

EID424 Week 3 Notes

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1 The ankle

- Leg: knee to ankle
 - Tibia: bigger
 - Fibula: small
 - Both end in the malleoli (ankle bones)
- Foot: "foot is a stick" – lots of bones, complicated
 - Calcaneus: heel bone
 - Talus: above calcaneus
 - Plantar fascia: tough tissue supporting arch, runs from heel to toe
- Ankle
 - Bones
 - * Talus fits into tibia/fibula
 - Form a mortise hinge
 - * Joint between talus and calcaneous allows foot to roll sideways

- Inversion (ankle sprain)/eversion
 - Subtalar joint
- Ligaments
 - * Lateral: ones that get damaged more easily
 - Anterior talofibular: front, going from talus to fibula
 - Posterior talofibular
 - Calcaneofibular
 - * Medial
 - Deltoid ligaments
- Musculature
 - Ankle plantar flexors
 - * Soleus: lower
 - * Medial/lateral gastrocnemius (calf)
 - Toe flexors
 - Foot inverters (tibialis posterior) (sprain your ankle)
 - Ankle dorsiflexors, tibialis anterior, ankle evertor, toe extensors
 - Lateral: peroneal muscles (ankle evertors)
- Achilles tendon
 - Inserts onto calcaneous
 - Major plantarflexors (calf muscles) attached to
 - Largest tendon in the human body
 - Is very important for efficient walking
 - Kangaroos make the most efficient use of stored elastic energy

2 Common injuries

- Turf toe: hyperextension injury of the first metatarsophalangeal joint (big toe)
 - Common on artificial turf
 - Causes decreased range of motion, loss of push-off strength
 - When full tear, possible sesamoid (ball of foot) bone fracture (hard to heal)

- Treatment:
 - * RICE:
 - Rest
 - Ice
 - Compression
 - Elevation
 - * Tape/rigid shoe/cam walker (ankle immobilizer)/cast to stiffen the apparatus
- Plantar fasciitis:
 - Painful especially early in the day
 - Flat or high arches
 - Sudden change in activity (exercise or weight)
 - Tight achilles tendon
 - Treatment:
 - * Rest, extra support
 - * Stretching achilles tendon; calf raises, towel curls
 - * Night brace to reduce morning pain
- Ankle sprain (sprain injury to ligament)
 - Most common sports injury
 - Almost always lateral ankle sprain
- High ankle sprain
 - Damage to syndesmotic ligaments
 - * Anterior/posterior tibiofibular ligaments
 - * Interosseus ligament: large ligament between tibia and fibula
 - Outward twisting injury
 - Painful
 - Heals nicely if rested
- Achilles tendonitis
 - Most common in runners; beware the middle-aged runner
 - Overuse injury ("training error"); beware of changes

- Treatment: rest
- If no rest, Achilles tendonitis and can tear Achilles heel
- Beware of Cipro (known to cause tendon weakness)
- Torn Achilles tendon
 - Usually surgical repair
 - One-inch heel lift
- Compartment syndrome
 - Compartment: "groups of muscles surrounded by tough connective tissue called fascia"
 - Fluid buildup in a compartment can cause lack of blood flow and tissue death
 - Can be acute (emergency: trauma, dislocation, vascular injury) or chronic (usually running; usually no permanent effects, goes away with rest; can measure by literally measuring pressure when exercising)

3 Other

- Injuries are usually classified in terms of three grades
- Three classes of drugs:
 - Opiates: heroin
 - Acetaminophenes: Tylenol
 - * Do not take with alcohol
 - Anti-inflammatory
 - * NSAID (?): non-steroidal: aspirin, ibuprofen
 - Aspirin, ibuprofen "Cox-1" inhibitors: on the stomach
 - Cox-2: easier on the stomach but side effects
 - * Steroidal
- Rehabilitation/treatment for different ages:
 - Deal with milestones (how is the patient feeling), not timelines. Don't push them in fear of rebreaking things

- * **Weight bearing as tolerated (WBAT)**
- * **Active range of motion (AROM)** exercises
- * Don't test the injury, don't do much motion in the direction of the injury
- **Proprioception:** perception of your position in space without looking, or reproducing a position from looks
- Rehab goes from gentle to more intense, eventually do sports-specific exercise
- When repairing tendon surgically
 - Have to optimize blood flow and strength
 - Can shorten the tendon: need to stretch it during the rehab
 - "Mop ends": messy, needs sufficient overlap between ends
 - **Percutaneous** repair: through the skin
 - Implant tendon force transducer
- "Studies on dead people are weird"
- Paavo Komi: fiber optic to measure strain in Achilles in live person