



The University of Texas at Austin
Dell Medical School

51st Sports Medicine Symposium UTHSCSA

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Glenohumeral Instability

Perthes Bankart GLAD ALPSA
Magnusson-Stack Putti-Platt
Latarjet Bristow HAGL Hill-Sachs
Remplissage RHAGL
Reverse Hill-Sachs MDI Rotator Interval
Casulorrhaphy Arthropathy
Thermal Capsulorrhaphy Sulcus
Crank Apprehension/Relocation Stimson
Milch
Inferior Capsular Shift Eden-Hybinette
Arthroscopic Capsulorrhaphy
UGHHHHHHHHHH!!!!!!

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Glenohumeral Instability

- Objectives
 - Anatomy
 - History and Physical Examination
 - Pathology
 - Treatment
- Case Presentations

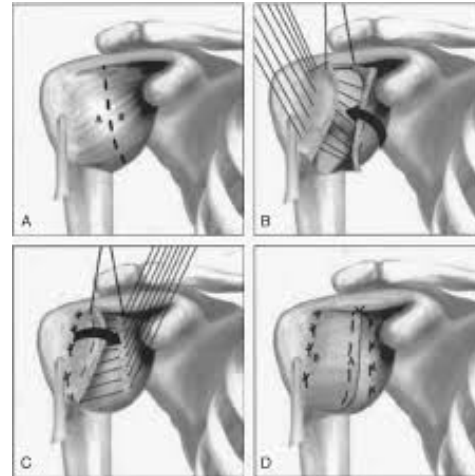
Glenohumeral Instability

- 2000 BC
 - papyrus texts documenting shoulder dislocations
- 400 BC
 - Hippocrates describes technique for shoulder reduction, stabilization
- Early 20th Century
 - Bankart describes repair of the “essential lesion”

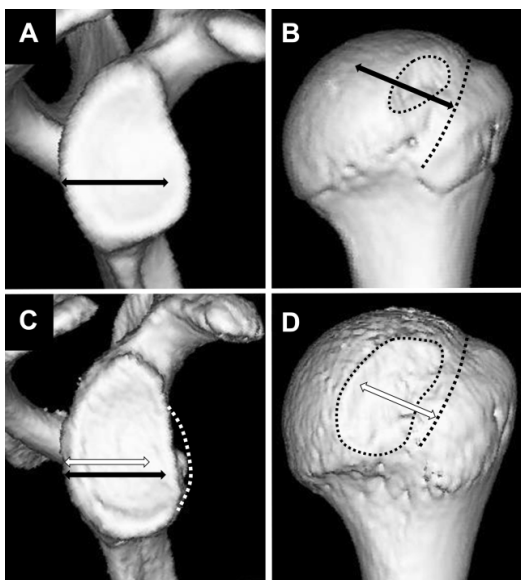


Glenohumeral Instability

- Mid 20th Century
 - Rowe (modern open Bankart Repair)
 - Magnusson-Stack
 - Putti-Platt
 - Bristow/Latarjet
 - Inferior Capsular Shift
- Late 20th-Present
 - Arthroscopy



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- Di Giacomo G, Itoi E, Burkhart SS. Evolving concept of bipolar bone loss and the Hill-Sachs lesion: from "engaging/non-engaging" lesion to "on-track/off-track" lesion. Arthroscopy. 2014 Jan;30(1):90-8. doi: 10.1016/j.arthro.2013.10.004. PMID: 24384275.
- Lo IK, Parten PM, Burkhart SS. The inverted pear glenoid: an indicator of significant glenoid bone loss. Arthroscopy. 2004 Feb;20(2):169-74. doi: 10.1016/j.arthro.2003.11.036. PMID: 14760350.

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Anatomy

- Static Stabilizers
 - Humeral Head/Glenoid cavity
 - Articular cartilage
 - ROC mismatch
 - Central bare area
 - Glenoid/humeral head version
 - Capsulolabral Complex
 - Labrum
 - Rotator Interval
 - Glenohumeral ligaments
 - SGHL
 - MGHL
 - IGHL
 - » Anterior
 - » Posterior
 - Negative intra-articular pressure

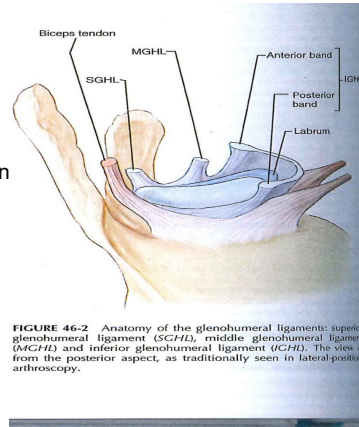


FIGURE 46-2 Anatomy of the glenohumeral ligaments: superior glenohumeral ligament (SGHL), middle glenohumeral ligament (MGHL) and inferior glenohumeral ligament (IGHL). The view is from the posterior aspect, as traditionally seen in lateral-posterior arthroscopy.

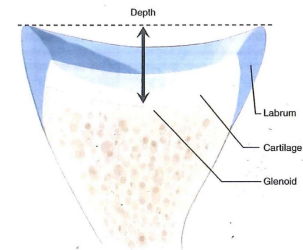


FIGURE 46-1 Glenoid concavity is deepened by both the articular cartilage and labrum.

Anatomy

- Glenohumeral Ligaments
 - Discrete “thickenings” of the shoulder capsule
 - Static restraint to shoulder motion

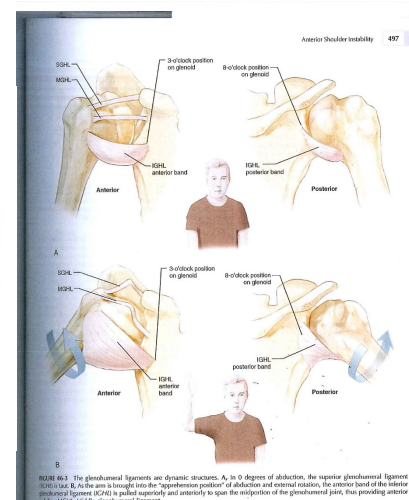
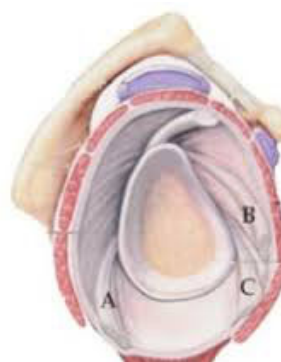
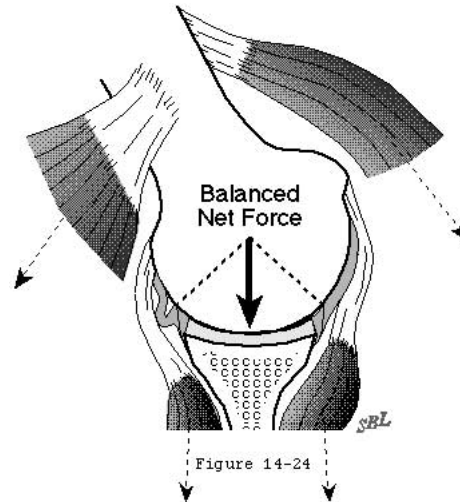


FIGURE 46-3 The glenohumeral ligaments are dynamic structures. A, In 0 degrees of abduction, the superior glenohumeral ligament (SGHL) is lax. B, As the arm is brought into the “prehension position” of abduction and external rotation, the anterior band of the inferior glenohumeral ligament (IGHL) is pulled superiorly and anteriorly to open the volar portion of the glenohumeral joint, thus providing anterior stability. C, Middle glenohumeral ligament.

Anatomy

- Dynamic Stabilizers
 - Rotator Cuff
 - Concavity compression
 - Periscapular Muscles
 - Scapular stabilization
 - Biceps (long head)
 - Limited role



History

- **T**raumatic
- **U**nidirectional
- **B**ankart
- **S**urgery
- **A**traumatic
- **M**ultidirectional
- **B**ilateral
- **R**ehabilitation
- **I**nferior Capsular Shift

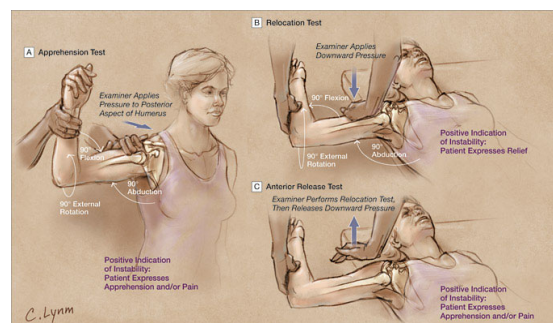
Physical Examination

- Inspection
- Palpation
- A/PROM
- Strength testing
- Neurovascular



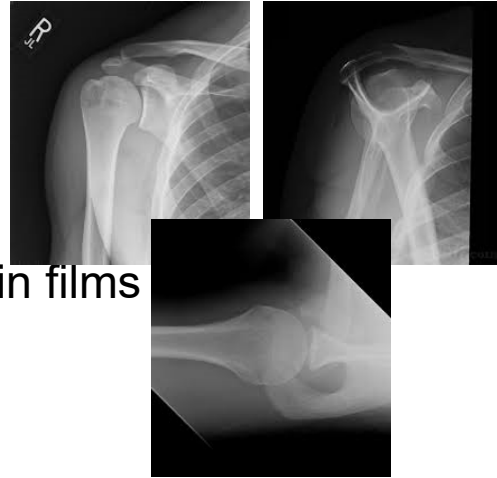
Physical Examination

- Apprehension/relocation
- Jerk Test
- Crank Test
- Shoulder Drawer
- Sulcus sign
 - MDI/Ehlers-Danlos (Beighton scoring system)



Radiographic Evaluation

- **2 Orthogonal views!!!!!!**
 - Anteroposterior
 - Axillary Lateral
 - Scapular “Y”
 - **CT Scan** if unable to obtain films
 - Special Views
 - *West Point-bony Bankart*
 - *Stryker Notch-Hill Sachs lesion*



Anterior Shoulder Instability

- Most common
- Contact sports
- Dislocation or subluxation
- Risk of recurrence linked to sex and age



Posterior Shoulder Instability

- Seizures
- Electric shock
- Voluntary
- Beware of locked, posterior dislocation
 - **ORTHOGANAL VIEWS**
or CT MANDATORY



Acute Management

- Closed Reduction Techniques
 - Anterior Dislocation
 - Stimson
 - Traction/Countertraction
 - Milch technique
 - Posterior Dislocation
 - "unlock" and reverse deformity



Acute Management

- Post reduction films
- Document neuro exam
- Immobilization
 - Sling (+/- swathe)
 - External Rotation ???? (Itoi et al)
 - Patient age 🌀 length of immobilization

Decision Making

- Patient demographics
- Activity level (goals)
- Chronic instability
- Associated pathology??
- Patient health and ability to comply
- ISIS (Instability Severity Index Score)

Prognostic Factor	Score
Age at surgery, y	
≤20	2
>20	0
Glenoid loss of contour on AP radiograph	
Loss of contour	2
No loss of contour	0
Hill-Sachs lesion on external rotation AP radiograph	
Visible	2
Not visible	0
Degree of sports participation	
Competitive	2
Recreational or none	0
Type of sport	
Contact or forced over head	1
Other	0
Shoulder hyperlaxity	
Present	1
Not present	0
Total	10

^aAs described by Balg and Boileau.¹ AP, anteroposterior.

Advanced Imaging Techniques

- MRI
 - Arthrogram
 - 3T
- CT (w/ or w/out contrast)
 - Glenoid bone loss/Hill-Sachs (On/Off Track)
- Flourescopic evaluation

Pathoanatomy

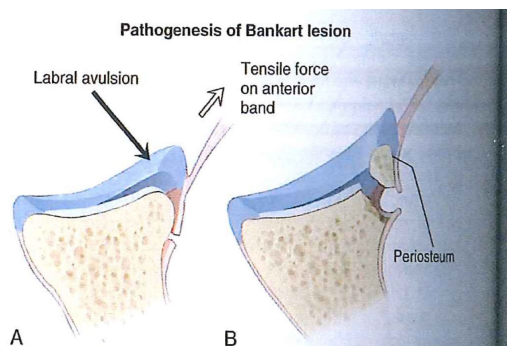


FIGURE 46-4 A, A Bankart lesion, which is defined as avulsion of the anterior-inferior capsulolabral complex with extension into the scapular periosteum and rupture of the periosteal tissue. B, A bony Bankart lesion occurs when the capsulolabral complex is avulsed along with a variably sized fragment of bone.

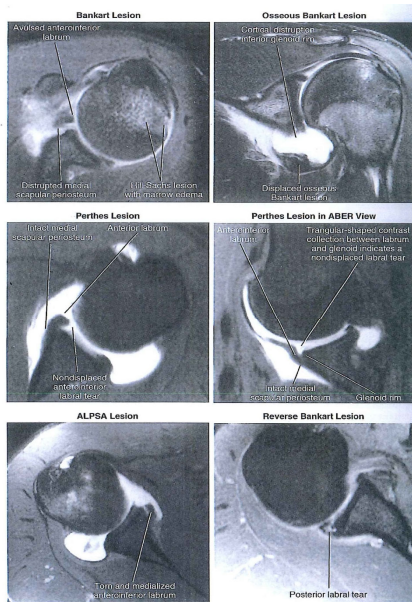
of as representing the initial stages of a Bankart lesion. The

TABLE 46-1

CAPSULOLABRAL LESIONS

Lesion	Description
Associated with Anterior Instability	
Perthes	Avulsion of the anterior-inferior glenolabral complex with preservation of the medial scapular neck periosteum
Bankart	Complete avulsion of the anterior-inferior glenolabral complex along with a piece of scapular neck periosteum
Bony Bankart	Osseous avulsion fracture of the anterior-inferior glenolabral complex
ALSPA	Avulsion of the anterior-inferior glenolabral complex with stripping of the medial scapular neck periosteum but preservation of a medial hinge; the loose fragment subsequently scars medially down the scapular neck
HAGL	Avulsion of the glenohumeral ligaments from their humeral-sided attachment
Not Associated with Instability	
Glenolabral articular disruption ¹²⁴	A superficial tear of the anterior-inferior labrum with associated cartilage injury but preservation of the anterior-inferior glenolabral complex; presents with a painful shoulder but is not a cause of shoulder instability
SLAP ¹²⁵	Disruption of the superior labrum, originally described to stop at the midglenoid notch; recent descriptions have associated SLAP tears with Bankart lesions, but SLAP lesions alone are not a cause of shoulder instability

ALSPA, Anterior labroligamentous periosteal sleeve avulsion; HAGL, humeral avulsion of the glenohumeral ligaments; SLAP, superior labrum anterior posterior.



Magnetic resonance imaging appearance of the various soft tissue pathologies associated with shoulder rotation; ALPSA, anterior labroligamentous periosteal sleeve avulsion. (Modified from Morrison in *musculoskeletal imaging*, 5th edn, 2008, Elsevier.)

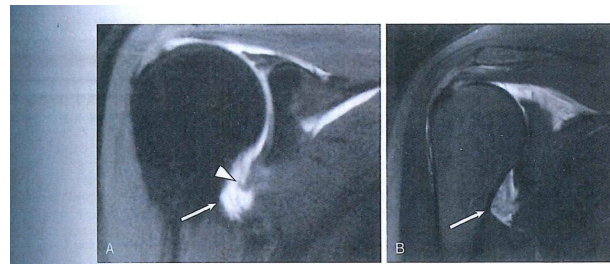
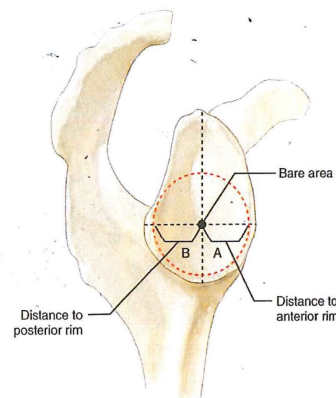


FIGURE 46-12 Magnetic resonance imaging appearance of a humeral avulsion of the glenohumeral ligaments lesion. A coronal resonance T1-weighted (A) arthrogram anterior to a T2-weighted (B) image shows the humeral avulsion of the anterior band of the glenohumeral ligament (arrowhead). The attachment of the axillary recess capsule to the humerus is too distal, the so-called J sign (arrow). (Modified from Pope TL, Bloem HL, Beltran J, et al: *Imaging of the musculoskeletal system*, Philadelphia, 2008, Elsevier.)

Pathoanatomy

- Bony Injuries
 - Bony Bankart
 - Attritional wear
 - Hill-Sachs lesion
- Rotator Cuff tear
 - >50% in pts over 65 yo
- Neurovascular Injury
 - Axillary nerve

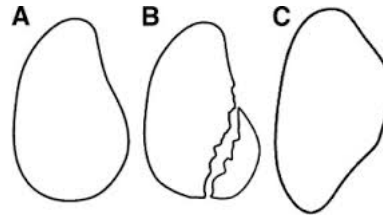


$$\text{Percentage bone loss} = \frac{(B - A)}{2 \times B}$$

FIGURE 46-10 Determining glenoid bone loss using the antero-posterior distance from bare area method.

Bony Bankart

- Acute vs chronic
- “Inverted pear” configuration
- $\geq 20\%$ consider bone restorative procedure
- Lowest risk of recurrent instability



Bony Bankart

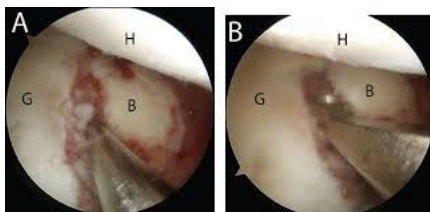
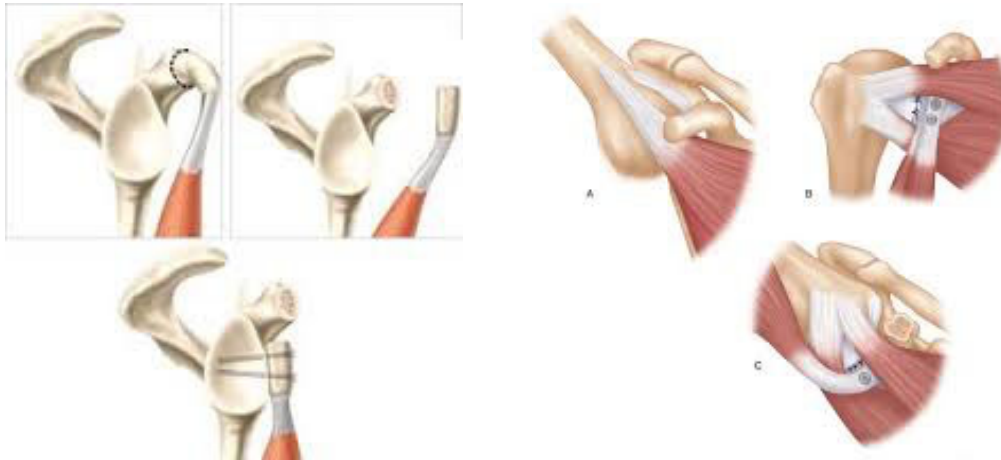


Table 1 Instability Severity Index Score ³	
Prognostic Factors	Points
Age at Surgery	
• ≤ 20	2
• > 20	0
Level of Sport	
• Competitive	2
• Recreational	0
Type of Sport	
• Contact/forced ABER*	1
• Other	0
Clinical Exam	
• Hyperlaxity	1
• No hyperlaxity	0
AP X-ray (IR† and ER‡)	
• Hill-Sachs on ER† view	2
• No Hill-Sachs visible	0
AP X-ray	
• Glenoid contour loss	2
• No glenoid contour loss	0

*ABER = abduction and external rotation; †IR = internal rotation;
‡ER = external rotation

Latarjet Procedure



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Hill-Sachs Lesion

- Engaging or Non-engaging
 - Glenoid track
 - Arthroscopic Evaluation
- Treatment
 - Benign neglect
 - Remplissage
 - Allograft
 - resurface

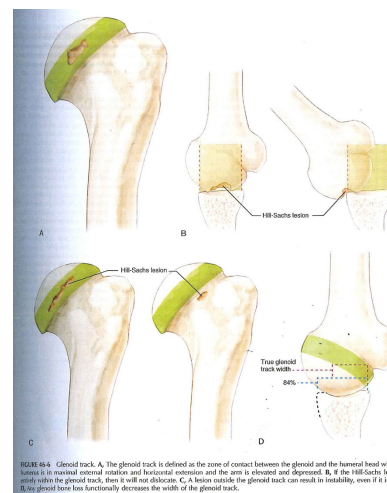
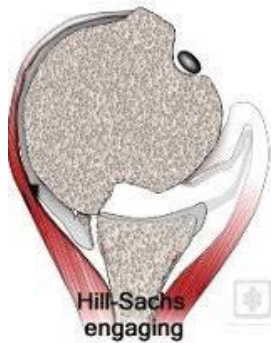


FIGURE 49-4 Glenoid track. A, The glenoid track is defined as the zone of contact between the glenoid and the humeral head when the humerus is in maximal external rotation and horizontal extension and the arm is elevated and depressed. B, If the Hill-Sachs lesion is small, it will not dislocate. C, A lesion outside the glenoid track can result in instability, even if it is small. D, A lesion that is too large to be treated with a remplissage procedure will result in instability.

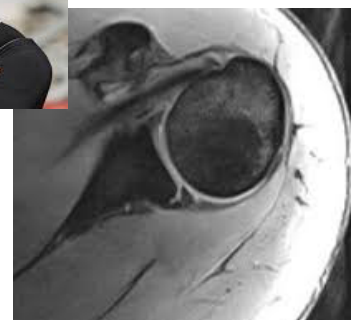
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Remplissage



Chronic Posterior Instability

- Less common
- Repetitive axial loading
 - Interior lineman
- With or without associated labral tear
- Differentiate between laxity and instability



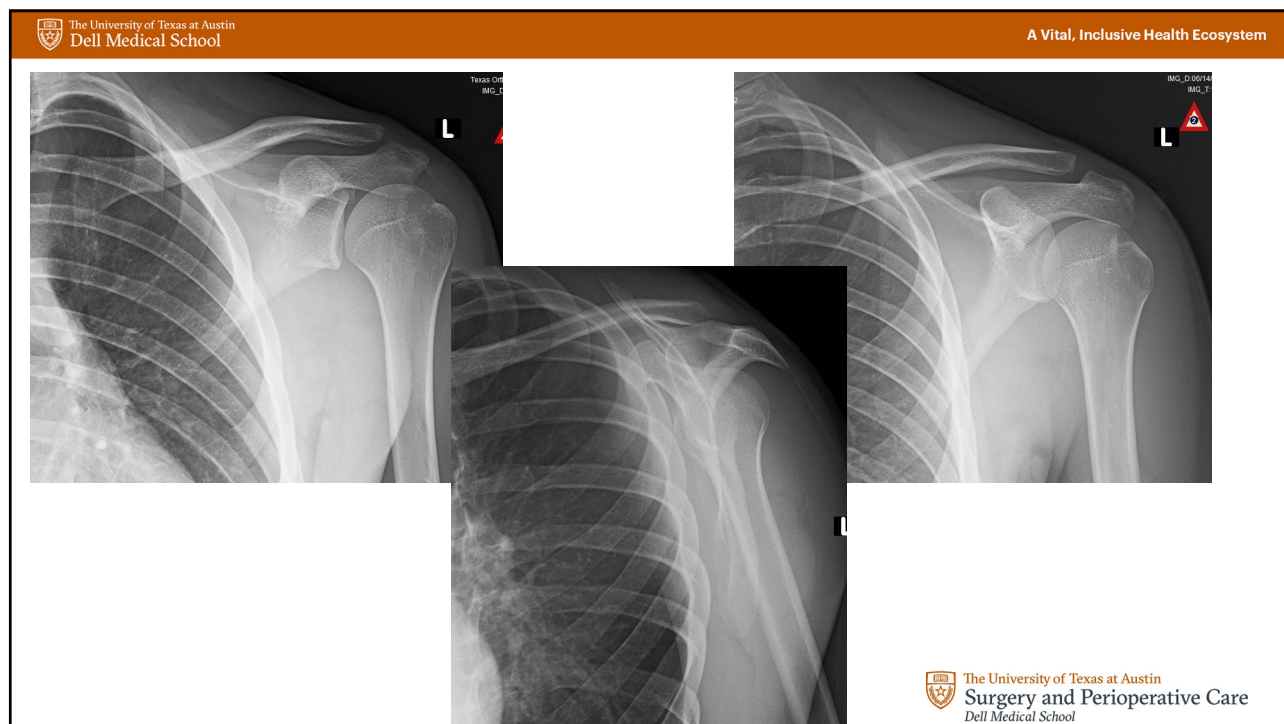
Multidirectional Instability (MDI)

- Hyperlaxity
- Evaluate for “primary” direction
- Sulcus sign
- Beighton scoring system
- Collagen Diseases
 - Ehlers-Danlos
 - Marfan’s Syndrome
- Inferior capsular shift vs Arthroscopic Capsulorrhaphy

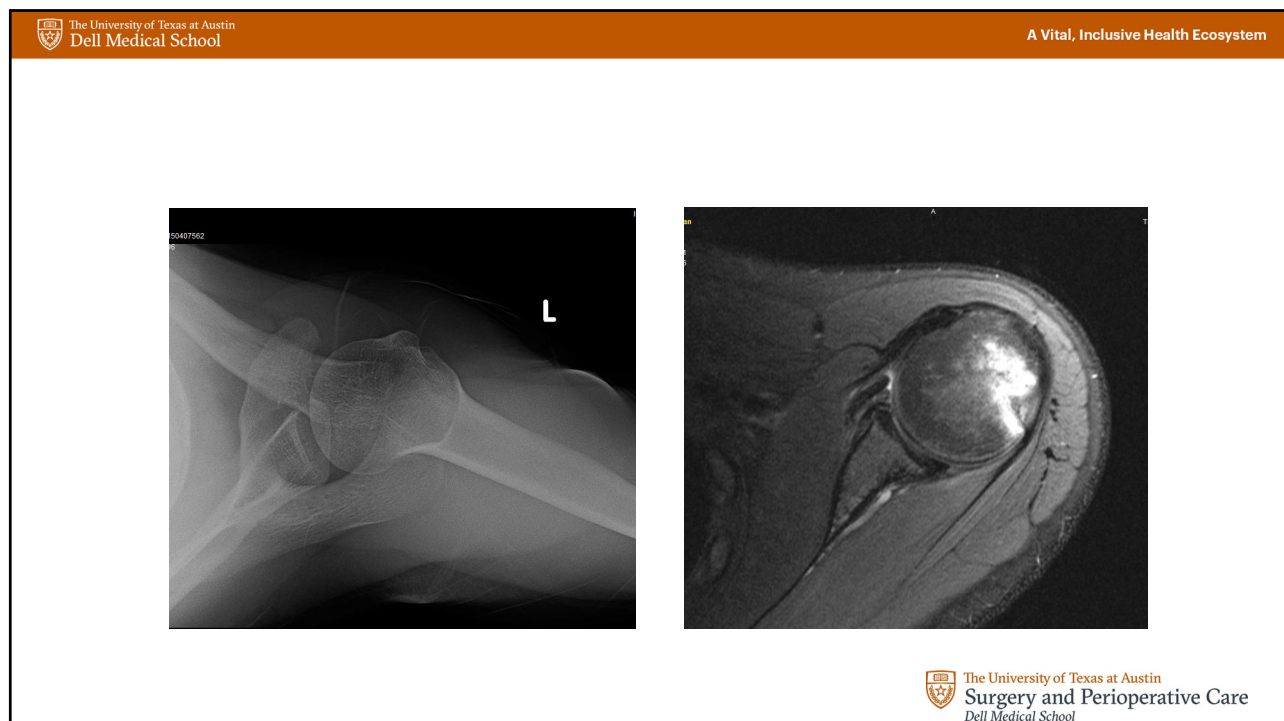
Joint	Finding	Points
Left little (fifth) finger	Passive dorsiflexion beyond 90°	1
	Passive dorsiflexion ≤90°	0
Right little (fifth) finger	Passive dorsiflexion beyond 90°	1
	Passive dorsiflexion ≤90°	0
Left thumb	Passive dorsiflexion to the flexor aspect of the forearm	1
	Cannot passively dorsiflex thumb to flexor aspect of the forearm	0
Right thumb	Passive dorsiflexion to the flexor aspect of the forearm	1
	Cannot passively dorsiflex thumb to flexor aspect of the forearm	0
Left elbow	Hyperextends beyonds 10°	1
	Extends ≤10°	0
Right elbow	Hyperextends beyonds 10°	1
	Extends ≤10°	0
Left knee	Hyperextends beyonds 10°	1
	Extends ≤10°	0
Right knee	Hyperextends beyonds 10°	1
	Extends ≤10°	0
Forward flexion of trunk with knees full extended	Palms and hands can rest flat on the floor	1
	Palms and hands cannot rest flat on the floor	0

Case #1

- 22 y/o male
- RHD
- Traumatic injury while water skiing
- Reports being arm being forced “behind” him
- Immediate pain/deformity
- Friend pulled on arm and felt a “pop”
- Presented to ER and imaging confirmed concentric reduction
- Placed in sling and FU was arranged as outpatient



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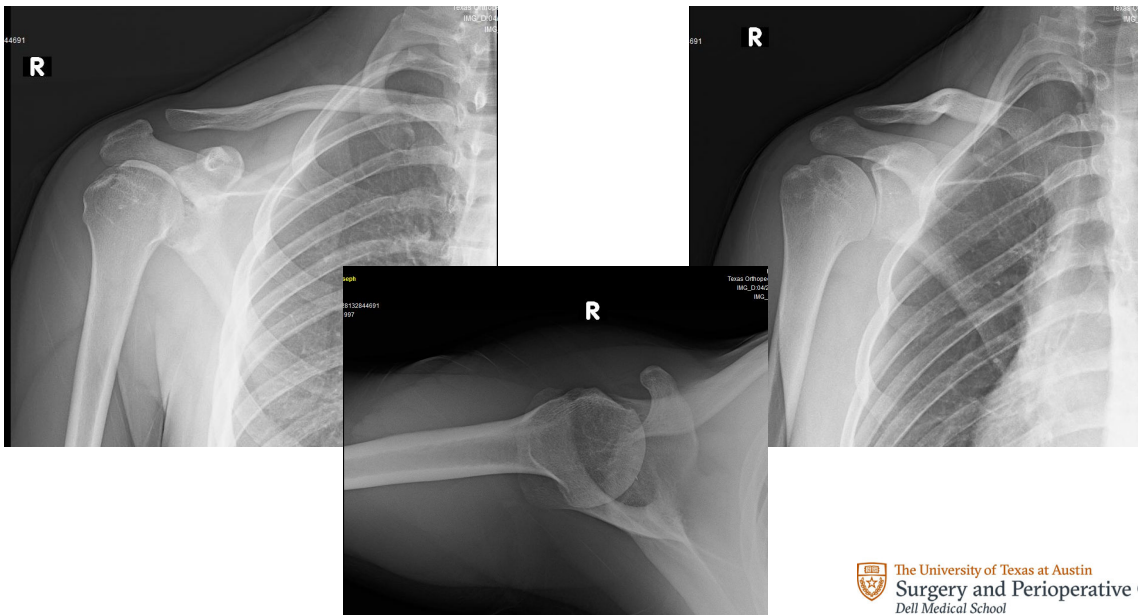
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Case #2

- 19 yo male
- RHD
- Original dislocation 2 yrs prior
- Underwent arthroscopic stabilization
- Returned to activity at 6 months
- Experienced multiple instability episodes starting at @1 yr from index procedure
- Presents with instability during ADLs

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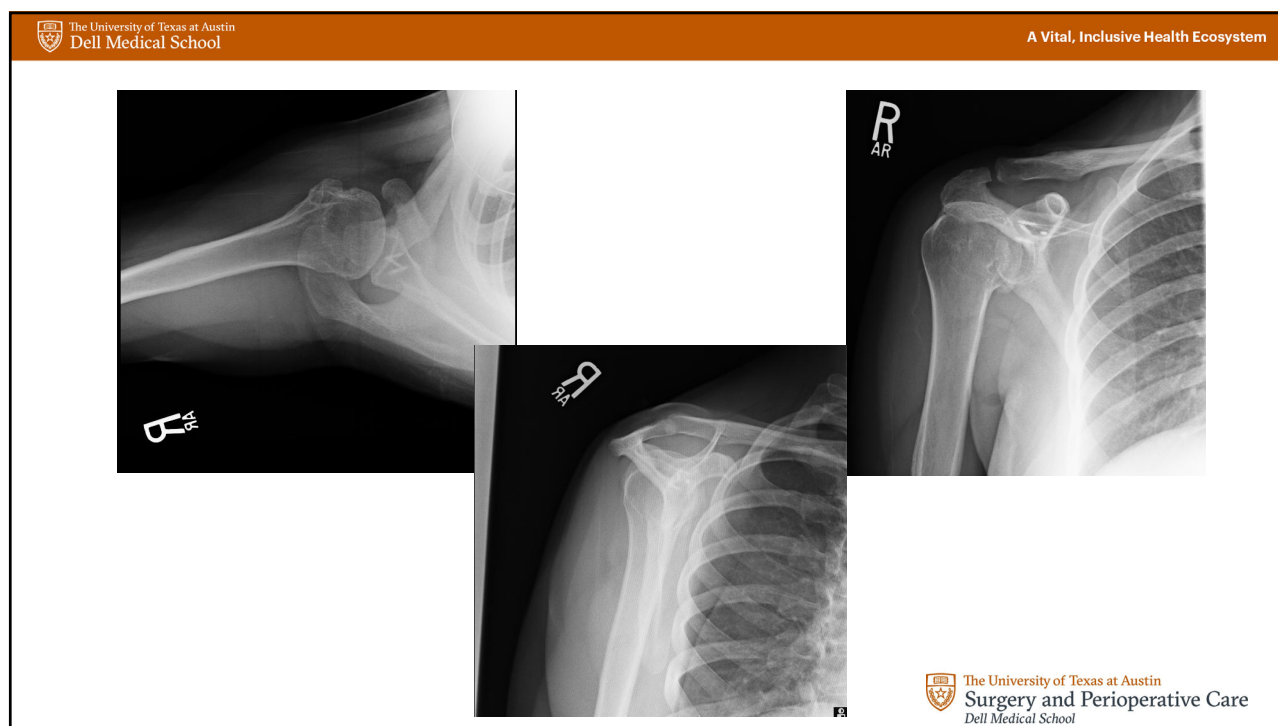
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Case #3

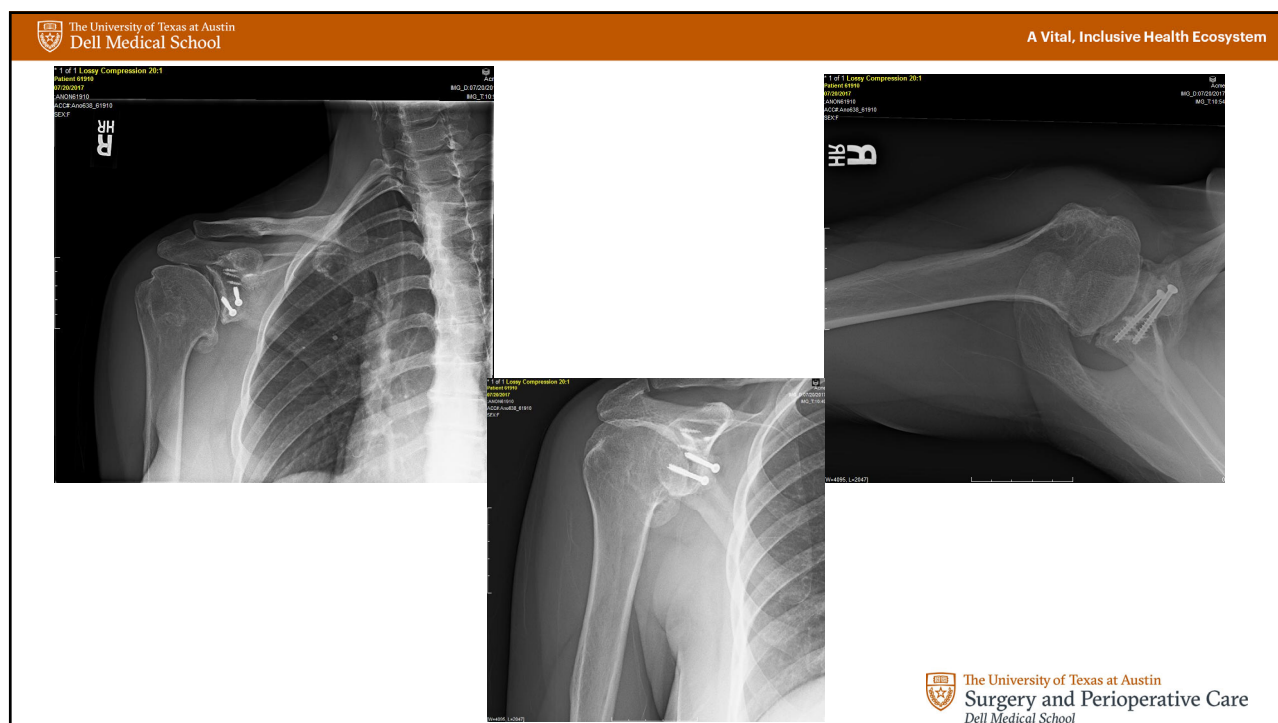
- 36 yo female
- RHD
- Multiply operated on shoulder (6 prior surgeries)
- Continues to have weekly instability episodes with ADLs
- Pain noted now at rest

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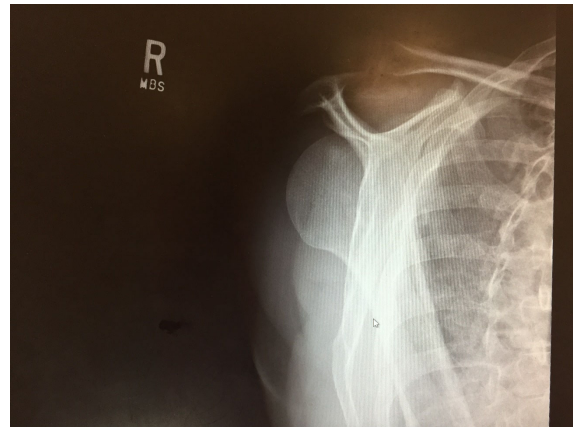
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Case #4

- 58 yo male
- RHD
- Fell while walking dog
- Instant pain and immediate loss of motion
- Presented to ER for evaluation

Case #4



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Case #4

- Attempted in office reduction
- Reduction under sedation
- MRI evaluation

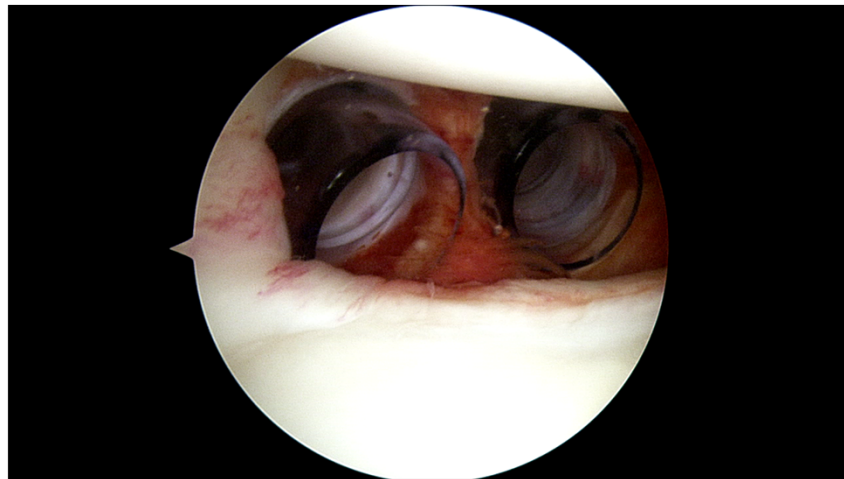


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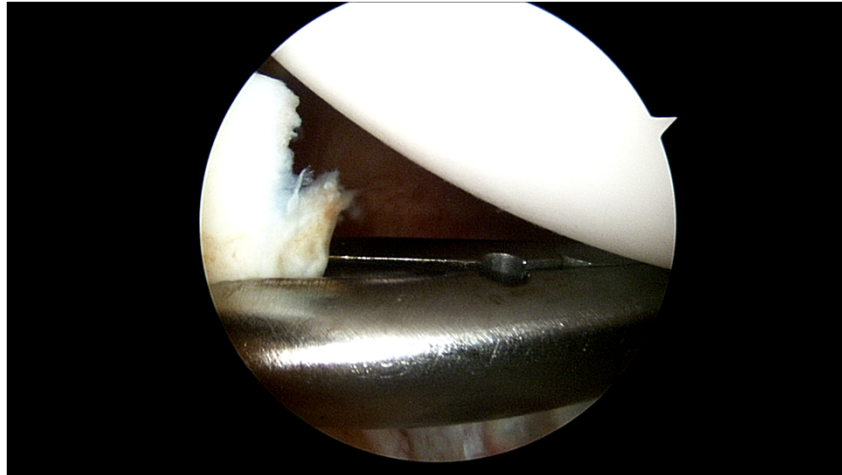


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HEALTH
COMMUNITY
CARE

Rethink **Everything**

EDUCATION
RESEARCH
INNOVATION

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