Shoulder Exam Break-out with Case Highlights.

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Faculty Disclosure Information

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• I do not intend to discuss an unapproved/investigative use of a commercial product/device in our presentation.
Anatomy: Joint

Articulations
- Scapulothoracic

Joints:
- Glenohumeral
- Sternoclavicular
- Acromioclavicular
Shoulder Anatomy:
Bony Anatomy

Humerus
Scapula
  Glenoid
  Acromion
  Coracoid
  Scapular body
Clavicle
Sternum
Anatomy: Glenohumeral Joint

- Most commonly dislocated
- Lacks Bone Stability
- Comprised of:
  - Fibrous capsule
  - Ligaments
  - Muscle groups
  - Labrum
  - Articular Cartilage
Anatomy: Important Muscle Groups

Scapulothoracic
Chest/Back
Biceps tendon
Rotator Cuff
  Supraspinatus
  Infraspinatus
  Subscapularis
  Teres Minor
Focused History Questions

**Mechanism of Injury**

Helps predict injured structure

- **Fall directly onto anterior/superior shoulder** → AC joint injury (shoulder separation)
- **Hit over anterior chest or fall onto lateral shoulder** → Clavicle Fracture
- **Arm forcefully abducted and externally rotated** → subluxation or anterior dislocation
- **Fall onto the posterior shoulder** → Scapula Fracture
- **If chronic pain, note activity that triggers pain, such as the cocking phase of throwing or the pull-through phase of swimming**
## History Questions Continued

<table>
<thead>
<tr>
<th>Rule out Referred pain</th>
<th>Associated Symptoms</th>
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<tbody>
<tr>
<td>Pain with Cervical Motion?</td>
<td>Weakness</td>
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<tr>
<td>Chronic cough or dyspnea?</td>
<td>Popping</td>
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<tr>
<td>Cardiac History?</td>
<td>Numbness/tingling</td>
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<td>Abdominal Pain or vomiting?</td>
<td>Crepitus</td>
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<td><strong>Aggravating Factors</strong></td>
<td>Instability</td>
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<td>Sleep?</td>
<td>Loss of ROM</td>
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<tr>
<td>Overhead?</td>
<td>Miscellaneous</td>
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</table>

- Hand dominance
- Prior injury
Differential: Non-skeletal

Cardiac
Pneumonia
Pleural effusion
Cervical radiculopathy
Thoracic outlet
Splenic laceration
Pericarditis

Gout
Rheumatoid Arthritis
Cholecystitis
Tumor
Infection
Physical Exam - General

Develop a standard routine
Alleviate the patient's fears
Adequate exposure - bilateral
   Males – shirtless
   Females – tank top or sports bra
Always compare shoulders
Inspection

Swelling, asymmetry, muscle atrophy, scars, ecchymosis
Note posture/positioning
Deformities
  - Squaring of shoulder - anterior dislocation
  - Scapular "winging" - shoulder instability and serratus anterior or trapezius dysfunction
  - Atrophy - supraspinatus or infraspinatus - suprascapular nerve entrapment or neuropathy
PE: Inspection

Scapulothoracic motion
Dyskinesia or winging

FIGURE 3. In medial scapular winging (A), the medial scapular border displaces from the thoracic cage most prominently when the patient engages in humeral flexion (arrow). In lateral scapular winging (B), the lateral border of the scapula (arrow) is prominent during humeral abduction, and the superior trapezius is flattened (arrowhead).
Palpation

- Sternoclavicular joint
- Clavicle
- Acromioclavicular joint
- Acrominum
- Coracoid process
- Bicipital groove
- Proximal Humerus
- Scapula
- Cervical Spine
- Include soft tissue

**TIP:** Start medially at the SC joint, proceed laterally, end posteriorly.
Quick Range of Motion (ROM) Assessment

- Evaluate active ROM
  - If movement limited by pain, weakness, or tightness, assist passively
- Evaluate bilaterally
- Don’t forget to check neck ROM
Landmarks for Internal Rotation
Forward Flexion and Extension
(Normal 180 and 40-60 degrees)
Abduction
(normal 180 degrees)

Arm straight
Hand – palm up (arm supinated)
ROM measured in degrees as for forward flexion
External and Internal Rotation
(90 degrees and 70-90 degrees)

Arm at side, elbow flexed to 90 and held at waist
Examiner externally or internally rotates arm
Strength Tests

External rotation
  Infraspinatus
  Teres minor

Internal rotation
  Subscapularis
Strength tests

Empty can test
  Supraspinatus

Lift off test (belly press is alternative)
  Subscapularis
Sensory Exam

Axillary
Musculocutaneous
Radial
Median
Ulnar
Sensory Exam

Dermatomal distribution
**Special Tests**

**Impingement tests**
- Neer’s sign
- Hawkin’s test

**Biceps tendon**
- Speed
- Yergason’s

**Cross over Test**
- AC Joint

**Labral tear**
- O’Brien’s test
- Crank test

**Instability tests**
- Apprehension
- Relocation test
- Posterior instability
- Sulcus test
Impingement - Neer Test

- Stabilize the Scapula
- Examiner brings the patient into maximal elevation (flexion)
- Positive test if pain is reproduced
Impingement-Kennedy-Hawkins Sign

- Patient is standing
- Elevate arm to 90. Flex Elbow to 90 degrees. Internally rotate the arm
- If pain is reproduced in the subacromial space it is a positive test
Speed’s Test - Biceps tendon

Forward flex shoulder against resistance while maintaining elbow in extension and forearm in supination

Positive test = tender in bicipital groove (bicipital tendinitis)
Yergason’s Test

Arm at side, elbow flexed at 90° degrees and forearm pronated

The patients attempts to supinate the arm, while the examiner applies a resistive pronation force
AC joint: Crossover Test

Patient raises affected arm to 90°
Actively adducts arm across body
Forces acromion into distal end of clavicle
Isolates AC joint & painful if positive
**Labral Tear (SLAP) - O'Brien's Active Compression Test**

Patient standing

Arm forward flexed 90°, adducted 15° to 20° with elbow straight

Full internal rotation so thumb pointing down

Examiner applies downward force on arm - patient resists

Patient externally rotates arm so thumb pointing up

Examiner applies downward force on arm - patient resists

Positive test = **Pain** or **painful clicking** elicited with thumb down and decreased or eliminated with thumb up
Glenohumeral Instability: Apprehension Test

Patient in supine position with affected shoulder at edge of table, arm abducted 90°

Examiner externally rotates by pushing forearm posteriorly.

Positive test = patient expresses apprehension
Relocation Test

Performed after positive result on anterior apprehension test
Patient supine
Examiner applies posterior force on proximal humerus while externally rotating patient’s arm
Positive test = patient expresses relief
Posterior Instability Testing

Posterior Apprehension

Arm abducted 90°, elbow flexed 90°

Examiner applies a posteriorly directed force on the humeral head
Inferior Instability Testing:  
**Sulcus Sign**

- Arm in neutral position
- Pull downward on elbow or wrist
- Observe for depression lateral or inferior to acromion
- Positive if > 1 cm
- Indicates inferior instability
- Compare to other side
Shoulder Injury

16 year old male football player
Abducts and ER his arm to stop a run
He feels a pop
Unable to elevate or rotate his arm
He presents to the office in extreme discomfort
Shoulder injury
Shoulder Dislocations

Directions
- Anterior
- Posterior
- Inferior
- MDI

Shoulder stabilizers
- Negative pressure
- Static stabilizers
- Dynamic Stabilizers
Differential Diagnosis

- Anterior shoulder dislocation
- Posterior shoulder dislocation
- AC Sprain
- Proximal Humeral Fracture
- Brachial Plexus neuropathy
Neurological examination
Documentation *Prior* to Reduction

Axillary

Suprascapular

Musculocutaneous

Others?
Radiographs to Obtain (Before and After the reduction)

Anterior-Posterior

Scapular Y (Lateral)

Axillary
What are important radiographic findings?

Dislocation

After Reduction

Bony Bankart

Hill Sachs Lesion

Reverse Hill Sachs

Greater Tuberosity fracture
Anterior Dislocation: Methods of Reduction

Milch

Traction-Countertraction

Stimson

Kocher
What to do if they walk in to your office or you are at the game?

- Assess Neurovascular status
- Attempt reduction if you are comfortable
- If uncomfortable reducing
  - Apply a sling
  - Ice
  - Don’t have them eat or drink
- Refer to the emergency department
- Assess for hypermobility at next Well child check
Screening for Hypermobility: Beighton Criteria

Beighton Scale - Assessing Joint Hypermobility

FOR EACH POSITIVE FINDING:
• Score one (1) point if unilateral and two (2) points if bilateral.
• Trunk flexion receives one (1) point.
• Maximum Score: Nine (9) Points

A score of five (5) or more suggests widespread joint hypermobility and warrants further screening to assess the likelihood of a connective tissue disorder. Utilize the Brighton Criteria to more thoroughly assess a patient for Ehlers-Danlos Syndrome, Hypermobility Type.

Poor Surgical Candidates for Shoulder Instability
Case

- 15 year old male football player falls on R shoulder
- He is unable to lift his right arm
- He has swelling and point tenderness over the right clavicle
Clavicle Fractures:

2.6-5% of all fractures
88% occur <10 yoa

Mechanism
Fracture position

Middle third 82%
Lateral 15%
Medial Rare
How to approach in the office?

- Physical exam
- Obtain radiographs
  - AP
  - Zanca view (15 degree cephalic tilt)
- Comfort measures
  - Sling or Figure 8 (toddler)
  - Ice
  - Elevate head of bed
  - Teach how to dress
  - Tylenol
  - When to refer
Clavicle Fractures: When is surgery indicated?

Absolute:
- Open fracture
- Skin compromise or neurovascular injury

Relative:
- Greater than 15-20 mm shortening
- High risk of non-union
- Comminution
- Distal clavicle fx

How about Early Return to Play?
Clavicle Fractures: What not to miss?

Medial Clavicle fracture
SC dislocation
Pneumothorax
Associated fractures
  First rib fracture
  Scapular fracture
Clavicle Fractures
Return to Play

Sport dependent
Full rom and strength
Radiographic healing
Case

• 14 y.o. right hand dominant male baseball pitcher
• Shoulder pain for 3 months and difficulty lifting
• No prior history
• Exam notable for limited flexion and abduction
• Pain and weakness with resisted ER
• Tenderness posterior humerus
• No Neck pain, swelling, deformity, or instability
Differential

- Shoulder Impingement
- Rotator Cuff Tendonitis or Tear
- Biceps Tendonitis
- Multi-Directional Instability
- Tumor or Infection
- Little League Shoulder

Are you going to obtain an X-ray?
Radiographic findings

Little League Shoulder
Features of Little League Shoulder

• Dominant arm in baseball pitcher
• Commonly seen in boys between 12 to 16 years of age
• Pain localized to proximal humerus when throwing hard
• Pain reproduced with palpation of the lateral humerus or resisting external rotation.
• Weakness with resisted external rotation
• X-ray notable for widening, calcification, or fragmentation of the proximal humeral physis on AP internal and external rotation.
• Comparison view can be helpful.

Current Treatment Recommendations

- Complete cessation from throwing 6 weeks to 3 months (depending on pain resolution) or until physis has completely fused.
  - Return Minimum 6 weeks rest (3 months from pitching)
  - No Pain, Full ROM and strength
  - Normalization of radiographs
- Prescribe a strengthening program for the rotator cuff, scapular stabilizers, and core musculature.
- Radiographs in 2 month intervals until the physis returns to normal radiographic appearance.


Sports where Little League Shoulder should be considered

- Tennis
- Volleyball
- Swimming
- Racquet Sports
- Gymnastics
- Baseball

Little League Shoulder’s Prevention

Avoid Breaking pitches until skeletal maturity
Avoid year-round baseball
Minimum of 2-3 months rest from throwing per year
Limit pitch counts and mandate minimum periods for rest

Screening in your office in your overhead athletes

Loss of IR

Scapular alignment
CASE

14 year old male

Checked with a lacrosse stick to the posterior shoulder

No contact was made with the ground.

Complains of pain and weakness in posterior left shoulder
What is unusual about the complaint?

**Posterior** Shoulder pain

Differential of posterior shoulder pain
- Scapular Fracture
- Rib Fracture
- Posterior instability
- Cervical Radiculopathy
- Para-labral cyst/Suprascapular nerve entrapment
- Scapular bursitis
- Parsonage-Turner
<table>
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<th>Physical Examination (Initial)</th>
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<tbody>
<tr>
<td>No swelling, ecchymosis, or muscular atrophy</td>
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<tr>
<td>No palpable tenderness</td>
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<tr>
<td>Full pain free, cervical spine range of motion</td>
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<tr>
<td>Negative Spurling maneuver</td>
</tr>
<tr>
<td>Adson’s compression test</td>
</tr>
<tr>
<td>No sensory deficits were identified</td>
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<tr>
<td>No instability was noted</td>
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Weakness (4/5) with external rotation, initiating abduction, and supraspinatus testing.
Restriction from contact activities until full strength and pain free range of motion

Referral to ATC at school for rehabilitation program
Re-Evaluation
(one month later)

History
Complains of persistent weakness in right shoulder specifically (dips and pull-ups)

Physical Exam
Atrophy infraspinatous fossa
Weakness on external rotation and initiation of abduction
Further Work Up (MRI)

Showed atrophy of the supraspinatus muscle

Showed high signal intensity on T2 weighted images in the supraspinatus/infraspinatus muscle (denervation)
EMG and nerve conduction studies confirmed a severe partial injury of the left suprascapular nerve with evidence of denervation of both the supraspinatus and infraspinatus muscles.
Suprascapular Nerve Palsy

mechanism: direct trauma from a lacrosse stick
Anatomy

- Suprascapular nerve is a motor nerve
- Arises from C5/C6 nerve roots of upper trunk
- Passes through the suprascapular notch
- Innervates the Supraspinatus and Infraspinatus muscles
Mechanisms of Injury (Literature Review)

**Traction** – from repetitive microtrauma

Overhead activities such as tennis, volleyball, and weightlifting

**Direct Trauma** = scarring, tethering, or neuroma formation

**Extrinsic compression**

At suprascapular notch or spinoglenoid notch

Generally secondary to a ganglion cyst or less commonly lipoma

**Brachial plexus disorder**

Most common mechanisms via scapular fractures or entrapment at the suprascapular notch
Suprascapular Nerve Palsy Presents As:

Non-specific posterior shoulder pain or poorly localized shoulder pain.

Infraspinatus and Supraspinatus atrophy

Weakness of external rotation and initiation of abduction
Thank you

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