Weekend Warriors:
"What's causing all this pain?"

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Disclosures

- No Financial Disclosures

Orthopaedic Topics

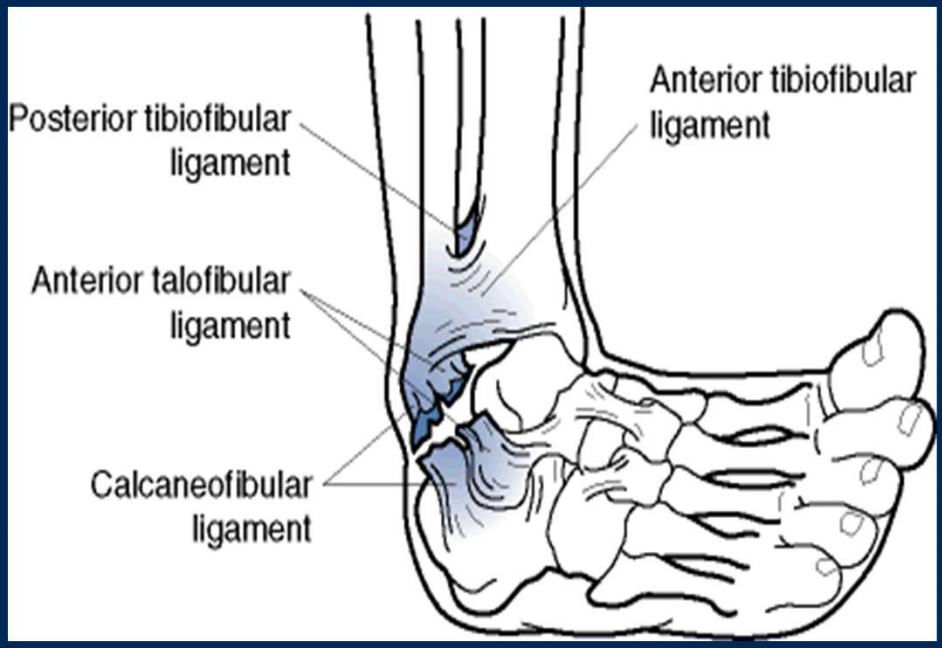
- Ankle Sprains
- Stress Fractures
- Meniscus Tears
- Ligamentous Injuries of the knee
- Osteoarthritis
- Hip Impingement/ Bursitis
- Rotator Cuff Injuries
- Shoulder Instability
- AC Joint Injuries
- Elbow/ Wrist/ Hand Sprains/ Strains
- Cervical and Lumbar Spine pathology

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

Ankle Sprains

- Lateral Ankle Sprain (90%)
  - Anterior Talofibular ligament is most commonly injured
  - X-ray to rule out fracture/ avulsion
  - MRI is not typically necessary
  - Short period of immobilization along with physical therapy



Ankle Sprains

- Syndesmosis Injury
  - "High Ankle Sprain"
  - Involves tib/fib ligament
  - MOI: Twisting/ rotational
  - Pain above the ankle
  - May be associated with a fracture
  - Deltoid tenderness???

Gravity Stress View

- Consider a gravity stress view with any Deltoid ligament tenderness or Distal Fibula Fractures to assess for ankle instability
- Medial clear space widening may indicate the need for surgical fixation

Distal Fibula Fractures

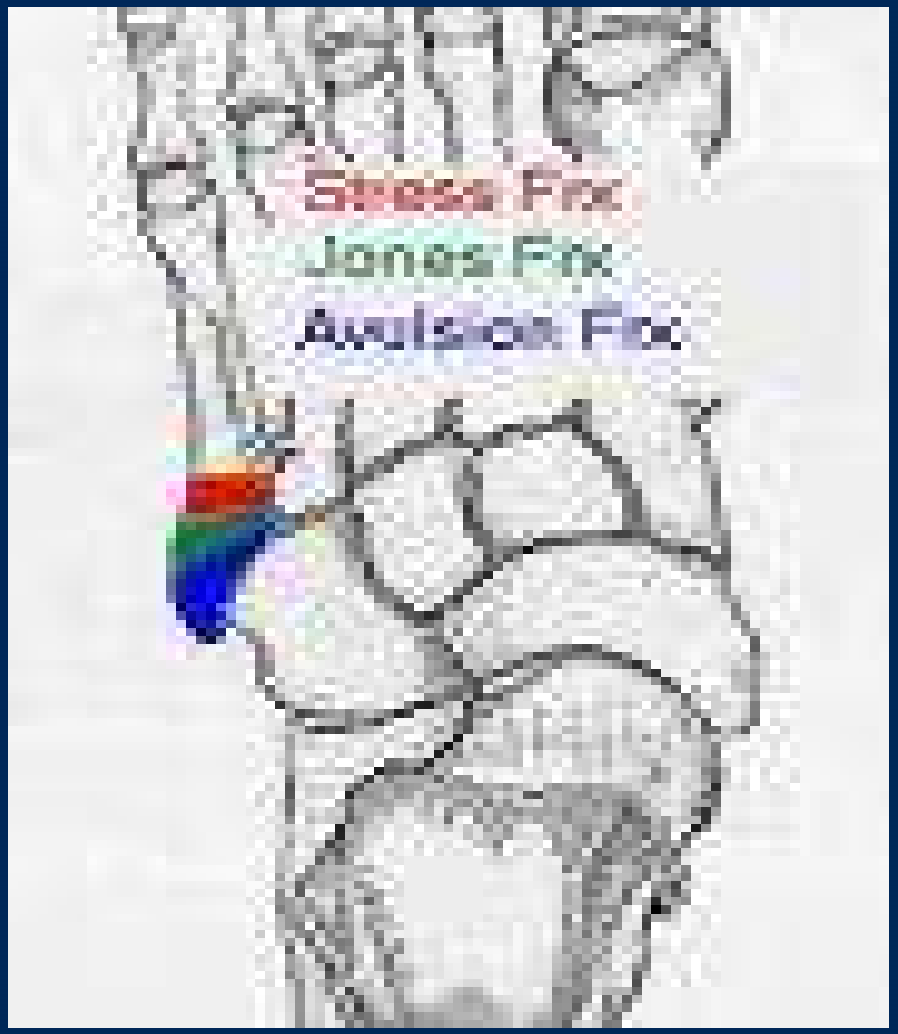
- **Weber Classification**
  - A: below syndesmosis
    - Typically non-op tx.
  - **B: at syndesmosis**
  - C: above syndesmosis

Maisonneuve Fracture

- ALWAYS check proximal Fibula!
- Fracture may be located at fibular head

- MOI: external rotation (twisting) force
- Typically requires surgical fixation

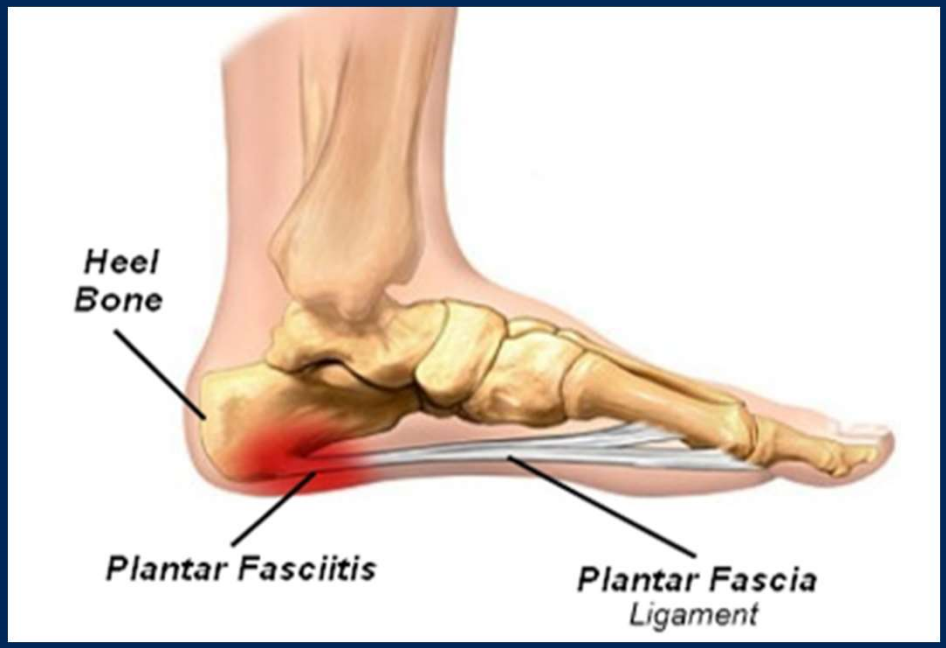
5th Metatarsal Fracture



- Stress Fracture
- Jones Fracture
  - Watershed Area
  - Surgical fixation
- Avulsion Fracture
  - Most Common
  - Non-op tx
  - WBAT in hard sole shoe

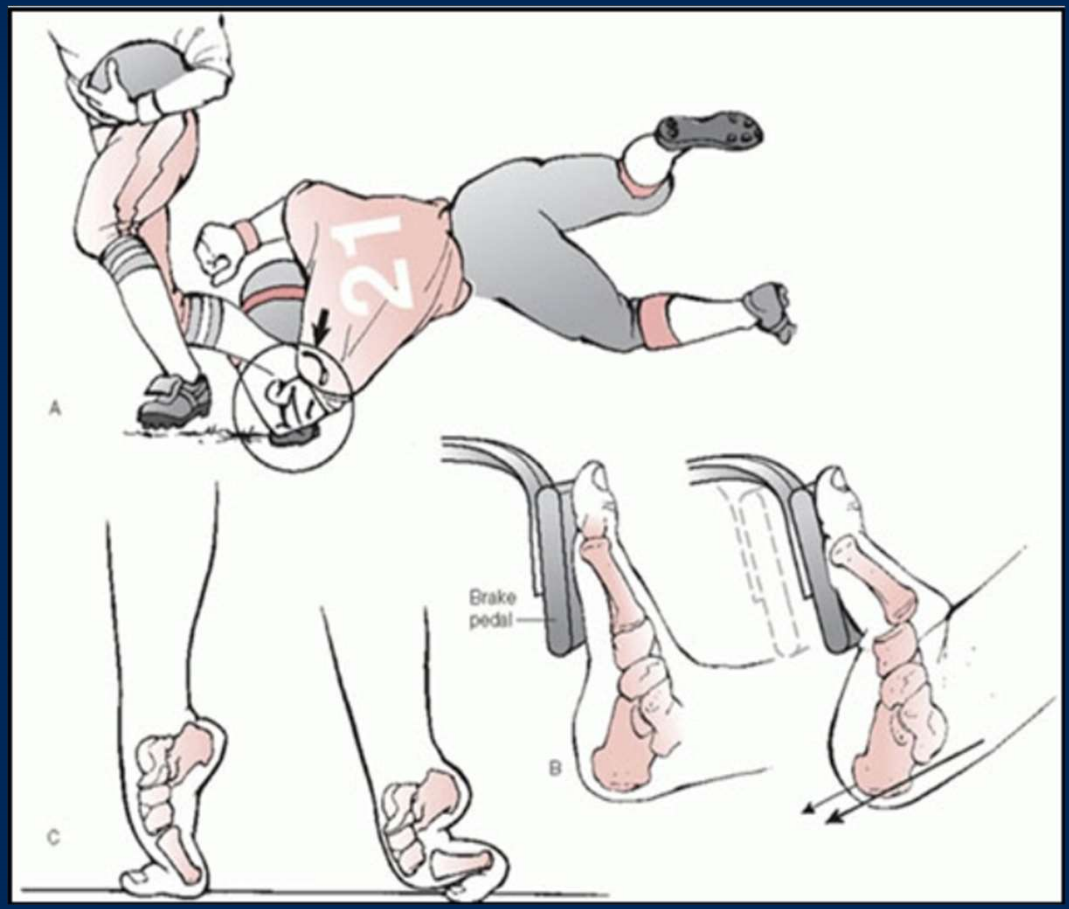
Plantar Fasciitis

- Subjective: heel pain with walking; most severe with initial steps out of bed
- X-ray may reveal a calcaneal bone spur
- Treatment: NSAIDs, Ice massage, stretching, night splint in neutral position
- Injections may increase risk of fascia rupture



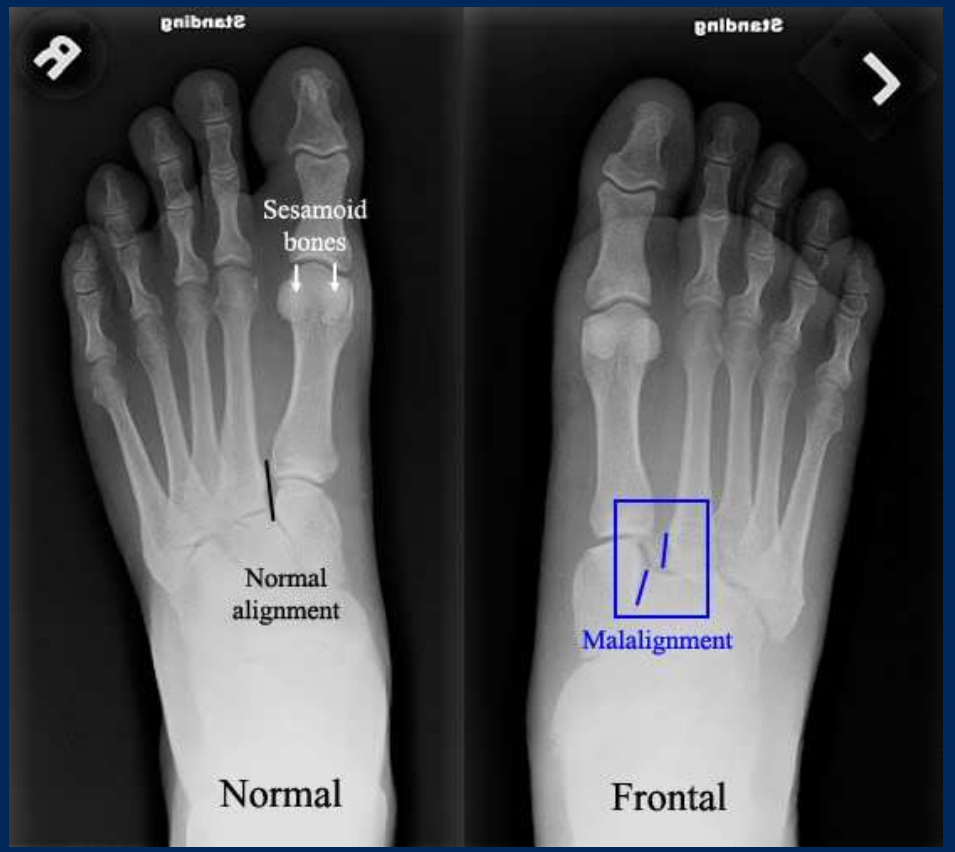
Lisfranc Fracture

- Midfoot injury involving the Medial Cuneiform and 2nd metatarsal
- Common in football and soccer
- MOI: twist and fall, hyperplantarflexed axial load, fall from height
- Difficulty bearing weight



Lisfranc Fracture

- SIGNS: plantar ecchymosis and pain with palpation of midfoot
- Foot x-ray must be weight-bearing; consider comparison view of other foot
- Fractures- consider CT
- Normal x-ray with suspicious exam- MRI



Achilles Tendon Rupture

- Largest tendon in body
- Watershed region approx. 4 cm proximal to insertion on calcaneus; most likely area to rupture
- Patient may report an audible “pop”
- “Felt like I was kicked”

- History
  - Injections?
  - Pre-existing Disease?
  - Age? Typically in 40s
  - Antibiotics: Quinolones?
- Physical Exam
  - Swelling/ Ecchymosis
  - Contour
  - Thompson Test

Achilles Tendon Rupture

- Always splint injury in plantarflexion and non-weight bearing
- MRI only if necessary; don't delay treatment
- Op vs Non-Op tx
  - Infection risk?
  - Rate of re-rupture?
  - Timing?

Stress Fractures

- More than 50% occur in the lower extremity
- MOI: Overuse injury, increasing activity too rapidly, unfamiliar surface, improper equipment, poor nutrition
- Female Athlete Triad: Eating Disorder/ Amenorrhea/ Osteoporosis

Evidenced Based Medicine: Stress Fractures

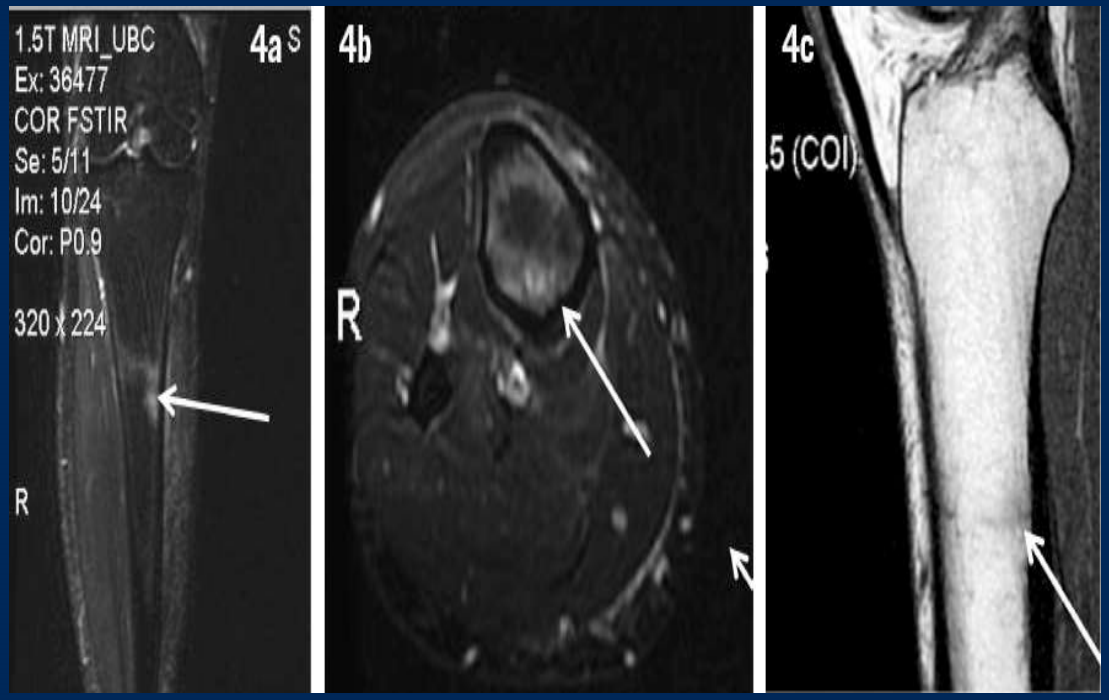
- X-rays
  - Sensitivity of 15-35% on initial examination
  - Sensitivity increases to 30-70% at 2-3 week follow-up evaluation
  - Should obtain plain film x-rays prior to advanced imaging
- MRI
  - MRI has surprassed bone scans in imaging for stress fractures
  - MRI is 90-100% sensitive and up to 85% specific
  - Bone Scans are 90% sensitive but only 50% specific for stress fractures

Stress Fractures

Treatment

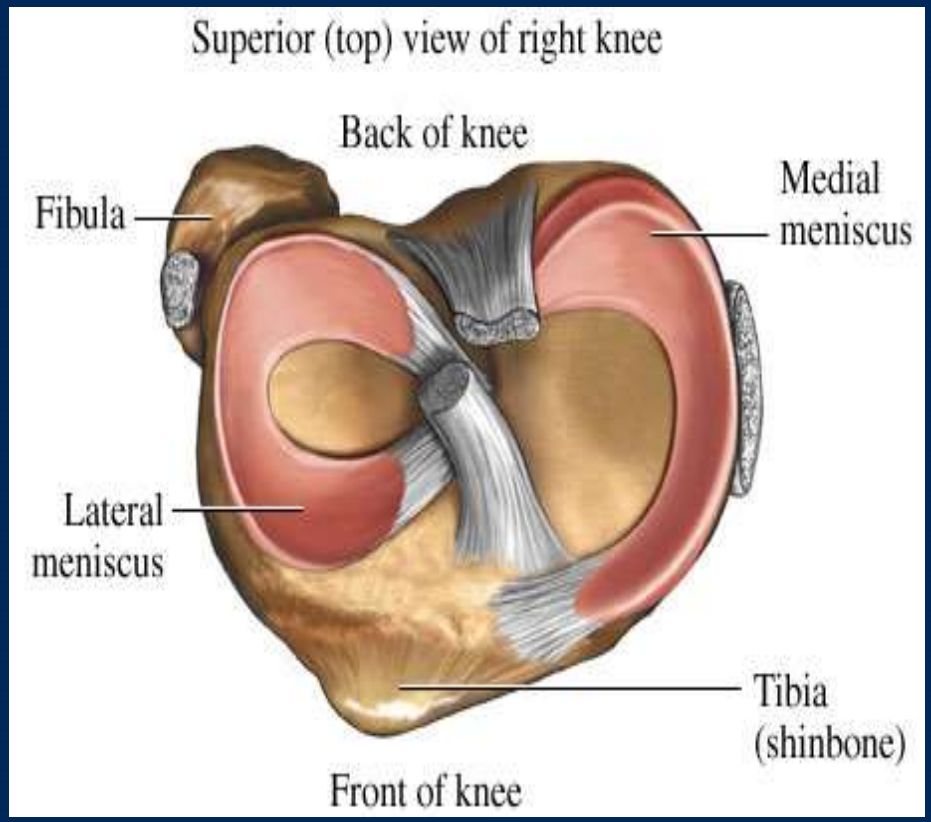
- REST
- Alleviate activity causing stress; cross train
- Evaluate and correct any biomechanical issue
- Correct nutritional deficiencies; Vit. D
- Gradual return to play progression after pain free

MRI



Meniscus Tears

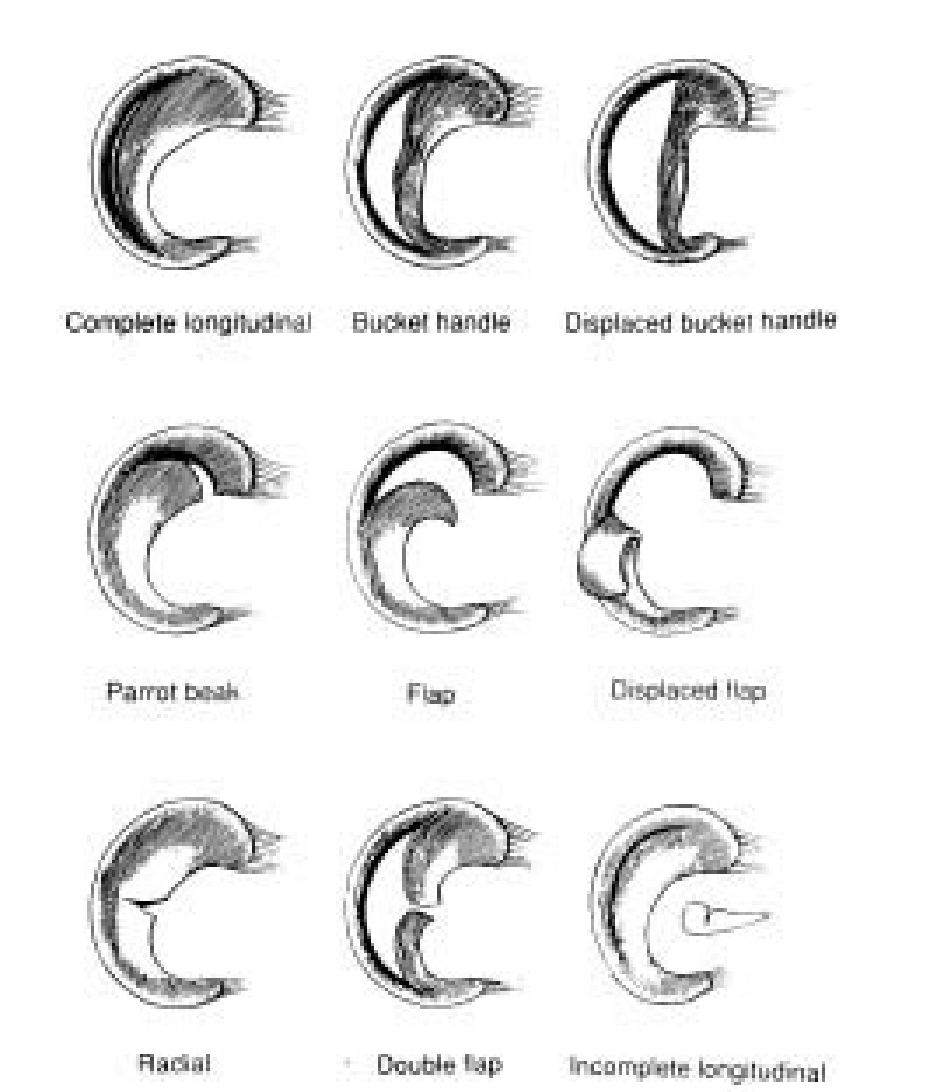
- Cartilage that provides “shock absorption” and secondary knee restraints
- MOI: squatting and twisting movements
- Patients may report catching/ locking of knee, delayed knee effusion
- Medial Meniscus Tears are most common



Meniscus Pathology

- Types of Meniscus Tears
  - Vertical Longitudinal Tear
    - Bucket-handle tear (3 times more common in medial meniscus)
    - Typically involves posterior portion of meniscus
  - Radial Tear
    - Most common in medial aspect of lateral meniscus; may be associated with a meniscal cyst
  - Horizontal Cleavage Tear
  - Flap Tear
  - Oblique Tear
    - Full thickness tear running obliquely from the inner edge of the meniscus into the body of the meniscus

Meniscus Pathology



- MENSICAL ZONES
- Red – Red
  - Vascular zone in the peripheral 1/3 with best chance of healing
- Red – White
  - Middle 1/3 with intermediate healing potential
- White – White
  - Inner 1/3 avascular zone

Meniscus Tears

- Start with wt. bearing x-ray of knee
- Exam: joint line tenderness, McMurray's, + effusion, dec ROM
- MRI is indicated for mechanical symptoms
- Op vs Non-op Tx
  - Repair vs Debridement

Meniscus Tears

- Bucket Handle Meniscus Tear
- “Double PCL Sign”
- Lacks full knee extension on physical exam
- Make patient non-wt. bearing, STAT MRI and refer to Orthopaedics

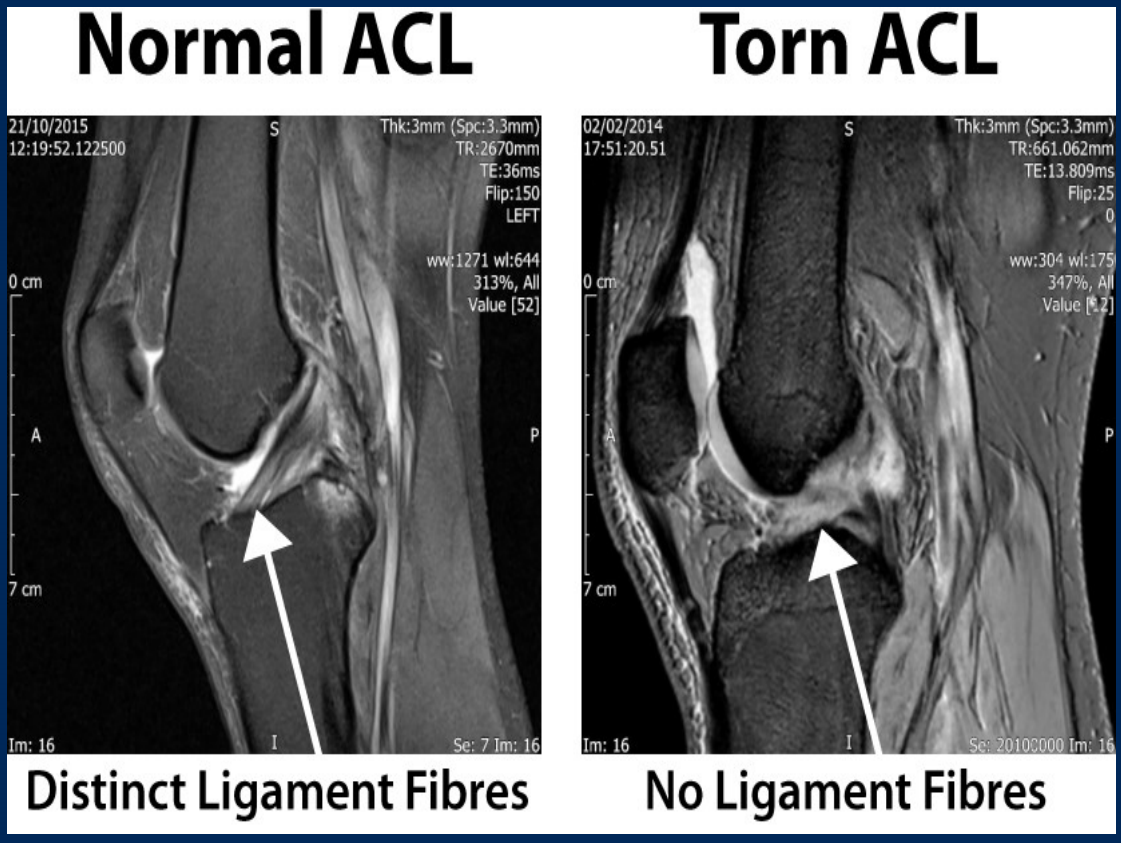
Anterior Cruciate Ligament (ACL) Tear

- MOI: twisting, change of direction, hyperextension, deceleration
- Contact vs Non-contact
- Patient may hear or feel a “pop” in the knee
- Sensation of instability
- Immediate swelling

Anterior Cruciate Ligament (ACL) Tear

Segond Fracture

MRI



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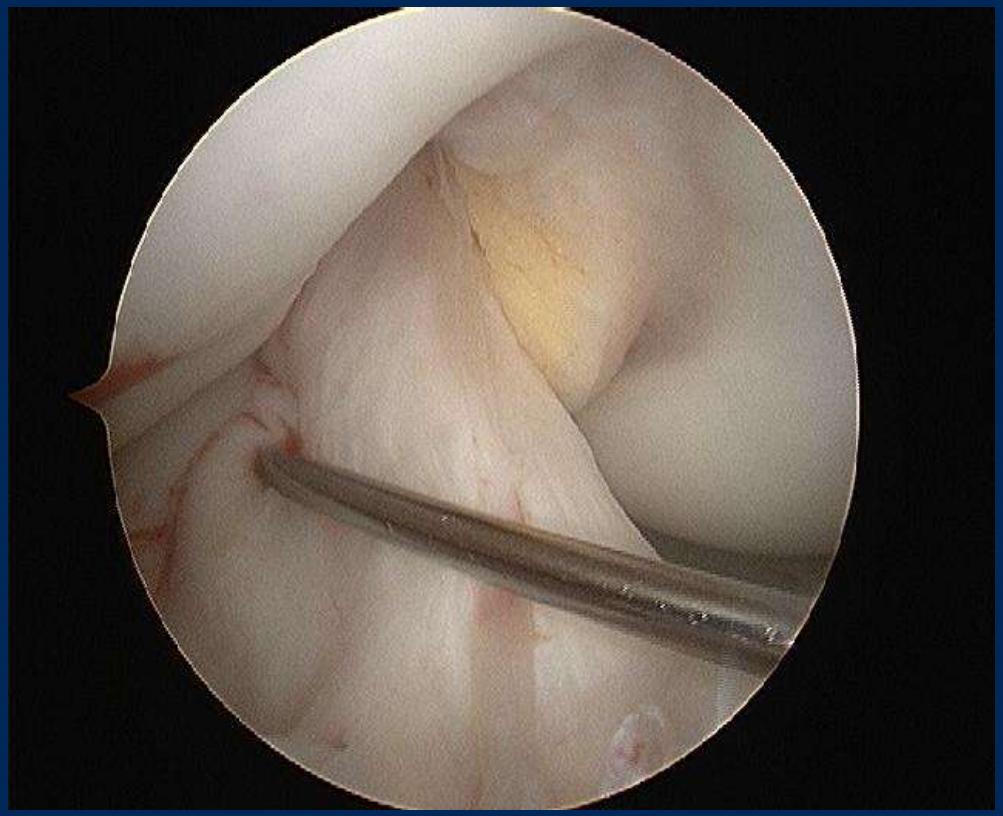
Anterior Cruciate Ligament (ACL) Tear



- Exam: + effusion, dec ROM, + Lachman's test, + anterior drawer
- May have concurrent meniscus tear
- ACL Reconstruction recommended for symptoms of instability
- Non-op: bracing/ PT

Medial Collateral Ligament (MCL)

- MOI: valgus force directed at the lateral aspect of knee
- Exam: TTP over MCL, laxity with valgus stress; check at 0 and 30 degrees of flexion
- Tx: short course of immobilization, PT, gradual return to play

Knee Osteoarthritis

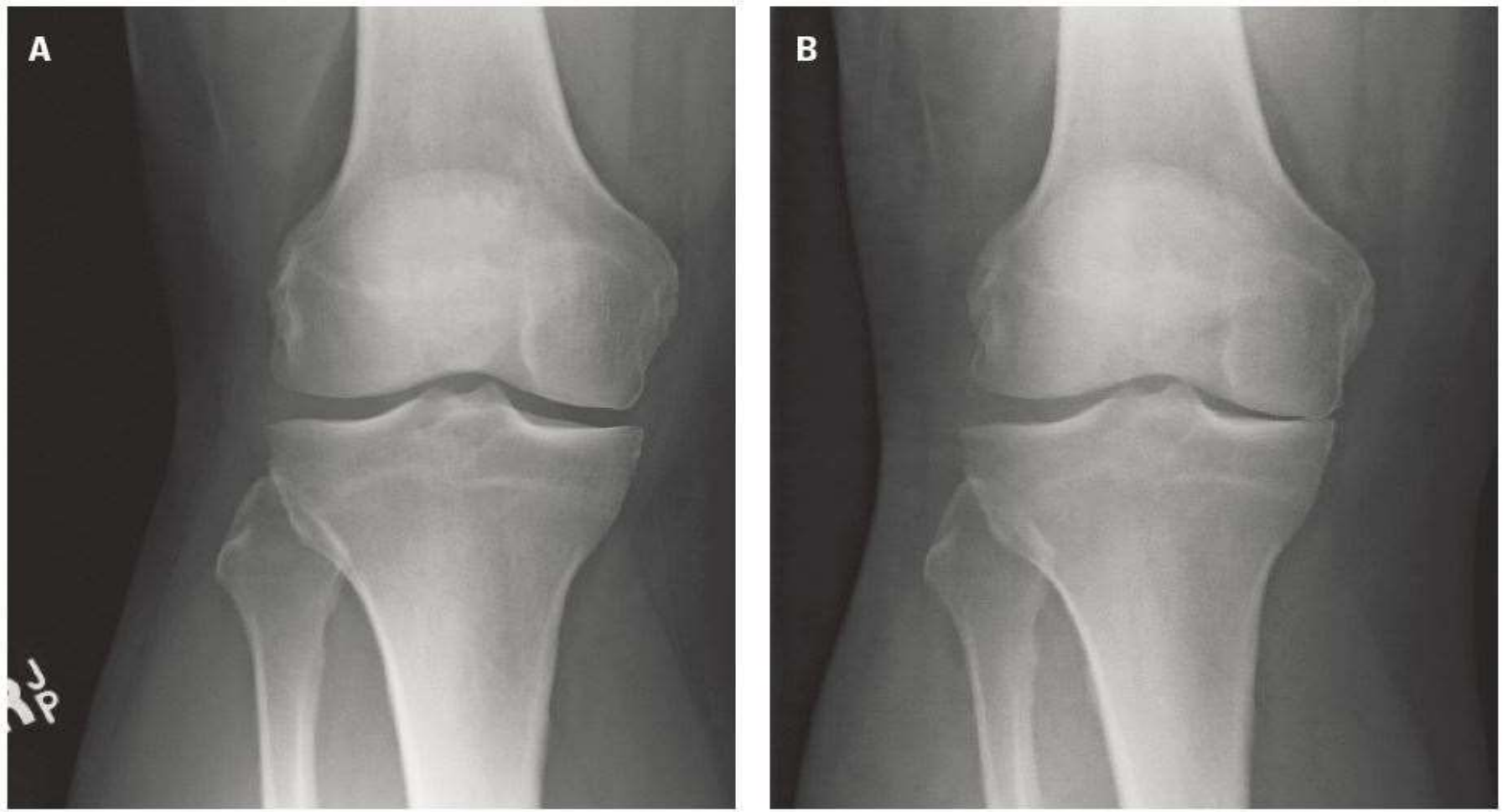


Figure. Two anteroposterior radiographs of the same knee. The non-weight-bearing radiograph (A) shows minimal medial joint space loss, while the weight-bearing radiograph (B) reveals significant loss.

Knee Osteoarthritis

- WT. BEARING X-RAYS!!
- Non-Op Treatment: PT, NSAIDs, Weight Loss, Corticosteroid Injection, Viscosupplementation
- Operative Tx: Partial vs Total Knee Arthroplasty
  - BMI < 45
  - HbA1C < 7
  - Ideally > 60 years old

Septic Arthritis

- Most common joints:
  - Knee
  - Hip
  - Ankle
  - Wrist
  - Shoulder
  - Elbow
- Monoarthritis

- Exam: erythematous, swollen joint; pain with passive ROM
- Cartilage destruction begins as early as 3 days

- Arthrocentesis- avoid traversing area of inflammation or skin lesion

Septic Arthritis

RheumTutor.com

Synovial Fluid Analysis

	NORMAL	Non-Inflammatory	Inflammatory	Septic	Hemorrhagic
Clarity	Transparent	Transparent	Translucent	Opaque	Bloody
Colour	Clear	Yellow	Yellow	Dirty/Yellow	Red
Viscosity	High	High	Low	Variable	Variable
WBC/mm3	<200	200-2,000	2000-10,000 (up to 100,000)	>80,000	200-2,000
PMNs %	<25%	<25%	>50%	>75%	50-75%

Depending on the clinical scenario, synovial fluid is analysed for:

- Cell count and differential
- Crystals
- Culture and sensitivity (if septic arthritis suspected)
- Cytology (if malignancy suspected)

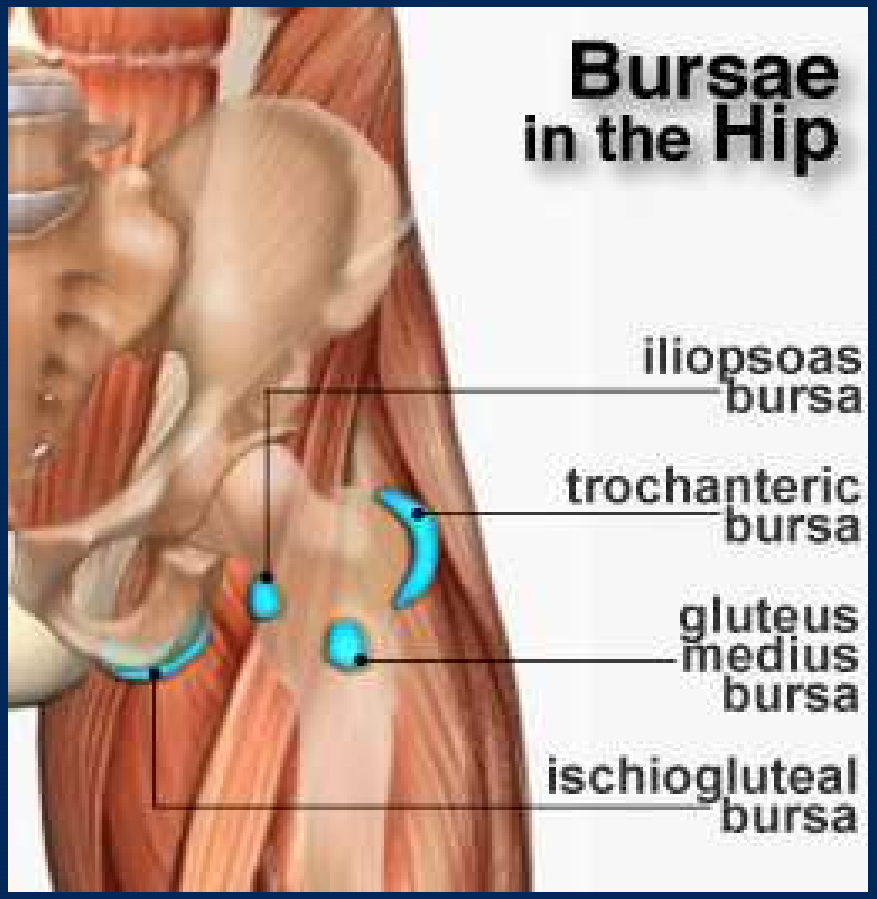
Hip Osteoarthritis

Femoroacetabular Impingement (FAI)

Cam Lesion

Pincer Lesion

Trochanteric Hip Bursitis



- Pain located directly over the greater trochanter and increases with hip flexion
- Tx: NSAIDs and Physical Therapy (core stabilization and IT band stretching
- Corticosteroid injection for persistent symptoms

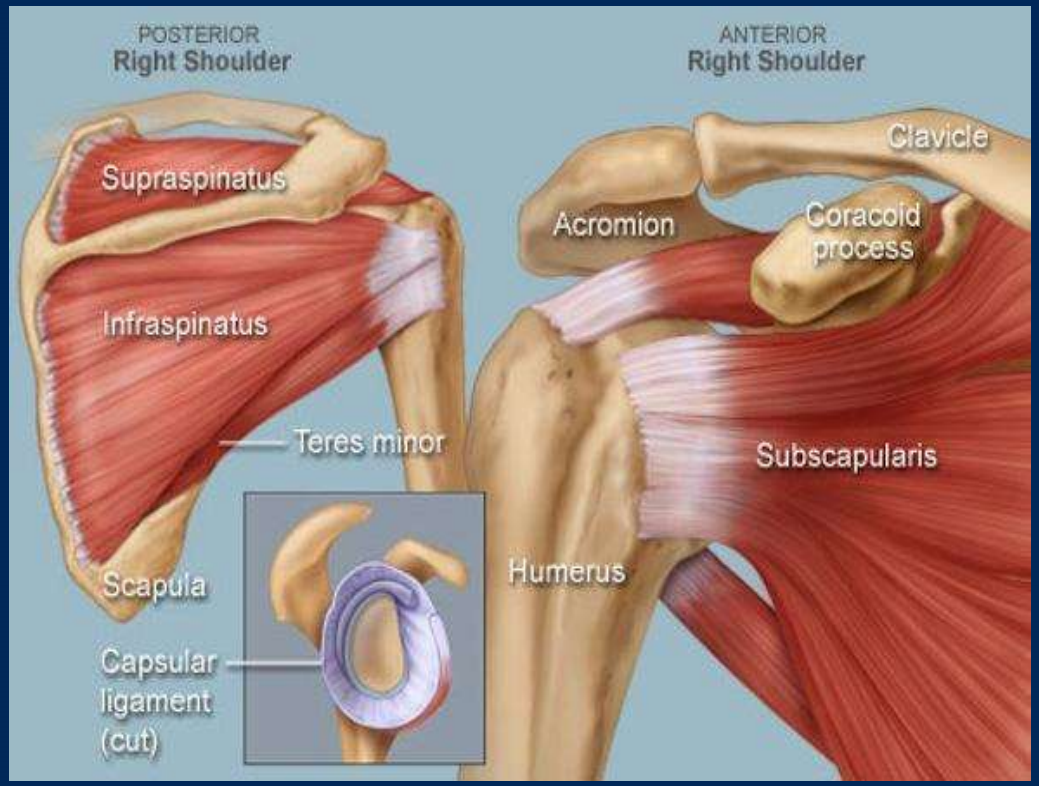
Shoulder Evaluation

- 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 Tear

- MOI: fall on outstretched arm, shoulder dislocation, throwing, pulling movements
- Patients may experience pain at greater tuberosity; pain at night
- May lack the ability to actively forward flex

Rotator Cuff Tear

Figure 1

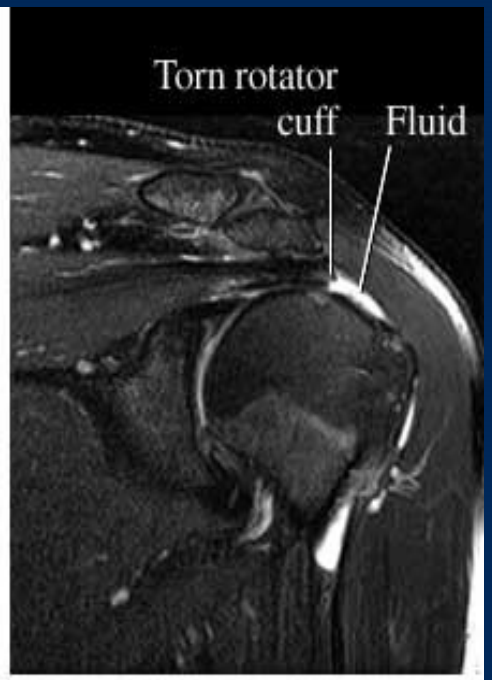


Figure 2

- 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

Adhesive Capsulitis

- Inflammation and thickening of joint capsule
- Painful, gradual loss of shoulder motion
- More common in females and diabetics
- Active and Passive ROM are the same

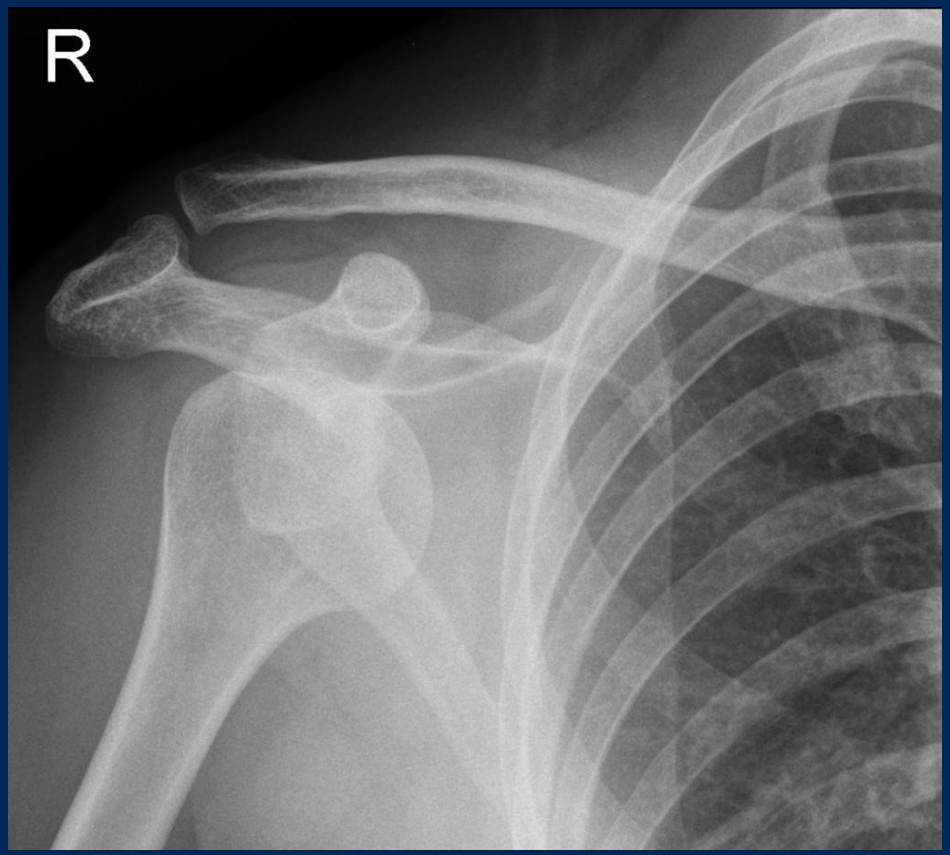
- Treatment
  - Aggressive stretching in physical therapy
  - Corticosteroid injection
  - Typically self-limiting condition over 18 months
  - Surgery for manipulation if conservative tx fails

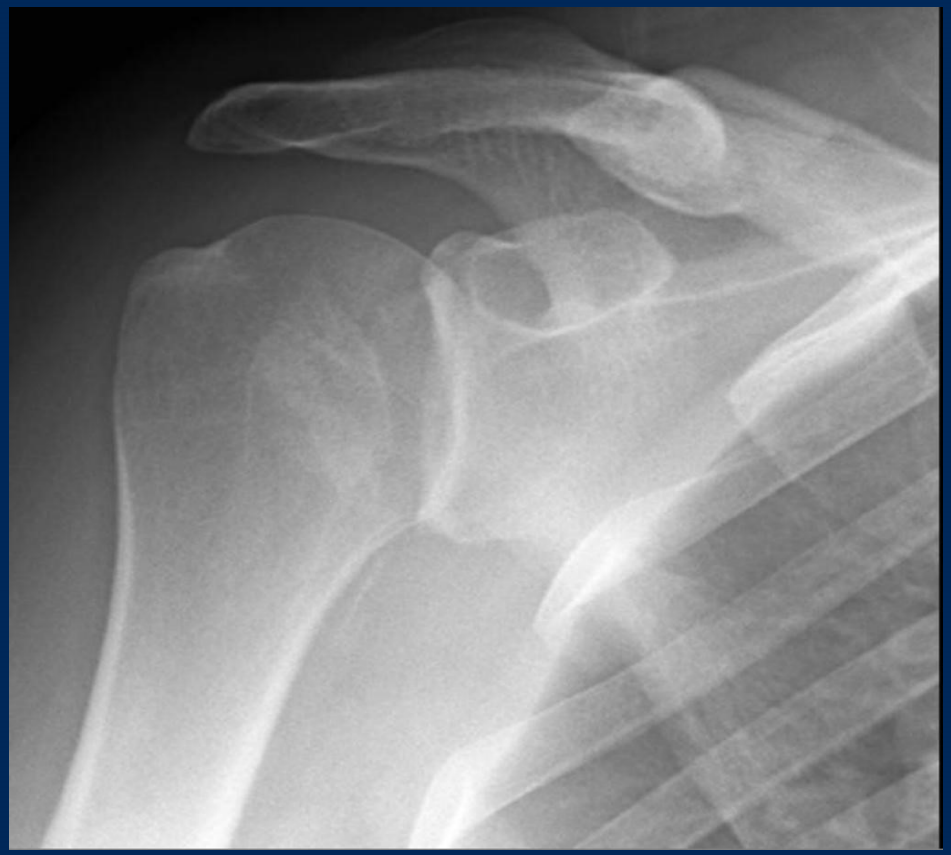
Shoulder Instability

- Anterior Shoulder Dislocation
  - Common in overhead sports
  - MOI: Abduction/ Ext. Rotation

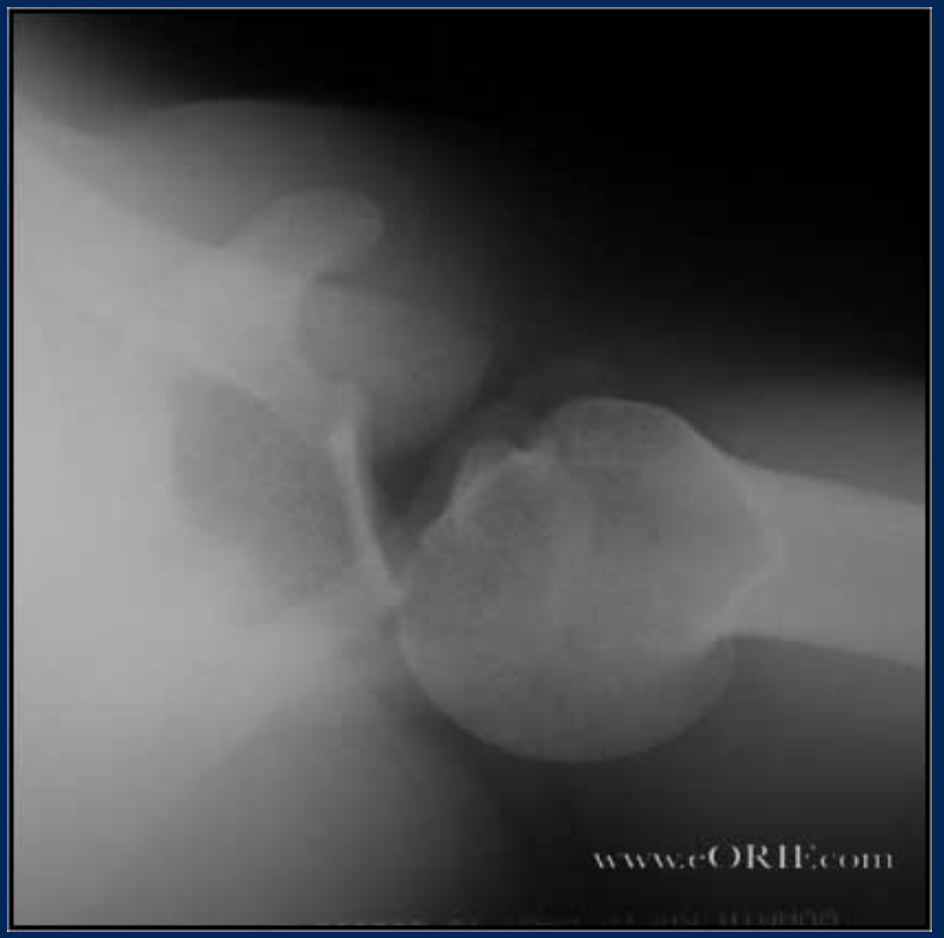
- Posterior Shoulder Dislocation
  - May be caused by trauma, seizure or electric shock

Shoulder Instability



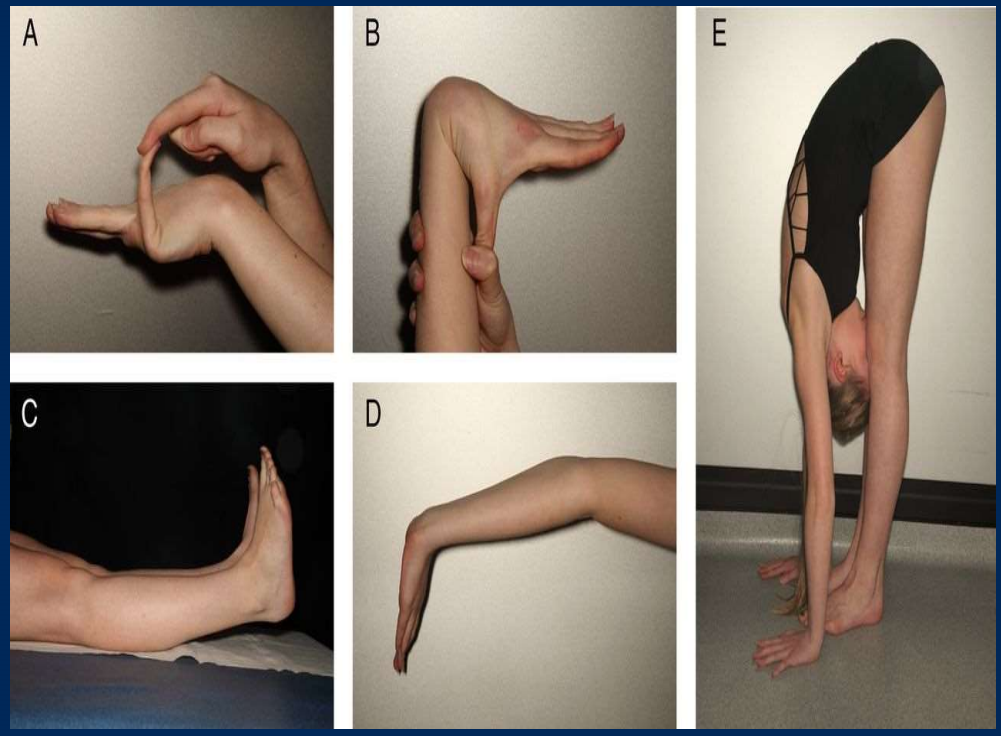


Shoulder Instability



Shoulder Instability

- ALWAYS get an axillary view!
- 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

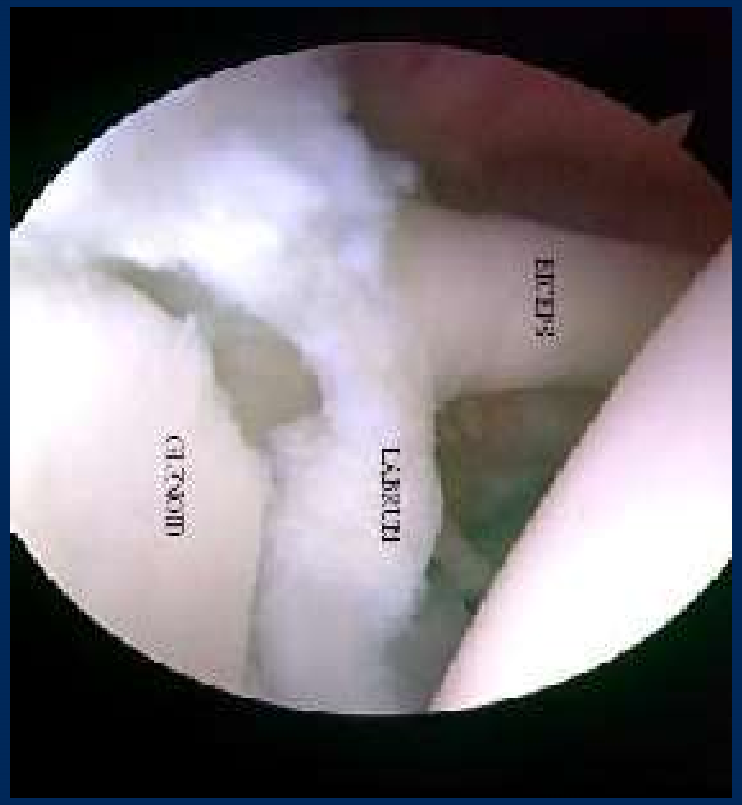


Shoulder Instability

- 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



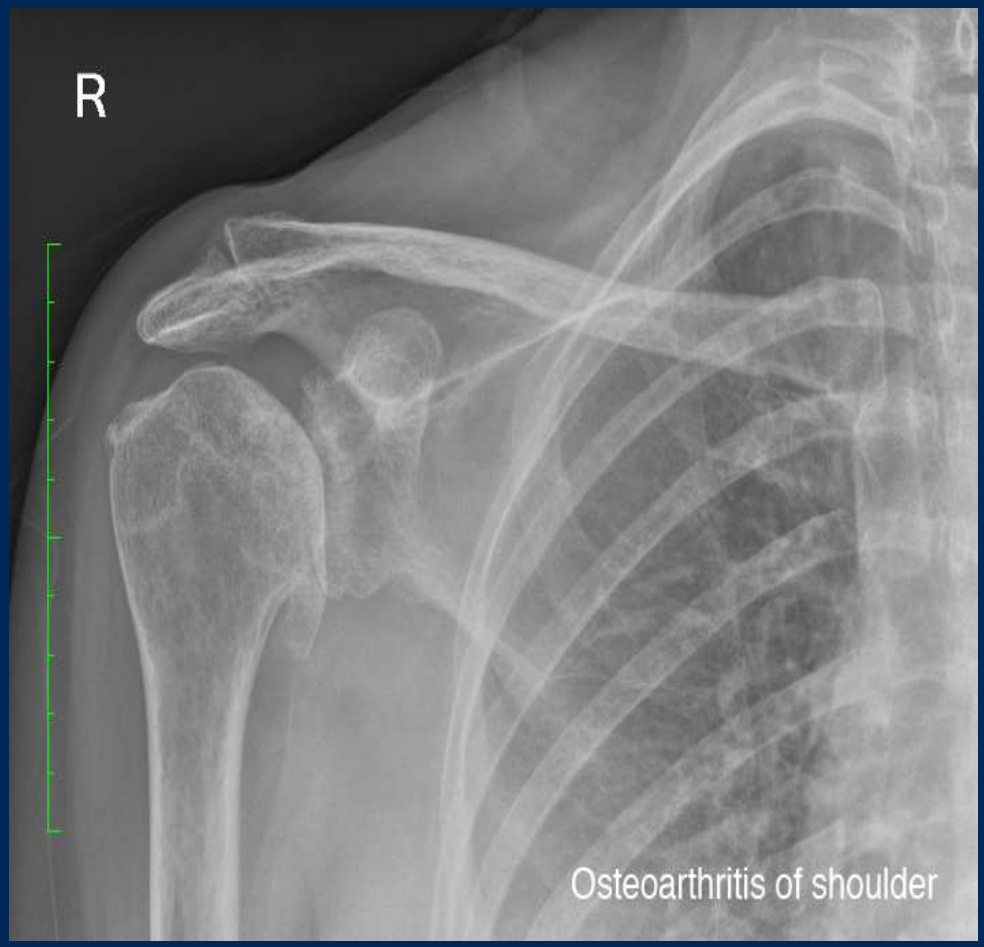
(SICK) Scapula Dyskinesis

- 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

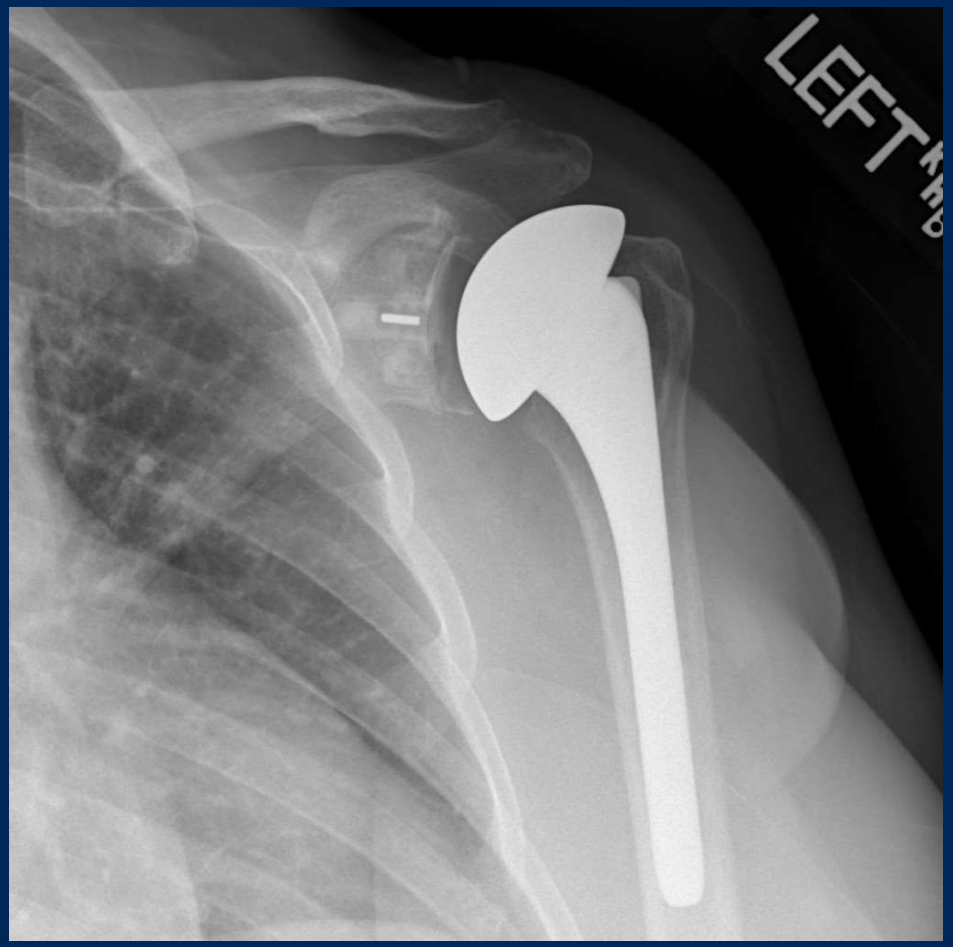
- Shoulder pain (most commonly around coracoid or superior medial border of scapula); may actually complain of GH joint pain only
- Decreased ROM with shoulder flexion
- Scapular Crepitus/ Snapping Scapula
- Perform scapular assist

Shoulder Osteoarthritis

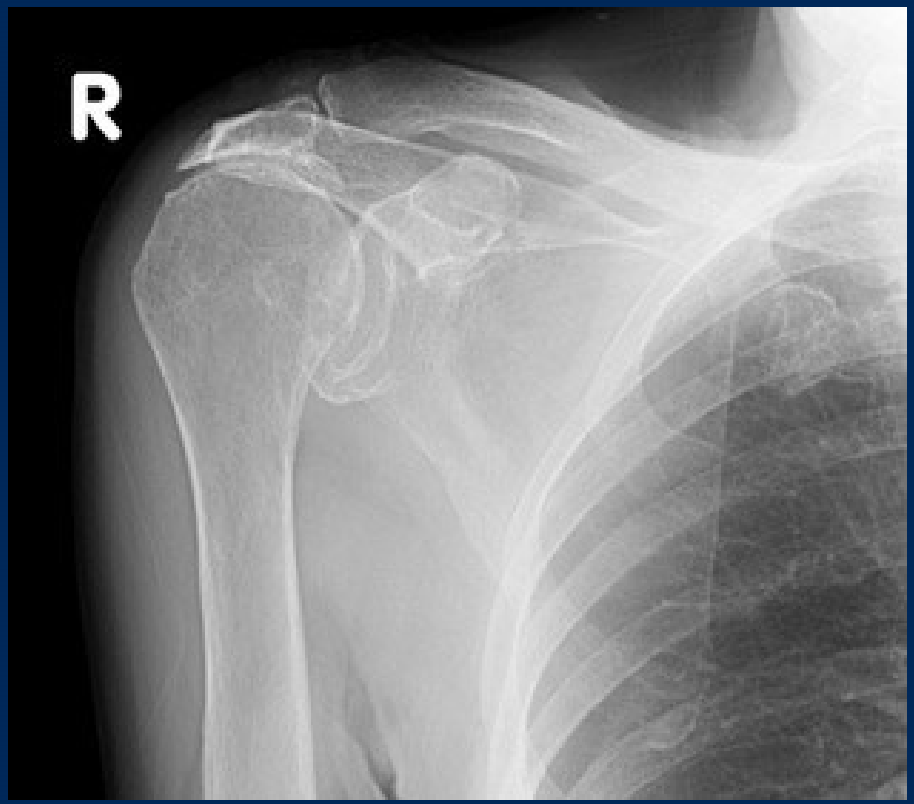


Shoulder Osteoarthritis

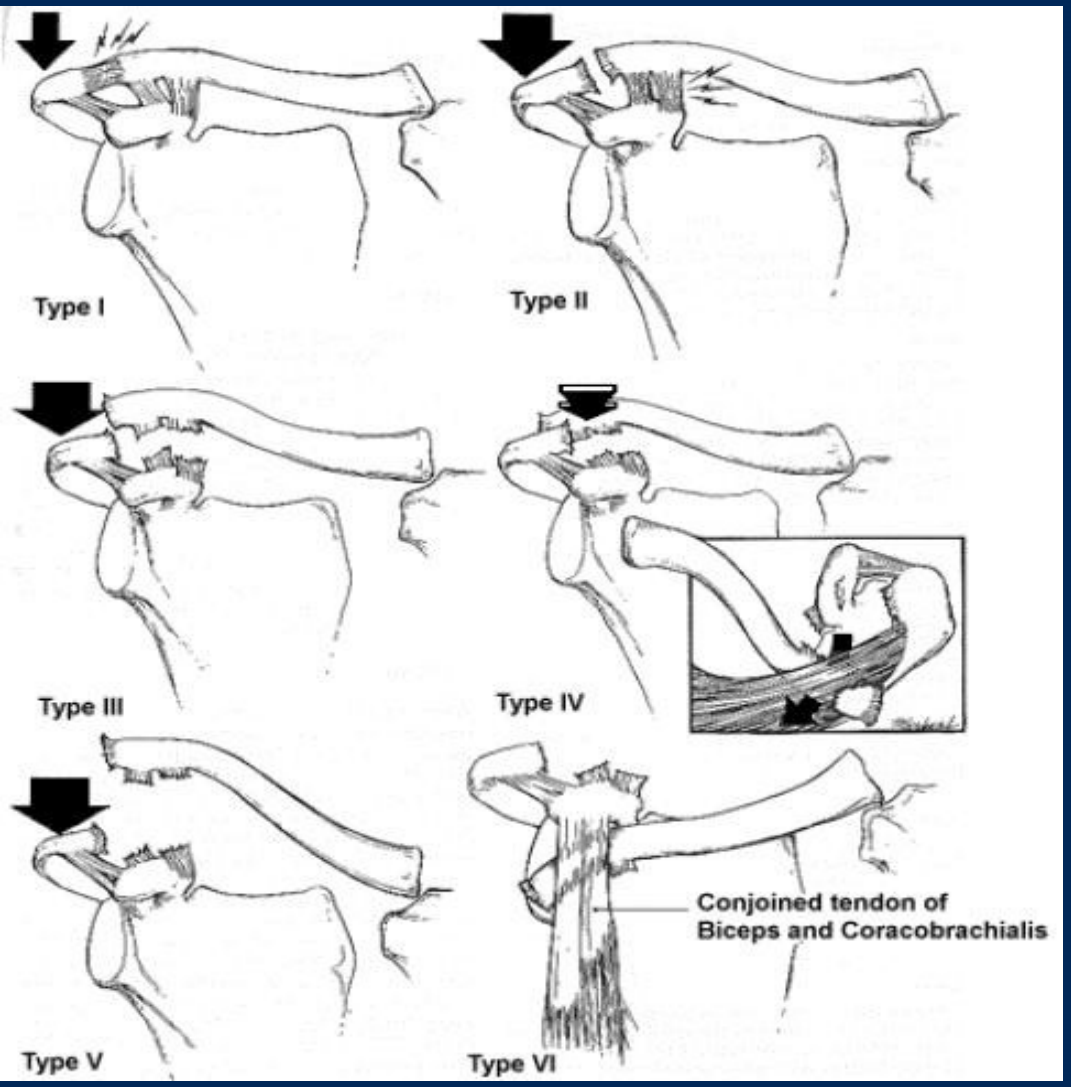
- Non-op Treatment
  - NSAIDs
  - Physical Therapy
  - Corticosteroid Injections
- Operative Treatment
  - Partial/ Total Shoulder Arthroplasty- RTC intact
  - Reverse Total Shoulder Arthroplasty- RTC retracted



Shoulder Osteoarthritis



AC Joint Separations



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

AC Joint Separations

- 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

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 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

Lateral Epicondylitis

- Known as “Tennis Elbow”
- Overuse injury with repetitive wrist extension
- Tendonitis of the common ext. tendon at the lateral epicondyle
- Tx: Rest, NSAIDs, PT, Counterforce Strap, Injection, equipment modifications; surgery as last option

Medial Epicondylitis

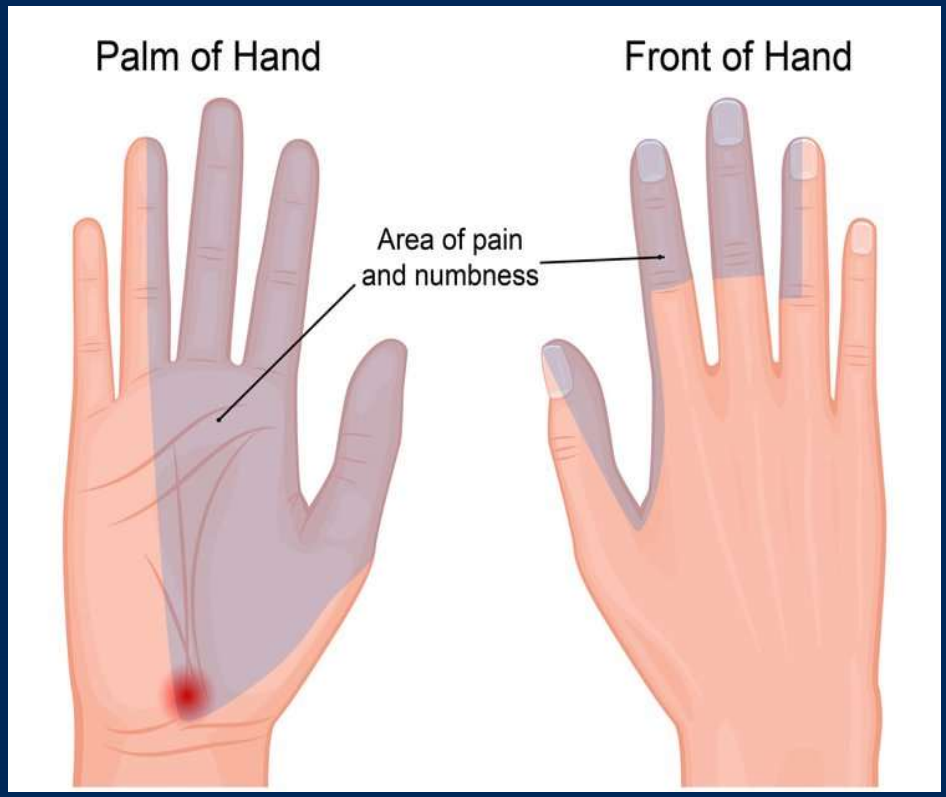
- Golfer's Elbow or Little Leaguer's Elbow
- Caused by repetitive stress with wrist flexion
- Evaluate for Cubital Tunnel Syndrome/ UCL Sprain
- Tx: Rest, NSAIDs, PT, Counterforce Strap, Injection, modify equipment; surgery as last option

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

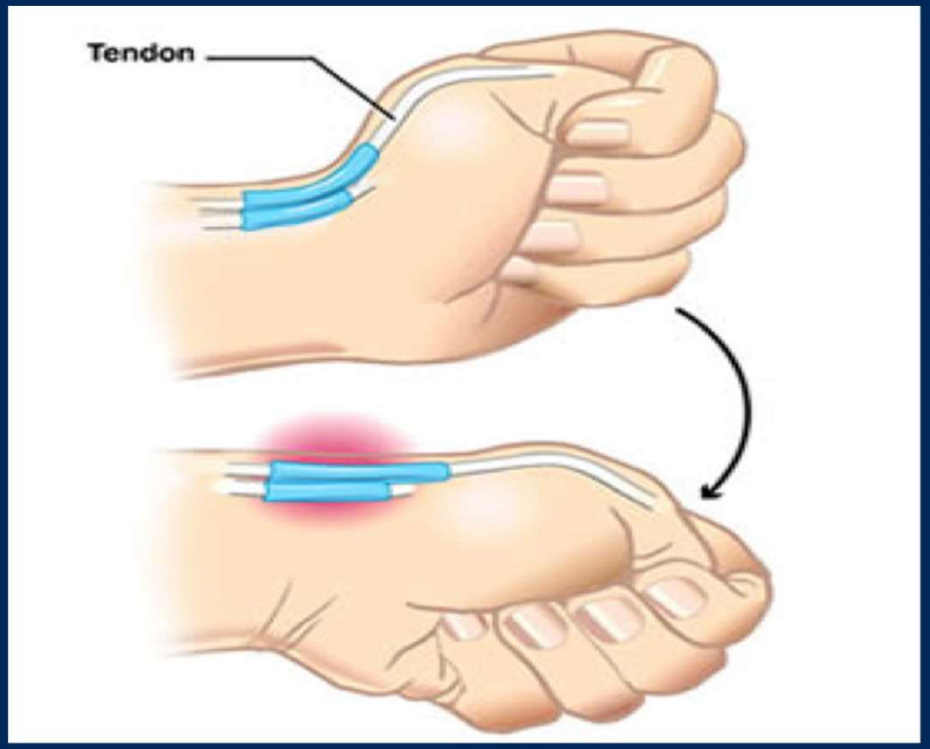
Carpal Tunnel Syndrome

- 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



De Quervain Syndrome

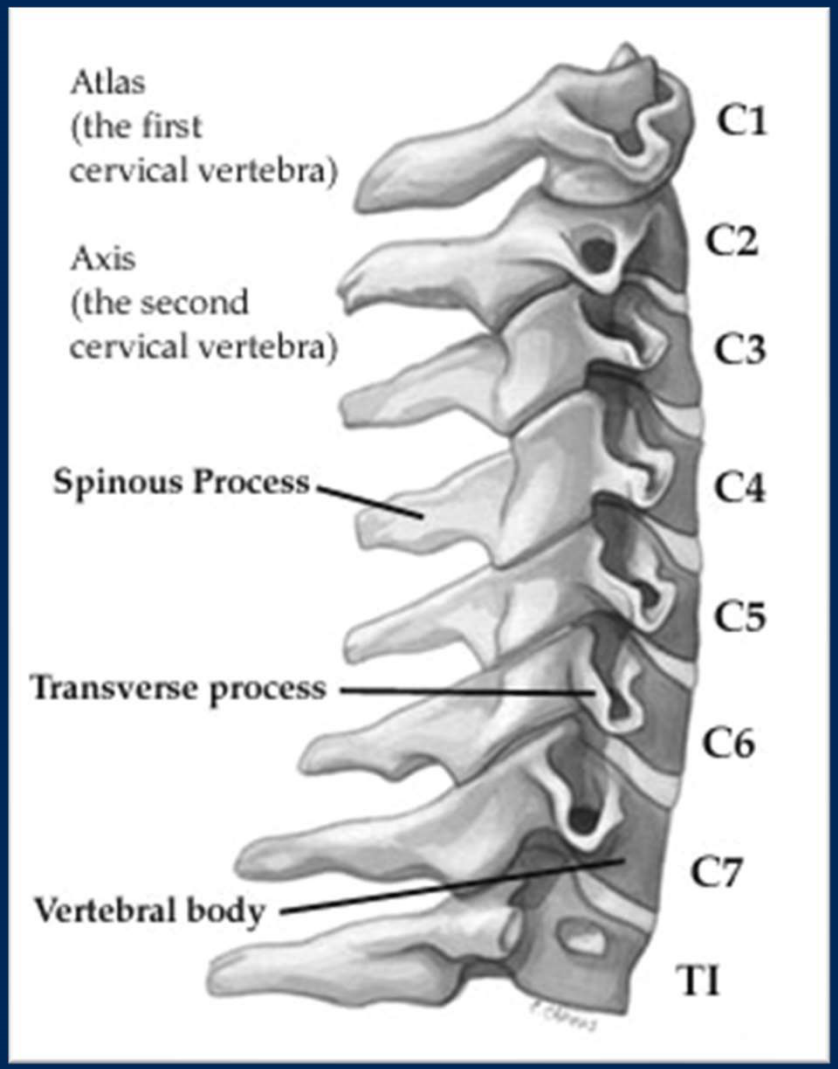
- Tenosynovitis of thumb extensors
- Pain with grasping, twisting and thumb motions
- Seen in women after pregnancy; video game controllers or texting
- Exam: Finkelstein Test
- Tx: thumb spica splint, NSAIDs, injection



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



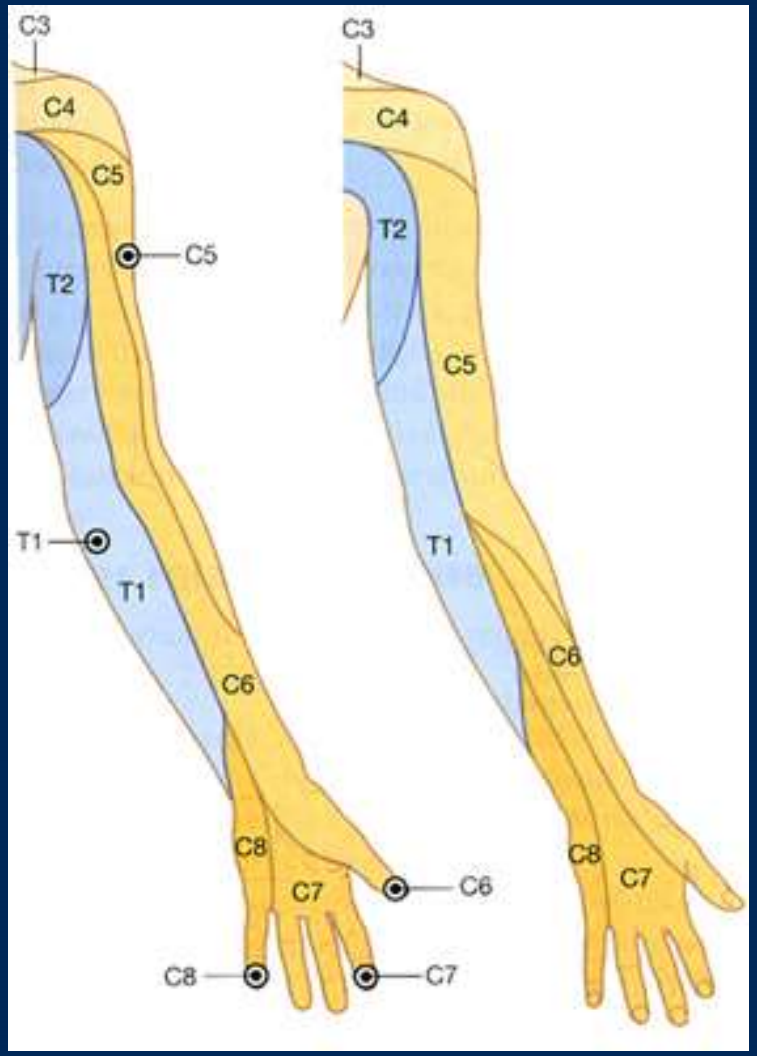
- 7 Cervical Vertebrae
- 8 Cervical Nerves
  - Cervical nerve exits above the corresponding cervical vertebrae
- Lordosis curvature
- Physical Exam: assess postural alignment, gait, muscle strength, atrophy, reflexes, ROM

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 abduction/adduction	

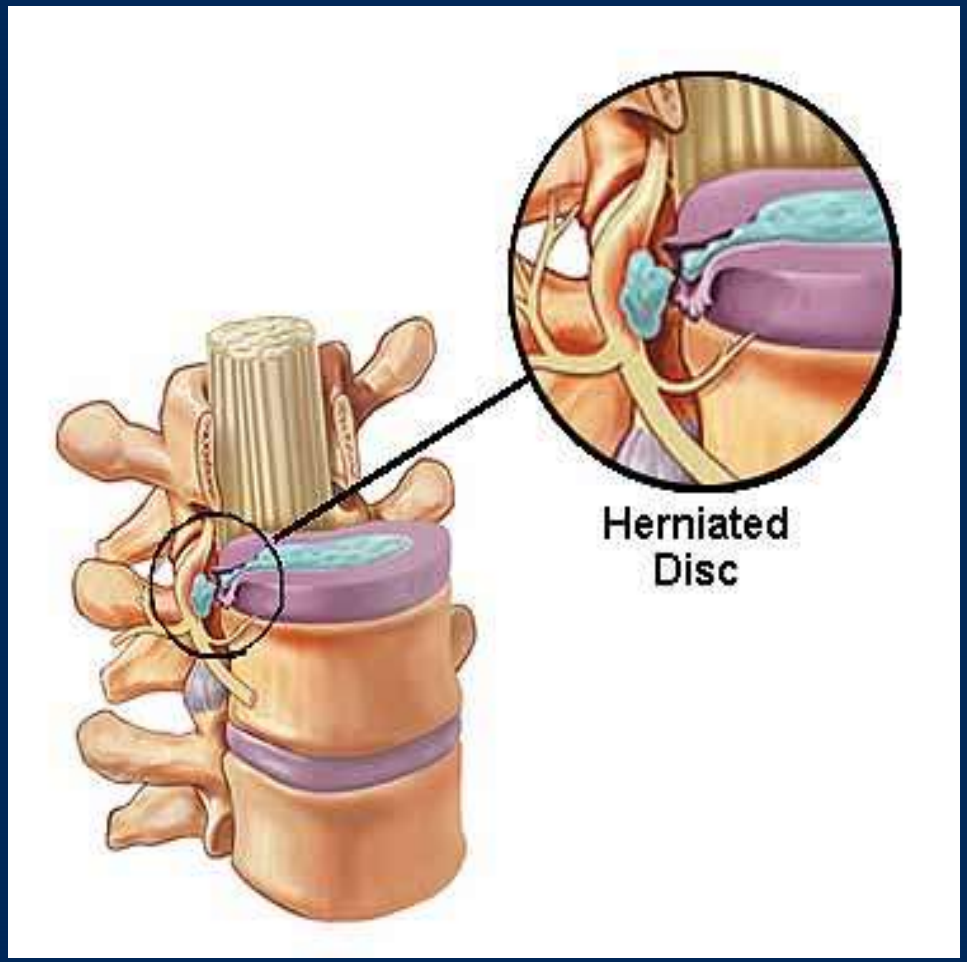
Cervical Spine

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



Cervical Disc Herniation

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

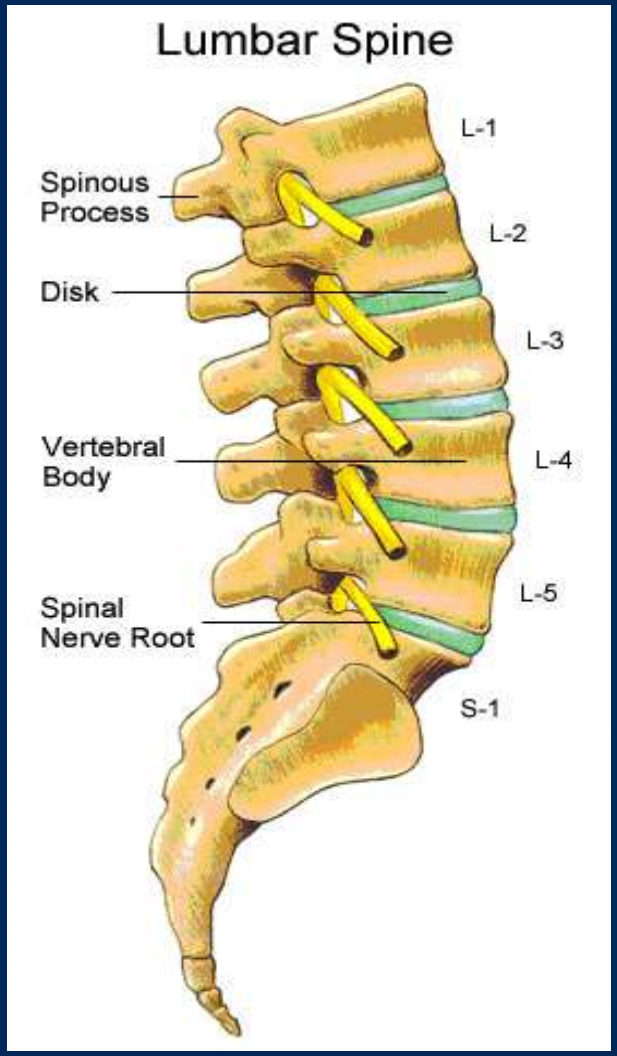


Cervical Myelopathy

- 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

Lumbar Spine

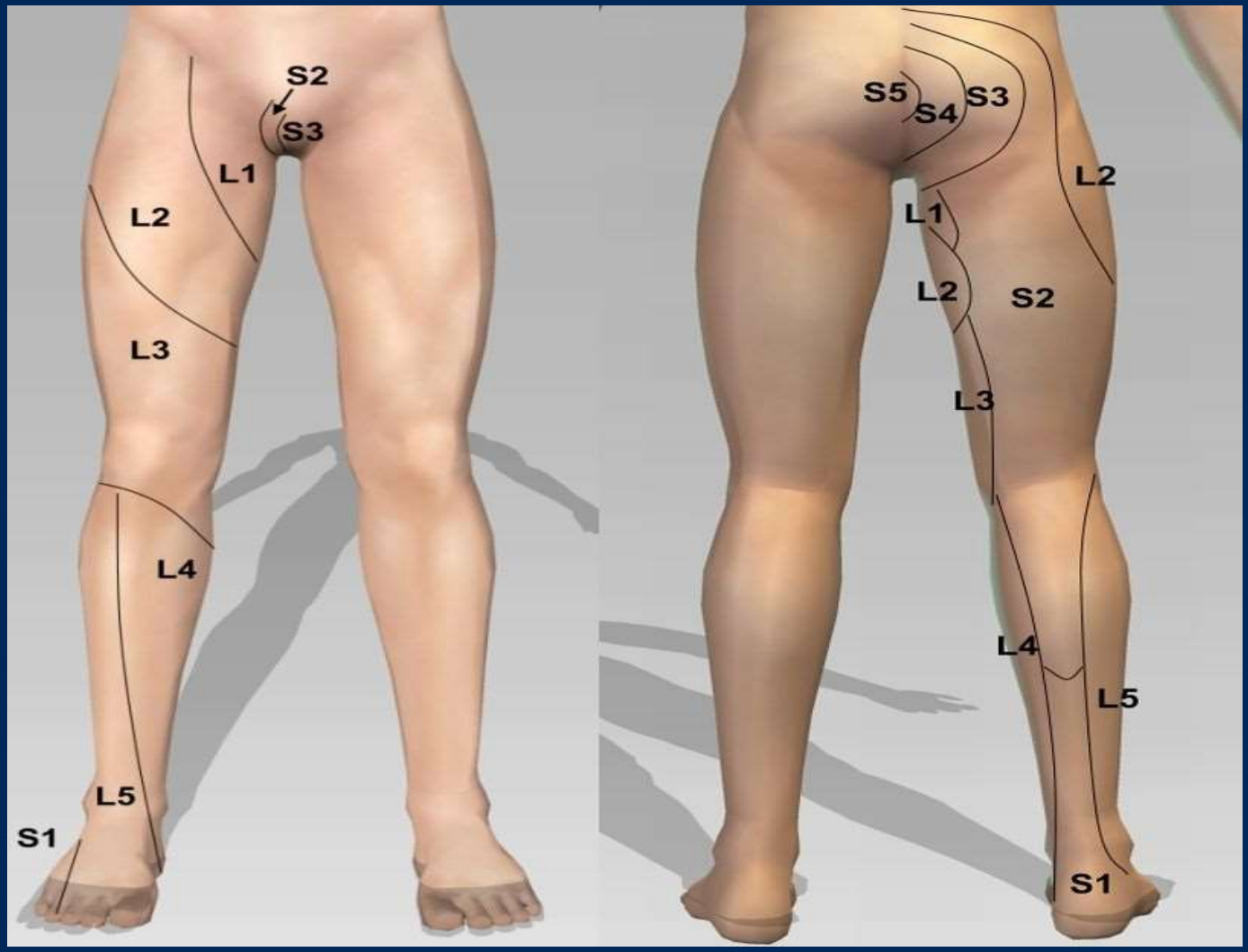
- 5 Lumbar Vertebrae
- 5 Lumbar Nerves
  - Lumbar nerve exits below the corresponding lumbar vertebrae
- Lordosis Curvature
- Examine gait, posture, strength, ROM, atrophy, clonus
- Upper vs Lower Motor Neuron Lesion



Lumbar Spine

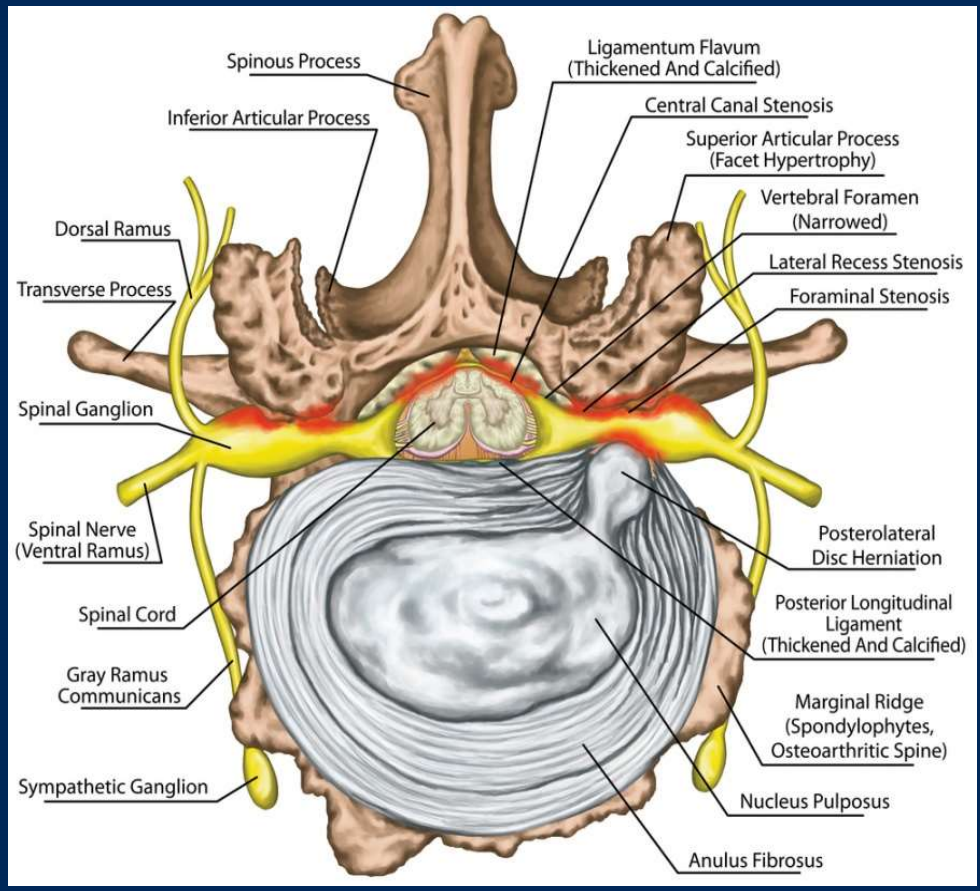
• L1-L2	Hip Flexion	Pat. Tendon Reflex
• L3	Knee Ext/ Hip Add	Pat. Tendon Reflex
• L4	Ankle Dorsiflexion	
• L5	Great Toe Ext./ Ankle Ev./ Hip Add	
• S1	Ankle PF/ Hip Extension	Achilles Reflex
• S1-2	Knee Flexion	

Lumbar Spine



Lumbar Disc Herniation

- Intervertebral Disc- shock absorbers between vertebrae
  - Annulus fibrosus: tough, flexible outer ring
  - Nucleus pulposus: soft center
- Back pain, unilateral leg pain, numbness/ tingling, weakness

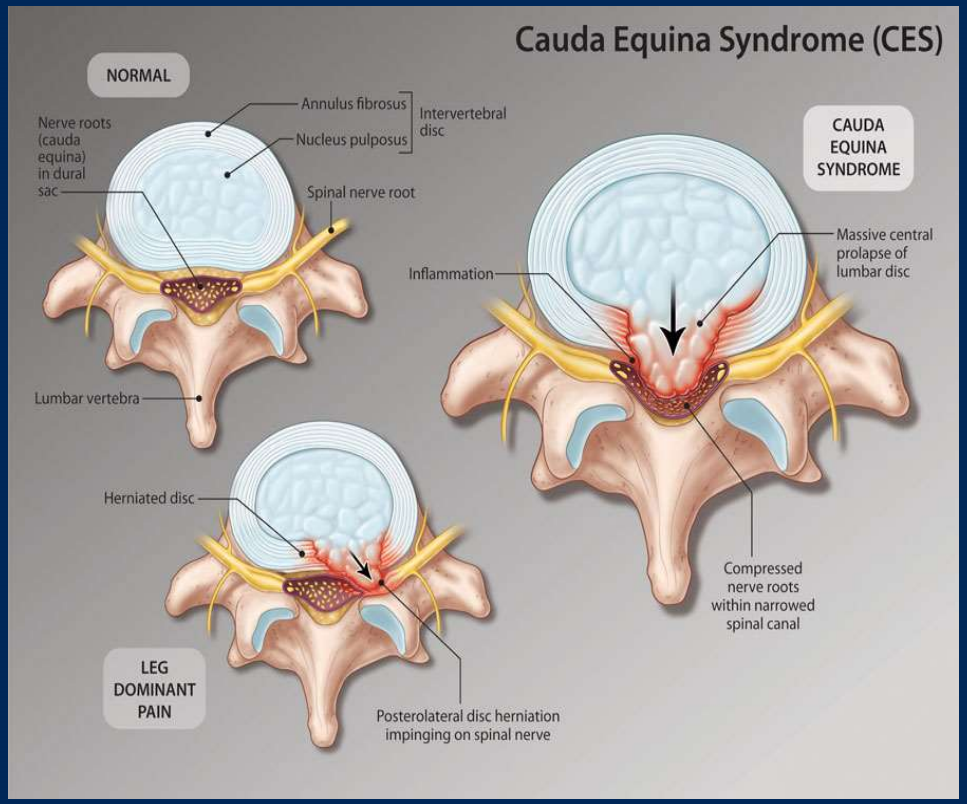


Lumbar Disc Herniation

- Risk factors: improper lifting, overweight, frequent driving, sedentary, smoking
- Exam: Neuro exam, Straight leg raise, MRI
- Tx: Rest, NSAIDs, Steroid dose pak, PT, Epidural Steroid Injection, Surgery

Cauda Equina Syndrome

- Low back pain, motor/ sensory abnormality, bowel/ bladder dysfunction, saddle paresthesia, loss of anal tone
- *SURGICAL EMERGENCY*
- Compression of nerve root bundle by herniated disc, tumor, infection, fx, stenosis



Spondyloysis

- Defect or stress fracture in the pars interarticularis
- Common in repetitive lumbar extension; Common at L5
- Pain with extension and rotation; tight hamstrings
- Spondylolisthesis- actual anterior slippage of vertebrae
- Imaging: oblique x-ray, CT SPECT

Thank You!

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WVU Medicine