

# Common Orthopedic Conditions

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# Overview of Lecture

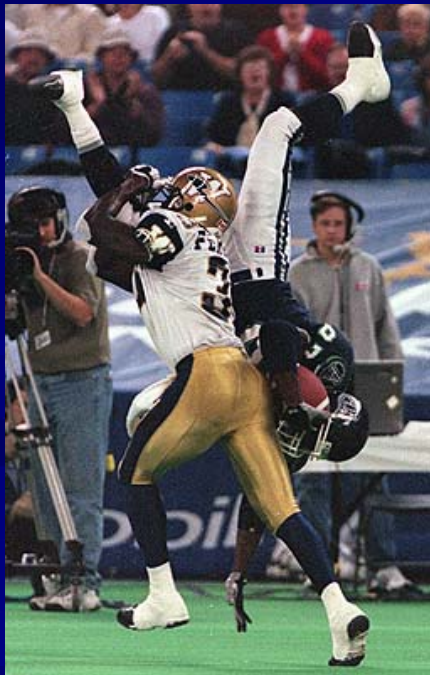
## Top to Bottom

- Shoulder & Elbow
  - Wrist & Hand
    - Hip & Knee
      - Ankle & Foot

# Clavicle Fracture

## ■ Mechanism

- Falling on the tip of the shoulder
- Direct blow to front of shoulder
- Fall on outstretched arm



## ■ Incidence

- 5% of all ED fractures
  - 80% occur in middle third

# Clavicular Fracture

## ■ Signs/Symptoms

- Tenderness
- Crackling
- Swelling
- Deformity



## ■ Treatment

- Immobilization w/ sling when possible
- Figure-of-eight clavicular splint
  - Falling out of favor - Very uncomfortable
- Analgesics and ice
- Surgery rarely necessary, but more common in older adolescents with wide displacement

# Shoulder Separation

## ■ Mechanism

- Involving AC-joint ligaments (where collarbone meets the shoulder)
- Direct impact
  - Tip of shoulder

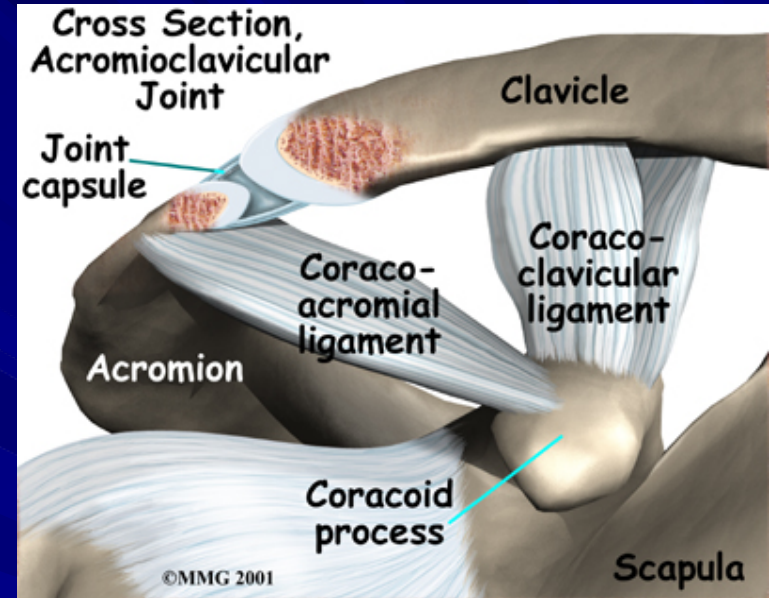




# Shoulder Separation

## ■ Simplified Classification

- Type 1
  - Strain of supporting ligaments
- Type 2
  - Partial tearing of supporting ligaments
- Type 3
  - Complete tearing of supporting structures



# Shoulder Separation

## ■ Diagnosis

- Tenderness over top of shoulder
- Swelling & Tenderness over distal (far end) clavicle
- Confirmatory xrays



## ■ Treatment

- Analgesics, NSAIDs
- Immobilization
- Physical Therapy
- Surgical Intervention with ligament reconstruction if high-grade



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# Shoulder Dislocation

## ■ Incidence

- Account for 50% of all joint dislocations
  - ~90% are anterior (out the front)



## ■ Mechanism

- Falling on an outstretched hand
- Extreme positions of shoulder
- Direct blow to back of shoulder

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# Shoulder Dislocation

## ■ Presentation

- Arm held away from body
- Humeral head palpable

## ■ Diagnostics

- Xrays of joint

## ■ Treatment

- Joint Reduction
  - w/ or w/o sedation in ER
- Immobilization for comfort
- **Surgical Intervention very likely for teenagers – Recurrence rate in this age group >90%**



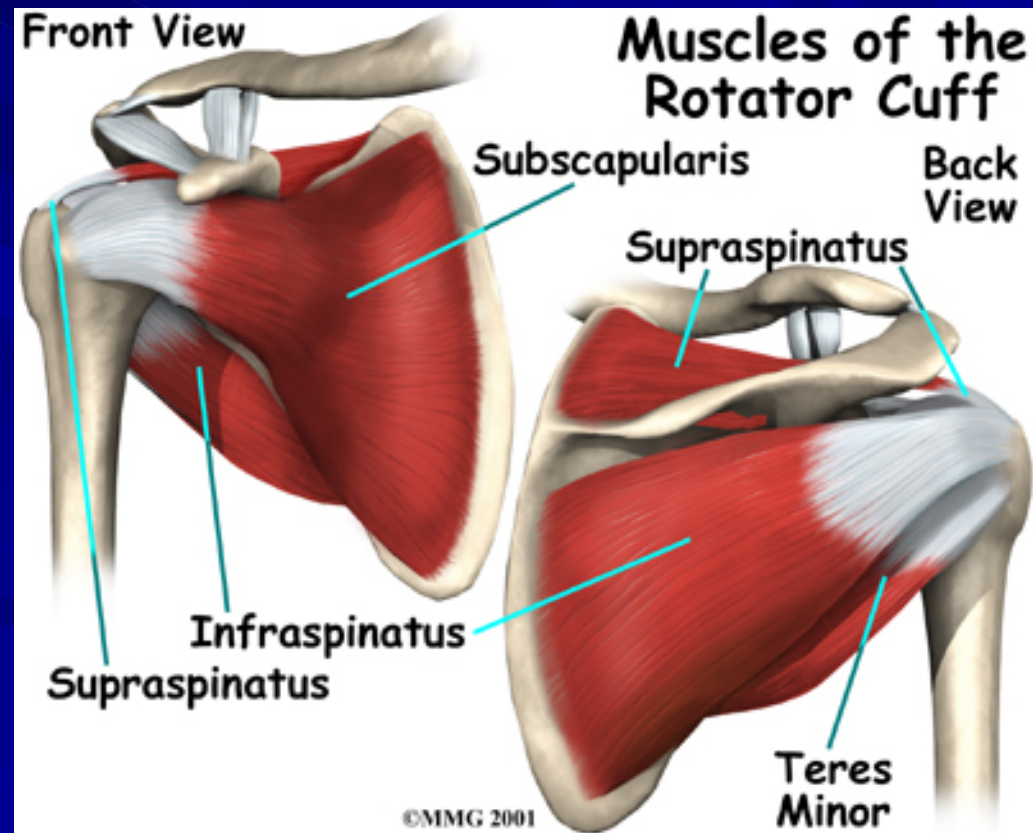
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# Rotator Cuff Disorders

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# Anatomy

- Enveloping cuff of tendons help move the shoulder in space
- Subscapularis
- Supraspinatus
- Infraspinatus
- Teres minor



# Many Different Causes

- Trauma
- Vascular
- Impingement
- Degenerative
- Scapulothoracic/scapulohumeral muscular imbalance
- Developmental
- Instability
- Inflammatory disease
- Iatrogenic
- Multifactorial



# Typical Complaints

- Pain, weakness, both
- Insidious onset or specific trauma
- Pain usually anterior shoulder or down the humerus to the deltoid insertion
- Pain worse with overhead activity
- Night pain

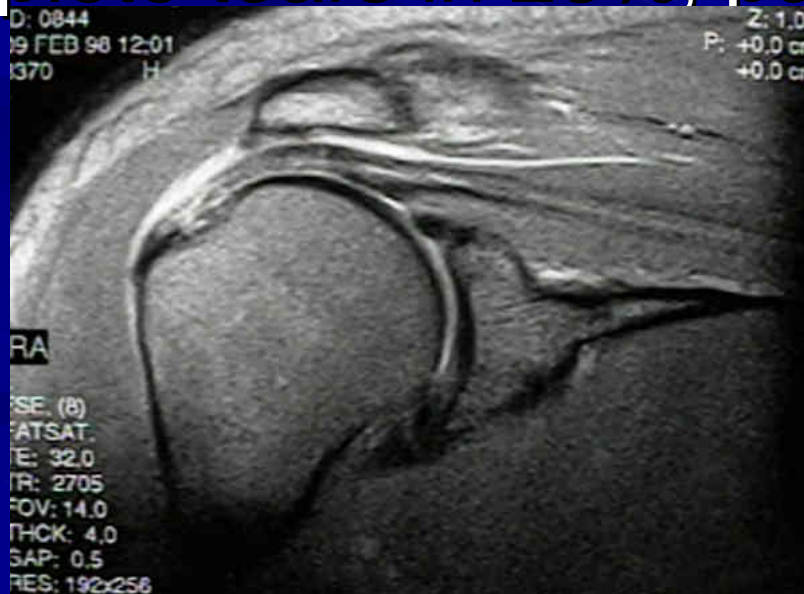




# Cuff Tears are Common

- 96 normal volunteers of all ages had MRI
- Complete tears in 14% and partial-thickness tears found in 20% of patients
- Age>60: complete tears in 28%, partial in 26%

Sher et al, *JBJS*, 1995



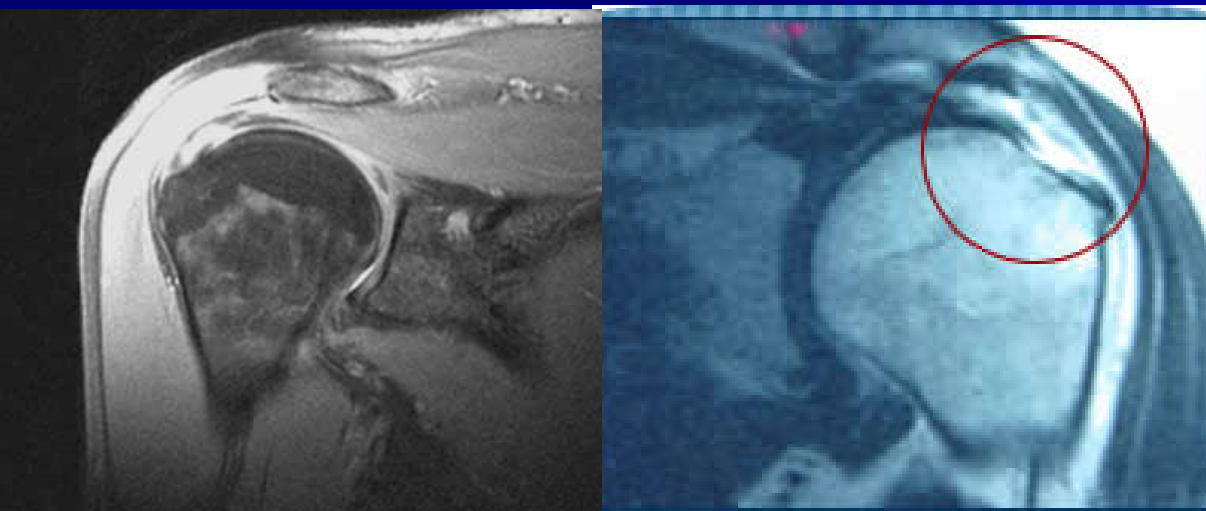
# Physical Exam

- Visual inspection
  - Supraspinatus/infraspinatus atrophy
- ROM, passive and active
  - Usually only active is decreased
- Strength testing
  - Abduction, ER, IR
- Provocative testing



# MRI

- Imaging study of choice
- Accuracy of detecting full-thickness tears between 93% and 100%
- Detect full vs. partial-thickness
- Muscle quality and fatty degeneration



# Treatment

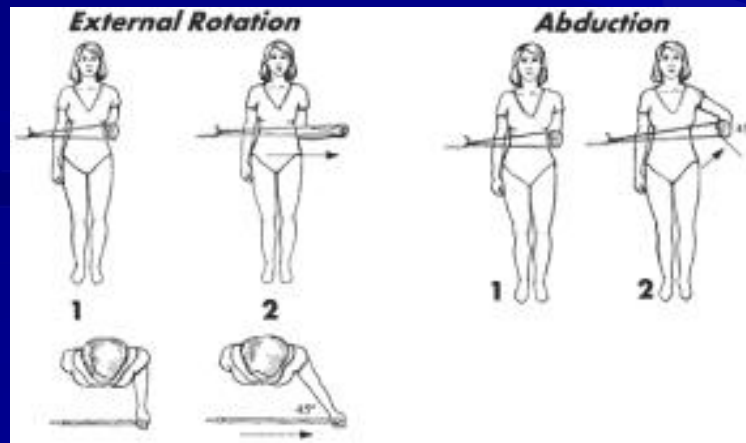
- Initial *non-surgical* tx for most pts w/ impingement & RCT, except young, active pts w/ acute, massive avulsions of cuff or greater tuberosity fx's
- Behavior modification to control painful motions





# Physical Therapy

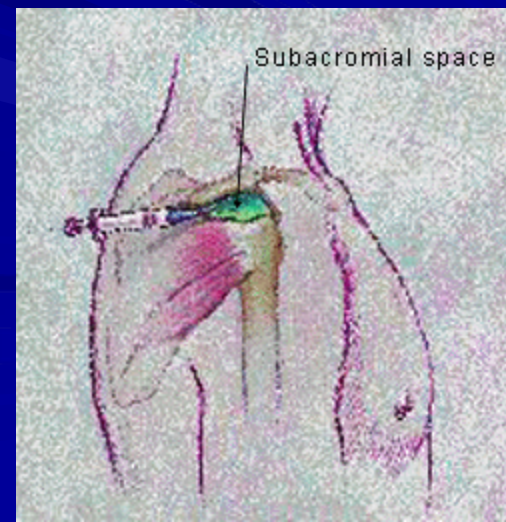
- Step-wise progression of PT program
  - Stretch & strengthen RC musculature, deltoid & periscapulars
  - All TX initially performed below 90° flexion in scapular plane
  - NSAIDS





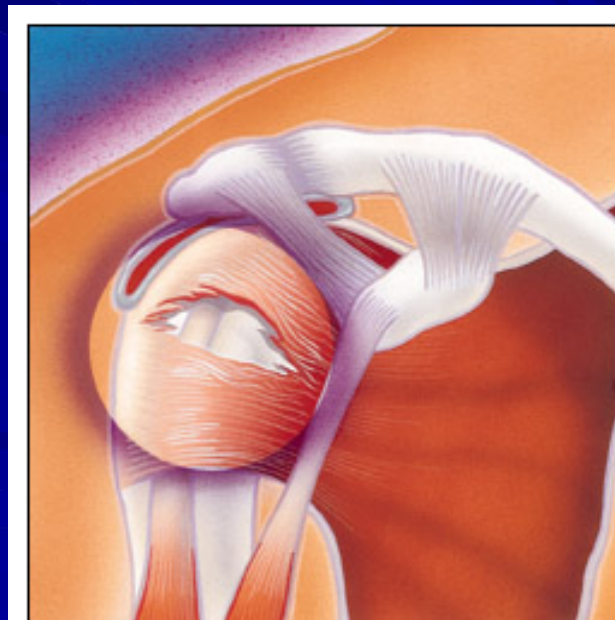
# Injections

- Subacromial injections? *Controversial*
  - Dbl blind trial showed no difference compared with placebo -Withrington et al,1985
  - Adverse affects on local tissues: 17/20  $\geq 4$  injections had weak resid cuff tissue, held sutures poorly, worse results after repair -Watson



# Nonoperative Treatment

- Successful in 33% to 92% of cases
- Boker et al, *Clin Orthop*, 1993
  - 53 pts, avg. follow-up 7 years
  - 75% had satisfactory pain relief
  - Pts with long-standing pain (>6 months), did worse
- Wirth et al, *Orthop Clin North Am*, 1997
  - 60 pts, 2 year follow-up
  - 62% satisfactory result
  - 4% excellent



Full Thickness Rotator Cuff Tears



# Surgical Indications

- Presence of pain or functional deficit that interferes with ADL's that have not responded to conservative management (2 to 6 months)
- This process is accelerated in those who develop weakness after an acute injury with full-thickness tear on MRI or younger individuals

# Surgical Treatment Options

- Open
- Mini-open (arthroscopic-assisted)
- Arthroscopic

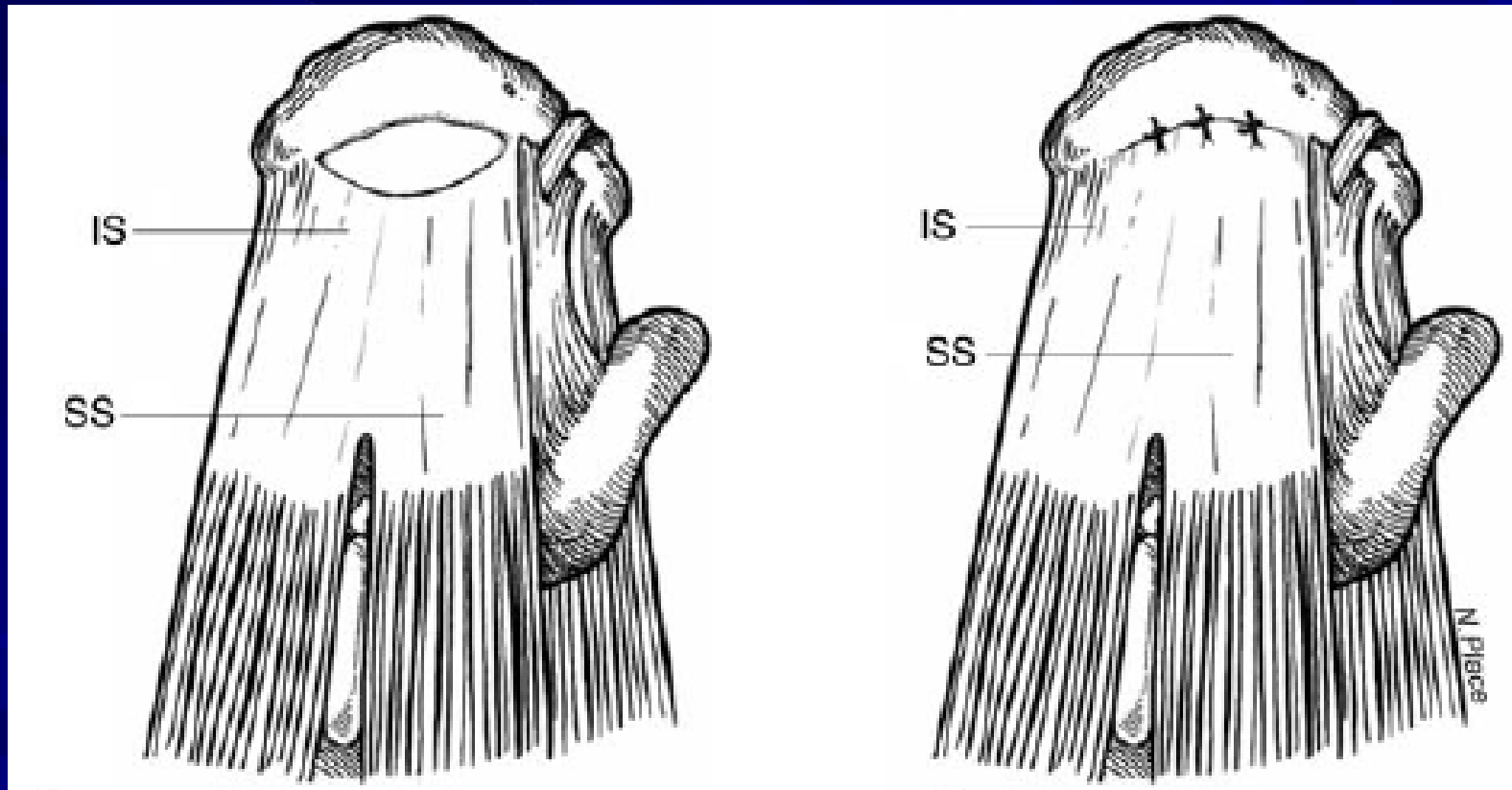


# Advantages of Arthroscopy

- Less dissection, trauma
- Open requires repair through anterolateral window – may not see the whole tear
- Open approach involves only medial to lateral repair mindset
- Arthroscopy allows full visualization of entire tear and tear pattern
- Allows visualization and treatment of partial-thickness cuff tears



# Typical Repair



Burkhart and Lo, *JAAOS*, 2006

# Open Versus Arthroscopic Rotator Cuff Repair: A Comparative View of 96 Cases

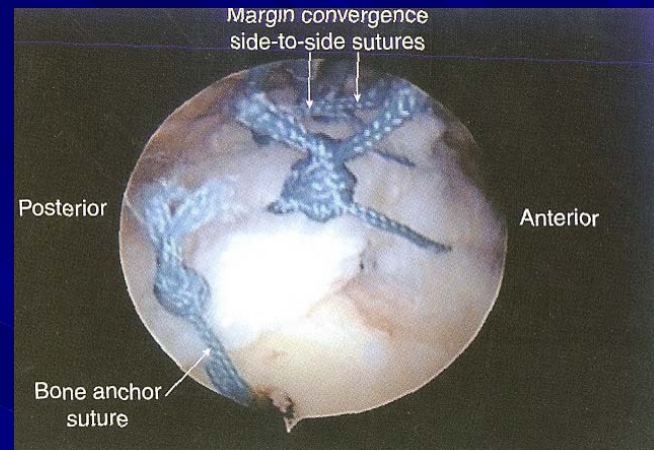
Eduard Buess, M.D., Kai-Uwe Steuber, M.D., and Bernhard Waibl, M.D.

- 30 open repairs (12 open, 18 mini-open)
- 66 arthroscopic repairs
- Arthroscopic group had significantly better pain relief and higher patient satisfaction rate (92.4% vs. 80%)
- Arthroscopic group had significantly more yes answers in questions regarding mobility

Buess et al, *Arthroscopy*, 2005

# Massive Rotator Cuff Tears

- Treatment options:
  - Limited debridement and decompression
  - Partial repair
  - Mini-open repair
  - Arthroscopic repair
  - Tendon transfers
  - Shoulder hemiarthroplasty
  - Reverse Total Shoulder Arthroplasty



# Nursemaid's Elbow



## ■ Mechanism

- Radial head (elbow) dislocation
  - Usually one-sided

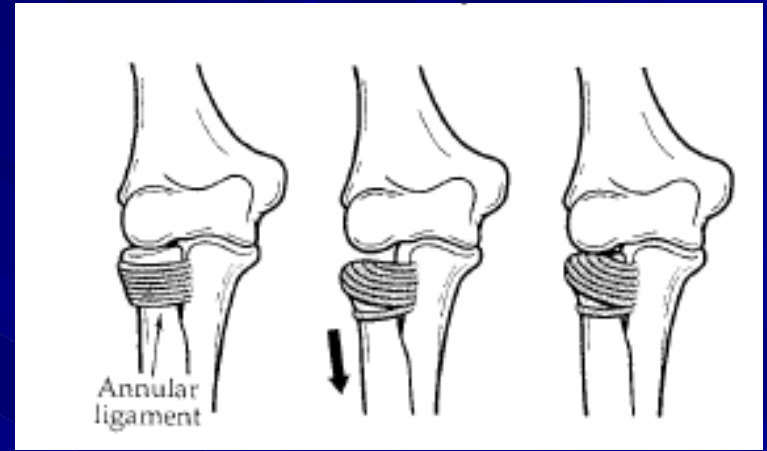
## ■ Common Scenarios

- Child pulled in opposite direction
- 1...2...3...Jump!
- Swinging child from wrists
- No history of trauma

# Nursemaid's Elbow

## ■ Signs & Symptoms

- Anxious child
  - Anxiety > Pain
  - Protective of affected arm
  - Partially bent elbow ( $\sim 15-20^\circ$ ) & pronated (palm down) forearm
- Tenderness at elbow
- Pt resists bending elbow or rotation of forearm





# Nursemaid's Elbow

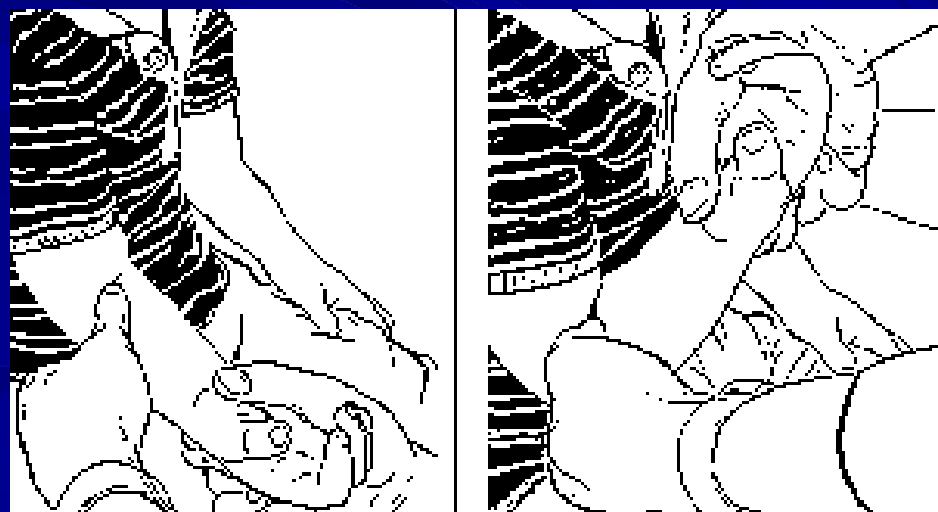
## ■ Treatment

- Manual reduction
  - Apply pressure to radial head
  - Grasp wrist & apply slight traction
  - Supinate wrist while flexing elbow to 90°
  - An audible click/pop should be elicited

## ■ ED Course

- Observe 15-30mins in ED
- Xrays not needed if completely comfortable

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# Scaphoid Fractures

## ■ Mechanism

- Fall on an outstretched hand
- Direct blow to palm

## ■ Incidence

- 60-70% of all carpal fractures
- Frequently missed injury
  - 10-15% not demonstrated on routine x-rays
  - Can interrupt blood supply to bone



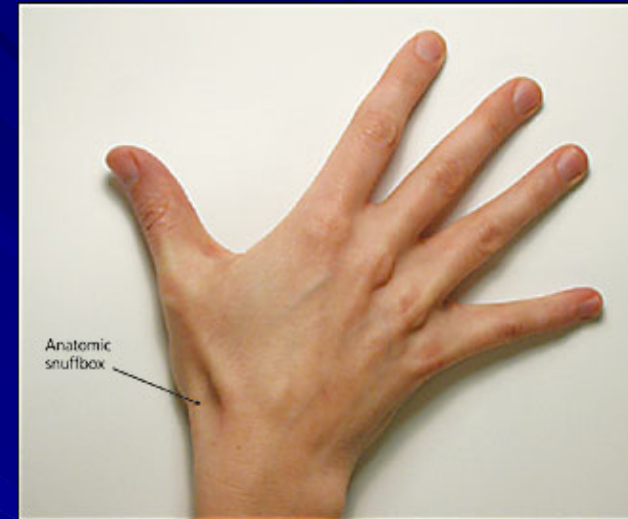
# Scaphoid Fractures

## ■ Diagnosis

- Tenderness in the anatomic snuffbox
- ↑ Pain w/ wrist motion
- Scaphoid view X-rays

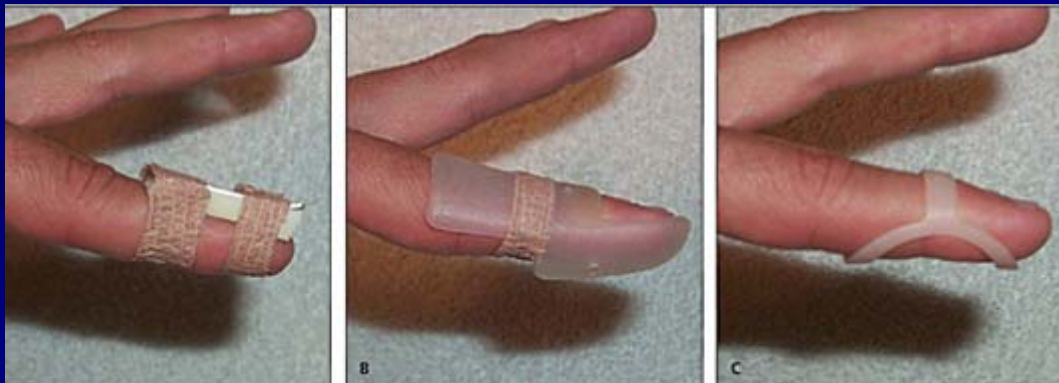
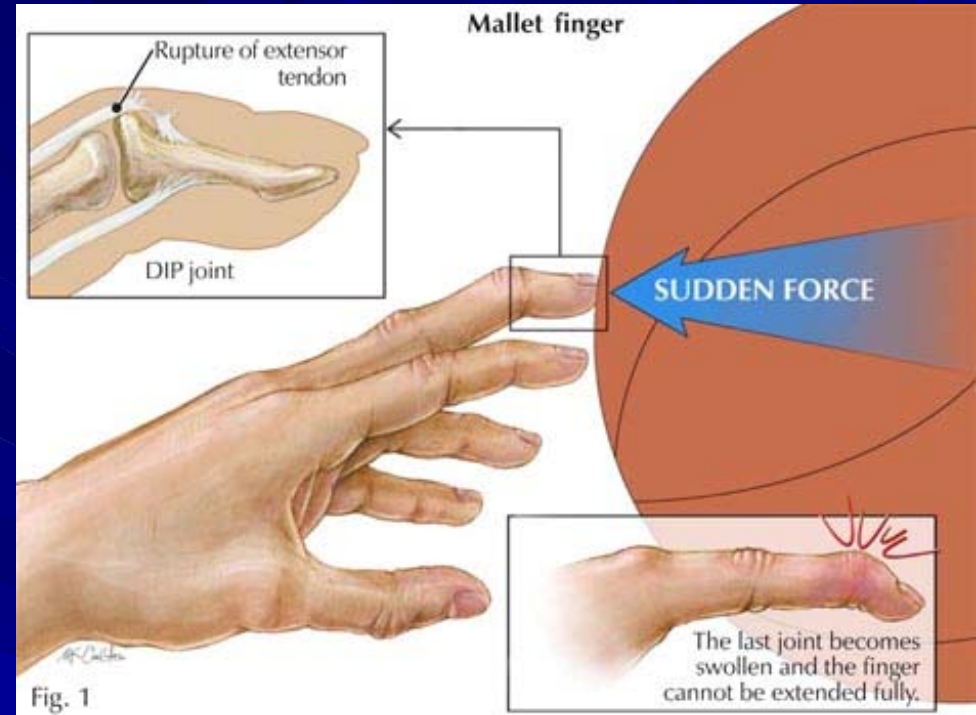
## ■ Treatment

- Immobilization if nondisplaced
  - Short-arm vs Long-arm Spica cast (includes thumb) for 8-12 weeks
- Surgery if displaced
- Can take a long time to heal



# Mallet or “Jammed Finger”

- Mechanism
  - Axial load to finger
- Signs & Symptoms
  - Swelling, pain & drooping of last knuckle
- Treatment
  - Stack splint - 12 weeks
  - Surgery rarely needed



# Osteoporosis

- Osteoporosis is a brittle bone disease that becomes more common as people age
- Fractures most frequently associated with osteoporosis are those of the hip, wrist and spine







# Common Problem

- 10 million Americans have osteoporosis
- 33.6 million Americans have low bone mineral density at the hip
- 50% of Caucasian women will suffer a fracture caused by osteoporosis in their lifetime
- 20% of men will have an osteoporosis-related fracture

– National Health and Nutrition Examination Survey III

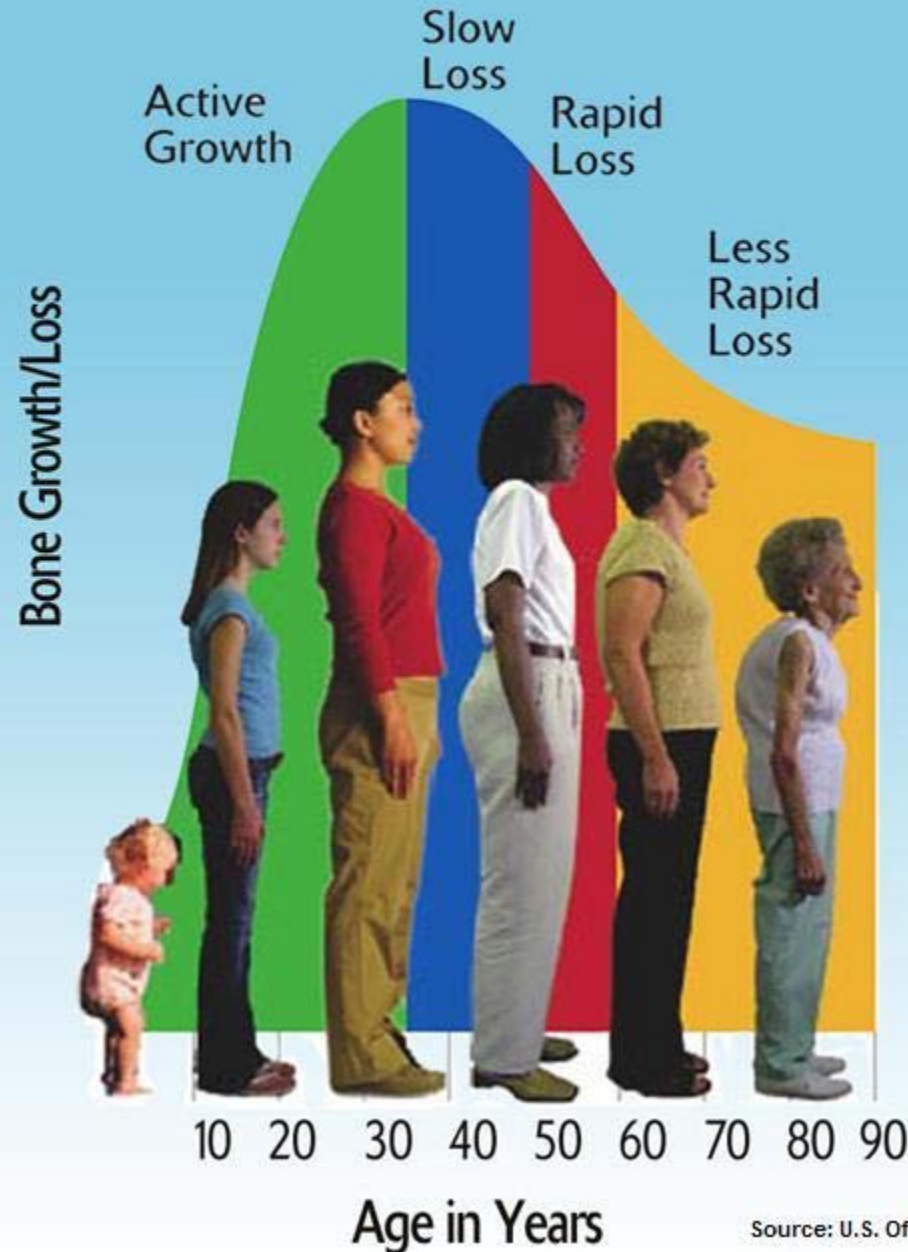


# Devastating Impact

- 24% of people over 50 will die in the year following a hip fracture
- Those with hip fractures have 2.5x increased risk of another fracture
- 1 in 5 hip fracture patients will require long-term nursing home care
- 40% of hip fracture patients will not return to their pre-fracture level of functioning

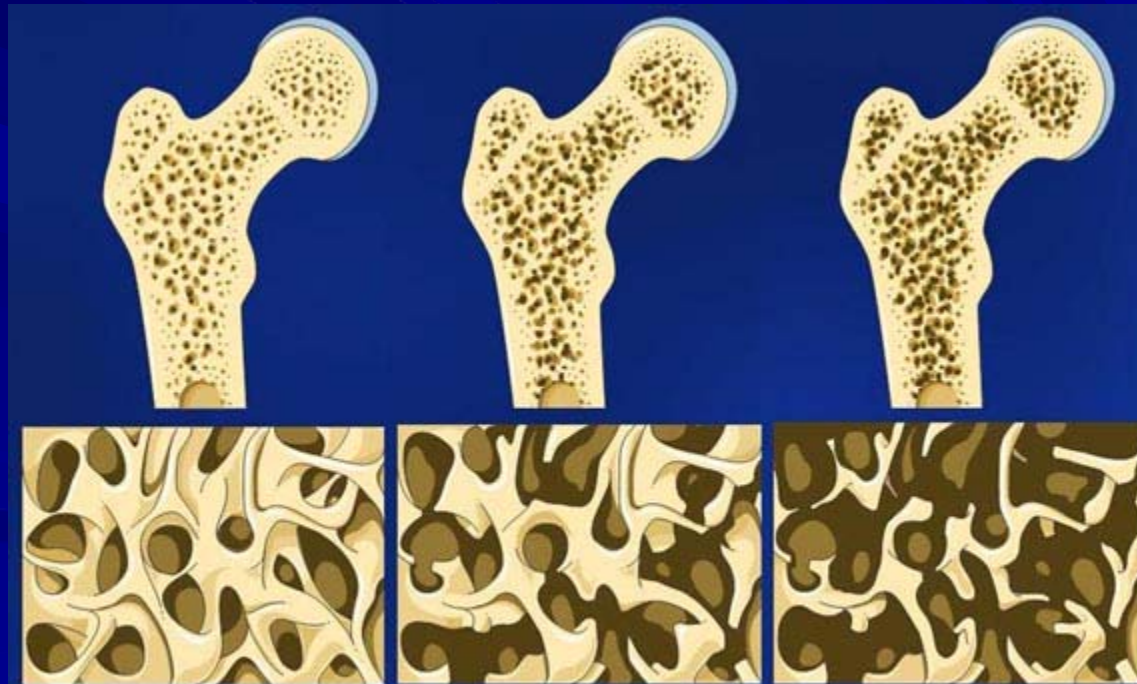
– Surgeon General's Report on Osteoporosis 2004

**After your mid-30s, you begin to slowly lose bone mass. Women lose bone mass faster after menopause, but it happens to men too.**



# Basic Science

Body normally replaces older bone with new bone, but imbalance occurs in osteoporosis



*Osteoporosis*



# Lifestyle Risk Factors

- Low Calcium Intake
  - Low Vitamin D Intake
  - Smoking
  - Excessive Alcohol Intake (>3 drinks/day)
  - Physical inactivity
  - Immobilization
- Too Thin
  - Frequent Falls
- National Osteoporosis Foundation







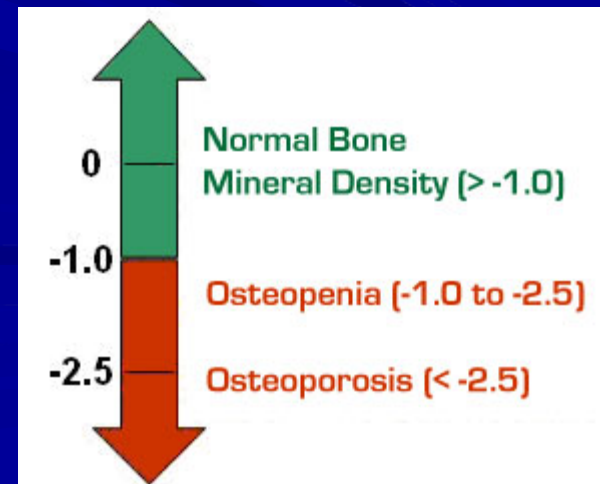
# Medical Risk Factors

- Parental history of hip fracture/osteoporosis
- Anorexia/Bulimia
- Athletic Amenorrhea
- Menopause
- Diabetes
- Gastric Bypass Surgery
- Rheumatoid Arthritis
- Lupus
- Steroids
- Depression
- Kidney Disease
- Chemotherapy
- Prior Fracture as Adult

■ National Osteoporosis Foundation

# Diagnosing Osteoporosis

- Bone mineral density (BMD) measurements via dual energy x-ray absorptiometry (DEXA) scans
- Low Bone Mass = BMD 1-2.5 standard deviations below the value for a young adult
- Osteoporosis = BMD  $> 2.5$  std dev. below young normal adult
  - World Health Organization





# Who should get a DEXA Scan?

- Women age 65 and older
- Men age 70 and older
- Women in menopausal transition who have additional risk factors
- Men age 50-69 with additional risk factors
- Adults with a fracture after age 50
- Adults taking steroids or with a condition associated with development of osteoporosis
  - National Osteoporosis Foundation

# Prevention

## Calcium & Vitamin D Intake

### ■ Calcium Daily Req.

- 1-3 yrs – 500 mg
- 4-8 yrs – 800 mg
- 9-18 yrs – 1300 mg
- 19-49 yrs – 1000 mg
- > 50 yrs – 1200 mg
- Higher doses can cause kidney stones and certain heart conditions

### ■ Vitamin D Daily Req.

- 1-17 yrs – 400 IU
- 18-71 yrs – 600 IU
- > 71 yrs – 800 IU
- Safe upper limit from Institute of Medicine is 4000 IU

■ Sources: American Academy of Pediatrics and National Osteoporosis Foundation



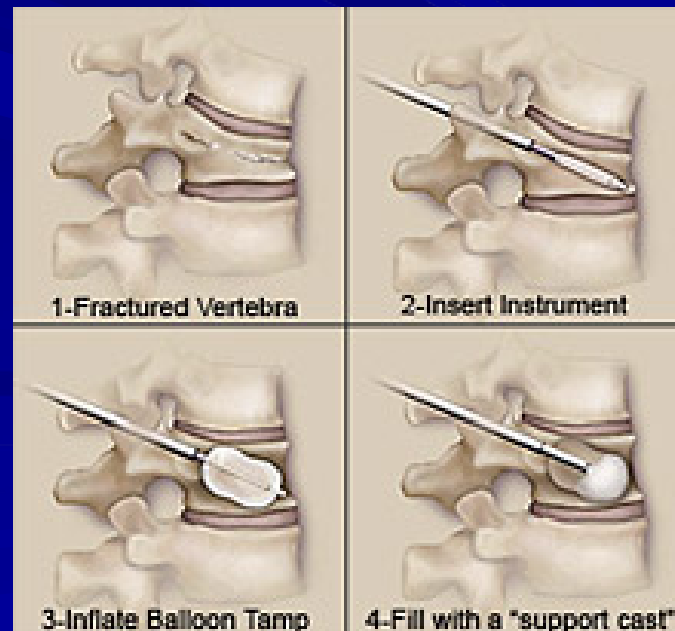
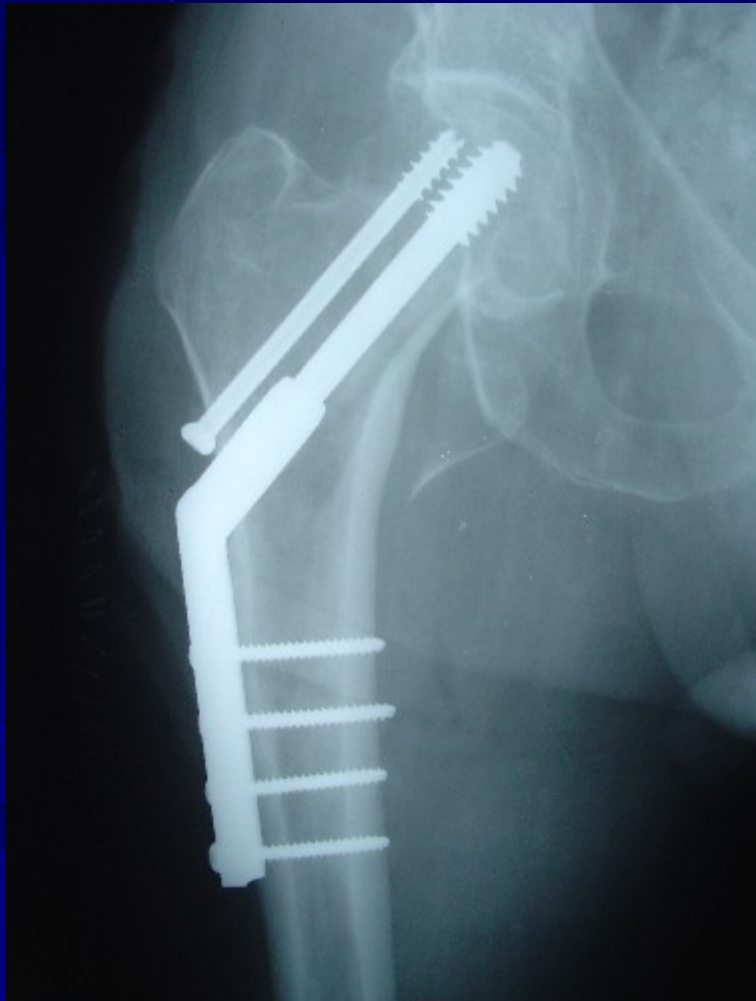
# Medications

- Bisphosphonates: Fosamax, Boniva, Actonel, Reclast
- Calcitonin: Miacalcin or Fortical
- Estrogen/Hormone Therapy: eg. Estraderm, Premarin, Prempro
- Estrogen Agonist or Antagonist: Evista
- Parathyroid Hormone: Forteo
- Combination Treatments





# Casts, Plates, Screws, Cement



# PatelloFemoral Syndrome: “Jumper’s Knee”

## ■ What is it?

- Generalized knee pain
  - Usually around kneecap
- Occurs with activities involving...
  - Knee flexion
  - Forceful contraction of the quads
- Pain after sitting for long periods
- Pain going up or down stairs

## ■ What causes it?

- **Weakness of the hip flexors**
- Malalignment of the kneecap
- Tight lateral knee structures



# Patellofemoral Syndrome

## ■ Physical Exam

- Tenderness over knee-cap
- Cracking throughout range of motion
- **Weak Hip Flexors**

## ■ Treatment

- Rest, Ice, NSAIDs
- Stretching & Strengthening program
  - Hip flexor strengthening and ITB stretching
- Patella strap or patella taping
- Surgery rarely necessary or useful



# Ligamentous Injuries

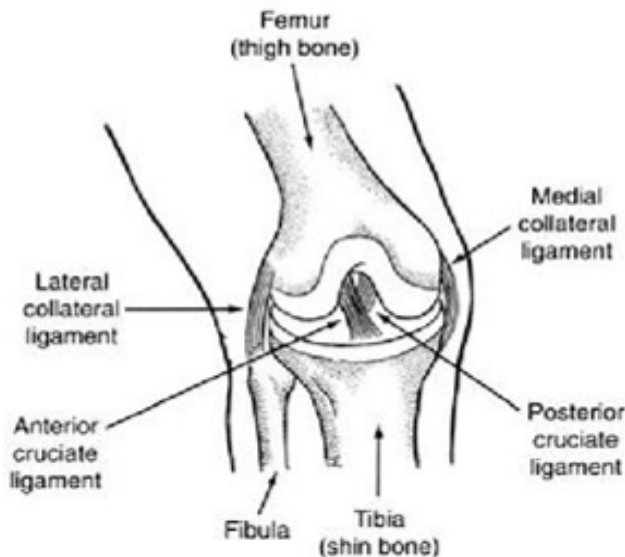


## MCL

- 2° to hit on outside of knee
- rest, early motion, and bracing
- most return 1-6 wks after injury
- surgical intervention rarely necessary

## ACL

- 2° to hyperextension or twisting on planted foot
- “pop”, inability to continue, swelling
- Reconstruction usually after gain full knee extension (~ 4 weeks after injury)





# Why do we care about ACL injuries?

- 31% of patients with moderate to severe disability in walking activities
- 44% of patients with moderate to severe disability in ADLs
- 77% of patients with moderate to severe disability in sports activities

*Noyes et al. 1983*





# Why do we care about ACL injuries?

- Two thirds of ACL-deficient patients suffer from chronic knee instability and cartilage damage
- If left alone, this has been shown to cause osteoarthritis in 100% of patients

*Yu et al. 2002*



# At risk group



- Female collegiate basketball players are approximately 8 times more likely to tear their ACLs than their male counterparts  
*Malone et al. 1993*
- Arendt et al. found the rate of ACL injuries among female collegiate basketball and soccer players to be 3 times higher than their male counterparts *Arendt et al. 1995*

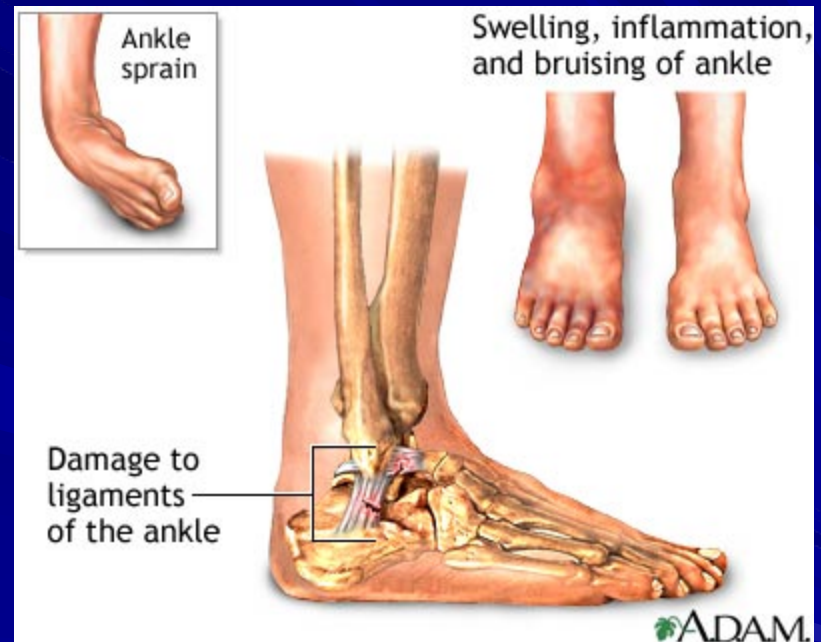
# Treatment and Prevention

- In general, we counsel adolescent athletes with ACL tears to have them reconstructed using their own tissue
- Teaching female athletes proper stance and landing techniques has been shown to significantly reduce ACL tears



# Ankle Sprains

- Common sports injury usually due to an inversion of the ankle
- Grade I: ATFL injured only
- Grade II: ATFL and CFL injured
- Grade III: ATFL, CFL and Deltoid Ligaments injured



# Diagnosis

- Present with pain, swelling, bruising, inability to walk on ankle
- Tenderness over torn ligaments
- Xray if pain over bone, inability to ambulate or pain medially to palpation





# Other Diagnoses

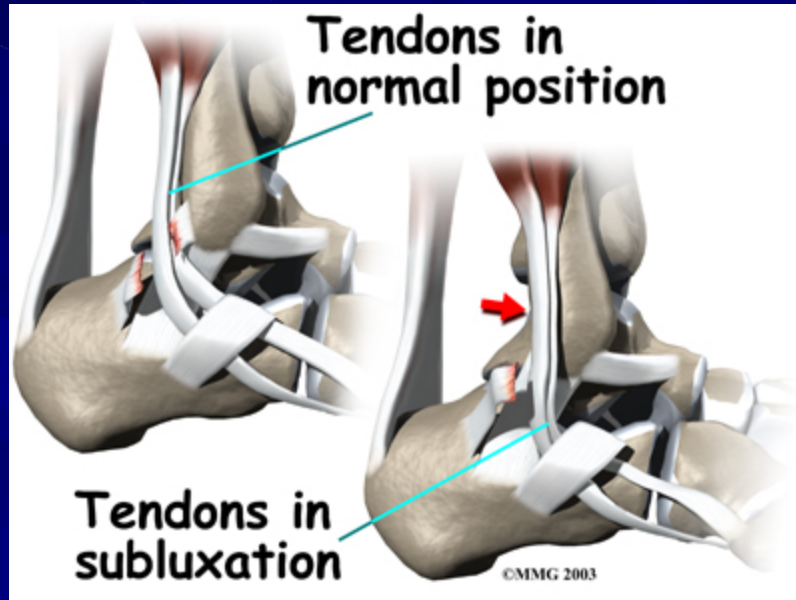
- Fracture of base of 5<sup>th</sup> metatarsal
- Ankle Fracture
- Osteochondral Injury to Talus
- High Ankle or Syndesmotic Sprain
- Peroneal Tendon Instability



# Other Injuries continued



Osteochondral Injury



Peroneal Tendon Instability



High Ankle Sprain

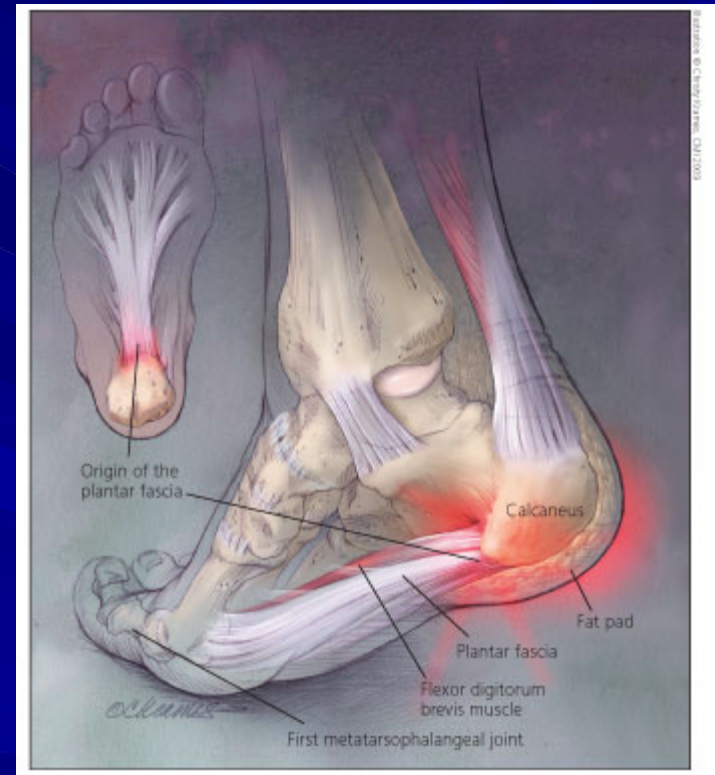
# Ankle Sprain Treatment

- Rest
- Ice
- Compression
- Elevation
- Rehabilitation with stretching, strengthening and proprioceptive training
- Gradual Return to Sports



# Plantar Fasciitis

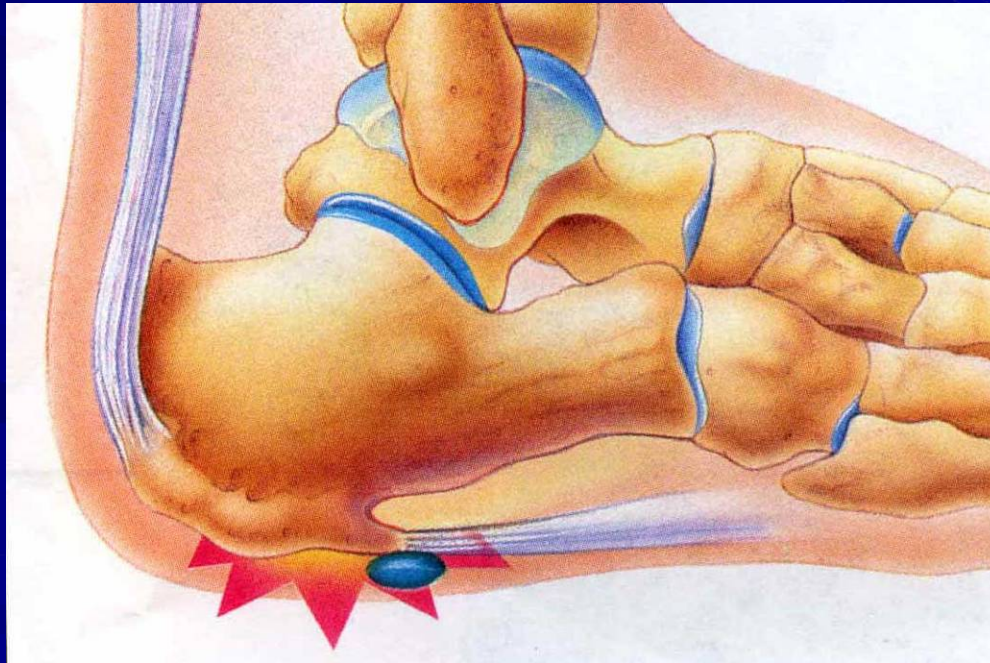
- Common cause of heel pain
- Usually due to long periods of standing
- Pain worse when first get out of bed and at the end of the day





# Diagnosis

- Pain at medial calcaneal tuberosity
- Tight heel cord
- Pain with dorsiflexion of foot





# Treatment

- Stretching
- NSAIDs
- Night Splint
- Formal PT
- Steroid Injection
- PRP Injection
- Shock Wave Therapy
- Surgery



# Bunions

- Most commonly found in women
- Narrow shoes thought to be culprit in majority of patients
- Can come about due to neurologic or hereditary phenomena



# Treatment

- Taping
- Spacer
- Accommodative Shoes
- Variety of Surgeries based on Severity



Bunion deformity pre-op left and post-op right with screw fixation.



# Thank You

