

Anatomy: Ligaments of the Foot and Ankle

Erick J Janisse, CO, CPed

What is a Ligament?

- Ligaments are made of connective tissues comprised of very strong collagen fibers.
- The primary job of ligaments is to hold things – like joints – in place. Most ligaments connect bones to other bones.
- Ligaments are found in many different shapes, sizes and configurations throughout the body. Most are quite short. Some are shaped like ropes; others are shaped like bands or straps of varying widths and thicknesses.
- In addition to stabilizing joints, ligaments are critical to proprioception.
- Most ligaments are named for the structures they connect.

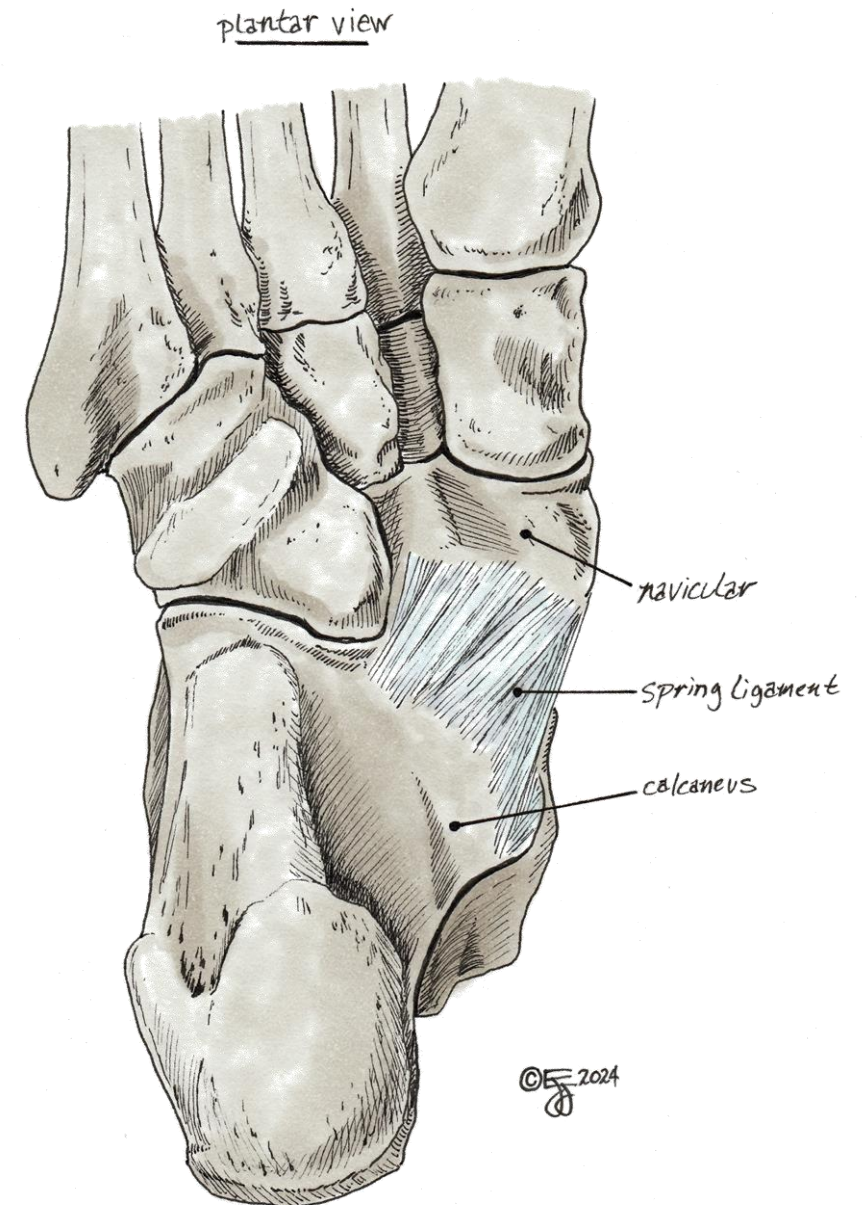


Ligamentous Injury

- *Sprains* are usually caused by a joint being suddenly forced beyond the boundaries of its usual range of motion and the inelastic fibers are stretched excessively.
 - Grade I Structural damage only on microscopic level, with slight local tenderness; no joint instability.
 - Grade II Partial tear of the ligament, visible swelling and noticeable tenderness, but with no or only mild joint instability.
 - Grade III Severe sprain. Complete rupture with significant swelling and instability of the joint.
- The most common sprain seen in the foot and ankle is an inversion sprain.

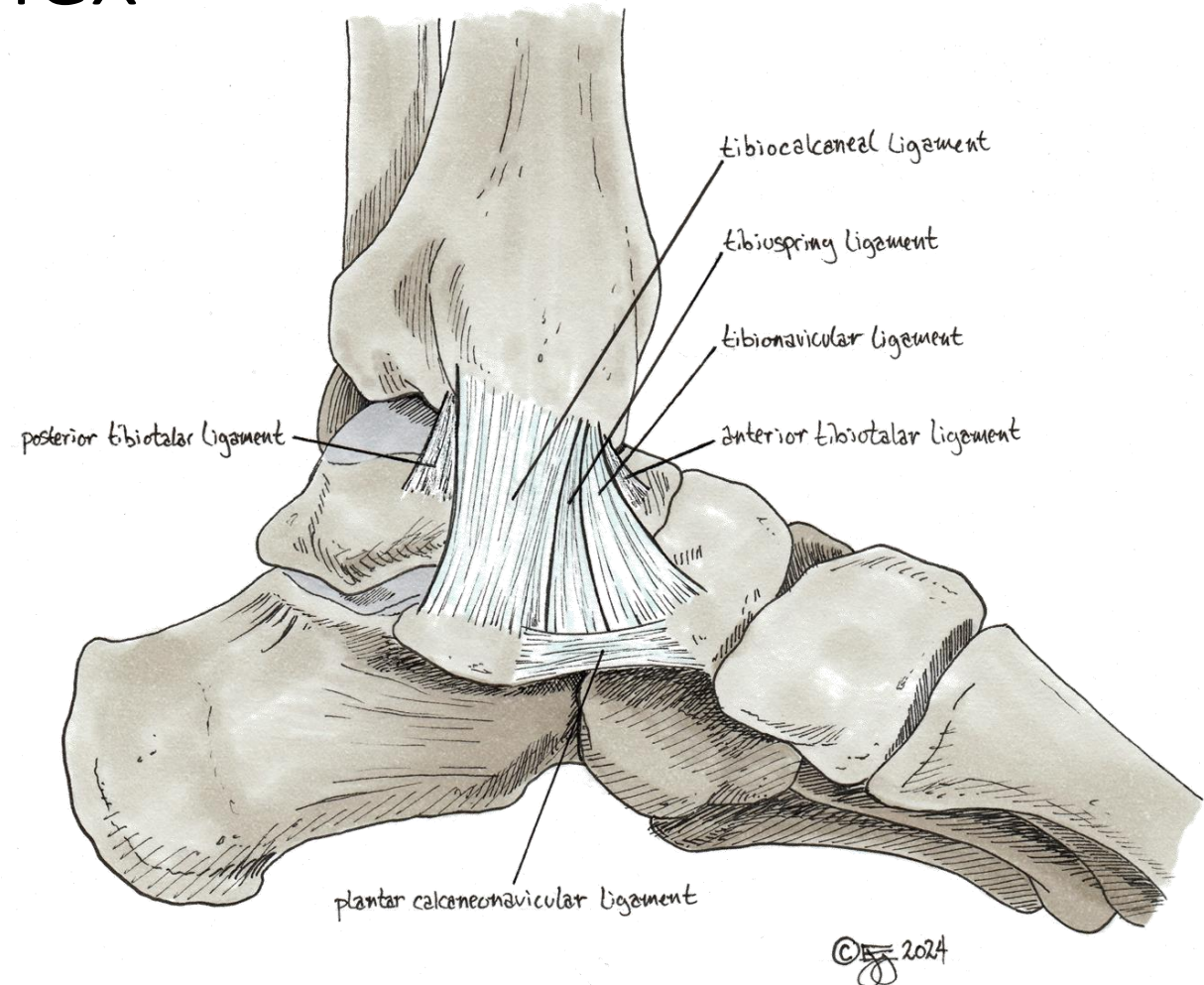
Plantar Calcaneonavicular Ligament

- Also known as the *spring ligament*, the plantar calcaneonavicular ligament is probably the most well-known foot ligament.
- It is a thick wide band of cartilaginous connective tissue that supports the medial longitudinal arch of the foot. It is assisted from above by the deltoid ligament complex.
- Failure of the spring ligament is one of the key elements in the development of an acquired flat foot deformity.
- Despite its name, it has very little “springiness” as it is highly collagenous.



Deltoid Ligament Complex

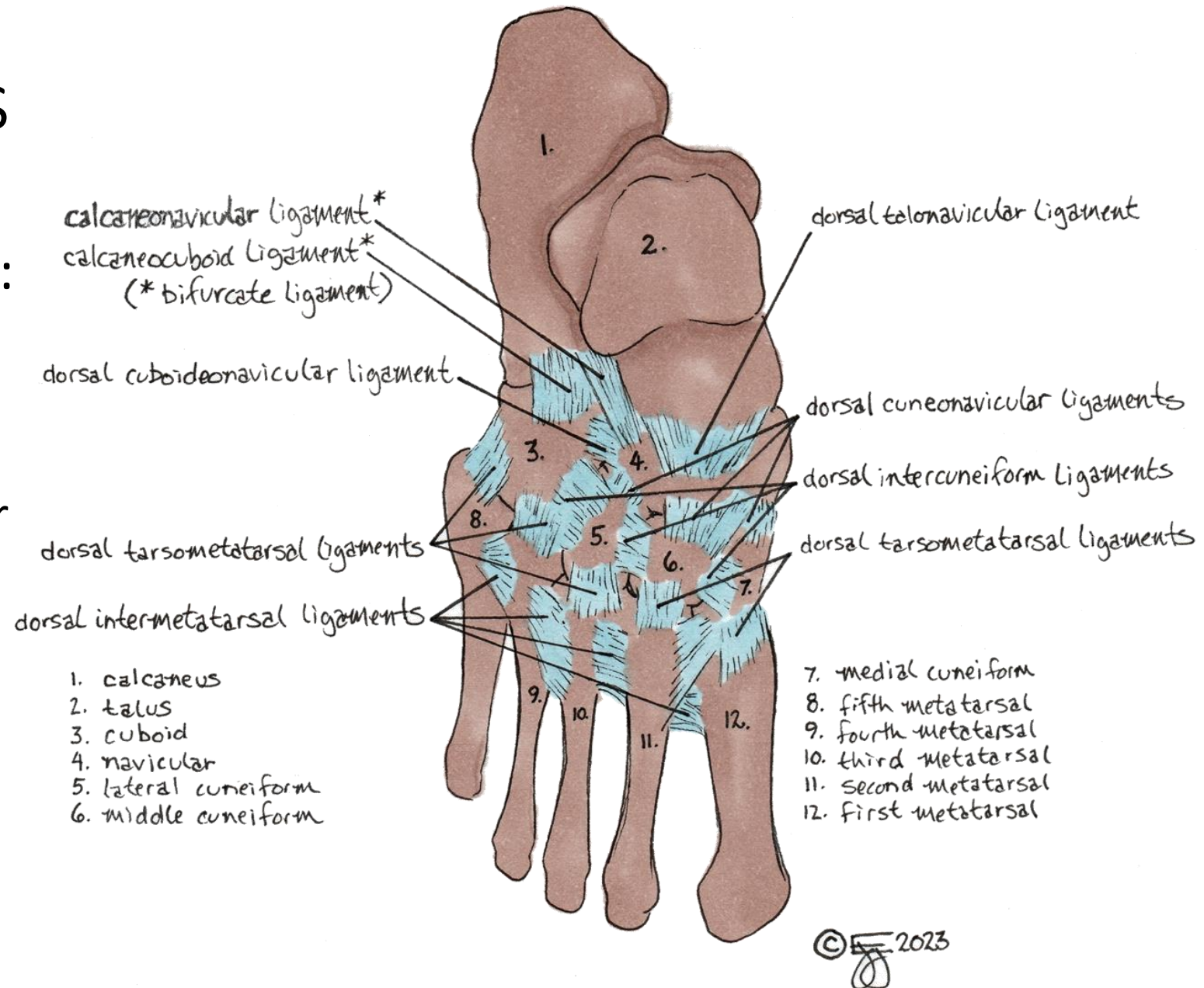
- Also known as the medial collateral ligament complex.
- A strong, broad ligament with multifascicular appearance that spans out from the medial malleolus and attaches to the talus, calcaneus, and navicular bones.
- While definitions tend to vary by source, a separation of the deltoid ligament into a superficial and a deep layer is widely accepted.
- Superficial layer: Tibiospring, tibionavicular, superficial posterior tibiotalar, and tibiocalcaneal ligaments
- Deep layer: Deep posterior tibiotalar and deep anterior tibiotalar ligaments
- The spring ligament is often considered a functional component of the deltoid ligament complex.
- All these ligaments serve to provide medial stability to the hindfoot and ankle; they also help guide passive joint motion.



Dorsal Ligaments

- Dorsal ligaments include:

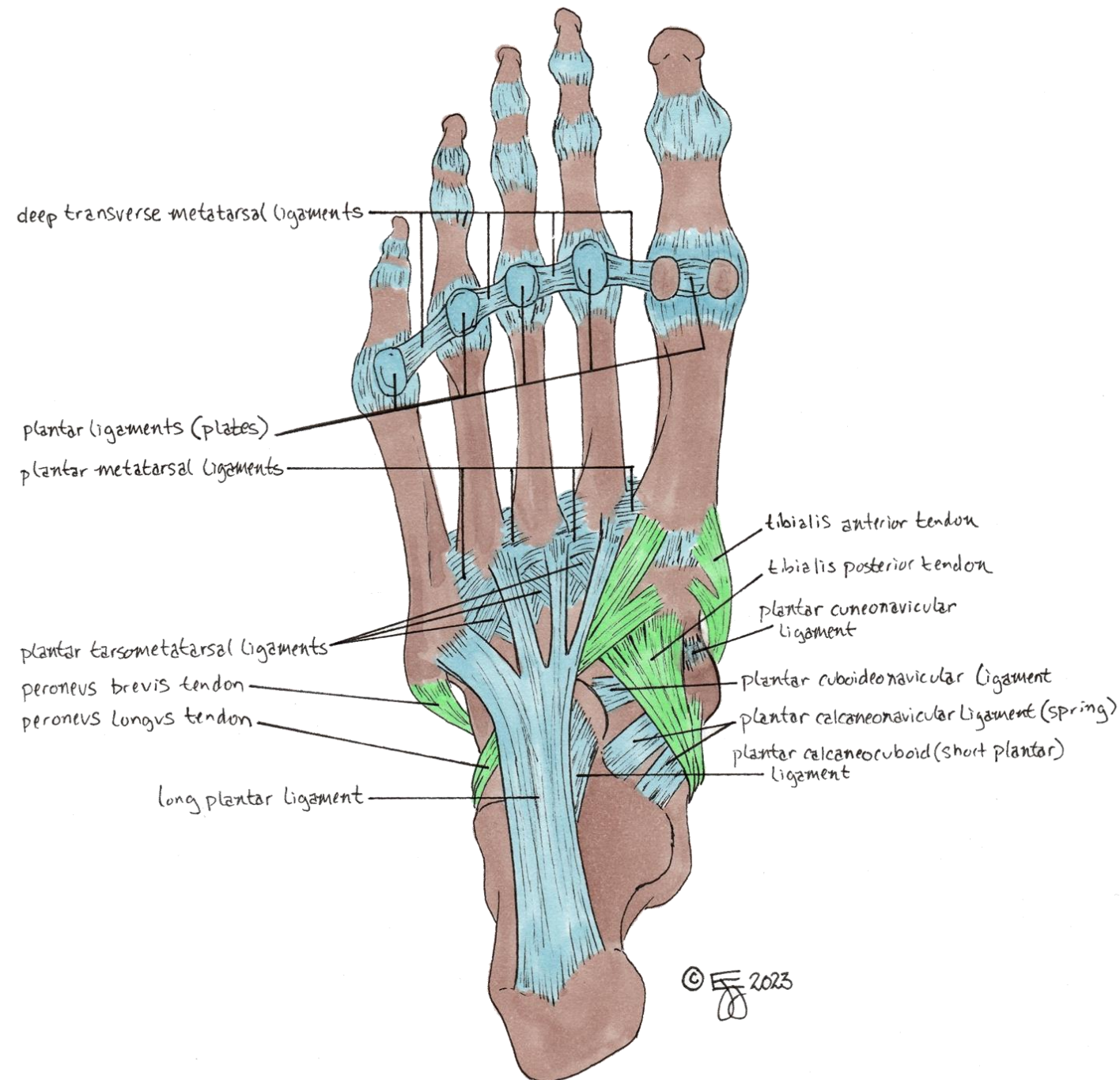
- Bifurcate ligament
 - Calcaneonavicular
 - Calcaneonavicular
- Dorsal cuboideonavicular
- Dorsal talonavicular
- Dorsal cuneonavicular
- Dorsal intermetatarsal



Plantar Ligaments

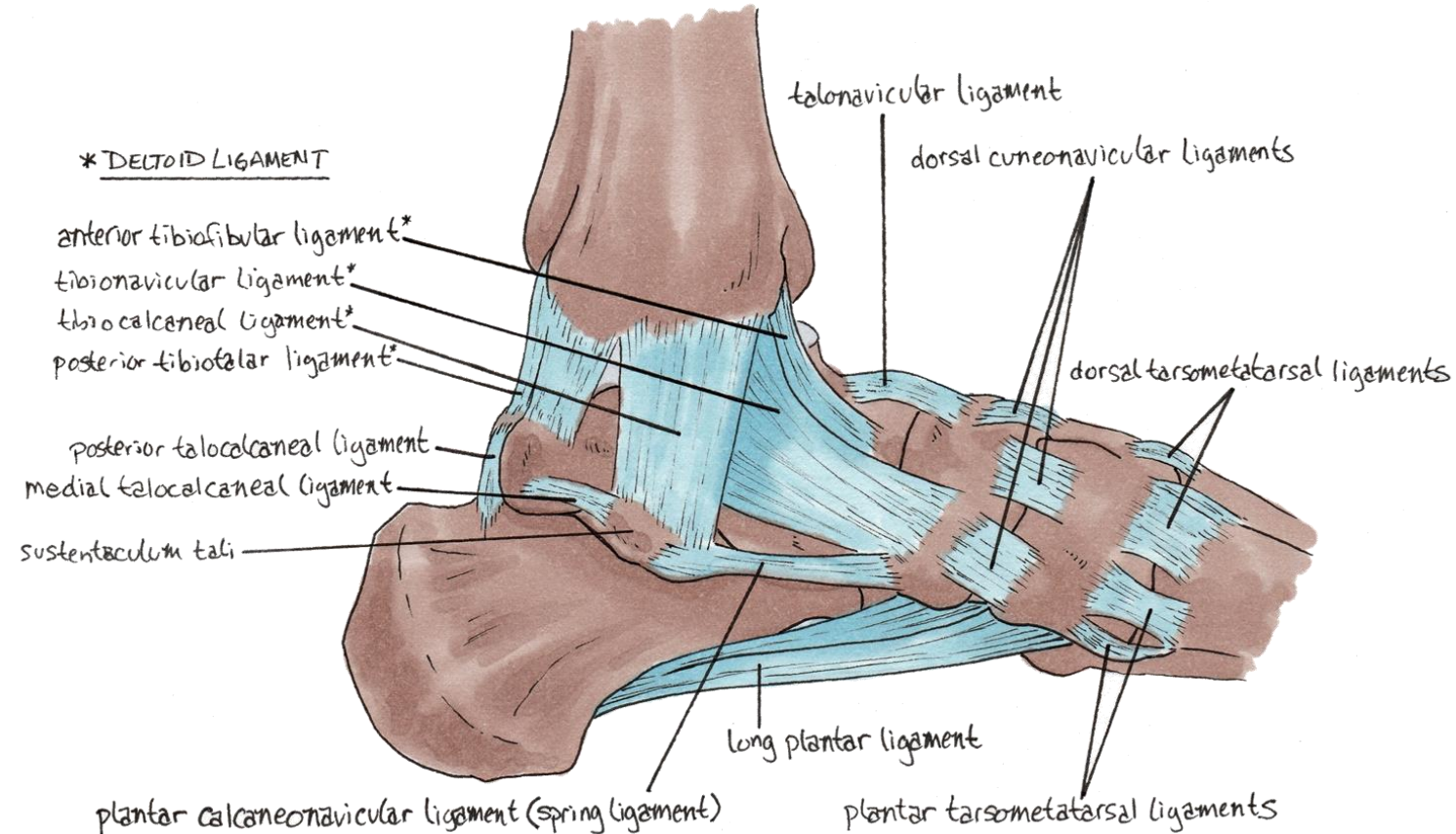
- Plantar ligaments include:
 - Spring ligament
 - Long plantar ligament*
 - Plantar cuboideonavicular*
 - Plantar cuneonavicular*
 - Short plantar ligament
 - Plantar plates (under MTHs)
 - Plantar metatarsal ligaments
 - Plantar TMT ligaments
 - Deep transverse MT ligaments

* Assist with formation/structure of medial longitudinal arch



Medial Ligaments

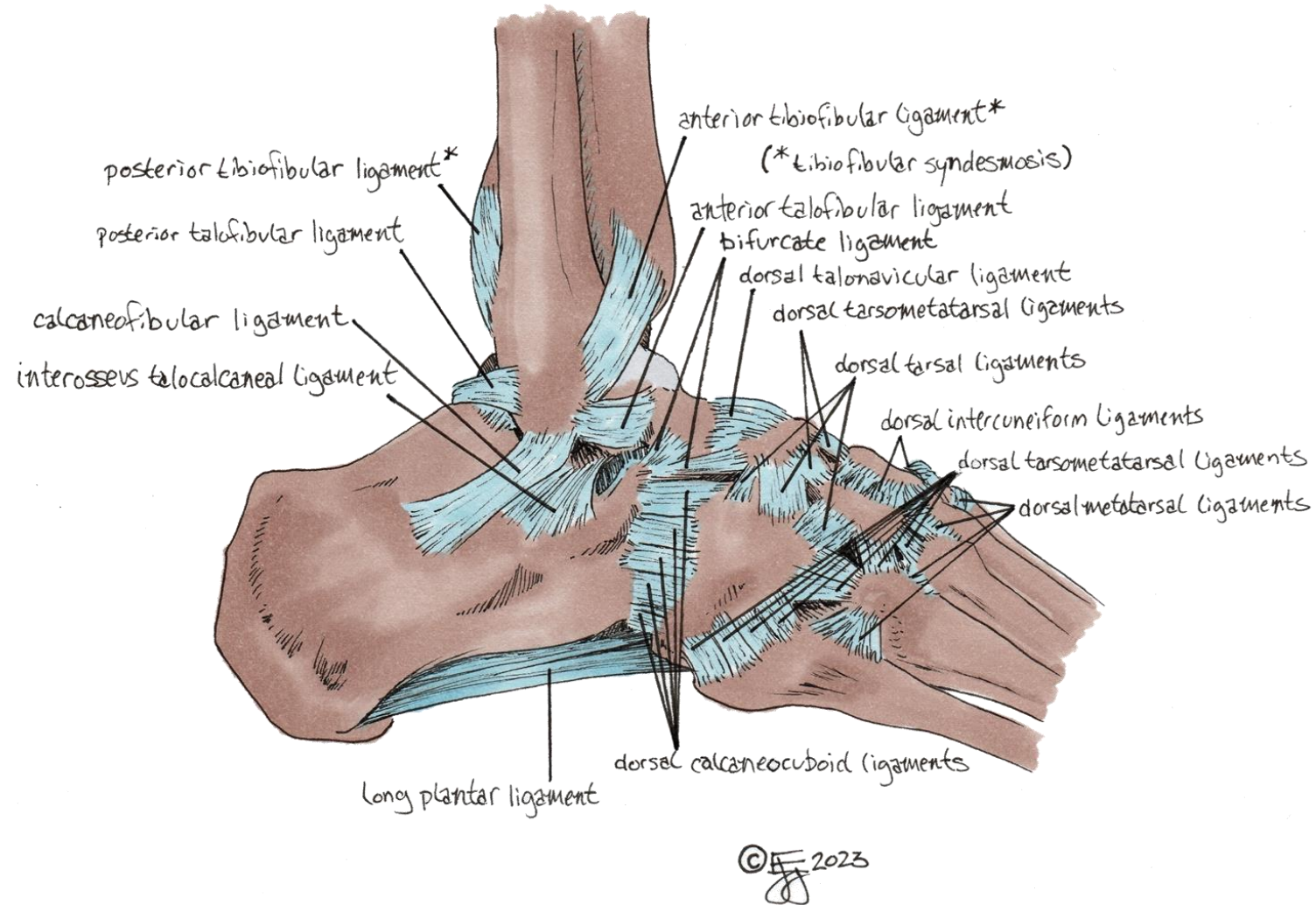
- Medial ligaments include:
 - Deltoid ligament complex
 - Spring ligament
 - Posterior talocalcaneal
 - Medial talocalcaneal
 - Dorsal talonavicular
 - Dorsal cuneonavicular
 - Dorsal TMT ligaments
 - Plantar TMT ligaments



Lateral Ligaments

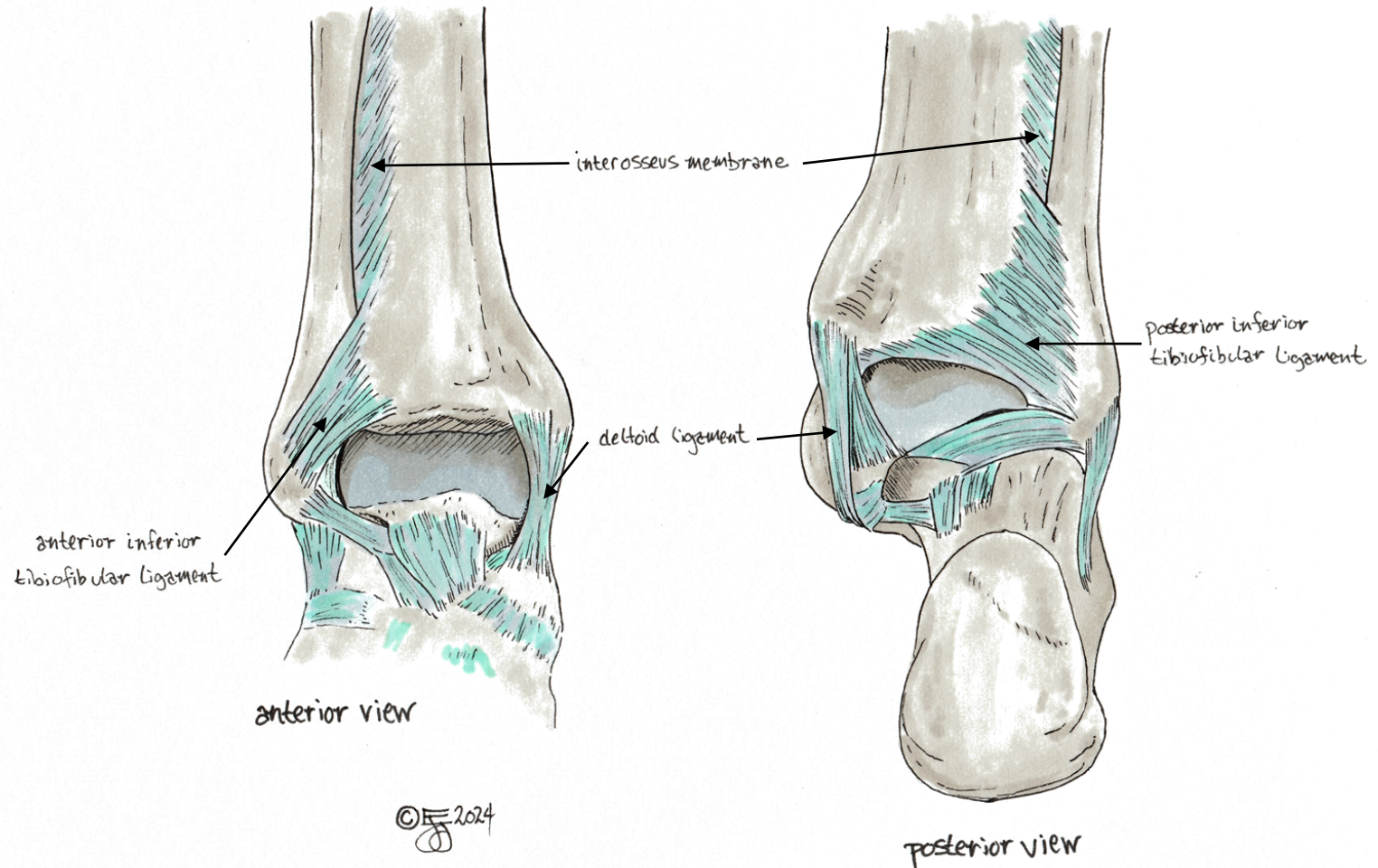
- Lateral ligaments include:

- Posterior talofibular
- Calcaneofibular
- Interosseus talocalcaneal
- Dorsal calcaneocuboid
- Dorsal talonavicular
- Bifurcate ligament
- Anterior talofibular
- Dorsal TMT ligaments
- Dorsal tarsal ligaments
- Dorsal intercuneiform
- Dorsal MT ligaments



Tibiofibular Syndesmosis and Interosseus Membrane

- A syndesmosis is a fibrous joint in which two adjacent bones are linked by a strong membrane or ligaments.
- Tibiofibular syndesmosis
 - Anterior inferior tibiofibular ligament
 - Posterior inferior tibiofibular ligament
- The tibiofibular syndesmosis helps to maintain proximal integrity between the tibia and fibula.
- The interosseous membrane holds the fibula and tibia together and stabilizes any posterolateral bowing of the fibula that may occur with weight bearing.
- A syndesmotic injury is also called a *high ankle sprain* and is common in impact sports like football.



The End