

Pennsylvania Academy of Family Physicians Foundation

Pittsburgh CME Conference

November 7 - 9, 2014

The Acutely Injured Shoulder: A Case Based Approach

Matthew Silvis, MD

Penn State Milton S. Hershey Medical Center, Hershey, PA

Gene Hong, MD

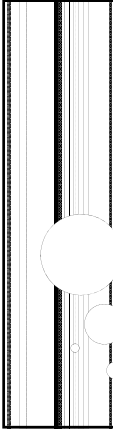
Drexel University School of Medicine, Philadelphia, PA

Disclosures:

Speakers have no disclosures and there are no conflicts of interest.

The speakers have attested that their presentation will be free of all commercial bias toward a specific company and its products.

The speakers indicated that the content of their presentation will not include discussion of unapproved or investigational uses of products or devices.




THE SHOULDER: A CASE BASED APPROACH
Eugene Hong MD & Matthew Silvis MD
PAFP Conference, Pittsburgh, PA
November 8th, 2014

DISCLOSURES: NONE


- o Eugene Hong, MD
 - Has no conflict of interest, financial agreement, or working affiliation with any group or organization.

- o Matthew Silvis, MD
 - Has no conflict of interest, financial agreement, or working affiliation with any group or organization.

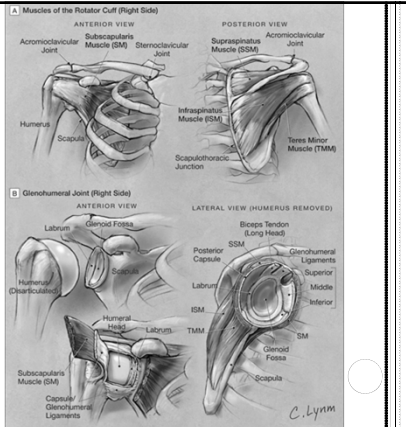


LEARNING OBJECTIVES

- o Describe the pertinent underlying anatomy of a common shoulder conditions seen in family medicine and the relation of the underlying anatomy to findings on physical examination.
- o After reviewing cases, explain your approach to the evaluation and management of: rotator cuff tendinopathy, acromioclavicular joint separations, shoulder instability, biceps tendon rupture/tendinosis, adhesive capsulitis, and referred pain.

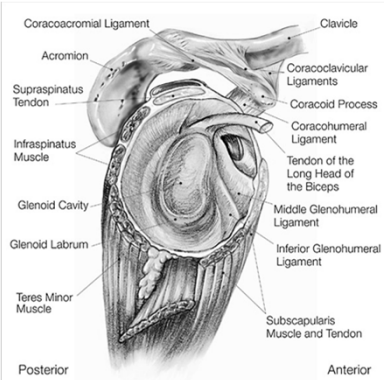


Shoulder anatomy



JAMA 2004; 292 (16): 1989-1999.

NORMAL ANATOMY OF THE SHOULDER, LATERAL VIEW



JAMA 2000; 284 (12): 1559-1567.

CASE #1

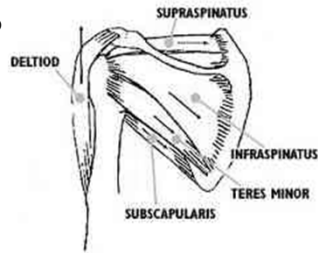
- o 64 year old retired female lawyer, RHD, complaining of right shoulder pain for 4 months
- o No trauma or acute onset; aggravated by getting dressed, "lifting things", driving; now having trouble sleeping
- o No radiation or distal weakness or paresthesia
- o **What is the most likely diagnosis?**

CASE #1 CHOICES

1. Adhesive capsulitis
2. Proximal humerus fracture
3. Rotator cuff tendinopathy/ bursitis
4. Degenerative joint disease

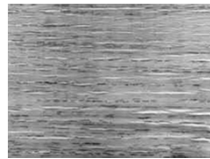
CLINICAL CASES: ROTATOR CUFF TENDINOPATHY/ BURSITIS

- o Tendinitis vs. Tendinosis
- o Impingement Syndrome
- o Neer's classification
 - I (edema and hemorrhage)
 - II (scarring and fibrosis)
 - III (tearing, osteophytes)
- o History
 - Age
 - Traumatic or atraumatic
 - Acute, recurrent, chronic
- o Evaluation
 - Range of motion
 - Rotator cuff strength testing
 - Hawkin's and Neer's



CLINICAL CASES: ROTATOR CUFF TENDINOPATHY/ BURSITIS

- o Management
 - Physical therapy (including scapular stabilization) (SORT B)
 - NSAIDs (SORT B then C)
 - Injection (subacromial) (SORT A then B)
 - Surgery
 - *There is evidence to support non-operative treatment of full thickness rotator cuff tears (SORT B)*
- o Associated conditions
 - Calcific tendinopathy
 - Labral injury
 - Instability
 - Degenerative joint disease
 - Adhesive capsulitis



**CLINICAL CASES: ROTATOR CUFF
TENDINOPATHY/ BURSITIS**

- Studies
 - Full thickness
 - Partial thickness
 - Operative
 - Non-operative
 - Associated conditions:
labral, DJD,
instability, biceps
tendon
- Optimal approach to
partial thickness tears
still to be determined

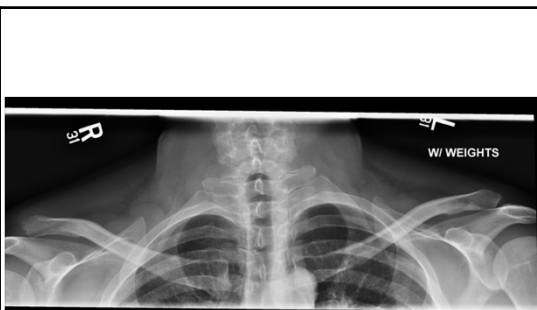


CASE #2

- 42 y/o RHD painter travels to Ocean City, New Jersey
- Struck by a wave and knocked into the hard sand
shoulder first...
- Pain over right superior shoulder with slight swelling
noted
- No skin tenting
- Range of motion full but hesitant due to pain
- Worst with adduction
- Neurovascular exam intact

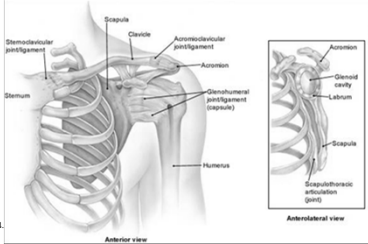
- *What is the diagnosis and how are these injuries
graded?*





ACROMIOCLAVICULAR SEPARATION

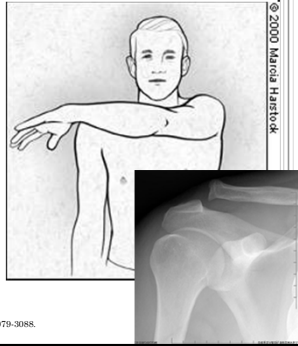
- o Damage to AC ligaments
- o Pain and/or deformity over AC joint
- o Graded I-VI



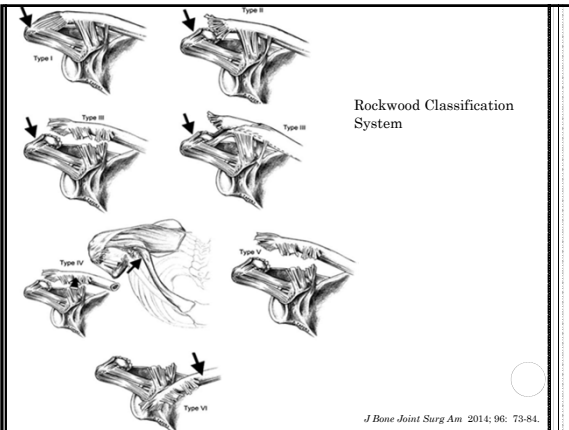
Am Fam Phys 2004; 70 (10): 1947-1954.

SPECIFIC TESTING – AC JOINT

- o Cross-Arm Test
 - Elevate shoulder to 90° and then adduct the arm across the body in a horizontal plane
 - o + if pain over AC joint



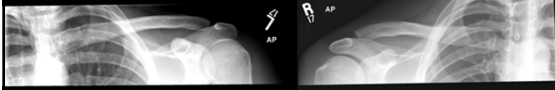
Am Fam Phys 2000; 61 (10): 3079-3088.



Rockwood Classification System

J Bone Joint Surg Am 2014; 96: 73-84.

GRADE 1 & 2 AC SPRAINS



Grade 1 AC Sprain

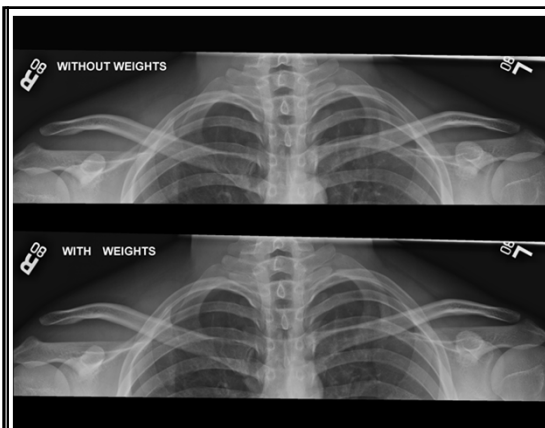
Grade 2 AC Sprain



TREATMENT: GRADE 1 & 2 AC SPRAINS

- Shoulder sling for pain reduction/comfort for 3-7 days max
- Early ROM – the sooner, the better
- PT for rotator cuff, scapular stabilizers and trunk strengthening as pain resolves
- RTP when normal shoulder ROM and strength and shoulder asymptomatic





GRADE 3 AC SPRAIN AND MORE

- Typically conservative management
- Zanca views, weighted may be helpful
- Consider referral on a case by case basis for surgery
 - Hand dominance
 - Occupation
 - Heavy labor/sport requirements
 - Scapulothoracic dysfunction
 - Risk of reinjury
- Fracture injuries in 5% of patients with type III-V
- Intra-articular injuries in 18% of type III-V (SLAP in 5-14% and RC tears in 4%)
- Type IV-VI managed surgically
 - Surgical reduction and coracoclavicular ligament reconstruction
 - Significant morbidity associated with persistently dislocated joints and severe soft tissue disruption



CASE #3

- 19 year old male baseball player fell on his outstretched left arm while diving for a catch last week
- Immediately felt left shoulder pain and “like it was out of place”; spontaneously reduced a few minutes later as he was being evaluated by the athletic trainer
- History of prior documented glenohumeral dislocation
- ***What is the likelihood that he will experience another glenohumeral dislocation in his lifetime?***

CASE #3 CHOICES

1. 66%
2. 90%
3. 33%
4. 10%

CLINICAL CASES: INSTABILITY, DISLOCATION, SUBLUXATION

- Anterior GH dislocation
 - Most common
 - Risk of recurrence corresponds with age
 - Associated injuries
 - Neurovascular
 - Fracture
 - Soft tissue
- History
 - Traumatic fall on outstretched arm
 - Unable to move arm
 - History of prior episodes
- Evaluation
 - Slightly abducted, slightly externally rotated
 - Deformity, prominence
 - *Assess neurovascular status!*

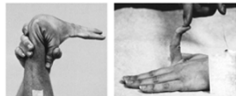
CLINICAL CASES: INSTABILITY, DISLOCATION, SUBLUXATION

- Management
 - Imaging: X-ray AP with IR and ER, scapular (Y), axillary
 - Reduction: closed if possible and acceptable
 - Immobilization
 - Consider advanced imaging MR/CT
 - Rehabilitation
- Surgical referral
 - If closed reduction unsuccessful
 - Significant fracture
 - Neurovascular compromise
 - To reduce risk of recurrence (younger age at higher risk; bony Bankart lesion at higher risk)



CLINICAL CASES: INSTABILITY, DISLOCATION, SUBLUXATION

- Posterior GH dislocation
 - Reduction
 - Rehabilitation
 - Treatment largely non-operative
- Multi-directional instability
 - Collagen vascular condition, e.g. Ehlers Danlos
 - Treatment usually non-operative



CLINICAL CASES: INSTABILITY,
DISLOCATION, SUBLUXATION

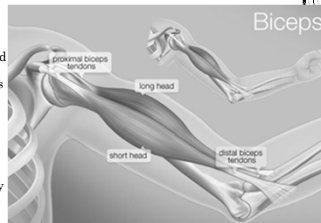


CASE #4

- 40 y/o RHD male was carrying a heavy piano when his partner dropped the other side...
- Immediate anterior shoulder and arm pain
- Felt a “pop” and had significant bruising
- Also surprised to see that one arm appeared stronger than the other
- ***What is the difference between the pathology seen with the long head of the biceps (LHB) versus the short head of the biceps (SHB)?***

BICEPS TENDON

- SHB
 - Distal biceps rupture has a low annual incidence, 1.2/100,000
 - Result of overwhelming eccentric load applied to flexed elbow
 - Acute avulsion of distal biceps from bicipital tuberosity
 - Dominant arm (86%), male, tobacco use
- LHB
 - Proximal biceps
 - Tendinopathy over anterior aspect of shoulder, specifically bicipital groove
 - Overuse injury associated with RC pathology, SLAP lesions, biceps tendon subluxation or rupture



Wehmd.com

SPECIFIC TESTING - BICEPS

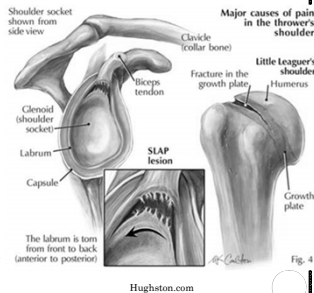
- Yergason Test
 - Evaluates biceps tendon
 - Elbow flexed to 90° and forearm pronated; active supination against resistance
 - + if pain in biceps region
- Speed Test
 - Evaluates long head of biceps
 - Arm positioned in 90° forward elevation with elbow extended and forearm supinated; resist downward pressure
 - + if pain in biceps region
- Hook test



Am Fam Phys 2000; 61 (10): 3079-3088

BICEPS TENDON RUPTURE COMMONLY ASSOCIATED CONDITIONS

- RC impingement
 - Can lead to biceps tendon degeneration
- SLAP lesion
 - Can disrupt biceps anchor
- Subscapularis rupture/partial rupture
 - Subluxation of biceps tendon out of bicipital groove



Hughston.com

BICEPS TENDON RUPTURE TREATMENT

- Acute
 - < 4 weeks; antecubital pain, loss of function, weakness
- Chronic
 - > 4 weeks; lack pain/swelling
- For comfort, posterior elbow splint at 90° and sling
- Early shoulder and elbow passive ROM exercises
- Traditionally, managed non-operatively
 - Morbidity from extensive dissection
 - 30%/40% decreased flexion/supination strength
- Currently, more managed operatively
 - Exceptions: low demand, sedentary, medical complications

J Bone Joint Surg Am 2014; 96 (e176): 1-11

BICEPS TENDINITIS

- o Rest, NSAIDs, PT
- o Steroid injection
- o U/S – avoid intratendinous injection and potential iatrogenic tendon rupture
- o Biceps tenotomy
 - Cutting LHB at superior labrum
 - Potential decreased strength and pain with repetitive activity
- o Biceps tenodesis
 - Reattach LHB to either soft tissue or proximal aspect of humerus
 - Greater surgical morbidity



CASE #5

- o Same patient in clinical case 1, who improved with appropriate management, returns to the office a year later again complaining of right shoulder pain that recurred about 4 months ago
- o No trauma or acute onset; feels similar but this time any shoulder activity or movement is painful.
- o She has developed mild DM type 2 which is well controlled; no other new medical history
- o *What is the most likely diagnosis now?*



CASES #5 CHOICES

1. Adhesive capsulitis
2. Proximal humerus fracture
3. Rotator cuff tendinopathy/ bursitis
4. Degenerative joint disease



CLINICAL CASES: ADHESIVE CAPSULITIS

- “Frozen shoulder”
 - Inflammation, thickening and contracture of shoulder capsule
- Prevalence: 2-3% general population; 11% in patients with diabetes
- 15% will have condition bilaterally
- Higher risk:
 - Female (1.4:1)
 - Age 40-60s
 - Prolonged immobilization or disuse (e.g. after humeral fracture)
 - Associated conditions diabetes, thyroid or autoimmune disorder, inflammatory arthritis
- Can be “primary” (idiopathic) or “secondary” (e.g. due to trauma and immobilization)

CLINICAL CASES: ADHESIVE CAPSULITIS

- History
 - Insidious onset
 - May or may not have precipitating event
 - Pain worse with any shoulder movement
- Exam
 - Pain and limited active and passive ROM
 - External rotation and then abduction more sensitive
- Stage 1: 1-3 months, up to 9 months
- Stage 2: 2-9 months, or longer
- Stage 3: 12-24 months or longer
- Most will improve, though may take 18-30 months

CLINICAL CASES: ADHESIVE CAPSULITIS

- X-rays usually normal
- Arthrogram not necessary to show capsule volume loss
- Imaging indicated to evaluate for other possible contributing factors
- NSAIDs
- Physical therapy – for this condition should be painful for patient and emphasize ROM
- Injections glenohumeral can be helpful
- Surgical intervention for prolonged (>6 months) or worsening course should be decided on a case by case basis – e.g., manipulation under anesthesia or capsular release

CASE #6

- 30 y/o LHD white female with left lateral shoulder pain and weakness after painting her ceiling
- Weakness with abduction
- You suspect RTC syndrome
- However, you complete a thorough exam of her left upper extremity using the right side for comparison
- She also has a decreased biceps reflex and decreased sensation of her lateral upper arm
- *What cervical nerve root is involved?*

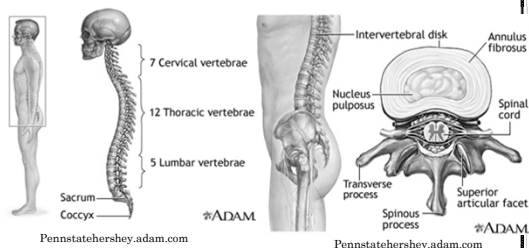


CERVICAL RADICULOPATHY

- **Referred neurogenic pain in distribution of cervical nerve root (s) with or without associated numbness, weakness, or loss of reflexes**
 - Young (disk)
 - Old (foraminal narrowing)
- Symptoms
 - Neck/radicular pain with numbness/paresthesias
 - Muscle spasms
 - Weakness, lack of coordination, changes in handwriting, diminished grip strength, dropping objects, etc.
 - *Relieve pain with hands above head*



THE SPINE: RELEVANT ANATOMY



Nerve roots from the cervical spine are named for the vertebra below them as they pass through the intervertebral foramen. However, 7 cervical vertebra and 8 cervical nerve roots. All nerve roots caudal to C8 are named for the vertebra above them as they pass through the foramen.

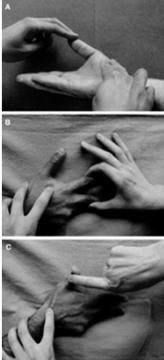
| Nerve Root | STRENGTH | SENSATION | REFLEXES |
|------------|--|--|-----------------|
| C5 | Deltoid (shoulder abduction), biceps (elbow flexion) | Lateral arm | Biceps |
| C6 | Wrist extensors | Lateral arm; thumb, index, and half of middle finger | Brachioradialis |
| C7 | Triceps, wrist flexors, finger extensors | Middle finger | Triceps |
| C8 | Finger flexors | Ring and little fingers, medial forearm | |
| T1 | Interossei muscles (finger abduction) | Medial side upper half of forearm and arm | |

TESTING OF MAJOR PERIPHERAL NERVES (UPPER EXTREMITY)

| NERVE | MOTOR TEST | SENSATION TEST |
|------------------------|--|---|
| Radial nerve | Wrist extension, thumb extension | Dorsal web space between thumb and index finger |
| Ulnar nerve | Abduction of little finger | Distal ulnar aspect of little finger |
| Median nerve | Thumb pinch, opposition of thumb, abduction of thumb | Distal radial aspect of index finger |
| Axillary nerve | Deltoid | Lateral arm (deltoid patch on upper arm) |
| Musculocutaneous nerve | Biceps | Lateral forearm |

MOTOR EXAM

- o Median nerve
 - Resisted thumb abduction (palmar)
 - Muscle belly palpated
- o Ulnar nerve
 - Index finger abducted against resistance
 - 1st dorsal interosseous muscle belly palpated
- o Radial nerve
 - Thumb retroflexed dorsally against resistance
 - EPL palpated



Sports Health 2009; 1 (6): 469-477.

CERVICAL RADICULOPATHY

- Treatment
 - Spontaneous resolution 2-8 weeks in most
 - NSAID's, traction, PT
- Referral
 - Non-surgical approach fails
 - Atrophy, weakness, myelopathy (trunk/leg dysfunction, gait disturbance, bowel/bladder changes), signs of demyelinating lesion
 - Intolerable pain

Spurling Sign



Am Fam Phys 2010; 81 (1): 33-40.

SHOULDER CONSULTATION



- Uncertain diagnosis
- Worsening clinical course despite appropriate treatment
- Unclear course of optimal management
- Clinician discomfort

TAKE HOME POINTS

- Shoulder complaints are very common in primary care
- The history of the patient presenting with shoulder pain is key to determining the diagnosis
- A thorough, efficient physical exam will support the suspected diagnosis and help rule out other etiologies
- Practice, practice, practice
- Accurate diagnosis is critical to determining the optimal management
- Management goals should include: restoring function, maximizing function, and preserving function
- Need more evidence based outcome studies – currently more anecdotal, expert opinion, or case series based – for optimal management of shoulder conditions

THANK YOU! ANY QUESTIONS?



PENNSYLVANIA STATE UNIVERSITY
PENNSTATE HERSCHEY
Bone and Joint Institute



BONUS CASE (TIME PERMITTING)

- 13 year old male baseball player with right shoulder pain for 4 months
- Saw a physician 3 months ago, diagnosed with GIRD and treated with physical therapy for 1 month.
- Improved and returned to pitching, but symptoms recurred.
- History of Osgood-Schlatter and medial elbow apophysitis



BONUS CASE

1. Rotator cuff tendinopathy
2. Glenohumeral internal rotation deficit
3. Proximal humerus Salter Harris 1 fracture
4. Proximal humeral epiphysiolysis



BONUS CASE

- History
 - Atraumatic onset
 - Overuse history with overhead throwing activity
 - Skeletally immature
- Exam
 - Neurovascularly intact
 - Full range of motion
 - No impingement signs
 - May be difficult to localize pain
- Management
 - Xrays – consider ordering bilateral for comparison
 - Activity modification
 - Must rest from inciting/ aggravating activity, eg overhead throwing
 - Consider 3 months of no throwing
 - Gradual return to play
 - Consider physical therapy to strengthen and facilitate RTP

BONUS CASE



- Widening of growth plate
- Compare to unaffected shoulder
- Follow up xrays not always needed
- Other advanced imaging not typically needed for diagnosis
