Physical Examination and common pathological conditions of the Shoulder

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Epidemiology
- 2nd only to knee pain for specialist referrals
- Most common causes in adults (peak age 40-60)
  - Subacromial impingement syndrome
  - Rotator cuff related
- 20-40 years
  - Instability
  - Calcific tendonitis

Anatomy
- 3 Bones
  - Humerus
  - Scapula
  - Clavicle
- 3 Joints
  - Glenohumeral
  - Acromioclavicular
  - Sternoclavicular
- 1 “Articulation”
  - Scapulothoracic

Anatomy
- Humerus
  - Head *
  - Greater tubercle*
  - Lesser tubercle*
  - Intertubercular (bicipital) groove
  - Deltoid tuberosity
- Scapula
  - Angles
    - Superior
    - Inferior
    - Lateral (Head)

Biomechanics
- Glenohumeral joint
  - “Ball and socket” vs “Golf ball and tee”
  - Very mobile
  - Price: instability
  - 45% of all dislocations
  - Joint stability depends on multiple factors

Scapula Anatomy

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Anatomy

• Glenohumeral joint
• Passive stability
• Joint conformity (50%)
• Glenoid labrum
• Joint capsule
• Ligaments
• Bony restraints

Anatomy

• Muscles
  - Deltoid
  - Trapezius *
  - Rhomboids *
  - Levator scapulae
  - Rotator cuff
  - Teres major
  - Biceps
  - Pectoralis muscles
  - Serratus anterior
  * Scapular stabilizers

Anatomy

• Rotator Cuff Muscles
  - S – Supraspinatus
  - I – Infraspinatus
  - T – Teres minor
  - S – Supscapularis

Anatomy

• Bursae
  - Subacromial (Subdeltoid)
  - Subscapular

Anatomy

• Neurologic
  - Nerve roots
  - Brachial plexus
  - Peripheral nerves

Anatomy

• Coordinated shoulder motion
  - Glenohumeral motion
  - Acromioclavicular motion
  - Steroclavicular motion
  - Scapulothoracic motion
Differential Diagnosis
- Impingement syndrome
- Subacromial bursitis
- Rotator cuff tendinopathy
- Rotator cuff tear
- Biceps tendinopathy
- Adhesive capsulitis
- SC joint arthritis, sprain
- AC joint arthritis, sprain
- Glenohumeral joint OA
- Instability
  - GH dislocation
  - GH subluxation
  - Labral tear (e.g., Bankart, SLAP, etc.)
- Clavicle fracture
- Proximal humerus fracture
- Scapular fracture
- Other arthritic disease
- Rheumatoid, Gout, SLE
- Septic, Lyme, etc.
- Avascular necrosis
- Neoplastic disease
- Thoracic outlet syndrome
- CRPS
- Myofascial pain
- Referred pain
  - Cervical radiculopathy
  - Cardiac
  - Aortic aneurysm
  - Abdominal / Diaphragm
  - Other GI

Clinical History
- Mechanism of injury (if any)
- Pain
  - Type
  - Location
  - Night pain
  - Acute/chronic
  - Weakness
  - Deformity
  - Instability
  - Locking / Clicking / Clunking
  - Sport / Occupation
  - Alleviating / Exacerbating

Physical Exam
- Observation
  - Undress waist → up
- Palpation
- Active & passive ROM
- Strength testing
- Special tests

Physical Exam – Observation / Inspection
- Front & Back
- Height of shoulder & scapulae
- Asymmetry
- Obvious deformity
- Ecchymosis
- Muscle atrophy
  - Supraspinatus
  - Infraspinatus
  - Deltoid

Palpation
- Surface Anatomy (Anterior)
  - Clavicle
  - SC Joint
  - Acromion process
  - AC Joint
  - Deltoid
  - Coracoid process
  - Pectoralis major
  - Trapezius
  - Biceps (long head)

Palpation
- Surface Anatomy (Posterior)
  - Scapular spine
  - Acromion process
  - Supraspinatus
  - Infraspinatus
  - Deltoid
  - Trapezius
  - Latissimus dorsi
  - Scapula
  - Inferior angle
  - Medial border
Range of Motion

- Forward flexion: 160° – 180°
- Extension: 40° - 60°
- Abduction: 180°
- Adduction: 45°
- Internal rotation: 60° - 90°
- External rotation: 80° - 90°

Apley Scratch Test

Strength Testing

- Test & compare both sides
- Be specific to muscle or muscle group
- Grade strength on 0 → 5 scale
  - 0: no contraction
  - 1: muscle flicker; no movement
  - 2: motion, but not against gravity
  - 3: motion against gravity, but not resistance
  - 4: motion against resistance
  - 5: normal strength

Strength Testing

- External rotation
  - Tests RTC muscles that ER the shoulder
  - Infraspinatus
  - Teres minor
  - Arms at the sides
  - Elbows flexed to 90 degrees
  - Externally rotates arms against resistance

Strength Testing

- Internal rotation
  - Tests RTC muscle that IR the shoulder
  - Subscapularis
  - Subscapularis Lift-Off Test
  - Belly press sign

Strength Testing

- Supraspinatus
  - "Empty can" test
  - Tests Supraspinatus
  - Attempt to isolate from deltoid
  - Positioned sitting
  - Arms straight out
  - Elbows locked straight
  - Thumbs down
  - Arm at 30 degrees (in scapular plane)
  - Attempts to elevate arms against resistance
Provocative Tests – specific to pathology

- Impingement Signs
- Drop-Arm Test
- Speed’s Test
- Yergason Test
- Cross-Arm Adduction
- Sulcus Sign
- Apprehension test
- Relocation test
- O’Brien’s Test
- Crank test

Subacromial Impingement Syndrome

- Impingement of:
  - Subacromial bursa
  - Rotator cuff muscles and tendons
  - Biceps tendon
- Between
  - Acromion
  - Coracoacromial ligament
  - AC joint
  - Coracoid process
  - Humeral head
  - Rotator cuff tendonosis

Impingement Signs

- Neer’s Sign
  - Arm fully pronated and placed in forced flexion
  - Trying to impinge subacromial structures with humeral head
  - Pain is positive test

- Hawkin’s Sign
  - Arm is forward elevated to 90 degrees, then forcibly internally rotated
  - Trying to impinge subacromial structures with humeral head
  - Pain is positive test

Rotator Cuff Tear

- Partial thickness tear
- Full (Complete) thickness tear
- May be due to:
  - Impingement
  - Degeneration
  - Overuse
  - Trauma
- Partial tears
- Conservative
- Complete tears
- Surgery

Rotator Cuff Tear: Drop-Arm Test

- Abducted arm slowly lowered
  - May be able to lower arm slowly to 90° (deltoid function)
  - Arm will then drop to side if rotator cuff tear
- Positive test
  - Patient unable to lower arm further with control
  - If able to hold at 90°, pressure on wrist will cause arm to fall
Biceps Tendonosis

- Injury to long head of biceps tendon
- Typically an overuse injury
  - Repetitive (overhead) lifting
  - Impingement

Biceps Tendonosis: Speed's Test

- Forward flex shoulder to about 90°
- Abduct shoulder to about 10°
- Arm in full supination
- Apply downward force to distal arm
- Pain is positive test

Biceps Tendonosis: Yergason’s Test

- Elbow flexed to 90°
- Start in pronated position
- Active supination & flexion against resistance
- Palpate biceps tendon
- Pain or painful pop is positive test
  - Tendonosis
  - Subluxation

AC Separation

- AC Sprain / Separation
  - Typically due to fall onto tip of shoulder (acromion)
  - Arm tucked into side
  - Treatment depends on type

Treatment Options

Conservative
Various means of fixation
- Plate
- Ligament reconstruction
- Allografts

AC Arthritis / DJD
AC Joint: Scarf test/ Cross-Arm Adduction Test
- Arm flexed to 90°
- Arm adducted to > 45°
- Hyperadduct shoulder (down on elbow)
- Positive test is pain in AC joint
- Watch out for false-positives
  - Where is the pain?

Shoulder Instability
- Failure to keep humeral head centered in glenoid
- Dislocation
  - Complete disruption of joint congruity or alignment
- Subluxation
  - Partial or incomplete dislocation
- Laxity
  - Slackness or looseness in joint
  - May be normal or abnormal

Instability: Sulcus Sign
- Inferior instability
- Arm relaxed in neutral position
- Arm pulled downward at wrist
- Positive test is a visible sulcus at infra-acromial area
- Compare to contralateral side

Instability: Apprehension Test
- Anterior instability
- Shoulder abducted to 90°
- Slight stress to humeral head directed in anterior direction
- While externally rotating shoulder
- Positive test is apprehension due to feeling of instability or impending dislocation
  - Beware if false positives

Instability: Jobe’s Relocation Test
- Anterior instability
- After a positive apprehension
- Apply posteriorly directed force over externally rotated humeral head
- Positive test is relief of apprehension

Glenoid Labral Tear (Bankart)
- Tear in glenoid labrum may result in instability
- Bankart Lesion
- Anteroinferior capsulolabral complex detached from the glenoid
• SLAP tear
• Superior labrum detachment from insertion
• SLAP Tear (Superior Labrum Anterior to Posterior)
  • Superior labral tear
  • Fall on outstretched hand or shoulder
  • Rotator cuff tendinosis or tears

Laterjet Procedure
• Bone block transfer
• Usually salvage procedure for failed arthroscopic stabilisation
• Treatment of choice if more than 25% glenoid defect (“inverted pear glenoid”) high performance athletes

O’Brien’s Active Compression Test
• Labral, AC, or biceps pathology
• Arm flexed to 90°
• Arm cross-arm adducted 10-15°
• Elbow extended
• Max pronation
• Resist downward force
• Positive test if painful
• Beware location of pain
  • AC
  • Biceps
  • Internal +/- click

O’Brien’s Active Compression Test
• For labral pathology
• Repeat testing with
• Max supination
• Should be pain free

Labral Tear: Crank Test
• Abduct arm to 90-120°
• Stabilize shoulder
• Elbow secured with one hand
• Axially load with ER / IR at shoulder
• Positive test: audible or painful click / catch / grind

Posterior apprehension test
• Patient supine
• Arm FF 90 degrees and IR
• Apply posterior pressure
• posterior pain or apprehension indicated positive test
Shoulder OA

- Degenerative joint disease
- Systemic arthritis.
- Prerequisite – cuff should be intact else high risk of early loosening

Cuff tear Arthropathy

- Elderly patients 70 or over
- Irreparable cuff tear
- Muscle atrophy
- ‘Anterosuperior escape’
- Progress to arthritis

TREATMENT

- Reverse polarity shoulder replacement
- Re-recruit Deltoid to compensate.