

Notes for Shoulder, elbow, hand problems

Shoulder anatomy

- 3 Bones
 - Humerus
 - Scapula
 - Clavicle
- 3 Joints
 - Glenohumeral
 - Acromioclavicular
 - Sternoclavicular
- 1 “Articulation”
 - Scapulothoracic
- 4 Rotator cuff Muscles
- Biceps Tendon
- **Ligaments = Capsular thickenings**
- Glenohumeral joint
 - “Ball and socket” vs “Golf ball and tee”
 - Very mobile
 - Price: instability
 - 45% of all dislocations
 - Joint stability depends on multiple factors

History

- How often does it hurt
- Intensity
- Where is the pain
- Do you feel popping or clunking?
- Does the shoulder dislocate
- Does the shoulder sublux (ask if it feels like there is clunking/popping)
- If a pitcher.... How many pitches do you throw?

Imaging

- Shoulder x-rays not very helpful except for...
 - Clavicle fractures (or other suspected fractures)
 - Shoulder separations
 - Throwers with open growth plates with pain
- MRI's for acute traumatic injuries
 - Persistent pain
 - Are MRI arthrograms necessary now that we have 3Tesla machines?
 - Arthrograms (gadolinium injected into joint) increase sensitivity for labral tears
 - I never order in the knee, but do in shoulder in suspected labral tears

Scapula

- To stabilize and create stable platform for shoulder
- 1/3 of “shoulder motion”
 - Sternoclavicular joint 25 degrees
 - Scapulothoracic 35 degrees
- verses 2/3 at glenohumeral joint

Scapula dyskinesia

- Unhealthy movement of the scapula with resultant periscapular pain
- Dropped shoulder appearance
- Periscapular pain and tenderness
- Snapping or popping with scapular motion
- Loss of strength with shoulder and arm use.
- Winging of the scapula

- You can have symptoms with very few obvious signs of winging
- Most common sign is periscapular pain
- Treatment
 - Physical Therapy
 - Usually resolves within 2 months

Rotator Cuff Tears - **Rare in children**

Sternoclavicular Dislocations

- Anterior dislocation
 - Most common type
 - More common in loose jointed individuals
 - Treatment
 - Reassurance
 - PT as needed
 - Non-operative
- Posterior dislocation
 - Diagnose with CT
 - Surgery

Acromioclavicular Dislocation

- Mechanism
 - Fall or blow to shoulder with arm at side (adducted)
 - Always ask mechanism
 - Not just “fall” or “hit”
- Diagnosis
 - X-ray
 - Always get bilateral if there is question
 - Often overcalls on radiology reports

- MRI not needed
- Diagnosis
 - X-ray
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 - MRI not needed
 - Exam
 - Cross arm adduction test
 - AC Sheer Test
 - For Grade 1 & 2 lesions
 - Grade 3-6 obvious
- Treatment
 - Grade I-III nonoperative
 - Grade IV-VI operative

Shoulder Instability = looseness + pain

- Multidirectional Instability
 - A – Atraumatic
 - M – Multidirectional
 - B – Bilateral
 - R – Rehab
 - I – Imbrication
- Unidirectional Instability
 - T – Traumatic
 - U – Unidirectional
 - B – Bankart Lesion
 - S – Surgery
- **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**

Multi-directional Instability

- Generalized joint laxity
- Female (more common)
- “Feels like it slides around”
- Loose in multiple directions

- Test- sulcus sign
- Bilateral (often)
- Under-diagnosed

- Causes
 - Generalized capsular and ligament laxity
 - Insufficiency of the static ligament constraints of the glenohumeral joint
- Diagnosis
 - Females with atraumatic shoulder pain beware
 - “My shoulder pops out”
 - Do general exam to test for ligament laxity- any patient w/ shoulder pain without trauma be suspicious for multidirectional instability

Beighton Hypermobility Score

The Beighton score is a simple system to quantify joint laxity and hypermobility.

It uses a simple 9 point system, where the higher the score the higher the laxity.

The threshold for joint laxity in a young adult is ranges from 4-6. Thus a score above 6 indicates hypermobility, but not necessarily true BHJS (see below)

Joint	Finding	Points
left little (fifth) finger	passive dorsiflexion beyond 90°	1
	passive dorsiflexion <= 90°	0
right little (fifth) finger	passive dorsiflexion beyond 90°	1
	passive dorsiflexion <= 90°	0
left thumb	passive dorsiflexion to the flexor aspect of the forearm	1
	cannot passively dorsiflex thumb to flexor aspect of the forearm	0
right thumb	passive dorsiflexion to the flexor aspect of the forearm	1
	cannot passively dorsiflex thumb to flexor aspect of the forearm	0
left elbow	hyperextends beyonds 10°	1
	extends <= 10	0
right elbow	hyperextends beyonds 10°	1
	extends <= 10	0
left knee	hyperextends beyonds 10°	1
	extends <= 10	0
right knee	hyperextends beyonds 10°	1
	extends <= 10	0
forward flexion of trunk with knees full extended	palms and hands can rest flat on the floor	1
	palms and hands cannot rest flat on the floor	0

- Score of 4-6 is threshold for laxity
- Greater than 6 = hypermobility
- Even if score normal, still possible to have loose shoulders
 - Xray and MRI findings?
 - Often normal
 - MRI- Often joint loose enough to where any subluxation/dislocation doesn't cause trauma to labrum

Testing

- Sulcus sign

- Arm relaxed in neutral position
- Arm pulled downward at wrist
- Positive test is a visible sulcus at infra-acromial area
- Compare to contralateral side
- Load and shift test

Will patients with MDI ever get better?

- Symptoms may improve
- Will always be lax
- Nonsurgical treatment in a mean follow-up of 8 years showed one in three of the patients had required surgical treatment, one in three had persistent instability or pain and only half rated their shoulder function as better or much better after conservative treatment.

Treatment

Therapy for at least 3 months

Surgery – only if persistent failure (with caution and education)

Traumatic Instability

- TUBS
- Traumatic
- Unidirectional – 95% anterior
- Bankart Lesion
- Surgery

- Traumatic 90% Anterior
- Position of dislocation = Abduction + External position
- Humeral head dislocates anterior- inferior
- Dislocation = Pops out and stays out until maneuver to relocate
- Subluxation = Pops out and goes back in quickly

- Posterior Dislocations rare
 - Seizure
 - Electrocutation

Posterior subluxation

- Weight lifters
- Football lineman

Testing for anterior instability

- Apprehension test
 - Shoulder abducted to 90° with external rotation
 - Positive test is apprehension due to feeling of instability or impending dislocation

Relocation test for anterior instability

- After a positive apprehension apply posteriorly directed force over externally rotated humeral head
- Positive test is relief of apprehension

Recurrence rate of traumatic dislocations in youth

- Up to 60-90%

- Long term???
- 25 year post dislocation X-Rays
 - Shoulders were normal in 44%
 - Arthropathy was mild in 29%
 - Moderate in 9%
 - Severe in 17%.

Treatment

- First time dislocation - +/- surgery
- Two dislocations
 - Surgery – Bankart repair and capsulorrhaphy
 - The nip and tuck of the shoulder
 - Repairs torn labrum
 - Tightens Capsule
 - Success rate 85%

Posterior Instability

- **The culprits**
 - **The Big lineman injury**
 - **Weight Lifters – bench press**
 - **Gymnasts**
 - **Swimmers**

Testing

- Jerk Test
 - Arm abducted to 90 deg
 - Internally rotated
 - Axially directed pressure as the arm is adducted in horizontal plane

Treatment

- PT
- Surgery for failed rehab
 - Labral repair and capsular tightening

SLAP TEARS (Superior Labrum Anterior Posterior)

- Tear of the biceps anchor at attachment site on glenoid
- Diagnosis
 - Exam – Notoriously poor sensitivity and specificity
 - O’Brien’s Compression Test
 - Arms forward flexed to 90 degrees with 10 degrees of adduction. Examiner pushes down, and patient pushes up
 - First -thumbs down
 - Second - palms up
 - Treatment – nonop preferable. Surgery only if prolonged failure

Little League Shoulder

- overuse injury caused by stress to proximal humerus
- Widening of the growth plate, resulting in swelling and pain
- Usually between ages 10 and 14

Pitch count is key

AGE	DAILY MAX (PITCHES)	REQUIRED REST (PITCHES)				
		0 Days	1 Days	2 Days	3 Days	4 Days
7-8	50	1-20	21-35	36-50	N/A	N/A
9-10	75	1-20	21-35	36-50	51-65	66+
11-12	85	1-20	21-35	36-50	51-65	66+
13-14	95	1-20	21-35	36-50	51-65	66+
15-16	95	1-30	31-45	46-60	61-75	76+
17-18	105	1-30	31-45	46-60	61-75	76+

Treatment

REST, STRETCHING, MECHANICS, EDUCATION

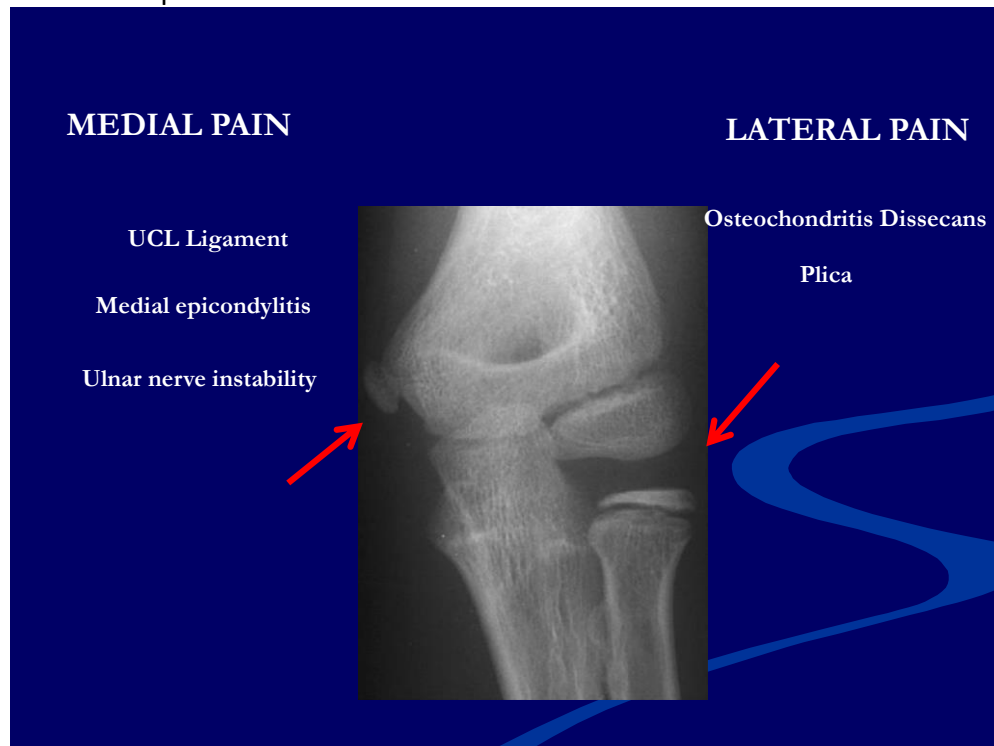
Clavicle Fractures

- General rule of thumb
 - If the ends of fracture aren’t touching each other, send to ortho
 - If there is contact and not angled, OK to treat in your office
 - Midshafts are OK to treat, proximal and distal, send out
 - Pediatricians can always treat babies in office (they all heal without problems)

When to operate

- 2cm of shortening
- Comminution
- Major displacement

Elbow Injuries/Pain
Location important



Medial epicondylitis

- Pediatric version of golfer elbow
- Common in gymnasts and baseball players
- Pain at epicondyle
- Rest, rest, rest

Osteochondritis Dissecans

- Area of poor blood
- Leads to unhealthy bone at capitellum
- Lateral sided pain
- Etiology? Microtrauma in setting of tenuous blood supply
- OVERUSE INJURY
- Weakening of vulnerable subchondral bone with repetitive loads
- Gymnasts and Baseball players predominantly
- Vague pain and decreased range of motion, locking
- Knee and Elbow most commonly affected

Diagnosis

Imaging

- X-Ray show most lesions
- MRI to categorize stability

- Treatment of Osteochondritis Dissecans
 - Observation and rest
 - Surgery often necessary

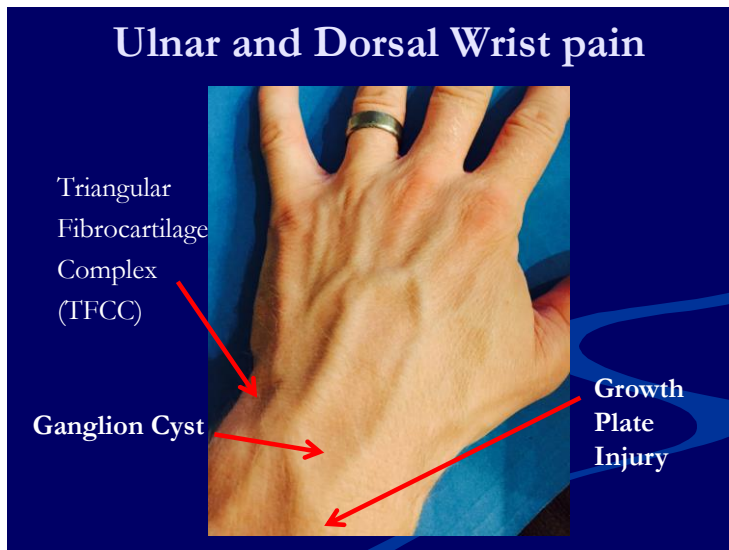
Ulnar Collateral Ligament Injury

- Injury to the medial ligament of the elbow in throwers
- Treatment
 - Non-operative with PT
 - Especially in the recreational athlete
 - Surgical intervention (Tommy John Surgery)
 - Only in competitive athlete with failed PT
 - Long recovery (one year)
 - Over 50% of Tommy John Surgery is now performed in children

Plica

- Lateral band of tissue causing vague lateral sided pain
- MRI to diagnose (often missed by radiologist)
- Surgery effective at treating

Wrist Pain



Triangular fibrocartilage complex

- Role
 - load transmission
 - Stabilizes distal RU joint
- History – ulnar wrist pain
- Testing
 - Rotation against stress

- Getting out of seated position with legs off ground
- Ulnar sided pain just distal to ulna
- Injury usually from fall
- Pain with twisting motion
- Diagnosis- MRI
- Healing a Long process
- Tx: Casting, splinting, injections, occasionally surgery

Dorsal Ganglion Cyst

- Over 50% of cysts resolve spontaneously
- 20% recurrence rate with surgery
- 50% recurrence rate with needle aspiration

Scaphoid Fractures

- Don't miss
- always check for snuffbox pain
- Treatment- Cast for nondisplaced fractures, surgery for displaced fractures

DeQuervans

- Irritation of the radial sided extensor compartment
- Treatment
 - Immobilization
 - PT
 - Injection
 - Occasionally surgery

Mallet Finger – The bent finger (at distal interphalangeal joint)

- Extensor digitorum longus tear
- Don't ignore
- Very easy to treat
- Test active extension
- Treat with stack splint

12 weeks

Thumb Ulnar Collateral Ligament Injury

- “Gamekeeper Thumb” “Skier Thumb”
- Abduction load to thumb
- Cast
- Occasional surgery
- Recovery prolonged

Carpal Tunnel – Rare in children

