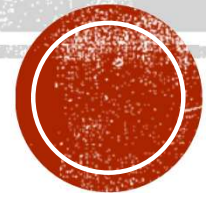


THE FOOT AND ANKLE

John Kim, PT, DPT



AGENDA

- Brief foot and ankle anatomy
- Importance of foot structure
- Impact on the kinetic chain
- Foot and ankle mobilizations and exercises
- Brief overview



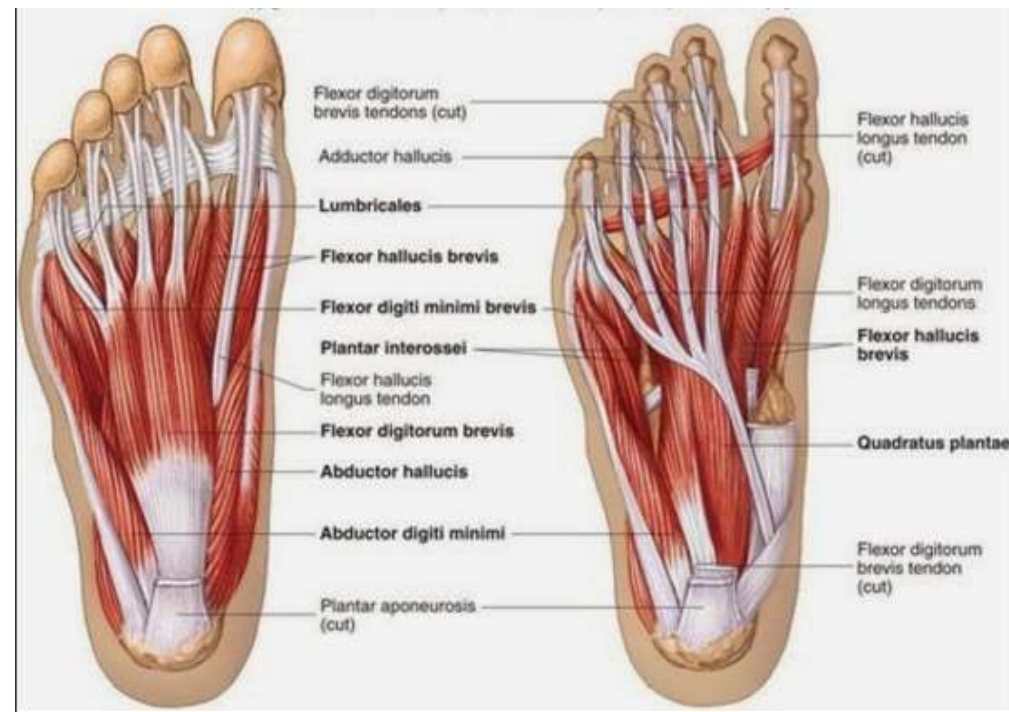
ANATOMY

- 26 bones
- 33 joints
- 100+ muscles and ligaments
 - Intrinsic
 - Plantar fascia



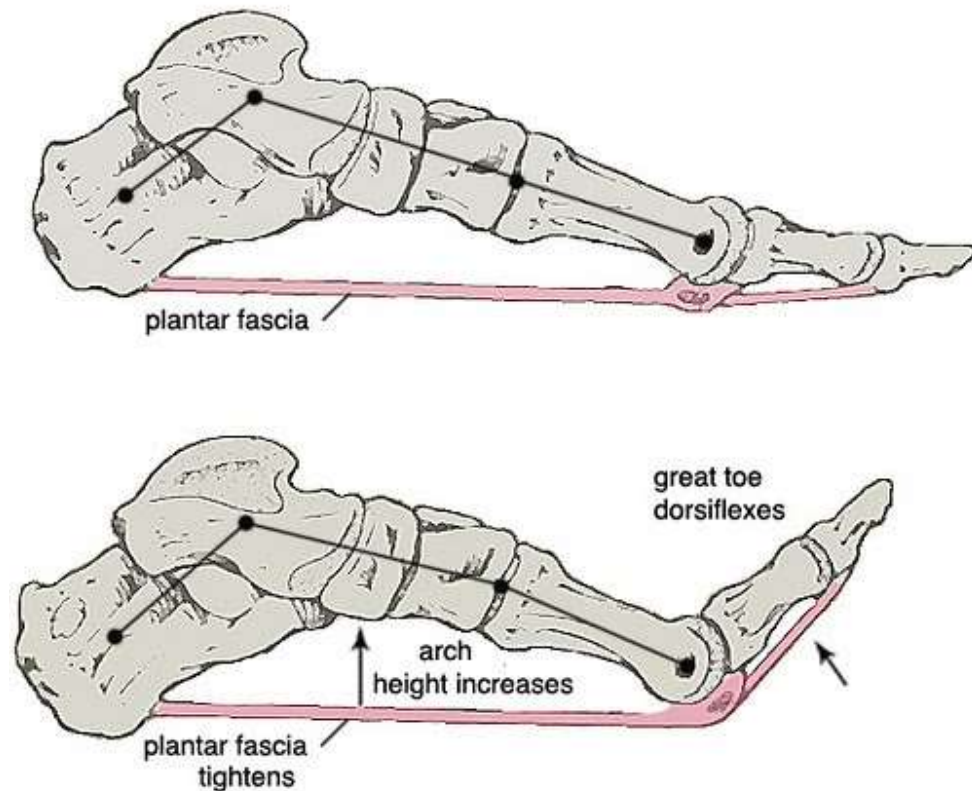
INTRINSICS

- These muscles are very important for supporting the structure of the foot.
- Can actively contract these muscles to change the shape of the foot.



PLANTAR FASCIA

- A thick band of tissue that runs across the bottom of your foot and connects the heel bone to the toes.
- Windlass Mechanism
 - The winding of the plantar fascia shortens the distance between the heel and toes to elevate the arch. The plantar fascia shortening that results from the big toes being extended is the essence of the windlass mechanism principle.



WHY IMPORTANT

- The foot is the lowermost part of the leg.
- The first part of the body to touch the ground and last part of the body to leave the ground when we walk.
- All forces are transferred through foot and ankle during walking, running, jumping, squatting, etc.
- It functions as a rigid structure for weight bearing and it can also function as a flexible structure to conform to uneven terrain.
 - Supports body weight
 - Provides balance
 - Shock absorption
 - Transferring ground reaction forces (Newton's Third Law)



WHY IMPORTANT CONT.

- We need a rigid foot in order to propel us forward.
 - Example: walking, running, sprinting, jumping, etc.
- We need a soft compliant foot in order to absorb impact.
 - Example: landing, stopping, etc.



RIGID FOOT

- Forces to the ground will be translated back to the foot for propulsion during locomotion.



COLLAPSED ARCH

- With a collapsed arch, forces meant to be placed on the ground are dispersed within the foot.
- Net reactive force from the ground is less than force placed on the ground.
- Less efficient.
- Can lead to repetitive stress injuries like plantar fasciitis or stress fractures.



FOOT/ANKLE AND KINETIC CHAIN

- The joints in the ankle are collectively a ball-and-socket type joint.
- It has full degree of freedom, meaning you can lift your foot in the air and make a full circle with the foot without moving the entire leg.
- The joint above the ankle is the knee. This is a hinge type joint and can only flex and extend. (Can't make a circle with the knee joint.)



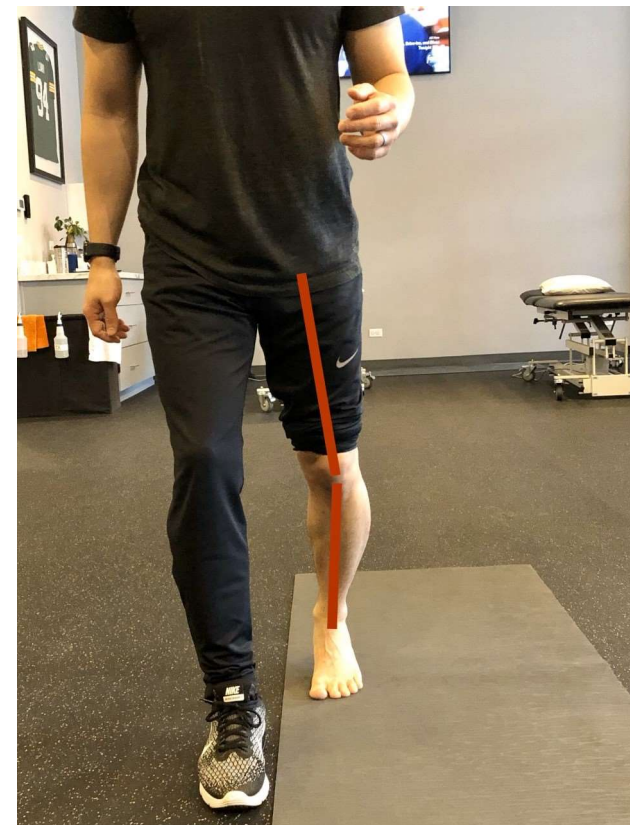
FOOT/ANKLE AND KINETIC CHAIN

- If there are mobility or stability deficits in the ankle/foot, this can reverberate into the knee and up the kinetic chain leading to compensations and increased risk of injury.



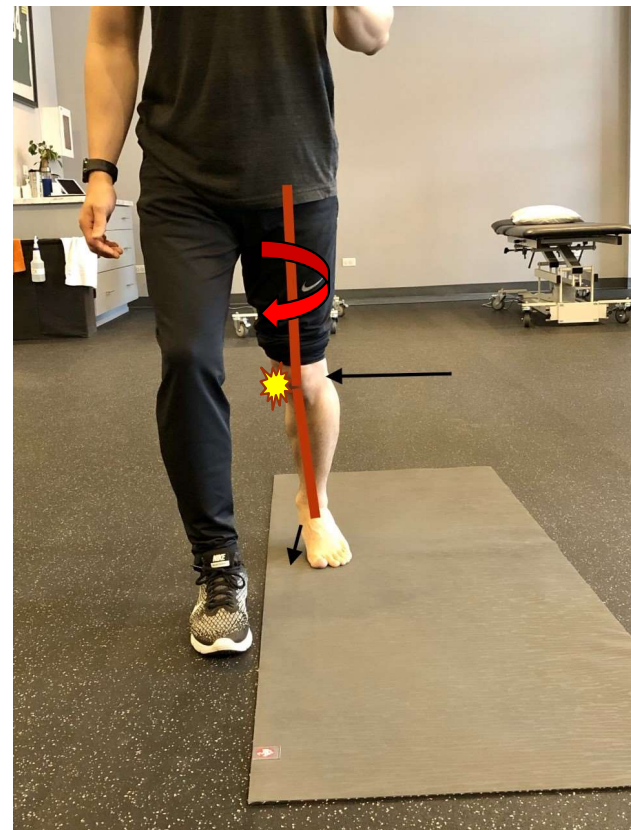
FOOT/ANKLE AND KINETIC CHAIN

- With good arch support, there is better knee alignment and improved stability in the hip.



FOOT/ANKLE AND KINETIC CHAIN

- With collapsed arch the knee goes inward (genu valgus).
- This is setting you up for knee injury (MCL, meniscus, ACL)



ANKLE

- “Normal” range of motion is 20 degrees of dorsiflexion and 50 degrees of plantarflexion.
- Need good range of motion and strength for functional activities such as walking, squatting, stairs, dressing, etc.
- Need good strength for balance and reduce risk for falls.



SQUATTING



STAIRS



SINGLE LEG BALANCE



HOW TO TEST ANKLE MOBILITY

- Knee to wall
- DEMO



ANKLE MOBILIZATION

- **Banded ankle mobilization**
- **DEMO**



RELEASES FOR ANKLE

- Tibialis anterior
- Calves



RELEASE FOR FOOT

- Plantar fascia



EXERCISES FOR FOOT/ANKLE

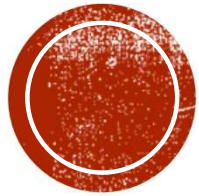
- Towel Scrunches → Short Foot
- Resistance Band Ankle
 - Dorsiflexion and eversion
- Calf Raises 3-ways
 - Tennis ball calf raise
- Lunges
- Single Leg Activities



TAKE HOME MESSAGE

- Foot and ankle gets disregarded a lot of times but it is very important to the entire kinetic chain.
- Changing foot mechanics and structure can effect all the joints up the chain.
- Proper foot and ankle mechanics and strength reduces chances of injury and improves efficiency.
- There are mobilizations and exercises you can do to improve foot and ankle mechanics.





QUESTIONS?





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