 patients (63%), Bankart lesion in 66 patients (76%) and Hill Sachs lesion in 55 patients (62%), sensitivity, specificity (87.2%, 80.6%). Sensitivity and specificity Bankart lesions (98% and 95%)

Hayes ML, Collins MS, Morgan JA, Wenger DE, Dahm DL. Efficacy of diagnostic magnetic resonance imaging for articular cartilage lesions of the glenohumeral joint in patients with instability. *Skeletal Radiol* 2010;39:1199-1204.

MRI scans and assessment of detection of Hill-Sachs lesion and Bankart lesion – 87 patients – 55 intra-articular contrast (63%), 32 no contrast (67%).

- Sensitivity of Hill Sachs was 96.3% and specificity 90.6%.
- No difference was found in MR examination with and without gadolinium ($p = 0.89$)
- Conclusion: High sensitivity and specificity of articular cartilage injuries in shoulder glenohumeral instability – don't need contrast for this.

Hayes ML, Collins MS, Morgan JA, Wenger DE, Dahm DL. Efficacy of diagnostic magnetic resonance imaging for articular cartilage lesions of the glenohumeral joint in patients with instability. *Skeletal Radiol* 2010;39:1199-1204.

Evaluation of glenoid labrum with 3-T MR – Is intraarticular contrast necessary?

- 42 patients: 28 men, 14 women, mean age 33 underwent MR arthrography and conventional MRI. 2 patients bilateral; 22 patients underwent arthroscopy.
- Of 22 arthroscopies, 26 labrum tears, 18 shoulders, 4 were normal. Conventional MR identified 9 of the 12 and MR arthroscopy identified 9 of 12 superior, 7 of 9 posterior, 8 of 9 posterior.
- Conclusions: Power of the study is small suggesting that intraarticular contrast is helpful, particularly in tears of anterior labrum.

Major NM, Browne J, Domzalski T, Cothran RL, Helms CA. Evaluation of the glenoid labrum with 3-T MRI: is intraarticular contrast necessary? AJR Am J Roentgenol 2011;196: 1139-1144.

Outcome nonoperative treatment symptomatic rotator cuff tears

- 59 shoulders in 54 patients, mean age 58 years, treated nonoperatively. MRs acquired six months after initial study.
- **Conclusions:** Factors with progression documented by MR: rotator cuff tear age more than 60, full thickness tear, fatty infiltration rotator cuff.

Maman E, Harris C, White L, Tomlinson G, Shashank M, Boynton E.
Outcome of nonoperative treatment of symptomatic rotator cuff tears
monitored by magnetic resonance imaging.
J Bone Joint Surg Am 2009;91:1898-1906.

Rotator Cuff Diagnosis Study

- Accuracy of MR arthrography and abduction external rotation – partial thickness rotator cuff tear – sensitivity and specificity – Result: Accuracy of each reader on MR imaging without ABER view 83%, 90%, 86%, and 83%, 80%, and 82%; with ABER, accuracy, the sensitivity is 92%, 70%, 82%, specificity 92%, 80%, 86%
- ABER view in routine sequences increases sensitivity and inter- and intraobserver agreements for partial rotator cuff tears. No mention of SLAP tears.

Jung JY, Jee WH, Chun HJ, Ahn MI, Kim YS. Magnetic resonance arthrography including ABER view in diagnosing partial-thickness tears of the rotator cuff: accuracy and inter- and intra-observer agreements. *Acta Radiol* 2010;51:194-201.

Are 3-T MRI scan or arthrogram necessary?

- 150 patients underwent conventional shoulder MR and MR arthrography. Group of patients that were less than 50 years old selected for arthroscopy. No prior surgery.
- Results: 3 full-thickness, 9 partial-thickness supraspinatus tears, 7 SLAP tears, 6 anterior labral tears, 2 posterior tears. Seen on MR arthrography but not conventional MR.
- Conclusions: MR arthrography significantly increased sensitivity for detection of partial-thickness articular surface supraspinatus tears, anterior labral tears, and SLAP tears, compared to conventional MR 3-T.

Magee T. 3-T MRI of the shoulder: is MR arthrography necessary? AJR Am J Roentgenol 2009;192:86-92.

When Should an MRI Exam Be Obtained?

- Recent Trauma
- Difficult Physical Exam
- Physical Exam that Does not Match Clinical Symptoms
- Normal Radiographs with Significant Symptoms
- Pre-Operative Planning
- Recent MRI that was Technically Suboptimal

Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB

How Should The MRI Scan Be Performed

- **Best Possible Equipment**
- **Dedicated Coils for the Body Part**
- **Contrast When Necessary**
- **Correct Sequences to Define Appropriate Anatomy**
- **Shortest Exam to Achieve Results and Keep Patient Comfortable**

**Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB**

Contrast Administration

- **Intraarticular Contrast Gives Superior Soft Tissue Contrast and Significantly Enhances Diagnostic Capability**
- **Intravenous Contrast Useful for Post Operative Menisci and Tumors**

**Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB**

Intraarticular Contrast Injection

- **Use Sterile Technique and Fluoroscopic Guidance**
- **Mix Iodinated Contrast with Dilute Gadolinium Solution to Avoid Air Bubbles**
- **Use Enough Volume to Distend Joint**
- **Perform Injection Quickly and as Painlessly as Possible**

**Courtesy Martin L. Schwartz, MD
Clinical Prof. of Radiology, UAB**

What about ultrasound?

- Series of 50 patients underwent arthroscopy examined with 3D ultrasound with MR arthrography
- Results: Arthroscopic diagnosis: Full thickness in 40, partial 5, intact supraspinatus in 5. 3D ultrasound correctly diagnosed 35 out of 40 full-thickness and MR arthrography were 39 out of 40 full-thickness. Partial tears: Ultrasound 2 and MR 1.
- Conclusions: 3D ultrasound promising imaging comparable to MR arthrography for assessment of supraspinatus tendon tears.

Kang CH, Kim SS, Kim JH, Chung KB, Kim YH, Oh YW, et al. Supraspinatus tendon tears: comparison of 3D US and MR arthrography with surgical correlation. *Skeletal Radiol* 2009;38:1063-1069.

You May Not Have Seen It



But It Has Seen You.



16 YO RHD Male Differential Diagnosis

Left shoulder pain

No Injury

Positive O'Brien's Test

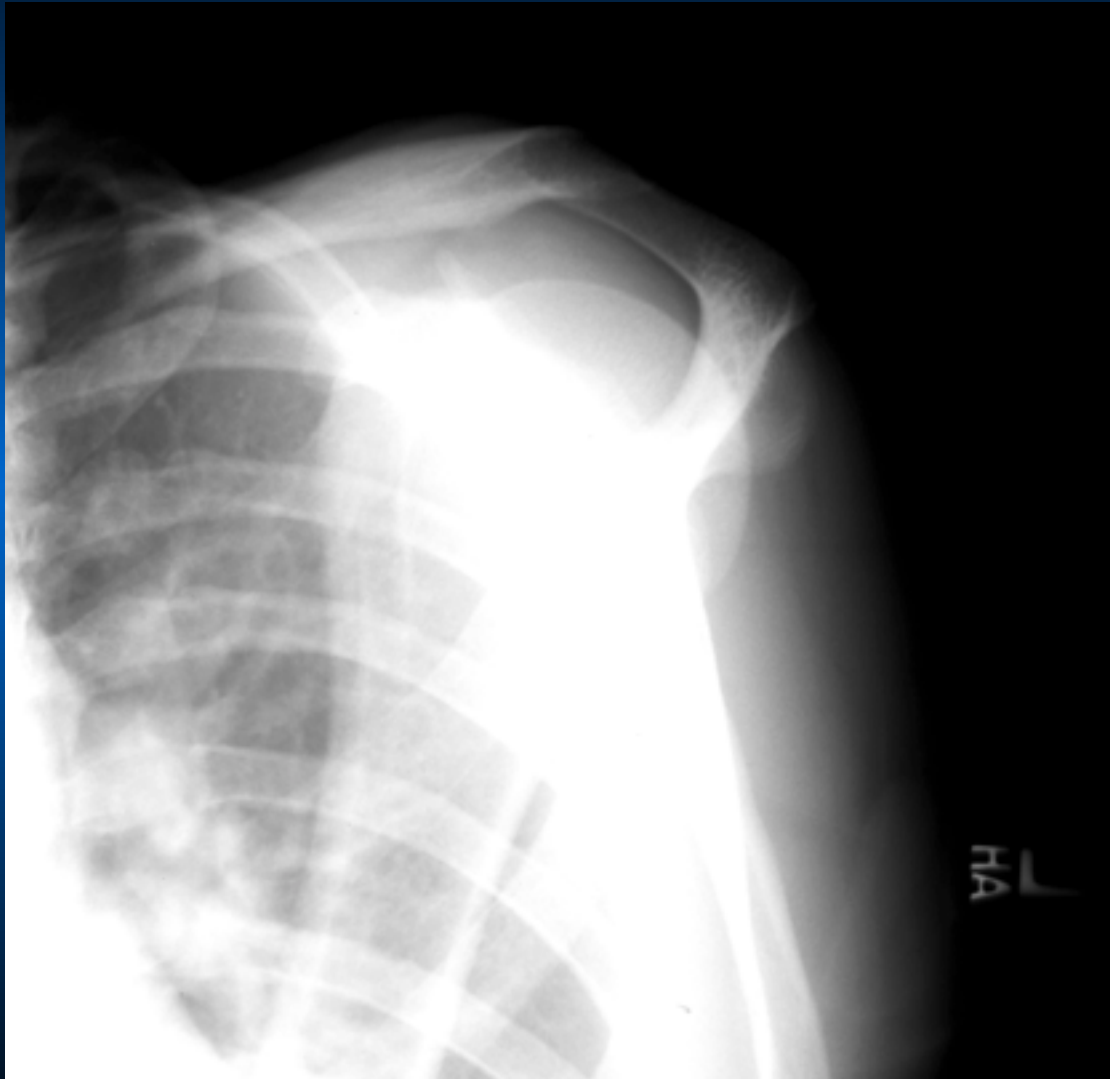
- **SLAP tear**
- **Anteroinferior glenohumeral instability**
- **Proximal humeral lesion**

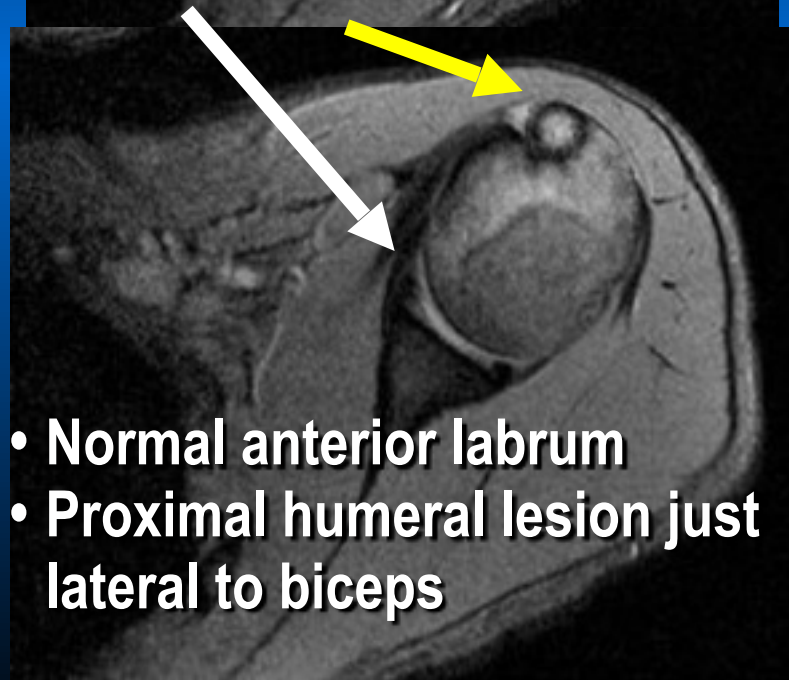
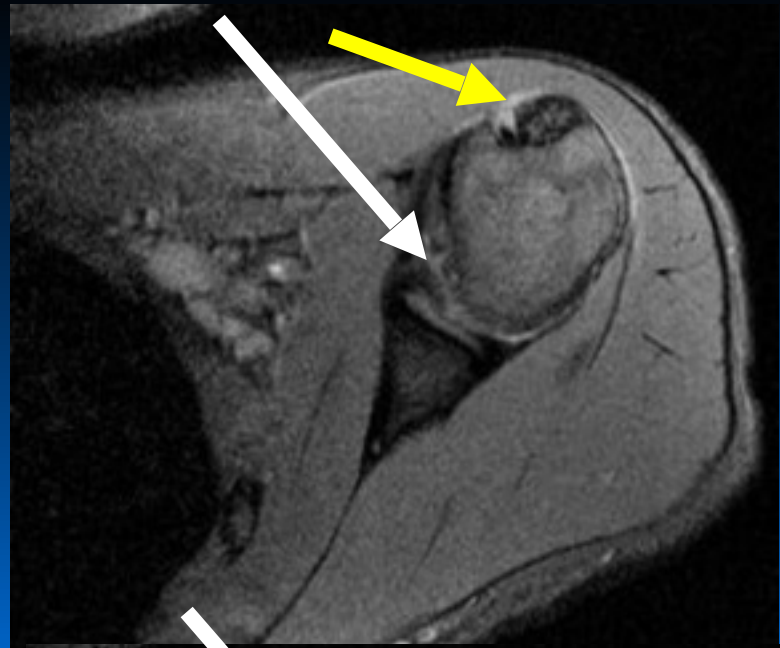
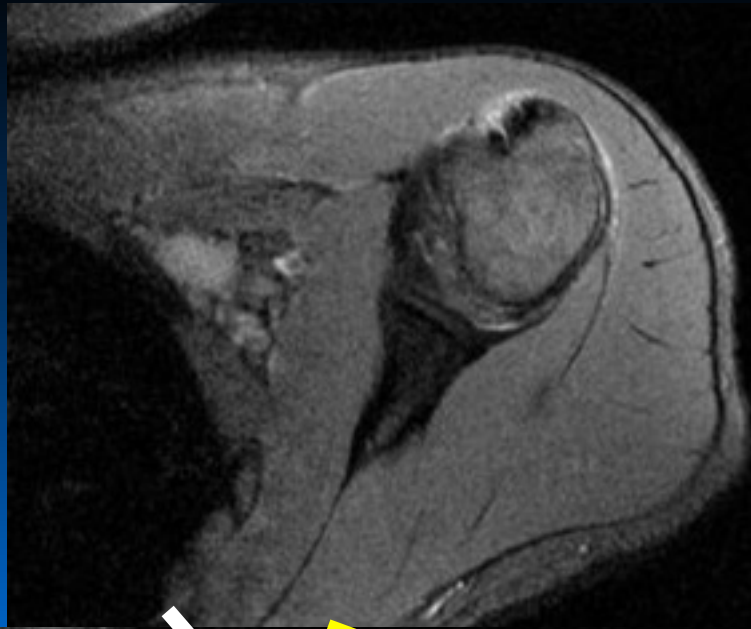


16 YO RHD Male

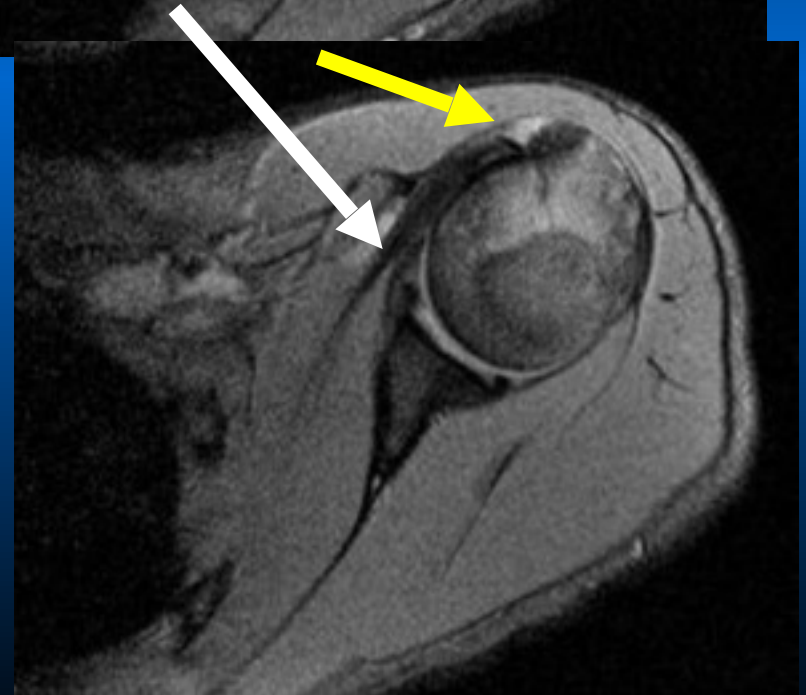


16 YO RHD Male

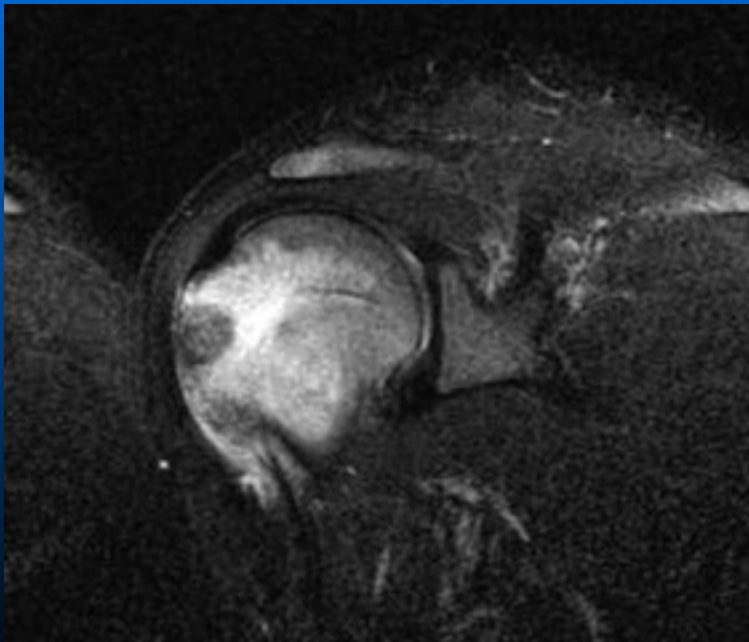
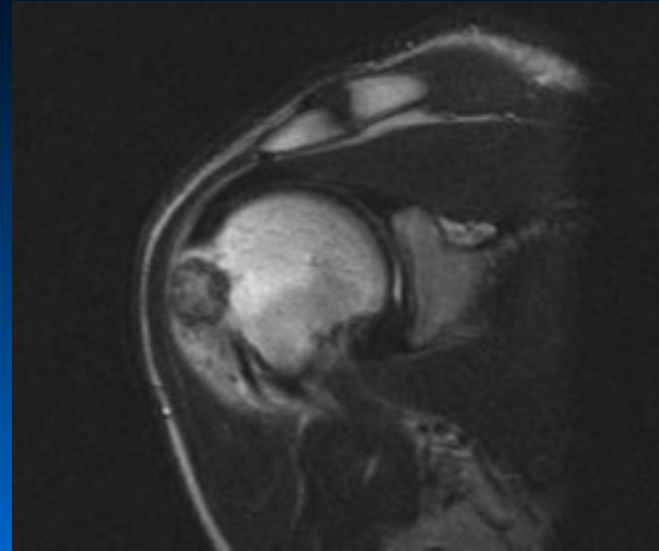
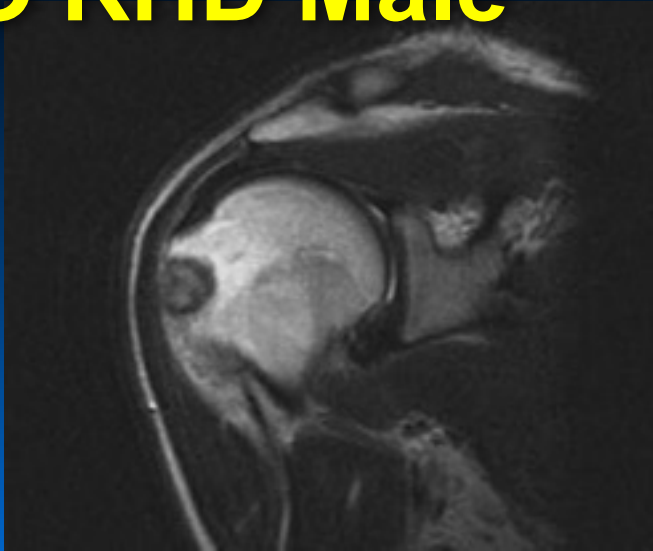




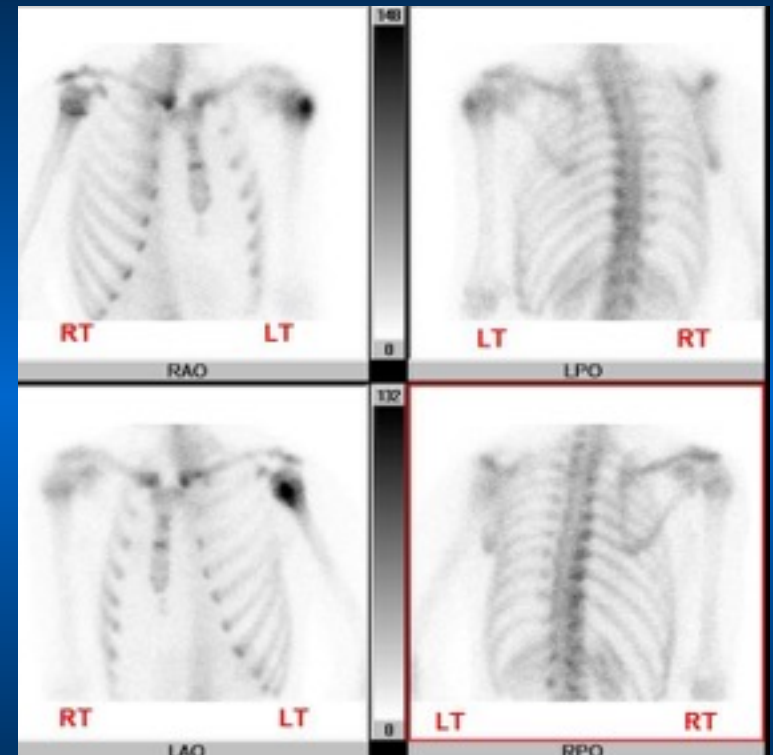
- Normal anterior labrum
- Proximal humeral lesion just lateral to biceps



16 YO RHD Male

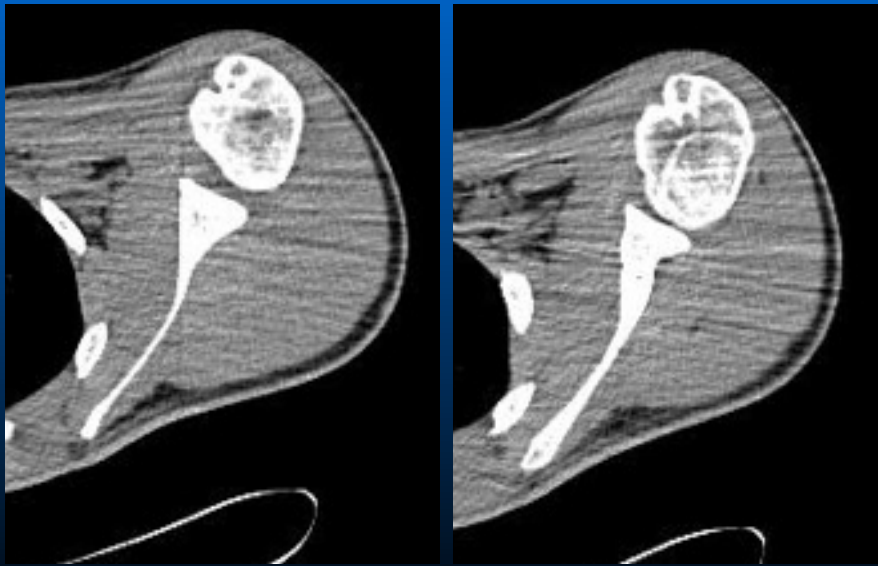


16 YO RHD Male Bone scans



CT scans

- Well corticated thick-bordered proximal humeral lesion
- Small peripheral snowflake radiodensities
- No calcification or nidus



Differential diagnosis: Proximal humeral lesion

- **Osteoid osteoma**
- **Atypical enchondroma**
- **Infection with sequestrum**
- **Chondroblastoma**
- **Osteochondritis dissecans**



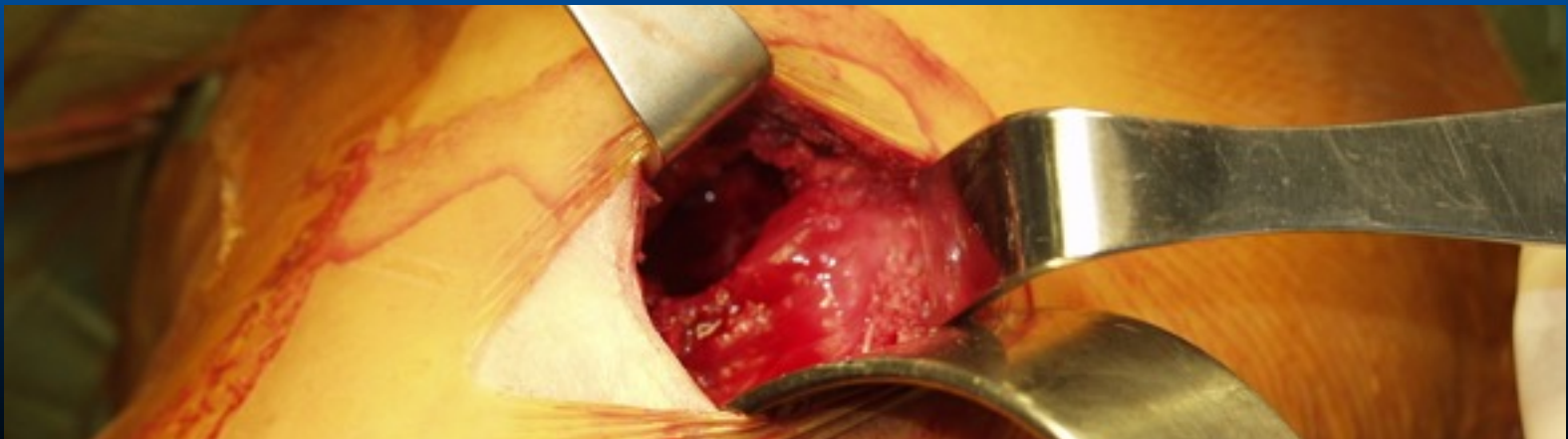
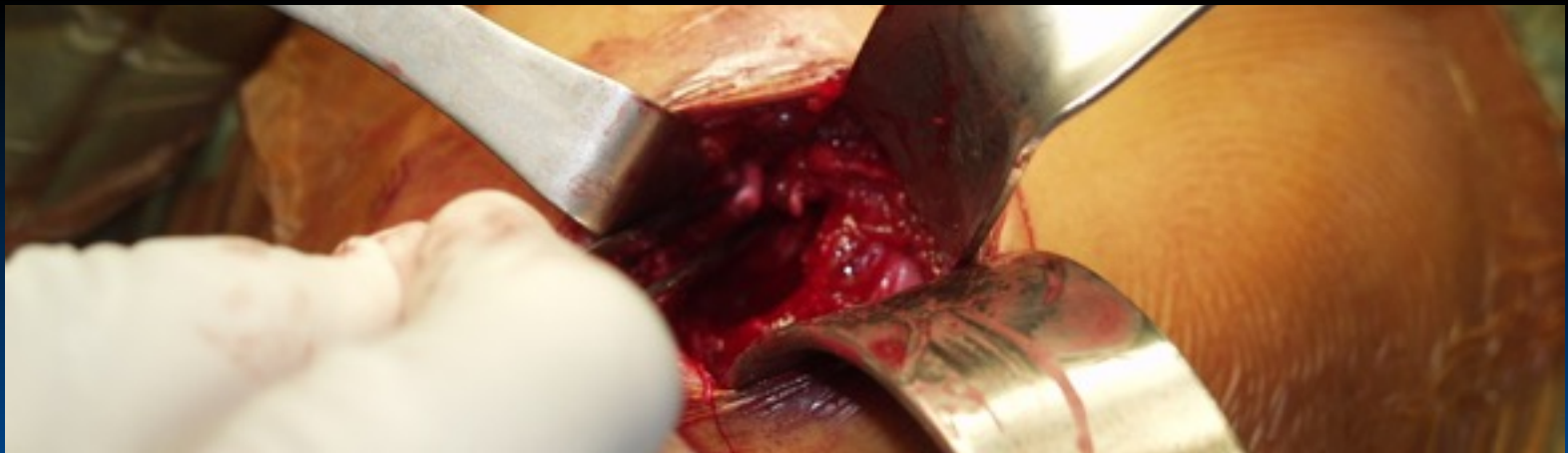


Operative Findings

Open Excisional Biopsy

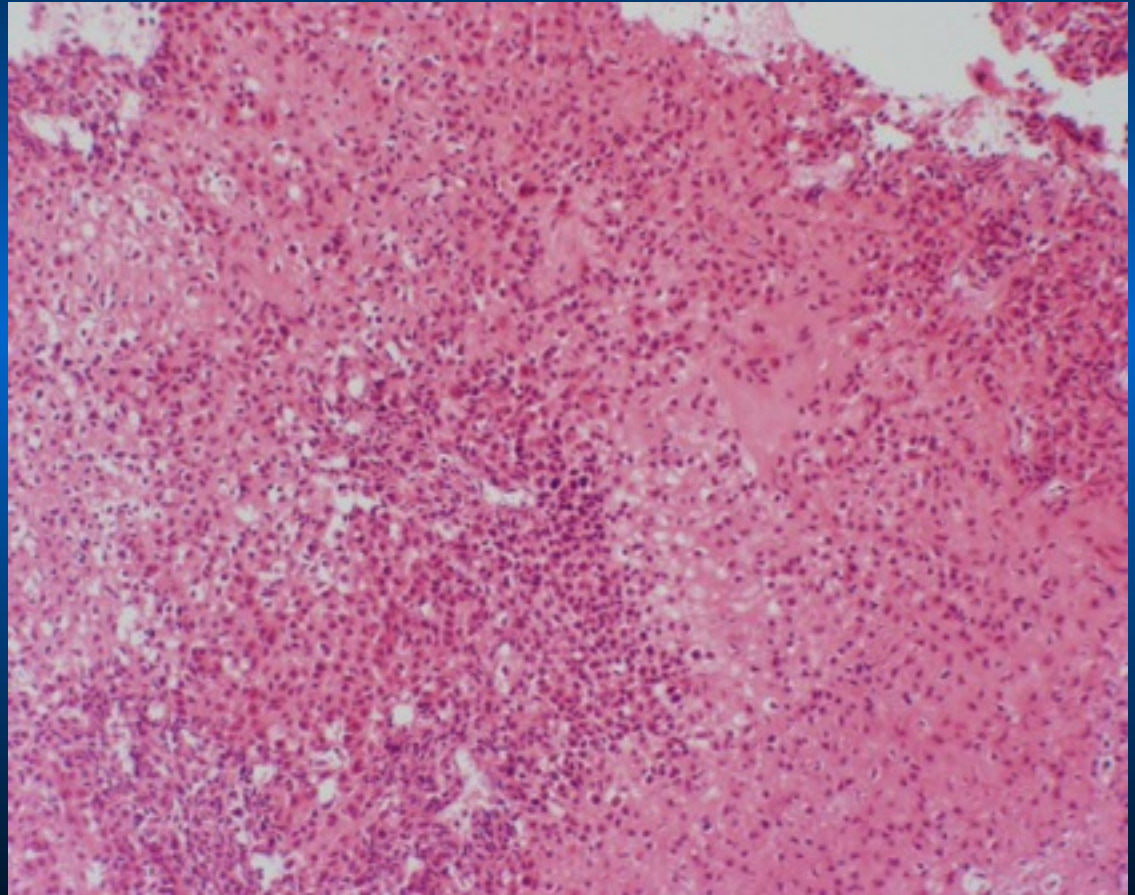
- Thin cortical bone
- Brownish appearance of tumor
- Lesion just lateral to biceps
- Excisional biopsy
- No bone graft
- No arthroscopy performed





Characteristic of classic chondroblastoma:

Cartilaginous matrix
Rich cellularity
Round distinct cells
Multi-nucleated



Original Description

Codman EA, “Epiphyseal chondromatous giant cell tumors of the upper end of the humerus,” *Surg., Gynec. and Obstet.*, 52:543-548, 1931.

Diagnosis reclassified as “chondroblastoma of bone”

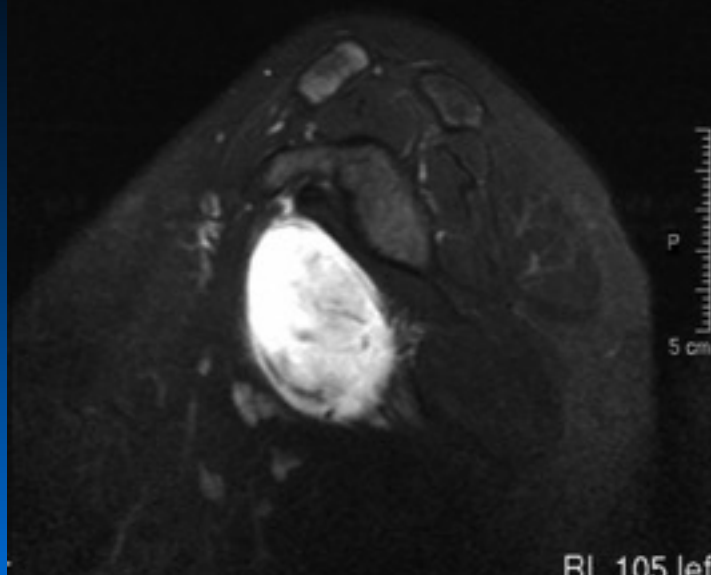
Jaffe HL and Lichtenstein L, “Benign chondroblastoma of bone: a reinterpretation of the so-called calcifying or chondromatous giant cell tumor,” *Am J. Pathol.*, 18: 969-991, 1942.

12 YO Male Soccer Athlete

- Pain in left shoulder, 1 to 2 years
- No injury
- PE: normal stability
- Mildly tender firm axillary mass

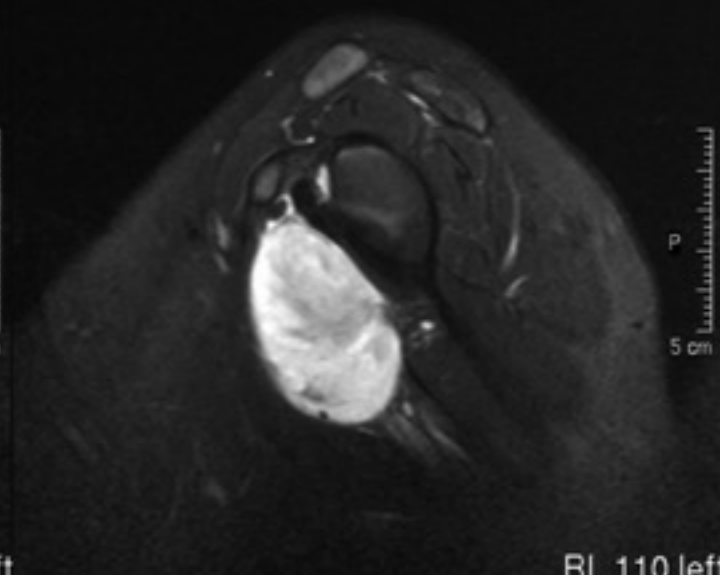


Sc3
TSE/M
SL10



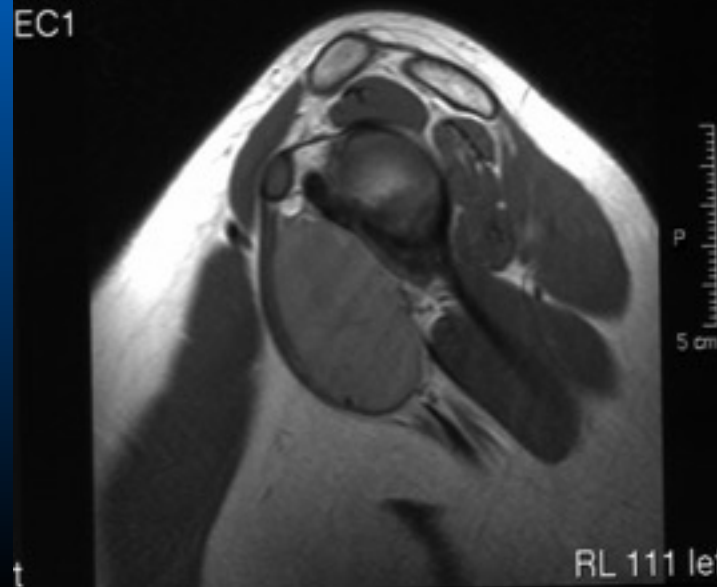
RL 105 left

Sc3
TSE/M
SL9



RL 110 left

Sc4
SE/M
SL11
EC1



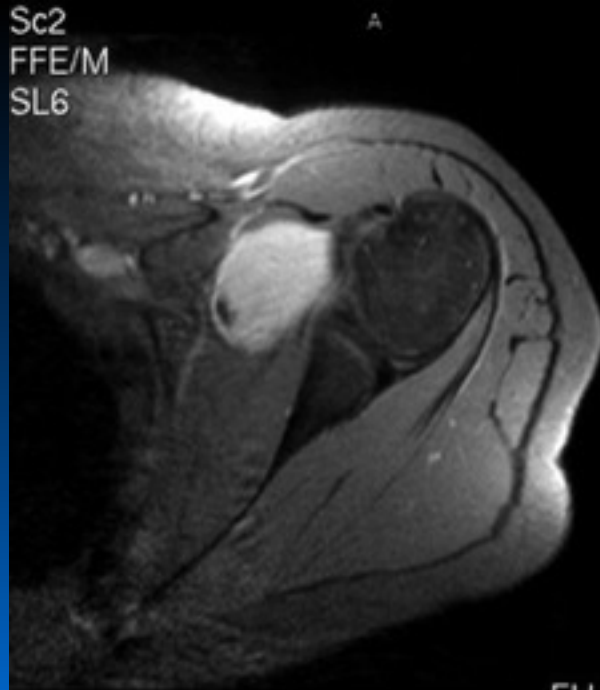
RL 111 left

Sc4
SE/M
SL11
EC2



RL 111 left

Sc2
FFE/M
SL6



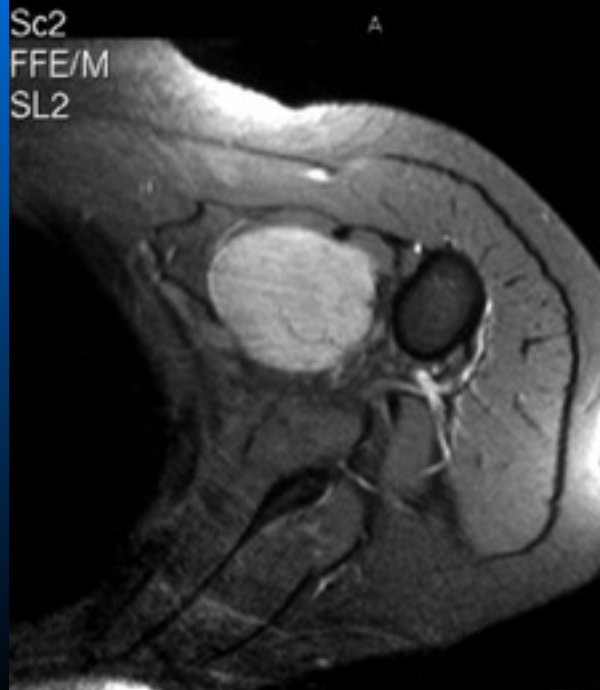
FH -24 feet

Sc2
FFE/M
SL5



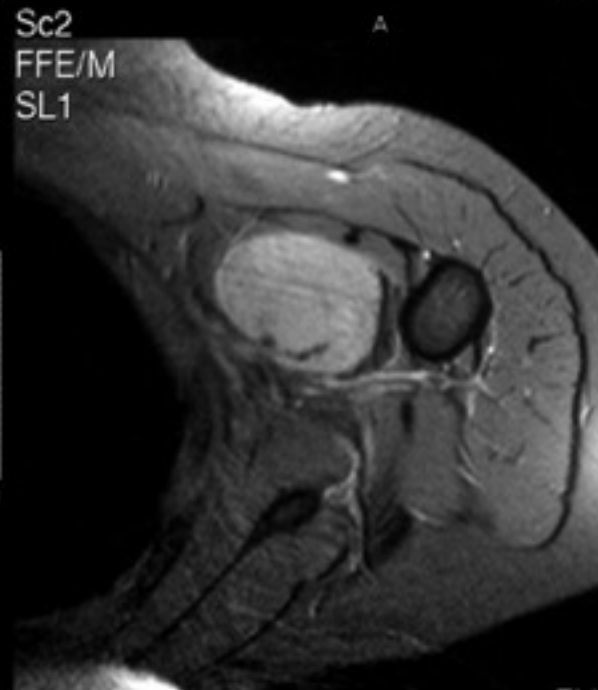
FH -28 feet

Sc2
FFE/M
SL2



FH -41 feet

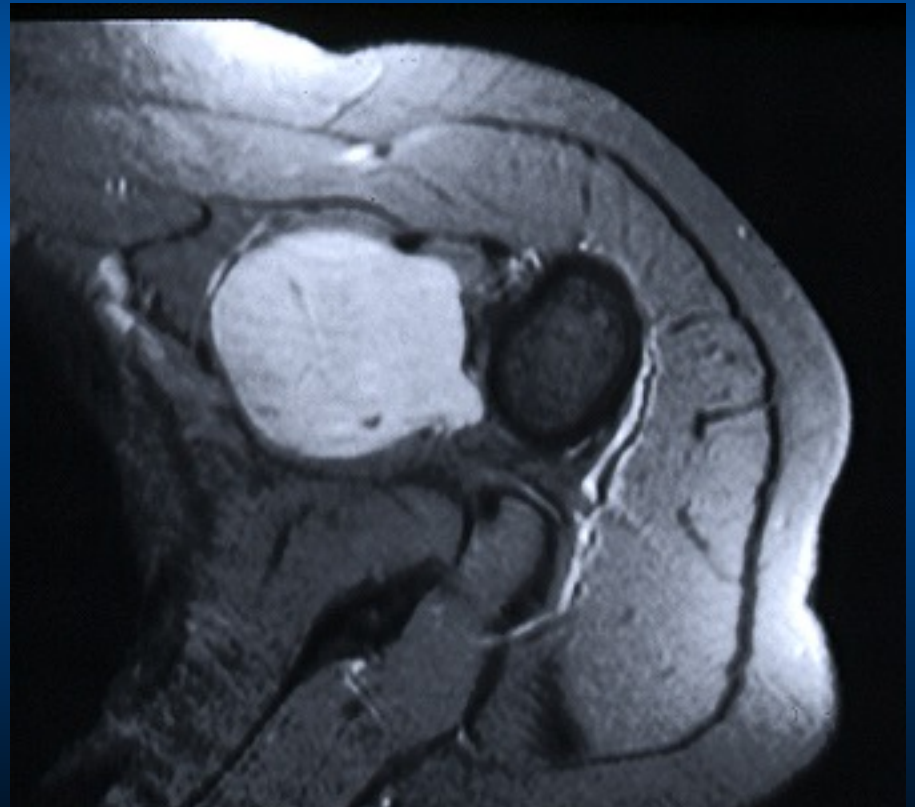
Sc2
FFE/M
SL1



FH -46 feet

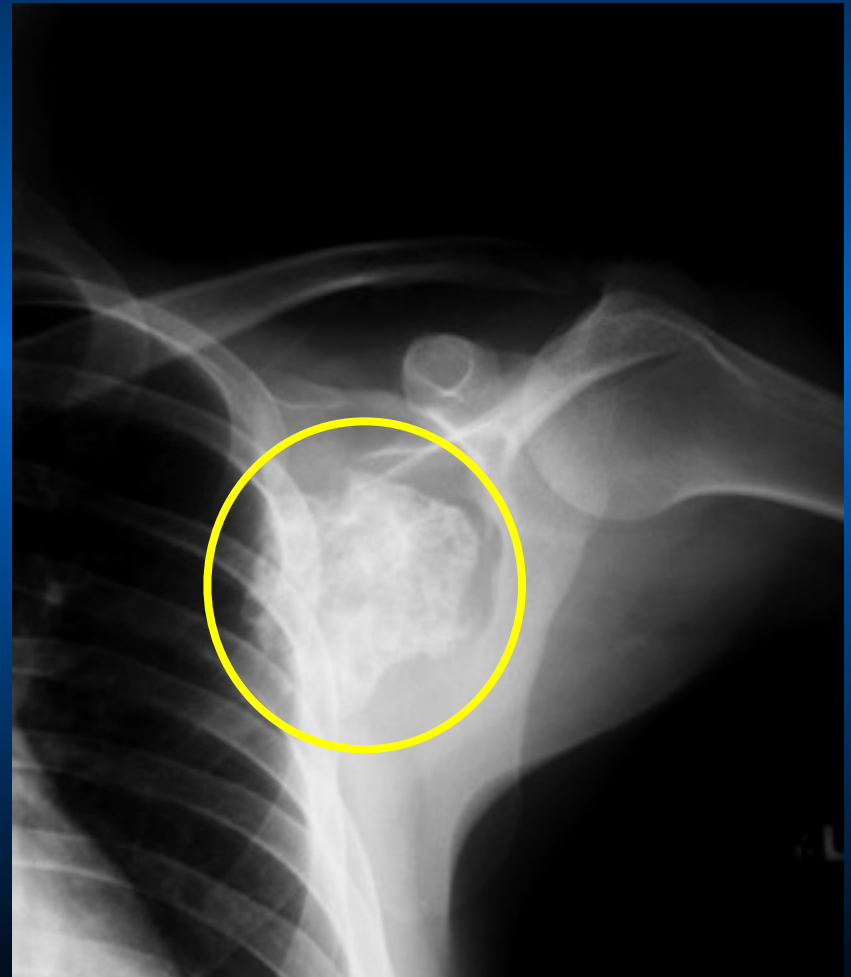
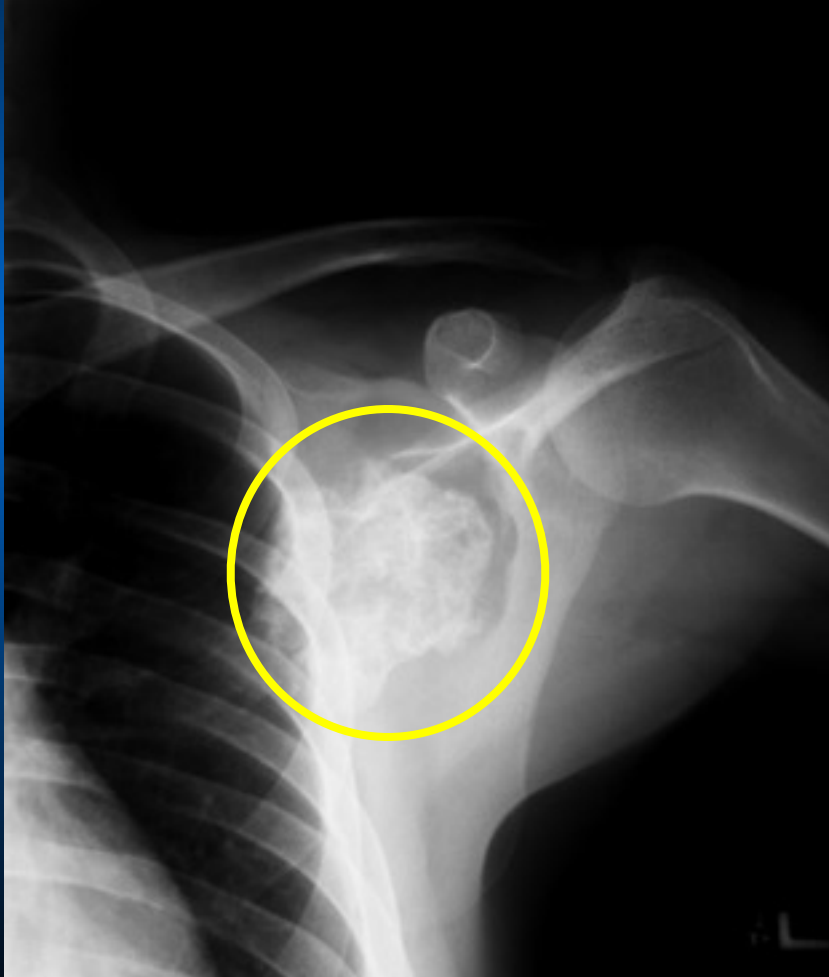
Dx: Synovial Sarcoma

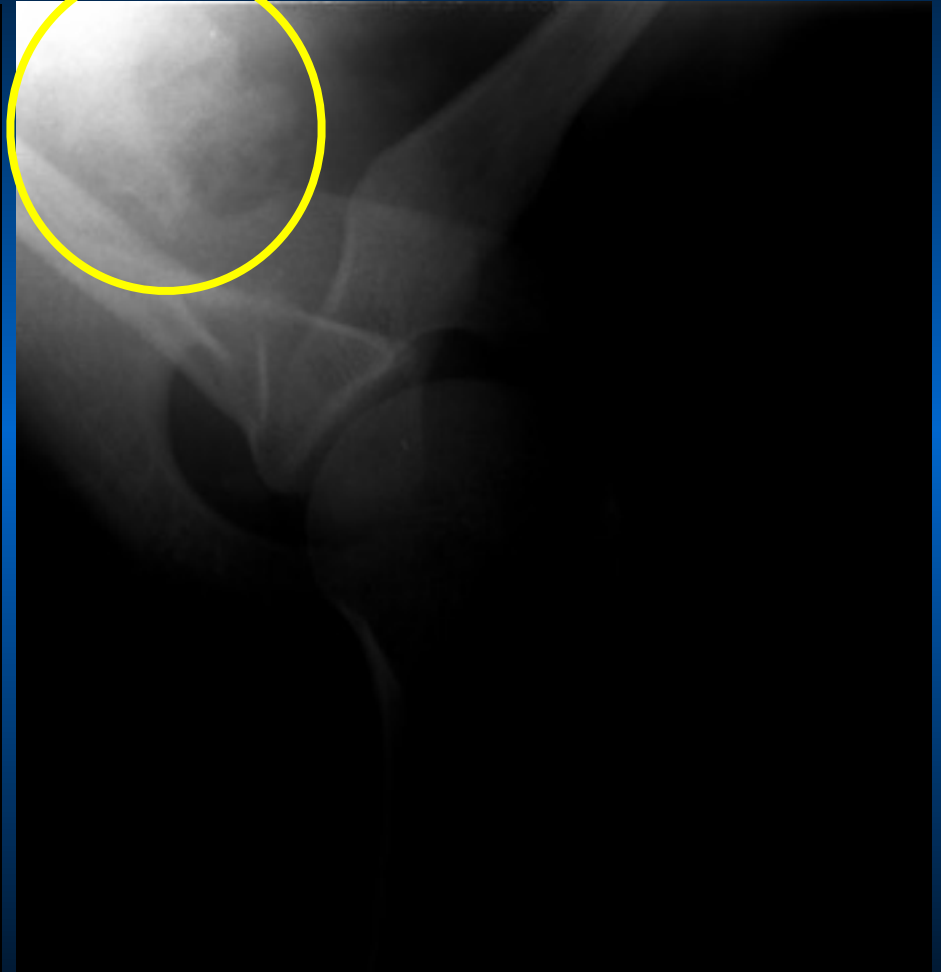
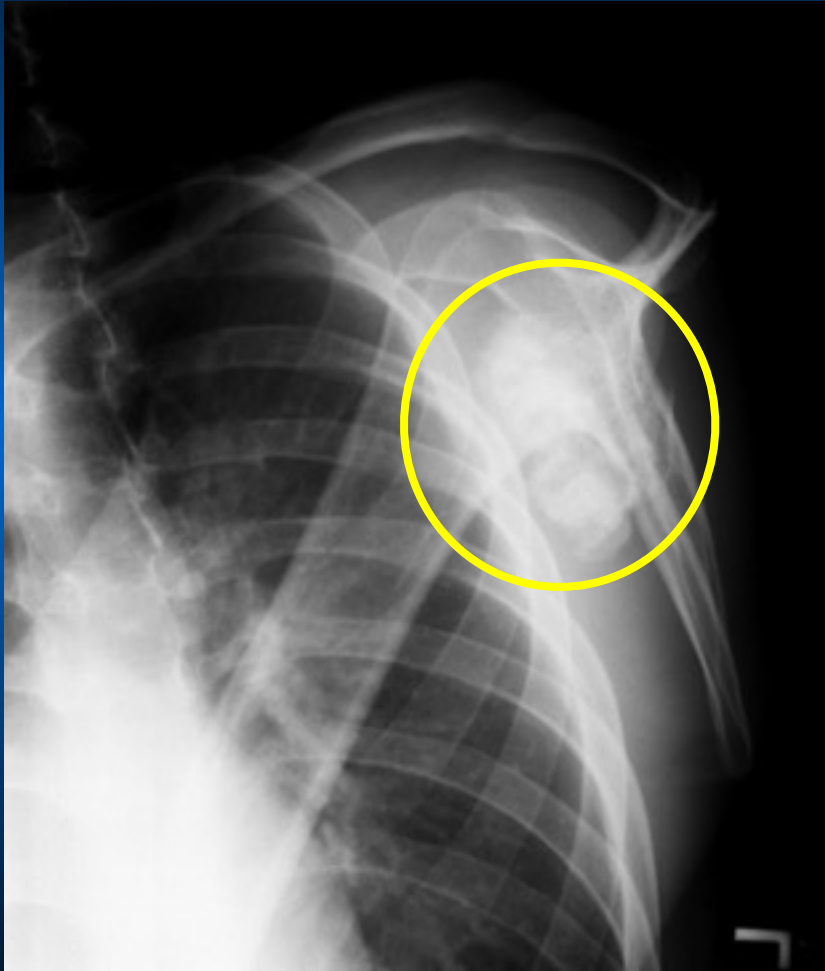
- Underwent limb salvage sarcoma resection and chemotherapy



22YO LHD Male

- Multiple osteochondroma
- Girlfriend noted scapular asymmetry







Remember to examine scapular position

- Have patient reproduce symptoms
- If scapula is unstable, shoulder problems will result
- An unstable scapula is similar to firing a cannon out of a canoe

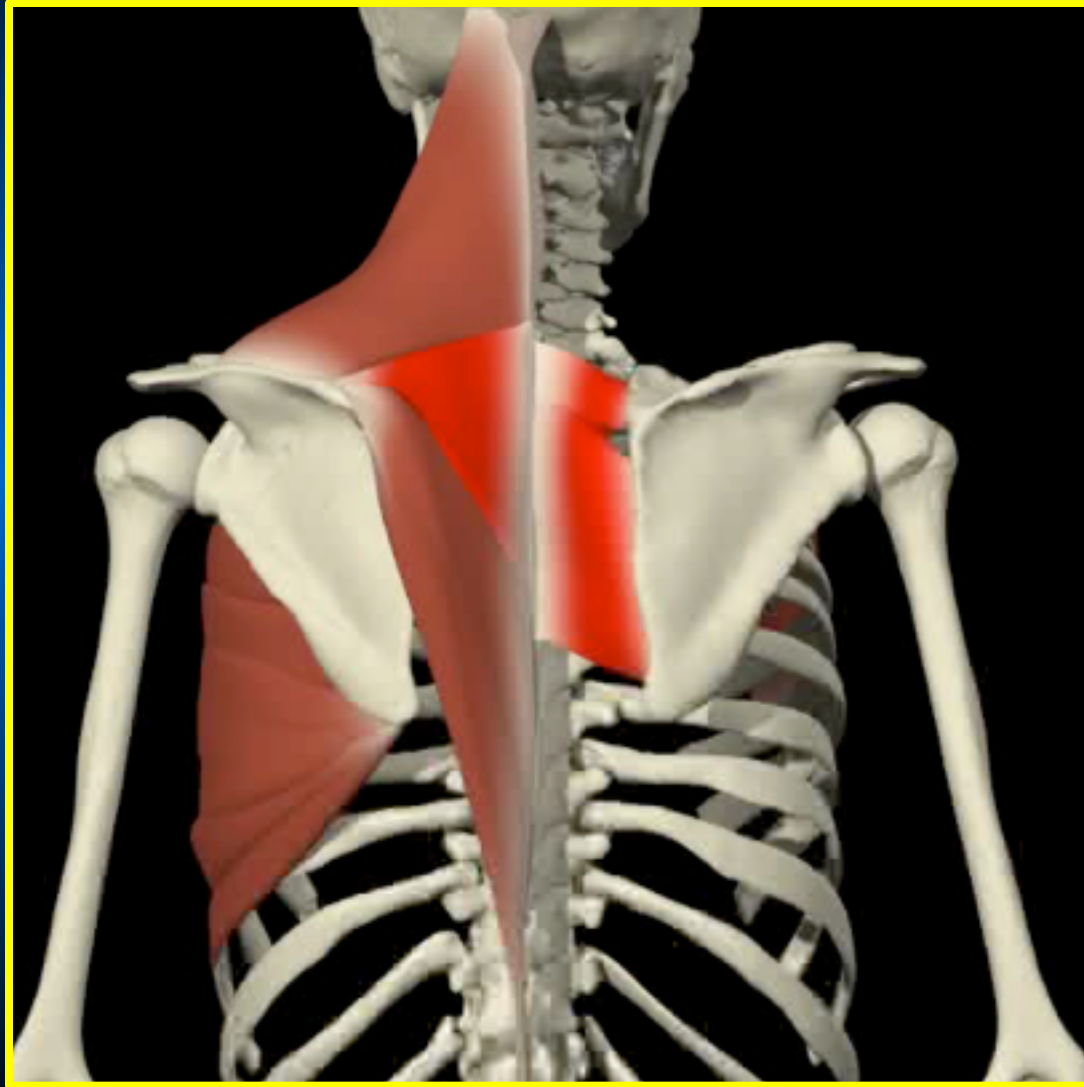


Scapular Dysfunction

- If exists, shoulder function is like firing a cannon out of a canoe!
- Remember the scapula!
 - Tightness anterior
 - Forward head
 - Overdeveloped pectoralis
 - Scapular movements
 - Touch medial borders
 - Elbows to back pocket
 - Shrugs
 - Clockwise/counterclockwise



Protraction/Retraction of the Scapula



Rotation

- External + Internal
- Downward + Upward



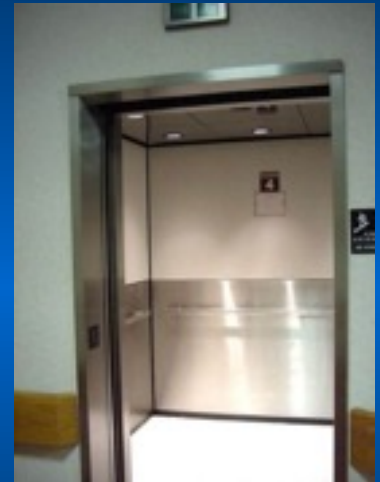
Tators

- Re- + Pro-



Elevators

- Upward + Downward



Tilters

- Posterior + Anterior



Tractors

- Pro- and Re-



Neurologic stretch injury from lifting heavy dumbbells, suprascapular (C5) nerve involved



Scapular asymmetry - golfer



Like firing a cannon out of a canoe . . .



CONCLUSIONS

- Don't order a test if you can't read it.
- Communicate with the radiologist at your imaging center.
- A bad scan is worse than no scan.
- In KY, we have many MRI scanners. Shoulder scans are notoriously bad if ordered by someone who is unable to examine a shoulder.



CONCLUSIONS

“Sometimes an MRI report just doesn't help. . .”

北京医科大学第三医院放射科

CT, MRI号 _____

MRI 检查申请单

申请日期: 00年10月12日 检查日期: 00年 月 日

姓 名: 孙 雯	男, 女: <input checked="" type="radio"/>	出生: 00年10月12日	28岁	体重: Kg
名 拼音:	科室: 达达	病房床号:	电话:	
患者永久通讯地址:	邮编:	电话:		

请注意: 装有心脏起搏器的患者以及体内植入金属者不能作此项检查!

临床摘要: 左膝外伤后肿胀疼痛半月余, 曾行理疗及热敷, 有积液, 膝关节活动受限, 由该科转来。X线片示: 左膝关节积液, 关节面光整, 未见骨折。Lachman (+)

手术史: 无, 有 (年 月 日)

临床诊断: 左膝前交叉韧带断裂, 内侧副韧带部分断裂, 关节积液

检查部位与要求: 左膝关节

体内金属: 无, 有 ()

放射科 田 田

上海长海医院 MRI 报告单

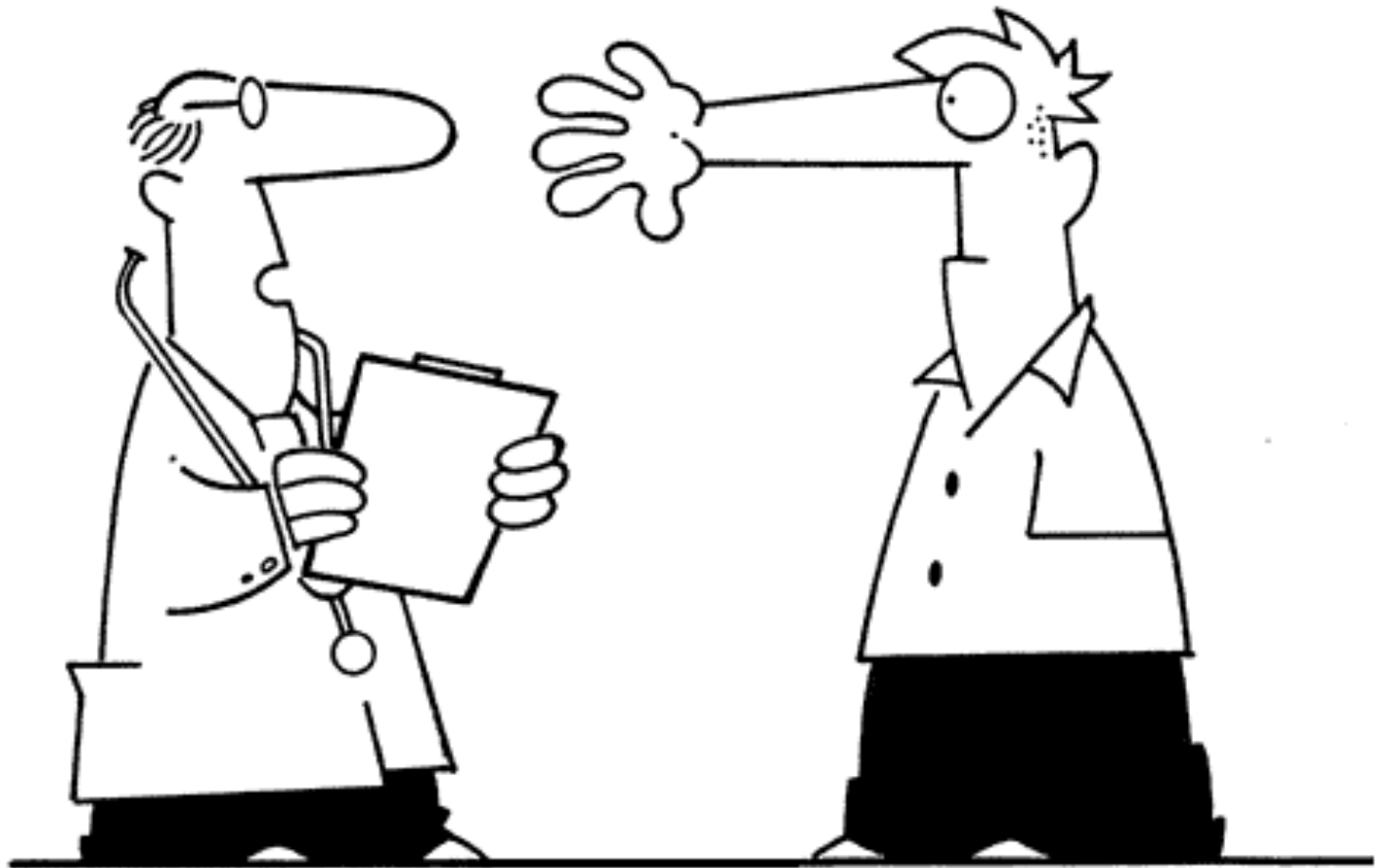
姓名: 孙雯 性别: 女 年龄: 28岁 科别: 骨 检查部位: 左膝

病区: 1 床号: 住院号: MRI号: 50666 报告日期: 2000.10.23

左膝关节MRI

MRI 所见:

右膝列扫描左膝关节, 骨质略增生, 关节腔内少量积液, 关节滑膜增厚, 以外后侧为甚。内侧半月板后角在T2WI上可见水平线状高信号, 外侧半月板后角未见明显高信号线状影, 与后关节囊滑膜相连接。局部可见小束状积液。后交叉韧带连续完好, 信号无异常。前交叉韧带未见异常。两侧副韧带也是明显异常。



**“I’ll have to do some x-rays to be sure,
but I’m guessing you dislocated your shoulder.”**

Listen, Look, Examine

The End

