Shoulder Instability in Athletes
See also Shoulder (Sports)
See also Rotator Cuff Injuries

Background

1. Definition: Recurrent episodes of subluxation and/or dislocation
   o Dislocation: complete loss of humeral articulation with glenoid fossa
      • Due to acute trauma
   o Subluxation: partial loss of glenohumeral articulation
      • Due to repetitive trauma
   o Laxity: partial loss of glenohumeral articulation
      • Usually asymptomatic

2. Static instability
   o Glenoid rim displaced and fixed superior, anterior, or posterior to humeral head
   o Less common than dynamic
   o Occurs w/rotator cuff tears or glenoid defect

3. Dynamic instability
   o Loss of normal glenohumeral stability due to trauma
   o Unidirectional without hyperlaxity (60%)
      • Tests: positive
         • Apprehension test
         • Hyperabduction test
      • Tests: negative
         • Sulcus sign
         • Anterior/posterior drawer tests
      • Lesion: anterior
         • Inferior glenohumeral ligament
         • Hill-Sachs lesion
      • Lesion: posterior
         • Posterior capsulolabrum
         • McLaughlin lesion
   o Unidirectional with hyperlaxity (30%)
      • Tests: positive
         • Anterior or posterior apprehension (not both)
         • Sulcus sign
         • Anterior and posterior drawer tests
      • Lesion
         • Anteroinferior capsulolabrum w/opening of rotator interval
         • Dysplasia of middle glenohumeral ligament
         • Posteroinferior capsule disruption
   o Multidirectional without hyperlaxity
      • Tests: positive
         • Anterior and posterior apprehension
      • Tests: negative
         • Sulcus sign
         • Drawer test
      • Lesion
         • Bony and capsulolabral lesions of anterior and posterior instability
Multidirectional with hyperlaxity
- Prevalence <5% of instabilities
  - Usually females (swimmers, gymnasts)
- Usually major trauma, can be caused by minor injury
- Generalized hyperlaxity
  - Pt has no control over humeral head
  - May subluxate several times per day
- Tests: positive
  - Anterior, posterior, inferior drawer tests
  - Incr external and internal rotation
- Lesion
  - Anterior and posterior instability
  - Widened rotator interval
  - Patulous capsule
  - Stretched ligaments

Pathophysiology
1. Pathology of dz
   - Disruption as a result of trauma to one or more of static or dynamic stabilizers of shoulder joint
2. Incidence/ prevalence
   - 76% of anterior dislocations occur in athletic activity
   - 70% of primary dislocations experience recurrent dislocation w/in 2 yrs
     - Age <20 years: 83-90%
     - Age 20-40: 60-63%
     - Age >40: 10-16%
3. Risk factors
   - Young age:
     - Stretching of ligaments incr due to greater Type III: Type I Collagen ratio
   - Hill-Sachs Lesion:
     - Compression fx at posterolateral margin of humeral head
   - Bankart Lesions:
     - Capsulolabral avulsion at anteroinferior glenoid rim
   - Baseball, softball, football players:
     - Stress to abducted, externally rotated arm results in anterior instability
   - Football linemen, falling gymnasts:
     - Posterior stress on adducted, outstretched arms results in posterior instability
   - Gymnasts, swimmers:
     - Repetitive microtrauma results in multidirectional laxity
4. Morbidity/ mortality
   - Loss of shoulder function, especially those requiring overhead motions
   - Glenohumeral osteoarthritis

Diagnostics
1. History
   - Feeling of joint looseness, crepitus, or anterolateral joint pain
2. Physical exam
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3. Laxity tests
   - **Sulcus Sign**
     - Arm at rest at side of pt
     - Elbow is grasped and pulled inferiorly
     - Dimple created beneath acromion w/inferior translation
     - Indicates capsular laxity
     - Tests superior glenohumeral ligament
     - Likelihood ratio of 6:1 for shoulder instability with >2 cm sign
   - **Apprehension Test**
     - Position pt supine w/center of scapula on edge of bed
     - Abduct and externally rotate to 90°
     - Further extend and rotate
     - Positive if pt feels shoulder will dislocate or subluxate
   - **Load and Shift Test**
     - Position pt supine with center of scapula on edge of bed
     - Grasp arm distal to elbow and at humeral head
     - Abduct arm 90° with neutral rotation
     - Attempt to shift humeral head anterior, inferior, and posterior
     - High specificity (98-100%), low sensitivity (41% unidirectional, 26% multidirectional)
   - **Relocation Test**
     - After performing apprehension test, apply posterior force to humeral head attempting to reduce it
     - Positive if symptoms improved by maneuver
   - **Surprise Test**
     - Applied at end of relocation test
     - Arm is maximally externally rotated w/posterior force applied to humeral head then released
     - Sensation of apprehension is a positive test
     - 64% sensitivity; 99% specificity; 98% PPV; 73% NPV
   - **Hyperabduction Test**
     - More than 10° difference in abduction between arms
     - Signifies lesion in inferior glenohumeral ligament
   - **Anterior Drawer Test**
     - Pt in supine position
     - Arm is held in 80° to 120° abduction, 0° to 20° flexion, 0° to 30° external rotation
     - Scapula is stabilized w/one hand while other hand provides an anterior and posterior force on humeral head
   - **Posterior Drawer Test**
     - Pt is positioned supine
     - Arm is held in 80° to 120° abduction, 20° to 30° forward flexion, elbow at 120° flexion
     - Examiner flexes arm 60° to 80° w/slight internal rotation, w/posterior pressure on humeral head

3. Dx tests
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4. Dx imaging (SOR:A)
   - MRI arthrogram, shoulder
     - With contrast if suspect glenoid labrum lesion
   - MRI, routine, shoulder (alternative)
   - CT arthrogram (if MRI contraindicated)

4. Other studies
   - AP and axillary radiographs of shoulder
     - Show Hill-Sachs lesions and r/o glenohumeral arthritis

4. Dx criteria (SOR:A)
   - Reproduction of symptoms of instability w/laxity testing
     - See Laxity Tests

4. Differential Diagnosis
   1. Glenohumeral arthritis
   2. Impingement syndrome
   3. Rotator cuff tear

4. Therapeutics
   1. Acute treatment
      - Reduction Techniques Anterior Dislocation
   2. Further mgmt
      - Immobilization: (SOR:B)
        - Traditional immobilization (internal rotation)
        - Efficacy and length of immobilization inconclusive
      - External rotation
        - Gaining evidence of benefit
        - After 15.9 months, internal rotation recurrence rate 30% vs. 0% for 30° external rotation
   3. Long-term Care
      - Rehabilitation (SOR:A)
        - 27-94% re-dislocation rate
        - Immobilization for 3-4 wks followed by 12-wks of strengthening cannot be recommended over surgery for decr recurrence of instability following primary shoulder dislocation
        - Stabilization exercises alone are not recommended when compared w/surgery for reducing recurrence of instability
        - Strengthening exercises cannot be recommended for reducing instability, returning pts to pre-morbid status, or for decr symptoms
      - Surgery (SOR:A)
        - Reduces incidence of re-dislocation rate to: 4-15.9%
        - Unidirectional (Bankart repair)
        - Detachment and reattachment of humeral insertion of subscapularis tendon and reattachment of glenoid labrum
        - Arthroscopic procedure equal to open w/skilled surgeon
        - Arthroscopic contraindicated w/HAGL, Hill-Sachs, glenoid defects
      - Multidirectional
        - Anterior capsular shift
          - Open procedure imbricating anterior and inferior capsule
        - Capsular shrinkage
• Thermal denaturation of collagen shortening triple helices
• Shrinks capsule by arthroscopically applying heat
• Can result in a transient axillary nerve palsy

Follow-Up
1. Refer to specialist
   ○ Orthopedic surgeon

Prognosis (SOR:A)
1. No therapy:
   ○ Recurrence rate 85-90%
2. Rehabilitation:
   ○ Recurrence rate ranges from 27-94%
3. Open Surgery:
   ○ Recurrence rate ranges from 4-15.9%

Prevention (SOR:A)
1. Avoid trauma to shoulder
2. Rotator cuff strengthening
   ○ Maintain ratio of external rotation to internal rotation strength greater than 65%

Patient Education
1. Handout on shoulder instability can be found at
   ○ http://www.aafp.org/afp/990515ap/990515a.html

References
5. Greene W. Essentials of Musculoskeletal Care. 2nd Ed. P 147-150.
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