

# Foot and Ankle Complaints

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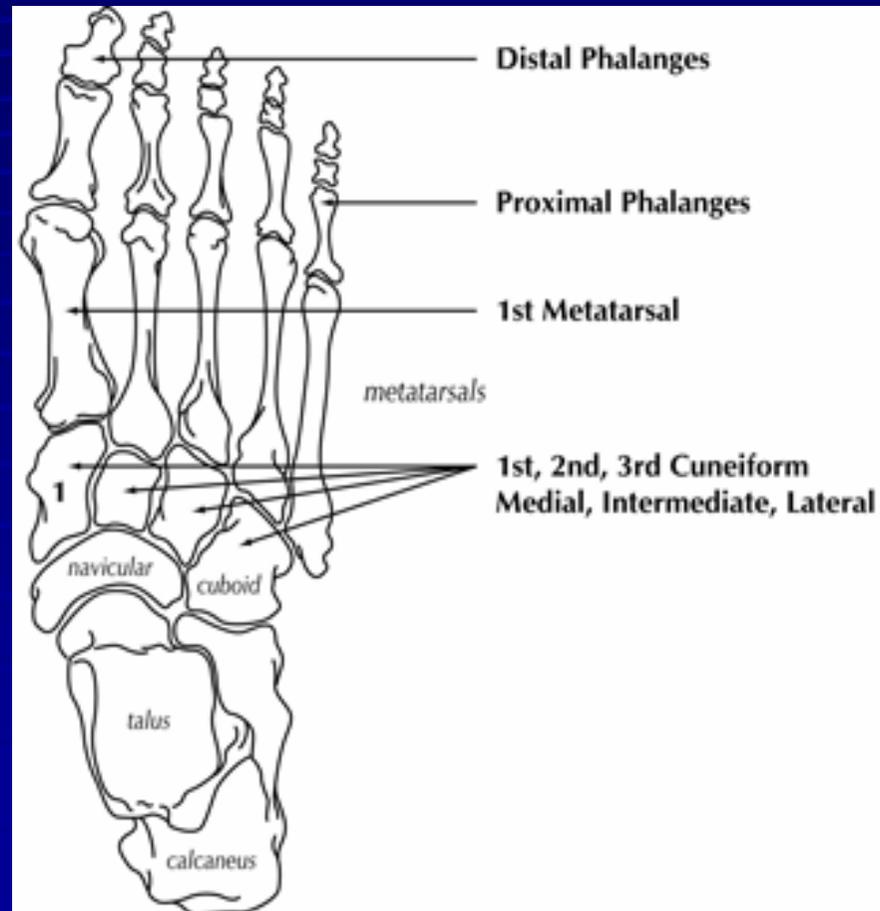
# INTRODUCTION

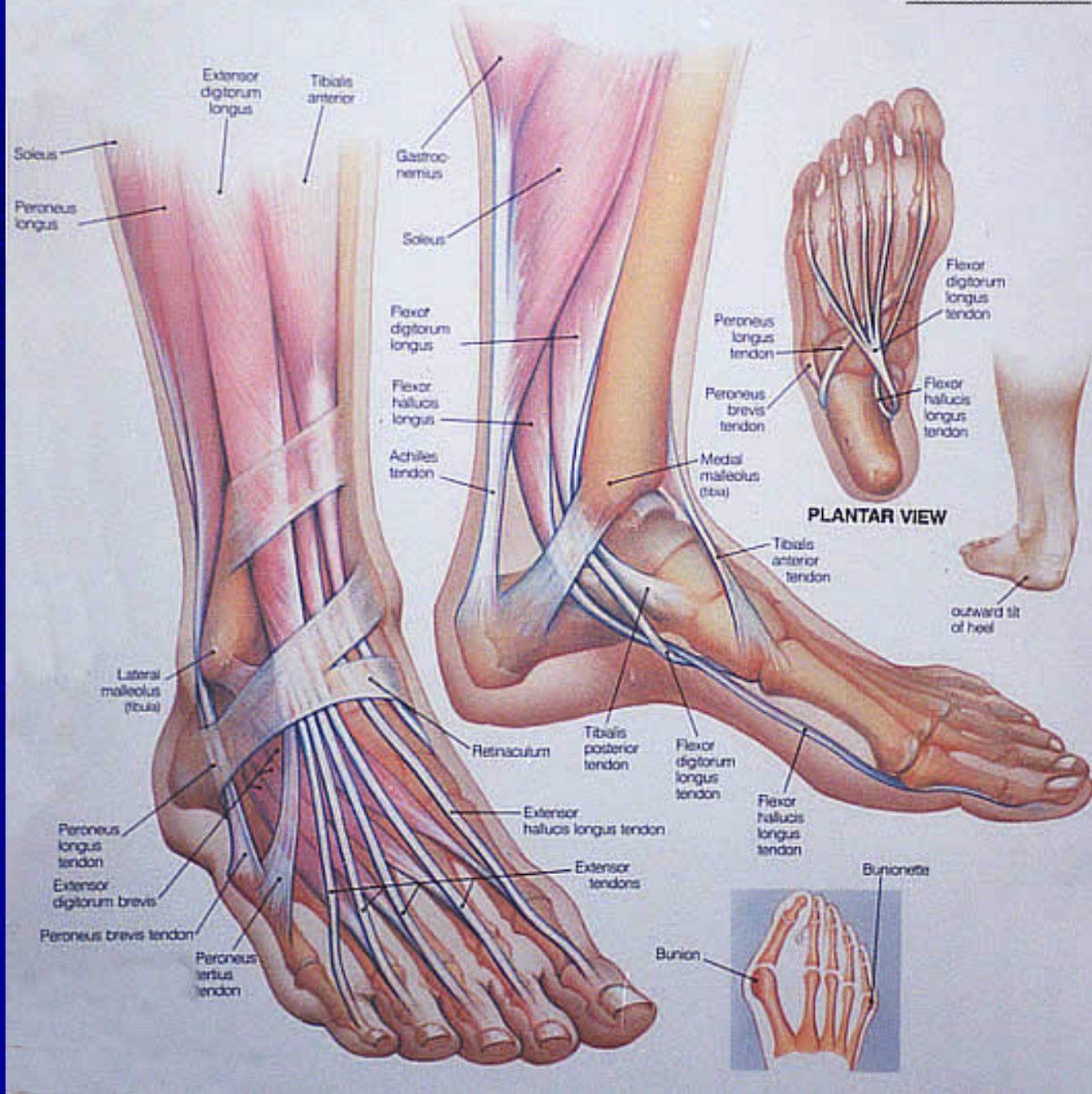
- Anatomy and Function
  - Foot
  - Ankle
- Common complaints
- Common diagnoses



# FOOT AND ANKLE ANATOMY

- 26 bones and 2 sesamoids
- Forefoot
  - Metatarsals
  - phalanges
- Midfoot
  - 5 tarsals
- Rearfoot
  - Talus and Calcaneus





# FOOT AND ANKLE



- FUNCTIONS
  - Absorb impact loading forces
  - Adapt to uneven ground
  - Allow efficient propulsion

# HISTORICAL CLUES

- Previous injury?
- New shoes?
- New sport/activity?
- Sudden increase in mileage?
- Long term training without rest?

# FOOT AND ANKLE COMMON COMPLAINTS

- Heel pain
- Forefoot pain
- Ankle pain
- Numbness/tingling/burning
- Ankle swelling

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# HEEL PAIN

- Determine location
  - Plantar surface
    - Plantar fasciitis
    - Heel pad atrophy
    - Distal tarsal tunnel syndrome
    - Calcaneal stress fracture
  - Posterior heel
    - Retrocalcaneal bursitis
    - Achilles tendinopathy
    - Sever's disease
    - Stress fracture
    - Lateral Plantar Nerve entrapment

Consider  
inflammatory  
conditions also:

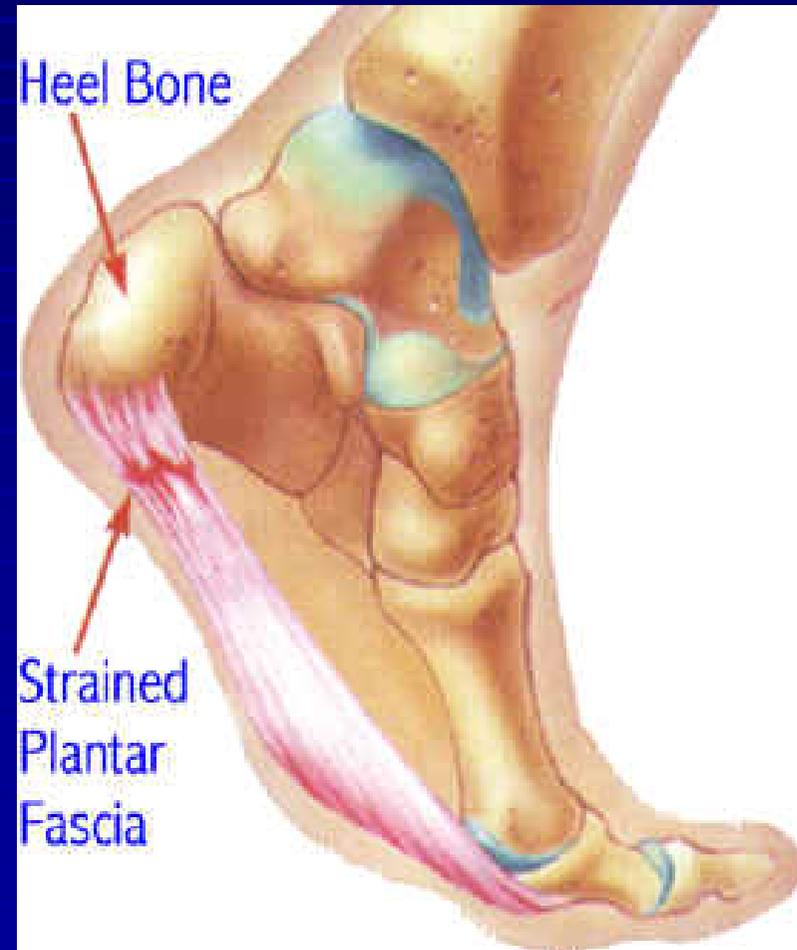
Gout

Reiter's

Psoriasis

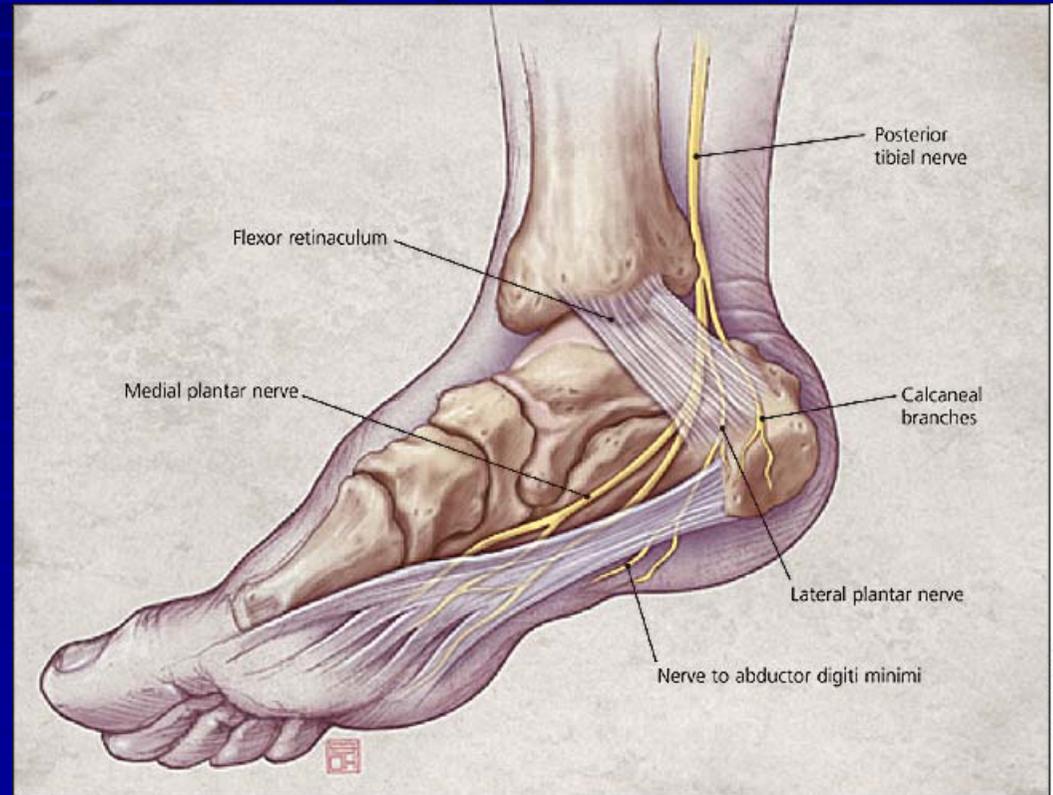
# PLANTAR FASCIITIS

- Pain at the most anterior portion of the heel pad
- Medial tubercle
- Worst with first step in the morning or after inactivity
- Pain increases with active dorsiflexion of first toe



# PLANTAR FASCIITIS

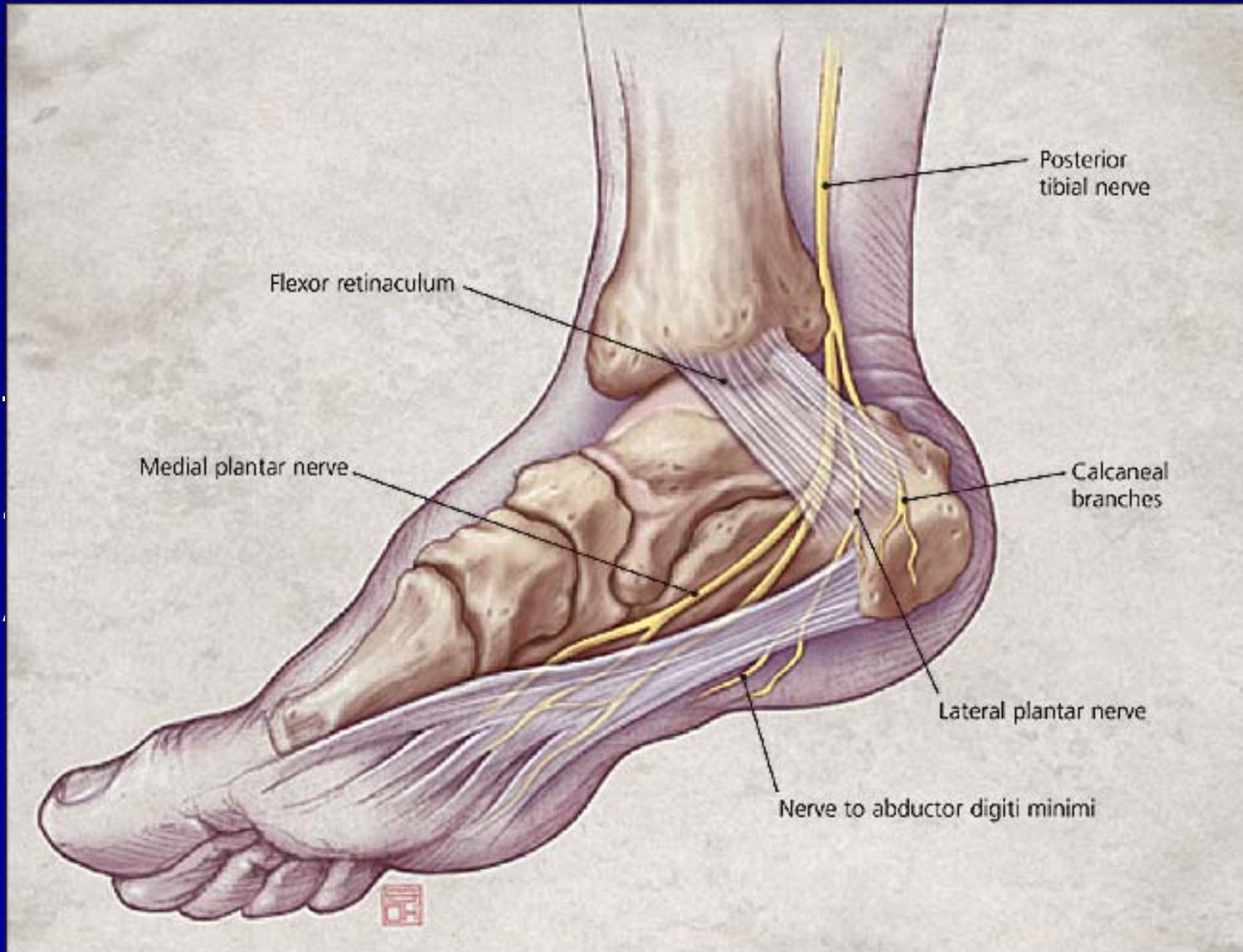
- Treatment
  - ICE
  - Stretching
  - NSAIDs
  - Correction of arch abnormalities
  - Improved shoe quality
  - Training adjustment
  - Night splints
  - Injections



# HEEL PAD ATROPHY

- After age 40, adipose tissue begins to atrophy
- Loss of absorbency
- May occur as a complication of plantar fascia corticosteroid injection

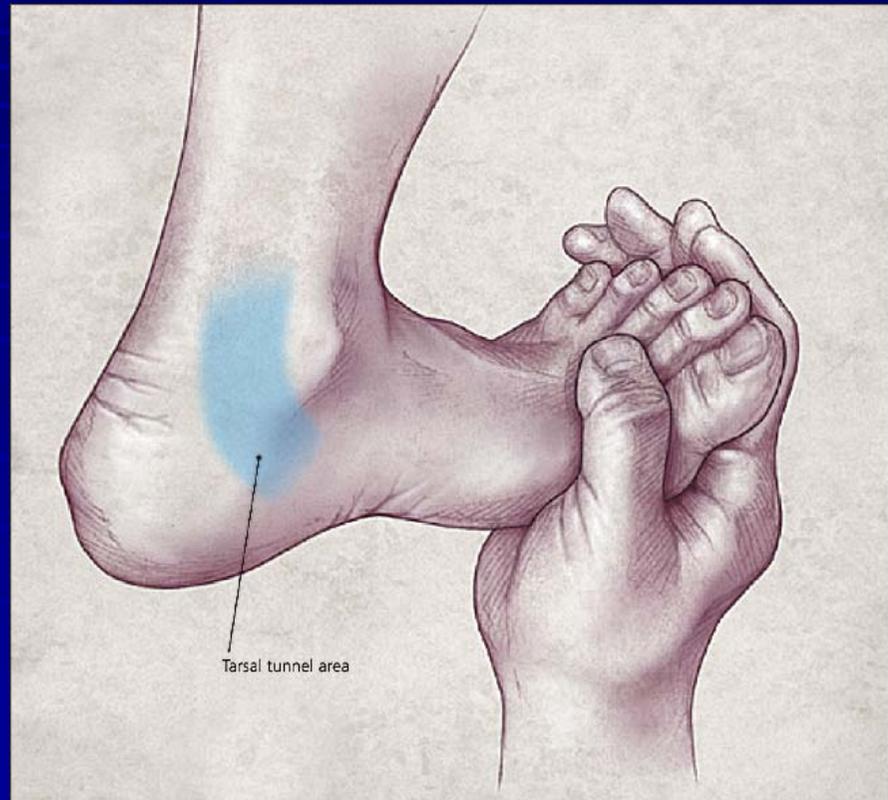
# TARSAL TUNNEL SYNDROME



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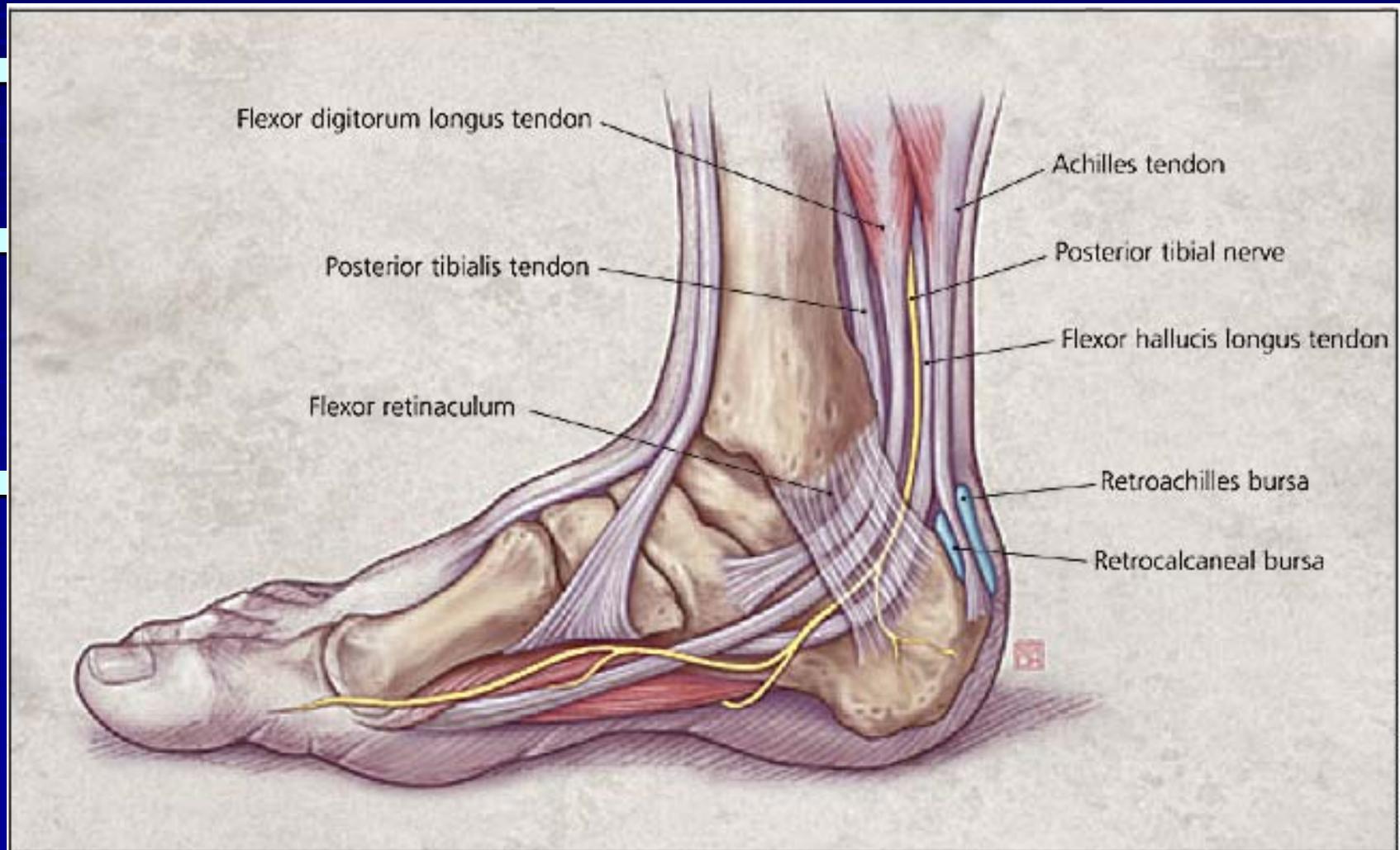
# TARSAL TUNNEL SYNDROME

CON'T



- Exam:
  - Positive Tinel's sign over tunnel
  - Palpation of involved nerve causes pain to radiate proximally and distally
- Treatment:
  - Ice, NSAIDs
  - Injection
  - Surgery

# RETROCALCANEAL BURSITIS



# ACHILLES TENDINOPATHY

- Common cause of posterior heel pain
- Can have pain at insertion or mid-substance of tendon
- Generally occurs after overuse
- Exam:
  - Insertional tendonitis: pain at insertion onto calcaneus
  - Non-insertional tendonitis: mid-substance pain
    - Localized swelling

# ACHILLES TENDINOPATHY

- Treatment:
  - Ice, NSAIDs
  - Physical therapy
    - Flexibility
    - Eccentric exercises
  - Heel lift or orthotic to control pronation
  - Cam walker for severe cases

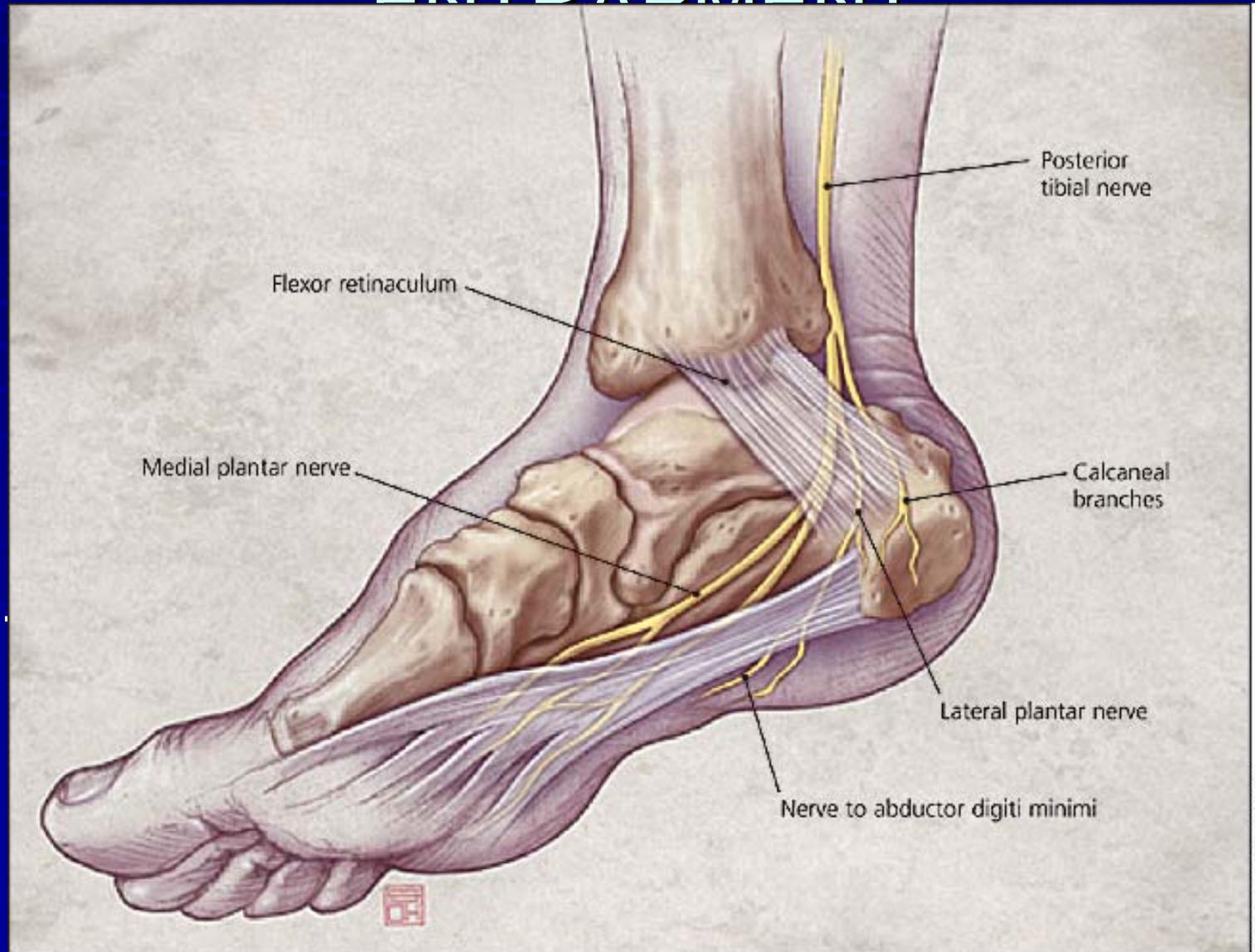
# SEVER'S DISEASE

aka. Calcaneal Apophysitis

- Overuse injury in 8-12 year olds
- Traction apophysitis of os calcis
- Pain increases with activity
- Exam:
  - Localized tenderness of posterior calcaneus
  - Heel-cord tightness
  - Weakness of ankle dorsiflexors
- Treatment
  - Relative rest, NSAIDs, ice, stretching, heel cups
  - Strengthening of dorsiflexors



# LATERAL PLANTAR NERVE ENTRAPMENT



# FOOT AND ANKLE COMMON COMPLAINTS

- Heel pain
- Forefoot pain
- Ankle pain
- Numbness/tingling/burning
- Ankle swelling

# FOREFOOT PAIN

- Acute
  - Fracture of metatarsal
  - Gout
- Trauma
  - Lis Franc sprain/dislocation
  - Stress fracture
- Chronic
  - Stress fracture
  - Metatarsalgia

# 5<sup>th</sup> METATARSAL FRACTURE

- Avulsion fracture= Most common
- Jones fracture= Metaphyseal-Diaphyseal junction

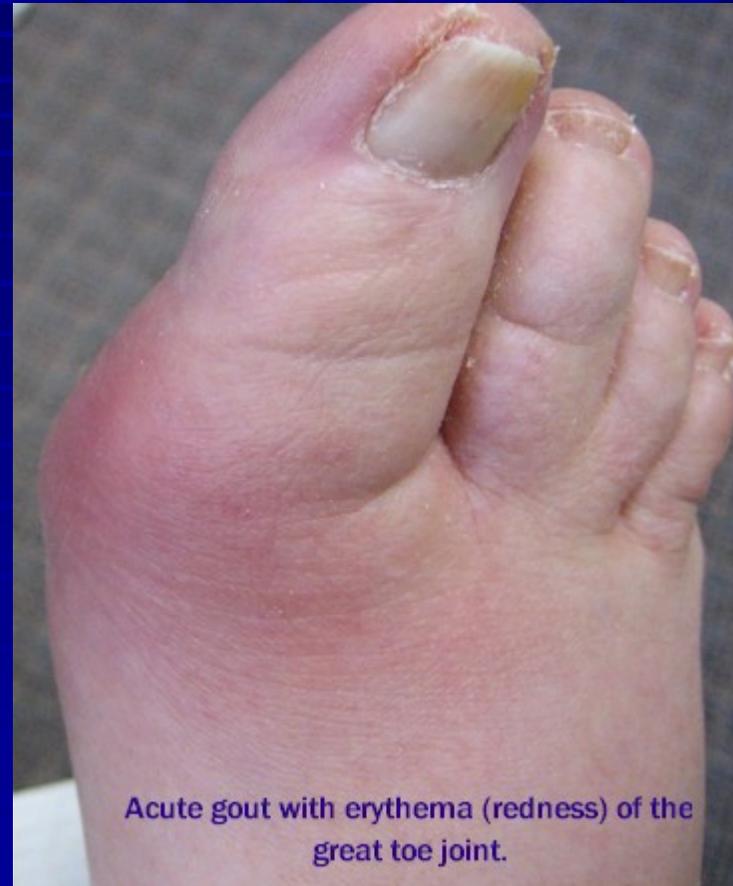


# METATARSAL FRACTURE

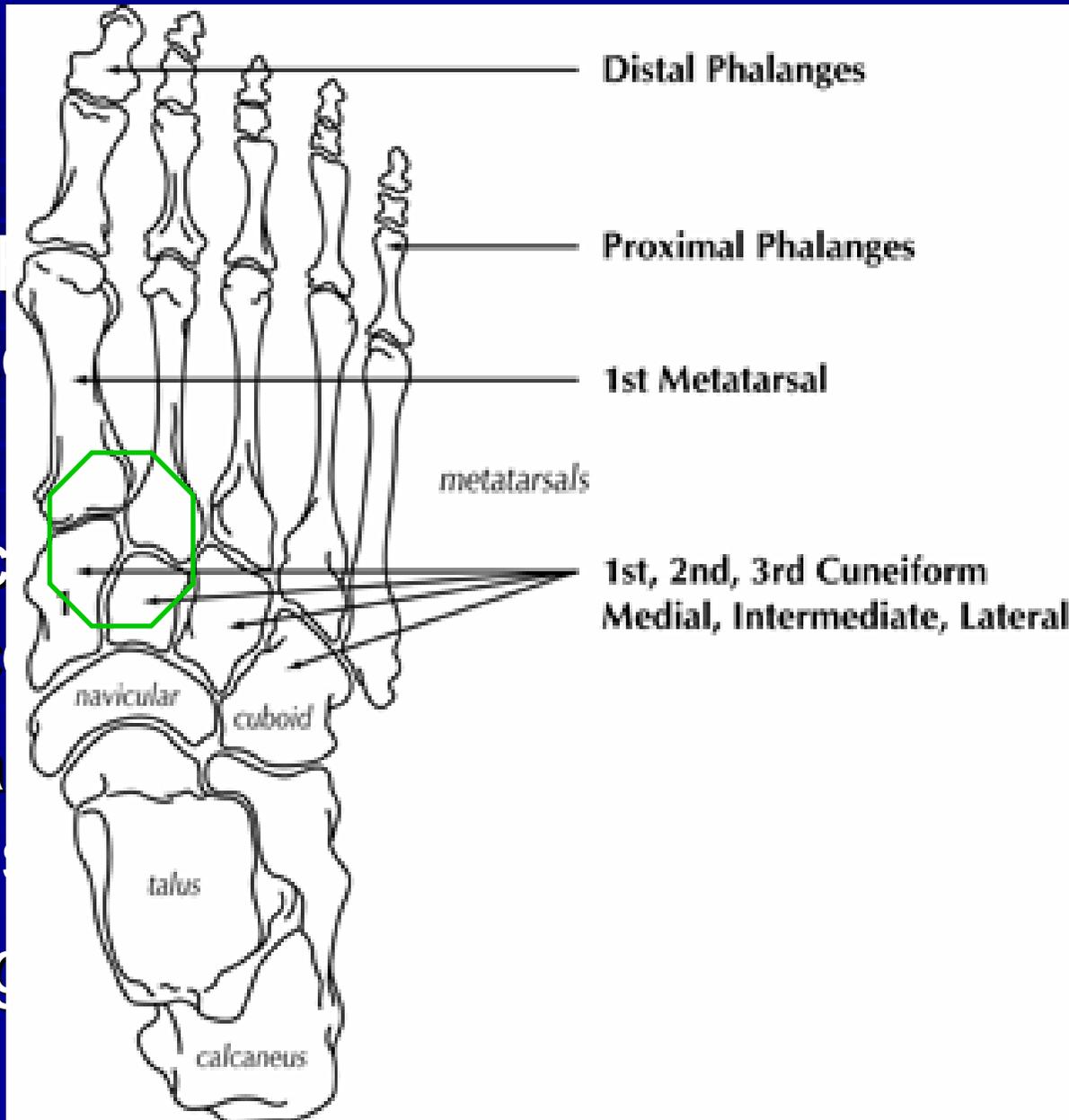


# GOUT

- Commonly involves first MTP joint
- Warm, red, rapid onset
- Exam: painful ROM at toe
- Diagnosis: negative birefringent crystals
  - Xray: erosions of bone
- Treatment:
  - Colchicine
  - NSAIDs
  - Intra-articular steroids



- Lisfranc joint
- 1st Metatarsal and proximal phalanx
- Occurs at the junction of the tarsals and metatarsals
- Examine for bruising
- Diagnostic



with 1st  
forms  
the foot is  
rotated  
WS



# LIS FRANC SPRAIN

- Treatment:
  - Immobilization—
    - NON-WEIGHT BEARING
  - Surgery commonly
- Complications:
  - Chronic pain



# METATARSALGIA

- Pain at base of second metatarsal and heads of second and third metatarsal
  - Any metatarsal can be involved
- Association with high heels, hyperpronation
- May see large callus under metatarsal heads
- Treatment:
  - Paring of callus
  - Orthotics to correct hyperpronation

- **A 40-year-old runner complains of gradually worsening pain on the lateral aspect of his foot. He runs on asphalt, and has increased his mileage from 2 miles/day to 5 miles/day over the last 2 weeks. Palpation causes pain over the lateral 5th metatarsal. The pain is also reproduced when he jumps on the affected leg. When you ask about his shoes he tells you he bought them several years ago. Which one of the following is the most likely diagnosis?**
  - **A. Ligamentous sprain of the arch**
  - **B. Stress fracture**
  - **C. Plantar fasciitis**
  - **D. Osteoarthritis of the metatarsal joint**

# STRESS FRACTURE

- Gradual onset of pain with activity
- History:
  - Increased intensity or duration of activity
  - Change in footwear
  - Change in surface
- Initial x-rays are often negative
- Secondary studies: bone scan, MRI
- Key to treatment is pain free ambulation

# STRESS FRACTURE

- Common areas involved:

- Navicular
- Tibia
- Fibula
- Metatarsals

- Less common:

- Calcaneus
- Cuboid



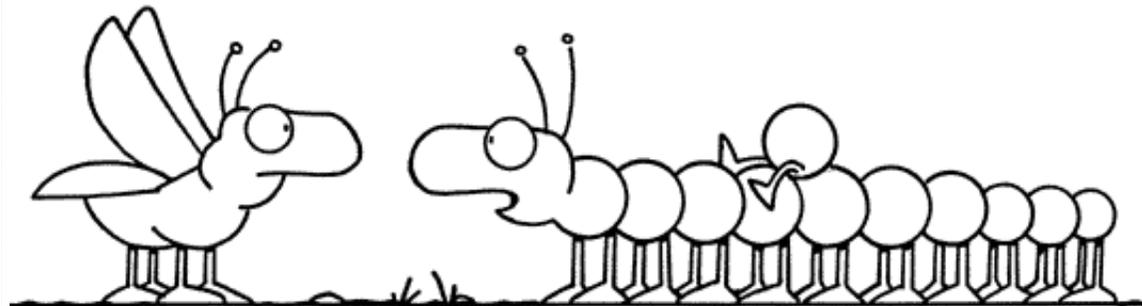
# FOOT AND ANKLE COMMON COMPLAINTS

- Heel pain
- Forefoot pain
- **Ankle pain**
- Numbness/tingling/burning
- Ankle swelling

# ANKLE PAIN

- Chronic
  - Osteochondral defect/ Osteochondritis dessicans
- Trauma
  - Ankle sprain
  - Ankle sprain
  - Ankle sprain
  - Fracture

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**"Section six twisted his ankle and has to stay off his feet for a month."**

# OSTEOCHONDRAL DEFECT

- Can occur with up to 6.5% of ankle sprains
- History:
  - Pain, swelling, give way, instability, locking, catching
- Consider if ankle sprains do not respond to 6-8 weeks of conservative therapy
- Plain radiographs first
- MRI very sensitive and can grade lesion
- Treatment:
  - Non-operative = immobilization and limited weight bearing for 6 weeks
  - Surgery for higher grade lesions

# OSTEOCHONDRAL DEFECT

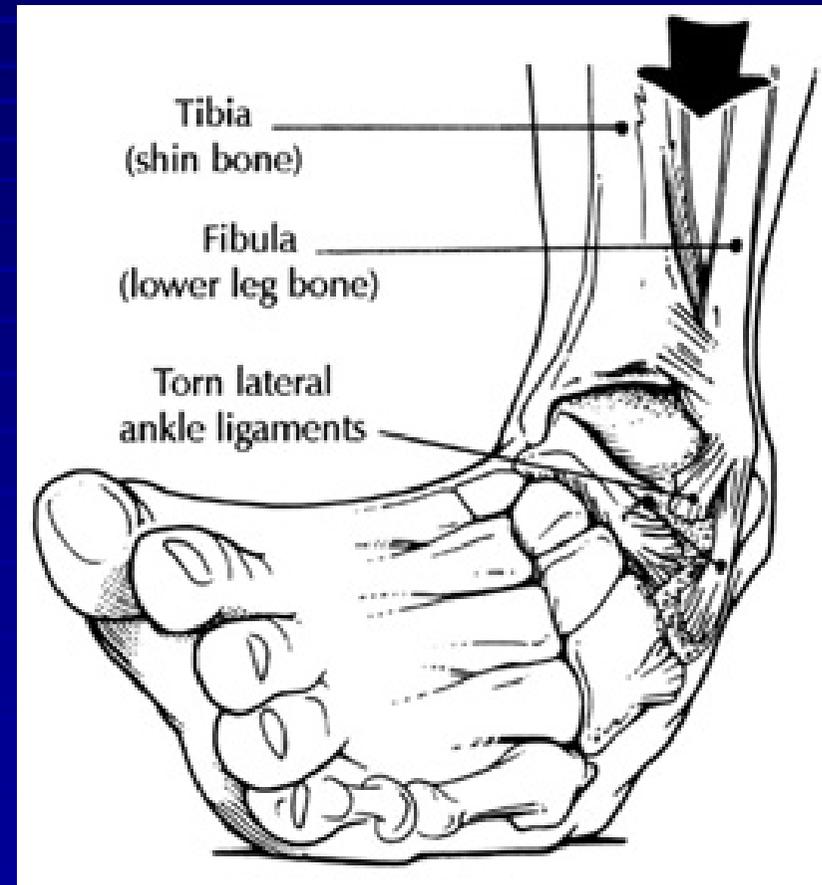


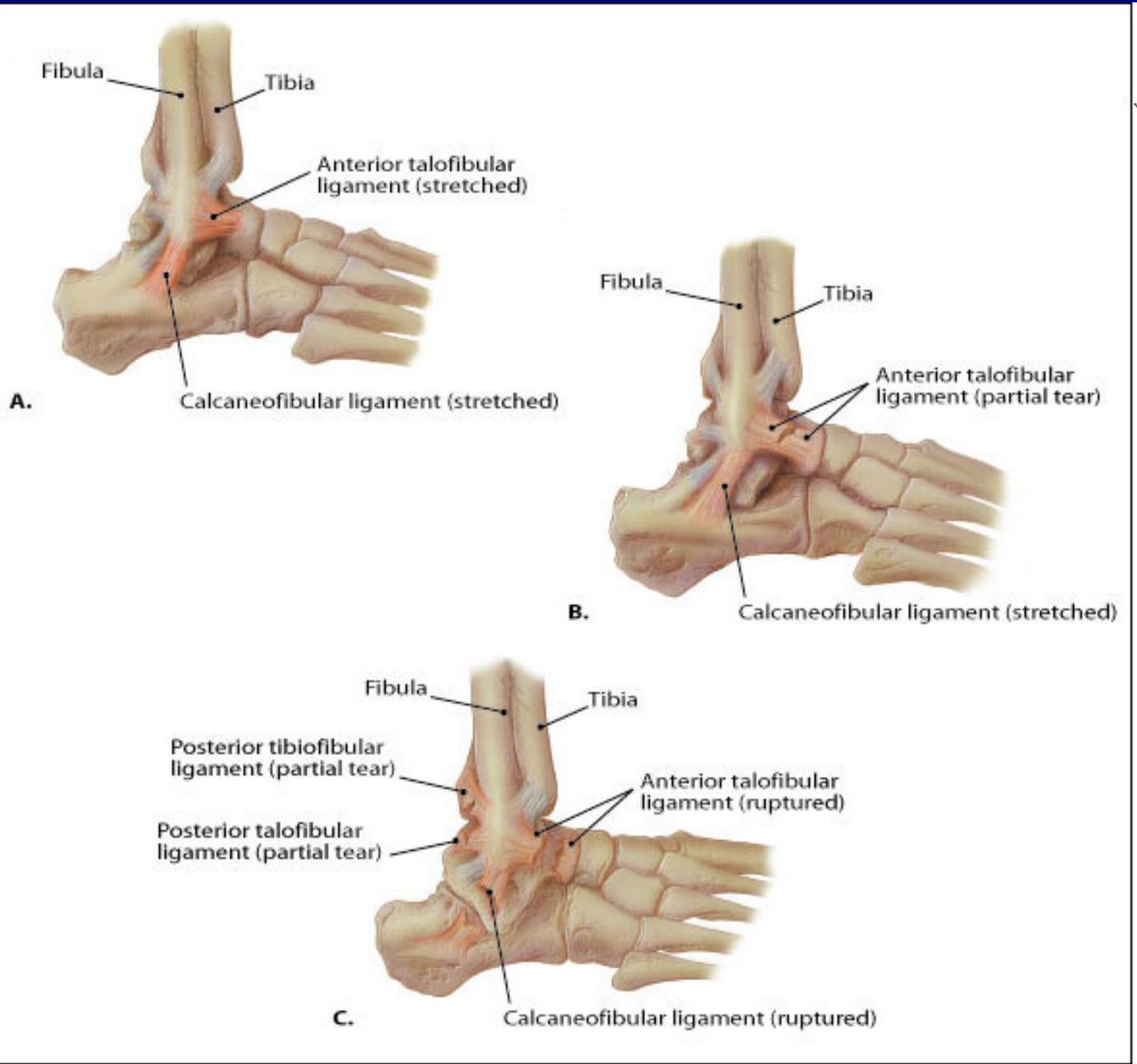
# OSTEOCHONDRAL DEFECT



# ANKLE SPRAIN

- Most commonly injured joint among athletes
- 85% of all ankle injuries are sprains
- Most (85%) are **INVERSION** injuries

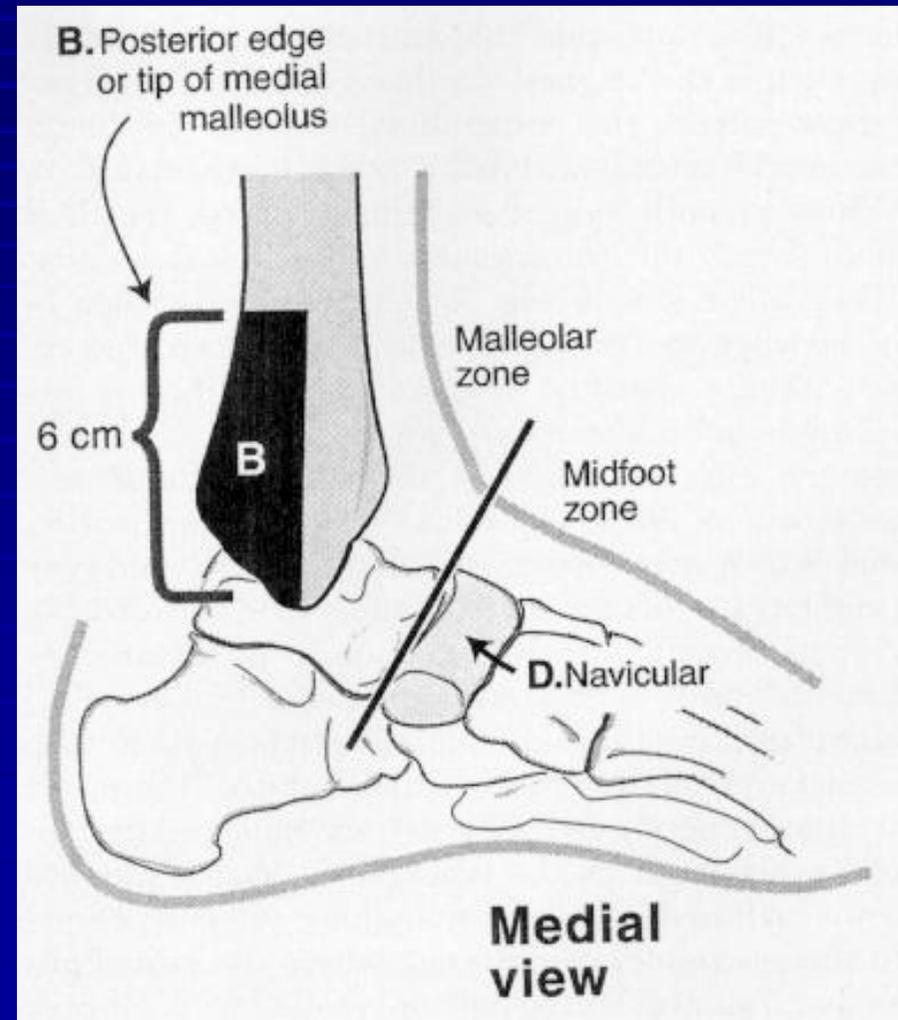
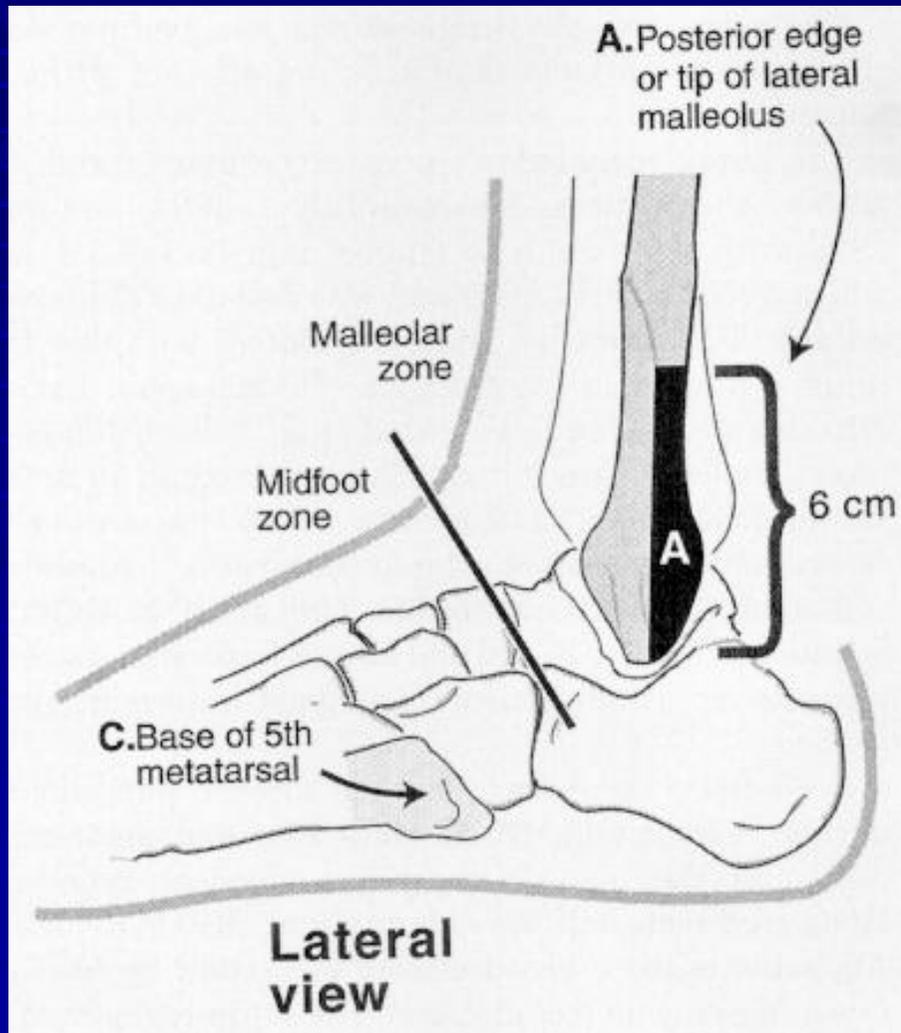




# OTTAWA ANKLE AND FOOT RULES

- Purpose: to determine which patients with ankle trauma need radiographs
- Strengths:
  - Decrease unnecessary x-rays, patient waiting times, & diagnostic costs
  - Sensitivity near 100% for detecting malleolar and midfoot fractures
- Limitations:
  - Only for skeletally mature patients
  - Only applies if seen within 10 days of injury

# Ottawa Ankle Rules



OR INABILITY TO BEAR WEIGHT AFTER INJURY OR IN OFFICE/ED

# Radiographs

- A-P, lateral, mortise views – **WEIGHT BEARING**
- Looking for fracture, dislocation, abnormal widening of “clear space”
- Don't forget to image the foot if clinically indicated



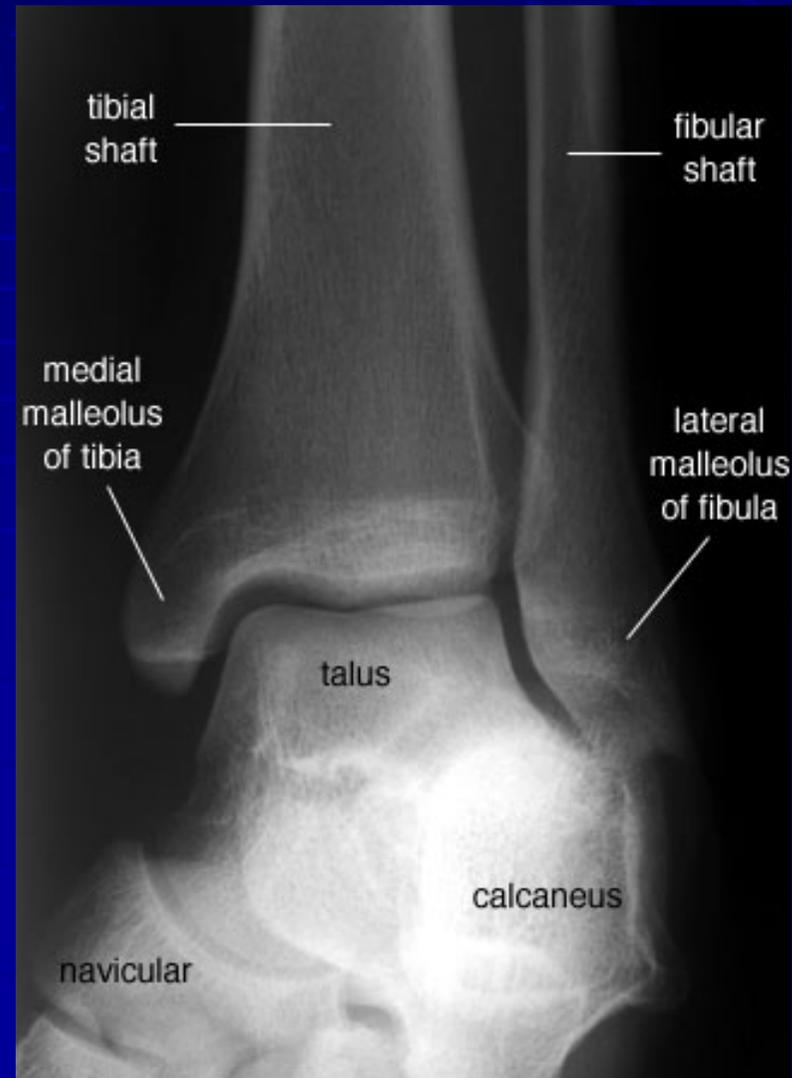
*A-P View of Ankle*

# Radiographs

*Lateral View of Ankle*

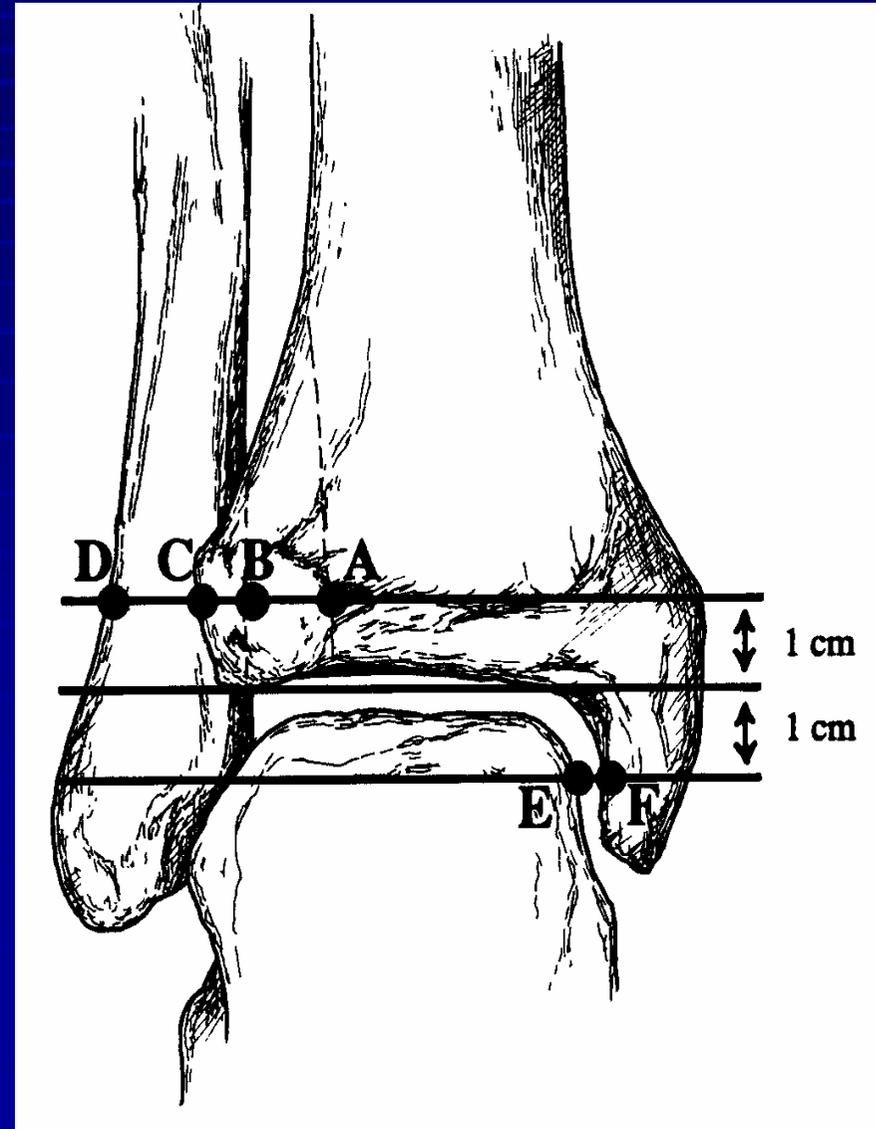


*Mortise View of Ankle*



# Mortise View Normals

- E-F Tib-Talo “clear space” should be  $\leq 5$  mm
- A-B Tib-Fib “clear space” should be  $\leq 5$  mm



# CLASSIFICATION OF LATERAL ANKLE SPRAINS

	Grade I	Grade II	Grade III
Edema, ecchymosis	[Redacted]		
Weight bearing	[Redacted]		
Ligament pathology	stretch	[Redacted]	[Redacted]
Instability testing	[Redacted]		
Time to return to sport	[Redacted]		

# OTHER (THAN LATERAL) ANKLE SPRAINS

- Syndesmotic or high ankle sprain
  - Stretching/tearing of syndesmosis and/or inferior tibiofibular ligaments
  - Common mechanism forced external rotation of foot or internal rotation of tibia on planted foot
- Isolated deltoid ligament sprain
  - Rare, usually accompanied by lateral malleolar fx and/or syndesmotic injury
- Rehabilitation similar to lateral sprains but more likely to require immobilization and have residual symptoms

- A 21-year-old white female presents to the emergency department with a history c/w lateral ankle sprain that occurred 2 hours ago while playing softball. She complains of pain over the distal anterior talofibular ligament (ATFL), but is able to bear weight. There is mild swelling, mild black and blue discoloration, and moderate tenderness over the insertion of the ATFL, but the malleoli are nontender to palpation. Which of the following statements is TRUE regarding management?

- A: AP, Lateral and 30 degrees internal oblique (mortise view) radiographs should be obtained to rule out fracture
- B: Stress radiographs will be needed to rule out a major partial or complete ligamentous tear
- C: The patient should use crutches and avoid weight bearing for 10-14 days
- D: Early ROM exercises should be initiated to maintain flexibility
- E: For best results, functional rehabilitation should begin within the first 24 hours after injury

# ANKLE SPRAIN TREATMENT

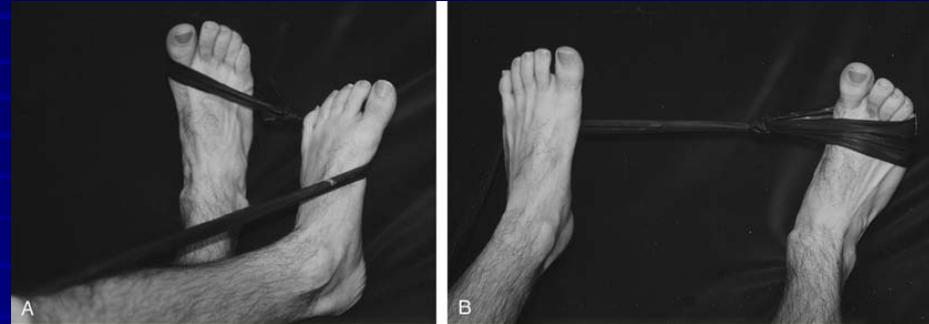
## ■ PRICE

- Protection – stirrup splint, walking cast/boot, crutches if unable to bear weight due to pain
- Rest
- Ice – 20 min every 2-3 hours for first 48-72 hours
- Compression
- Elevation



# ANKLE SPRAIN TREATMENT

- Weight bearing as soon as tolerated
- Passive/active ROM
- Resistance exercises
- +/- Proprioceptive exercises



# NON-HEALING ANKLE SPRAINS

- Symptoms not improving after 6 weeks
- Pain and/or recurrent instability
- Top 3 causes:
  - Inadequate rehabilitation
  - Inadequate rehabilitation
  - Inadequate rehabilitation
- Other causes
  - Talar dome OCD, peroneal tendon injury, anterolateral impingement, loose body, OA, tarsal coalition, complex regional pain syndrome

# FOOT AND ANKLE COMMON COMPLAINTS

- Heel pain
- Forefoot pain
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- **Numbness/tingling/burning**
- Ankle swelling

# NUMBNESS/TINGLING/BURNING

- Heel
  - Jogger's foot
  - Tarsal Tunnel
- Plantar surface of foot
  - Tarsal tunnel
- Toes
  - Morton's neuroma

## Peripheral Neuropathy

Diabetes

Nutritional deficiency

Alcoholism

Heavy metal exposure

Chemotherapy

Renal disease

INH therapy

HIV

# JOGGER'S FOOT

- Medial plantar nerve entrapment
- Neuropathic pain radiating along medial heel and arch
- Often associated with overpronating styles
- Exam: tenderness at navicular tuberosity, pain with toe raise, forceful heel eversion provokes symptoms

# MORTON'S NEUROMA

- Damage to  
sensory nerves
- Usually  
caused by  
repeated  
trauma
- Risk factors  
include:
  - High-heeled shoes
- Histology  
shows:
  - Proliferation of  
nerve fibers
  - Radiation  
induced  
swelling

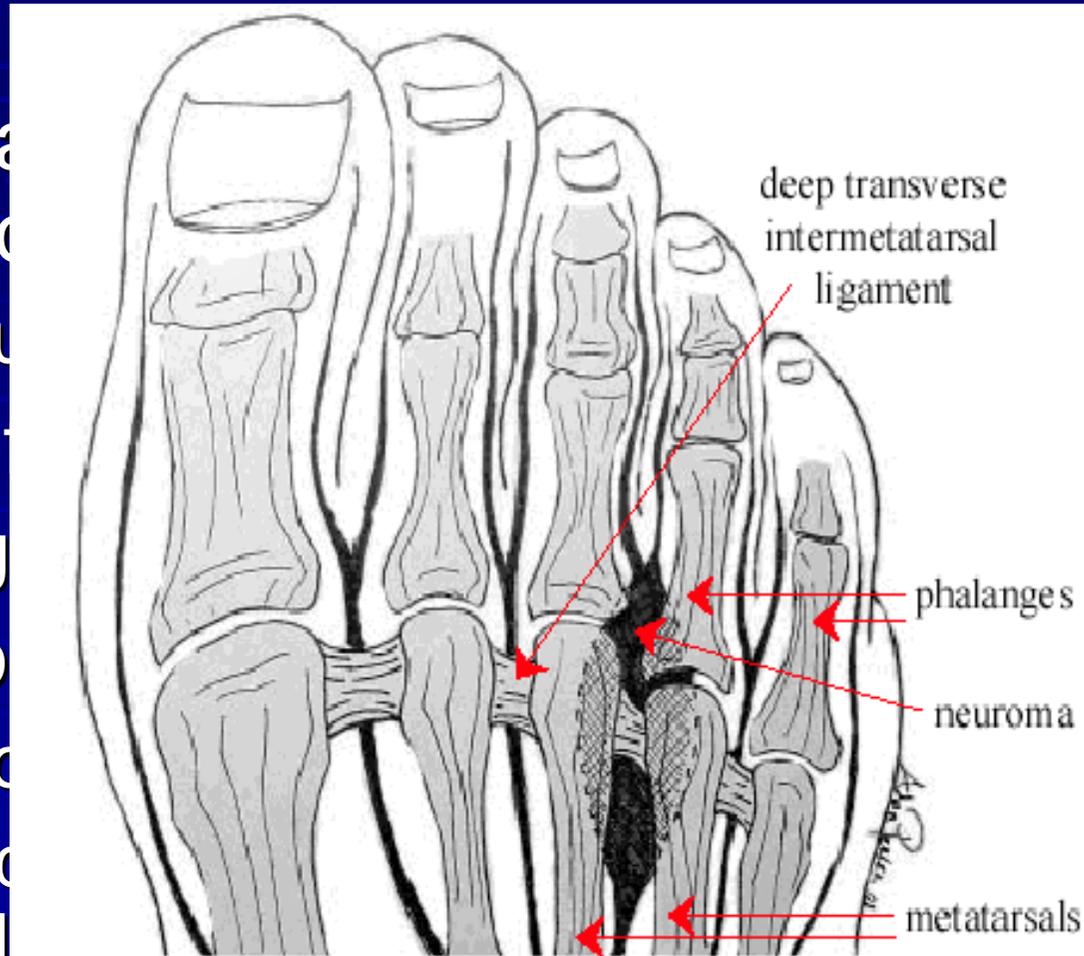


Figure 1. Morton's neuroma found between 3<sup>rd</sup> and 4<sup>th</sup> toes underneath the deep transverse intermetatarsal ligament.

# MORTON'S NEUROMA

- Exam:
  - Squeeze test (lateral compression of metatarsal heads)
  - May be able to palpate swelling between toes
- Treatment
  - RICE, NSAIDs, proper shoes
  - Injection, metatarsal pads, surgical resection

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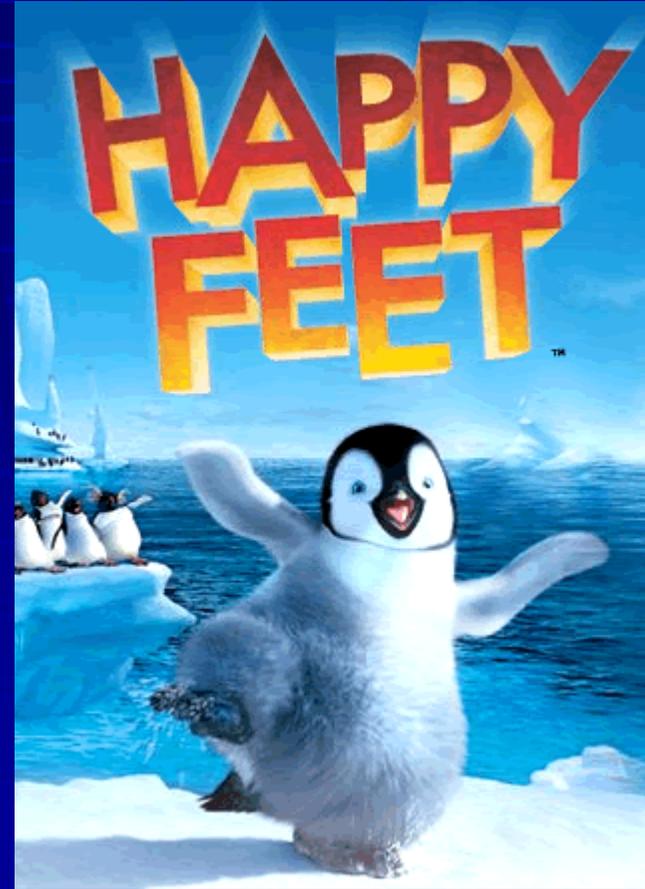
# ATRAUMATIC ANKLE SWELLING

- Osteoarthritis
- Rheumatoid arthritis
- Gout
- Infectious
  - Gonorrhea
  - Lyme disease
  - Septic



# TAKE HOME POINTS

- Try and localize pain
- Take a look at shoe wear, gait style
- Include a sensory exam
- Consider x-rays if history or trauma or repetitive stress
- Keep systemic illness in mind



# RHEUMATOID ARTHRITIS



## ■ ANKLE

- Ankle sprains- medial and lateral and high
  - Ottawa ankle rules
- Achilles tendonitis
- Retrocalcaneal bursitis
- Posterior tibial tendonitis
- Sever's disease (calcaneal apophysitis)
- Tarsal tunnel syndrome
- OCD

## ■ FOOT

- Plantar fasciitis
- Metatarsalgia
- Morton's neuroma
- Tarsal tunnel
- Toe fracture
- Navicular stress fracture
- Freiberg's infarction

