Orthopaedic Injuries Above the Waist: They Aren't All HUMERUS!

Travis Randolph, PA-C
Clinical Director of Sports Medicine
WVU Department of Orthopaedics

Disclosures

- No Financial Disclosures

History: Subjective Complaints

- Age/ Occupation/ Hand Dominance/ Sports
- Mechanism of Injury (MOI)
- Previous injury or surgery on affected body part
- Provocative or Alleviating movements
- Location, rating (0-10), quality of pain
- Night pain (common complaint with RTC tears)
- Paresthesia

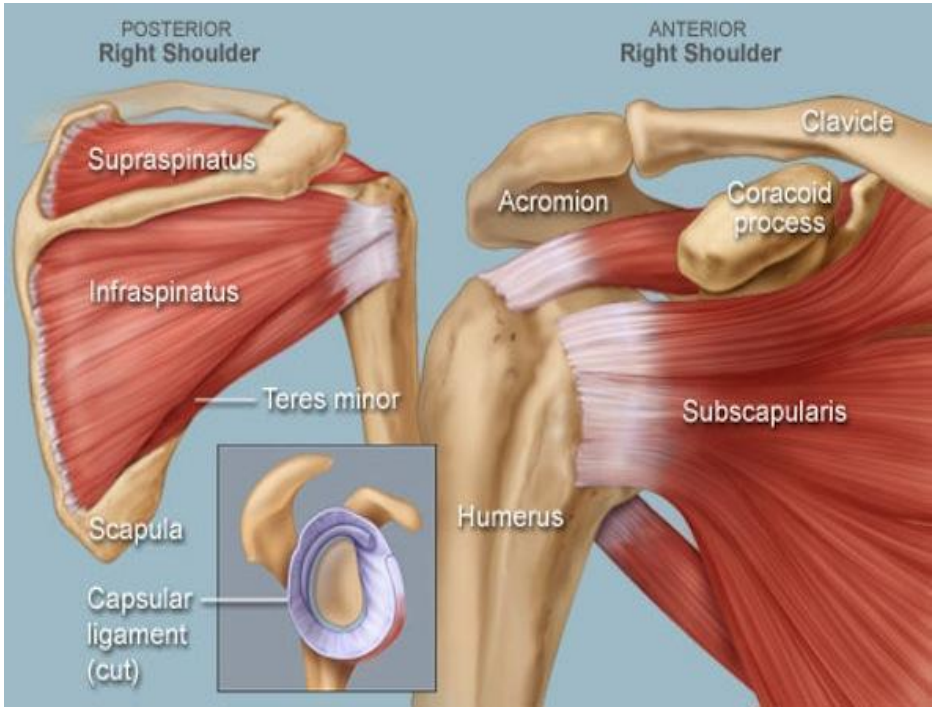
Shoulder Evaluation

- Evaluate shoulder movements when patient moves during exam, shakes hand, removes shirt
- Assess for deformities or malalignment (biceps rupture, AC separation, pec rupture, scapula winging, rounded shoulder posture, sulcus, scoliosis, kyphosis)
- Look for any scars, abrasions, ecchymosis, swelling, muscle atrophy (Deltoid- Axillary N.)
- Be sure to compare to contralateral shoulder!

Rotator Cuff

- Supraspinatus
  - Most commonly injured
- Infraspinatus
- Teres Minor
- Subscapularis
  - Only one to assist with internal rotation

Primary function is to center the humeral head in the glenoid fossa



Rotator Cuff Injuries

Rotator Cuff Muscles (SITS): function to stabilize the glenohumeral joint and keep the humeral head centered on the glenoid during shoulder movement

- **S**upraspinatus: Abducts (primary) and externally rotates/ dynamic stabilizer
  - Innervated by Suprascapular nerve
- **I**nfraspinatus: External rotator/ dynamic stabilizer
  - Innervated by Suprascapular nerve
- **T**eres Minor: External rotator/ dynamic stabilizer
  - Innervated by Axillary nerve
- **S**ubscapularis: Internal rotator/ anterior stability
  - Innervated by Subscapular nerve

RTC Blood Supply: Suprascapular (Thyrocervical) and Subscapular (Axillary) arteries

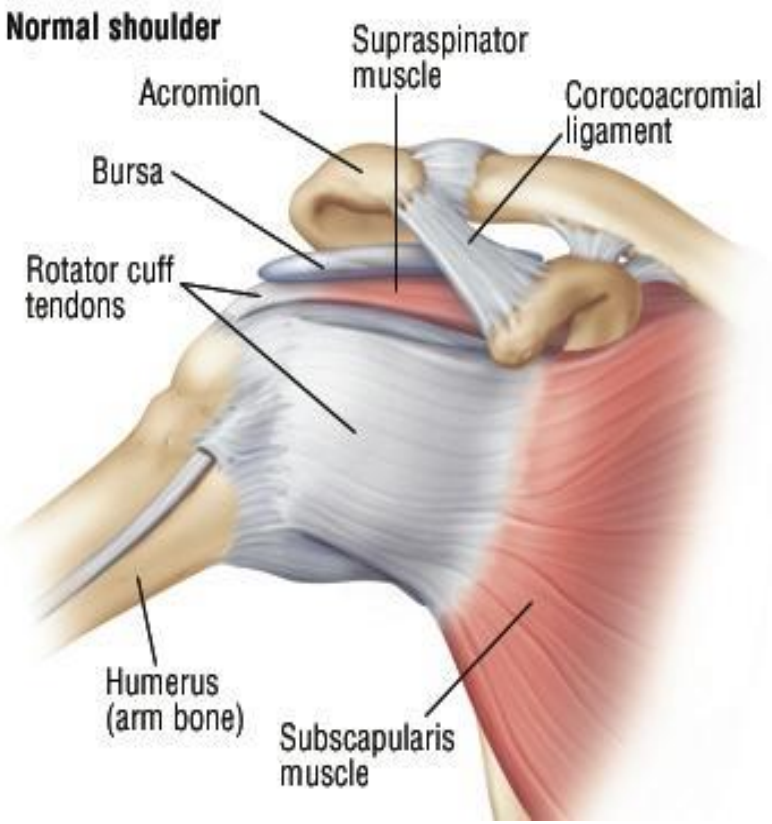
Rotator Cuff Injuries

Signs and Symptoms of Rotator Cuff Tears

- Dull achy pain vs. sharp pain
- Gradual onset vs. sudden onset
- “Painful arc” 60-120 degrees ROM
- Night / sleep pain
- Overhead pain & weakness
- Deltoid pain
- Numbness small fingers affected side
- Weakness with daily activity or specific tasks
- Atrophy Shoulder Girdle (Supraspinatus & Infraspinatus)
- Activity level: variable

Rotator Cuff Injuries

- Impingement Syndrome
  - RTC tendon and subacromial bursae compressed against acromion
  - Acromial spur decreased space
  - Repetitive stress on shoulder joint
  - RTC/shoulder girdle weakness



Rotator Cuff Injuries

- Definition of Rotator Cuff Tear:
  - Disruption of the RTC tendon either by acute trauma or attritional tears
- Supraspinatus tendon injured most commonly
- Contributory factors
  - Age (Typically over the age of 40)
  - Circulatory impairment
  - Previous injury
  - Chronic impingement syndrome
  - Chronic shoulder girdle weakness
  - Diabetes
  - Smoking

Rotator Cuff Tear

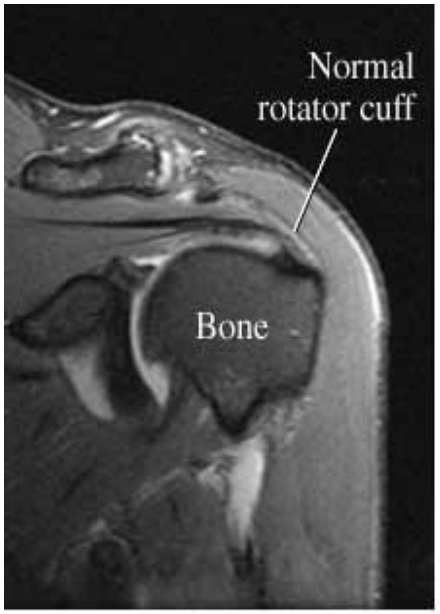


Figure 1

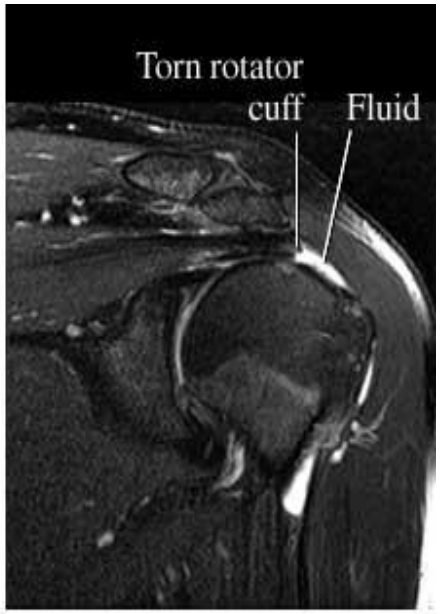


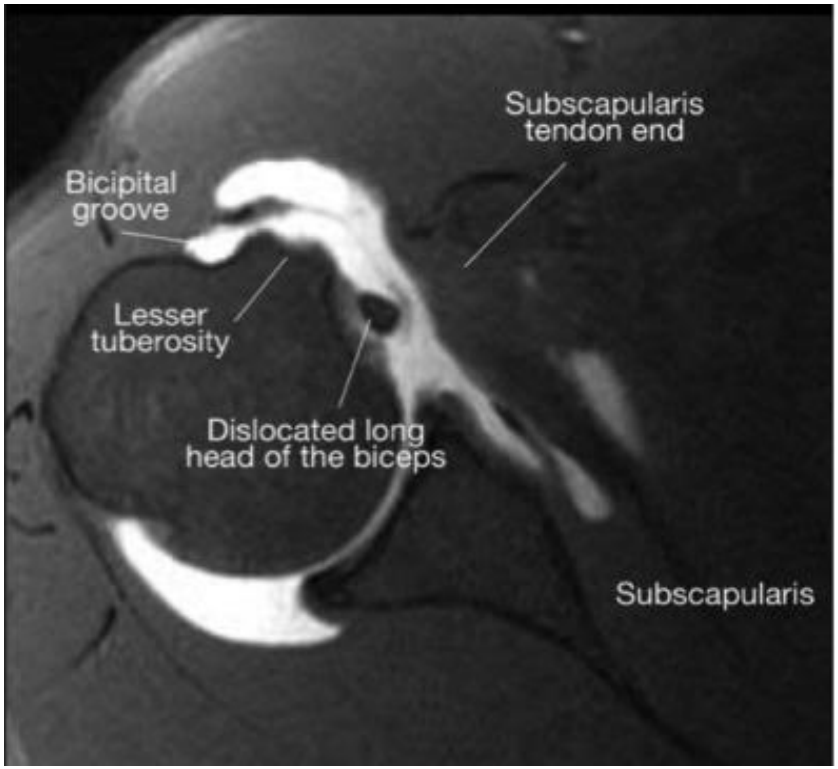
Figure 2

- Bursitis/ Partial Thickness Tears
  - NSAIDs, Physical Therapy, Injections
- Full Thickness Tears
  - May try non-op treatment with smaller tears
  - Surgical repair to avoid tendon retraction

Rotator Cuff Injuries

Subscapularis Tears

- Best seen on MRI Axillary images
- Commonly associated with a dislocated long head of the biceps
- Weak with internal rotation
- Positive lift off test and belly press test
- Treatment: surgical repair with a biceps tenodesis



Rotator Cuff Injuries

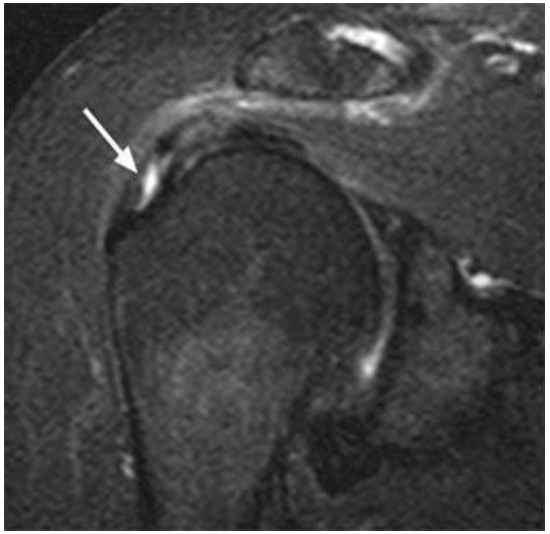
- Treatment Options:
  - Modify Activity
  - NSAIDS
  - Physical Therapy (PT) vs. Home Exercise Program (HEP)
  - Subacromial Corticosteroid Injection
  - Arthroscopic Surgery

Subacromial Injections

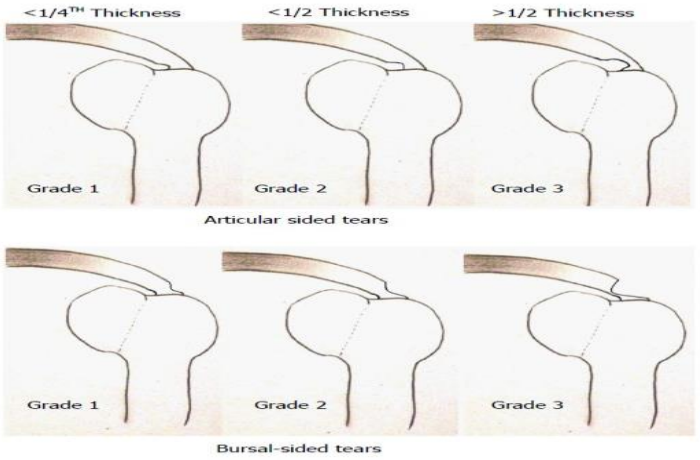
- 3 locations for injection:
  - Anterior
  - Lateral
  - Posterior
- Confirm landmarks
- Avoid RTC tendon
- Limit activity
- Ice for pain relief
- Start or resume Rehab program
- Warn about elevated blood sugar levels with corticosteroids

Rotator Cuff Injuries

Partial Thickness Rotator Cuff Tear



- Conservative care
  - NSAIDS
  - Corticosteroid injection
  - Physical Therapy: ROM & strength
  - Consider surgery when fail conservative care
- Surgical care
  - Arthroscopy, Subacromial decompression & debridement
  - Repair RTC tendon
    - Open
    - Arthroscopic



Rotator Cuff Injuries

- Full Thickness Tear Rotator Cuff
  - Conservative care
    - Modify Activities
    - NSAIDS
    - Subacromial Corticosteroid Injection
    - Physical Therapy: ROM & strength

Rotator Cuff Injuries

- Full Thickness Tear Rotator Cuff
  - Surgical care
    - Arthroscopy, Subacromial decompression & debridement
    - Repair RTC tendon:
      - Open
      - Arthroscopic
        - Amount of tendon retraction
        - Best results < 6weeks post injury
        - Control DM and stop smoking

Rotator Cuff Injuries

- **Post-op considerations**
- Sling & abduction pillow- 4-6 weeks
  - limits “wringing out” effect
  - improves circulation to tendon
  - Reduces stress on repair

- Ice: swelling and pain control
- Start PT: Physician preference
  - 2-4 weeks post-op (more aggressive with younger pt or athletic population)
    - Active assistive exercises
    - Elbow ROM
    - Codman’s exercise (arm hands) 2-4 weeks post-op
    - Increase AROM and strength at 6+ weeks post-op
    - Full release to activity approximately 12 weeks post-op

Rotator Cuff Injuries

Irreparable RTC Tears

- RTC tears progress over time and some tears develop tendon retraction and fatty infiltration of the muscle
- Patients may present with a long duration of symptoms
- Patients may have experienced recurrent RTC tears or neglected treatment for a previous tear
- Patients are typically weak with external rotation and limited AROM in forward flexion

Rotator Cuff Injuries

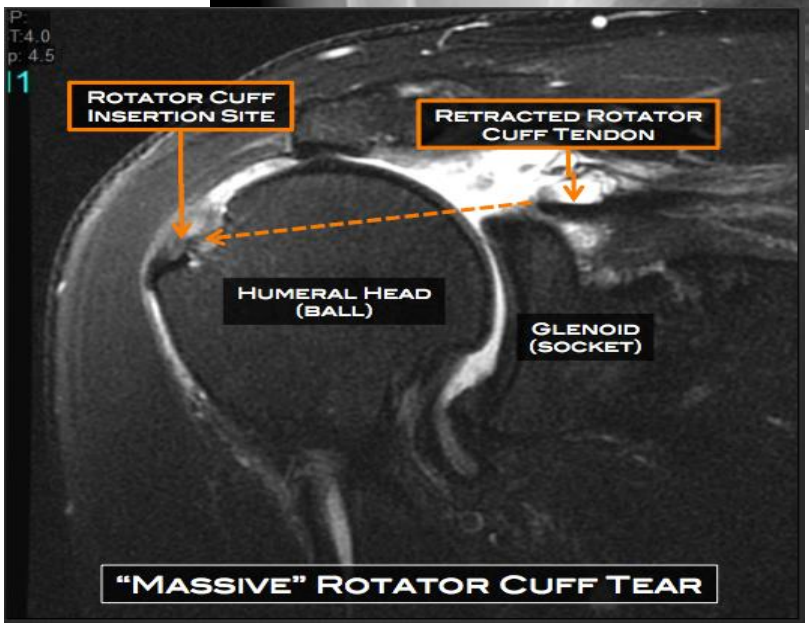
Radiology for Irreparable RTC Tears

- AP view shows an Acromiohumeral Interval (AHI) < 6 mm (high riding humeral head)

- Tendon retraction to the level of the glenoid seen on MRI

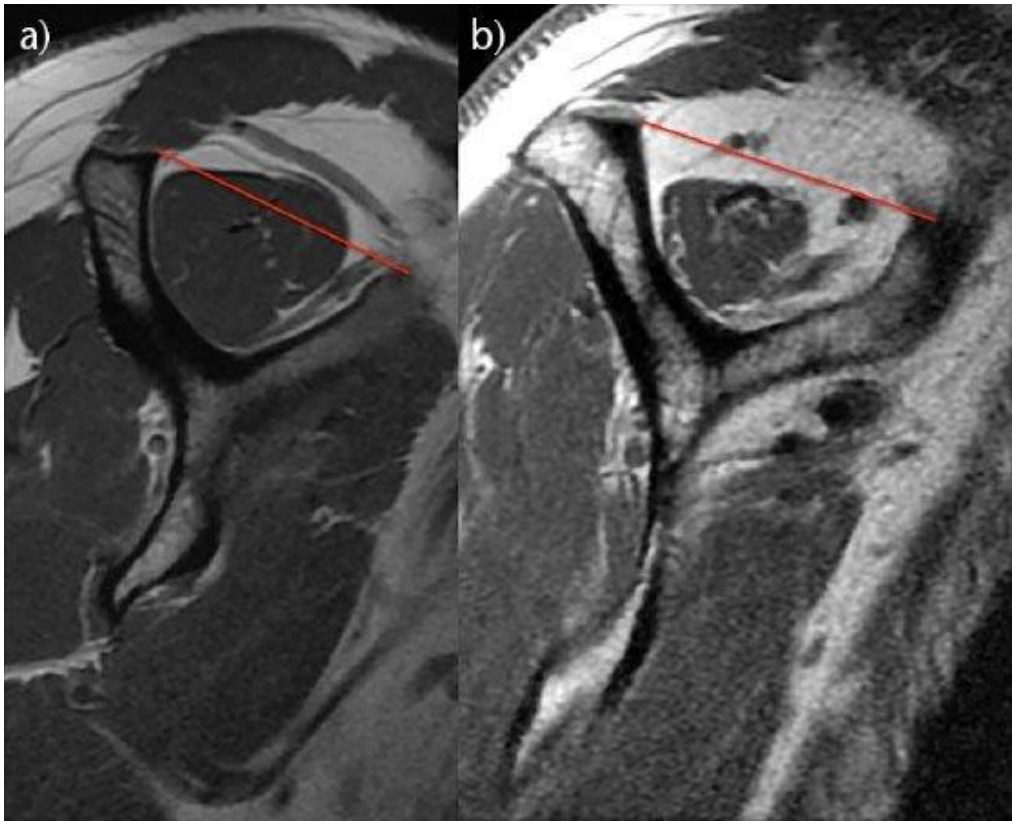
- Fatty Infiltration of the RTC muscle seen on T1 sagittal view

- Positive Tangent Sign



Rotator Cuff Injuries

Sagittal View



Tangent Sign

- A line (in red) which is drawn at a tangent to the superior border of the scapular spine and the superior margin of the coracoid on the most lateral image where the scapular spine is in contact with the scapular body: a) negative tangent sign; b) positive tangent sign.

Rotator Cuff Injuries

Treatment options for Irreparable RTC Tears

1. Conservative Treatment-
   - physical therapy to focus on Anterior Deltoid rehabilitation; may be a good option for patients not medically suited for surgery
2. Arthroscopic Debridement with Subacromial Decompression
3. Partial RTC Repair
4. Marginal Convergence- utilized in U-shaped tears
   - Method to reduce strain on RTC and increasing fixation strength

Rotator Cuff Injuries

Treatment options for Irreparable RTC Tears

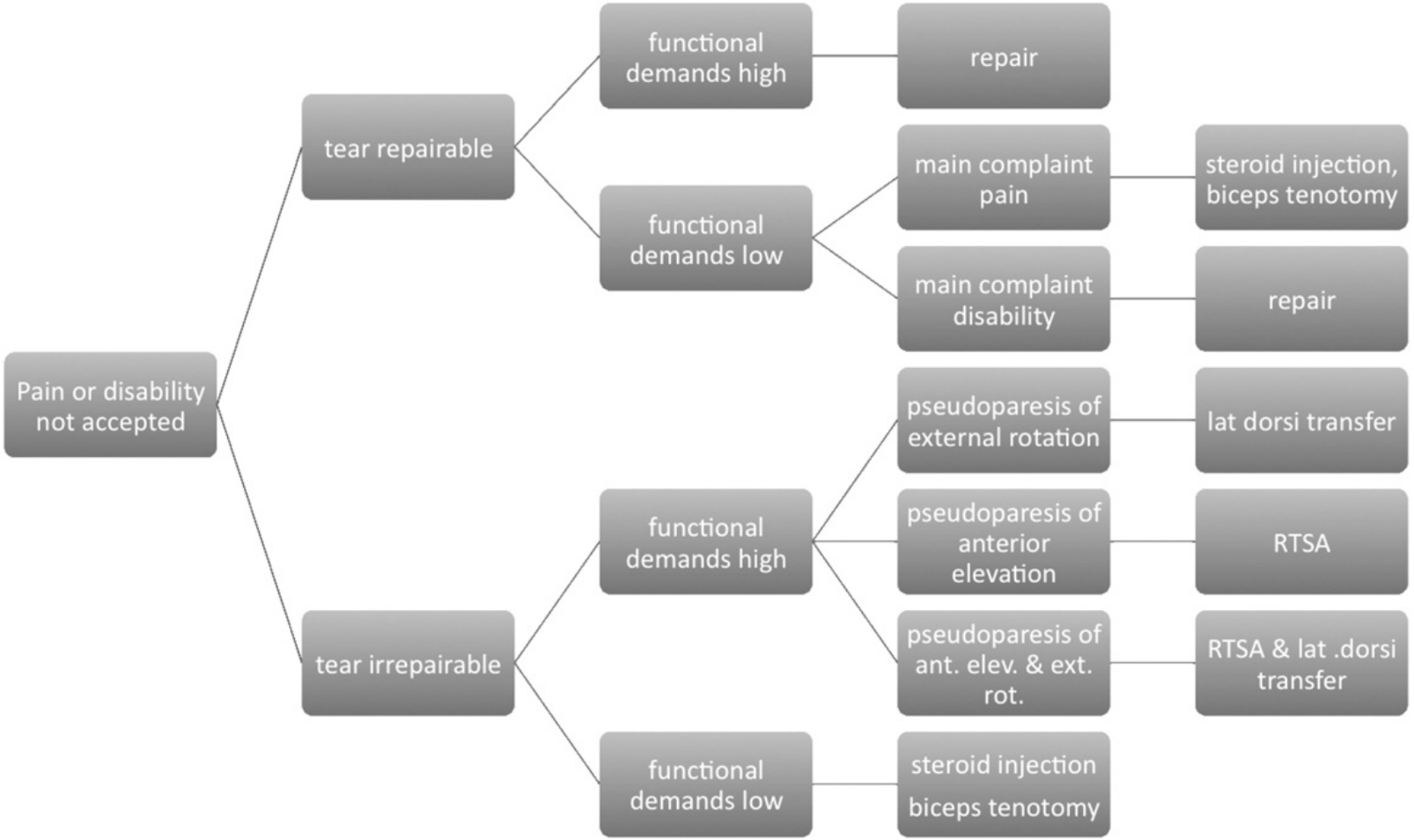
5. Graft Augmentation
6. Tendon Transfer- Latissimus Dorsi/ Pectoralis Major
7. Superior Capsule Reconstruction
8. Reverse Total Shoulder Arthroplasty
   - best option when there is evidence of glenohumeral osteoarthritis

Rotator Cuff Injuries

Reverse Total Shoulder Arthroplasty (RTSA)

- Optimal for RCTs with superior migration of the humeral head in the presence of osteoarthritis
- RTSA works through medialization of the center of rotation and recruits the deltoid muscle to act as shoulder abductors
  - Must have a functioning Axillary nerve
- RTSA should be considered as a last resort when all other salvage procedures have failed
- RTSA should be an option primarily for patients 65 years old or older

Rotator Cuff Injuries



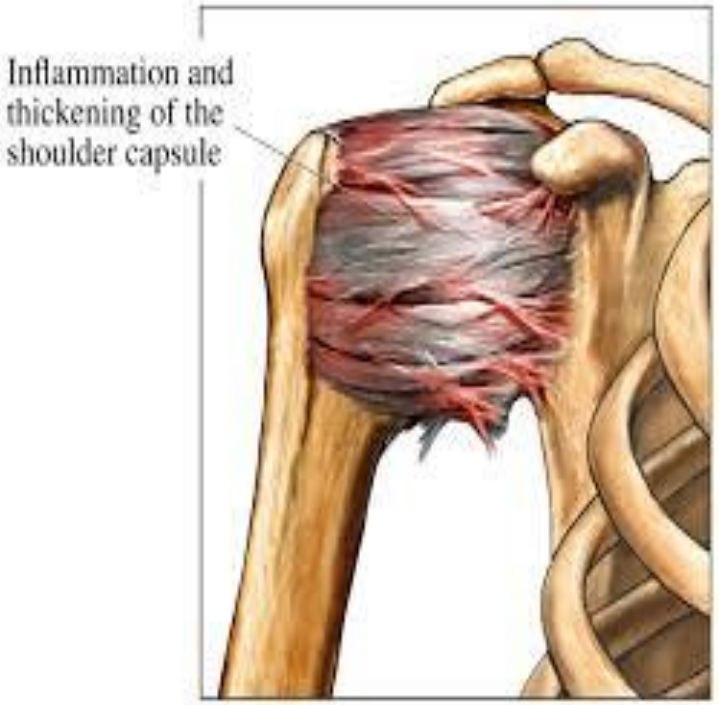
Adhesive Capsulitis "Frozen Shoulder"

- Insidious onset
- Mechanism of injury poorly defined but related to inflammatory process
- Affects women > men, ages 35 - 65
- More prevalent w/ hx:
  - Diabetics, recent trauma, breast surgery, RTC symptoms
  - Recent AMI, Parkinson's disease and hypothyroidism
- Characterized by loss of ROM
- Non-dominant arm

Adhesive Capsulitis "Frozen Shoulder"

Examination

- Inspection
- Palpation
- ROM
  - Painful
  - Decrease flexion, Int. &Ext rotation
  - Limited AROM & PROM
  - Hallmark finding: AROM = PROM
- Neuro / Vascular
- Orthopaedic Tests



Google Image

Adhesive Capsulitis
"Frozen Shoulder"

Classification

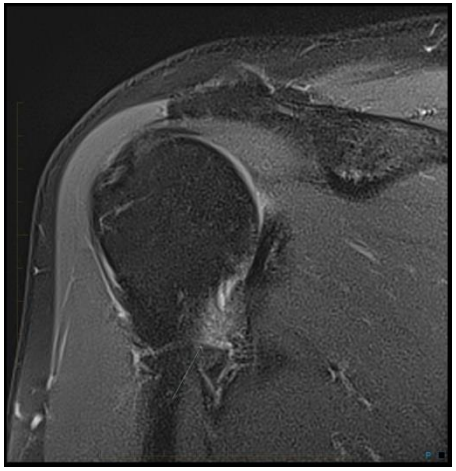
- Primary- insidious and idiopathic
  - Gradual onset and progression of symptoms
  - May not seek treatment until ROM and pain begin to limit their activities of daily living
- Secondary- due to trauma or subsequent immobilization
  - Notice symptoms soon after trauma
  - Patient notices their ROM does not improve as expected following an injury

Adhesive Capsulitis
"Frozen Shoulder"

Clinical Phases

1. Freezing or Painful stage
   - Typically last between 3 – 9 months
   - AROM and PROM continue to decrease and pain increases
2. Frozen or Transitional stage
   - Pain does not necessarily worsen during this stage
   - Typically last between 4 – 12 months
3. Thawing stage
   - This stage begins when ROM starts to improve
   - Typically lasts between 12 – 42 months

Adhesive Capsulitis "Frozen Shoulder"



- X-ray
  - AP / Axillary / Y view
    - Check tumor, calcific deposit, bony spur
- MRI / Arthrogram
    - Indicted if fail to progress (3 months)
    - Arthrogram – "***Therapeutic and Diagnostic"***
    - MRI may show thickening of the axillary recess
- Radiographs can help to rule out other possible diagnosis
- Adhesive capsulitis is often a diagnosis of exclusion

Adhesive Capsulitis "Frozen Shoulder"

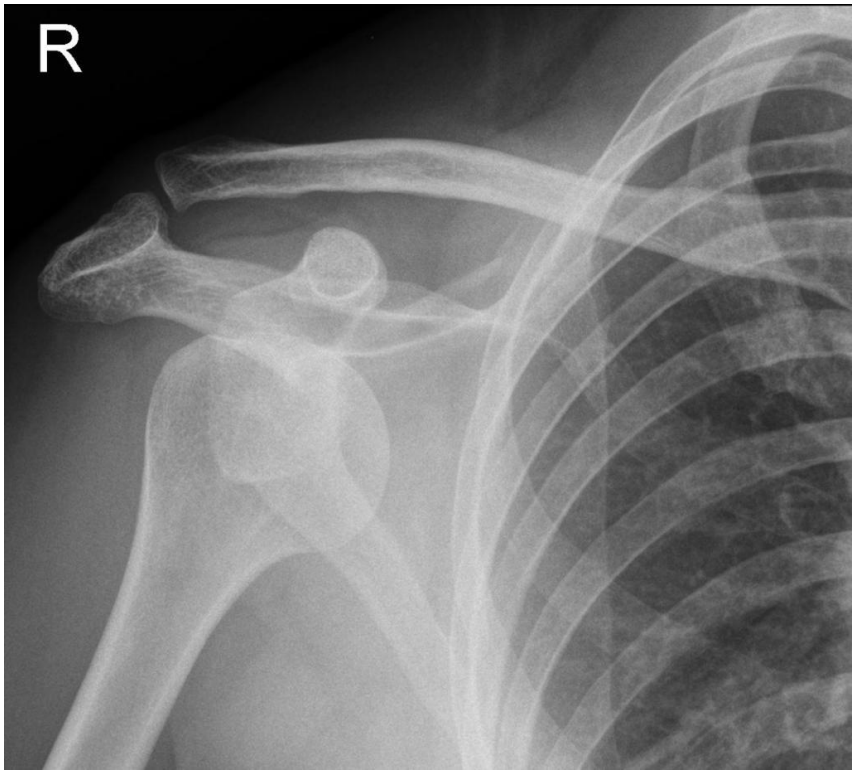
- Treatment-
  - NSAIDS
  - Corticosteroid injection
  - Physical Therapy
  - Home Exercise Program
  - Manipulation under anesthesia
  - Shoulder Arthroscopy- fail a minimum of 2 months of conservative treatment
    - Arthroscopy with capsular release and manipulation under anesthesia
- PATIENCE
  - Can take 12 - 24 months to resolve

Shoulder Instability

- Anterior Shoulder Dislocation
  - Common in overhead sports
  - MOI: Abduction/ Ext. Rotation
- Posterior Shoulder Dislocation
  - May be caused by trauma, seizure or electric shock

Shoulder Instability

Anterior GH Dislocation



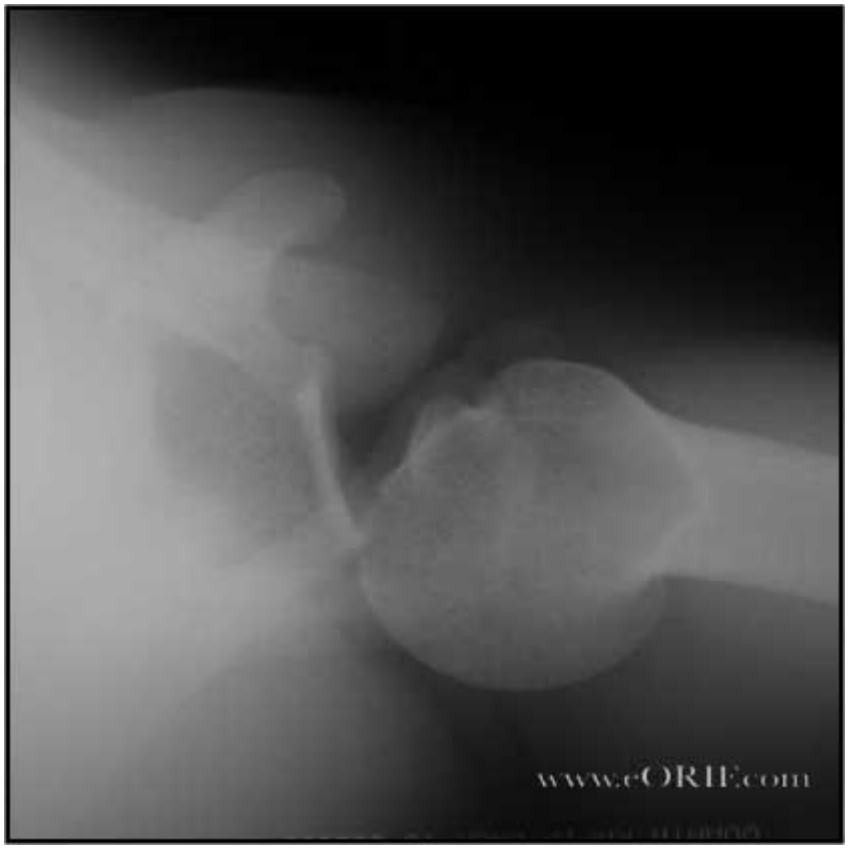
Posterior GH Dislocation

Shoulder Instability

ALWAYS get an AXILLARY view

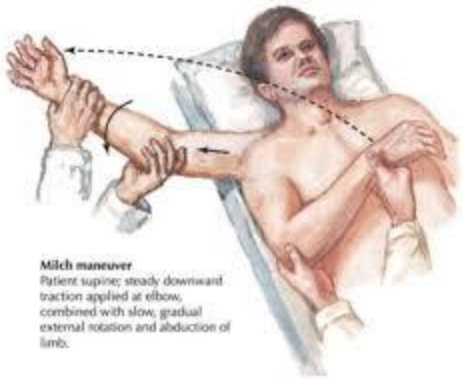
Anterior GH Dislocation

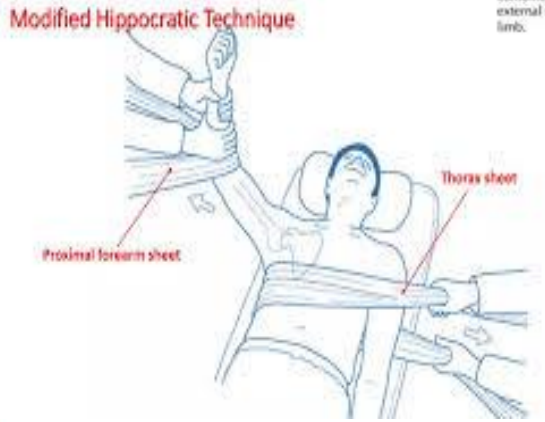
Posterior GH Dislocation



Shoulder Dislocation

Stimson Maneuver

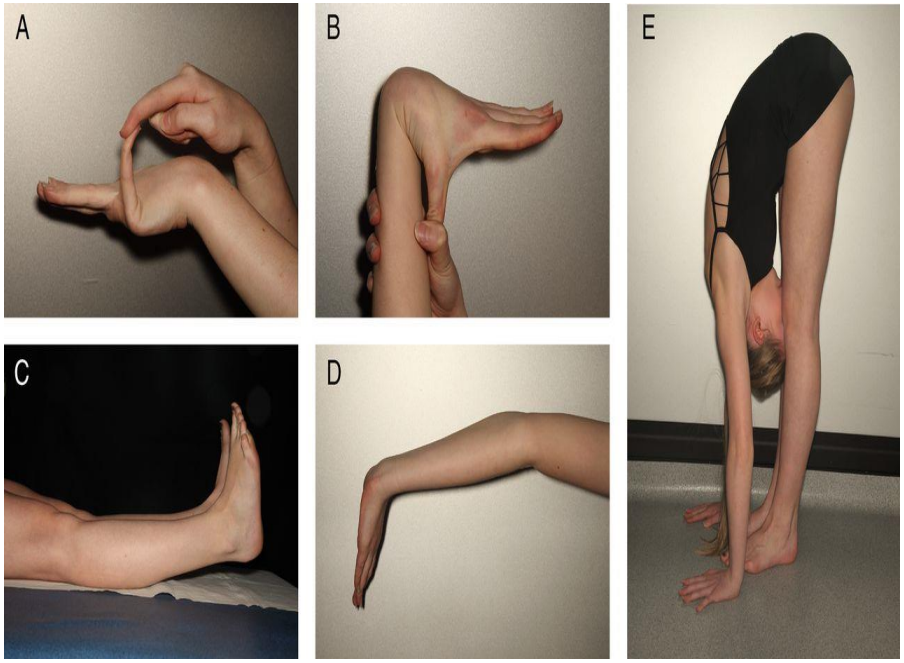




- Relaxation key
- Traction to disengage humeral head from glenoid
- +/- gentle rotation
- Many techniques described
- Immobilize in sling after reduction

Shoulder Instability

- Assess for generalized ligamentous laxity
- Higher incidence of recurrent instability in patients < 20 years old
  - May lead to OA
- Assess for injury to Axillary nerve



Beighton Scale

Physical Examination

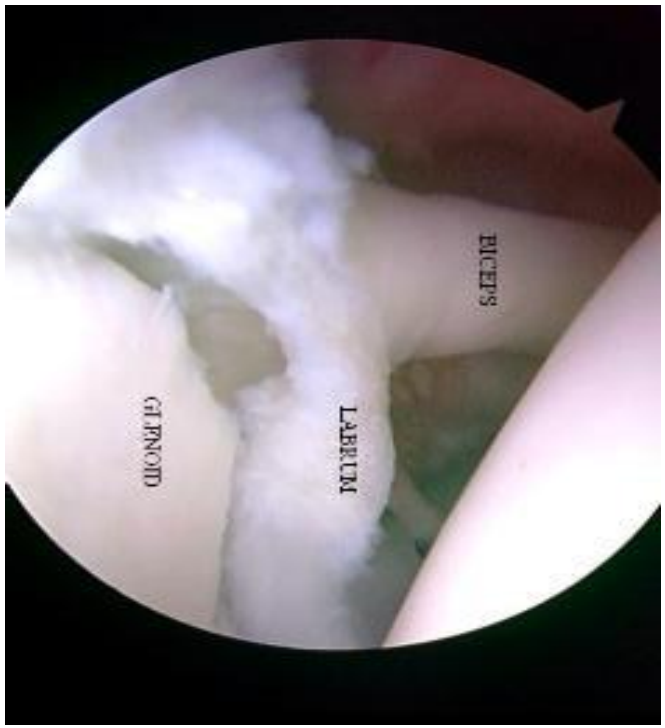
- In the setting of patella instability, assess for evidence of generalized joint laxity utilizing the Beighton scale
  - Components of the Beighton Scale
    1. Passive dorsiflexion and hyperextension of the fifth MCP joint beyond 90 degrees (R/L)
    2. Passive apposition of the thumb to the flexor aspect of the forearm (R/L)
    3. Passive hyperextension of the elbow beyond 10 degrees (R/L)
    4. Passive hyperextension of the knee beyond 10 degrees (R/L)
    5. Active forward flexion of the trunk with the knees fully extended so that the palms of the hands rest flat on the floor
- Scored 0-9; Score of 4-9 represents generalized laxity

Shoulder Instability

- Physical Exam
  - Apprehension
  - Relocation Test
  - Anterior/ Posterior Drawer
  - Clunk Test
- Treatment
  - MRI Arthrogram to eval labral pathology
  - Op vs Non- op

Superior Labrum Anterior to Posterior (SLAP) Tear

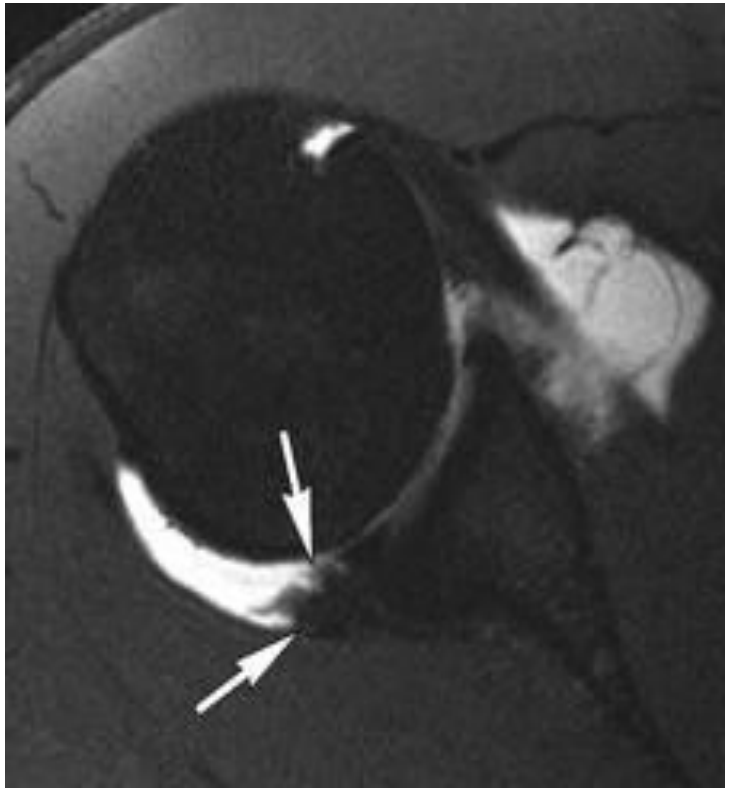
- MOI: throwing, pulling, FOOSH
- Subjective: Pt. reports anterior shoulder pain; may radiate down to biceps; pain with overhead activities
- Exam: O'brien's Test
- MRI Arthrogram to evaluate
- Op vs Non-op
  - Repair vs Tenodesis/ Tenolysis



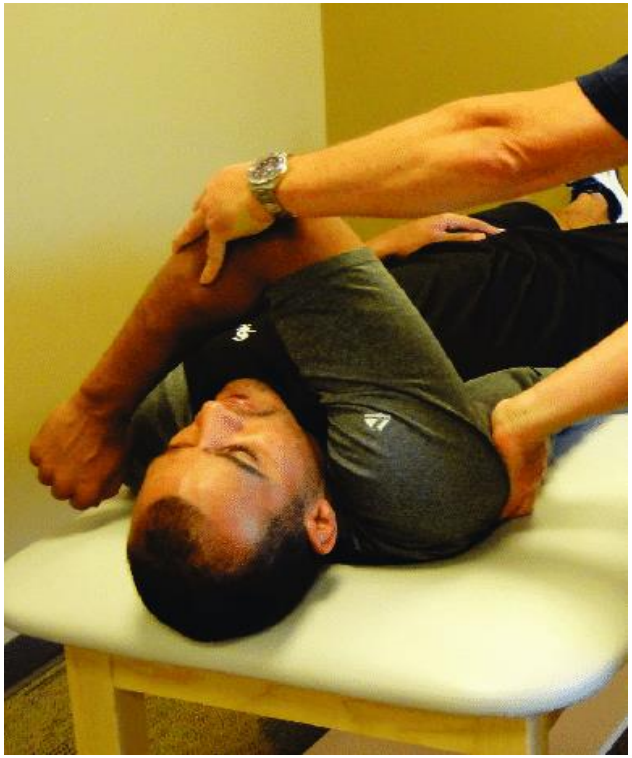
Glenohumeral Internal Rotation Deficit (GIRD)

- Glenohumeral Internal Rotation Deficit
- May have increased external rotation; need to maintain 180 deg. arc of motion in throwers
- Can lead to internal impingement; posterior shoulder pain with abduction and external rotation
- Tx: posterior capsule stretching

Glenohumeral Internal Rotation Deficit (GIRD)



Glenohumeral Internal Rotation Deficit (GIRD)



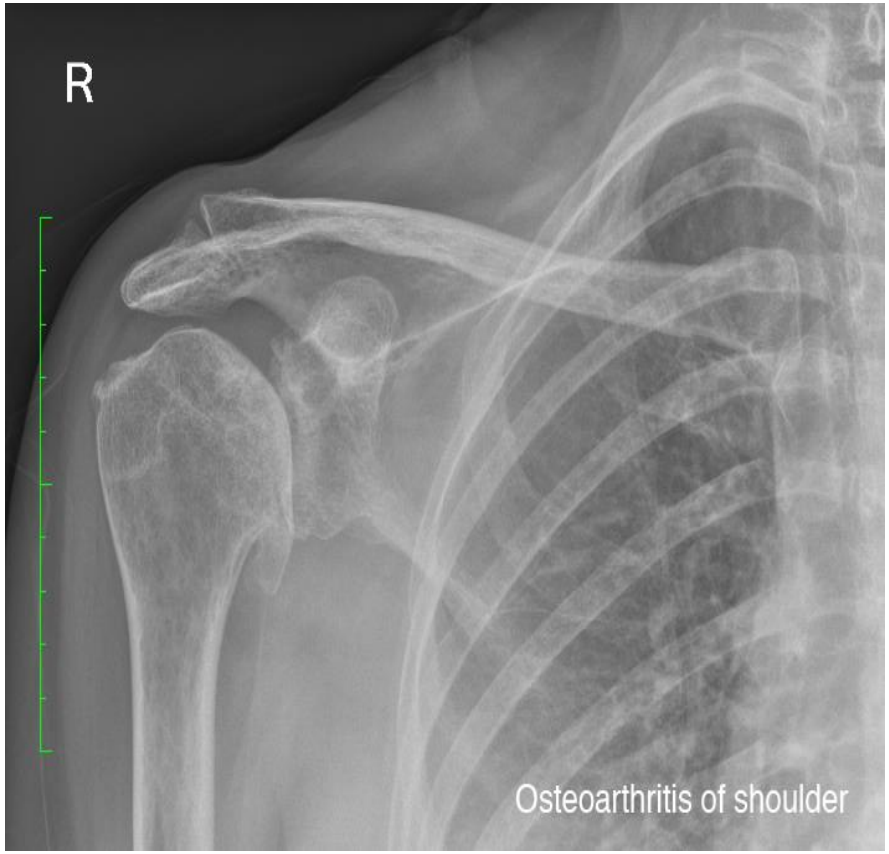
(SICK) Scapula Dyskinesis

- S: Scapular Malposition
  - Abnormal scapula position at rest that is inferior, protracted and tilted anteriorly
- I: Inferior Medial Border Prominence
  - Secondary to winging position
- C: Coracoid Pain and Malposition
  - Tender to palpation along medial edge of Coracoid
- K: dysKinesis of Scapular Movement
  - Possibly due to Pectoralis Minor muscle spasm

(SICK) Scapula Dyskinesis

- Shoulder pain (most commonly around coracoid or superior medial border of scapula); may actually complain of GH joint pain only
- Decreased ROM with shoulder flexion
- Scapular Crepitus/ Snapping Scapula
- Perform scapular assist

Shoulder Osteoarthritis



Glenohumeral Joint Arthritis

- Many causes for arthritic changes in the GH joint
  - Osteoarthritis
  - Rheumatoid Arthritis
  - Psoriatic Arthritis
  - Systemic Lupus Erythematic (SLE)
  - Avascular Necrosis (trauma vs. steroid injections)
  - Chondrolysis (continuous intra-articular pain pump infusions)
- More common Elderly
- Repetitive activity could be 2nd cause for arthritis

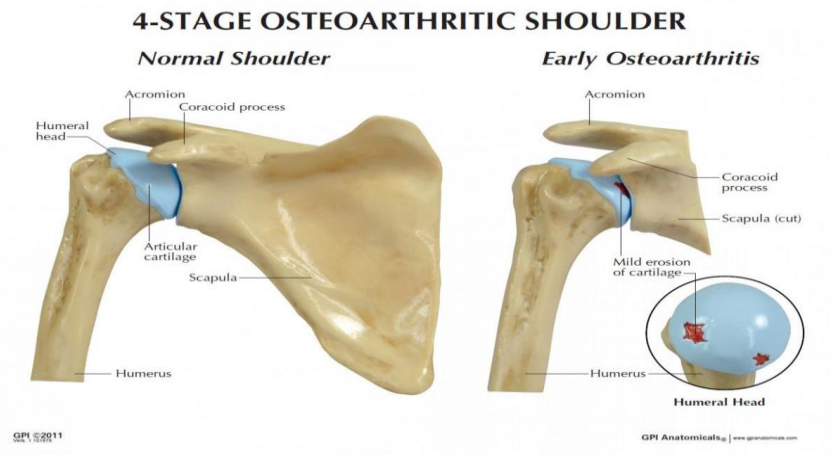
Glenohumeral Joint Arthritis

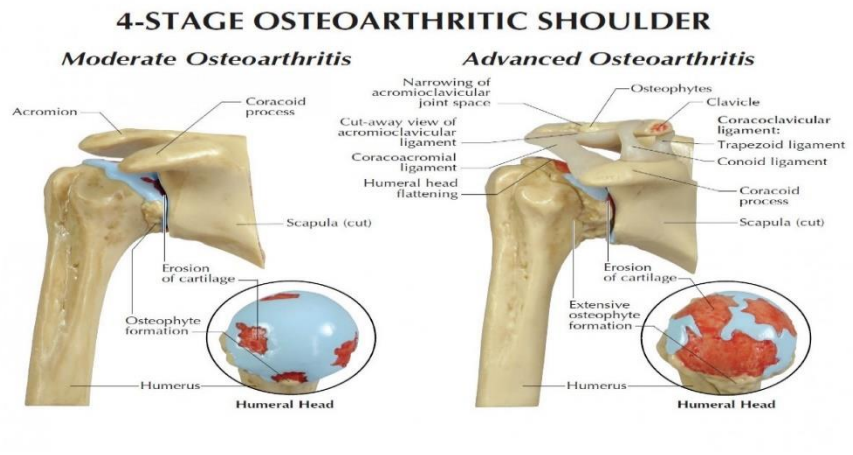
Physical Examination

- Symptoms
  - Night pain
  - Painful ROM with limits
  - Weakness

General Shoulder exam:

- Increase tenderness GH jt on palpation
- Limits AROM/PROM 2nd to jt destruction
- Limited External rotation
- Crepitus with ROM





Glenohumeral Joint Arthritis

Radiographic Examination

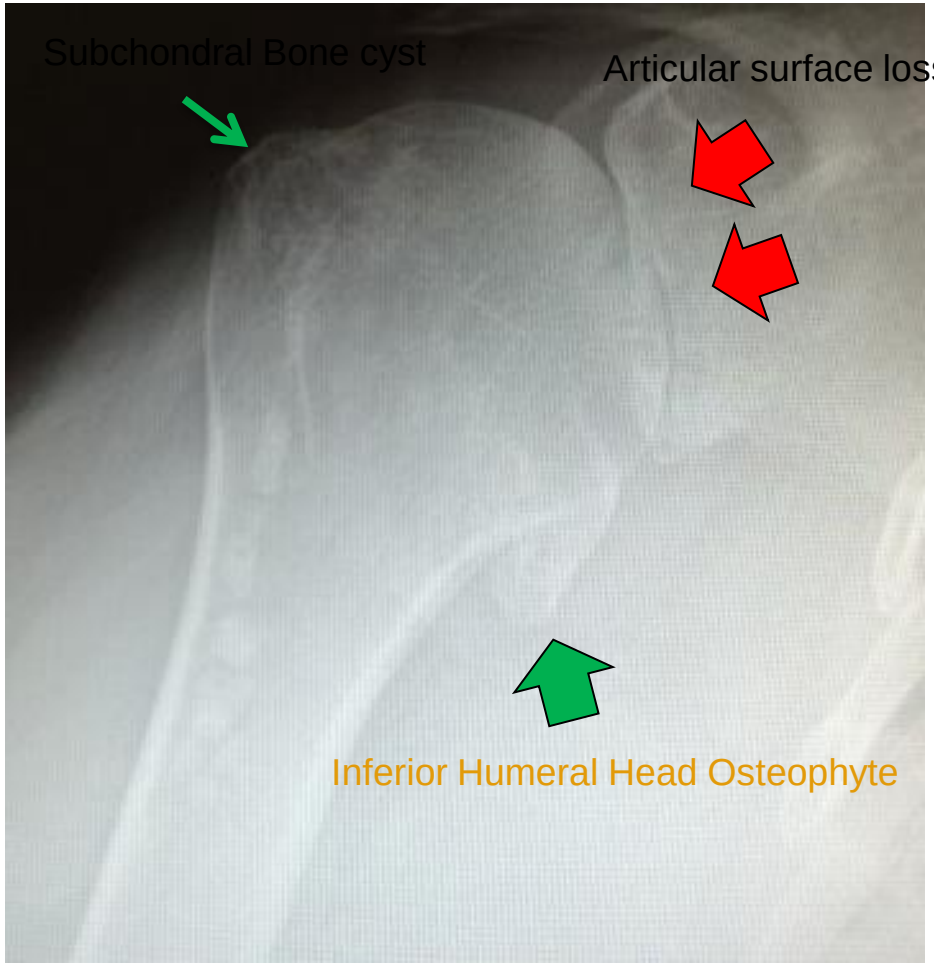
- X-ray: AP/AXILLARY/GRASHEY
  - Findings
    - Subchondral cystic changes Humeral head and Glenoid Fossa
    - Posterior Humeral head subluxation with posterior Glenoid wear pattern
    - Osteophytes inferior Glenoid and Humeral head
    - Superior Humeral Head migration – RTC tear
- CT scan – helpful in FX assoc with GH joint arthritis
- MRI – if concerned with RTC tear/tendon viability

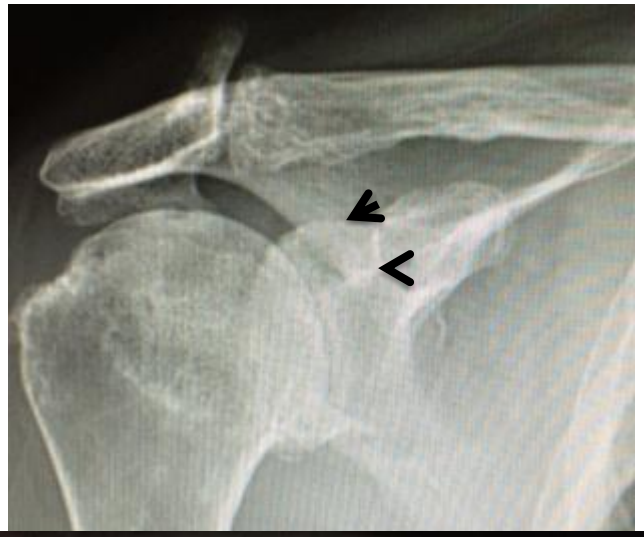
Glenohumeral Joint Arthritis

Treatment:

- Non-operative – Main-stay of therapy
  - Activity modification
  - NSAIDS
  - Rheumatoid arthritis medications
  - Steroid injections
  - Viscosupplimentation injections (off label use)
  - Physical therapy/HEP
    - Maintain ROM
    - Improve strength

Glenohumeral Joint Arthritis





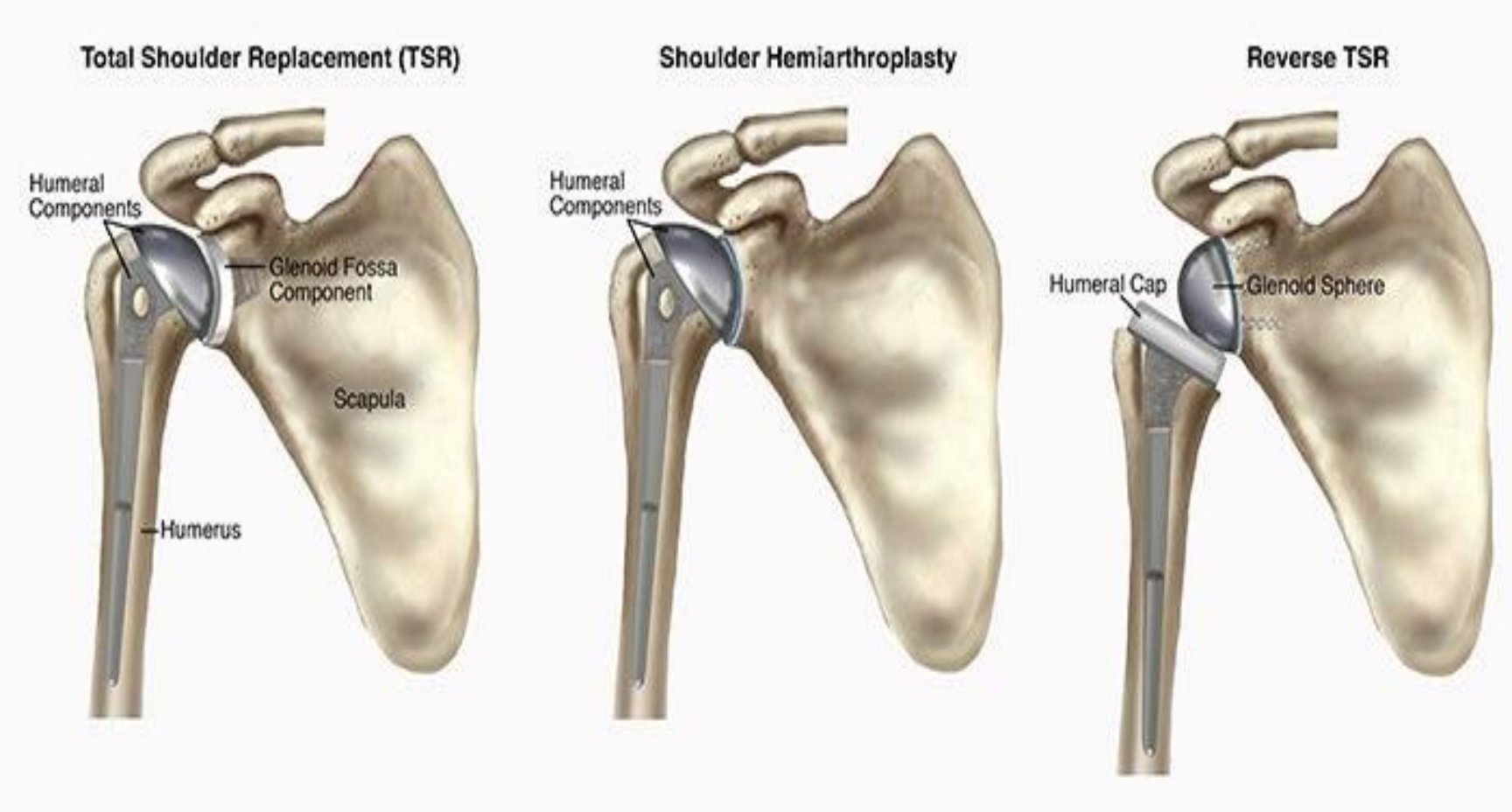
Glenohumeral Joint Arthritis

Treatment:

- Operative –
  - Failed conservative therapy
  - Decrease in ADL's
- Hemiarthroplasty/Total Shoulder Arthroplasty*
  - OA & RA
  - Concerns for bone quality
  - Irreparable RTC tear/ RTC arthropathy
  - Decreased ROM 2nd arthritic changes

*Total shoulder arthroplasty decreased need for revision vs. hemiarthroplasty

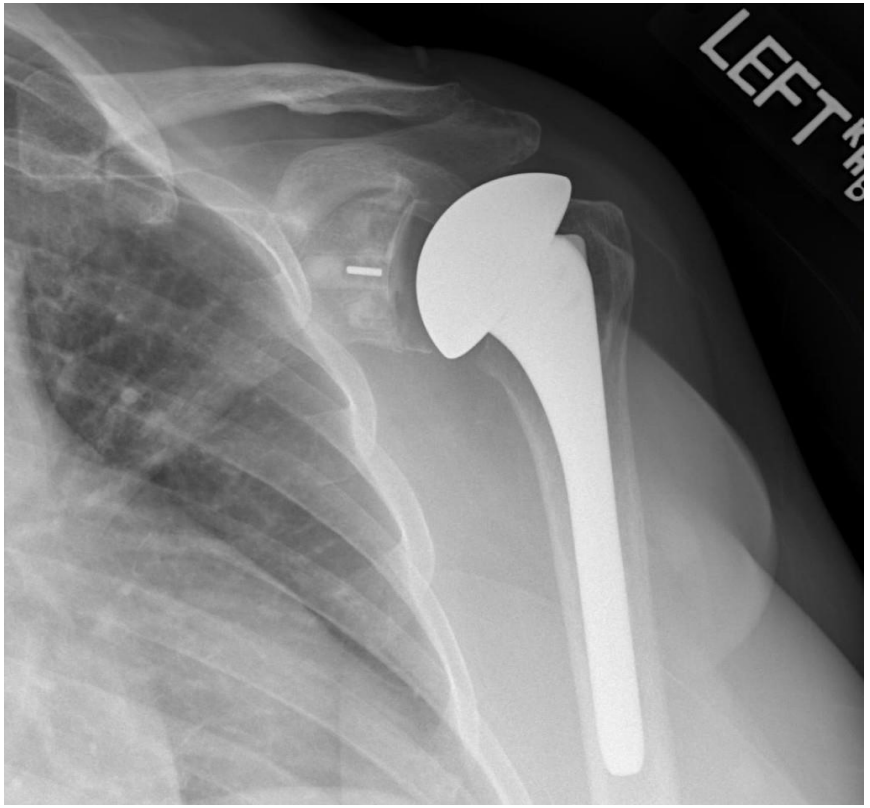
Glenohumeral Joint Arthritis



Glenohumeral Joint Arthritis

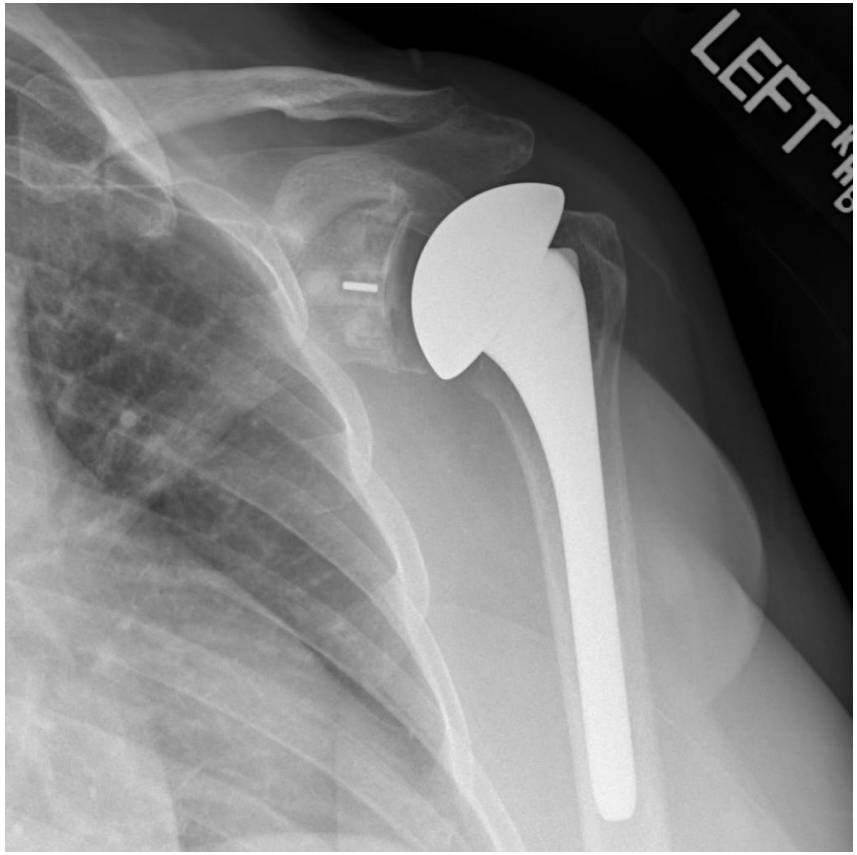
Hemiarthroplasty

Total Shoulder Arthroplasty



Shoulder Osteoarthritis

- Non-op Treatment
  - NSAIDs
  - Physical Therapy
  - Corticosteroid Injections
- Operative Treatment
  - Partial/ Total Shoulder Arthroplasty- RTC intact
  - Reverse Total Shoulder Arthroplasty- RTC retracted



Acromioclavicular Joint

- Mechanism of Injury
  - Direct Trauma
    - Humerus adducted position & driven inferior to position of Glenoid
  - Indirect Trauma
    - Fall on flexed elbow or fall on out-stretched hand (FOOSH)
    - Results in forces transmitted thru the AC joint
    - Injures AC ligaments primarily
    - Coracoclavicular ligaments – less often injured
      - relaxed with upward movement/elevation of the scapula

AC Joint Separation

- MOI: fall on shoulder
- Subjective: pain at AC joint
- Exam: noticeable deformity; piano key
- Non-op tx: Grade I-II
- Grade III: tx depending on symptoms/ function
- Operative tx: Grade IV-VI

Acromioclavicular Joint

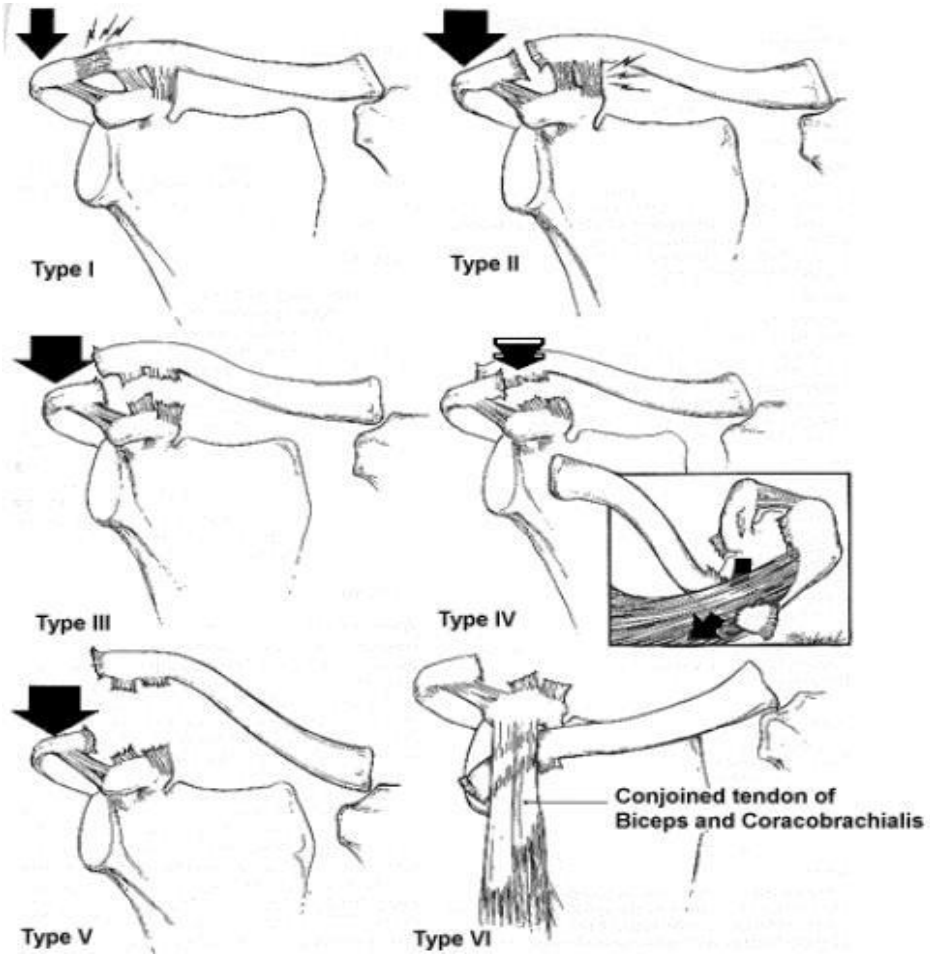
Google Image

- Clinical Signs
  - Deformity of AC joint region & joint laxity
  - Skin abrasions
  - Limited ROM
  - Pain
  - Increased pain with cross-body adduction (Scarf Test)
  - Positive Piano Key sign
    - Patient seated or standing and examiner presses down on the distal end of the clavicle; pain or excessive movement of the distal clavicle is (+) for an AC separation

Acromioclavicular Joint

- Crossover Test
  - Assess integrity of the AC joint for laxity and degenerative conditions
  - Shoulder flexed to 90 & patient reaches over and touches opposite
  - Positive test indicates pain and limited motion isolated to AC joint region

AC Joint Separation



- Rockwood Grading
- I: sprain
- II: < 25 %
- III: 25-100 %
- IV: posterior
- V: > 100%
- VI: Inferior

AC Joint Separation

Long Head Bicep Tendon Rupture

- Function
  - Serves as depressor humeral head
  - Prevents superior migration of humeral head along w/ RTC tendon
- Mechanism
  - Sudden bicep flexion against stronger apposing force
  - Sudden pop
  - Rupture usually occurs within shoulder joint
  - Stump may cause/contribute to impingement symptoms

Long Head Bicep Tendon Rupture

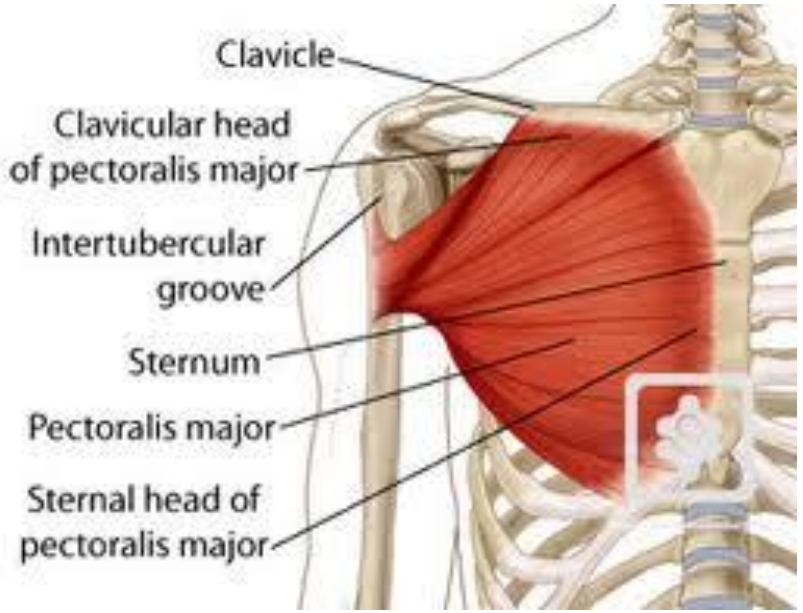
- Clinical presentation
  - Pain with AROM shoulder and elbow
  - “Popeye” deformity biceps muscle (mid-humerus)
  - Marked bruising and discoloration
  - Weakness w/ elbow flexion and supination (will resolve over time)

Long Head Bicep Tendon Rupture

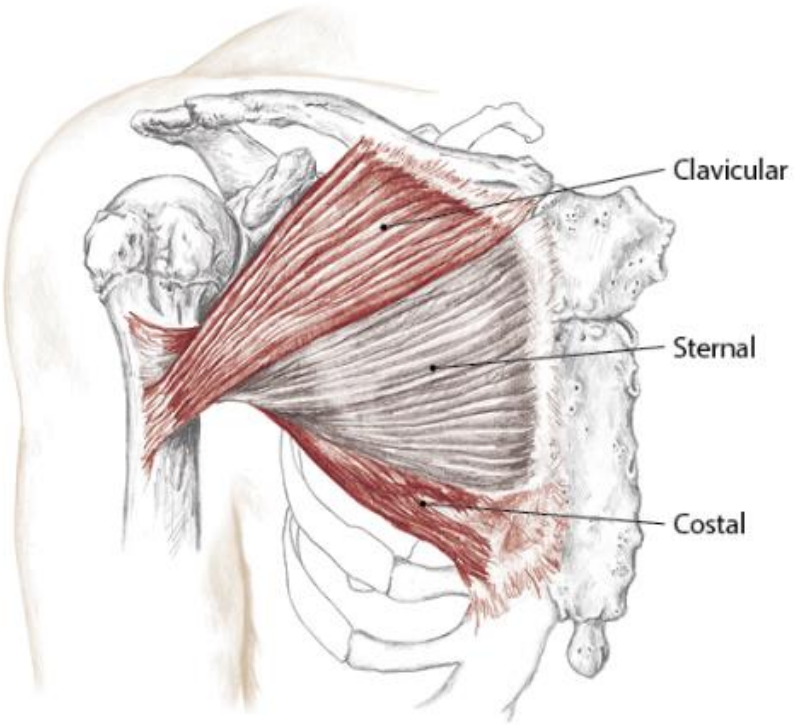
- Treatment
  - Conservative:
    - Majority conservative
    - Work on short head bicep strength
    - Symptoms resolve 4-6 weeks
  - Surgical:
    - Primarily cosmetic
    - Unresolved weakness
    - Advance stump to coracoid process, humeral shaft (Bicipital groove) or short head bicep tendon
    - Arthroscopy to debride retained intra-articular stump

Pectoralis Major Rupture

- Primarily occurs in men aged between 20-40
- Typically associated with bench pressing
- May experience “tearing” sensation
- Ecchymosis, swelling and deformity seen on exam
- Surgical repair for tendon avulsions



Pectoralis Major Rupture



2.88 Anterior view identifying the three segments of pectoralis major

- Anatomy
  - Triangular-like shape
  - Origin
    - Medial Clavicle
    - Anterior Sternum
    - First through sixth costal cartilage
  - Insertion
    - Humerus, lateral to the Bicipital groove
- Function
  - Adduction and internal rotation of shoulder
  - Assist with shoulder flexion

Pectoralis Major Rupture

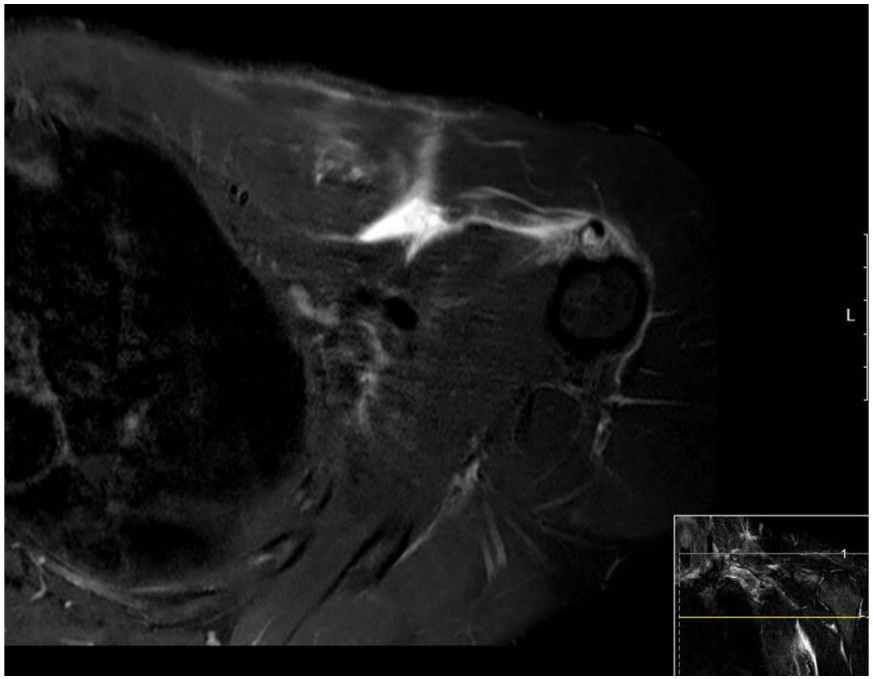
- Mechanism of Injury
  - Indirect trauma
  - Eccentric phase of the bench press when the shoulder is abducted, extended and externally rotated
  - May be associated with consumption of anabolic steroids

Pectoralis Major Rupture

- Physical Exam
  - Pain along medial side of upper arm
  - Swelling and ecchymosis
  - Asymmetry
  - Weakness with adduction and internal rotation
  - Absence of the anterior axillary fold evidenced by resisted adduction or passive abduction

Pectoralis Major Rupture

- Radiology
  - X-rays
    - r/o bony avulsion
  - US
    - Requires an experience operator
  - MRI
    - Preferred imaging
    - Axillary image will show Pectoralis tendon avulsion from the humerus

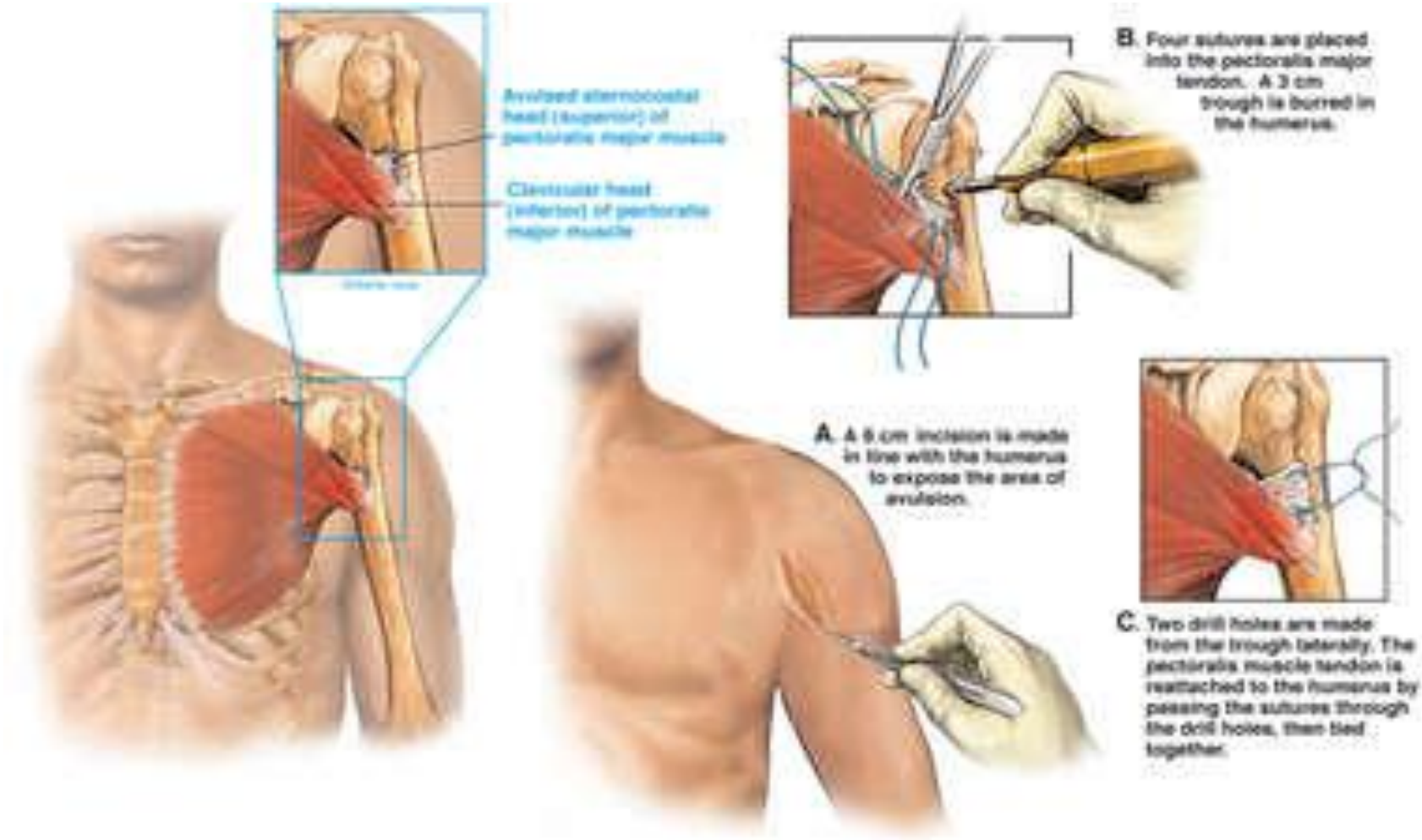


Pectoralis Major Rupture

- Conservative Treatment
  - Low-demanding patients
  - Partial tendon ruptures
  - Muscle fiber ruptures
- Treatment
  - Immobilization
  - Analgesics
  - Physical Therapy

- Surgical Repair
  - Direct repair to bone with acute tears
  - Early surgical treatment has better outcomes
  - Chronic ruptures may require an autograft or allograft reconstruction
  - 4-6 months recovery

Pectoralis Major Rupture



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Elbow Injuries

- Evaluation: assess ROM in flexion/ extension/ pronation/ supination
  - Identify tender landmarks, swelling, ecchymosis, deformities
- X-ray
  - Presence of fat pad indicates intra-articular swelling
  - Assume fracture is present; very common in pediatrics

Distal Biceps Tendon Rupture

- MOI: Pulling or lifting
- Subjective: report feeling a “pop”
- History: ask about anabolic steroids, antibiotic use, etc.
- Exam: ecchymosis, asymmetry of biceps muscle (popeye), + hook test, weakness with supination; MRI only if diagnosis is in question
- Tx: Recommend surgery to restore strength

Distal Bicep Tendon Rupture

- Function
  - Serves as elbow flexor and supination
- Mechanism
  - Sudden bicep flexion against stronger apposing force
  - Sudden pop
  - Rupture occurs at radial tuberosity

Distal Bicep Tendon Rupture

Clinical presentation

- Inability to actively or resistively flex elbow
- Marked weakness supination
- Marked bruising and discoloration
- Palpable defect distal biceps tendon
- Partial tear:
  - Palpable distal tendon & tender anti-cubital fossa
  - Weak w/ flex and supination but can perform

Distal Bicep Tendon Rupture

Orthopaedic Tests

- Hook Sign
  - Patient resistively & forcefully flexes **elbow**
  - **<u>Positive test</u>:** reveals pain, deformity and inability to contract distal Biceps tendon.
    - Unable to “Hook” a finger under the distal Bicep tendon insertion.
-

Distal Bicep Tendon Rupture

- Radiographs:
  - X-ray: may show calcific changes in tendon
  - MRI: more sensitive for tissue changes and quality of remaining tendon for repair

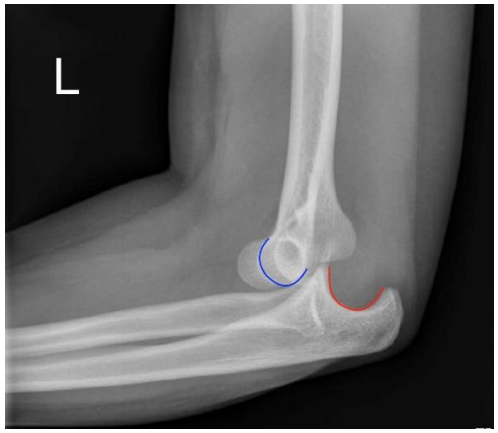
Distal Bicep Tendon Rupture

Treatment

- Surgical: only real option
  - Early repair helps limit scarring
  - Need to monitor for heterotrophic ossification & synostosis
  - Tendon repair augmented with suture anchors
    - Limits PIN/Radial nerve injury
    - Limits synostosis (radiation vs. Indomethacin)
  - Splint 90 degrees flexion x 2wks then brace for gentle ROM
  - Avoid AROM / Resistive exercise till 8 wks post-op

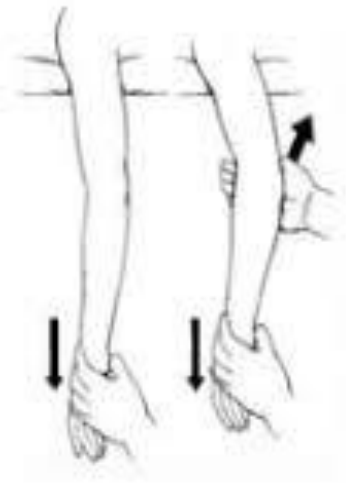
Elbow Dislocation

- Posterior most common (>90%) with FOOSH
- Traction, flexion and direct manual palpation of olecranon
  - Reduce medial/ lateral displacement 1st
  - Address ant./ post. Next
  - Sup./ Pro may assist in reduction
- Immobilize in posterior long arm splint +/- sugar tong
- Treatment: non-op management with early ROM with protected brace
- Terrible Triad: radial head fx/ coronoid fx/ LCL disruption requires operative fixation



PARVIN'S METHOD

- Patient in prone
- Gentle downward traction of the wrist for few minutes
- As the olecranon fossa begins to slip distally, physician lifts up gently on arm.



Ulnar Collateral Ligament (UCL)

- Anterior bundle of the UCL is the key stabilizer to valgus stress at the elbow
- Common injury in throwing athletes
  - Limit youth pitch counts
- May be acute or chronic
- Exam: Milking maneuver has higher sensitivity than valgus stress test
- May be accompanied with ulnar nerve symptoms
- Diagnosis with MRI
- Treatment
  - Partial Tears: rest and slow return to throwing/ PRP
  - Complete Tears: UCL Reconstruction (Tommy John Surgery)
    - 1 year for full recovery of function
    - >80% return to same level of sport

Lateral Epicondylitis (Tennis Elbow)

- Overuse injury with repetitive wrist extension (rarely tennis)
- Patients aged 30-65
- Pain with grip and lifting objects
- Tendonitis of the common ext. tendon at the lateral epicondyle
- Tender at lateral epicondyle and pain with resisted wrist extension with elbow in extension
- Tx: Rest, NSAIDs, PT, Counterforce Strap, Injection, Nitroglycerin patch, equipment modifications; surgery as last option (80-90% resolve w/wo treatment within a year)

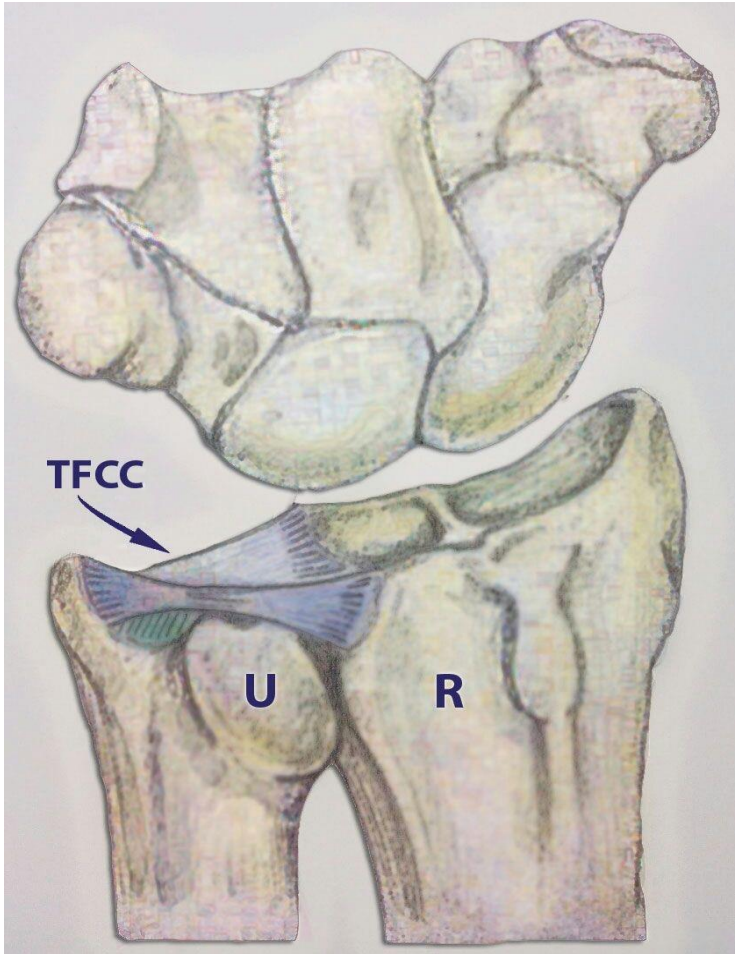
Medial Epicondylitis (Golfer's Elbow)

- Caused by repetitive stress with wrist flexion
- Common in golf, tennis and throwing athletes
- Present with pain over medial elbow
- Pain with resisted wrist flexion, forearm pronation and grip
- Evaluate for Cubital Tunnel Syndrome/ UCL Sprain
- Tx: Rest, NSAIDs, PT, Counterforce Strap, Injection, modify equipment; surgery as last option

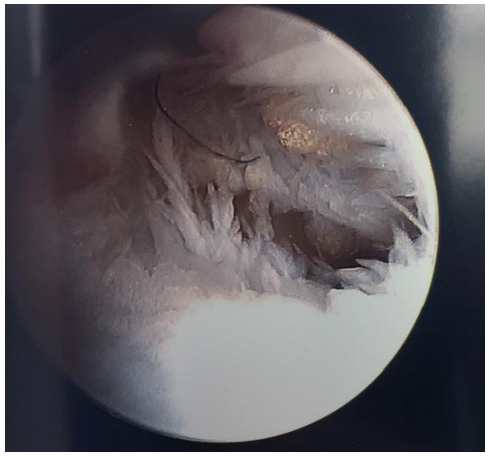
Olecranon Bursitis

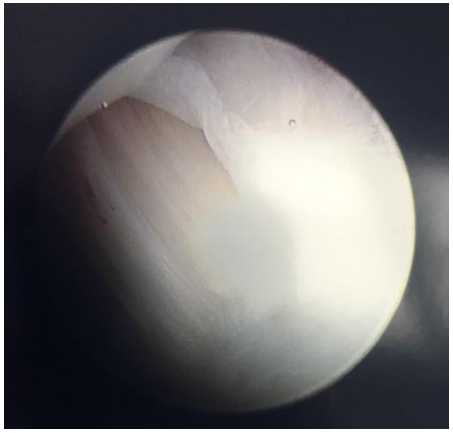
- Bursa sac posterior to Olecranon becomes inflamed and fills with fluid
- Signs of infection: erythema, swelling, drainage, warm, pain
- If there are no signs of infection, do NOT aspirate
- Infected: aspirate, abx, surgery
- Non-infected: ice, compression, NSAIDs

Triangular Fibrocartilage Complex



Triangular Fibrocartilage Complex

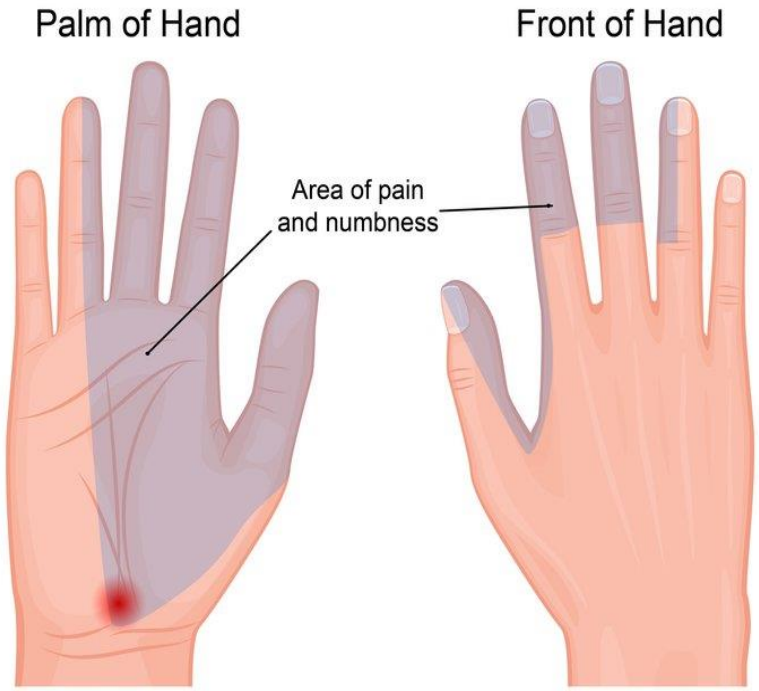




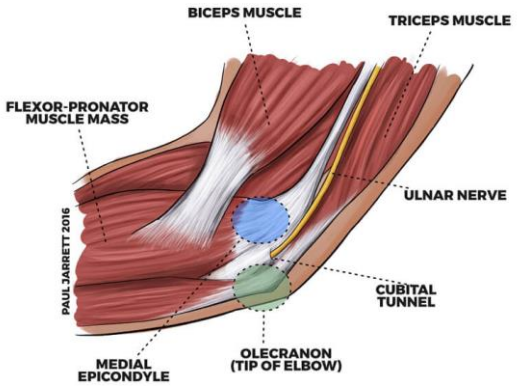
- Helps stabilize DRUJ
- MOI: FOOSH
- Pain with ulnar deviation (compression) and radial deviation (tension)
- Pain with turning key
- Tx: Surgical repair

Carpal Tunnel Syndrome

- Median nerve is compressed in wrist
- S/S: numbness and tingling, weakness, thenar atrophy (late finding)
- Exam: Tinel, Phalen, EMG
- Treatment: modify activities/ posture, wrist splint at night, steroid injection, surgery



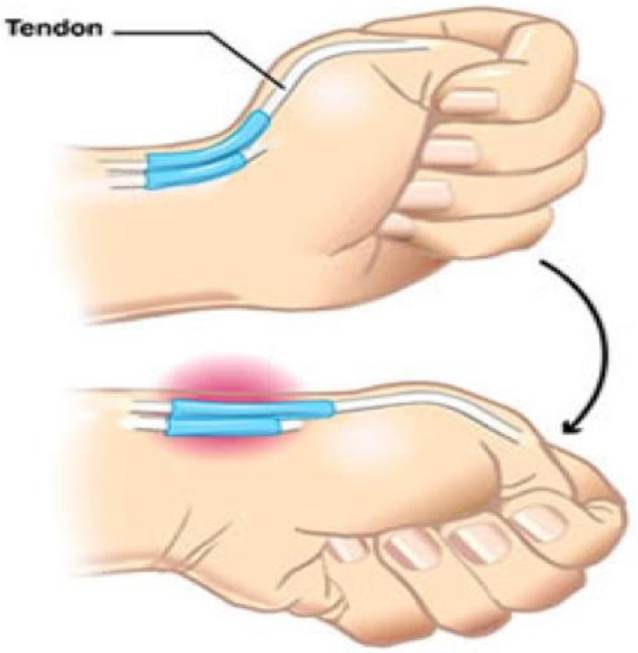
Cubital Tunnel Syndrome



- Ulnar nerve is compressed at elbow (“funny bone”)
- S/S: numbness and tingling in ulnar digits; hand weakness
- Imaging negative
- Exam: Elbow flexion test/ +Tinel medial elbow/ Hypothenar wasting/ EMG
- Treatment: night splint to prevent elbow flexion vs Cubital tunnel decompression

De Quervain Syndrome

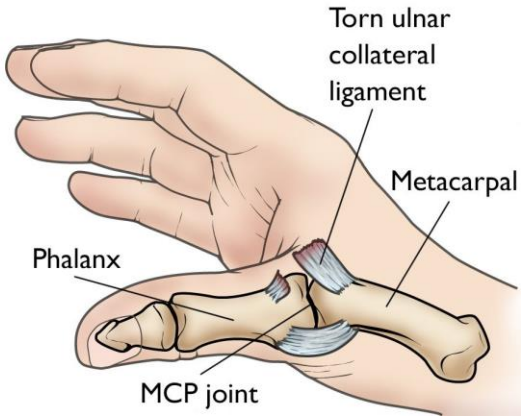
- Tenosynovitis of thumb extensors
- Pain with grasping, twisting and thumb motions
- Seen in women after pregnancy (breastfeeding hold); video game controllers or texting
- Exam: Finkelstein Test
- Tx: thumb spica splint, NSAIDs, injection

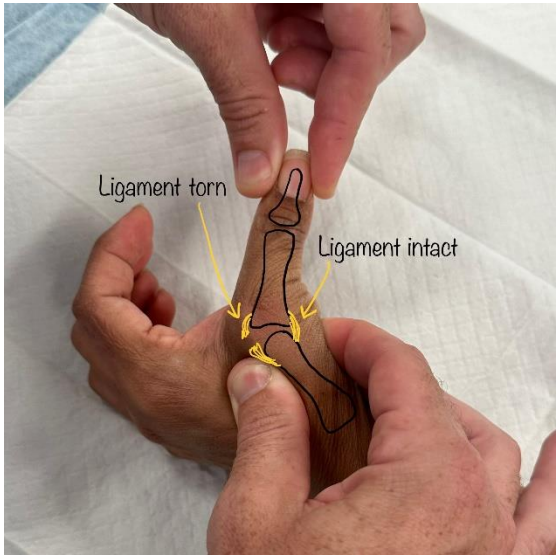


Thumb CMC Arthritis

- Women >> Men
- > 50 years old
- Pain with grip and opening jars
- 30% concomitant with carpal tunnel syndrome
- Tx: hand therapy, splints, steroid injections, surgery

Thumb UCL Injury





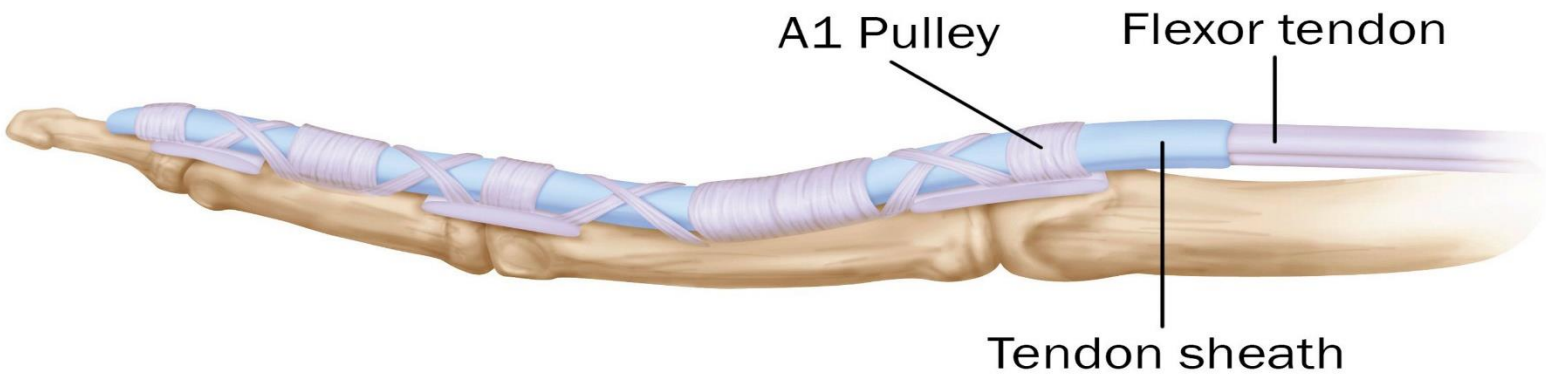
- AKA “Skier’s thumb” or “Gamekeepers thumb”
- UCL tears off proximal phalanx (Stener lesion)
- Tenderness over ulnar MP joint and laxity with stress
- Tx:
  - Pain and tenderness at UCL wo laxity- cast/ splint in adduction 3-4 weeks
  - Laxity- surgical repair with 6 weeks of immobilization

Mallet Finger

- Disruption of the distal end of extensor tendon from forced flexion of DIP joint
- Common even with minor trauma
- Tx: Splint with the DIP in extension and the PIP free; FULL TIME SPLINT x 6-8 WEEKS

Trigger Finger

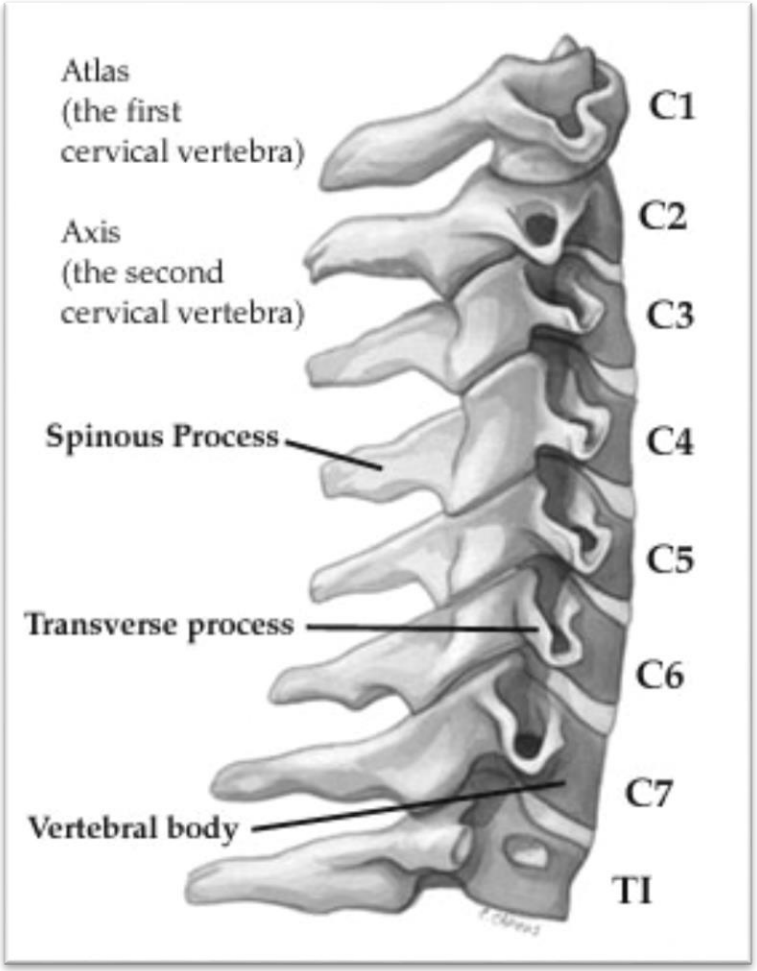
- Associated with increased age, diabetes and RA
- Stenosing tenosynovitis
- Pain where flexor tendons enter tendon sheath (A1 pulley)
- Catching and locking of the digit
- Tx: Rest/ Splint/ Injections vs Surgical release



Infectious Tenosynovitis

- Risk factors: Diabetes, IV drug use, Immunocompromised
- Kanavel's Four Signs
- 1. Intense pain with passive extension of partly flexed finger
- 2. Finger is held in flexion
- 3. Uniform swelling along entire finger
- 4. Tenderness along course of tendon sheath

Cervical Spine



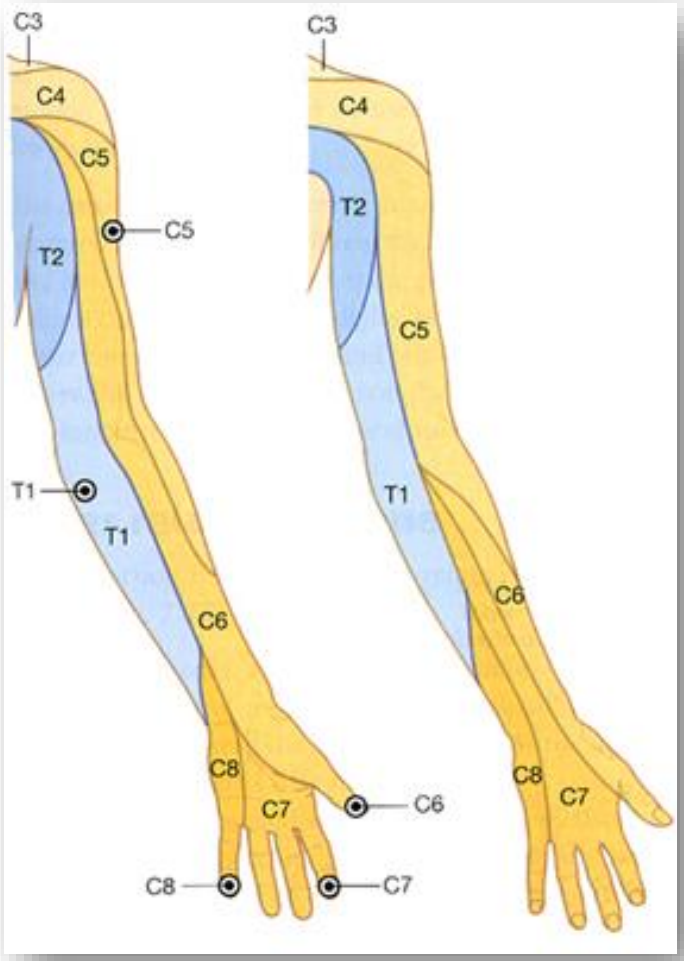
- 7 Cervical Vertebrae
- 8 Cervical Nerves
  - Cervical nerve exits above the corresponding cervical vertebrae
- Lordosis curvature
- Physical Exam: assess postural alignment, gait, muscle strength, atrophy, reflexes, ROM

Cervical Spine

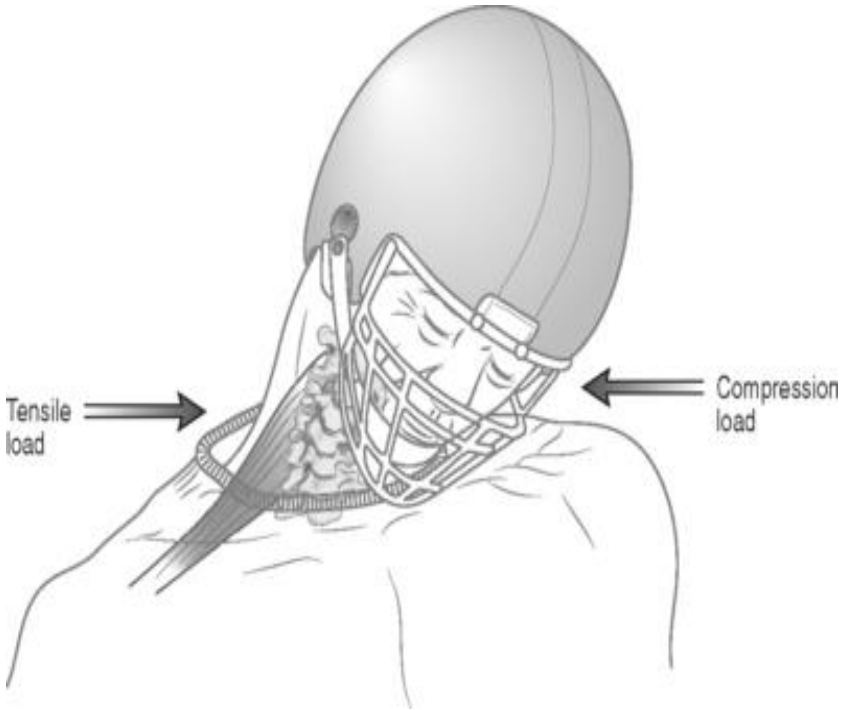
C4	Trapezius	Shoulder elevation	
C5	Deltoid	Shoulder abduction	Biceps tendon reflex
C6	Bicep/wrist extensors	Elbow flex/wrist ext	Brachioradialis reflex
C7	Triceps	Elbow extension/wrist flex	Triceps tendon reflex
C8	Finger flexors	Hand grip	
T1	Hand interossei	Finger	

Cervical Spine

- Cervical Dermatomes
  - C5: Lateral Forearm
  - C6: Thumb
  - C7: Middle Finger
  - C8: Small Finger
  - T1: Medial Forearm



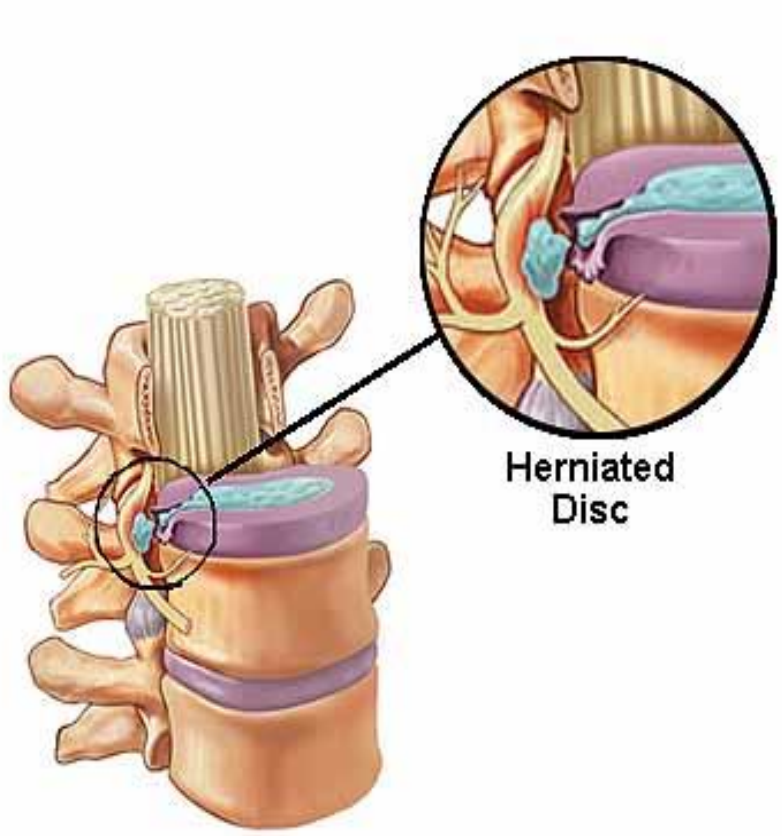
Brachial Plexus



- Burner/ Stinger
- Transient neurapraxia of cervical nerve roots
- Unilateral upper extremity weakness
- Hold from competition until ROM/ strength returns; length of time is variable

Cervical Disc Herniation

- Less common than lumbar spine
- Patients may experience “shooting” pains down arm
- Often presents as referred pain
- Exam: Spurling Maneuver



Cervical Myelopathy

- Presents with neck pain, clumsiness in hands, gait imbalance; >55 years old
- Compression of Spinal cord commonly caused by cervical spondylosis (degenerative)
- C5-6 most common level
- Hoffman's Test- hold middle finger and flick distal phalanx into ext.; involuntary contraction of thumb IP joint is positive
- Better prognosis with early detection and surgical release

Non-Steroidal Anti-Inflammatory Drugs

- Mechanism of Action
  - NSAIDs work by inhibition of the enzyme cyclooxygenase (COX-1 and COX-2)
  - Cyclooxygenase converts arachidonic acid into thromboxanes, prostaglandins and prostacyclines
  - The effects of NSAIDs is due to lack of these Eicosanoids
  - Thromboxane- platelet adhesions
  - Prostaglandins- cause vasodilation and increase temperature
- COX-1
  - Expressed in the body
  - Maintains GI mucosal lining, kidney function and platelet aggregation
- COX-2
  - Expressed during an inflammatory response

Non-Steroidal Anti-Inflammatory Drugs

- Nonselective COX Inhibitors
  - Diclofenac
  - Etodolac
  - Ibuprofen
  - Indomethacin
  - Meloxicam
  - Naproxen

- COX-2 Inhibitors
  - Celecoxib (Celebrex)
  - Rofecoxib (Vioxx)
  - Valdecoxib (Bextra)

- Lower risk of GI issues/ ulcers with COX-2 Inhibitors
- Monitor kidney function with any use of NSAIDs
- Avoid in patients taking blood thinners and patients with concussions

Non-Steroidal Anti-Inflammatory Drugs

- Aspirin (Acetylsalicylic Acid)
  - Non-selective and irreversibly inhibits both COX-1 and COX-2
  - Low dose (81 mg/day): inhibits platelet generation of thromboxane resulting in an antithrombotic effect
  - Intermediate dose (4 g/day): inhibits COX-1 and COX-2, blocking prostaglandin production, as well as analgesic and antipyretic effects
  - High dose (8 g/ day): anti-inflammatory agents in rheumatic disorders
    - Toxicity may include tinnitus, hearing loss and gastric intolerance
- DO NOT give Aspirin to children and teenagers recovering from chickenpox or flu-like symptoms due to the risk of Reye's syndrome (swelling of liver and brain)

Tylenol (Acetaminophen)

- Tylenol (Acetaminophen)
  - Analgesic- elevates the pain threshold
  - Antipyretic (fever reducer)- works on the heat-regulating center of the brain
  - Typical dose: 500 mg every 8 hours; Maximum daily dose is 4 grams
    - May be packaged as 325 mg/ tab or 500 mg/ tab
  - Post-op: 1000 mg oral every 6 hours SCHEDULED
  - Metabolized by the liver (limit with hepatic impairment)
  - Ofirmev (IV Acetaminophen)- 15-minute IV infusion of 1000 mg Acetaminophen

Opioid Pain Medication

- Oxycodone (OxyContin, Roxicodone, Percocet)
- Hydrocodone/ Acetaminophen (Vicodin, Norco, Lortab)
- Morphine (MS Contin)
- Hyrdomorphone (Dilaudid and Exalgo)
- Fentanyl (Abstral, Duragesic, Fentora)
- Meperidine (Demerol)
- Methadone (Dolophine, Methadose)
- Codeine

- Mechanism of Action
  - Influence the release of chemical from the brain's internal reward system that can calm our emotions and give you a sense of pleasure
  - Slow down autonomic functions such as breathing and heart rate
  - Slow or reduce pain signals before they get to the brain
- Side Effects
  - Nausea/ fatigue/ Constipation
- Reversal with Narcan (Naloxone)- opioid antagonist, blocks receptors

Medications

- Gabapentin (Neurontin)
  - May be effective in treating peripheral neuropathy and/ or radiculopathy (nerve pain)
  - Typically start Gabapentin 300 mg QHS; can titrate up to a max of 900 mg/ day
  - In older adults, start at 100 mg and titrate every 3-4 days
  - Consider drug cost: trial Gabapentin over Pregabalin (Lyrica)
  - Taper Gabapentin over 7 days or more to D/C

Medications

- Muscle Relaxers:
  - Antispasmodic- more for myofascial pain
    - Methocarbamol (Robaxin)
    - Flexeril (Cyclobenzaprine)
    - Carisoprodol (Soma)
    - Metaxalone (Skelaxin)
  - Antispastic- treat spasticity associated due to damaged nerve pathways (MS, CP, Stroke, ALS, etc.)
    - Baclofen (Gablofen)
  - Antispastic and Antispasmodic
    - Tizanidine (Zanaflex)

Glucocorticoids

- Prednisolone/ Betamethasone/ Dexamethasone/ Hydrocortisone/ Methylprednisolone/ Deflazacort
- Work by reducing inflammation or the effect of the persons immune system
- May help with Rheumatoid Arthritis, Polymyalgia Rheumatica, nerve root irritation from disk herniation
- If taking high dose (40 mg more than 1 week) or any dose longer than 3 weeks, don’t D/C suddenly

Glucocorticoids

- Side-effects of Oral Steroids
  - Osteoporosis
  - Weight gain
  - Increased chance of infection
  - Increase in blood pressure
  - Hyperglycemia
  - Mood and Behavioral changes
  - Cushing Syndrome
  - Skin problems
  - Muscle Weakness
  - Increased risk of cataracts
  - Avascular Necrosis
  - Increased risk of ulcers

Glucosamine Chondroitin

- Components of normal cartilage and appear to stimulate the body to make more cartilage
- Evidence to support is very conflicting
- Supplements are very well tolerated with little to no side effects
- May take up to 6 months to notice any improvements

Osteoporosis Medications

- Vitamin D (1,500-2,000 IU/ daily in adults)
  - Increases absorption of calcium, magnesium, phosphate
  - Foods (fatty fish, dairy products) and Sun exposure
  - Deficiency (<30 mg/mL): 50,000 IU/ weekly for 8 weeks
- Prolia® (Denosumab)
  - Treatment of postmenopausal women with osteoporosis at high risk for fracture
  - Inhibits osteoclast formation to decrease bone breakdown
- Bisphosphonates (Fosamax/ Reclast)- slows down bone resorption to strengthen bones

trandolph@hsc.wvu.edu
(706) 247-1094
@TLRWVUFan