Common Shoulder Problems

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Shoulder Terminology

- Complex structural unit
- 4 articulations
  - Sternoclavicular
  - Acromioclavicular
  - Glenohumeral
  - Scapulothoracic
- 3 bones
  - Clavicle
  - Humerus
  - Scapula

Sternoclavicular Joint

- Only true synovial joint connecting UE-axial skeleton
- Anterior SC ligament most significant structure
- Medial clavicle physis to close (fuses 23 yrs)
- Allows 35 degrees elevation, 50 degrees rotation
- Key role in shoulder motion

Acromioclavicular Joint

- Shoulder Separation joint
- Acromioclavicular ligaments
- Coracoclavicular ligaments
  - Prevent inferior displacement of acromion and coracoid from clavicle
- Commonly injured from falls directly on the shoulder
**Glenohumeral Joint**
- Minimally constrained ball-and-socket joint
- Mobility ↔ Stability
- **Static Stabilizers**
  - Joint surfaces
  - Capsulolabral complex
- **Dynamic Stabilizers**
  - Rotator cuff
  - Scapular rotators

**Humeral Head** (static stabilizer)
- Round surface
  - One-third of a sphere
- Insertions of the rotator cuff tendons

**Glenoid Fossa** (static stabilizer)
- Small, pear-shaped, bony depression
- Surface area on third of humeral head
- Overall, bony contact minimal

**Glenoid Labrum** (static stabilizer)
- “Bumper” of the shoulder
- Triangular in cross-section
- Increases humeral contact area
  - 75% in vertical direction
  - 56% in transverse direction
- Increases glenoid depth 50%
- Anchors the capsule
- Added stability without compromising motion
- Biceps origin
Glenohumeral Ligaments

- Supraspinatus
- Infraspinatus
- Teres Minor
- Subscapularis

Motion and stability
- Originate scapula and terminate as short, flat tendons fusing with capsule
- Balance deltoid pull
- Active and passive restraint

Dynamic Stabilizers

Rotator Cuff (dynamic stabilizers)

- Supraspinatus
- Infraspinatus
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Scapula

- Spans 2nd through 7th ribs
- 17 muscle insertions
- Angled 30 degrees anterior
- 3 processes
  - Coracoid: conjoined tendon, CAL
  - Spine: deltoid, trapezius
  - Acromion
**Scapula**

- **Acromion Types**
  - I – Flat
  - II – Curved
  - III – Hooked
    - Biceps and Morrison
- Acromion type related to rotator cuff tears
- “Bone spurs”

**Scapulothoracic Articulation**

- Not a true “joint”
- Bone-muscle-bone articulation
- Articulates at AC joint
- Shoulder “hanging by the clavicle”

**Scapular Rotators**

- Scapular Stabilizers
  - Upper, middle, lower trapezius
  - L
  - S
  - R
- Serratus Anterior
  - Holds scapula to chest wall
  - Prevents winging

**Common Shoulder Injuries**

- Lots of them!!!
Shoulder Physical Exam

- Inspection
  - Swelling
  - Muscle atrophy
  - Shoulder position
  - Color change
  - Scapular winging
  - Scapulothoracic dyskinesis
  - Surgical scars

Palpation

- Greater tuberosity
- Anterior acromion
- Bicipital groove
- AC joint
- Posterior Joint line
- Trigger points?
- Compare both sides

Range of Motion

- Forward Flexion
- Abduction
- External Rotation
- Internal Rotation
- Check for both passive and active motion!

Shoulder Physical Exam

Motion - Test Active AND Passive
- Forward flexion
- Abduction
- External rotation (0 and 90)
- Internal rotation (0 and 90)

Check them supine to eliminate gravity and reduce guarding due to pain if you’re not sure…
**Range of motion**

- If there’s loss of motion:
  - Active = passive
    - Joint contracture
    - Physical/structural block
    - Guarding
  - Passive > active
    - Pain
    - Weakness
  - Check them supine to eliminate gravity and reduce guarding due to pain if you’re not sure...

**Strength**

- Abduction
  - Supraspinatus
- External rotators
  - Teres minor
  - Infraspinatus
- Internal rotators
  - Subscapularis

**Supraspinatus**

- Forward flexion 20-30 deg
- Abduction 90 deg
- Thumbs up
- Isolate supraspinatus muscle activity
- Resisted abduction

**Supraspinatus Tests**

- “Full Can” > “Empty Can”
**External rotators**

- Arms at the side
- Elbows flexed
- Resisted external rotation
- Infraspinatus
- Teres minor

**Subscapularis Tests- Internal Rotation**

**Gerber's “Lift-Off” Test**

**Belly Press**

**Acromioclavicular joint**

- Fall on the shoulder
- Separated shoulder
- Prominence
- Tenderness

**Acromioclavicular Joint**

- Shoulder Separation joint
- Acromioclavicular ligaments
- Coracoclavicular ligaments
  - Prevent inferior displacement of acromion and coracoid from clavicle
- Commonly injured from falls directly on lateral aspect of the shoulder

**Subscapularis Tests- Internal Rotation**

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**Acromioclavicular Joint**

- Shoulder Separation joint
- Acromioclavicular ligaments
- Coracoclavicular ligaments
  - Prevent inferior displacement of acromion and coracoid from clavicle
- Commonly injured from falls directly on lateral aspect of the shoulder
A 52 year old woman presents for evaluation of her shoulder after painting her bathroom wall all weekend. She complains of pain when raising her arm actively above shoulder height. On examination, she has some limitation of active range of motion and passive range of motion, due to guarding. Her strength test is normal but painful. The most likely diagnosis is:

- a  Impingement
- b  Massive rotator cuff tear
- c  Frozen shoulder (adhesive capsulitis)
- d  Anterior Shoulder Dislocation

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**Impingement syndrome**

- “Bursitis”
- Majority of shoulder pain
- Pain with overhead motion
- Pain reaching towards the back
- Related to
  - Weak or torn rotator cuff
  - Acromial spur

**Impingement Signs**

- **Neer’s test**
- **Hawkin’s test**
**Impingement Syndrome**

- Strengthening of rotator cuff muscles
- Scapula stabilization—poor posture often a component
- Control inflammation
  - Anti-inflammatories
  - Ice
- ? Steroid injection
- Arthroscopic subacromial decompression

**POP QUIZ**

A 60 year old woman presents for evaluation of her shoulder after a fall at home. She complains of an inability to raise her arm actively above shoulder height. On examination, she has limited active range of motion, but almost full passive range of motion, with minimal pain when passively moved. The most likely diagnosis is:

- a  Shoulder dislocation
- b  Massive rotator cuff tear
- c  Frozen shoulder (adhesive capsulitis)
- d  Glenohumeral arthritis

**Rotator Cuff Tears**

- Trauma
  - Acute loss of function
- Atraumatic
  - Gradual loss of function
- Weakness in arm
  - Especially with overhead motion
- Night pain
**Rotator Cuff Tears**

- Physical Therapy
  - Strengthening
  - Scapula stabilization exercises
  - Force coupling (Subscapularis and infraspinatus)
- ? Injection
- Surgery
  - Arthroscopic rotator cuff repair
  - Open rotator cuff repair

**Partial Rotator Cuff Tears**

- Partial tears
  - some attachment of tendon to bone
  - Bursal sided
    - More symptoms
    - More healing potential
  - Articular sided
    - Less likely to heal – synovial fluid, poor vascularity

**Partial Thickness and Small Tears**

- PASTA lesion>50% thickness
- Small Full thickness tear
  - 1 cm retraction from insertion

**Rotator Cuff Tear Views - small**

- Articular side
- Bursal side
Subscapularis Tears - easy to miss

- Weakness in internal rotation (liftoff, belly press)
- Occasionally caused by fall with arm in forced external rotation
- Biceps/ anterior shoulder pain
- Check the xray!

Bear Hug Test

Subscapularis Tears - easy to miss

Biceps subluxation

Bony avulsion?
**Subscapularis Tears - easy to miss**

- 50 yo man with remote injury
- Subscap weakness
- Bony avulsion

**Glenohumeral Dislocation**

- 90% of the dislocation is out the front (anterior)
- Rarely dislocation out the back (posterior)

**POP QUIZ**

- An 25 year old rugby player is attempting to make a tackle when his arm is forced into an abducted and externally rotated position. He falls to the ground in pain and is unable to continue. Examination on the sideline reveals significant shoulder pain and an inability to actively or passively internally rotate the arm. The most likely diagnosis is:
  - a Anterior shoulder dislocation
  - b Rotator cuff tear
  - c Impingement
  - d A “stinger” or “burner”
**Rarely Posterior!**
*(but easy to miss on xray and PE)*

Seizures, Linemen, posterior axial load...

**Glenoid Fossa** *(static stabilizer)*
- Small, pear-shaped, bony depression
- Surface area on third of humeral head
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- Anchors the capsule
- Added stability without compromising motion
- Biceps origin
Most dislocations can be managed without an operation.

- Watch for Cuff tears with dislocations in older patients.
- Short period of immobilization.
- Methods of immobilization.

Exceptions:
- Recurrent dislocation
- Bone loss
- Cuff tear

Glenohumeral Ligaments

Dislocation/Instability

Dislocation: Bone loss

Hill Sachs Lesion
Dislocation/Instability

- Recurrence related to age
  - Age     Recurrence
  - 12-22 y.o.  70%
  - 23-29 y.o.  59%
  - 29-40 y.o.  23%
- Active cadets (West Point study)
  - Recurrence rate 80% instability with no surgical treatment

Young patients usually require surgical repair

Operative repair

- Indications based on
  - Frequency of dislocations
  - Age of patient
  - Bone loss
  - NOT MDI or VOLUNTARY DISLOCATORS!!
- < 25 years
  - Bankart lesion
    - MRI
    - Arthroscopy
  - Operative repair
- > 45 years
  - Rotator cuff tear
    - MRI
    - Highly likely
  - Repair cuff

Bankart Repair

Pop Quiz

- A 60 year old diabetic male presents complaining of pain and stiffness in his non-dominant shoulder. The problem started about 4 months ago after “overdoing it” raking leaves in the yard. He has noted progressive loss of motion since then. Examination reveals limited active and passive range of motion, with a solid endpoint at the end-range of each range of motion test. The most likely diagnosis is:
  - a Rotator cuff tear
  - b Shoulder dislocation
  - c Frozen shoulder (Adhesive capsulitis)
  - d Glenohumeral arthritis
12/3/2011

**Adhesive Capsulitis**
- Frozen Shoulder
- 40-60 y.o.
- Female predominance
- Endocrine problems
  - Diabetes
  - Thyroid problems ↑↓
- Unknown etiology

**Clinical Presentation**

**Adhesive Capsulitis**
- Self-limiting but *debilitating* condition
- 2 years duration if no intervention
- Therapy, therapy, therapy
- Corticosteroid injection; NSAIDS
- Decrease inflammation
- Refractory shoulders
  - Arthroscopic lysis of adhesions, Manipulation under anesthesia

**SLAP Lesions**
- Superior Labrum
- Superior Labral Anterior Posterior
- Overhead athletes
**SLAP Lesions**
- Repetitive overhead stress
- Traction injury
- Fall on outstretched hand
- Positive O’Brien’s Test

**Pop Quiz**

A 75 year old man presents for evaluation of his shoulder. He has noted a gradual increase in pain in the shoulder over the past 3 years. He denies any fall or trauma. The pain is so bad now that he has trouble sleeping. Anti-inflammatories help relieve some of the pain. He does not think his arm has lost much strength, but he does note some loss of motion, and grinding when he externally rotates his arm. On exam, he has some loss of motion actively and passively, especially external rotation. His strength is symmetric. He has notable crepitus when the arm is externally rotated passively. The most likely diagnosis is:

- a Impingement
- b Glenohumeral Arthritis
- c Frozen shoulder (adhesive capsulitis)
- d Rotator Cuff Tear
**History**

- Pain with activity
- Night pain
- Decreased ROM
  - Active
  - Passive

**Osteoarthritis**

**Imaging**

- Radiographs: holding a 1-2 pound weight in abduction
- MRI: evaluate rotator cuff integrity (not to confirm the OA)

**Arthritis**

- **Treatment**
  - NSAID’s
  - Steroid injection
  - Shoulder strengthening
  
  - If no better in 3 to 6 months
    - Consider shoulder replacement surgery (arthroplasty)
Shoulder Arthroplasty

Thank You

Internal Impingement

- Disease of the overhead throwing athlete
- Pain at the posterior aspect of the shoulder at the cocking/early acceleration phase of throwing

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**Internal Impingement**
- Posterior capsule stretching-Int. Rotation (GIRD)
- Strengthening of rotator cuff tendons
- Correct throwing mechanics
- Surgery

**Internal Impingement**
- Posterior Superior labral tear
- Partial Cuff tear (PASTA)

**Rehabilitation**

**Athletes & Overhead Activities**
Need Stability & strength through full ROM
**Shoulder Maintenance & Injury Prevention**

- **Posture**
  - Forward shoulder posture
    - Computer use, poor posture
    - Strength imbalances: chest vs. mid-back
    - Results in neck, shoulder and scapular pain

- **Exercises**
  - Shoulder blade squeezes/shoulder rolls
  - Mid-back strength training
  - Stretching anterior pectoralis muscle

**Shoulder Flexibility**

- **Shoulder elevation**
  - Shoulder flexion – wall stretch
  - Shoulder abduction – wall stretch

- **Shoulder rotation**
  - Out to side – door frame
  - Hand behind back – towel stretch, doorknob

**Rotator cuff strengthening**

- **First stabilize shoulder blade**
- Rotation away from body
- Rotation towards body

**Rotator cuff strengthening**

- **Supraspinatus Lift**
  - Start at 45°45°
  - Progress to overhead
  - Keep thumbs up
**Overhead athletes**

- Increase resistance
- Train entire ROM
  - Scapular stabilizers
  - Rotator cuff
- Speed
- Eccentric and concentric

**Surgical Rehabilitation**

- Shoulder immobilization
  - Maintain flexibility & strength
    - Neck
    - Shoulder blade
    - Elbow
    - Wrist
    - Hand

**Overhead athletes**

- Train endurance
- Strengthening at the end of workouts

**Surgical Rehabilitation**

- Passive Range of Motion (PROM) Exercises
  - Maintain soft tissue and joint flexibility
  - Avoid active muscle contraction
    - Use other arm or equipment to move shoulder
  - Protect surgical repair
    - Allow time for healing

- Passive Range of Motion (PROM) Exercises
  - Maintain soft tissue and joint flexibility
  - Avoid active muscle contraction
    - Use other arm or equipment to move shoulder
  - Protect surgical repair
    - Allow time for healing
Pendulum
- Allow arm to swing

Rehabilitation

Isometric
- Active contraction without movement

Concentric
- Shortening contraction

Eccentric
- Lengthening contraction needed for control & coordination

Strengthening Progression

Rotator Cuff Tears

- Not every tear requires an operation
- Most people have rotator cuff tears that are asymptomatic

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<thead>
<tr>
<th>Age</th>
<th>Full thickness</th>
<th>Partial thickness</th>
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<tbody>
<tr>
<td>&gt; 60 y.o.</td>
<td>28%</td>
<td>26%</td>
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<tr>
<td>40-60 y.o.</td>
<td>4%</td>
<td>24%</td>
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<tr>
<td>&lt; 39 y.o.</td>
<td>0%</td>
<td>4%</td>
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