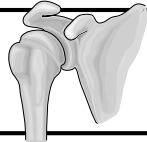




MR Imaging of the Shoulder: Instability

Dr. Mini N. Pathria M.D., FRCP(C)
Department of Radiology
University of California School of Medicine
San Diego, California



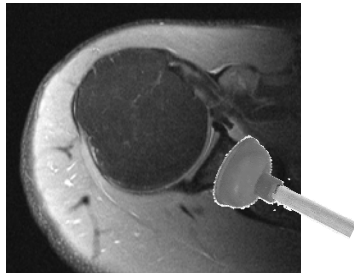
Glenohumeral joint

- Small and shallow glenoid relative to humeral head
- Extensive range of motion
- Osseous anatomy does not provide stability



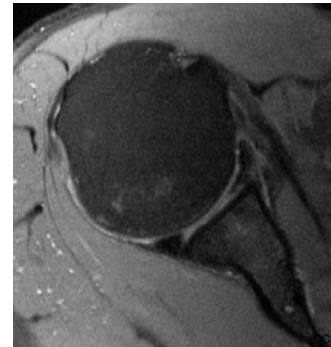
Shoulder stabilizers

- Static
 - Glenoid labrum
 - Capsule
 - Glenohumeral ligaments
- Dynamic
 - Rotator cuff muscles



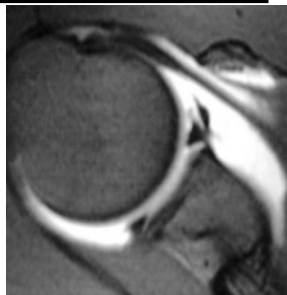
Glenoid labrum

- Cuff of fibrous and fibrocartilaginous tissue surrounding glenoid fossa
- Largest superiorly and anteriorly
- Deepens glenoid circumferentially
- Serves as attachment site for the glenohumeral ligaments

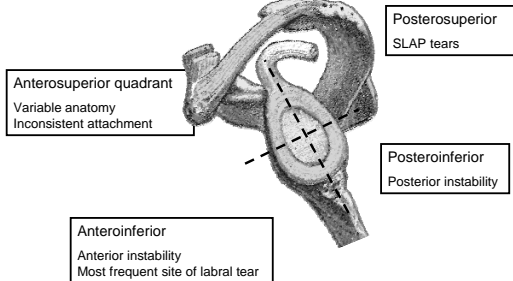


Glenoid labrum

- Difficulties
 - Normal variation
 - Undercutting with hyaline cartilage
 - Magic angle artifact
 - Labral degeneration
- Difficult to assess without joint fluid
- Increased accuracy with MR arthrography



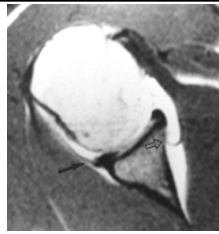
Glenoid labrum



Cooper et al, JBJS 74A:46-52, 1992

Capsule

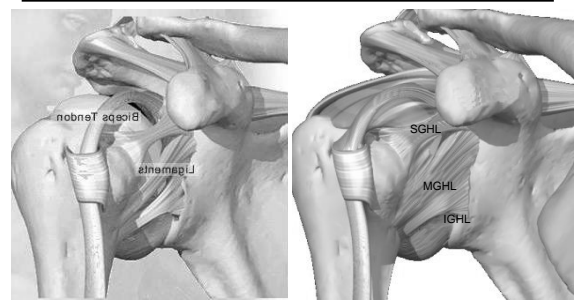
- Posterior capsule inserts onto labrum or immediately at base of labrum
- Anterior capsular attachment variable



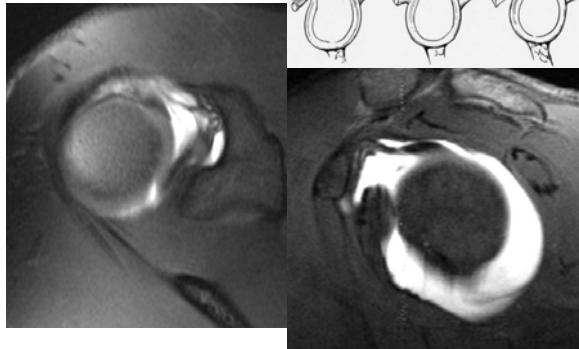
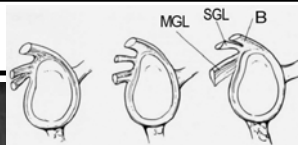
YH Park et al, AJR 175:667, 2000

Type 1	Capsule attaches on labrum
Type 2	Capsule attaches within 1 cm
Type 3	Capsule attaches far from labrum

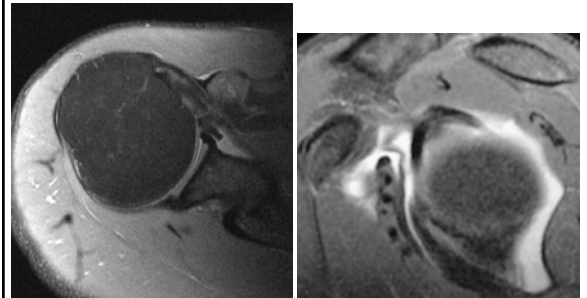
Ligaments



Superior GHL

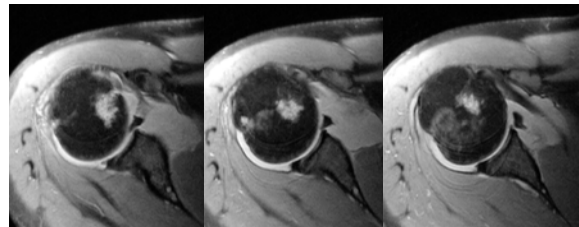


Middle GH ligament

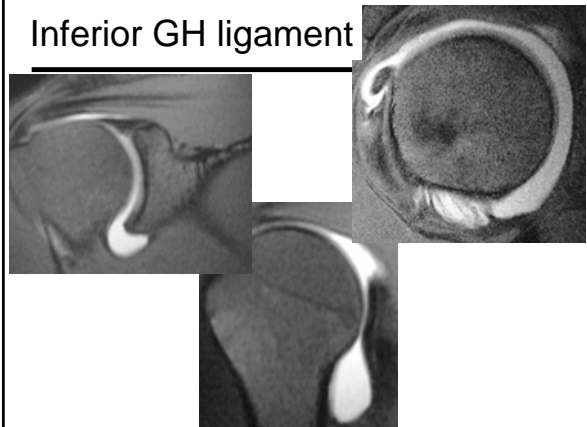


JV

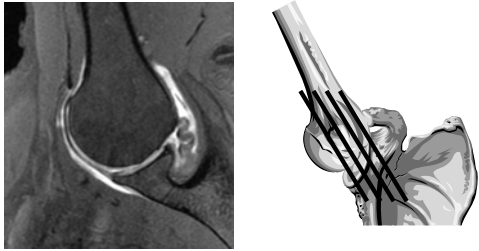
Buford complex



Inferior GH ligament



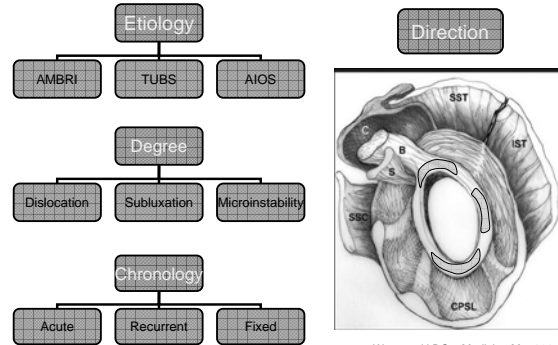
ABER position



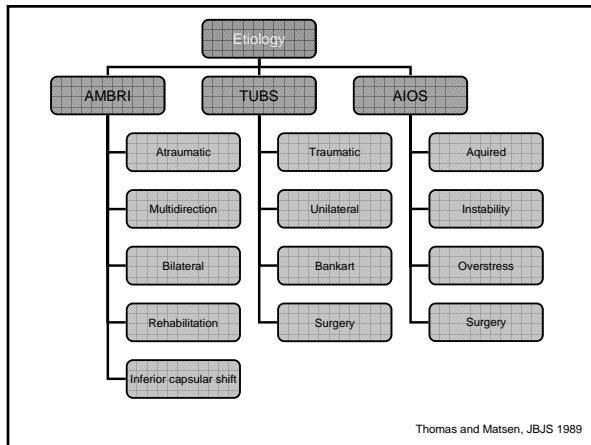
- Humerus abducted and externally rotated
- Relaxes rotator cuff and places tension on inferior glenohumeral ligaments
- Image along humeral axis in coronal plane

Tirman PFJ et al, Radiology 192:851, 1994

Classification



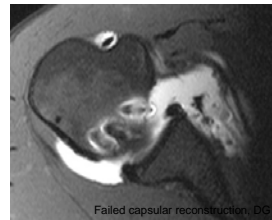
Wnorowski DC, eMedicine Mar 2007



Thomas and Matsen, JBJS 1989

AMBRI

- Benign joint hypermobility syndrome
- Collagen? often familial
- Young females



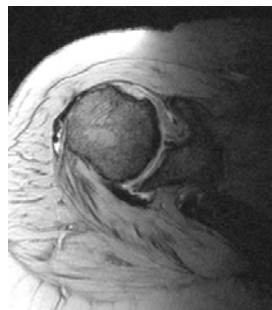
Failed capsular reconstruction, DC



Simpson M, JAOA 106:531, 2006

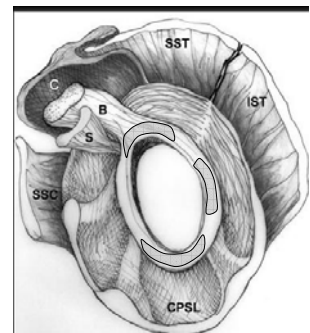
AIOS

- Repetitive overuse leading to microinstability
- Redundant capsule
- Anterior capsule attenuation
- Fibrosis of posterior capsule

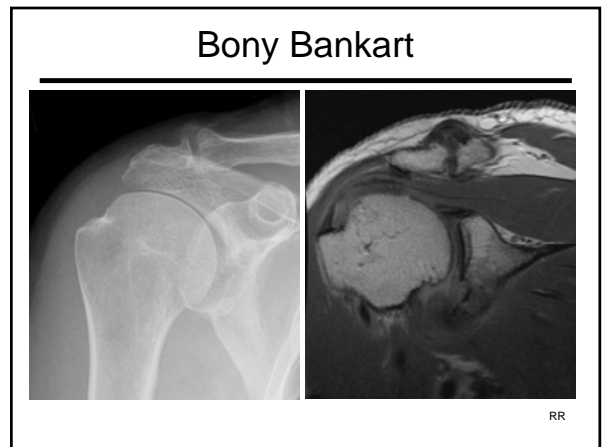
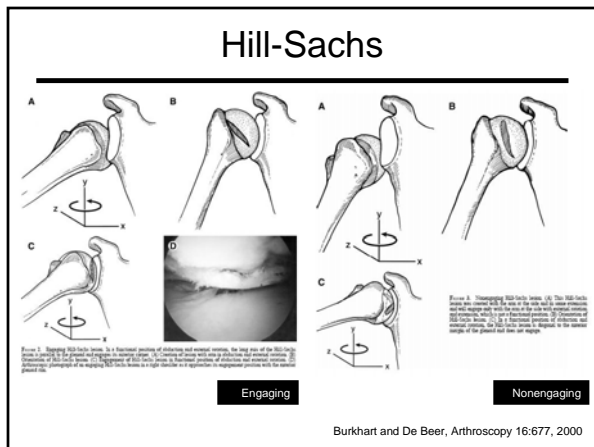
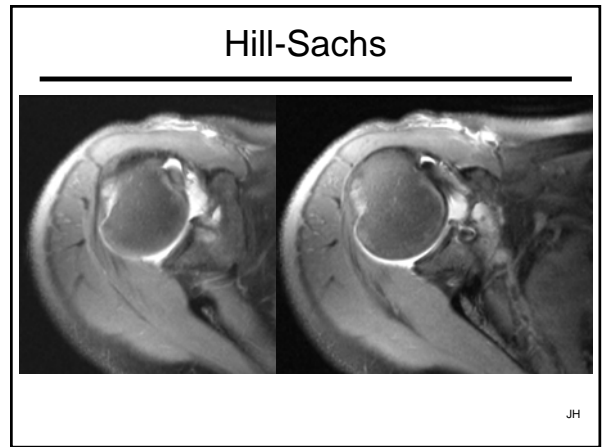
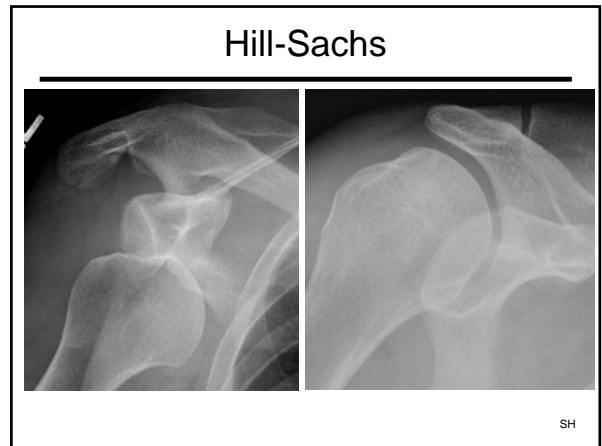
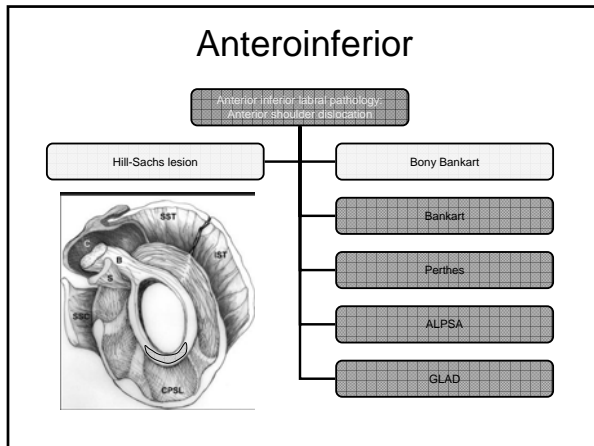


TUBS: Direction

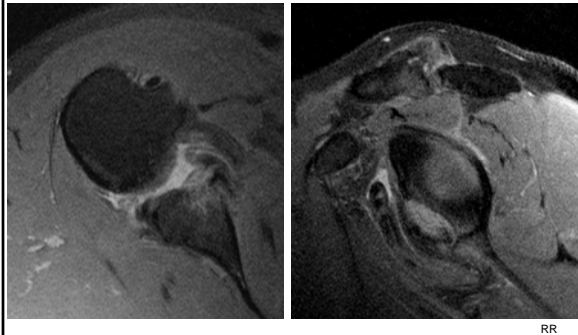
- Anteroinferior
- Posterior
- Superior
- Multidirectional



Ly et al, AJR 181:203-213, 2003

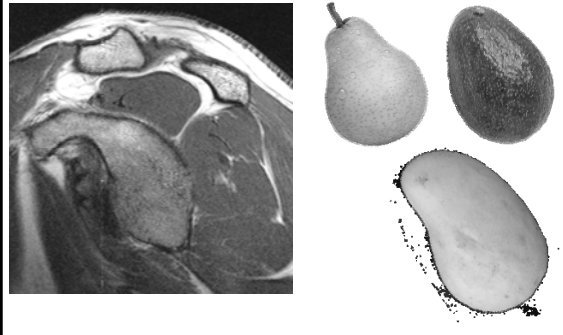


Bony Bankart



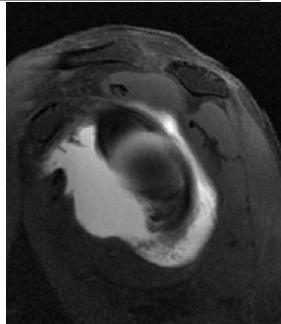
RR

Glenoid deficiency



Bony Bankart

Glenoid bone stock deficiency
 >25% bone stock loss, Bigliani
 Inverted pear configuration, Burkhart



Anteroinferior



Bankart lesion	Torn labrum Torn periosteum
Perthes	Torn labrum Intact periosteum
ALPSA	Medialized labrum Intact periosteum



Bankart

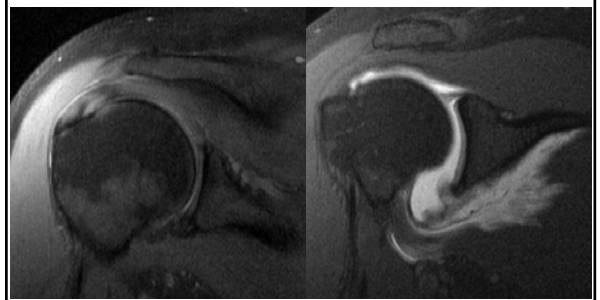
Perthes

ALPSA

Bankart lesion

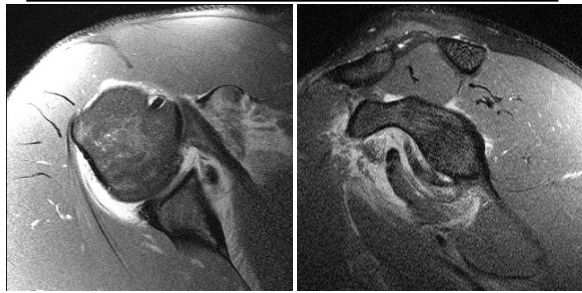


Bankart lesion



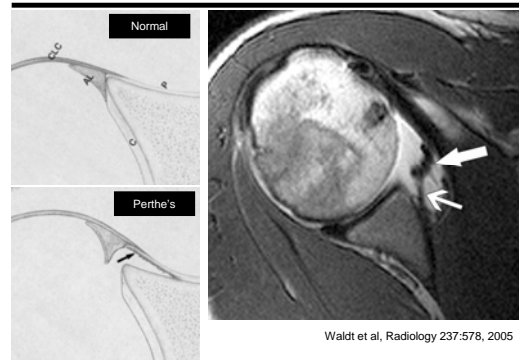
MR and MRA, EA

GLOM sign



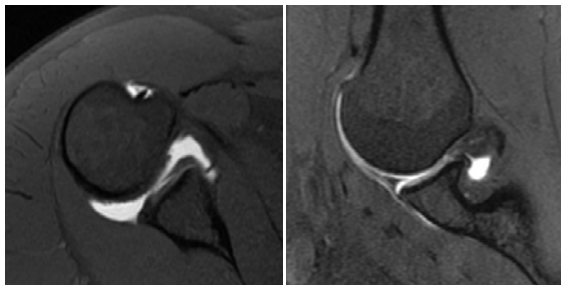
AY

Perthe's lesion

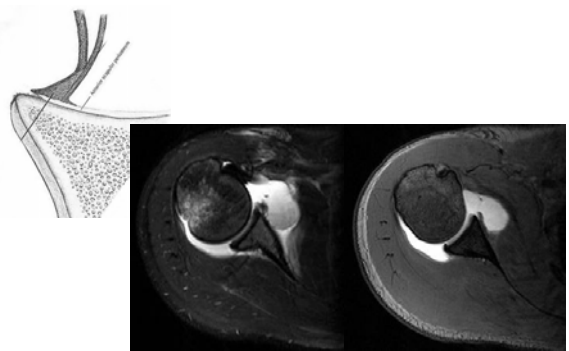


Waldt et al, Radiology 237:578, 2005

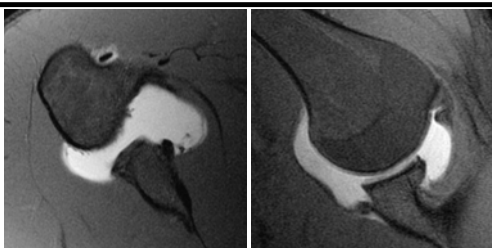
Perthe's lesion



ALPSA



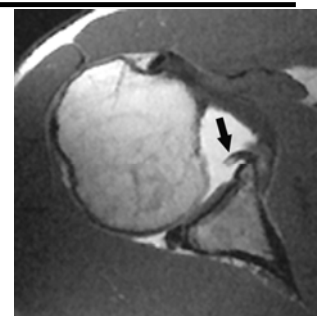
ALPSA



- Intact periosteum
- Labrum rotated and displaced medially
- May heal with synovialization in this position
- Can be difficult to see at arthroscopy

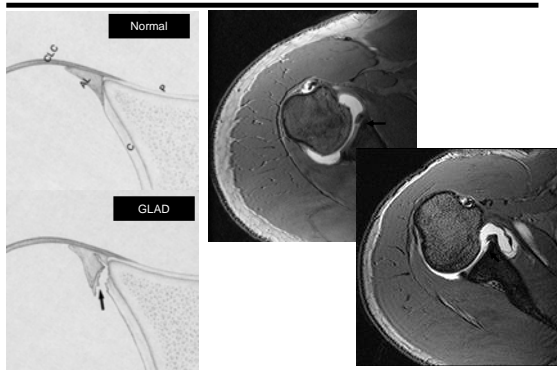
GLAD

- Glenolabral articular disruption
- Impaction injury
- No capsular tear or periosteal stripping
- Not associated with instability
- Superficial tear of anterior labrum attached to fragment of articular cartilage

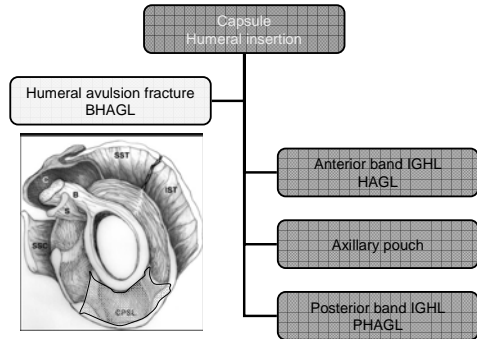


Waldt et al, Radiology 237:578, 2005

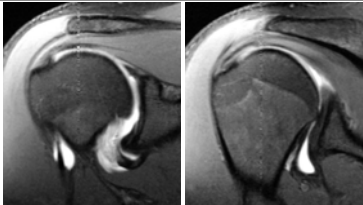
GLAD lesion



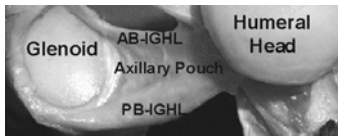
Anteroinferior



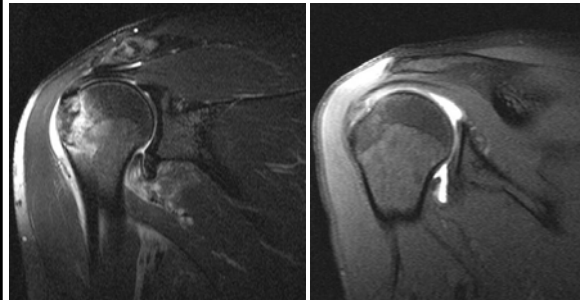
IGHL Humeral failure



- HAGL
- Axillary pouch
- PHAGL
- Complete

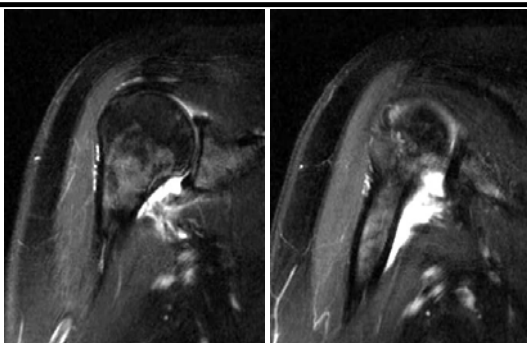


HAGL



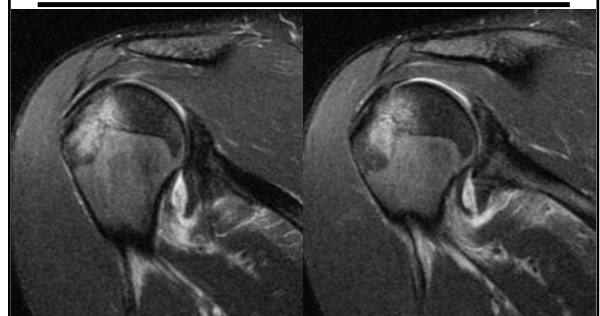
Injury and 10 month follow-up

PHAGL

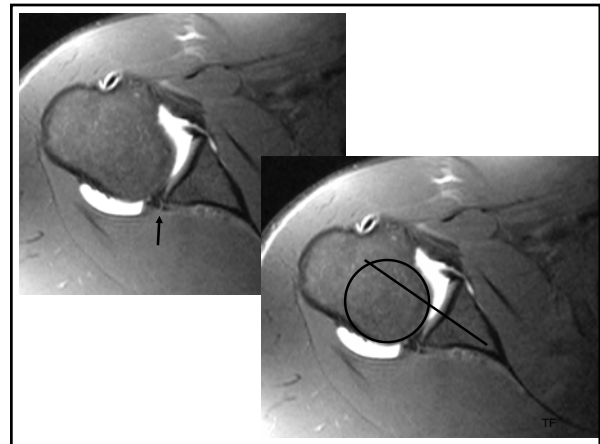
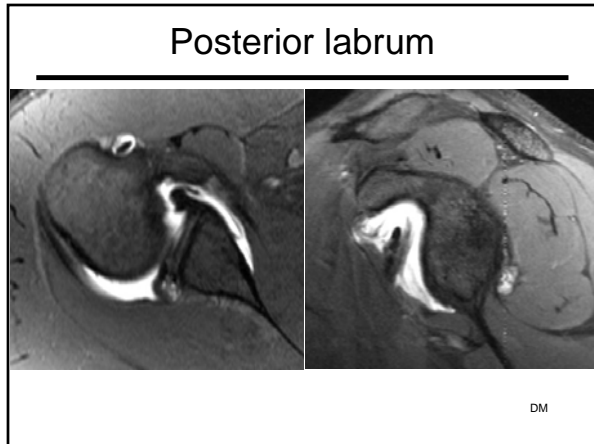
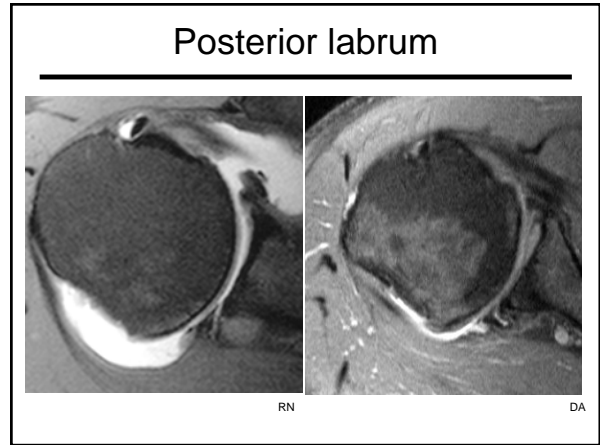
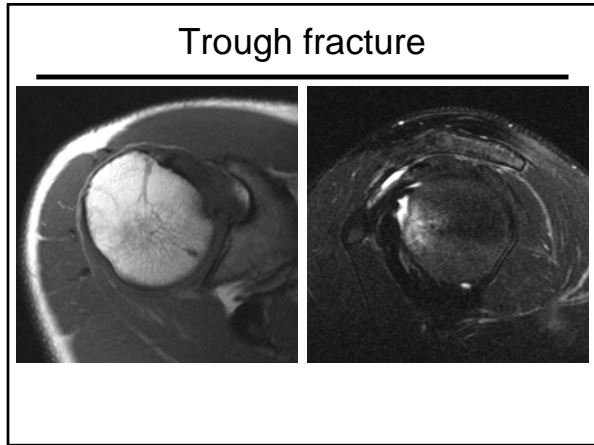
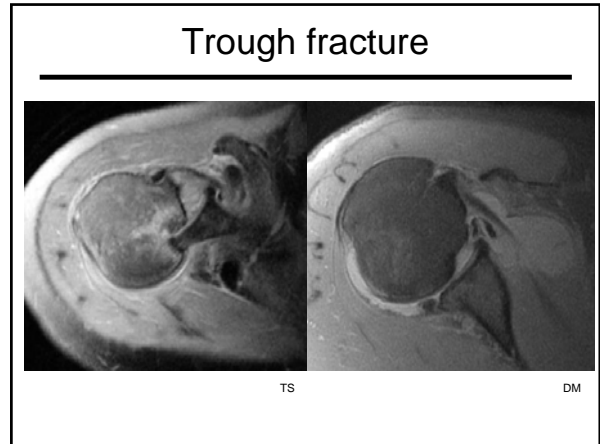
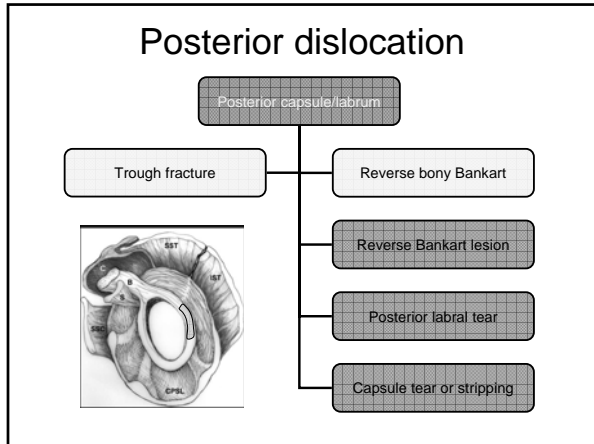


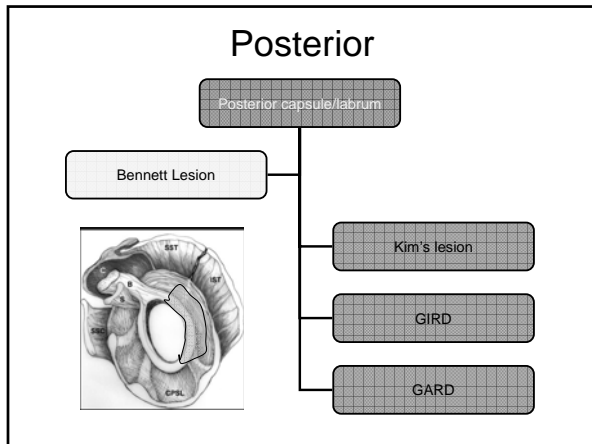
Chung et al, AJR 183:355-359, 2004

IGHL central failure



MP





Bennett lesion

- Extraarticular posterior capsule avulsive injury
- Crescentic bony mineralization at posterior-inferior glenoid rim
- Associated with posterior labral tears and rotator cuff tear

Kim's lesion

- Mechanism is force applied in posterior direction
- Force exerted on PIGHL leading to posterior labral tear, propagating in medial to lateral direction
- Preserved chondrolabral junction

Loss of posterior labral height & contour, cyst at junction of labrum and cartilage

GIRD

- Glenoid internal rotation deficit
- Tight posterior capsule in the throwing shoulder
- Thickening of the posterior capsule and labrum

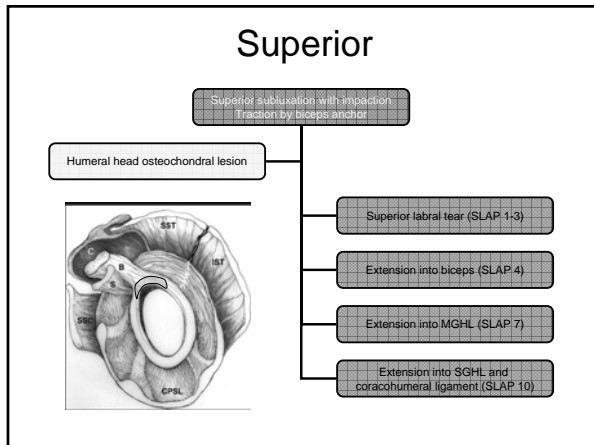
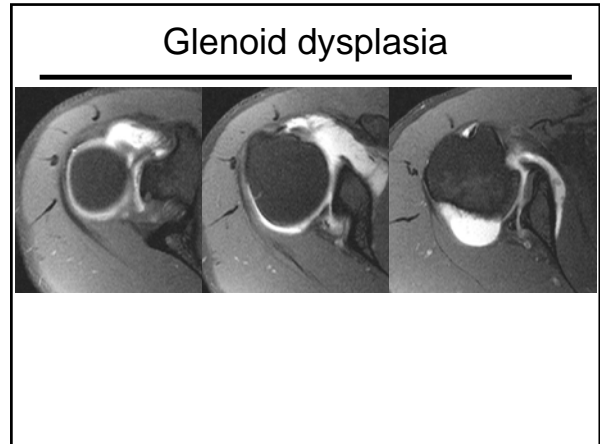
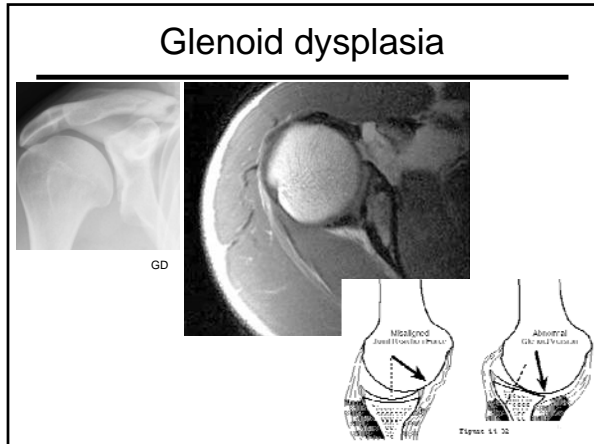
courtesy of Arash Tehranzadeh

GARD

- Glenoid articular rim divot
- Osteochondral injury of posterior glenoid rim
- Akin to GLAD lesion at posterior glenoid

GARD

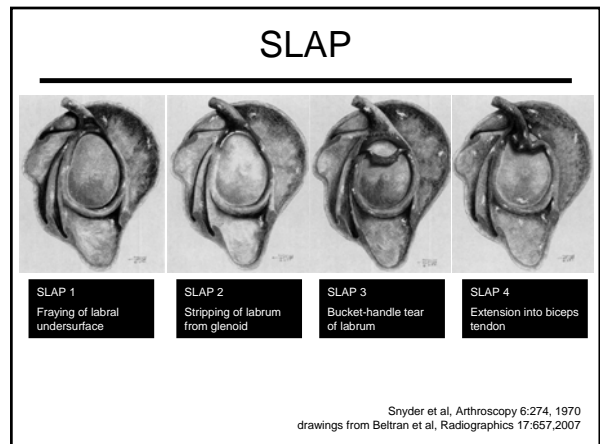
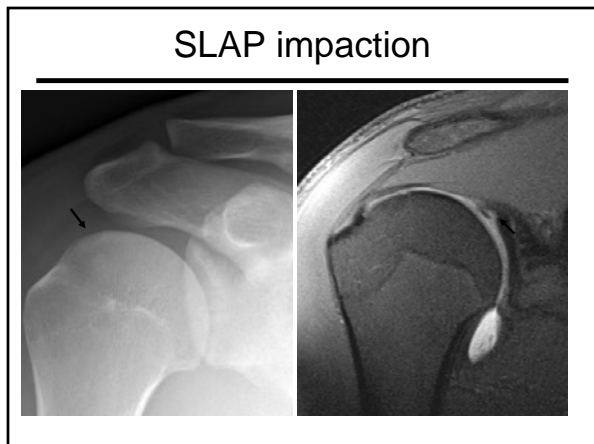
from the literature, 22 yo M impaction injury while weightlifting

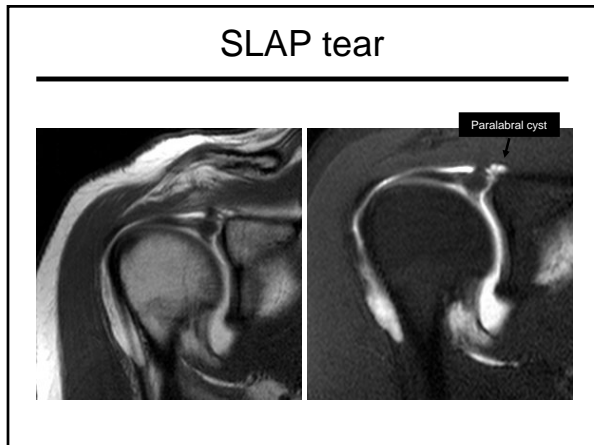
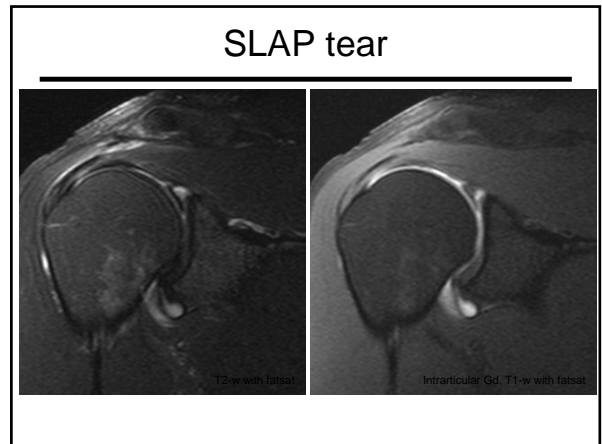
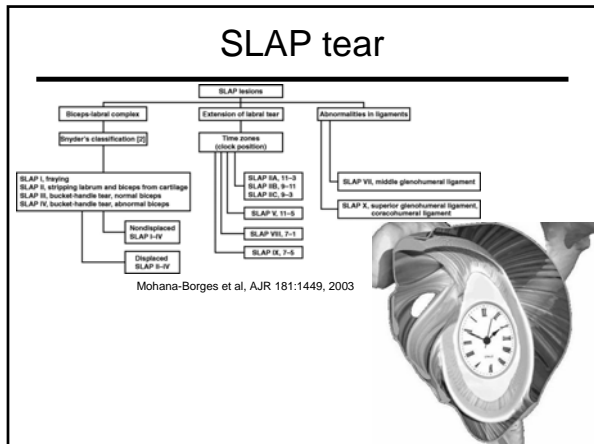


SLAP tear

- Tear of the biceps anchor/superior labral complex
- Acute trauma
- Repetitive throwing and other overhead activities
- "Superior labrum anterior posterior"

Cartland et al, AJR 159:787, 1992





Sublabral recess

- Anterior to biceps anchor
- Thin (<2 mm wide)
- Short (<5 mm tall)
- Smooth and even
- Parallel to glenoid
- Normal cartilage

TF

Smith DK et al, Radiology 201:251-256, 1996

