Foot and Ankle

PTA 216
Foot and Ankle

- Complex structure
- 28 bones
  - 2 sesamoid bones
- 55 articulations
  - 30 synovial joints

Dutton, 2012. pg 557
What are the functions of the foot?

- Support base that provides stability in an upright posture
- Allows rotation of the tibia and fibula
- Provides flexibility for absorption of shock
- Allows for adaptation of uneven terrain
- Acts as a lever during push off of gait

Shankman, 2011. pg. 844
Foot Problems

- Alter the mechanics of gait
  - Causing pain/pathology in other LE joints
- 80% of the population will be plagued by foot problems at some point
- Most conditions can be treated conservatively

Magee, 2008 pg. 844
Plantar Fasciitis

- Chronic inflammation of the plantar aponeurosis
- May or may not have an associated heel spur (depending on chronic vs acute)
- Repetitive micro-trauma
- Chronic traction

Shankman, 2011. pg. 251
Plantar Fasciitis

- Indicated by pain along the medial border of the calcaneus
- Some may have pain throughout the entire length of the fascia

Shankman, 2011. pg. 251
Treatment for Plantar Fasciitis

- **Conservative**
  - Ice
  - NSAIDS
  - Gentle gastroc/soleus stretching
  - Modalities as needed
  - Strengthening
  - Manual therapy techniques
  - Steroid injections
  - Night splinting

Shankman, 2011. pg. 251
Dutton, 2012. pg. 585
Treatment for Plantar Fasciitis

- **Surgical**
  - Fasciotomy
    - Plantar fascia release
  - Heel spur removal
    - Removal of the calcaneal exostosis

Shankman, 2011. pg. 252
Achilles Tendinitis

- Overuse injury following repetitive microtrauma/overloading of the tendon
  - Localized pain in the distal aspect of tendon

- Symptoms include:
  - Soft tissue swelling
  - Pain
  - Crepitus

Shankman, 2011. pg. 241
Achilles Tendinitis

- Conservative management:
  - Rest
  - Ice
  - NSAIDS
  - Progressive exercise as tolerated
  - Physical agents as needed

- ALL AGGRAVATING FACTORS MUST BE STOPPED

Shankman, 2011. pg. 242
Achilles Tendon Rupture

- Injury resulting from excessive sudden plantar flexion
- Usually occur 3 to 4 cm proximal to the insertion at the calcaneus (decreased vascularity)
- Mostly common in males between 20 and 50 years of age

Shankman, 2011. pg. 243
Dutton, 2012. pg. 584
Achilles Tendon Rupture

- Non-operative treatment:
  - Immobilization x 8 weeks
- Operative treatment:
  - End to end primary repair
  - Direct repair with augmentation with tendon

Shankman, 2011. pg. 243
Operative vs Non-operative treatment

- **Non-operative:**
  - Re-rupture rate of 8-39%
  - Loss of strength, endurance, and power

- **Operative:**
  - Re-rupture rate of 0-5%
  - Increase in strength, endurance, and power

- There is limited difference in function of achilles tendon following conservative/operative treatment

Shankman, 2011. pg. 270
Compartment Syndrome

- Acute or chronic elevations in tissue pressure within a closed fascial space
  - Results in occlusion of the vessels with compromised neuromuscular function

- Clinical symptoms:
  - Pain
  - Palpable swelling
  - Parasthesias
  - Warm and shiny skin

Shankman, 2011. pg. 245
Compartment Syndrome

- **Anterior:**
  - Tibialis anterior, extensor digitorum longus, extensor hallucis longus, and fibularis tertius

- **Lateral:**
  - Fibularis longus, fibularis brevis

- **Superficial Posterior:**
  - Gastrocnemius, soleus, and plantaris muscles

- **Deep Posterior:**
  - Posterior tibialis, flexor digitorum longus, and FHL (flexor hallucis longus)

Dutton, 2012. pg. 588
Fasciotomy: relieves intra-compartmental pressure by opening/releasing the fascial compartment

- Surgical incision will be left open and managed with sterile bandaging to allow for release of pressure

Shankman, 2011. pg. 246
Post-op Fasciotomy Care

- Ice packs and elevation (immediately)
- Gentle ROM of knee and ankle/ambulation as tolerated (2 days post-op)

- Muscle hypertrophy is contra-indicated following surgery
  - Heavy resistance and intense exercise should be avoided

Shankman, 2011. pg. 246
Morton’s Neuroma

- Benign tumor of a nerve causing pain into the toes and plantar and/or dorsal surfaces of the foot
  - Usually in between the 3rd and 4th metatarsal heads
- Present bilaterally in 15% of all cases
- Patient will present with:
  - Burning
  - Cramping
  - Catching sensation

Shankman, 2011. pg. 253
Morton’s Neuroma

- Usually treated conservatively:
  - Metatarsal pad
  - Wider, softer shoes
  - Cortico-steroid injections
  - Physical Therapy:
    - Active range of motion
    - Thermal agents as necessary
Morton’s Neuroma

- Surgical intervention requires an excision of the neuroma
- Post-op care:
  - Early ROM to limit stiffness
  - PWB -> FWB as tolerated
  - Compression bandaging
  - Thermal agents as indicated
Lateral (valgus) deviation of the great toe with deformity of soft tissue and bone.

Irritated by improper footwear
  - Pain is usually eliminated by removal of shoes

Conservative management:
  - Change in footwear
  - Orthotics
  - Modification of activity

Shankman, 2011. pg. 253
Toe Deformities

Types of hammer toes

- Hammer toe
- Claw toe
- Mallet toe

Shankman, 2011. pg. 254
Dutton, 2012. pg. 580-581
Special Tests for the Foot and Ankle
Homan’s Sign

- Patient lies supine on the table
- With the patient’s knee extended, the tester passively dorsiflexes the pt’s foot
- Most commonly, palpation of the calf is also performed in conjunction with the DF of the pt’s foot

Konin, 2006. pg. 318
Homan’s Sign

- Positive sign is pain in the calf
- A positive sign for this test is indicative of thrombophlebitis (DVT) and the patient should be sent for immediate follow up with appropriate medical personnel
Anterior Drawer Test

- The patient is seated on the table with the knee slightly flexed and the involved foot is relaxed in slight plantar flexion.
- The tester stabilized the tibia/fibula and grasps the calcaneus/talus with the opposite hand.
- The tester applies an anterior force on the calcaneus/talus while stabilizing the LE.

Cook, 2013. pg. 508
Anterior Drawer Test

- Increased anterior translation of the talus away from the ankle as opposed to the opposite side is indicative of a positive test.
- This indicates an anterior talo-fibular ligament (ATFL) sprain.
- This test can also be performed in prone.
The patient lies in prone with the feet over the edge of the table.

With the LE relaxed, the tester squeezes the belly of the gastrocnemius-soleus complex.

The tester is looking for plantar flexion of the foot.

Konin, 2006. pg. 328
Thompson Test

- Lack of plantar flexion is indicative of a positive result indicating a possible rupture of the Achilles Tendon
Inter-digital Neuroma Test

- Patient sits on a plinth with the involved leg extended with the tester having one hand around the metatarsal heads of the involved foot
- The tester then squeezes the metatarsal heads together and holds for 1-2 minutes

Konin, 2006. pg. 333
Complaints of pain, tingling, or numbness in the foot with increased pressure is indicative of a positive test.

Indicates ????

If positive, the pain is usually relieved by the release of pressure.
Exercises for the Foot and Ankle
DORSIFLEXION STRETCH

10 x 10 second hold
T-BAND INVERSION

3 x 10 reps
T-BAND EVERSION

3 x 10 reps
T-BAND DORSIFLEXION

3 x 10 reps
T-BAND PLANTARFLEXION

3 x 10 reps
Usually time based treatment
10 x 10 second hold
3 x 10 reps – progress to unilateral heel raises as able
Distance x reps
Usually time based treatment
PLANTAR FASCIA STRETCH

10 x 10 second hold
10 x 10 second hold
SOLEUS STRETCH

10 x 10 second hold
3 x 10 reps in all directions
Bibliography