

Foot and Ankle Injuries

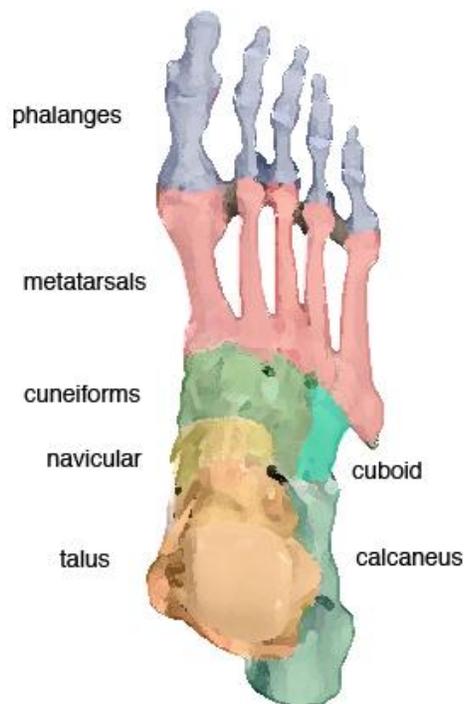
Ankle Injuries can vary from tendonitis, sprains (ligament tears), Strains (muscle tears), Stress reactions/fractures (bone injury) and complete fractures. The ankle is a very important component in the kinetic chain and has great influence on how we propel ourselves through space as well as what happens further up the chain from the knee to the hip and onto the back.

As showed in the illustration and description below the foot and ankle have 33 joints (20 of which articulate) 26 bones and more than 100 muscles tendons and ligaments.

These Injuries can take 7-10 days up to 12+ weeks to heal

Healing can be determined by severity, environment, nutrition, age, underlying medical conditions etc...

Each one of these injuries is on a case by case basis even though physiologically we know when they should be healed it doesn't always work out that way. Keep in mind there are variable that always changes the time and duration of proper healing and return to full functional ability.



Description of the foot bones

Phalanges: The bones in the toes are called phalanges.

Metatarsals: The bones in the middle of the foot are called metatarsal bones.

Cuneiforms: There are three bones in the middle of the foot, towards the center of the body called cuneiforms.

Cuboid: The bone sitting adjacent to the cuneiforms on the outside of the foot is called the cuboid.

Navicular: This bone sits behind the cuneiforms.

Talus: Also called the ankle bone, the talus sits directly behind the navicular.

Calcaneus: Also called the heel bone, the calcaneus sits under the talus and behind the cuboid.

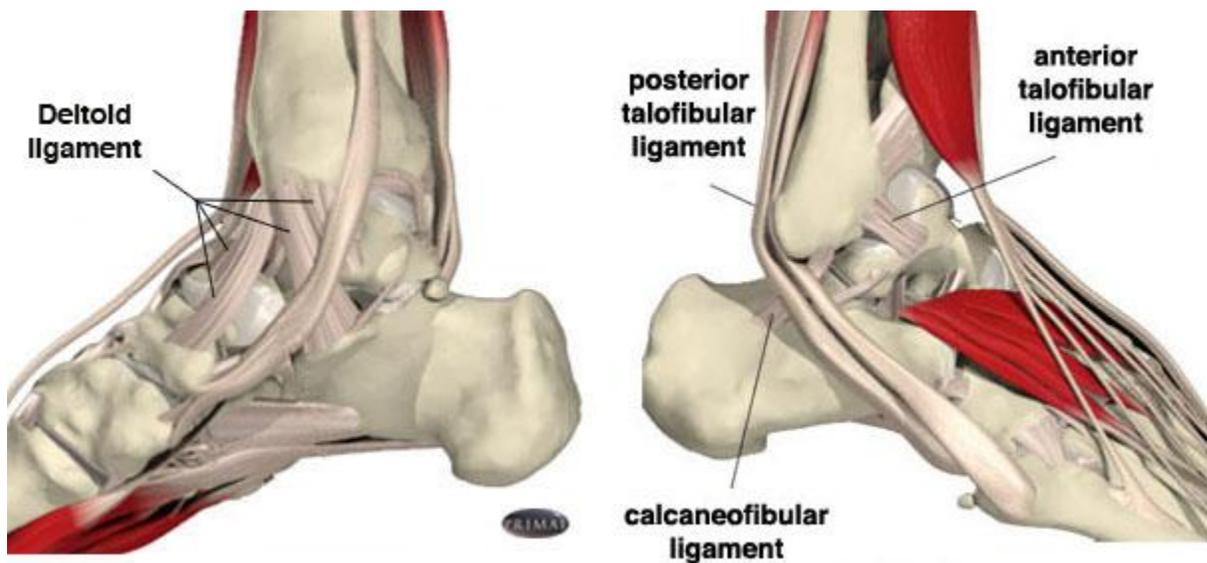
Ankle Ligaments

The medial ankle ligaments are described in the illustration below. These ligaments give support to the inside of the ankle (medial ankle joint). There are four ligaments which make up the deltoid ligament:

- posterior tibiotalar ligament
- tibiocalcaneal ligament
- tibionavicular ligament
- anterior tibiotalar ligament

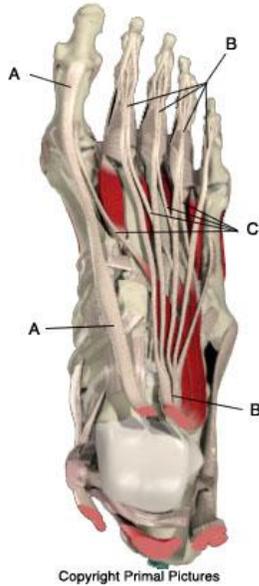
The lateral ankle ligaments are described in the illustration below. These ligaments give support to the outside of the ankle (lateral ankle joint). There are three ligaments on the lateral aspect of the ankle joint.

- anterior talofibular ligament
- calcaneofibular ligament
- posterior talofibular ligament



Tendons and Muscles in the Foot and Ankle

The groups of tendons illustrated below are called the extensor tendons and are responsible for elevating the toes and flexing the ankle up (dorsiflexion).



A. **Extensor hallucis longus**: dorsi flexes the big toe and dorsiflexes the foot (pulls up the big toe and the foot).

B. **Extensor digitorum longus**: dorsi flexes the small toes and dorsiflexes the foot (pulls the little toes up and pulls the foot up).

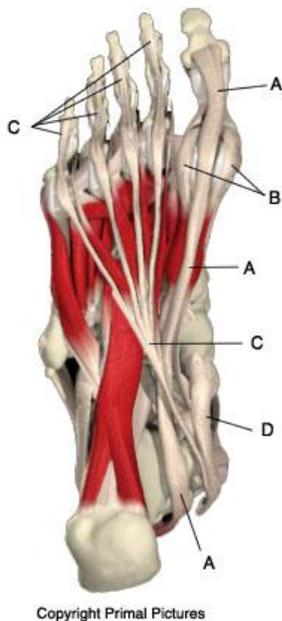
C. **Extensor digitorum brevis**: dorsi flexes the small toes (pulls the small toes up).



In the above illustration of the lateral ankle (outside of the ankle) you can see the tendons of the foot, ankle and lower leg. The peroneal longus courses under the foot and attaches on the inside of the arch. The peroneal brevis tendon attaches to the styloid process (see "K" labeled in the foot bone diagrams listed above). The peroneal tendons are responsible for flexing the foot down and rotating the foot out.

Peroneus longus: Everts and plantar flexes the foot (rotates the foot out and down). Stabilizes the arch when walking.

Peroneus brevis: Everts and plantar flexes the foot and stabilizes the foot when walking. The brevis tendon is a more powerful evertor than the peroneus longus tendon.



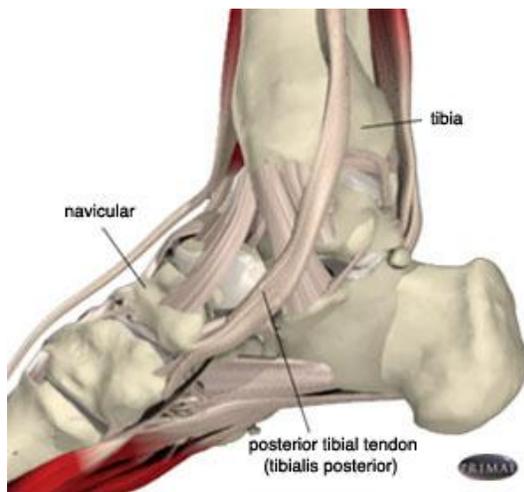
The flexor tendon group is responsible for pulling the toes down and flexing the ankle (plantarflexing).

A. **Flexor hallucis longus**: plantar flexes the hallux and the foot (brings the big toe down and flexes the foot down).

B. **Flexor hallucis brevis**: plantar flexes the hallux (brings the big toe down).

C. **Flexor digitorum longus**: plantar flexes the toes and the foot (brings the little toes down and flexes the foot down).

D. **Posterior tibialis**: inverts and plantar flexes the foot (brings the foot in and down).



The posterior tibial tendon originates in the back of the leg and courses around the inside of the ankle to attach on the inside and bottom of the arch as seen in the above illustration. The main attachment is on the navicular, a tarsal bone in the midfoot, but the tendon extends across the base of the foot. The posterior tibial tendon is a powerful inverter of the foot and one of the main structures which supports the arch. In individuals with faulty foot mechanics, specifically over pronation and arch collapse, the posterior tibial tendon can become stressed and torn. This results in tendonitis and posterior tibial tendinosis, also called adult acquired flatfoot.



Achilles tendon: plantar flexes the foot (brings the foot down and assists in "push off" when walking). The Achilles tendon is the largest and strongest tendon in the body. In individuals with tight calf muscles and those with over pronation and/or play sports which involve quick sprints or jumping, the Achilles tendon can become over stressed and torn, leading to inflammation and pain.



Plantar fascia: long ligament-type structure which supports the longitudinal arch when walking. There are three bands, the medial, central and lateral band as illustrated above. The plantar fascia is one of the main structures which supports the arch (along with the posterior tibial tendon). In those with faulty foot mechanics, most commonly over pronation (flat foot), the plantar fascia can become over stressed, stretched and experience microscopic tears leading to inflammation and pain. Chronic aggravation of the fascia can lead to plantar fasciosis, a degenerative condition.

*(illustrations taken from Primal Pictures)