

AMSER Case of the Month

May 2019

20 y/o male presenting with left shoulder pain
following trauma sustained in ice hockey game

Anthony D'Onofrio, OMS-IV
Lake Erie College of Osteopathic Medicine

Scott Rudkin, MD
Allegheny Health Network

Jason Long, MD
Allegheny Health Network
Division Director, Musculoskeletal Imaging

Matthew Hartman, MD
Radiology Clerkship Director
Allegheny Health Network



Patient Presentation

- HPI: 20 y/o male presents to ED with anterolateral left shoulder pain immediately following hit into the boards in an ice hockey game.
- PMH: Previous left shoulder anterior dislocation noted to occur two years prior
- Family Hx: none
- Social Hx: none

Physical Exam

- Vitals: BP 149/81; Pulse 58; Resp 16/min; Height 6'0"; Weight 220lbs; SpO2 96% room
- Pertinent Exam Findings: Obvious deformity of left shoulder with loss of normal rounded appearance of shoulder. ROM of left shoulder limited due to pain/apprehension. Radial pulses 2+ BL.

What Imaging Should Be Ordered?

American College of Radiology
ACR Appropriateness Criteria®
Shoulder Pain–Traumatic

Variant 1: Traumatic shoulder pain. Any etiology. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
X-ray shoulder	Usually Appropriate	⊕
CT arthrography shoulder	Usually Not Appropriate	⊕⊕⊕⊕
CT shoulder with IV contrast	Usually Not Appropriate	⊕⊕⊕
CT shoulder without and with IV contrast	Usually Not Appropriate	⊕⊕⊕
CT shoulder without IV contrast	Usually Not Appropriate	⊕⊕⊕
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	⊕⊕⊕⊕
MR arthrography shoulder	Usually Not Appropriate	○
MRI shoulder without and with IV contrast	Usually Not Appropriate	○
MRI shoulder without IV contrast	Usually Not Appropriate	○
Tc-99m bone scan shoulder	Usually Not Appropriate	⊕⊕⊕
US shoulder	Usually Not Appropriate	○

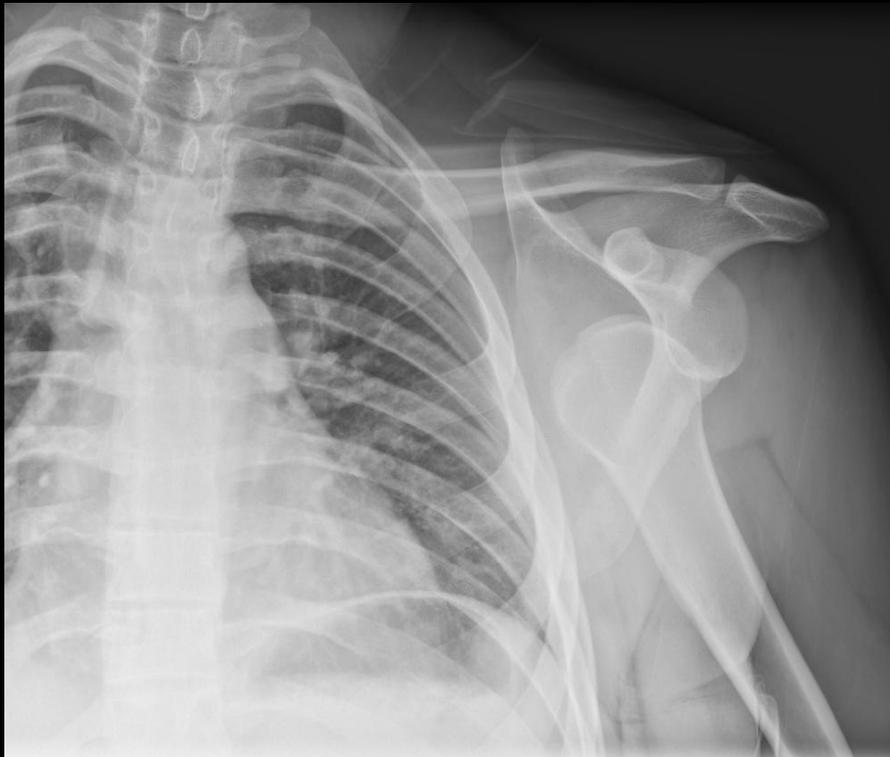
- X-ray left shoulder was ordered in ED

Radiograph Findings (Unlabeled)

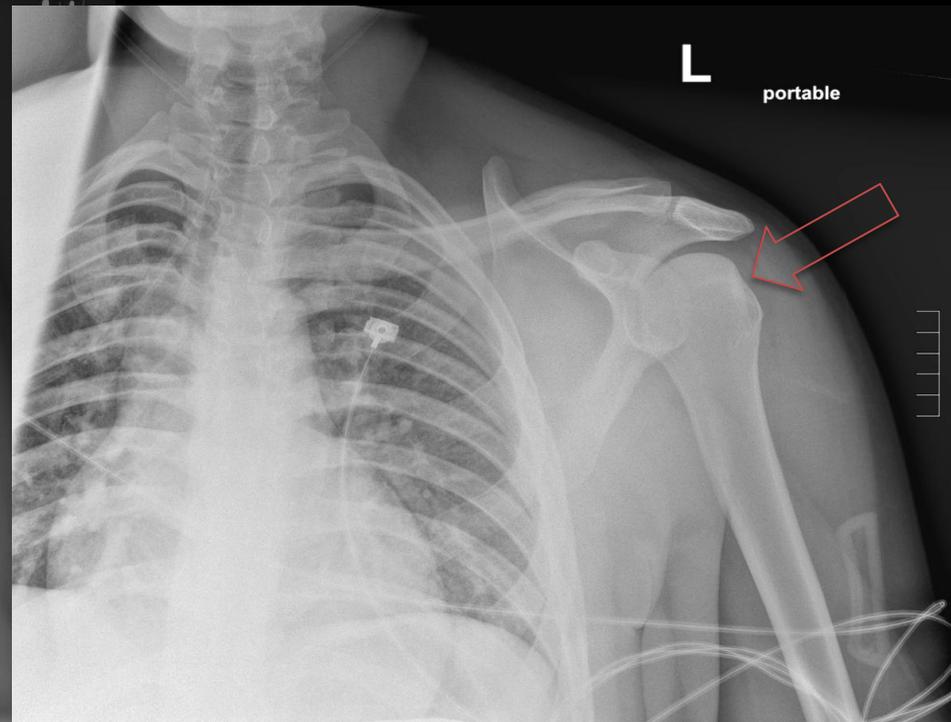


Radiograph Findings (Labeled)

- Patient's left shoulder was reduced in ED. Imaging taken before and after relocation of left shoulder.



AP Film: Left shoulder with anterior dislocation. Humeral head lies outside the glenoid and below coracoid process.



Left shoulder radiograph after closed reduction in ED. Hill-Sachs lesion noted on film (red arrow).

Patient F/U with Orthopedic Surgeon

- After 3 days, patient returned for follow up with orthopedic surgeon due to lingering pain in left shoulder following dislocation.
- Physical exam findings: Skin intact. Minimal decreased sensation in skin overlying left deltoid muscle. Strength 2/5 in forward flexion, 3/5 in external rotation. Normal grip strength. Radial pulses 2+ BL.

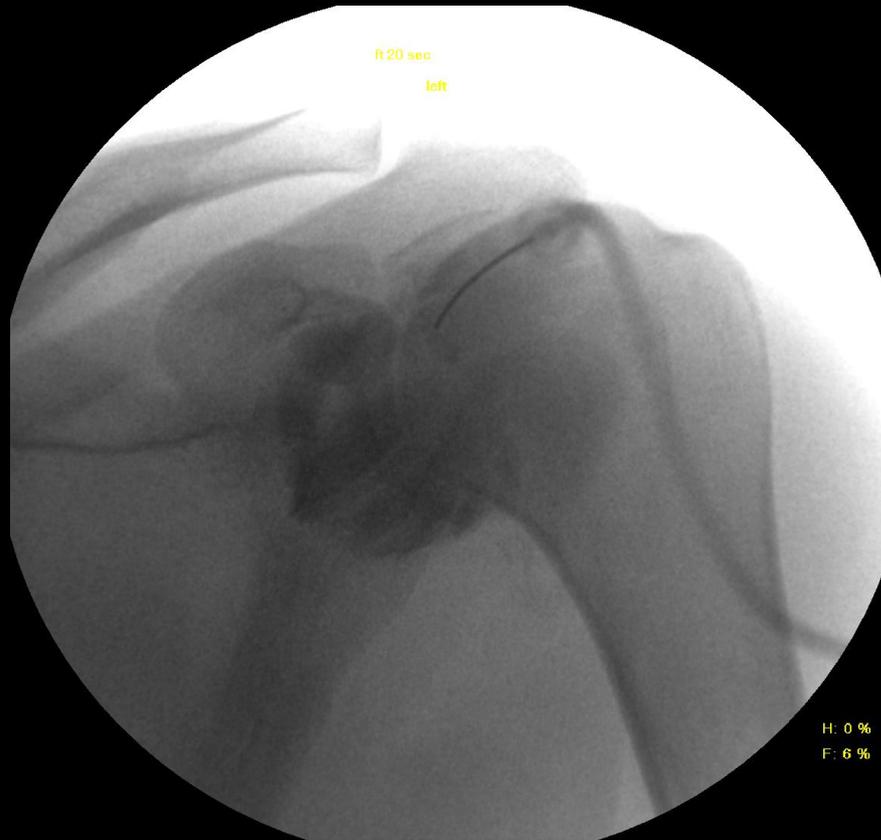
What Imaging Should Be Ordered?

Variant 5: Traumatic shoulder pain. Radiographs show Bankart or Hill-Sachs lesion. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
MR arthrography shoulder	Usually Appropriate	○
MRI shoulder without IV contrast	Usually Appropriate	○
CT arthrography shoulder	May Be Appropriate	⊗ ⊗ ⊗ ⊗
CT shoulder without IV contrast	May Be Appropriate	⊗ ⊗ ⊗
CT shoulder with IV contrast	Usually Not Appropriate	⊗ ⊗ ⊗
CT shoulder without and with IV contrast	Usually Not Appropriate	⊗ ⊗ ⊗
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	⊗ ⊗ ⊗ ⊗
MRI shoulder without and with IV contrast	Usually Not Appropriate	○
Tc-99m bone scan shoulder	Usually Not Appropriate	⊗ ⊗ ⊗
US shoulder	Usually Not Appropriate	○

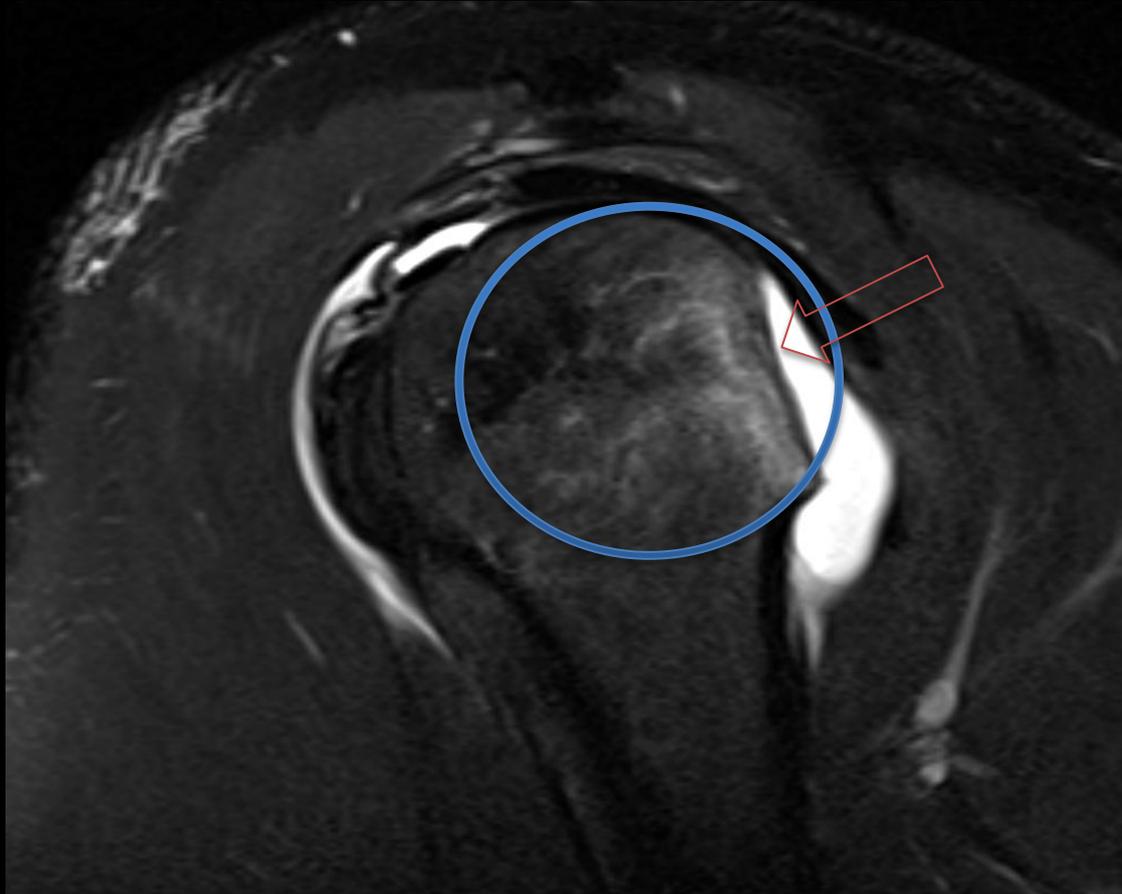
- MRI Arthrography Left Shoulder was ordered.

MRI Arthrogram Left Shoulder



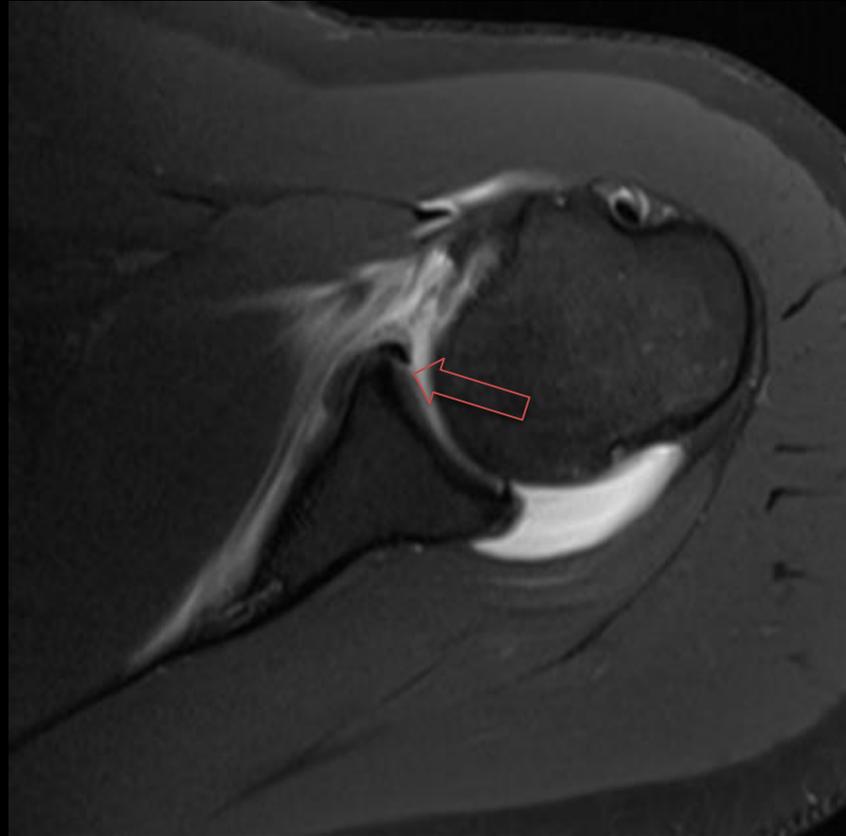
- Injection of gadolinium contrast into left shoulder joint under fluoroscopy.

MRI Arthrogram Left Shoulder



- Sagittal T2 MRI left shoulder demonstrates Hill-Sachs lesion of left lateral humeral head (red arrow pointing to region of flattening) with reactive edema within humeral head (blue circle).

MRI Arthrogram Left Shoulder



- Axial MRI T1 demonstrates labral tear, Bankart lesion of anterior inferior glenoid labrum. Note blunting of the free edge of the anterior labrum, which should appear triangular (red arrow).

MRI Arthrogram Left Shoulder

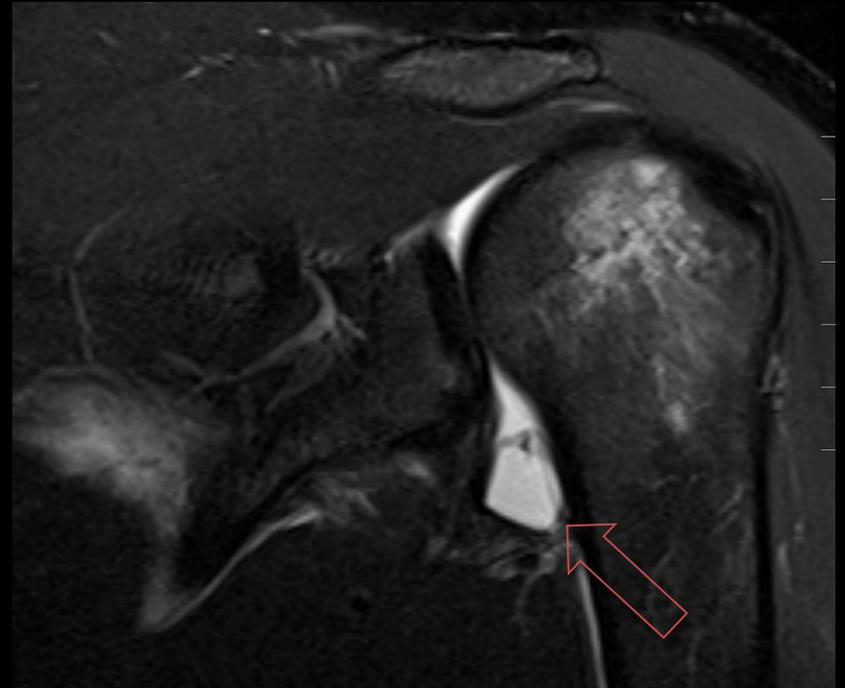
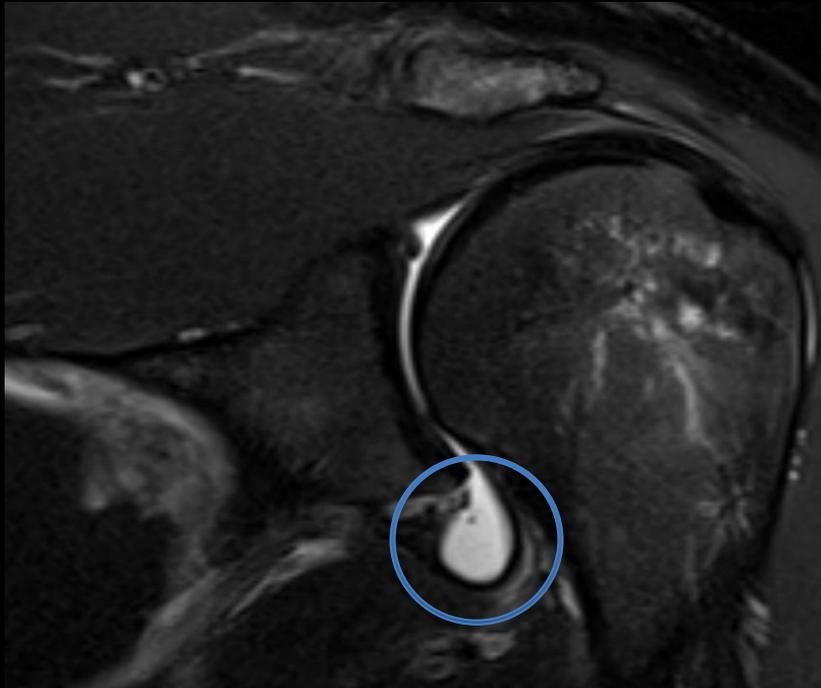


Coronal T1 MRI with Contrast:
Normal Labrum (Blue Circle)
(*Radiopaedia.com*²)



Coronal T1 MRI with Contrast:
demonstrating superior labral
tear

MRI Arthrogram Left Shoulder



- Coronal T2 MRI demonstrates posterior avulsion of Inferior Glenohumeral Ligament (red arrow). For comparison, note the smooth “J” shape of the normal IGHL (blue circle).

Final Diagnosis

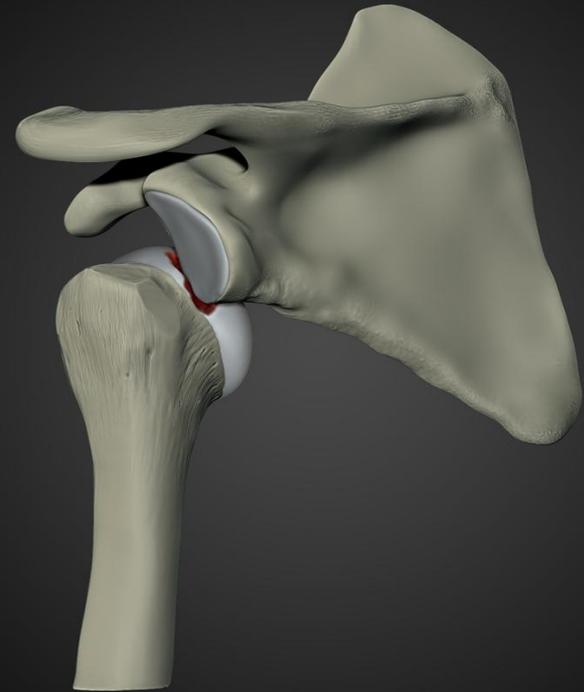
- Anterior-inferior labral tear (Bankart lesion) with extension through the superior labrum and involvement of the biceps anchor.
- Plan: Surgery with arthroscopic evaluation of left shoulder, anterior-inferior labral repair with likely capsular plication.

Anterior Shoulder Dislocation

- Anterior dislocation is most common type, 95-97% of cases (Posterior dislocation just 2-4%)
- Axillary nerve is the nerve most often injured in setting of anterior dislocation
- Mechanism: usually caused by a blow to abducted, externally rotated, extended arm
- Exam: prominent acromion, loss of normal rounded shoulder appearance, slight abduction/external rotation, patient resists all movement

Hill-Sachs Deformity

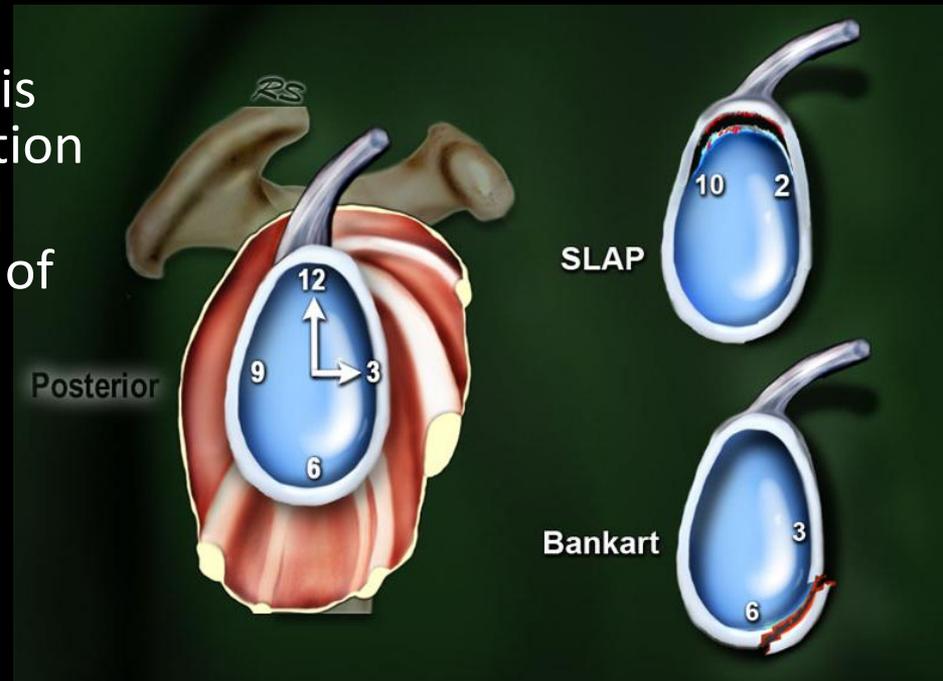
- Associated with anterior shoulder dislocation
- Cortical depression in the humeral head created by impact of glenoid rim during dislocation
- On radiograph, appears as a sclerotic vertical line running from top of humeral head toward the shaft
- On CT/MRI, appears as region of flattening or wedge-shaped defect involving posterolateral humeral head above level of coracoid
- Bankart lesion 11x more likely to occur when Hill-Sachs deformity occurs
- Bony defect itself does not require treatment, but co-existent instability and anterior glenoid labrum often require repair



Radiopaedia²

Bankart Lesion

- Refers to injury specifically at the anteroinferior aspect of the glenoid labrum complex
- Occurs when the glenoid labrum is disrupted during anterior dislocation
- Most are soft-tissue type; a small percentage (5%) involve avulsion of a bony fragment
- Greater tuberosity fractures are present in up to 10% of patients
- Can heal without surgical intervention; if repaired, labral fragment is sutured back to the glenoid rim with suture anchors
- In contrast, SLAP Lesion refers to anterosuperior location of labral tear



Radiology Assistant⁴

References

- 1. ACR Criteria of Appropriateness:
<https://acsearch.acr.org/docs/69433/Narrative/>
- 2. Case courtesy of Dr Matt Skalski, Radiopaedia.org. From the case rID: 22638
- 3. Gilcrease-Garcia, B., Gaillard, F. Bankart Lesion, Radiology Reference Article, Radiopaedia. Retrieved January 27, 2019, from <http://radiopaedia.org/articles/bankart-lesion>
- 4. Radiology Assistant. "Shoulder MR Instability." Smithius, Robin & Jan van der Woude, Henk, Eds., Radiology Department of the Rijnland Hospital. <http://www.radiologyassistant.nl/en/p4963d77684ef7/shoulder-mr-instability.html>
- 5. Skalski, M., & Gaillard, F. Hill-Sachs Lesion, Radiology Reference Article, Radiopaedia. Retrieved January 27, 2019, from <http://radiopaedia.org/articles/hill-sachs-lesion>
- 6. *UpToDate*. Sherman, S., MD. (2018, April 9). Shoulder Dislocation and Reduction (A. Wolfson, MD & J. Grayzel, MD, FAAEM, Eds.). Retrieved January 27, 2019, from <http://www.uptodate.com/contents/shoulder-dislocation-and-reduction>