Glenohumeral Joint Instability

Christine B. Chung, M.D.
Assistant Professor of Radiology
Musculoskeletal Division
UCSD and VA Healthcare System

Static Stabilizers of the GHJ

• Congruity of articular surface
  • Labrum
    – Increase depth of glenoid fossa
• Negative intraarticular pressure
  – Vacuum effect
• Capsular structures (CHL, GHL, Capsule)
  – Limit joint movement

Activation of Static Stabilizers

• Through change in arm position and alteration of capsule dynamics
  – Place capsulolabral complex under tension
  – Activate the inferior glenohumeral ligament
**Static Stabilizers**
- Function at extremes of motion

**Classification Systems for GHJ Instability**
- **Degree of instability**
  - Subluxation vs dislocation
- **Direction**
  - Anterior
  - Posterior
  - Inferior
  - Superior
- **Pathogenesis**
  - Traumatic
  - Atraumatic
  - Congenital
  - Voluntary

**Superior Instability**
- Very uncommon accounting for less than 1% of dislocations

**Superior Stability**
- Additional stability afforded by ceiling of the rotator cuff
- With small tear of supraspinatus, remainder of rotator cuff compensates
- Implications for several concepts
  - SLAC shoulder
  - Microinstability

**Posterior Instability**
- Accounts for 2-4% of all GHJ dislocations
- Over 50% unrecognized at presentation
  - Physical exam mistaken for adhesive capsulitis
  - Arm in fixed internal rotation
- Associated findings
  - Reverse Hill Sachs deformity
  - Posterior labral lesion
Posterior Instability

- Straight posterior dislocation

Posterior Instability
Trough Sign and Posteroanterior Labral Lesion

Inferior Instability: Luxatio Erecta

Labrum
- Cuff of fibrocartilaginous tissue surrounding glenoid cavity
  - Stability
  - Attachment site

Glenoid Labrum
- Cuff of fibrous and fibrocartilaginous tissue surrounding glenoid fossa
- Attachment site
  - Long head of biceps
  - Glenohumeral ligaments
**Glenoid Labrum**

- Variation in morphology and signal intensity

**Characterization of Labral Findings**

**Buford Complex**
- Occurs between anterosuperior labrum and glenoid
- Frequency 10%
- Simulates labral pathology

**Sublabral Recess**
- Occurs between anterosuperior labrum and glenoid
- Frequency 10%
- Simulates labral pathology

**Sublabral Hole**
- Separation of the labrum from the glenoid from the 12 – 3 o’clock position
Histologic Zone

Glenohumeral Ligaments
- Thickening of joint capsule
- Function
  - Integrity
  - Site of attachment
  - Position of arm
- Extend from anterior glenoid to proximal humerus

Superior Glenohumeral Ligament
- Biceps tendon (very rare)
- Anterior labrum (most common)

Middle Glenohumeral Ligament
- Anterior labrum (most common)
- Scapular neck

Glenohumeral Ligaments
- Superior GHL
  - Present 90-97%
  - Variable origin
- Middle GHL
  - Present 73-92%
- Inferior GHL
  - Present almost 100%
Classification Systems for GHJ Instability

- Degree of instability
  - Subluxation vs dislocation
  
- Direction
  - Anterior
  - Posterior
  - Superior
  - Inferior

- Pathogenesis
  - Traumatic
  - Atraumatic
  - Congenital
  - Voluntary

Anterior Instability

- Types
  - Subcoracoid
  - Subglenoid
  - Subclavicular
  - Intrathoracic
  - Intraabdominal

- Accounts for 95% of GHJ dislocation

- Mechanism of injury
  - Fall on the outstretched hand
    - Abduction
    - Extension
    - External rotation

Subcoracoid Dislocation

- Most common type of anterior dislocation

Subglenoid Dislocation

Subcoracoid-Subglenoid Dislocation Complications

- Hill Sach’s lesion
  - Compression fracture on posteroslateral humeral head
  - Produced by impaction of humerus against anterior rim of glenoid fossa
  - Best diagnosed on internal rotation view

Subcoracoid-Subglenoid Dislocation Complications

- Described by Hill and Sachs ~1940

- Frequency
  - 27% first time
  - 74% recurrent

- High incidence of recurrent dislocation (40% likelihood)
Hill Sachs Characterization
- Engaging lesion
  - Long axis of lesion parallel to the anterior glenoid margin
- Non-engaging lesion
  - Long axis of lesion diagonal to anterior glenoid margin

DDX Hill Sachs Lesion
- Normal posterior osseous groove
- Bare area of humeral head
- Impingement lesion
- Greater tuberosity fracture

DX Hill Sachs
- Diagnosed on first 3 cuts where humeral head visualized

DDX Hill Sachs
Normal Posterior Osseous Groove
- Diagnosed superior to level of coracoid

Subcoracoid-Subglenoid Dislocation Complications
- Bankart lesion
  - Labral or osseous lesion of the anterior glenoid rim

Intrathoracic Dislocation
Posterior Instability

- Accounts for only 2-4% of all GHJ dislocations

Posterior Instability

- Types
  - Over 50% unrecognized at presentation
    - Physical exam mistaken for adhesive capsulitis
    - Arm in fixed internal rotation
- Associated findings
  - Reverse Hill Sachs deformity
  - Posterior labral lesion

Posterior Instability

Trough Lesion

Superior Instability

- Very uncommon accounting for less than 1% of dislocations

Superior Stability

- Additional stability afforded by ceiling of the rotator cuff
- With small tear of supraspinatus, remainder of rotator cuff compensates
- Implications for several concepts
  - SLIP
  - SLAC shoulder
  - Microinstability
Superior Instability

Inferior Instability: Luxatio Erecta

Why Image Instability?

- Diagnose the anatomic lesion present
  - Must restore form to gain function
- Presence of other findings which may change treatment
  - Rotator cuff pathology (>40 year age group)
  - Avulsion fracture of humerus 10-15%
  - Brachial plexus pathology (7-45%)

Unstable Capsulo-Labral Lesions

- Glenoid Failure (70-75%)
- Capsular Failure (15-20%)
- Humeral Failure (5-10%)
- Humeral + Glenoid Failure

Bankart Lesion

Bankart

Bankart ALPSA Perthes

Tear/Laxity

HAGL BHAGL

Floating AIGHL

Language

Posterior Labrum
Anterior Labrum

Glenoid

IGHL Complex
- Bankart Lesion
  - Detachment of anteroinferior labrum

- Osseous Bankart Lesion

- Osseous Bankart Lesion

- Glenoid Labrum Ovoid Mass
  - GLOM
    - Detached anterior labral fragment which has migrated superiorly
Perthes Lesion

- Nondisplaced labral detachment with stripping of scapular periosteum when IGHL under tension

Acute ALPSA: Anterior Labral-Ligamentous Periosteal Sleeve Avulsion

- Displaced labral detachment with stripping of scapular periosteum
Chronic ALPSA:
Anterior Labral-Ligamentous Periosteal Sleeve Avulsion

Chronic ALPSA

• Displaced labral detachment with stripping of scapular periosteum

Chronic ALPSA

Humeral Failure of the IGHL Complex

• More common in pts > 30 years
• Associated with tears of subscapularis
• Reported frequency as high as 9.3% in series of dislocations

HAGL

• Humeral Avulsion of the IGHL

HAGL