

AMSER Case of the Month

March 2024

A 20-year old right hand dominant male presents with left shoulder pain

Christopher M. Liu, BS

Virginia Commonwealth University School of Medicine

Aram Salem, MD

Virginia Commonwealth University School of Medicine

Yujie Qiao, MD

Virginia Commonwealth University School of Medicine

Rafael J. Riveros, MD

Virginia Commonwealth University School of Medicine

Peter J. Haar, MD, PhD

Virginia Commonwealth University School of Medicine

Patient Presentation

HPI: 20 y/o right hand dominant baseball player with a history of left shoulder sprain treated non-operatively presents with left shoulder pain after hearing a pop in his left shoulder during batting practice. He reports 8/10 constant sore-like pain along the anterior aspect of his shoulder. The pain is worse with movement and is associated with weakness, with loss of power during his swing. He denies pain at night. He has been taking Advil for the pain.

Patient Presentation (Continued)

- Past Medical History: Asthma, left shoulder sprain (treated non-operatively)
- Past Surgical History: None
- Social history: Denies tobacco, alcohol, or illicit drug use
- Daily Medications: Advil PRN for pain
- Vitals: Stable, unremarkable
- Pertinent Labs: None

Physical Exam

General: Well-developed, well-nourished, no acute distress

Left Upper Extremity:

- Anterior shoulder tenderness to palpation

- Full ROM

- Normal strength with his arm by his side

- Pain and weakness with O'Brien test

- Negative speed test

- Neurovascularly Intact

What Imaging Should We Order?

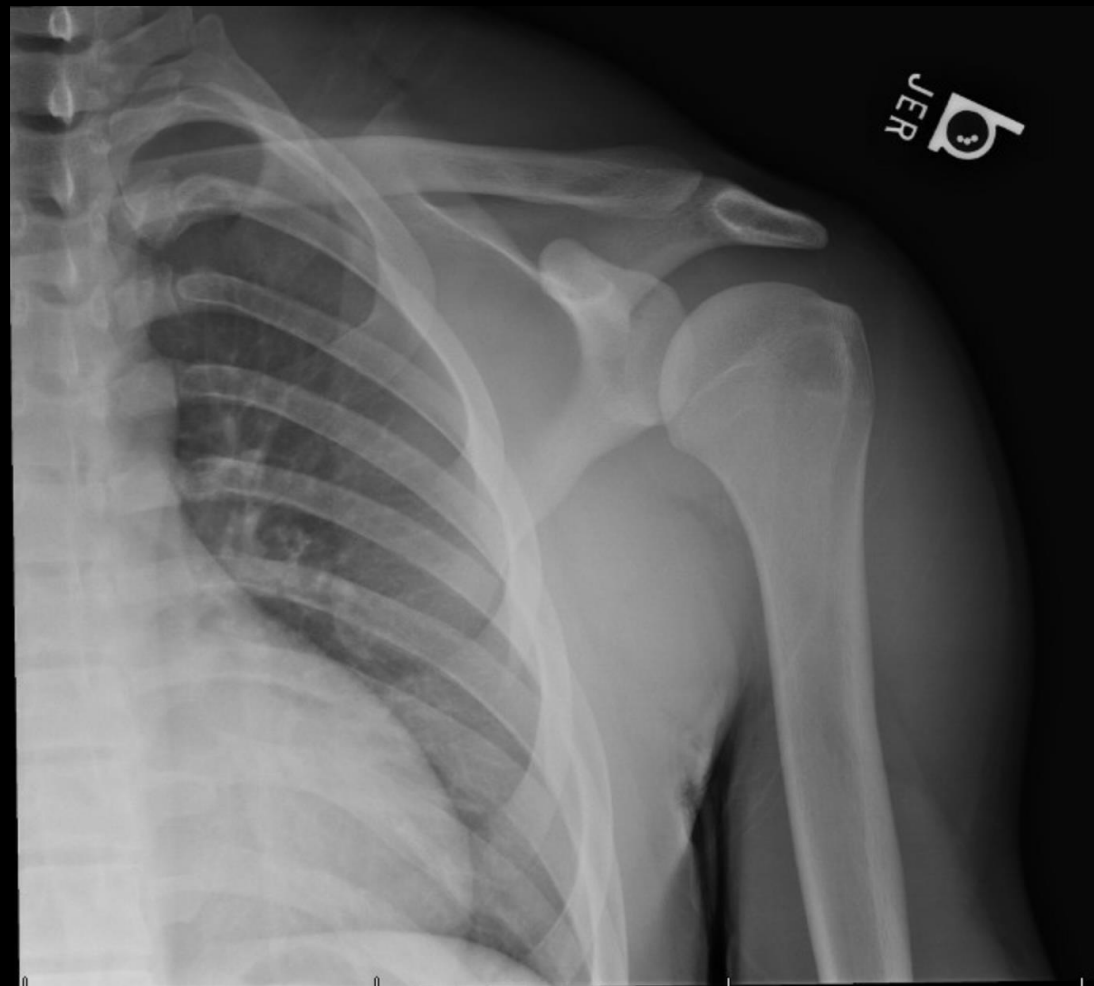
Select the applicable ACR Appropriateness Criteria

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

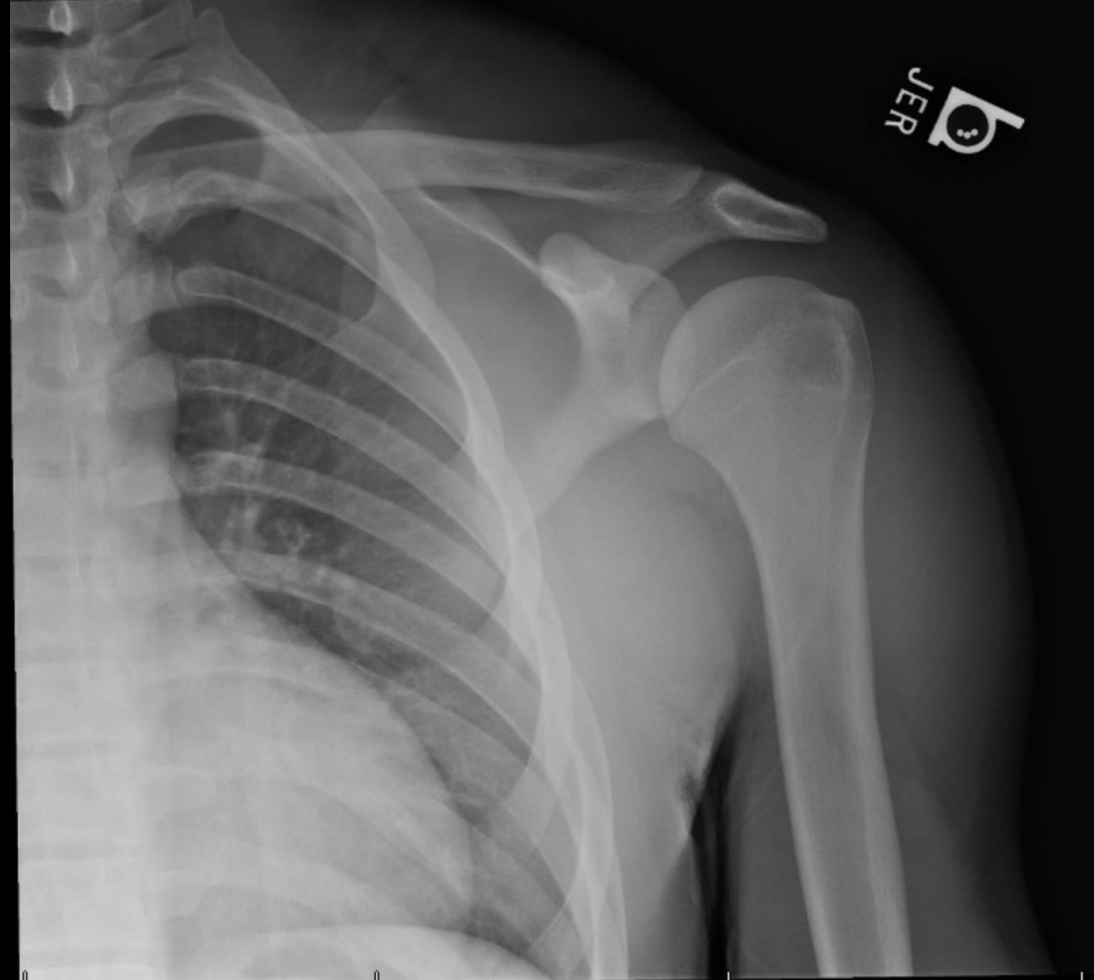
Procedure	Appropriateness Category	Relative Radiation Level
Radiography shoulder	Usually Appropriate	☼
CT arthrography shoulder	Usually Not Appropriate	☼☼☼☼
CT shoulder with IV contrast	Usually Not Appropriate	☼☼☼
CT shoulder without and with IV contrast	Usually Not Appropriate	☼☼☼
CT shoulder without 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	○
Bone scan shoulder	Usually Not Appropriate	☼☼☼
US shoulder	Usually Not Appropriate	○

Ordered by
Attending
Physician at
initial Clinic visit

Findings (unlabeled)



Findings: (labeled)



No acute fracture or
dislocation

What Imaging Should We Order Next?

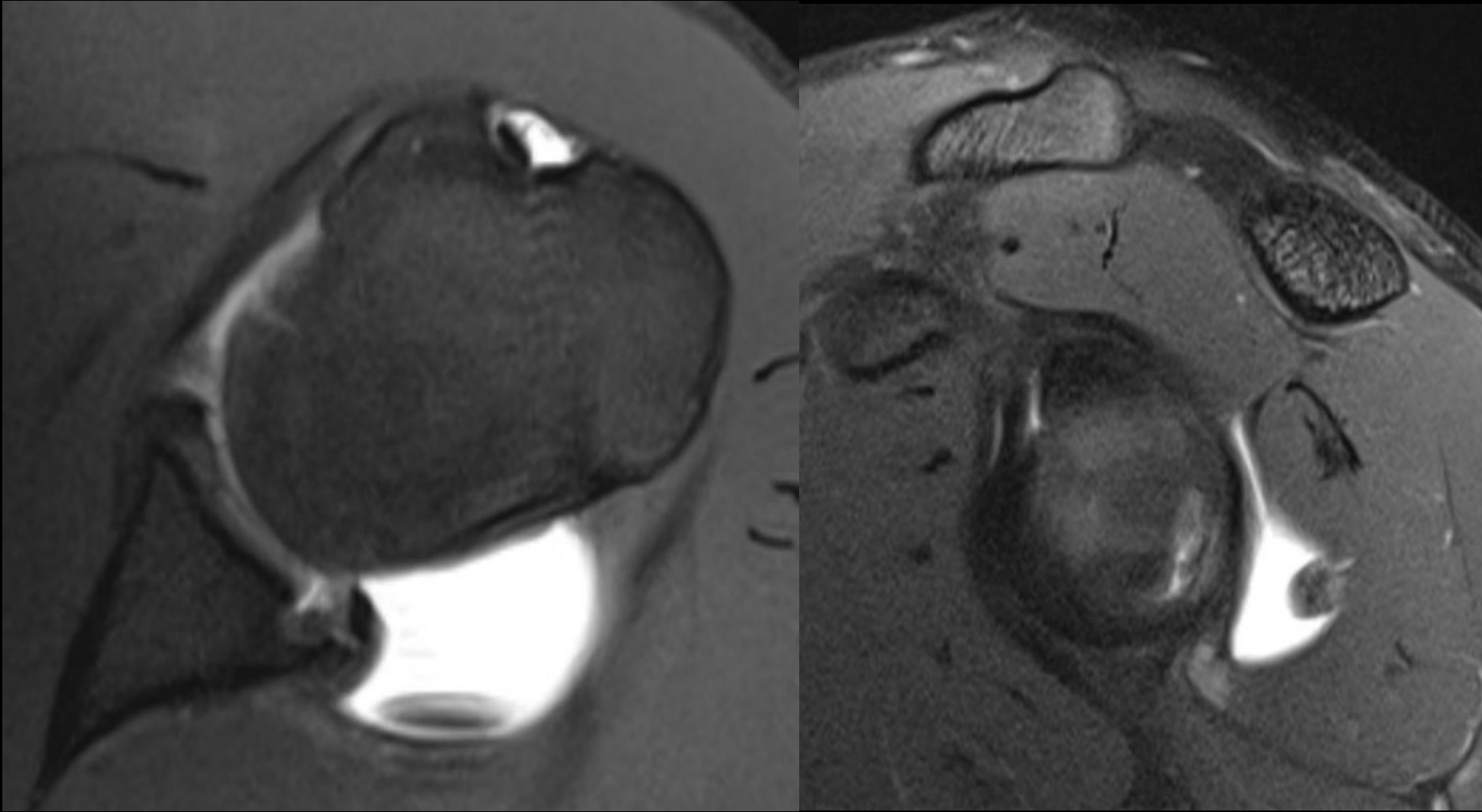
Select the applicable ACR Appropriateness Criteria

Variant 7: Traumatic shoulder pain. Radiographs normal. Physical examination findings consistent with labral tear. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
MR arthrography shoulder	Usually Appropriate	○
CT arthrography shoulder	Usually Appropriate	☼☼☼☼
MRI shoulder without IV contrast	Usually 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	☼☼☼☼
MRI shoulder without and with IV contrast	Usually Not Appropriate	○
Bone scan shoulder	Usually Not Appropriate	☼☼☼
US shoulder	Usually Not Appropriate	○

Ordered by
Attending
Physician

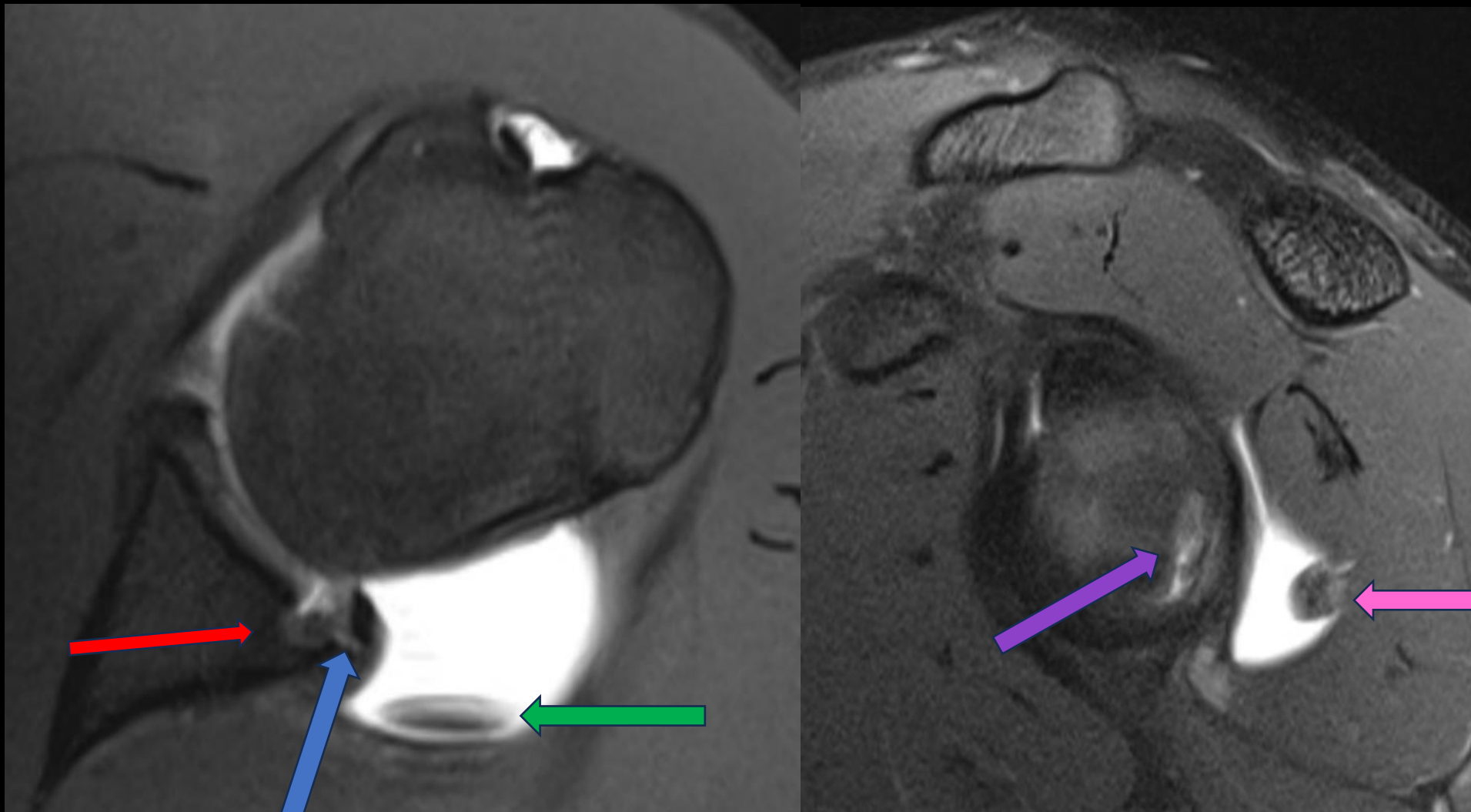
Findings: (unlabeled)



Axial T1 Fat Sat

Sagittal PD Fat Sat

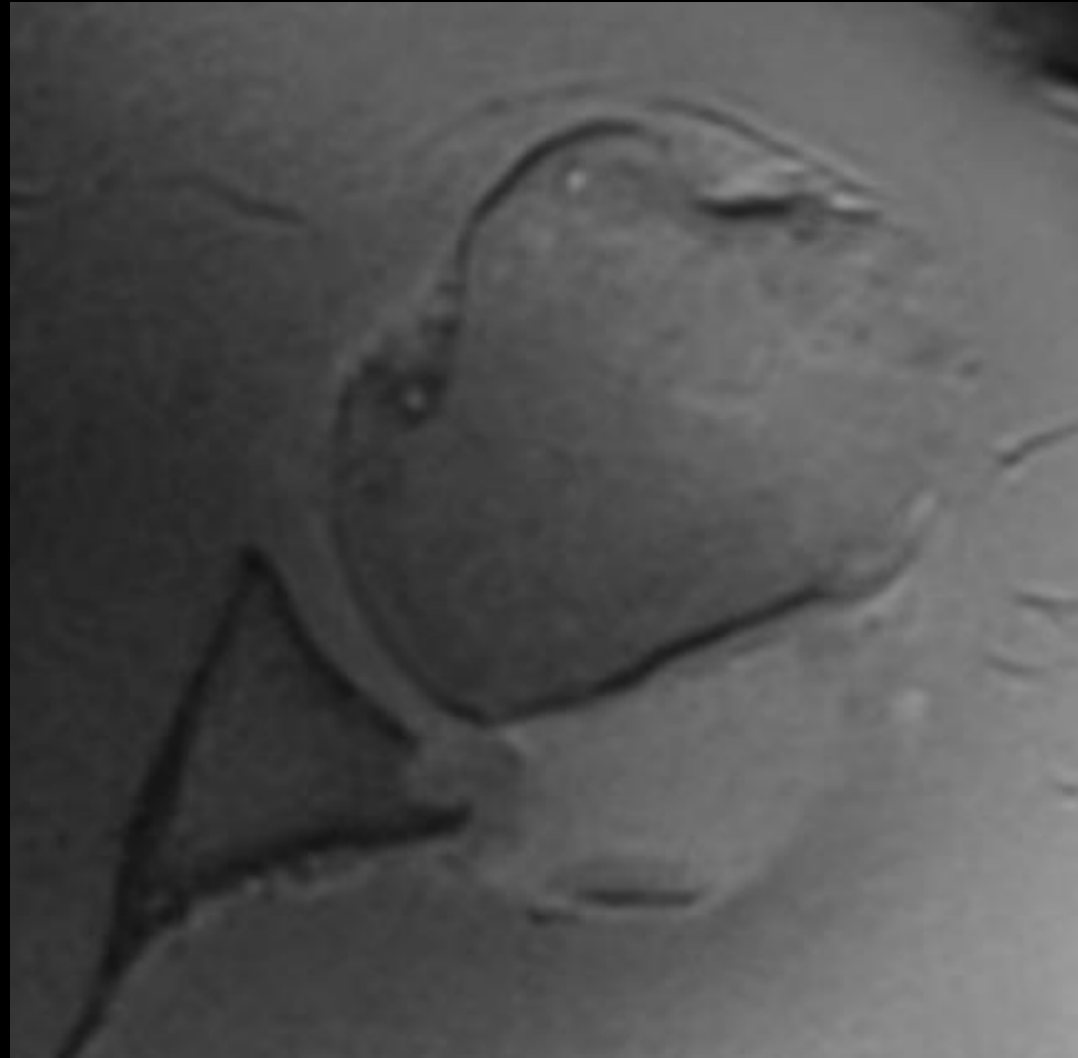
Findings: (labeled)



1.5 x 0.8 cm chondral loose body (green arrow), posterior labral tear (blue arrow), and Osteochondral Defect (red arrow)

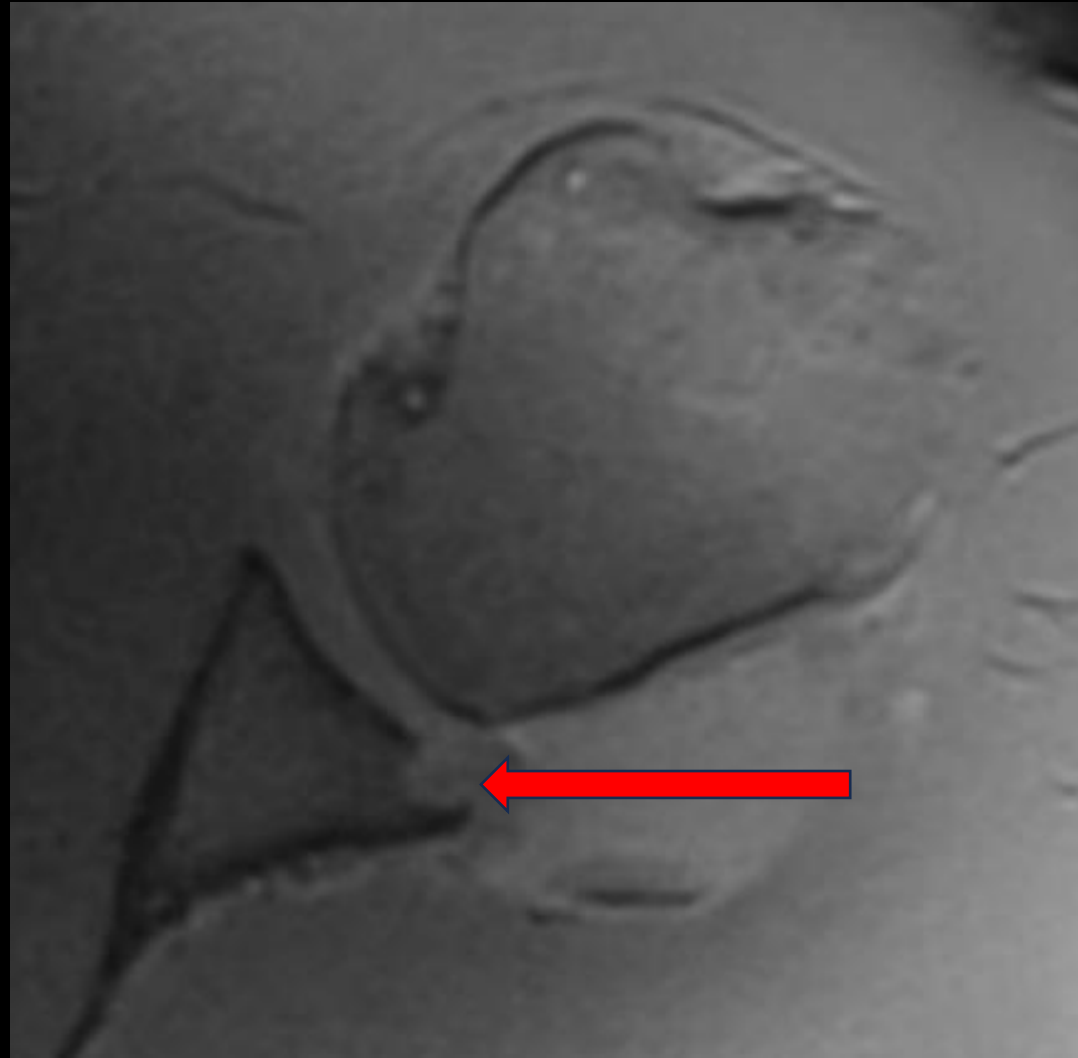
Osteochondral defect (purple arrow) and chondral loose body (pink arrow)

Findings (unlabeled)



Axial Zero Echo

Findings (labeled)



1.1 cm Osteochondral Defect of the
Posterior Glenoid (Red Arrow)

Follow-up/Surgical Findings

- Patient elected to proceed with left shoulder arthroscopy, labral repair, chondroplasty, and loose body removal to facilitate being able to start at the beginning of the upcoming season
- Surgical findings confirmed a 1.5 cm x 0.8 cm posterior glenoid osteochondral defect, partial thickness posterior labral tear, and a displaced osteochondral fragment within the posterior joint recess

Final Dx:

Left posterior glenoid labral tear with
osteochondral defect and associated loose body
(Batter's Shoulder)

Case Discussion

- Batter's shoulder is an uncommon injury to the posterior labrum of the lead batting shoulder often sustained by baseball players or other club-swinging athletes. Limited studies report that they make up 0.4% of baseball shoulder injuries.
- Immense forces generated during a swing are enhanced in instances where hitters increase their shoulder adduction angle such as when swinging at an outside pitch. When a batter fails to make contact with such a pitch, no counterforce is present and the large force of the swing is imparted on the posterior aspect of the batter's lead shoulder, possibly overcoming the stabilizing forces of posterior shoulder structures and leading to injury
- Diagnosis: History and Physical Exam
 - Patients may report an acute posterior subluxation event when swinging or an acute on chronic presentation of shoulder pain
 - Patients may have a positive Kim and Jerk test, posterior load and shift test, or O'Brien test
- First line imaging should include standard radiographs of the shoulder and a shoulder MRI Arthrogram
 - Radiographs should be used to confirm joint reduction
 - MRI Arthrograms have utility in assessing the shoulder joint for labral, capsular, or chondral injuries.

Case Discussion

- Initial treatment includes at least 12 weeks of nonoperative management of physical therapy and cessation of baseball activities
- Surgical repair in the form of arthroscopic posterior labral repair remains the best treatment option in patients who fail conservative treatment
- Post-operative rehabilitation consists of sling immobilization followed by shoulder range of motion/strength exercises, and then a gradual return to hitting protocol.

References:

Carbone A, Limpisvasti O. Understanding Batter's Shoulder: Diagnosis, Treatment, and Outcomes. *Curr Rev Musculoskelet Med*. 2022 Dec;15(6):547-551. doi: 10.1007/s12178-022-09795-y. Epub 2022 Nov 24. PMID: 36418814; PMCID: PMC9789263.

Fury MS, Moore LK, DeSena TD, Camp CL, Dines JS. Evaluation, Treatment, and Outcomes of Batter's Shoulder. *Curr Rev Musculoskelet Med*. 2023 Feb;16(2):60-65. doi: 10.1007/s12178-022-09815-x. Epub 2022 Dec 24. PMID: 36565406; PMCID: PMC9889578.

Kang RW, Mahony GT, Harris TC, Dines JS. Posterior instability caused by batter's shoulder. *Clin Sports Med*. 2013 Oct;32(4):797-802. doi: 10.1016/j.csm.2013.07.012. Epub 2013 Aug 22. PMID: 24079435.

Marigi EM, Conte S, Reinholz AK, Steubs JA, Knudsen ML, Krych AJ, Camp CL. Shoulder Injuries in Professional Baseball Batters: Analysis of 3,414 Injuries Over an 8-Year Period. *Arthrosc Sports Med Rehabil*. 2022 May 21;4(3):e1119-e1126. doi: 10.1016/j.asmr.2022.03.012. PMID: 35747625; PMCID: PMC9210489.