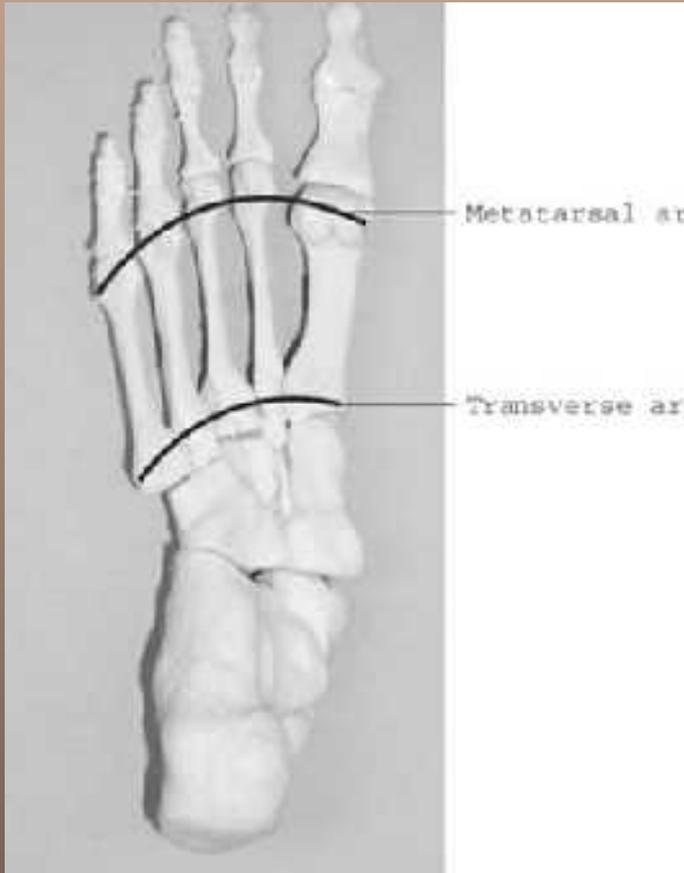


The Foot



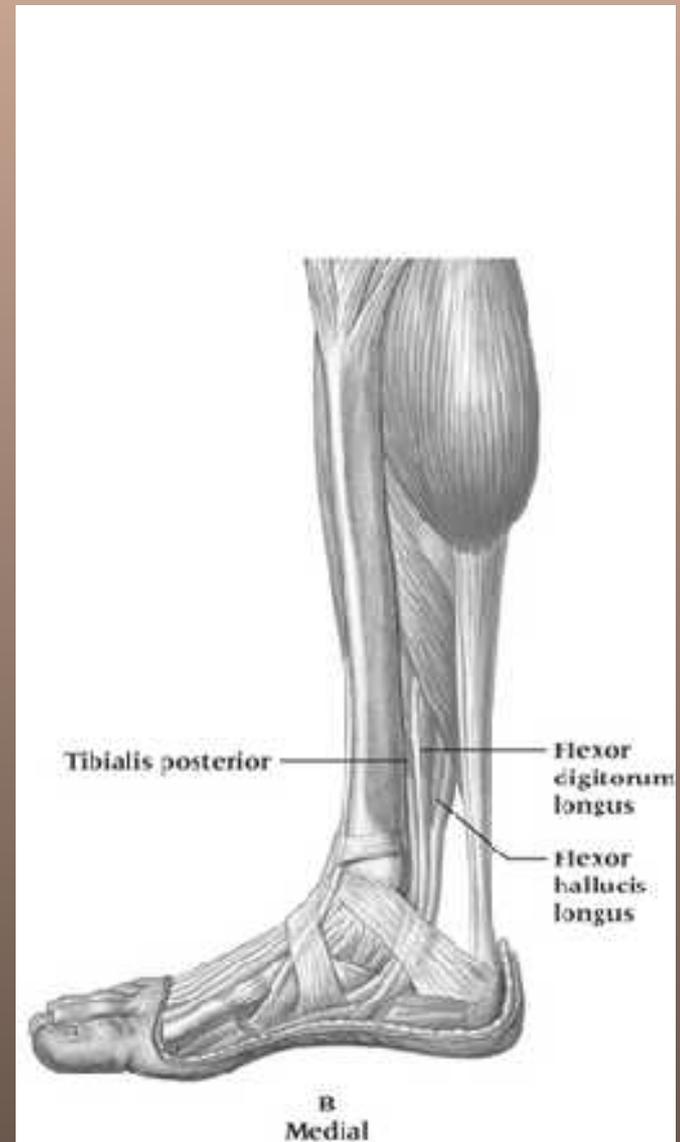
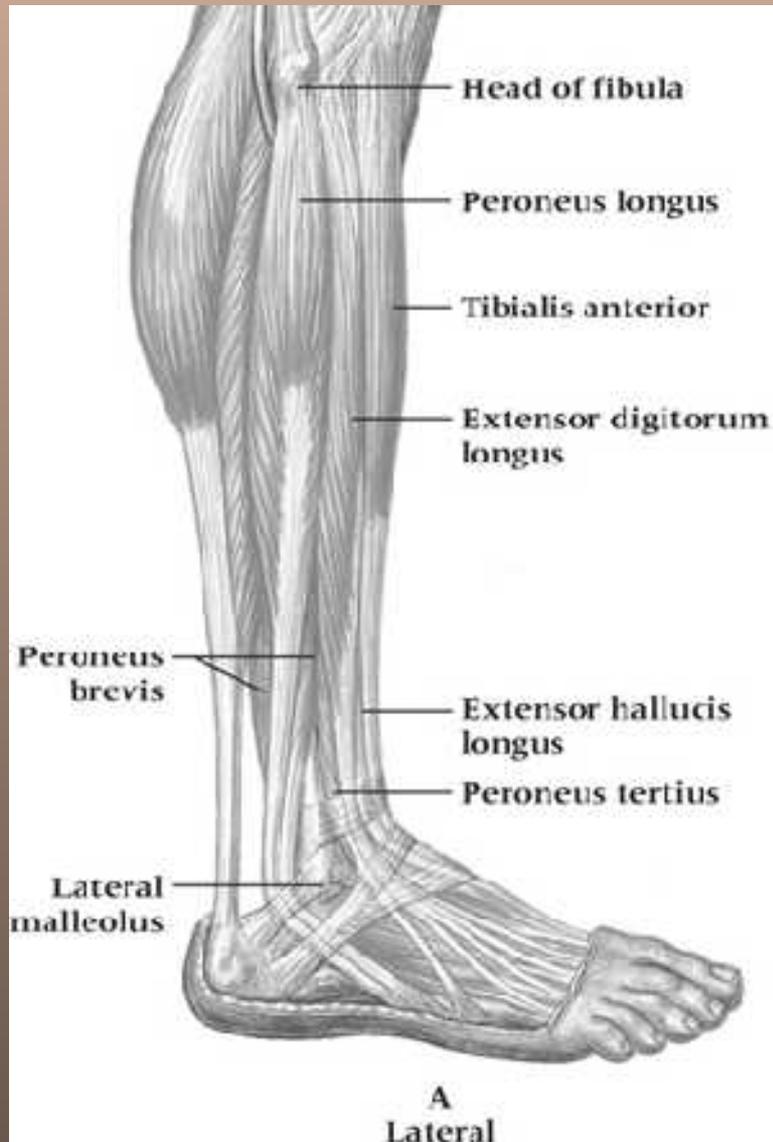
Arches of the Foot

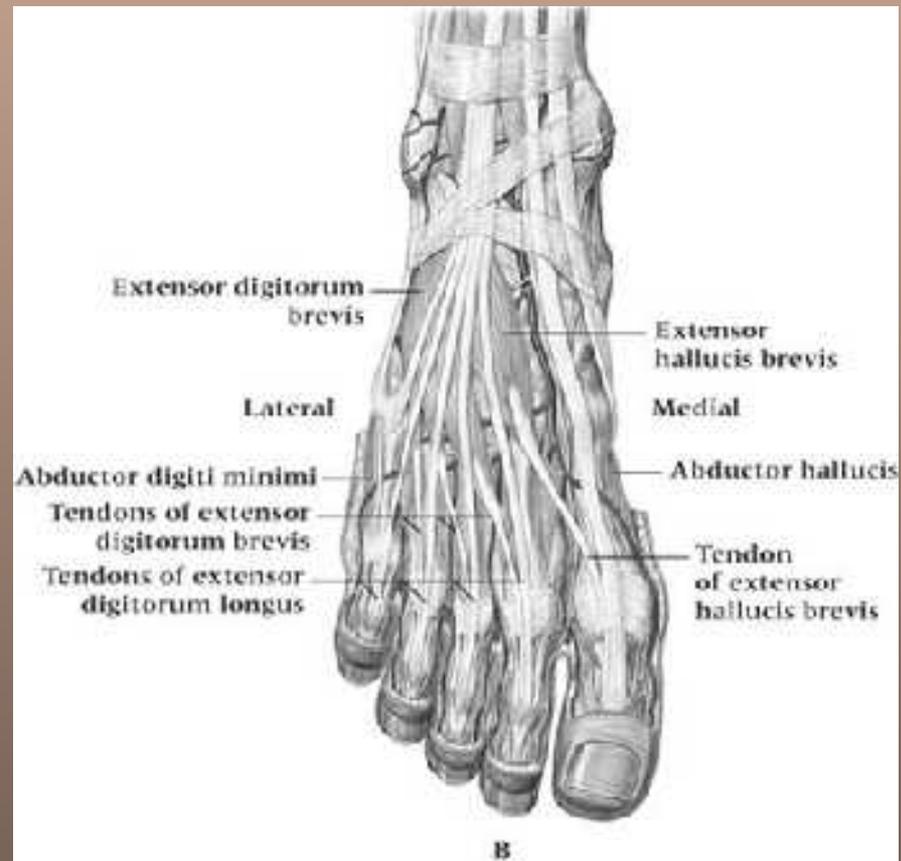


Plantar Fascia



Muscle of the Foot and Lower Leg





Prevention of Foot Injuries

- Highly vulnerable area to variety of injuries
- Injuries best prevented by selecting appropriate footwear, correcting biomechanical structural deficiencies through orthotics
- Foot will adapt to training surfaces over time
 - Must be aware of potential difficulties associated with non-yielding and absorbent training surfaces

Foot Assessment

- Athletes should be referred to qualified personnel for injury evaluation
- History
 - Generic history questions
 - Questions specific to the foot
 - Location of pain - heel, foot, toes, arches?
 - Training surfaces or changes in footwear?
 - Changes in training, volume or type?
 - Does footwear increase discomfort?

- Observations

- Does athlete favor a foot, limp, or is unable to bear weight?
- Does foot color change w/ weight bearing?
- Is there pes planus/cavus?
- How is foot alignment?
- Structural deformities?
- What does wear pattern look like on the sole of the shoe?
 - Is the wear symmetrical?

- Palpation
 - Should assess the bony anatomy first
 - Checking for deformities and areas of tenderness
 - Assessment of soft tissue (muscles and tendons) will allow for detection of point tenderness, swelling, muscle spasm or muscle guarding
 - Circulation must also be monitored using the **dorsal pedal pulse**
 - Located on anterior surface of ankle and foot

Recognition and Management of Specific Injuries

- Foot problems are associated with improper footwear, poor hygiene, anatomical structural deviations or abnormal stresses
- Sports place exceptional stress on feet
- ATCs must be aware of potential problems and be capable of identifying, ameliorating or preventing them

- Retrocalcaneal Bursitis (Pump Bump)

- Cause of Injury

- Caused by inflammation of bursa beneath Achilles tendon
- Result of pressure and rubbing of shoe heel counter of a shoe
- Chronic condition that develops over time and may take extensive time to resolve, exostosis (pump bump) may develop
- Must differentiate from Sever's disease



– Sign and Symptoms

- Signs of inflammation
- Tender, palpable bump on calcaneus
- Pain w/ palpation superior and anterior to Achilles insertion, swelling on both sides of the heel cord

– Care

- Routine stretching of Achilles, heel lifts to reduce stress, donut pad to reduce pressure
- Select different footwear that results in increasing or decreasing height of heel counter.

- Heel Bruise

- Cause of Injury

- Caused by sudden starts, stops or changes of direction, irritation of fat pad

- Signs of Injury

- Severe pain in heel and is unable to withstand stress of weight bearing
 - May progress to chronic inflammation of bone covering

- Care

- Reduce weight bearing for 24 hours, RICE and NSAID's
 - Resume activity with heel cup or doughnut pad after pain has subsided (be sure to wear shock absorbent shoes)



Applying tape can also be effective in generating a “heel cup”



- Plantar Fasciitis

- Cause of Condition

- Increased stress on fascia
 - Change from rigid supportive footwear to flexible footwear
 - Poor running technique
 - Leg length discrepancy, excessive pronation, inflexible longitudinal arch, tight gastroc-soleus complex
 - Running on soft surfaces, shoes with poor support

- Sign and Symptoms

- Pain in anterior medial heel, along medial longitudinal arch
 - Increased pain in morning, loosens after first few steps, pain with forefoot dorsiflexion

- Care

- Extended treatment (8-12 weeks) is required
- Orthotic therapy is very useful (soft orthotic with deep heel cup)
- Simple arch taping, use of a night splint to stretch
- Vigorous heel cord stretching and exercises that increase great toe dorsiflexion
- NSAID's and occasionally steroidal injection



Insert Figure 14-8

- Metatarsal Fractures

- Cause of Injury

- Direct force or by placing torsional/twisting stresses on bone

- Signs of Injury

- Difficult to distinguish fracture from sprain in this case
 - Generally present with swelling, pain, point tenderness and possible deformity
 - X-ray will be necessary to distinguish fx from sprain

- Care

- Symptomatic
 - RICE for swelling
 - Short leg walking cast once swelling subsides (3-6 weeks)

- Jones Fracture

- Cause of Injury

- Fracture of metatarsal caused by inversion or high velocity rotational forces
 - Most common = base of 5th metatarsal

- Sign of Injury

- Immediate swelling, pain over 5th metatarsal
 - May feel a “pop”
 - High nonunion rate and course of healing is unpredictable

- Care

- Generally requires 6-8 weeks non-weight bearing with short leg cast if non-displaced
 - If nonunion occurs, internal fixation may be required



- Metatarsal Stress Fractures

- Cause of Injury

- 2nd metatarsal fracture (March fracture)
 - Change in running pattern, mileage, hills, or hard surfaces
 - Often the result of structural deformities of the foot or training errors (terrain, footwear, surfaces)
 - Often associated with Morton's toe

- Signs of Injury

- Pain and tenderness along second metatarsal
 - Pain with running and walking
 - Continued pain/aching when non-weight bearing

– Care

- Determine cause of injury
- Generally good success with modified rest and training modifications (pool running, stationary bike) for 2-4 weeks
- Return to running should be gradual over a 2-3 week period with appropriate shoes

- Metatarsal Arch Strain

- Cause of Injury

- Hypermobility of metatarsals caused by laxity in ligaments – results in excessive splay of foot
 - Will appear to have fallen arch

- Signs of Injury

- Pain or cramping in metatarsal region
 - Point tenderness (metatarsalgia), weakness
 - Heavy callus may form in area of pain

- Care

- Pad to elevate metatarsals just behind ball of foot
 - Strengthening of foot muscles and heel cord stretching

- Longitudinal Arch Strain

- Cause of Injury

- Result of increased stress on arch of foot
 - Flattening of foot during mid-stance causing strain on arch

- Sign of Injury

- Pain with running and jumping, below posterior tibialis tendon, accompanied by pain and swelling
 - May also be associated with sprained calcaneonavicular ligament and flexor hallucis longus strain

- Care

- Immediate care, RICE, reduction of weight bearing.
- Weight bearing must be pain free
- Arch taping may be used to allow pain free walking



Insert Figure 14-12

- Fractures and Dislocations of the Phalanges
 - Cause of Injury
 - Kicking un-yielding object, stubbing toe, being stepped on
 - Signs of Injury
 - Immediate and intense pain
 - Swelling and discoloration
 - Obvious deformity with dislocation
 - Care
 - Dislocations should be reduced by a physician
 - Casting may occur with great toe or stiff soled shoe
 - Buddy taping is generally sufficient
 - Shoe with larger toe box may be necessary

- Bunion (Hallux Valgus Deformity)

- Cause of Injury

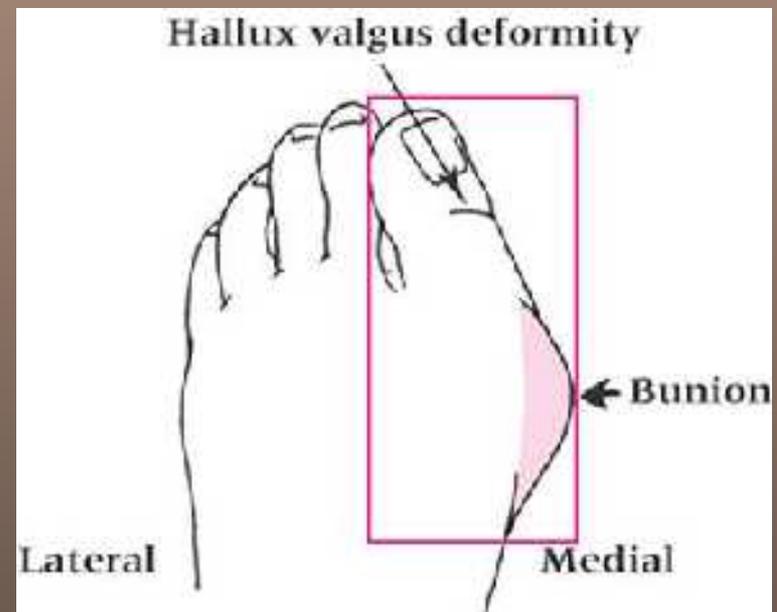
- Exostosis of 1st metatarsal head; associated with forefoot varus; shoes that are too narrow, pointed or short
 - Bursa becomes inflamed and thickens, enlarging joint, and causing lateral malalignment of great toe

- Sign of Injury

- Tenderness, swelling, and enlargement of joint initially
 - As inflammation continues, angulation increases causing painful ambulation

- Care

- Wear correct fitting shoes, appropriate orthotics, pad over 1st metatarsal head, tape splint between 1st and 2nd toe
- Surgery may be required during later stages of condition



- Morton's Neuroma

- Cause of Condition

- Thickening of nerve sheath (common plantar nerve) at point where nerve divides into digital branches
 - Commonly occurs between 3rd and 4th met heads where medial and lateral plantar nerves come together

- Signs of Condition

- Burning paresthesia and severe intermittent pain in forefoot
 - Pain relieved with non-weight bearing
 - Toe hyperextension increases symptoms

**Morton's
Neuroma**

**4th
metatarsal**



**3rd
metatarsal**

Insert Figure 14-14

- Care
 - Teardrop pad can be placed between met heads to increase space, decreasing pressure on neuroma
 - Shoes with wider toe box would be appropriate



Insert Figure 14-15

- Turf Toe
 - Cause of Injury
 - Hyperextension injury resulting in sprain of 1st metatarsophalangeal joint
 - May be the result of single or repetitive trauma
 - Signs and Symptoms
 - Pain and swelling which increases during push off in walking, running, and jumping
 - Care
 - Increase rigidity of forefoot region in shoe
 - Taping the toe to prevent dorsiflexion
 - Rest and discourage activity until pain free
 - 3-4 weeks may be required for pain to subside

- Calluses
 - Cause of Condition
 - Develop from friction – may be painful as fatty layer loses elasticity and cushioning effect
 - May be vulnerable to tears and cracks and possible blister development underneath
 - Care
 - Emery callus file may be necessary
 - Massaging with small amounts of lotion may be helpful
 - Sanding or pumicing – care must be exercised
 - Can be prevented
 - Shoes that fit appropriately are recommended
 - Wear at least one layer of socks
 - Apply petroleum jelly to reduce friction

- Blisters

- Cause of Injury

- Shearing forces on skin – results in development of fluid accumulation between layers of skin
 - Wearing appropriate footwear (socks and shoes) and applying lubricants may help to reduce friction

- Care

- Take action to reduce friction (apply lubricants, cover with tape/band aid/donut pad)
 - Avoid puncturing in order to prevent infection
 - Puncturing may be necessary if pressure build-up is too great and is causing excessive pain

- Corns

- Cause of Condition

- Result of pressure from improperly fitting shoes
 - Hard corns are often associated with hammer toes
 - Soft corns result from wearing narrow shoes and excessive foot perspiration

- Signs of Condition

- Form between 4th and 5th toes
 - Circular area of thickened, white macerated skin

- Care

- For soft corns – good fitting shoes are necessary in conjunction with good foot hygiene
 - Use of padding or cotton to separate toes is helpful
 - Soaking in warm soapy water will also aid in softening of corns

- **Ingrown Toenails**

- **Cause of Condition**

- Leading edge of nail grows into nearby soft tissue

- **Care**

- Shoes should be appropriate width and length
 - Prevent with correct trimming of nails
 - Nail should be left sufficiently long and not cut so as to allow penetration into soft tissue
 - Should be cut short enough that it is not irritated by shoes or socks
 - Treatment may require soaking and packing toenail with cotton in order to lift nail away from soft tissue
 - Cutting a “V” notch toward the infected side will allow the nail to grow towards the middle

- Subungual Hematoma

- Cause of Injury

- Direct pressure, dropping an object on toe, kicking another object
 - Repetitive shear forces on toenail

- Signs of Injury

- Accumulation of blood underneath toenail
 - Likely to produce extreme pain and ultimately loss of nail

- Care

- RICE immediately to reduce pain and swelling
 - Relieve pressure within 12-24 hours (lance or drill nail) – must be sterile to prevent infection