Foot and Ankle Complaints
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
FOOT AND ANKLE COMPLAINTS
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
FOOT AND ANKLE
COMMON COMPLAINTS

- Heel pain
- Forefoot pain
- Ankle pain
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- Ankle swelling
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

- Entrapment of posterior tibial nerve and its branches
- Insidious onset of burning, aching pain from posterior aspect of heel to mid-tarsal zone; may be worse at night
- Aggravated by weight bearing, standing
- Decreased sensation plantar foot, arch, heel
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

Thought to result from repetitive microtrauma from footwear.

Exam:
- Pain with palpation anterior to Achilles tendon.

Treatment:
- RICE (Rest, Ice, Compression, Elevation)
- NSAIDs
- Padded heel counter
- Relative rest
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 heel
- Heel-cord tightness
- Weakness of ankle dorsiflexors

Treatment
- Relative rest, NSAIDs, ice, stretching, heel cups
- Strengthening of dorsiflexors
LATERAL PLANTAR NERVE ENTRAPMENT

Most common neurological cause of heel pain but still very rare

Patient complains of medial heel pain
Usually do not have sensory or reflex deficit
Diagnosis: EMG or MRI usually not diagnostic but may rule out other causes
Treatment: primarily non-surgical
Medications, steroid injection, physical therapy
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
5th 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
Lis Franc Spinal

- Lis Franc joint of midfoot is tarsometatarsal articulation between 1st and 2nd metatarsals and 1st and 2nd cuneiforms.
- Occurs when joint is axial loaded as foot is forcibly plantar flexed and slightly rotated.
- Exam: dorsal foot swelling, plantar bruising very suspicious.
- Diagnosis: WEIGHT BEARING VIEWS.
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

"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
OSTEOCHONDRODINAL DEFECT

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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
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

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<thead>
<tr>
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<th>Grade I</th>
<th>Grade II</th>
<th>Grade III</th>
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<tbody>
<tr>
<td><strong>Edema, ecchymosis</strong></td>
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<td>Diffuse, significant</td>
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<td><strong>Weight bearing</strong></td>
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<td><strong>Ligament pathology</strong></td>
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<td><strong>Instability testing</strong></td>
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<td><strong>Time to return to sport</strong></td>
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<td>Diffuse, significant</td>
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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
- Ankle pain
- 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 or fibrosis of interdigital sensory nerves
  - Usually third web space
- Risk factors
  - High heeled shoes, narrow shoes
- History
  - Poorly localized, shock-like pain
  - Radiates into toes or proximally during walking

Figure 1. Morton’s neuroma found between 3rd and 4th 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
FOOT AND ANKLE
COMMON COMPLAINTS

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- Ankle swelling
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