Shoulder Instability in Athletes

See also Shoulder (Sports)
See also Rotator Cuff Injuries

Background

1. Definition: Recurrent episodes of subluxation and/or dislocation
    - Dislocation: complete loss of humeral articulation with glenoid fossa
        - Due to acute trauma
    - Subluxation: partial loss of glenohumeral articulation
        - Due to repetitive trauma
    - Laxity: partial loss of glenohumeral articulation
        - Usually asymptomatic
2. Static instability
    - Glenoid rim displaced and fixed superior, anterior, or posterior to humeral head
    - Less common than dynamic
    - Occurs w/rotator cuff tears or glenoid defect
3. Dynamic instability
    - Loss of normal glenohumeral stability due to trauma
    - 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
    - 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
    - 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

- ROM: Incr internal or external rotation
- Strength: Incr supraspinatus, external rotator
- Limitations on Patient-Based Assessment of Function Score
- 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

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

Differential Diagnosis

1. Glenohumeral arthritis
2. Impingement syndrome
3. Rotator cuff tear

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

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