PowerPoint Handout: Lab 6, Anterior and Lateral Leg, Dorsum and Plantar Foot, and Ankle

Extensor Retinaculum

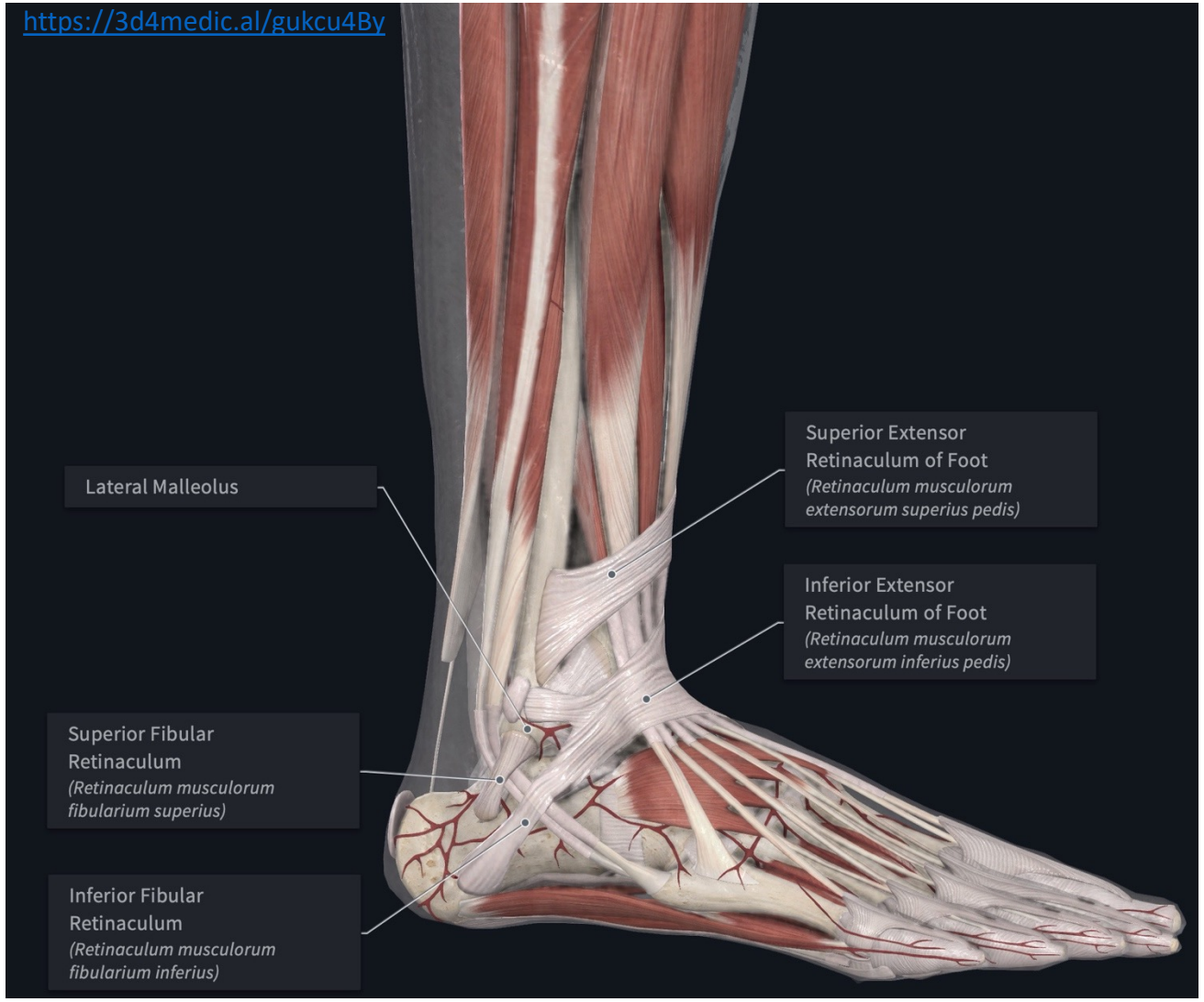
Recall that the crural fascia forms five retinacula at the ankle. The flexor retinaculum was emphasized in the previous PowerPoint handout.

On the anterior aspect of the ankle, there are two extensor retinacula that hold down the extensor tendons.

- The **superior extensor retinaculum** runs between the distal ends of the tibia and fibula.
- The **inferior extensor retinaculum** is a Y-shaped structure that spans from the medial malleolus on the medial side of the ankle to the lateral malleolus on the lateral side of the ankle. It also blends with the inferior fibular retinaculum on the lateral aspect of the ankle.

On the lateral aspect of the ankle, there are also two fibular retinacula that hold down the fibular tendons.

- The **superior fibular retinaculum** spans the distance between the lateral malleolus and calcaneus.
- The **inferior fibular retinaculum** is a continuation of the inferior extensor retinaculum and holds the fibular tendons against the lateral aspect of the calcaneus.

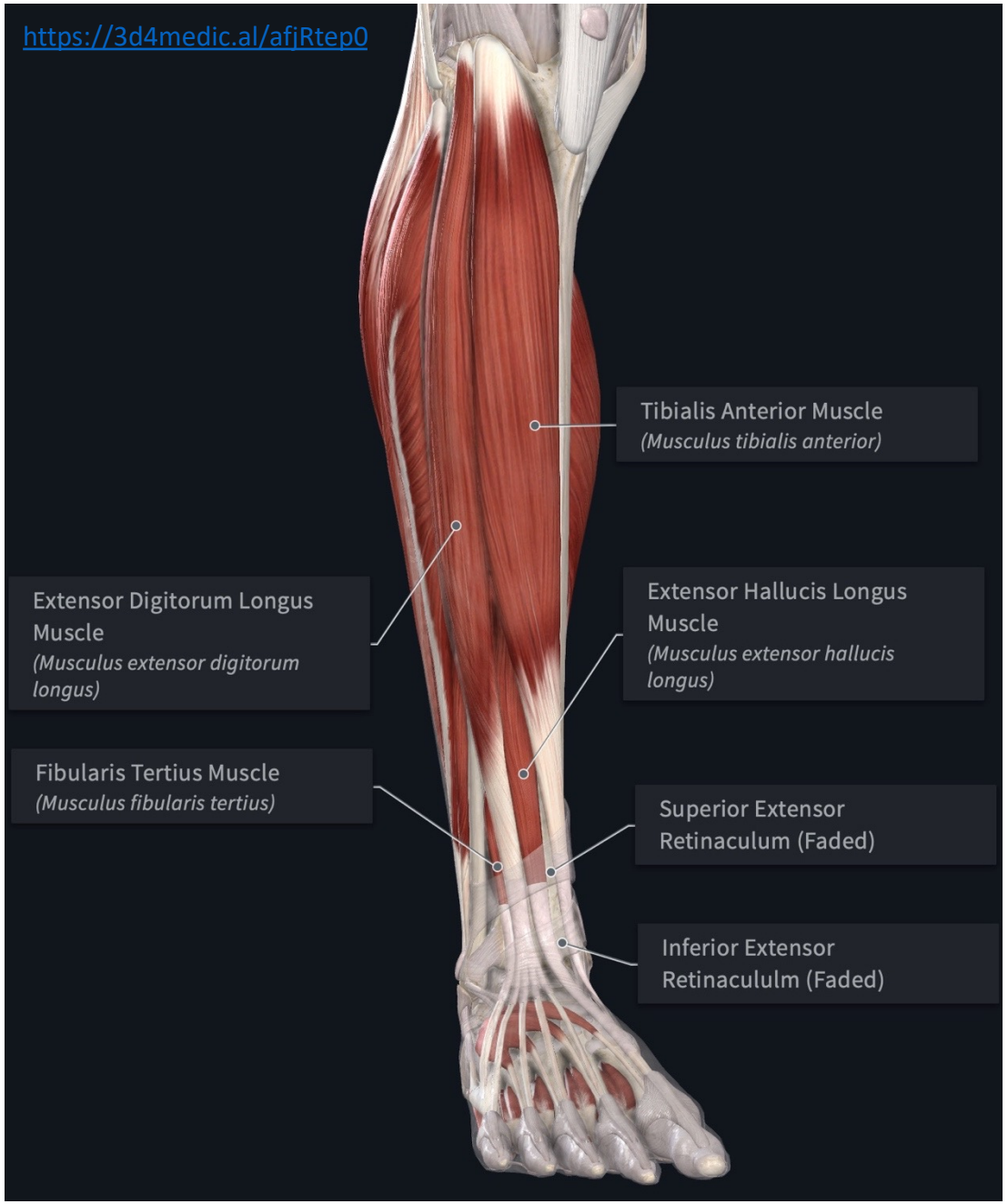


Anterior Compartment Leg Muscles

The anterior compartment contains muscles that primarily dorsiflex the foot at the ankle joint. Some also extend the toes, or invert the foot. All are innervated by the deep fibular nerve.

MUSCLE	INNERVATION	BLOOD SUPPLY	ACTION
Tibialis anterior	Deep fibular n.	Anterior tibial a.	Dorsiflexes foot, inverts foot
Extensor hallucis longus			Extends great toe, dorsiflexes foot
Extensor digitorum longus			Extends lateral four toes, dorsiflexes foot

The most lateral part of the extensor digitorum longus muscle is sometimes called the **fibularis tertius**. This portion of the EDL muscle everts the foot, which is why it is given the name “fibularis”. Even though this muscle has fibularis in its name, it ISN’T a lateral compartment muscle. Recall that the term peroneus often replaces fibularis in a clinical setting.

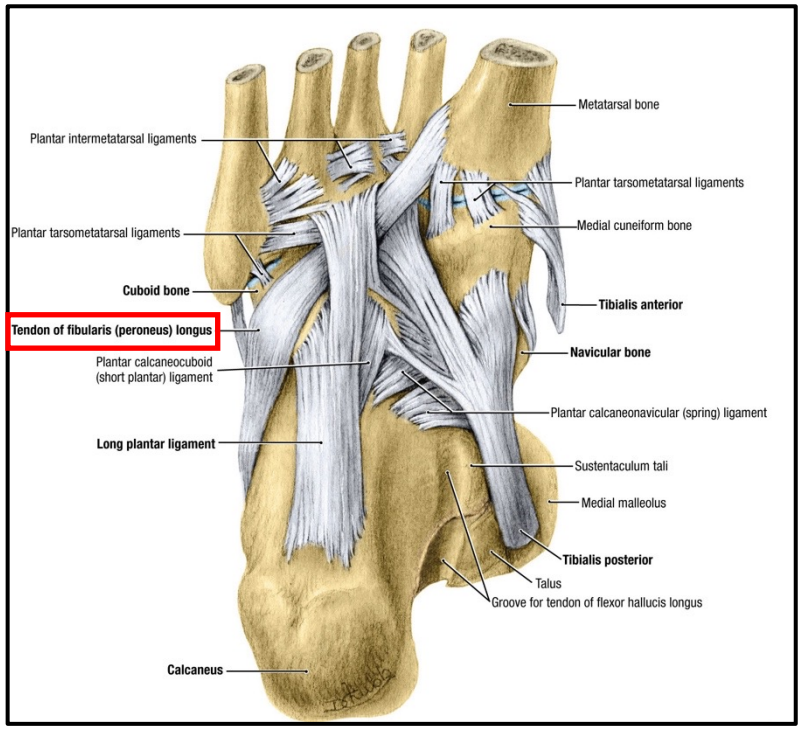


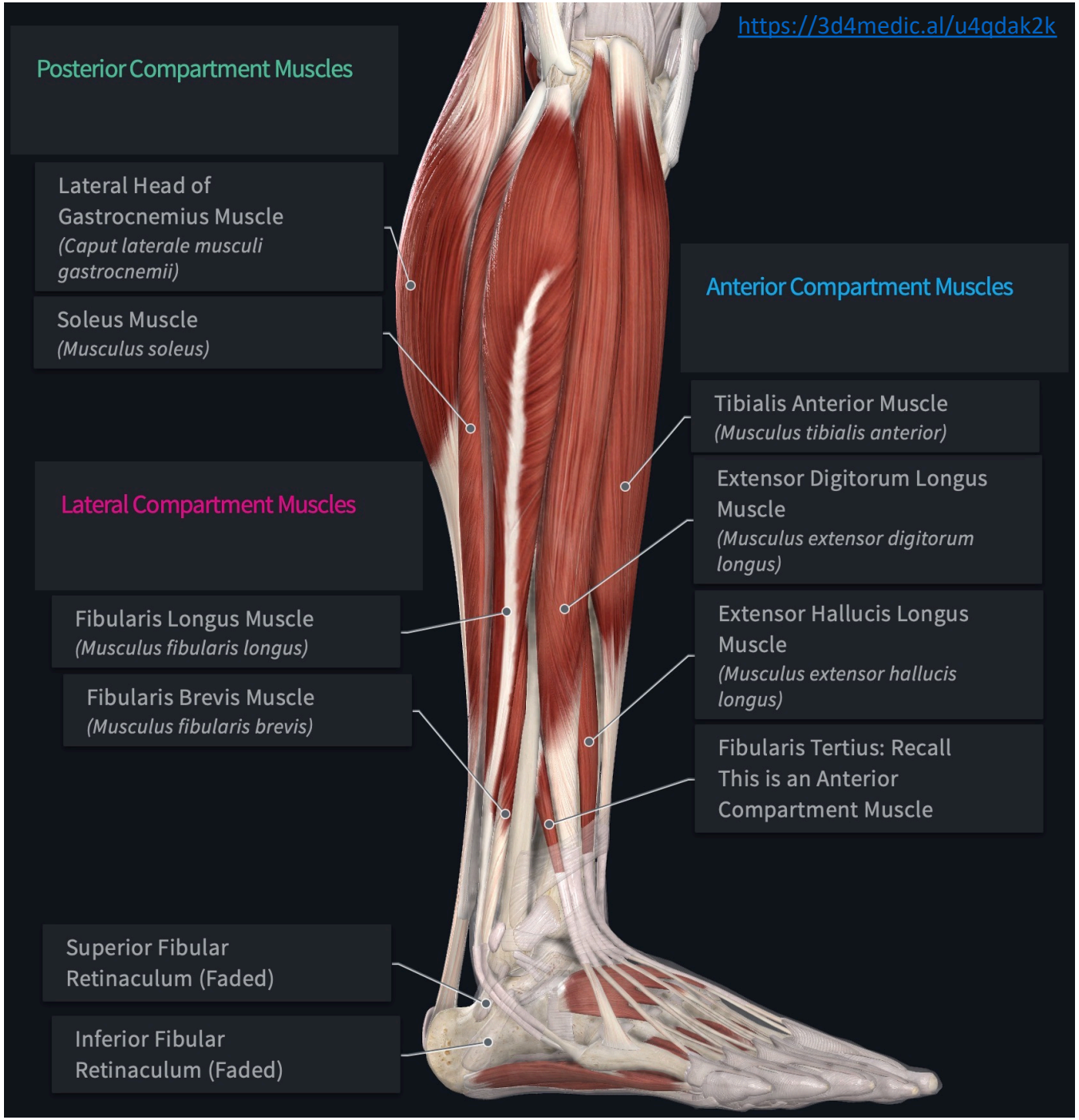
Lateral Compartment Leg Muscles

The lateral compartment contains two muscles that evert the foot at the subtalar joint. Both are innervated by the superficial fibular nerve.

MUSCLE	INNERVATION	BLOOD SUPPLY	ACTION
Fibularis longus Fibularis brevis	Superficial fibular n.	Fibular a	Everts foot and Weak Plantar Flexion

- The tendon of the fibularis brevis muscle inserts on the base of the 5th metatarsal.
- The fibularis longus tendon travels across the plantar surface of the foot to insert on the base of the 1st metatarsal.
- A mnemonic to remember the orientation of the two tendons as they pass posterior to the lateral malleolus is: ”brevis is closer to bone.”





Dorsum Foot Muscles

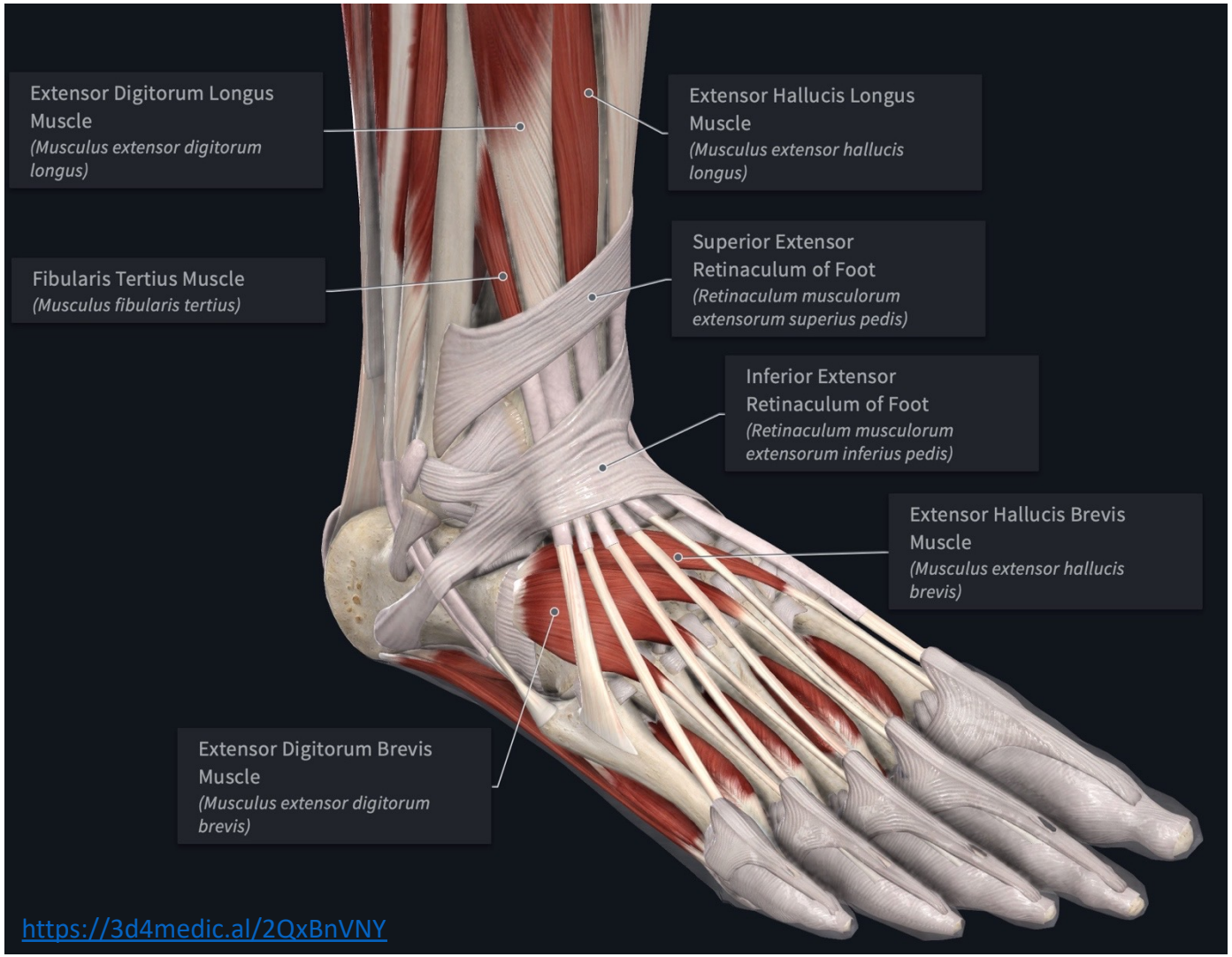
MUSCLE	INNERVATION	BLOOD SUPPLY	ACTION
Extensor digitorum brevis	Deep Fibular n	Dorsalis pedis a	Assist the extensor longus muscle with extending the toes (MP and IP joints)
Extensor hallucis brevis			

The dorsum of the foot contains one muscle called the extensor brevis that has two divisions.

- The **extensor digitorum brevis**
- The **extensor hallucis brevis**

The extensor brevis arises on the lateral aspect of the foot (superior surface of the calcaneus) and gives rise to four tendons. The most medial tendon is the extensor hallucis brevis that inserts on the great toe via the extensor expansion. The remaining three tendons join the extensor digitorum longus tendons that attach to the 2nd, 3rd, and 4th toes. Usually there isn't a contribution to the extensor longus tendon of the 5th toe.

The extensor brevis muscle assists extensor longus with extending the toes. Note that extensor brevis does NOT assist with dorsiflexion of the ankle because it does NOT cross the ankle joint.

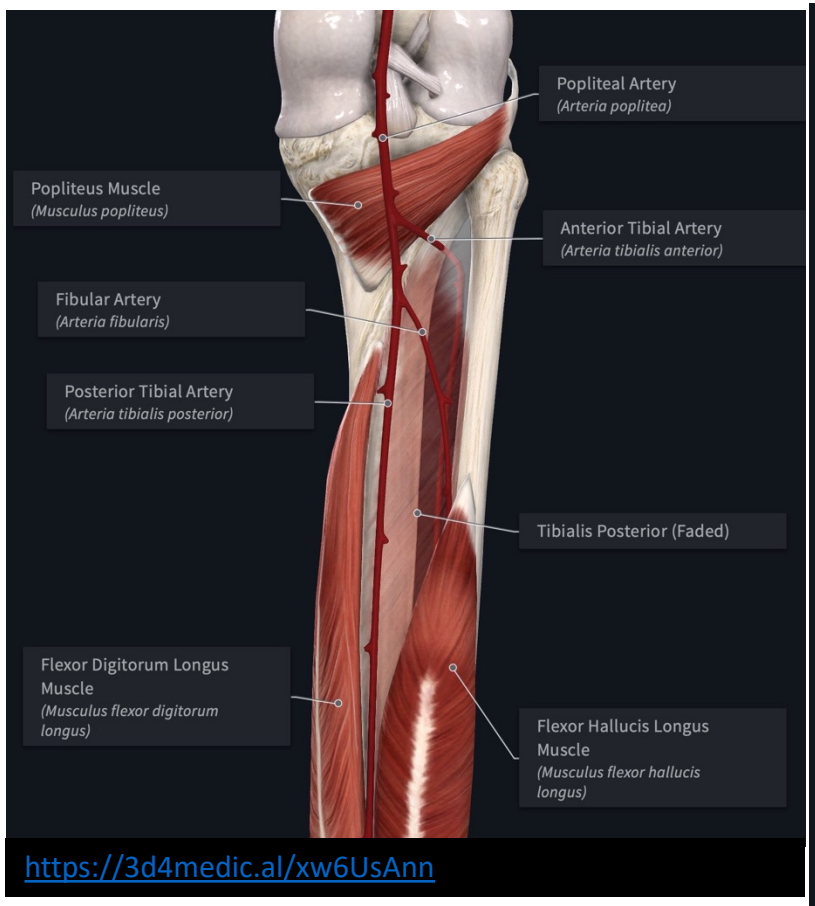


Blood Supply: Anterior Leg Compartment

The blood supply to the anterior leg is provided by the **anterior tibial artery,** which is one of the terminal branches of the popliteal artery.

- After branching from the popliteal artery, it passes through a gap in the superior part of the interosseous membrane to enter the anterior compartment of the leg.
- It then courses inferiorly on the anterior surface of the interosseous membrane, between the tibialis anterior and extensor digitorum longus muscles.
- When the anterior tibial artery crosses the ankle joint, it becomes the **dorsalis pedis artery** that supplies the dorsal foot.
- Its **arcuate branch** forms an arch across the foot that gives rise to **dorsal metatarsal arteries**, and ultimately **dorsal digital arteries**.

CLINICAL ANATOMY: The dorsalis pedis artery is evaluated when performing a physical exam of the peripheral vascular system. It is the farthest palpable vessel from the heart. It is typically palpated in the space between the tendons of extensor hallucis longus and extensor digitorum longus.



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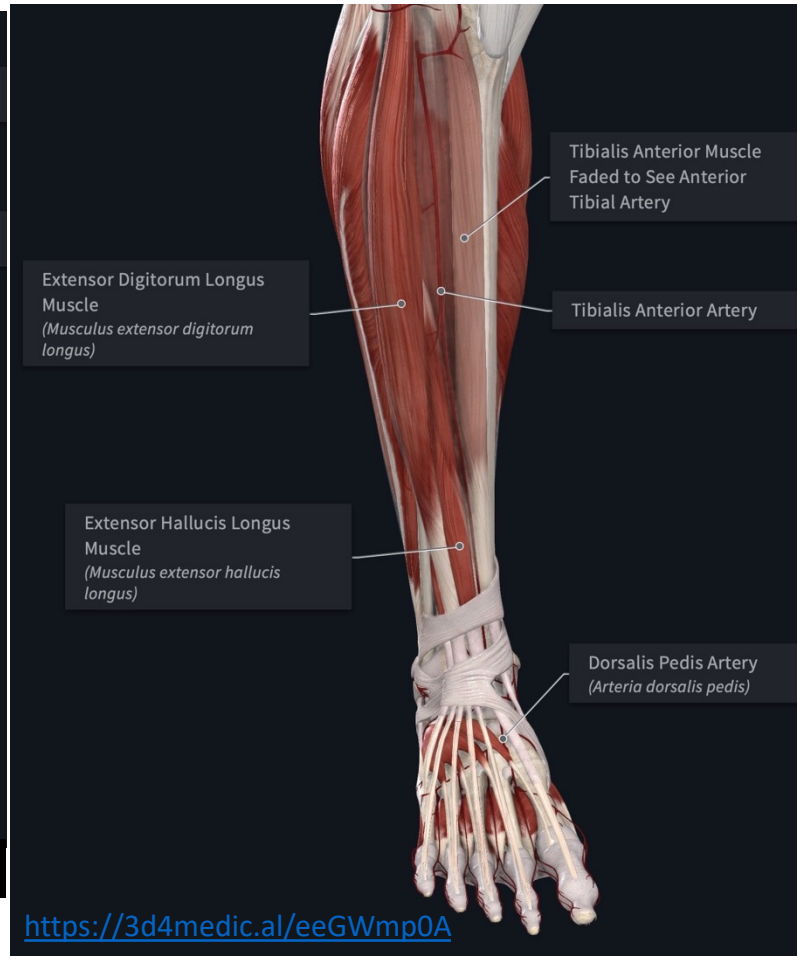

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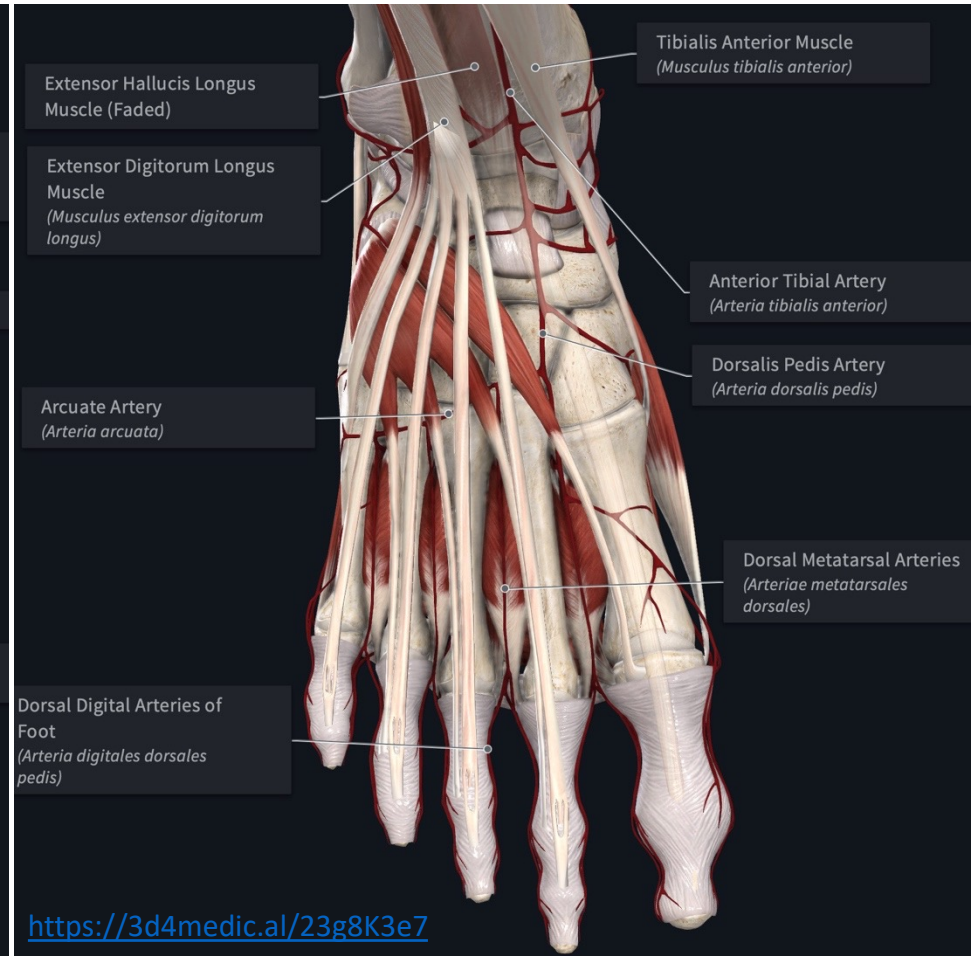

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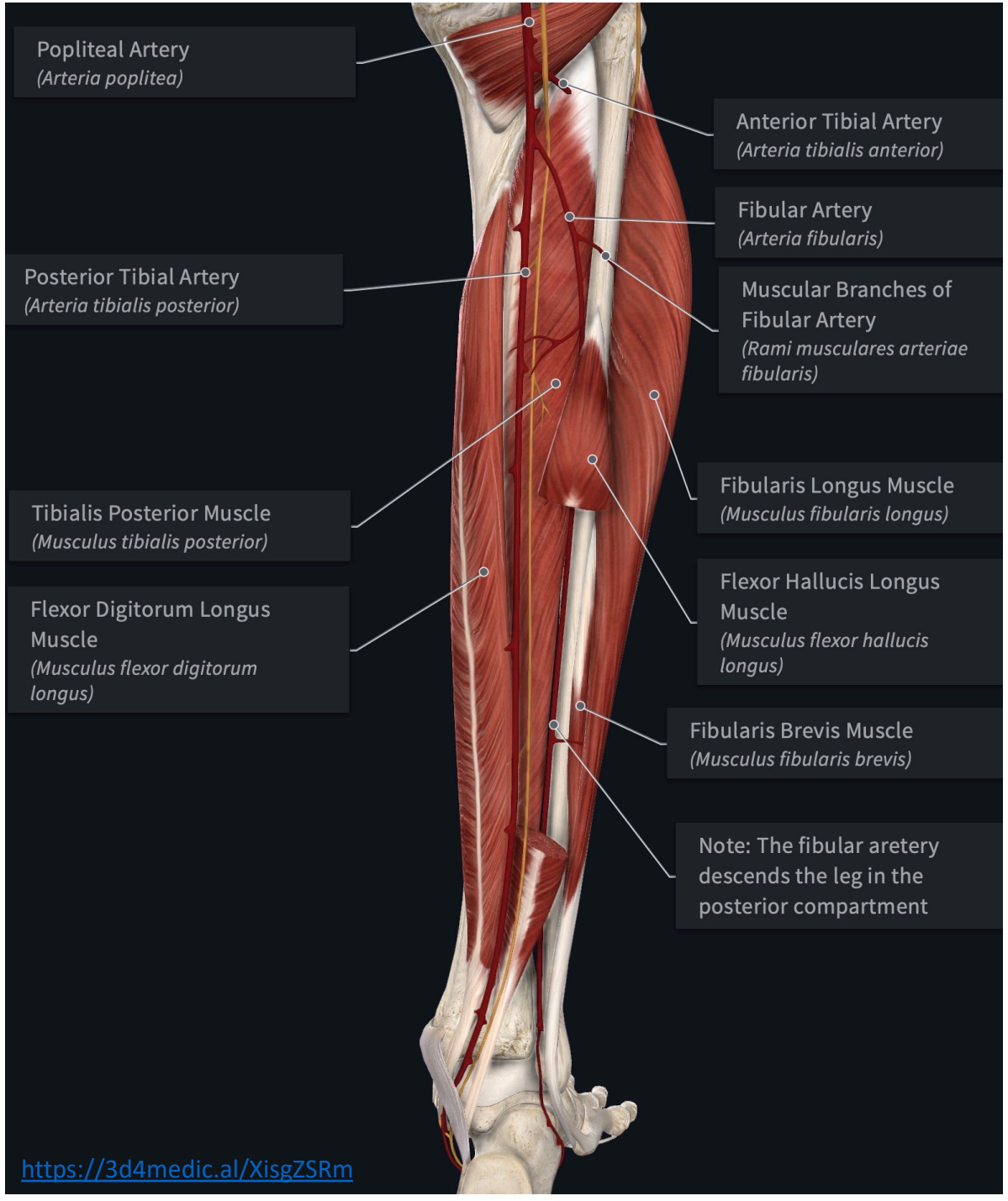
Blood Supply: Lateral Leg Compartment

The blood supply to the lateral compartment of the leg is provided by the **muscular branches** of the **fibular artery**. Recall that the fibular artery is a branch of the posterior tibial artery that travels in the lateral portion of the posterior compartment of the leg. (Note that NO named major artery travels within the lateral leg compartment).

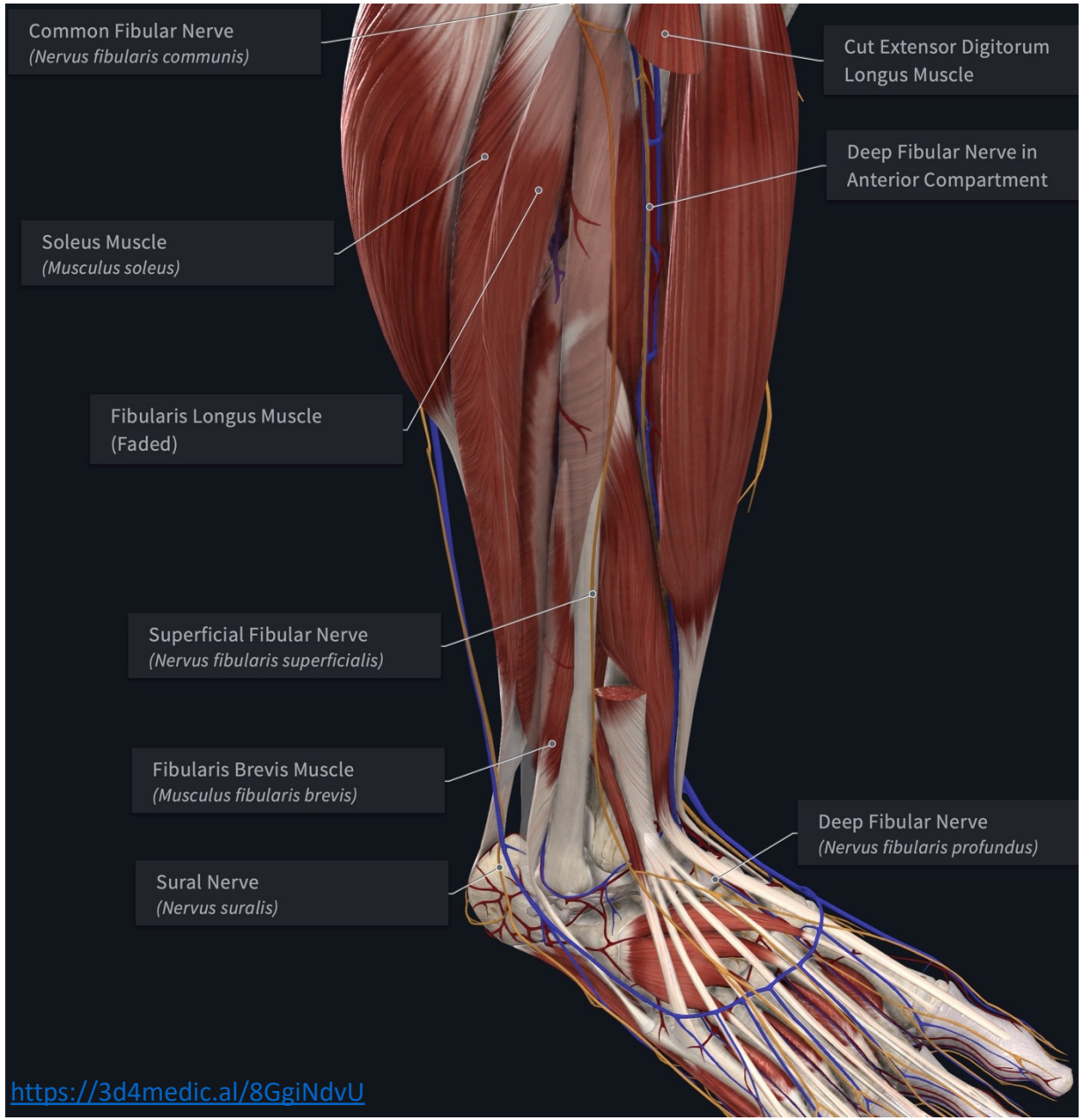


Motor Innervation: Anterior Leg, Lateral Leg, and Dorsum Foot

The motor innervation to the muscles in the both the anterior and lateral compartments of the leg is provided by the **common fibular nerve**. The common fibular nerve leaves the popliteal fossa by traveling around the neck of the fibula and divides into its two terminal branches,

- **Superficial fibular nerve**: The superficial fibular nerve enters the lateral compartment of the leg
  - Motor innervation: In the lateral compartment, it courses between the fibularis longus and brevis to provide them with innervation along its path
  - Sensory innervation: At the distal third of the leg, it pierces the deep fascia to enter the the superficial fascia where it becomes a cutaneous nerve. As a cutaneous nerve, it continues its course inferiorly to supply the distal third of the lateral leg and the dorsum of the foot.

- **Deep fibular nerve**: The deep fibular nerve enters the anterior compartment of the leg and travels inferiorly with the anterior tibial artery on the surface of the interosseous membrane.
  - Motor innervation: It innervates the muscles in the anterior compartment of the leg, as well as the extensor brevis muscle in the dorsal foot.
  - Sensory innervation: It innervates a small cutaneous region located at the webspace between the 1st and 2nd toes.



Cutaneous Innervation: Anterior Leg, Lateral Leg, and Foot

Cutaneous innervation of the anterior leg
- **Common fibular nerve** via the lateral sural cutaneous nerve
- **Saphenous nerve (branch of femoral n.)**
- **Superficial fibular nerve (branch of common fibular n.)**

Cutaneous innervation of the lateral leg
- **Common fibular nerve** via the lateral sural cutaneous nerve
- **Sural cutaneous nerve**
- **Superficial fibular nerve** (small area)

Cutaneous innervation of the dorsal foot
- **Superficial fibular nerve:** Most of dorsal foot
- **Deep fibular nerve:** supplies the webspace between the 1st and 2nd toes.

Cutaneous innervation of medial and lateral foot
- Lateral: **sural nerve**
- Medial: **saphenous nerve**

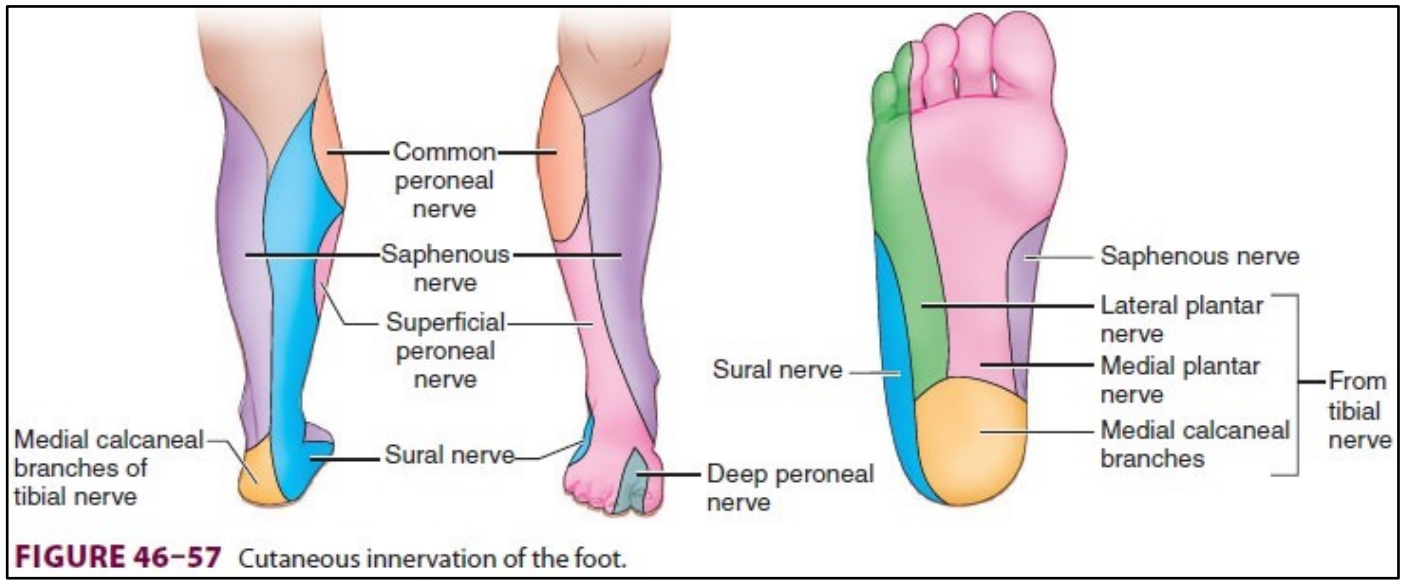
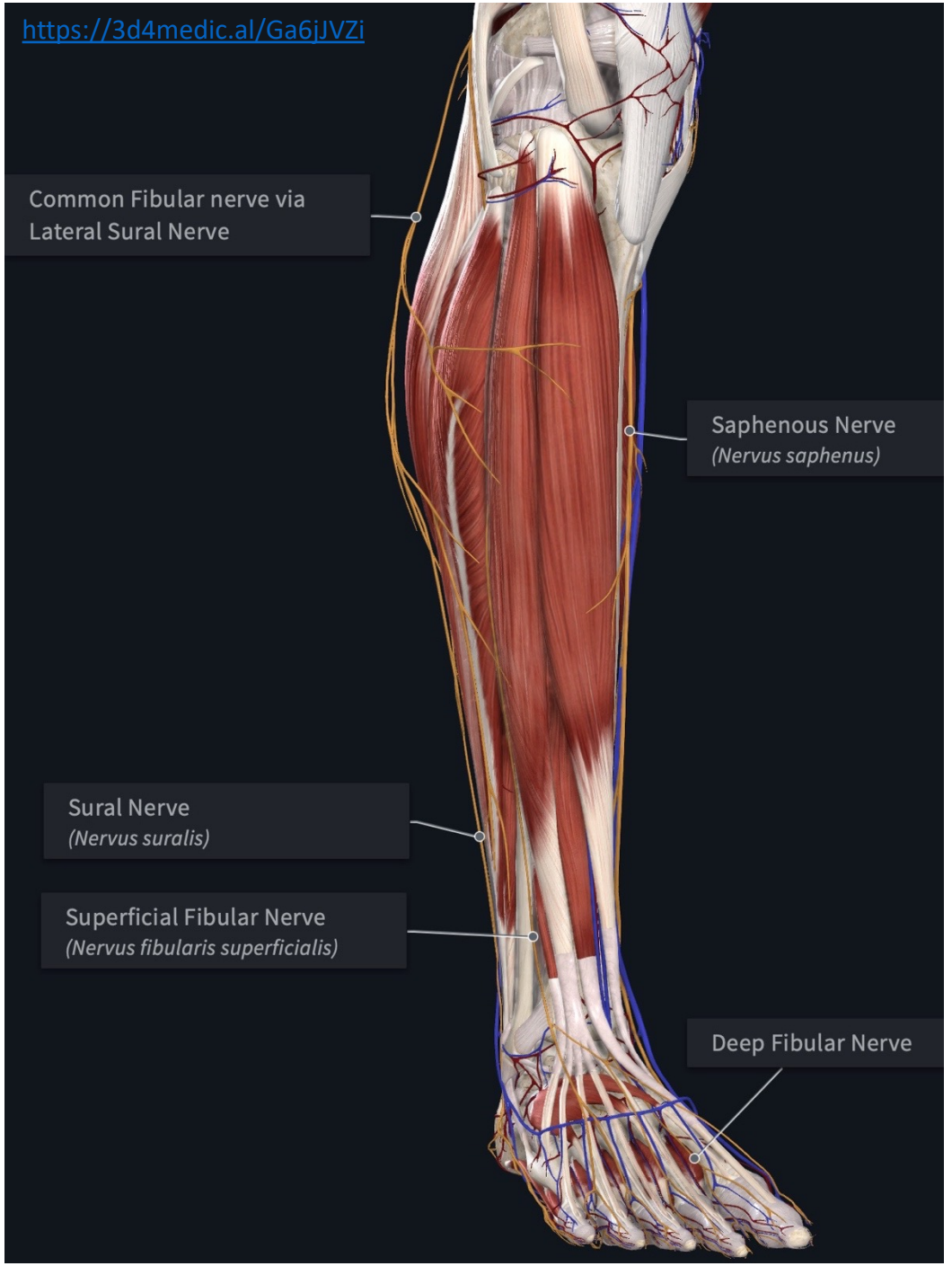


FIGURE 46–57 Cutaneous innervation of the foot.



Shin Splints and Anterior Compartment Syndrome

CLINICAL ANATOMY: Shin splints (medial tibial stress syndrome) is a repetitive strain injury characterized by mild edema and pain in the tibial region. It results from inflammation in muscles, tendons (tendonitis), and/or bone periosteum (periostitis) around the tibia. This inflammation/pain is typically the result of increased physical activity involving a repetitive action, such as walking and running without proper conditioning. Other important causes of shin pain that must be rule out are stress fractures and chronic exertional compartment syndrome (see below).

CLINICAL ANATOMY:

- Acute compartment syndrome (ACS) occurs when the pressure within a closed muscle compartment exceeds the perfusion pressure of its supplying vessels. This increase in pressure leads to ischemia of the muscles and nerves within the compartment, which can ultimately cause tissue necrosis. Because neurovascular damage and tissue necrosis can occur in as little as 6 hours, such conditions must be recognized quickly. Compartment syndromes are often resolved by surgically opening the facial compartment (fasciotomy) to relieve the pressure (Figure 1). Compartment syndrome can occur wherever a fascial compartment is present, such as the thigh, leg, hand, forearm, arm, abdomen, and buttock. Most cases of ACS are caused by trauma (common cause being fracture). Paresthesia (pins and needles sensation) over the region innervated by the deep fibular nerve is one of the early signs of acute anterior compartment syndrome of the leg.
- Chronic exertional compartment syndrome (CECS) is an episodic condition that typically affects young endurance athletes and is rarely a medical emergency. CECS is a reversible form of ACS that is initiated by physical activity, but resolves when activity ceases. The diagnosis of CECS is determined by measuring elevated compartment pressures (Figure 2) along with an indicative history and examination. Decreasing the intensity of physical training, running on soft surfaces, and altering footwear can often eliminate CECS.

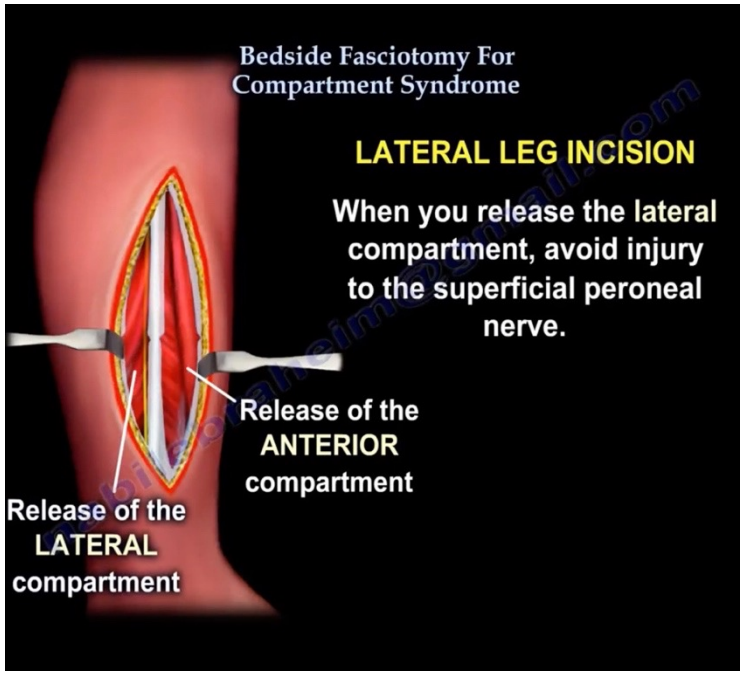
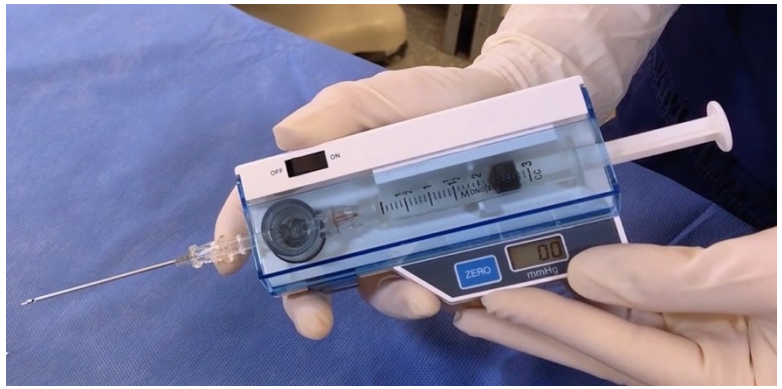


Figure 1

Image from Dr. Nabil Ebraheim Video: https://www.youtube.com/watch?time_continue=524&v=TLp5o6VH89U&feature=emb_logo

Figure 2

Solid State Transducer Intercompartment Catheter (STIC): used to measure compartment pressure

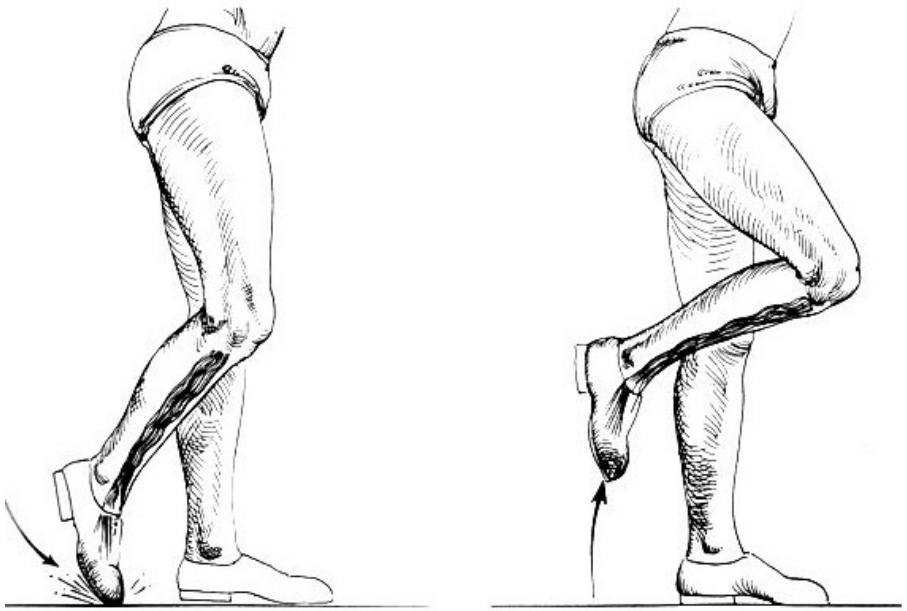


Foot Drop & Foot Slap

CLINICAL ANATOMY:

- **Foot drop** results from complete paralysis of foot dorsiflexor muscles. This paralysis results in the toe pointing (dropping) toward the floor when raising the foot off the ground during walking. In order to lift their foot higher off the ground to prevent dragging of the toes, the patient compensates by increasing knee flexion. This alteration in gait is referred to as a **steppage gait** (Figure 1). If lateral compartment muscles are also involved, the patient is unable to oppose inversion, which worsens the problem.
- **Foot slap** results from weakness (paresis) of foot dorsiflexor muscles. (Some clinicians call this partial foot drop). When the heel strikes the ground during walking, weakness of dorsiflexor muscles results in an inability to slowly lower the foot to the ground, which results in an audible slapping of the foot against the ground.
- The most common cause of foot drop/foot slap is due to compression of the neuron fibers within the common fibular (peroneal) nerve or deep fibular (peroneal) nerve as it courses within the anterior compartment.
    - Disc herniation (Typically L4-L5: L5 nerve root)
    - Lumbosacral plexus injury (pelvis fracture)
    - Hip dislocation
    - Knee dislocation
    - Compression at fibular head: Due to its superficial location, the common fibular nerve is vulnerable to injury from direct trauma, splinting, or compression from surgical positioning (lithotomy position: Figure 2).
    - Acute (anterior) compartment syndrome
- Neurological causes of foot drop include the following conditions.
    - Charcot Marie tooth disease
    - Diabetic neuropathy
    - Multiple sclerosis

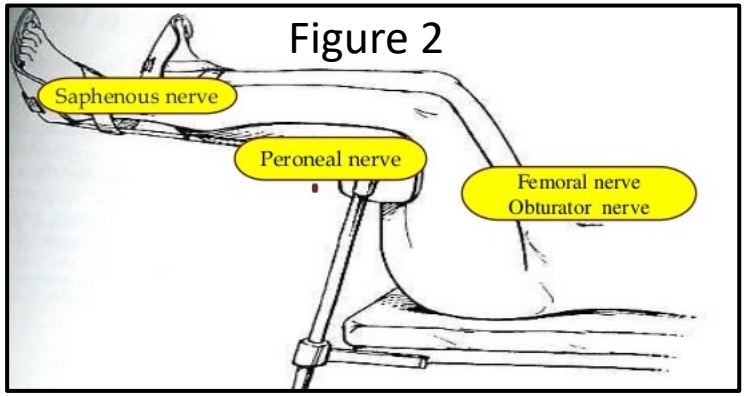
Figure 1



Foot drop results in dragging toe during walking.

Compensation for foot drop is exaggerated knee and hip flexion (steppage gait).

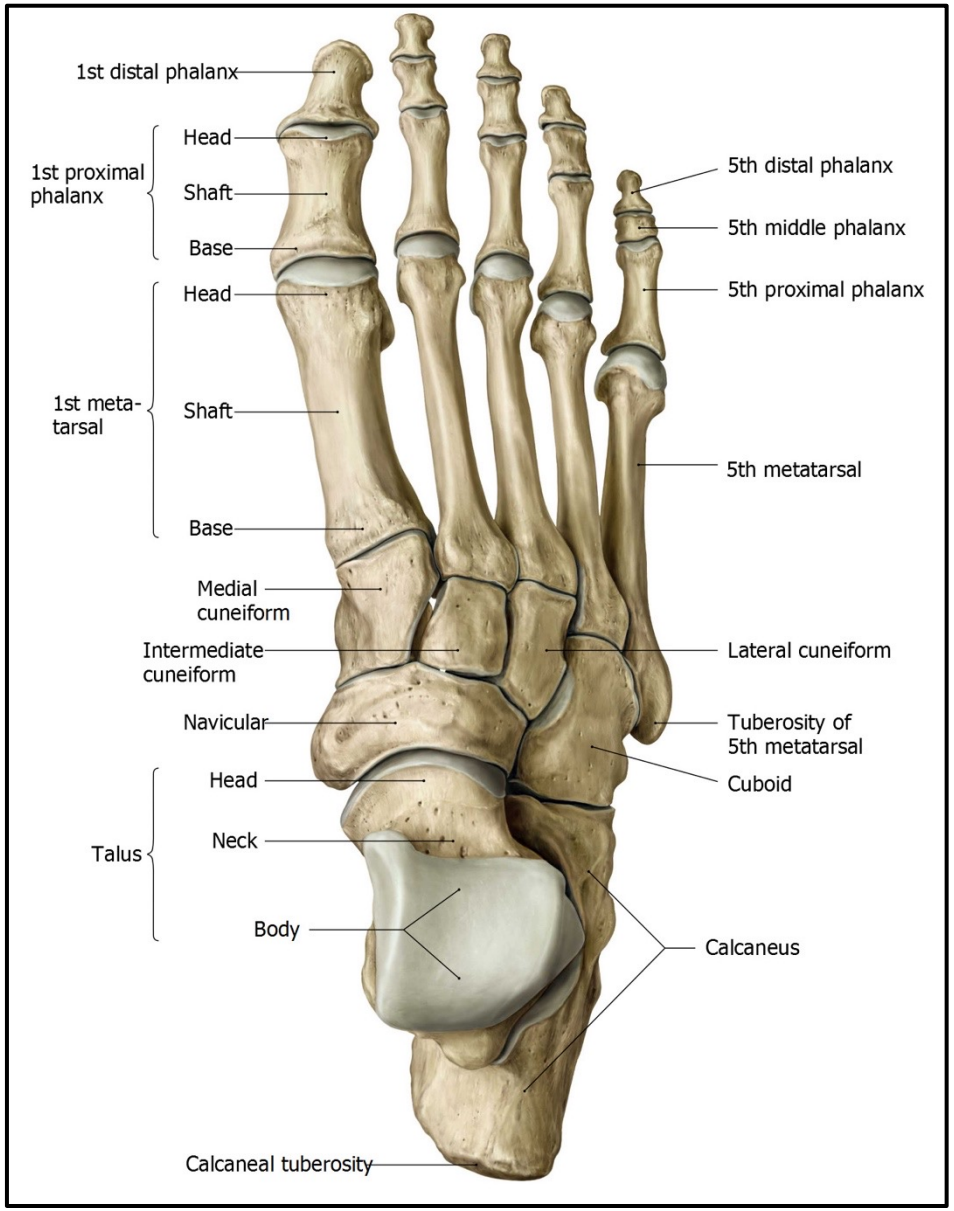
Figure 2



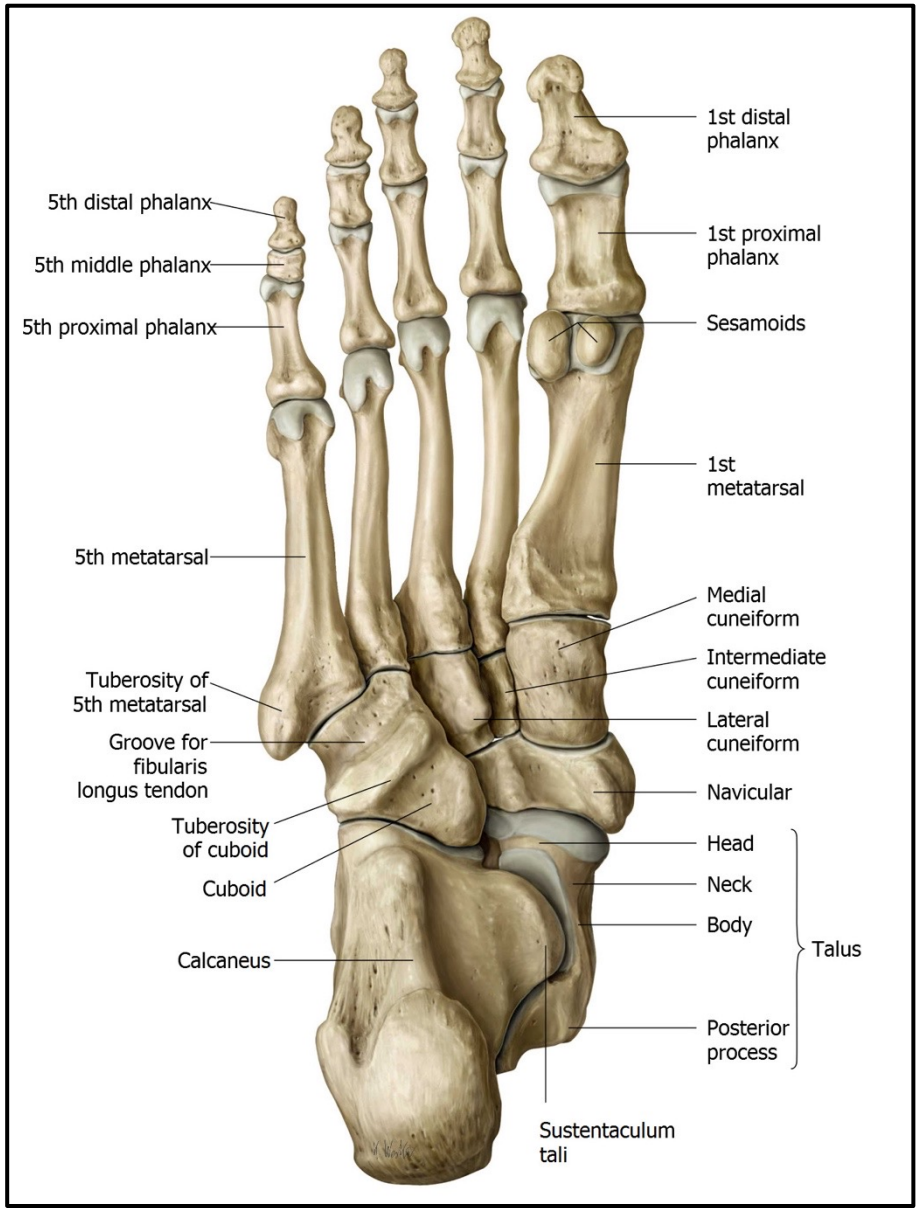
Bones and Osseous Features of the Foot

Tarsal Bones

- **Calcaneus**
  - **Calcaneal tuberosity**
  - **Sustentaculum tali (talar shelf)**
- **Talus**
  - **Head**
  - **Neck**
- **Navicular**
- **Cuboid**
- **Cuneiforms:**
  - **Medial**
  - **Intermediate**
  - **Lateral**
- **Metatarsals 1-5**
- **Phalanges: proximal, middle, and distal**



Superior to Inferior View

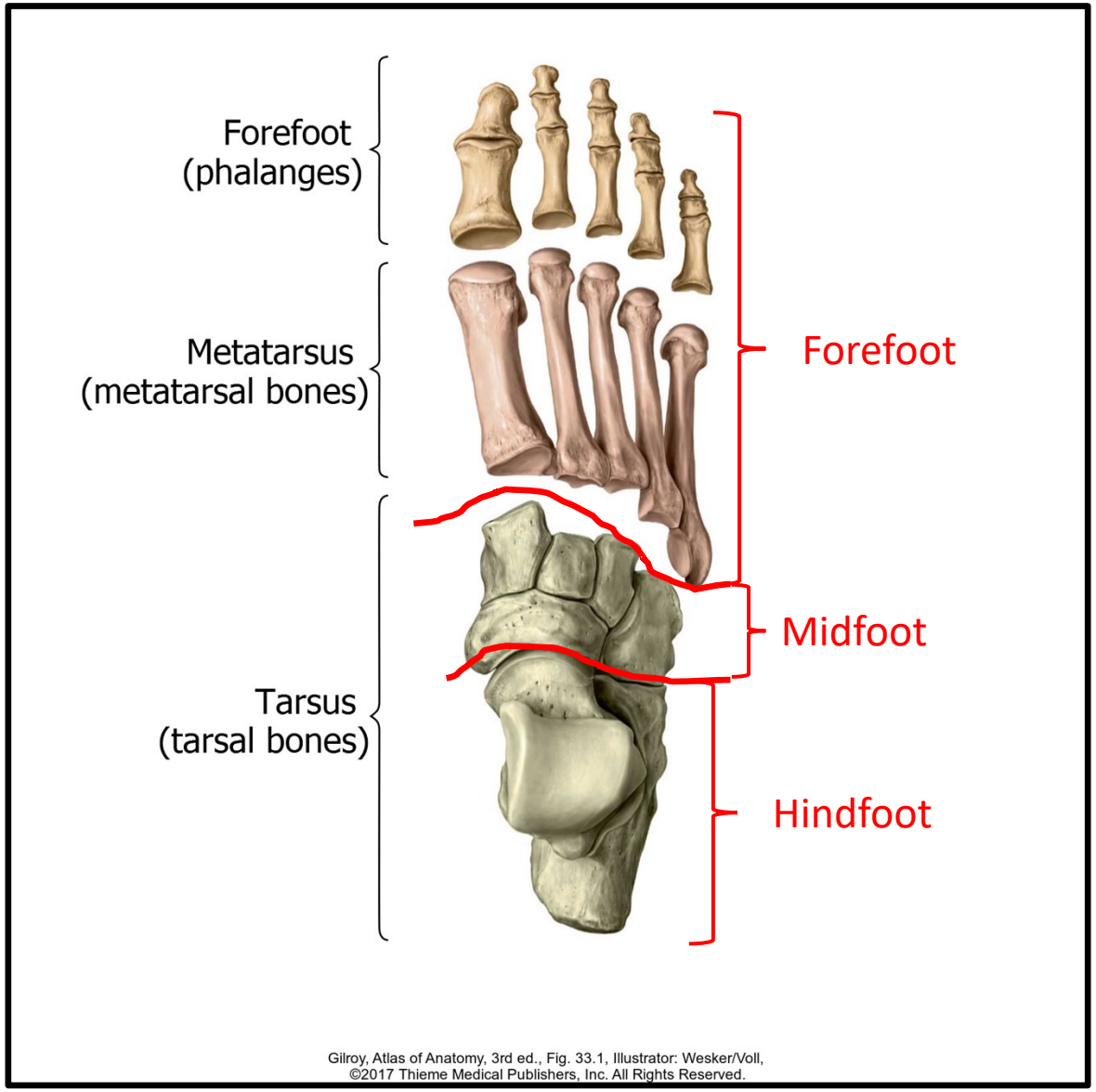


Inferior to Superior View

Foot Regions

The skeleton of the foot consists of 7 tarsals, 5 metatarsals, and 14 phalanges. The bones of the foot can be organized into three anatomical and functional groups.

- Hindfoot: talus and calcaneus
- Midfoot: navicular, cuboid, and cuneiforms
- Forefoot: metatarsals and phalanges

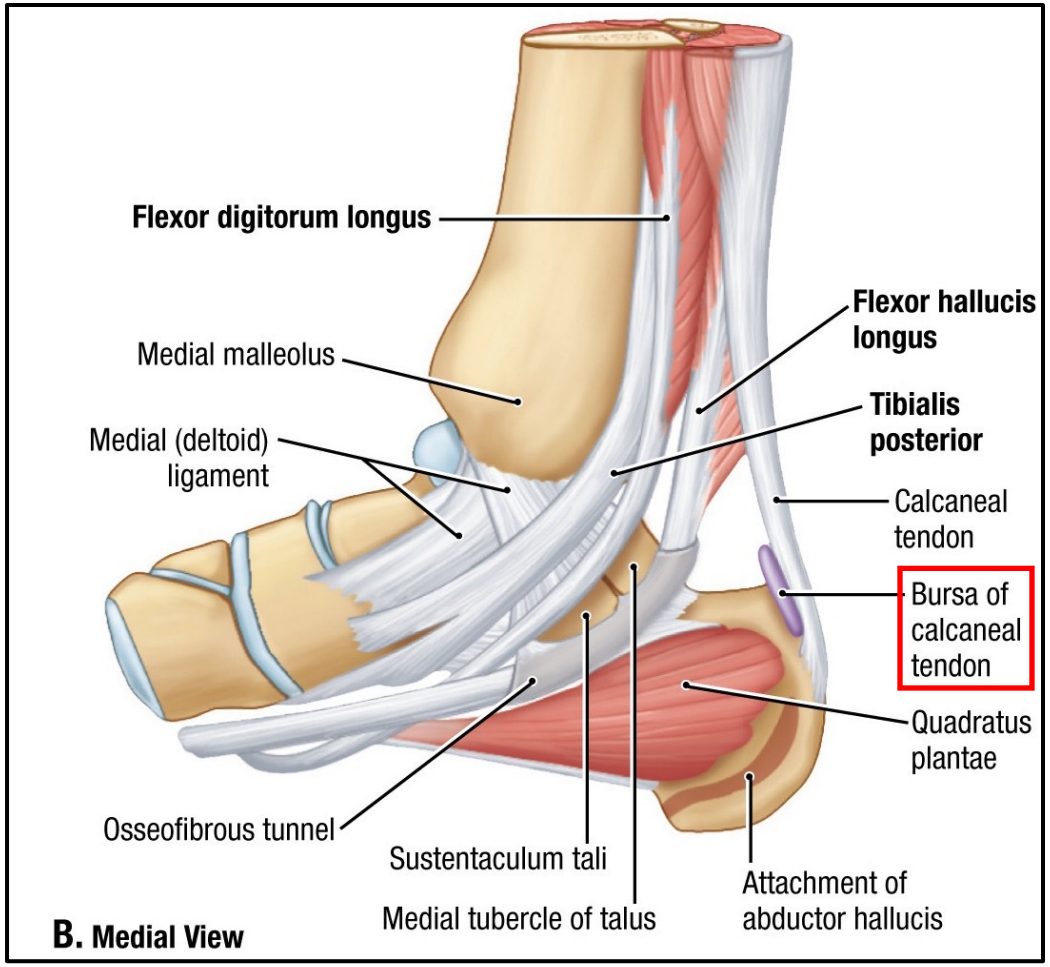


Calcaneal (Achilles) Tendon

The calcaneal (Achilles) tendon attaches to the calcaneal tuberosity. The narrow space between the anterior surface of the calcaneal tendon and the superior part of the posterior surface of the calcaneal tuberosity is occupied by the the retrocalcaneal bursa (labeled "Bursa of calcaneal tendon" in the figures).

CLINICAL ANATOMY: Irritation/Inflammation of the retrocalcaneal bursa, or of the subcutaneous calcaneal bursa (Achilles bursa), can cause pain at the heel and ankle.

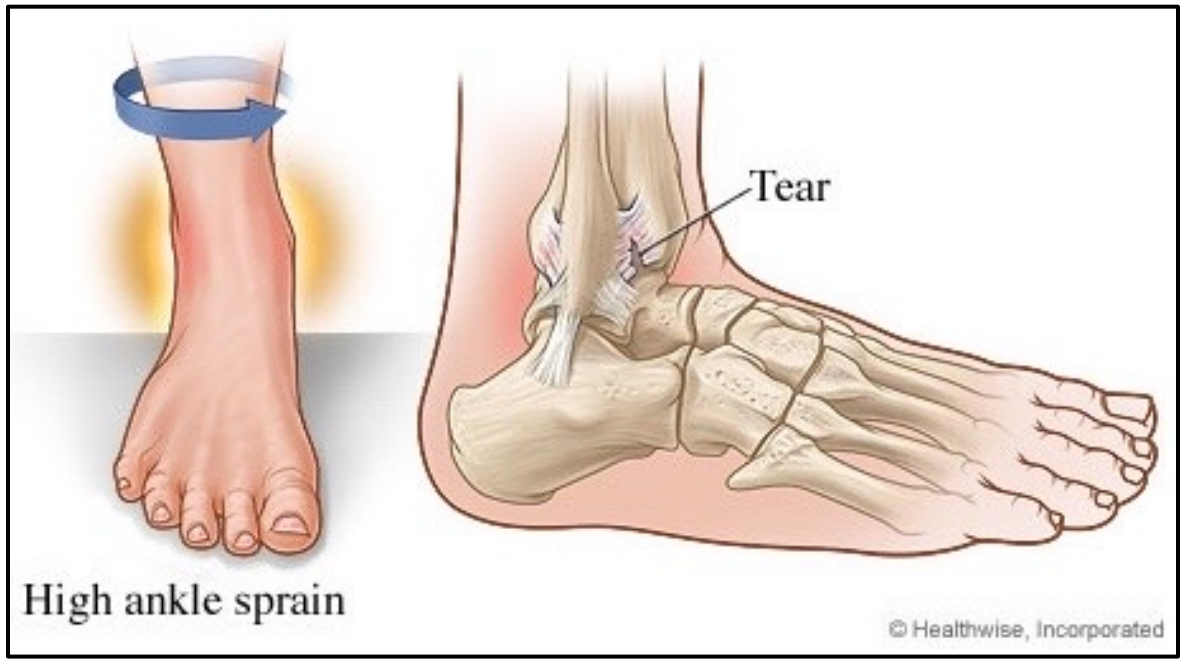
Clinical Anatomy: Microscopic tears of collagen fibers forming the calcaneal tendon results in tendinitis and can ultimately lead to calcaneal tendon rupture. Steroids, whether taken systemically or injected around the tendon, increase the probability of calcaneal tendon rupture.

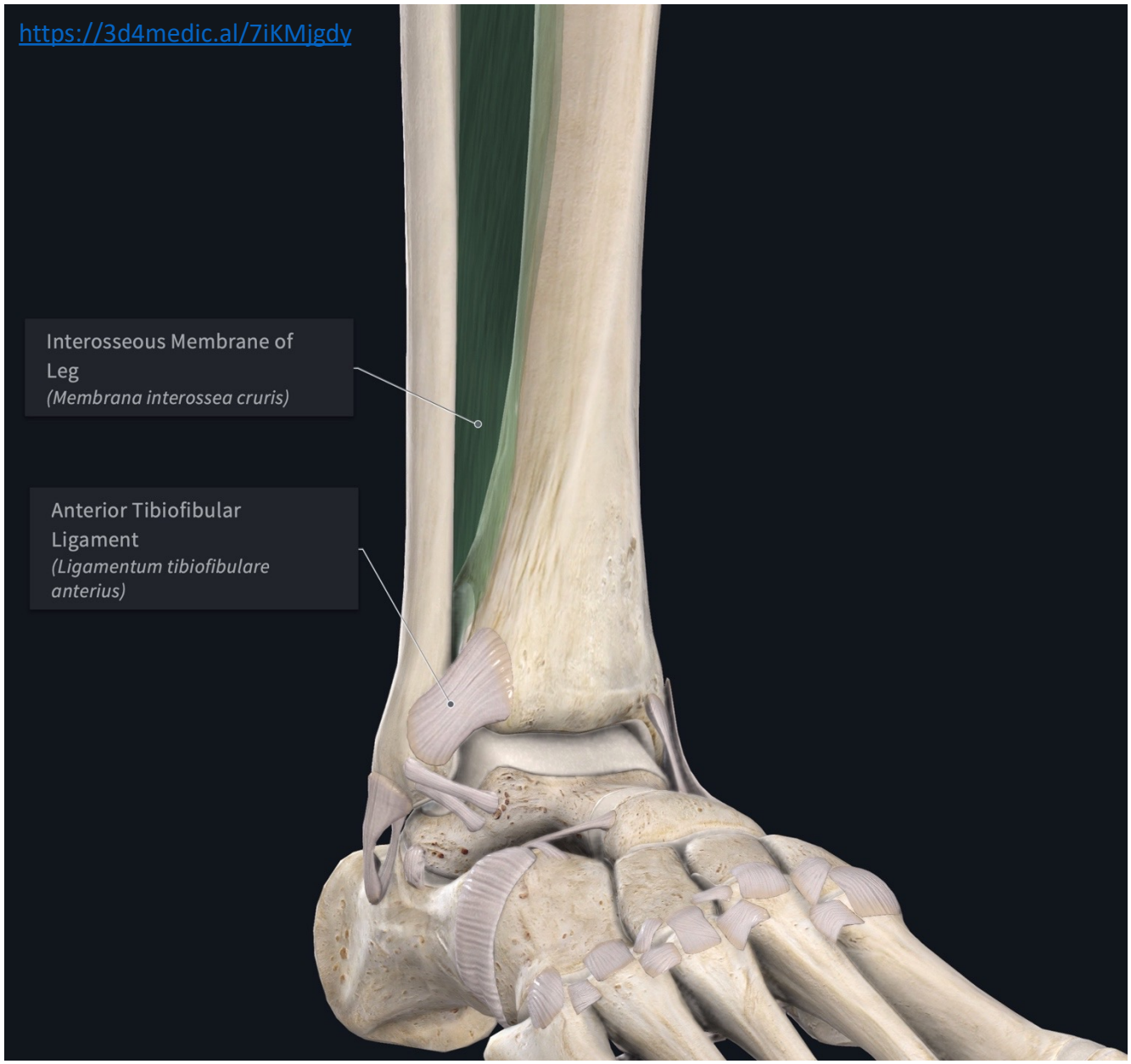


Distal Tibiofibular Joint

The distal tibiofibular joint is a complex fibrous joint essential to the stability of the ankle and is clinically known as "the syndesmosis." The lateral malleolus is firmly held against the lateral surface of the talus. The anterior side of the syndesmosis is reinforced by the anterior tibiofibular ligament, which is continuous with the interosseous membrane (Figure 1.4).

CLINICAL ANATOMY: The distal tibia and fibula are held tightly together by the interosseous membrane and the anterior and posterior tibiofibular ligaments. A syndesmotic sprain (high ankle sprain) is an injury to the distal tibiofibular syndesmosis with possible disruption of the distal tibiofibular ligaments and interosseous membrane.

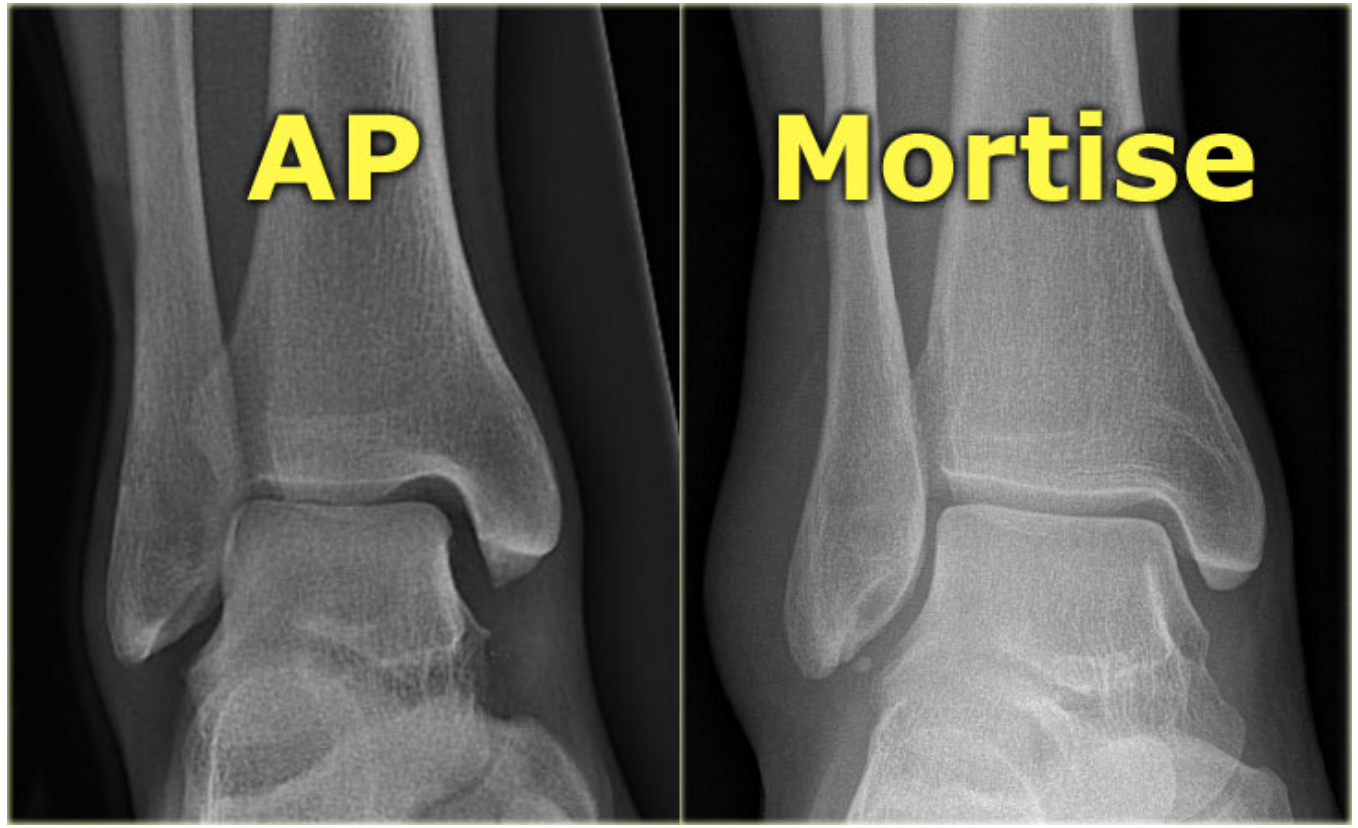


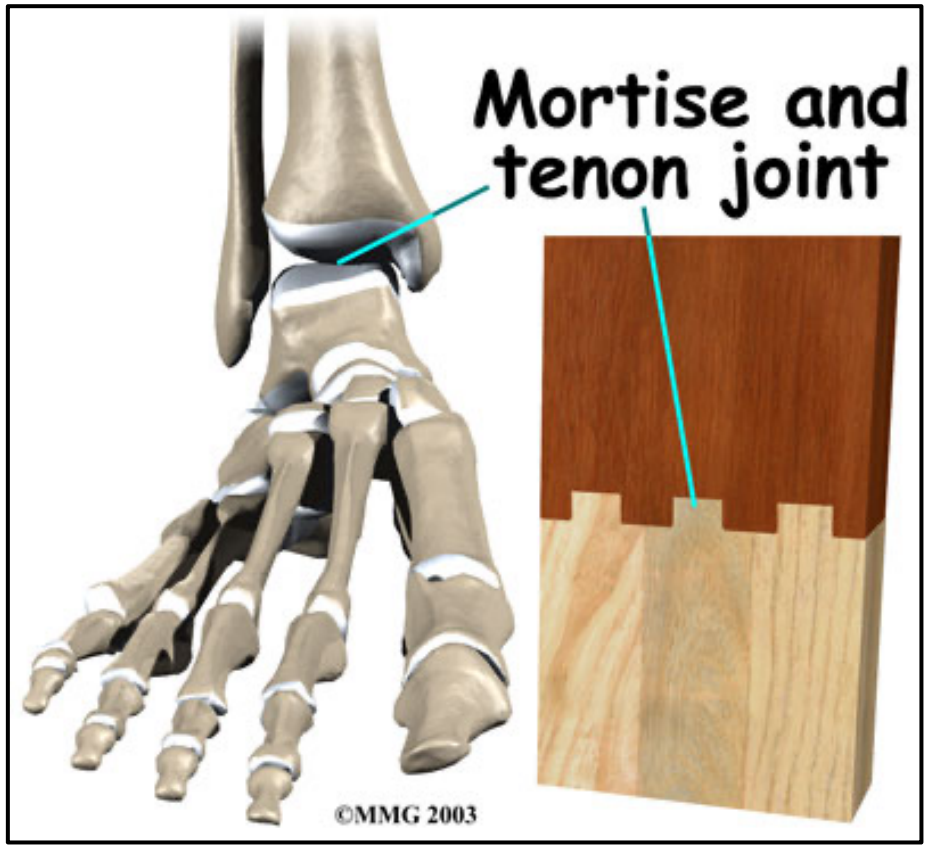


Ankle Mortise

The ankle joint is a hinge type of synovial joint between the tibia/fibula and the talus. The movements at the ankle joint are dorsiflexion and plantarflexion. Observe the “grip” of the tibia and fibula on the trochlea of the talus. The articulation between the tibia, fibula and talus is referred to as the ankle mortise, which refers to its resemblance to a type of joint used by carpenters to join pieces of wood. The shape of the joint offers stability to the ankle joint.

- The **tibia** and **fibula** together form a recessed area (mortise) into which the talus fits.
- The **talus** forms a rounded, superior portion called the trochlea that fits into the mortise formed by the distal tibia and fibula.

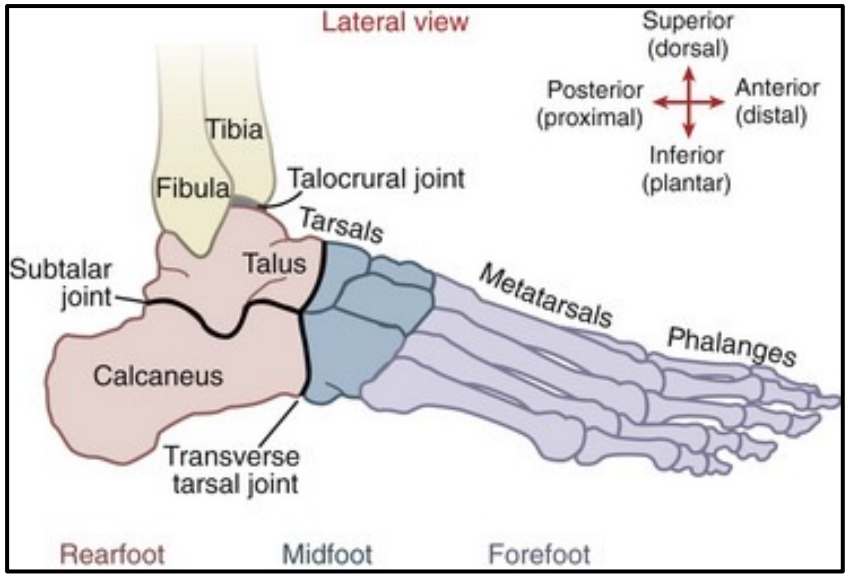


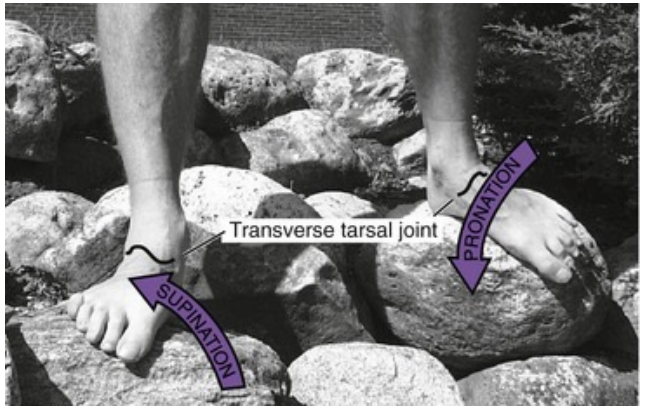


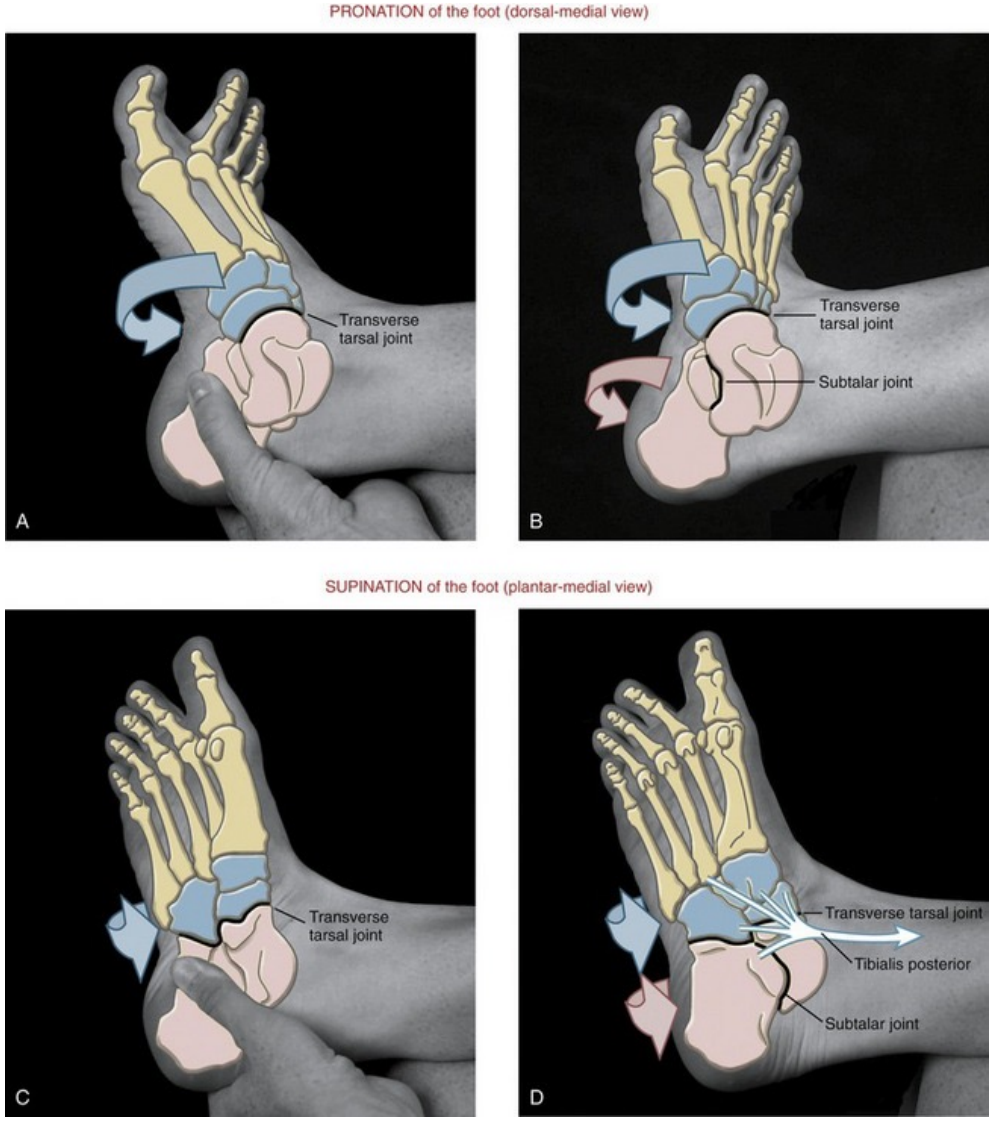
Subtalar and Transverse Tarsal Joints

- The **Subtalar joint** is an articulation between the inferior surface of the talus and the superior surface of the calcaneus.
- The **transverse tarsal joint** consists of two joints.
  - The talonavicular is an articulation between the talus and the navicular bone.
  - The calcaneocuboidal joint is an articulation between the calcaneus and the cuboid.

Most of the foot's movements occur at the *subtalar* and *transverse tarsal* joints. Inversion (supination) and eversion (pronation) produced at these joints allow the foot to continually adjust to the irregularities of terrain. When the wrong adjustment is made, the ankle buckles under body weight, resulting in an ankle sprain.







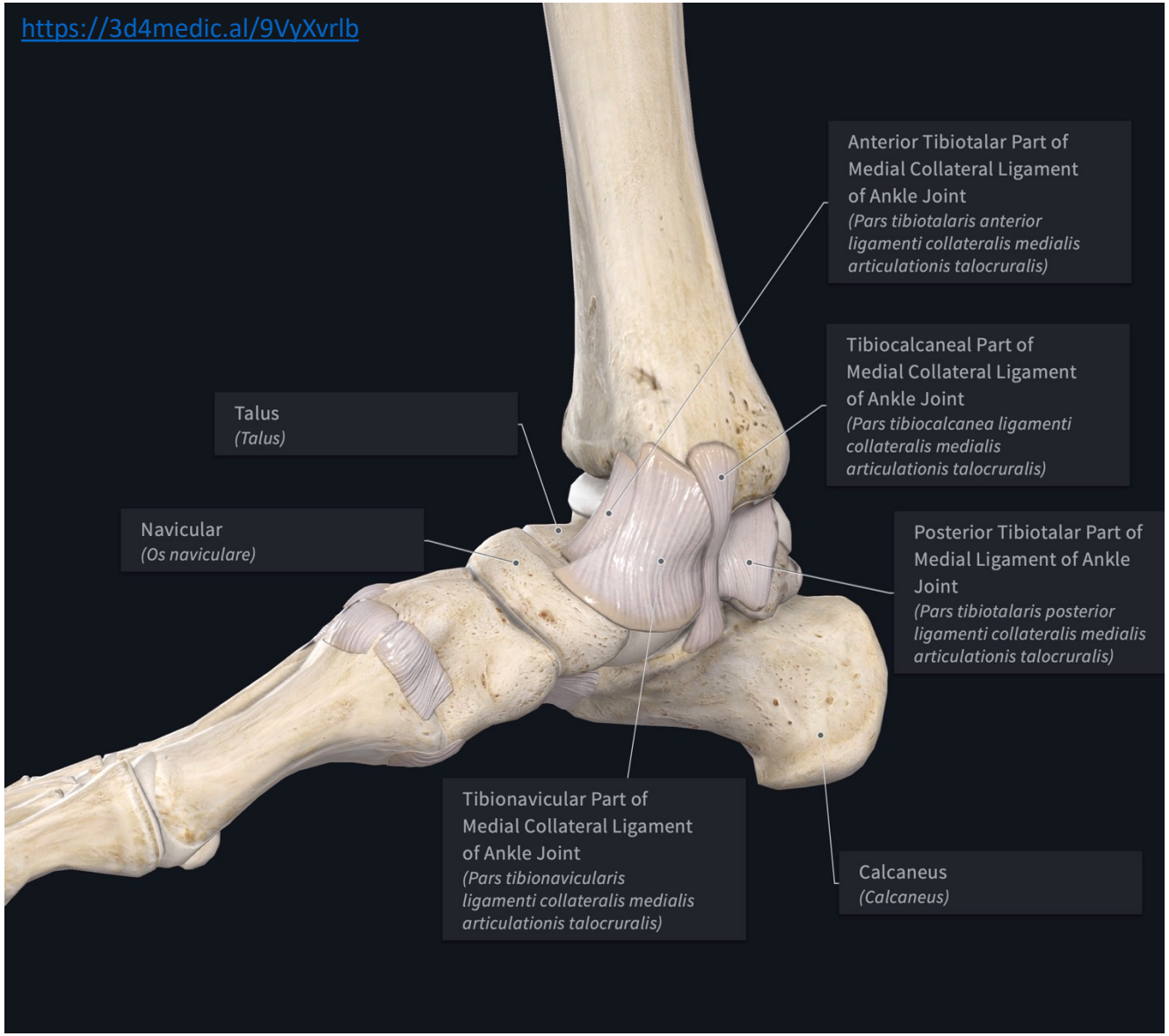
Pronation and supination of the unloaded right foot demonstrates the interplay of the subtalar and transverse tarsal joints. With the calcaneus held fixed, pronation and supination occur primarily at the midfoot (**A** and **C**). When the calcaneus is free, pronation and supination occur as a summation across both the rearfoot and midfoot (**B** and **D**). Rearfoot movement is indicated by pink arrows; midfoot movement is indicated by blue arrows. The pull of the tibialis posterior muscle is shown in **D** as it directs active supination over both the rearfoot and midfoot.

Deltoid Ligament

The fibrous capsule of the ankle is fairly weak, so it must rely upon ligaments to provide support.

- The **Deltoid ligament** (medial collateral) is a fan-shaped ligament whose apex is located on the medial malleolus of the tibia and attaches to the navicular, talus, and calcaneus. It has four parts, which are listed for completeness, but you can identify this ligament as the "deltoid" ligament.
    1. Tibionavicular ligament
    2. Tibiocalcaneal ligament
    3. Anterior tibiotalar ligament
    4. Posterior tibiotalar ligament

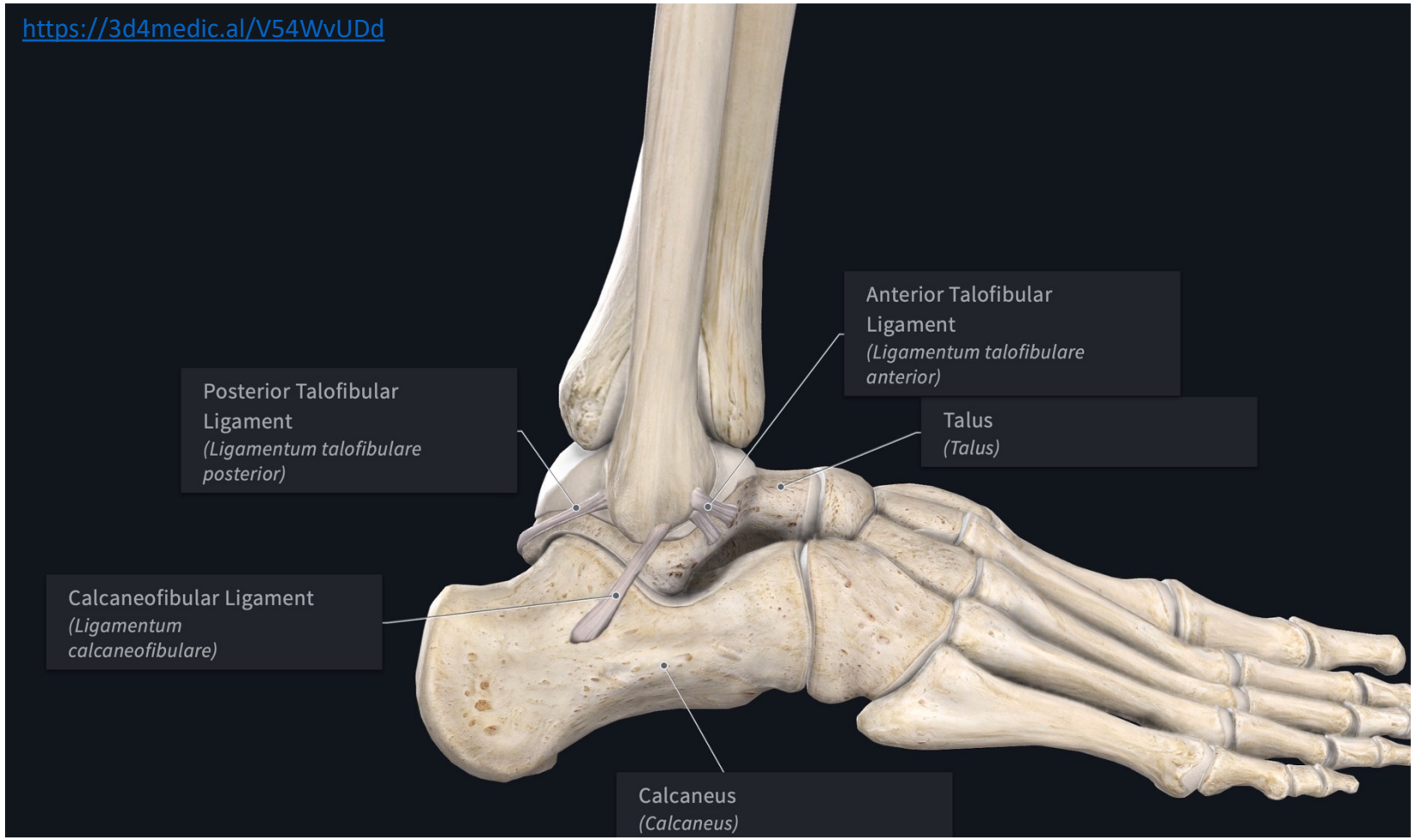
The deltoid ligament is a strong ligament and functions to prevent excessive range of motion (primarily eversion).



Lateral Collateral Ligament of Ankle

The **Lateral collateral ligament** consists of three separate bands that prevent excessive range of motion (primarily inversion). All three parts have an attachment on the lateral malleolus.

1. **Anterior talofibular ligament (ATFL):** Connects the lateral malleolus to the anterior talus
2. **Calcaneofibular ligament:** Connects the lateral malleolus and the calcaneus
3. **Posterior talofibular ligament**: Connects the lateral malleolus and the *posterior* talus



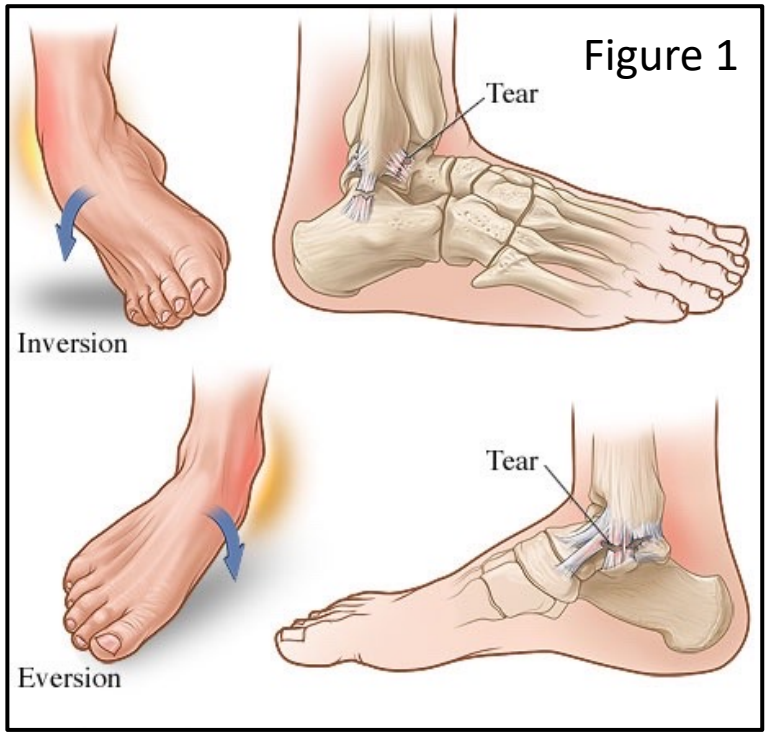
Ankle Sprain

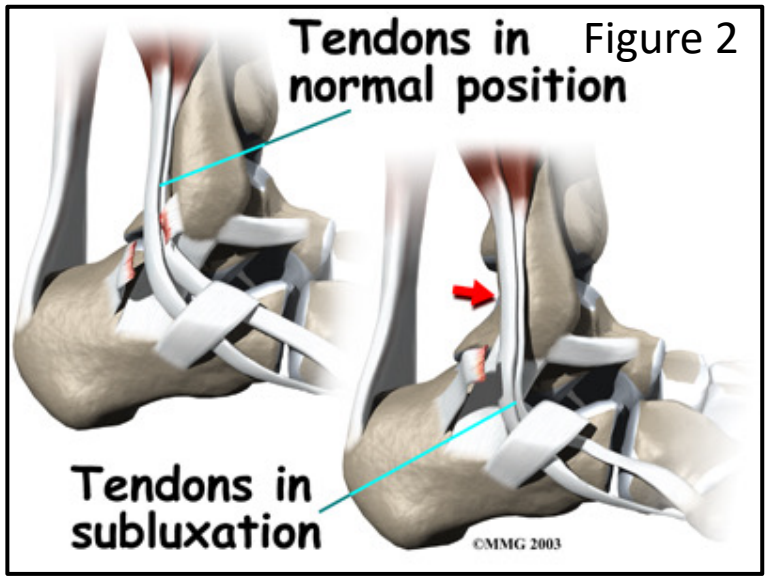
CLINICAL ANATOMY: An ankle sprain (tearing fibers of ligaments) is a common sports injury resulting from hyperinversion or hypereversion of a weight bearing foot.

- The vast majority of ankle sprains are **hyperinversion** injuries (Figure 1).
  - Hyperinversion injuries result in damage to the the lateral ligament complex, which is weaker than the deltoid (medial collateral) ligament complex.
    - The region of the lateral ligament often damaged is the anterior talofibular ligament.
    - The calcaneofibular ligament can also be involved.
  - The fibularis muscle tendons are susceptible to stretching/tearing in a hyperinversion sprain. In addition, the fibularis tendons can subluxate if the superior fibular retinaculum is ruptured (Figure 2).
  - If inversion occurs during planter flexion, an avulsion fracture can result where the fibularis brevis inserts on the base of the 5th metatarsal (Figure 3).

- A **hypereversion** injury causes damage to the deltoid/medial collateral ligament complex (Figure 1).
  - Damage to the deltoid ligament is more rare than damage to the lateral ligaments because of the strength of deltoid ligament and the medial malleolus functioning as physical block against excessive eversion.

Most ankle sprains are treated with RICE (rest, ice, compression, elevation) to control inflammation and promote healing. Ankle sprains may take weeks to months to completely resolve with surgery only being needed if a joint is chronically unstable.





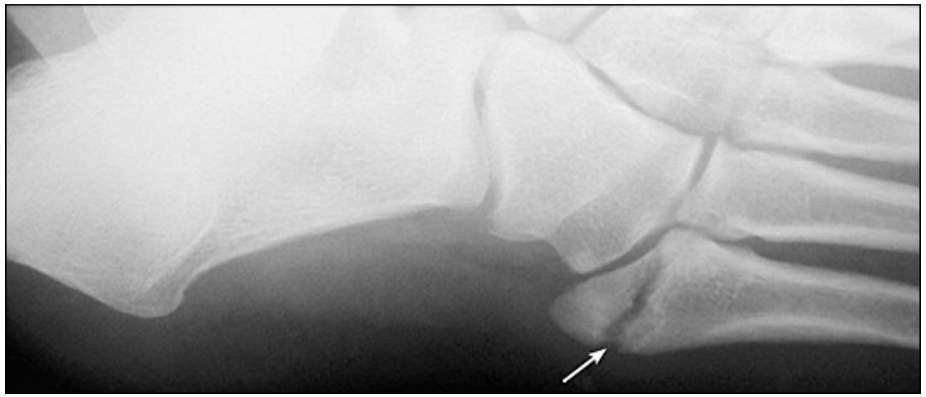


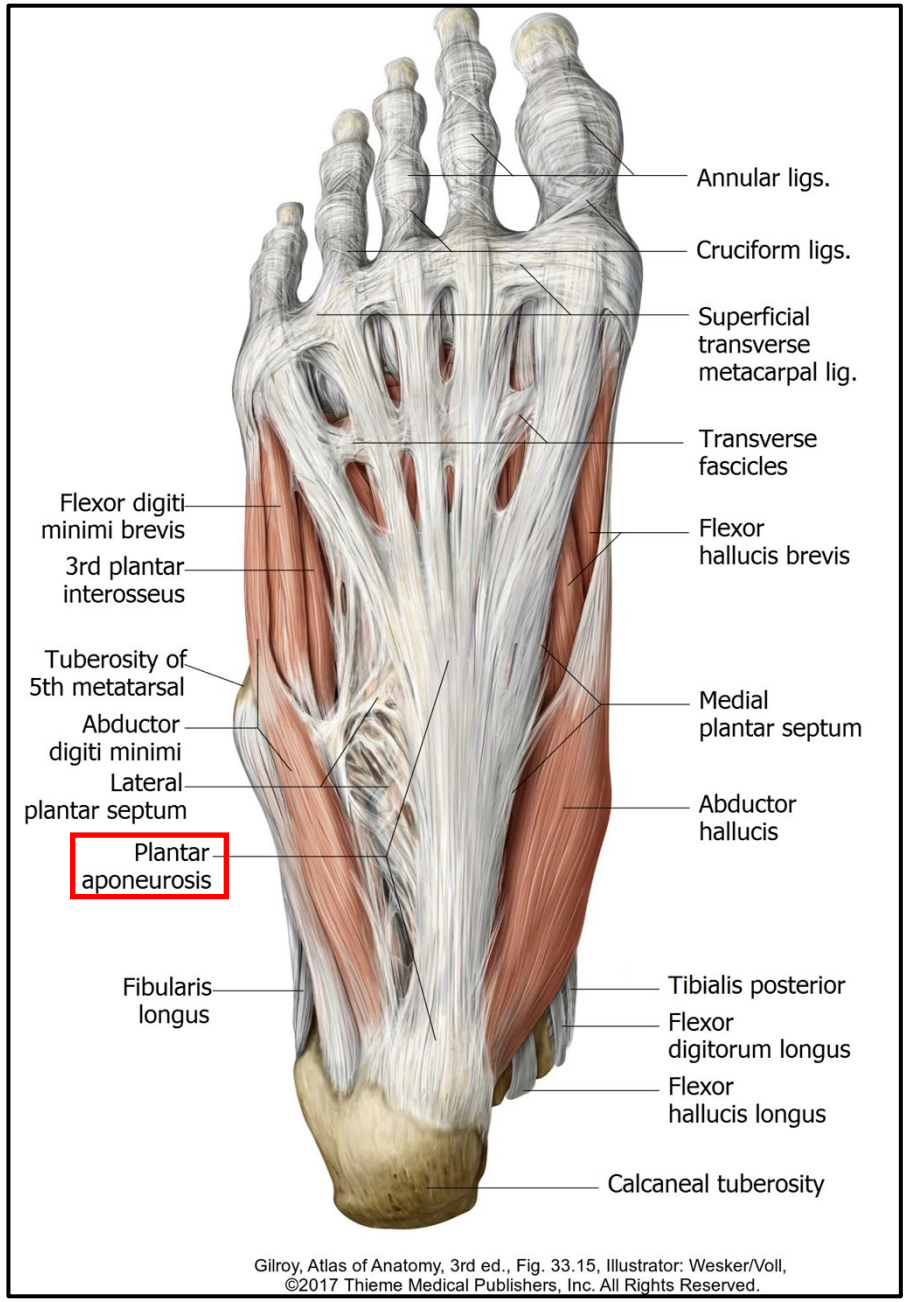
Figure 3

Plantar Fascia & Plantar Foot Muscles

The deep fascia of the sole of the foot is called the **plantar fascia**. The thickened central portion of the fascia is called the **plantar aponeurosis,** which spans the distance between the calcaneus and the toes.

CLINICAL ANATOMY: Plantar fasciitis (jogger's heel, tennis heel, Policeman's heel) is the most common cause of heel pain for which professional care is sought. It is commonly believed to be caused by repetitive microtrauma to the plantar fascia.

The intrinsic muscles of the foot are classically described as being arranged in four layers beginning from the plantar aspect. These plantar muscles function primarily as a group during the support phase of stance to maintain the arches of the foot.

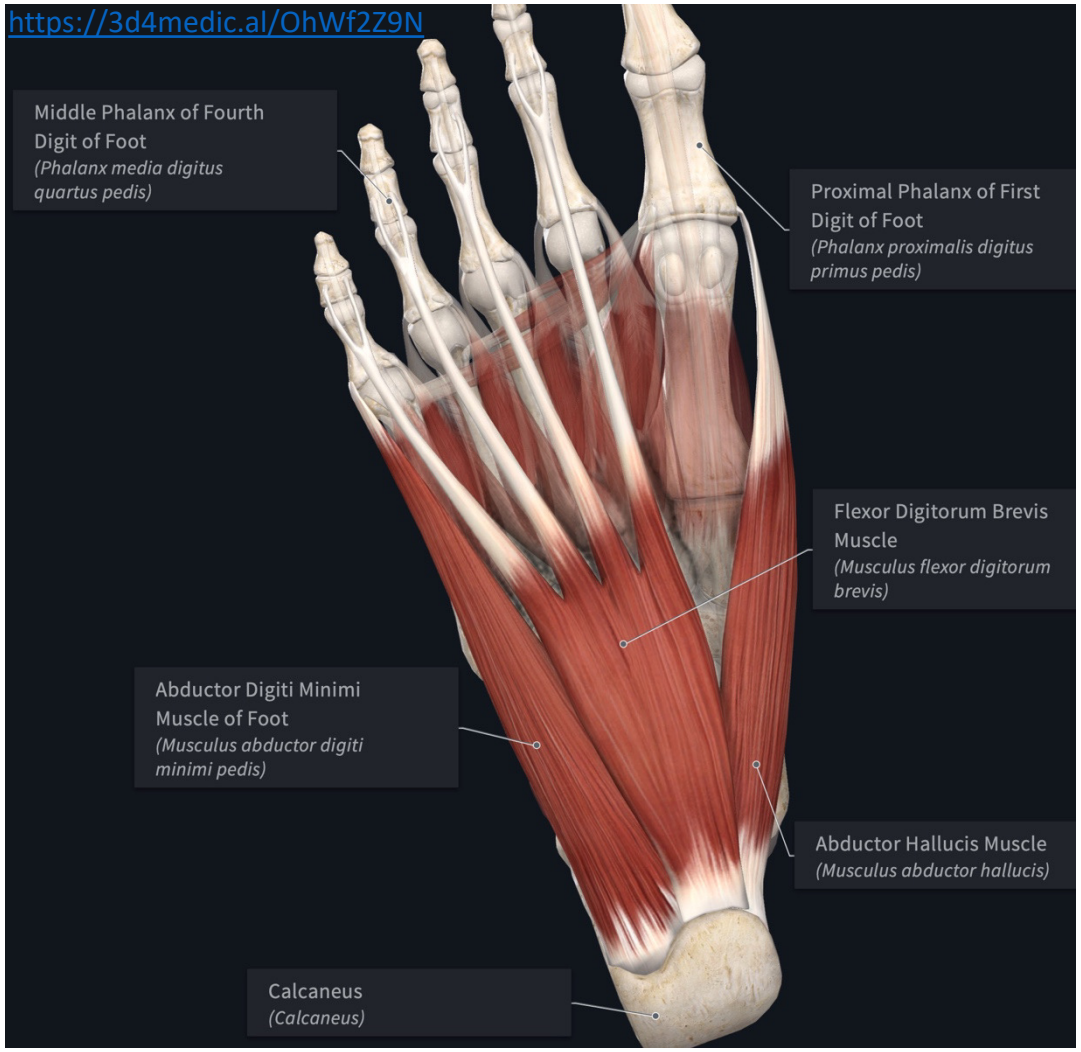


Gilroy, Atlas of Anatomy, 3rd ed., Fig. 33.15, Illustrator: Wesker/Voll,

Plantar Foot Muscles: Layer 1

MUSCLE	INNERVATION	BLOOD SUPPLY	ACTION
Abductor hallucis	Medial plantar n.	Medial plantar a.	Abducts and flexes 1st digit (great toe)
Flexor digitorum brevis		Medial and lateral plantar a.	Flexes lateral four digits
Abductor digiti minimi	Lateral plantar n	Lateral plantar a.	Abducts and flexes 5th digit (little toe)

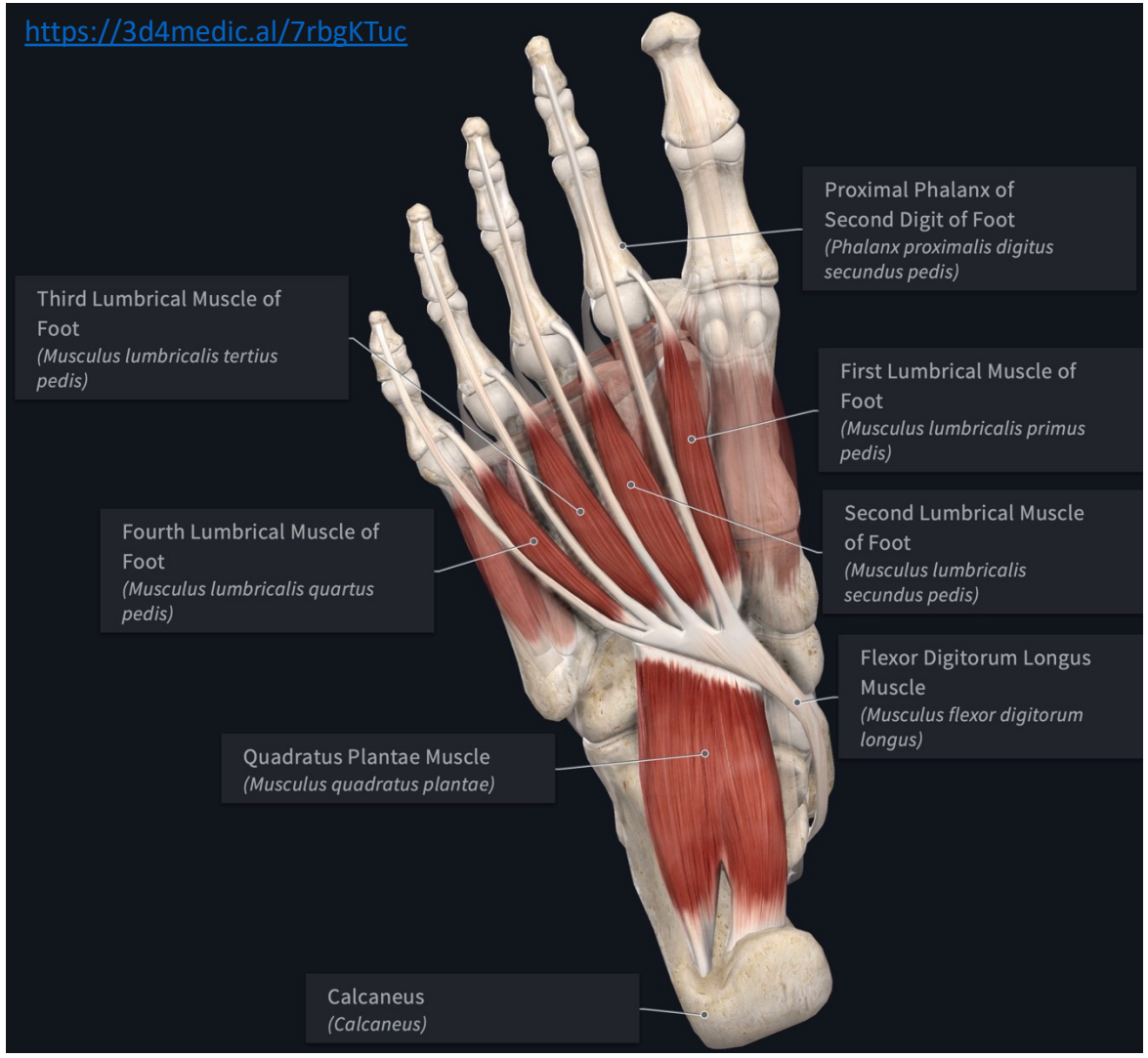
Three muscles form the first layer.



Plantar Foot Muscles: Layer 2

MUSCLE	INNERVATION	BLOOD SUPPLY	ACTION
Quadratus plantae	Lateral plantar n.	Medial and lateral plantar a.	Assists flexor digitorum longus with flexing lateral four digits
Lumbricals	Medial one: medial plantar n. Lateral three: lateral plantar n.	Medial and lateral plantar a.	Flex proximal phalanges, extend middle and distal phalanges of lateral four digits

Two muscles form the second layer of intrinsic plantar foot muscles.

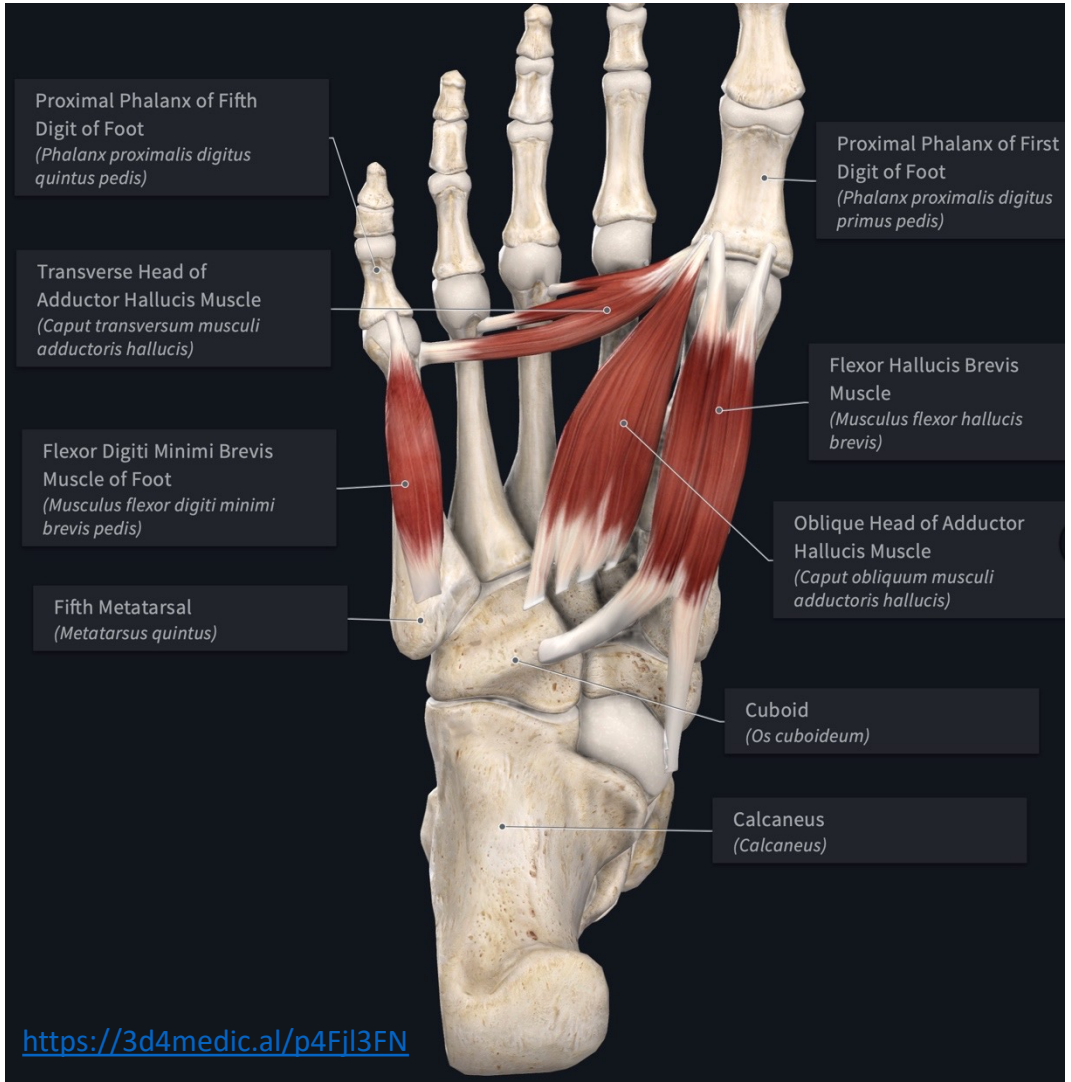


Plantar Foot Muscles: Layer 3

MUSCLE	INNERVATION	BLOOD SUPPLY	ACTION
Flexor hallucis brevis	Medial plantar n.	Medial plantar a.	Flexes proximal phalanx of 1st digit
Adductor hallucis: transverse and oblique heads	(Deep branch) Lateral plantar n.	Lateral plantar a.	Adduct 1st digit, assist maintaining transverse arch of foot
Flexor digiti minimi brevis	(Superficial branch) Lateral plantar n.	Lateral plantar a.	Flexes proximal phalanx of 5th digit

Three muscles form the third layer:

FUNCTIONAL ANATOMY: The medial and lateral sesamoids of the foot are located within the two tendons of the flexor hallucis brevis muscle (Right Figure). The sesamoids function to increase the mechanical advantage of flexor hallucis brevis, assist in weight bearing and determine the line of action of the flexor hallucis longus muscle. Disruption of the sesamoids leads to disruption of the normal functioning of the metatarsophalangeal joint.



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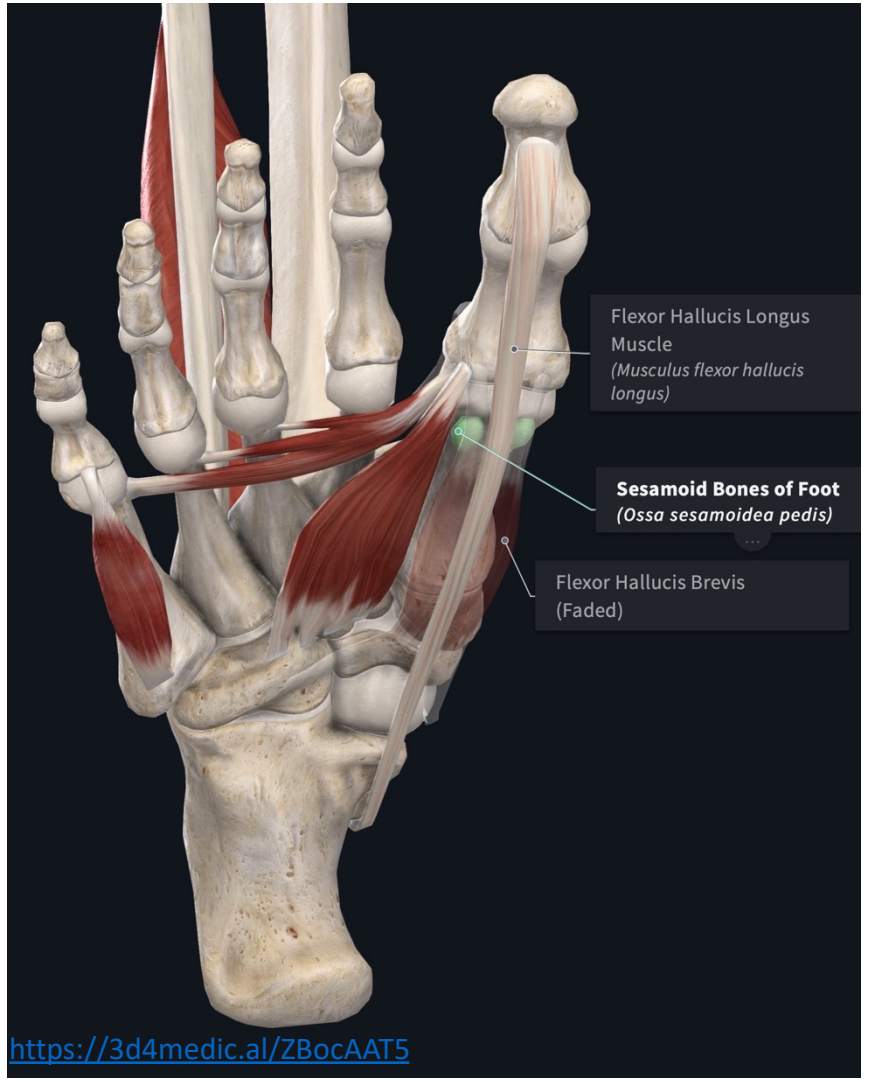

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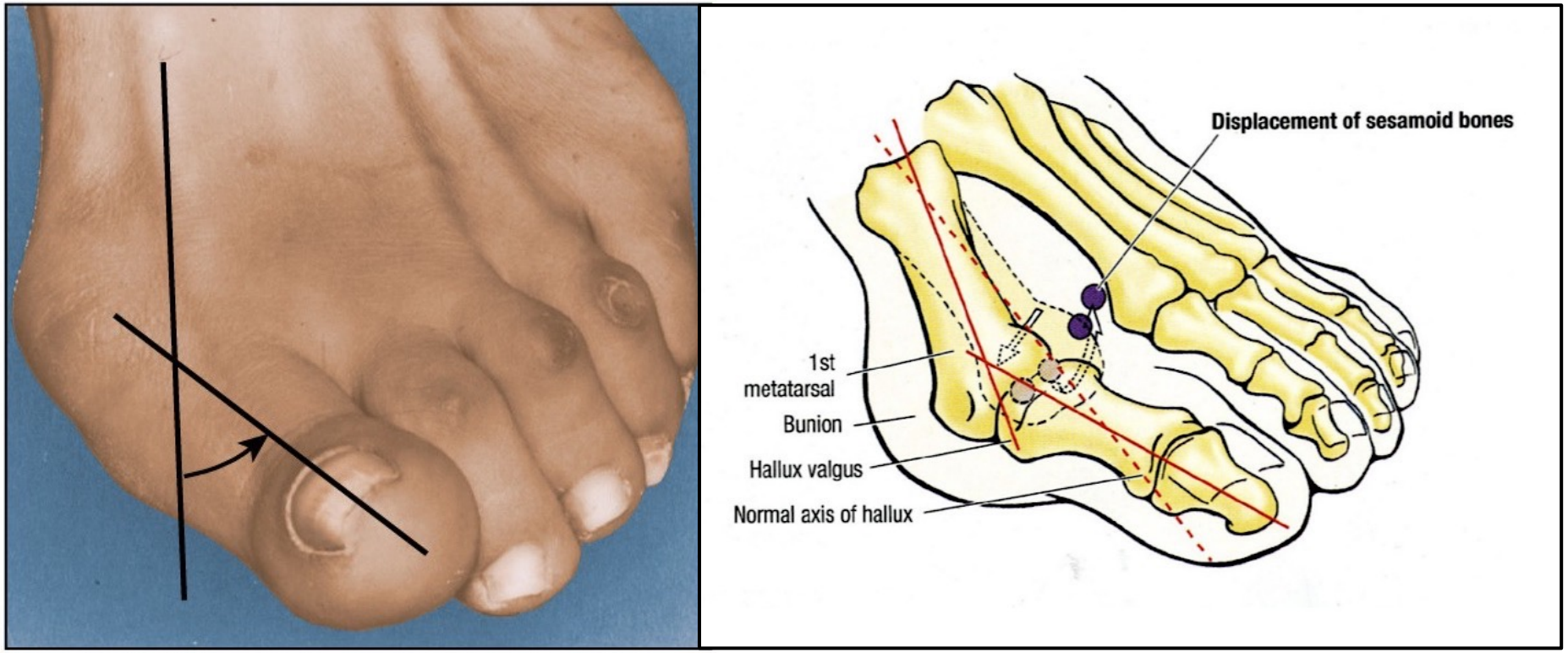
Hallux Valgus

CLINICAL ANATOMY: Hallux valgus (commonly referred to as a **bunion**) is a foot deformity that may be caused by pressure from improperly fitted footwear or degenerative joint disease. It is characterized by lateral deviation of the great toe. The "L" in vaLgus may used to remember that the deviation is lateral.

In some individuals, the lateral deviation is great enough to laterally displace the metatarsal head away from the sesamoid bones, which can result in them being located between the 1st and 2nd metatarsal heads. In some cases, the tissues surround the deviated metatarsal head become edematous, which results in pressure and friction against the shoe. This can lead to the formation of a subcutaneous bursa that can be tender and inflamed.

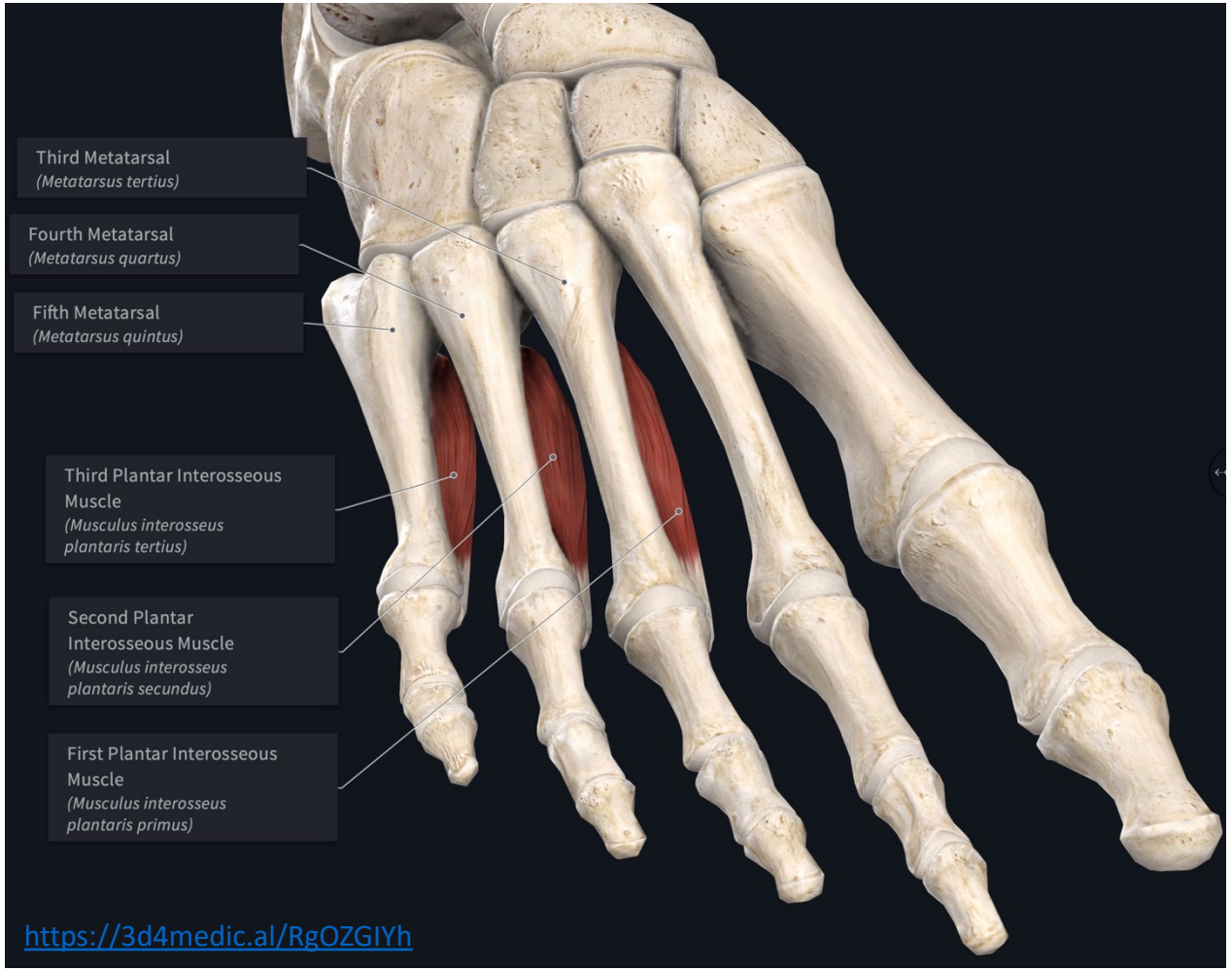


B. Hallux Valgus

Plantar Foot Muscles: Layer 4

The fourth layer of intrinsic foot muscles consists of two groups of muscle that abduct and adduct the toes. Both groups are innervated by the lateral plantar nerve. We won't be placing emphasis on these two groups of foot muscles, but pictures are provided for completeness.

- Dorsal interossei
- Plantar interossei



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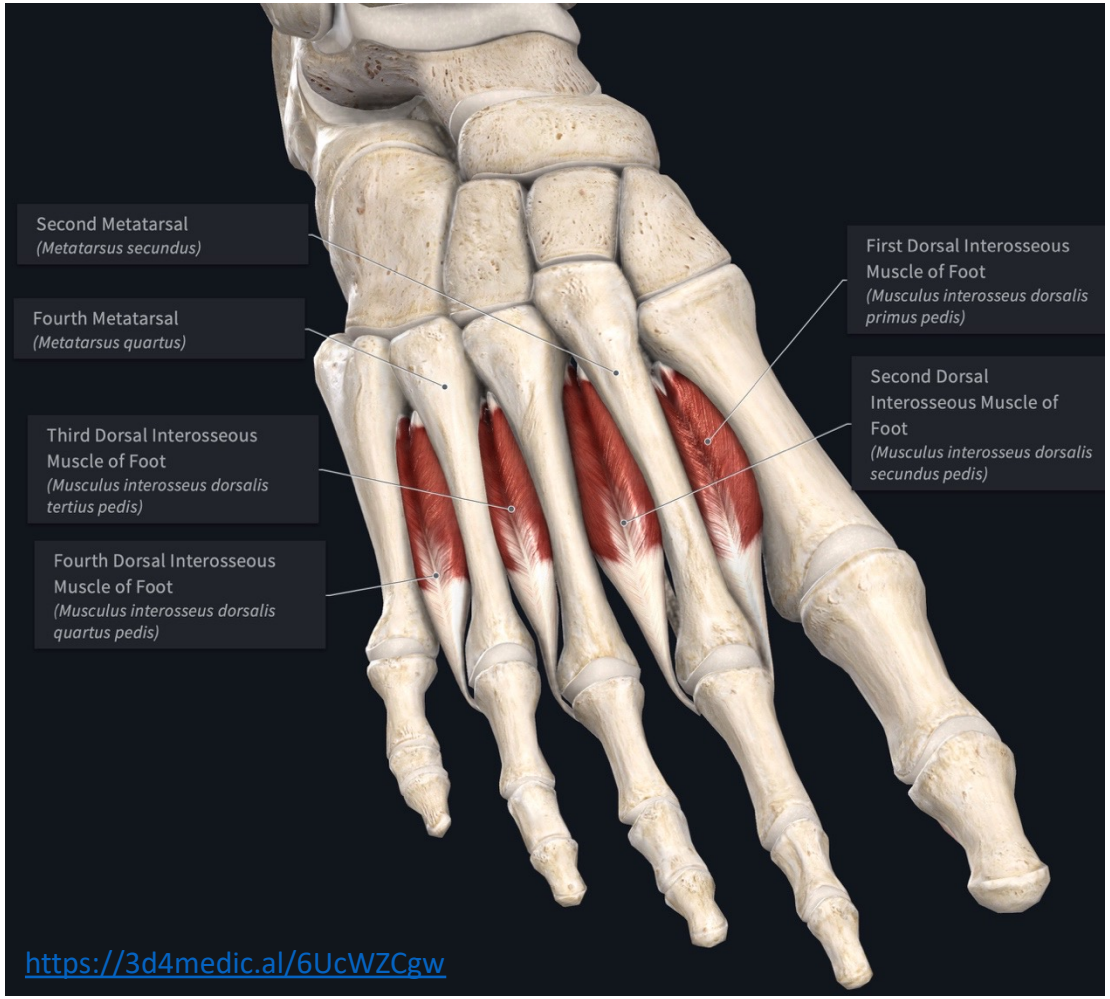

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Foot Arches

There are two types of foot arches: longitudinal and transverse. The longitudinal arches are the most important (Figures 1 and 2).

Longitudinal Arch

- **Medial Longitudinal Arch:** The medial longitudinal arch is the largest, and clinically the most significant. It is located from proximal to distal along the medial aspect of the foot.
- **Lateral Longitudinal Arch:** The lateral longitudinal arch lies from proximal to distal along the lateral aspect of the foot, and is more shallow than the medial arch.

Transverse Arch

- **Transverse Arch**
  The transverse arch is a half arch lying inferior to the forefoot and between the lateral and medial longitudinal arches.

Figure 1

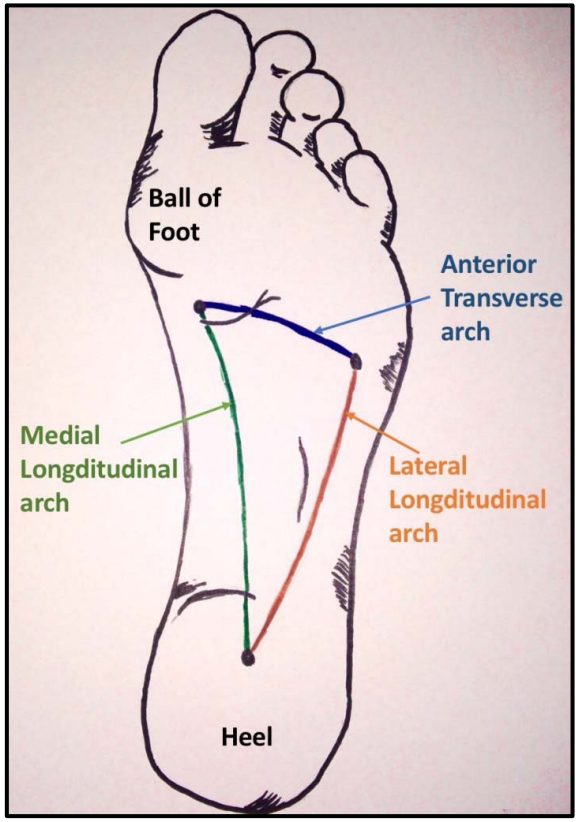
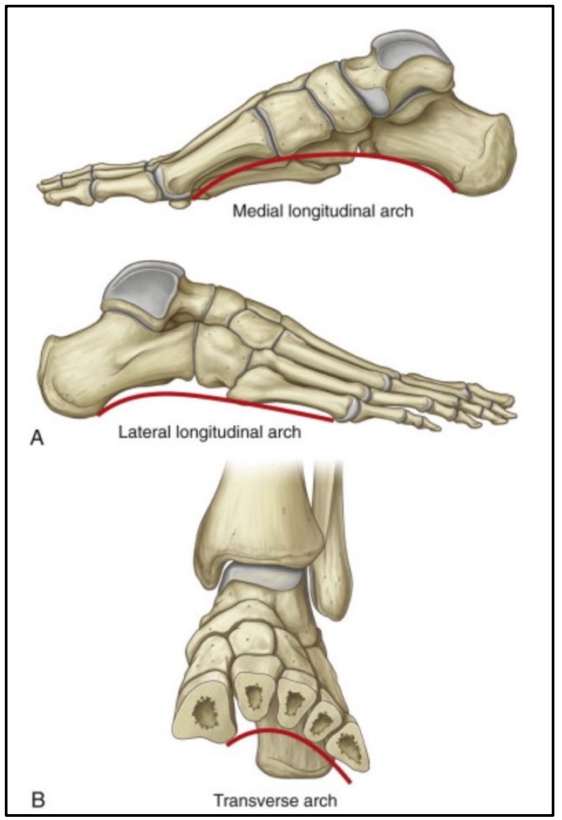


Figure 2



The **weight-bearing areas of the foot** are located at the anterior and posterior aspects of the longitudinal arches. These are the calcaneal tuberosity, the heads of the 2nd-5th metatarsals, and the sesamoid bones of the 1st metatarsal (Figure 3).

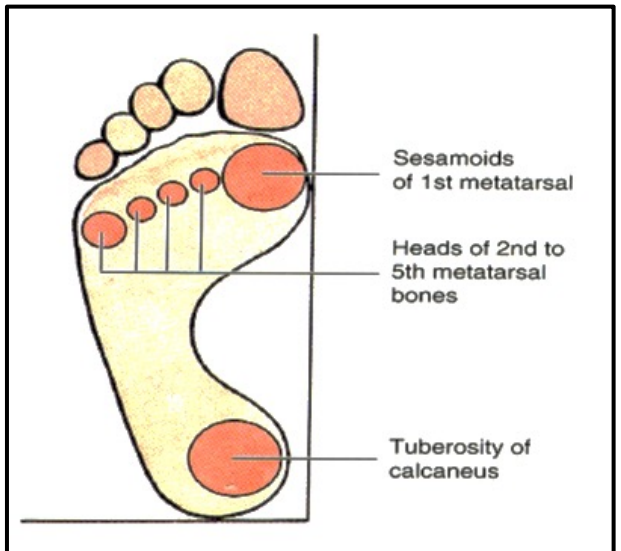
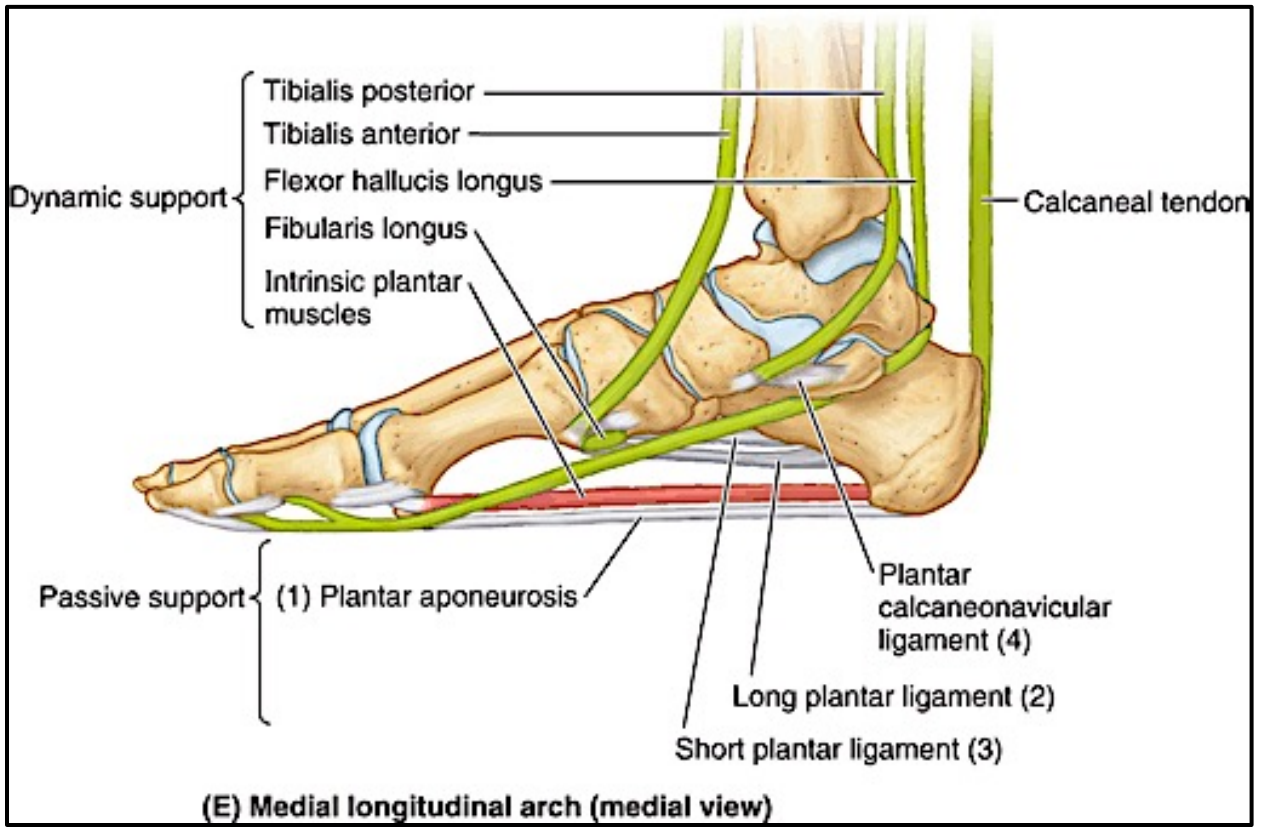


Figure3

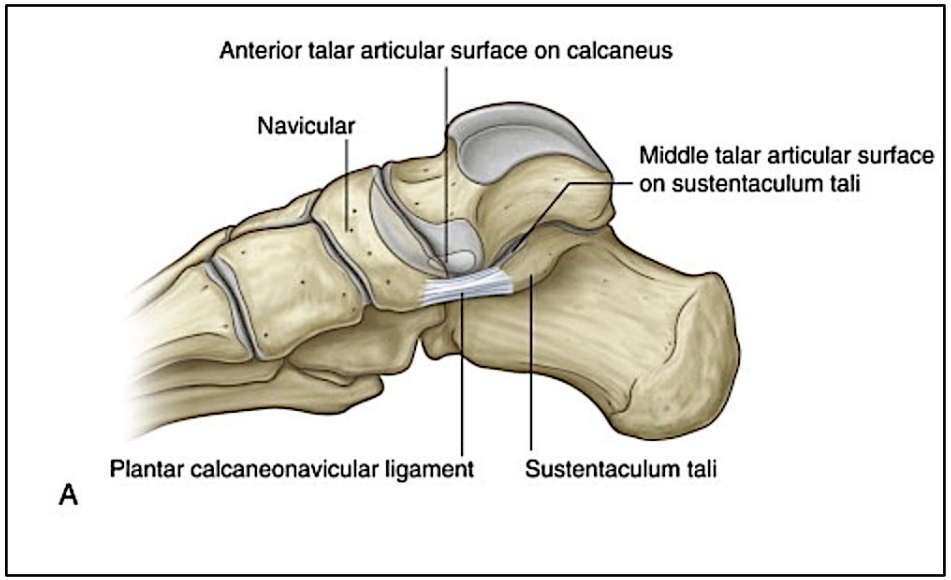
Dynamic & Passive Support of Arches

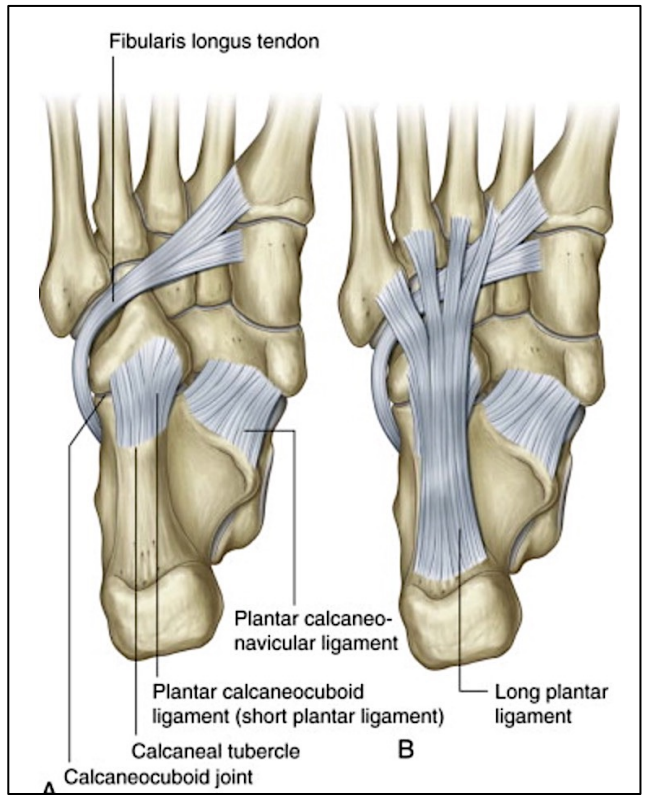
The arches are formed by the tarsal and metatarsal bones, and supported by the foot's ligaments and tendons.

- Dynamic support of the longitudinal arch is provided by the intrinsic foot muscles in the sole of the foot, as well as the **tibialis posterior**, **tibialis anterior**, and **flexor hallucis longus muscles**.
- Passive support is provided by the **plantar aponeurosis**, **short plantar ligament**, **long plantar ligament**, and **plantar calcaneonavicular (spring) ligament**. The spring ligament is important because it supports the head of the talus at the peak of the medial longitudinal arch of the foot



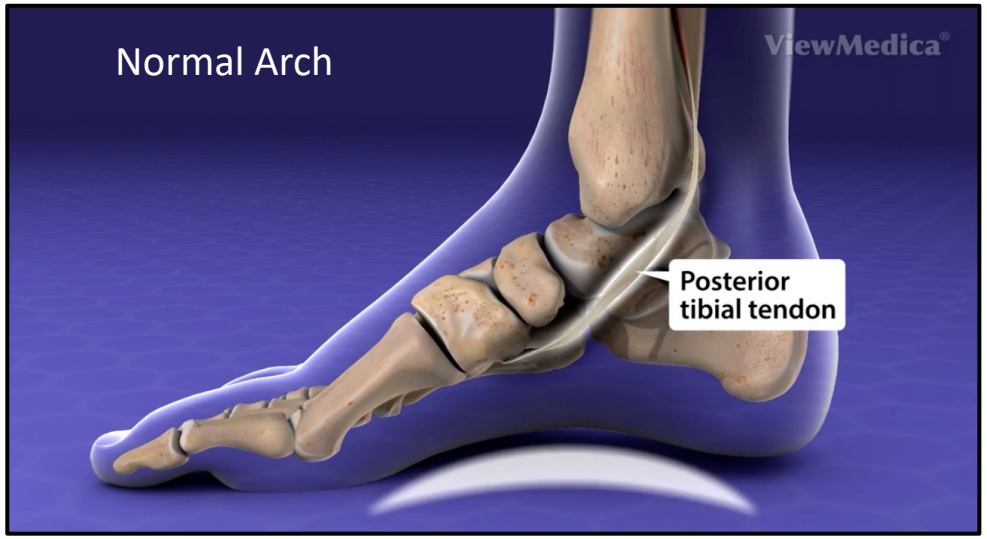
(E) Medial longitudinal arch (medial view)

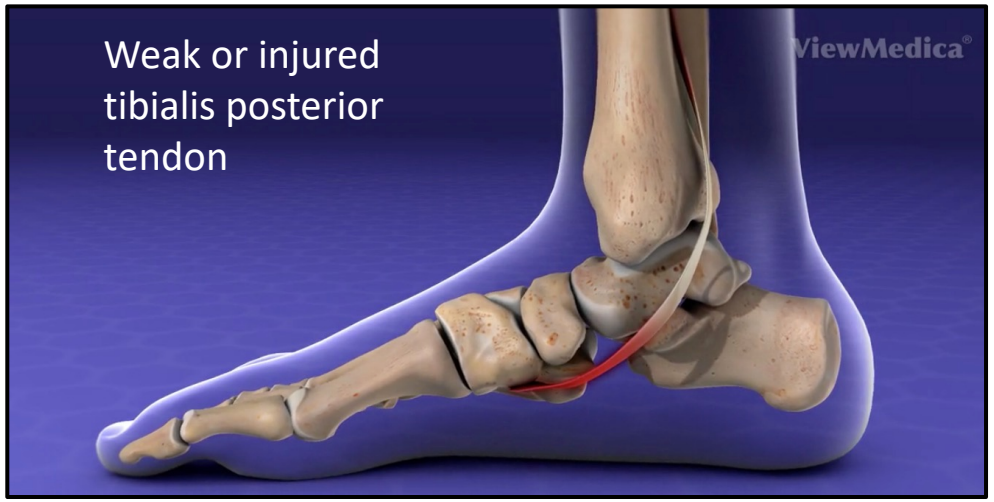


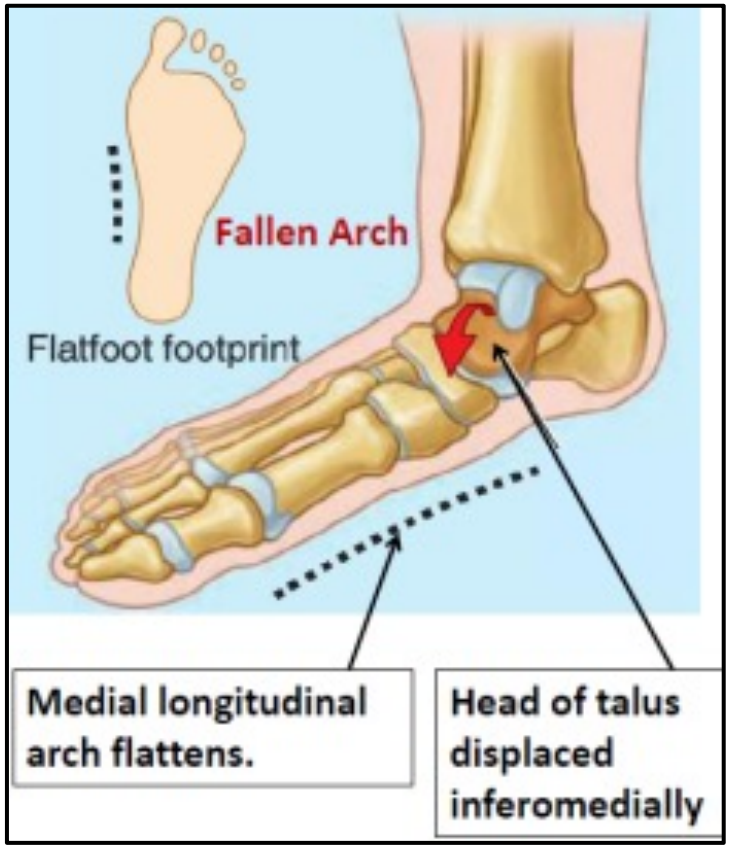


Acquired Flat Feet

CLINICAL ANATOMY: Acquired flat feet ("fallen arches") is a condition characterized by the inferomedial displacement of the head of the talus. This condition is most likely to be secondary to dysfunction of the **tibialis posterior muscle**.



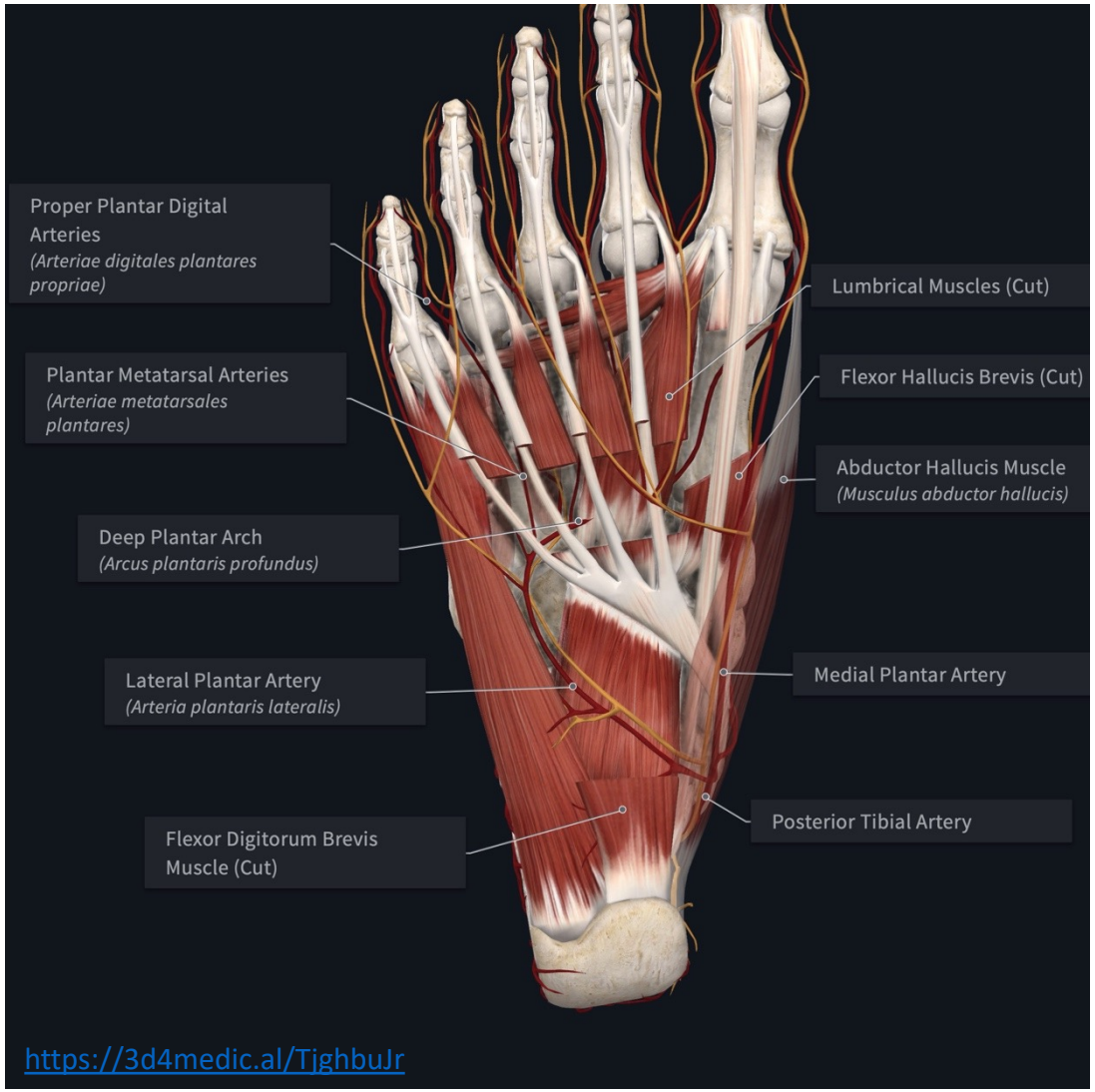




Blood Supply of the Plantar Foot

The **posterior tibial artery** enters the foot inferior the the medial malleolus through the **tarsal tunnel**. After passing through the tunnel it bifurcates into two vessels.

- The **medial plantar artery** courses through the foot along the medial edge of the abductor hallucis
- The **lateral plantar artery** courses between the quadratus plantae and flexor digitorum brevis muscles.
    - Distally in the foot, the vessel curves medially to form the deep plantar arch.
    - The arch supplies blood to the metatarsals and phalanges via plantar metatarsal arteries and plantar digital arteries.
    - The termination point of the arch is where it joins with the deep plantar artery, which is a terminal branch of the **dorsalis pedis artery**.



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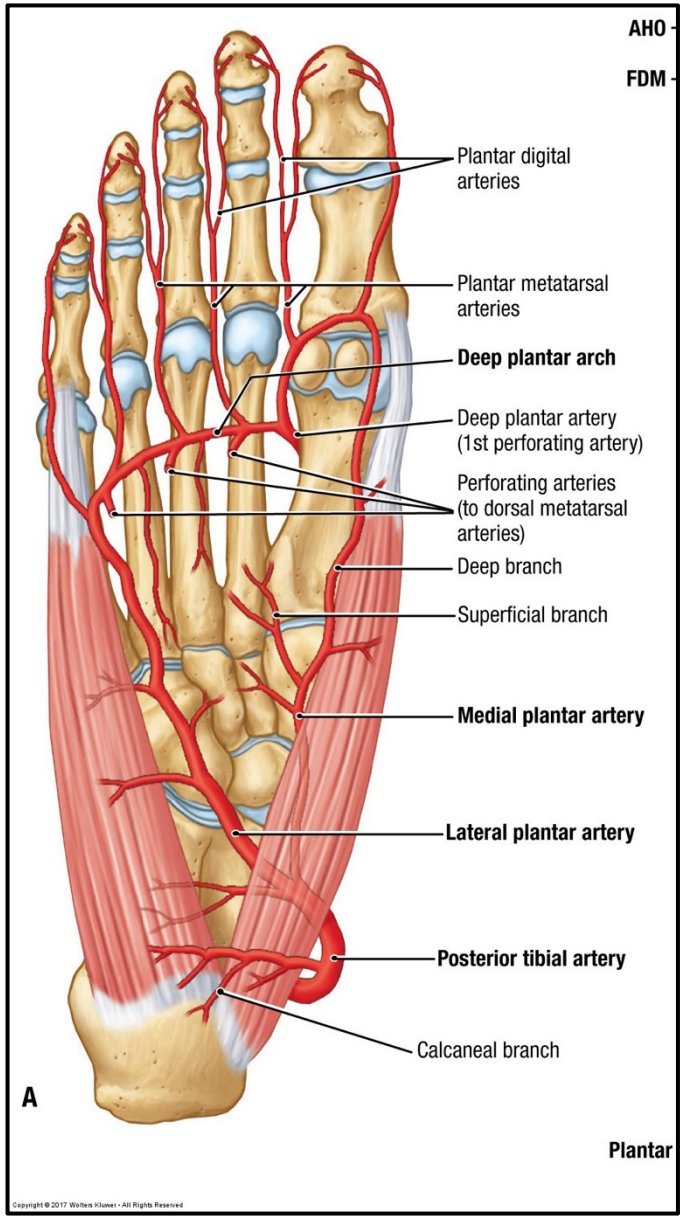

Innervation of the Plantar Foot

The **tibial nerve** enters the foot inferior the the medial malleolus through the **tarsal tunnel**. It forms several branches.

- The **medial calcaneal nerve** branches from the tibial nerve within the tunnel. It provides sensory innervation to the posterior and plantar heel.
- The tibial nerve forms two terminal branches.
  - **Medial plantar nerve**
    - Motor to intrinsic foot muscles
    - Sensory to medial region of plantar aspect of foot (figure below).
  - **Lateral plantar nerve**
    - Motor to intrinsic foot muscles
    - Sensory to lateral region of plantar aspect of foot (figure below).

CLINICAL ANATOMY: Function of the lateral and medial plantar nerves is often compromised in diabetic patients. The loss of sensation to the feet along with poor blood flow, render these patients susceptible to the development of foot ulcers. If foot ulcers are undetected and untreated, this can lead to infection and possibly the need for amputation. Most amputations are preventable with regular care and proper footwear.

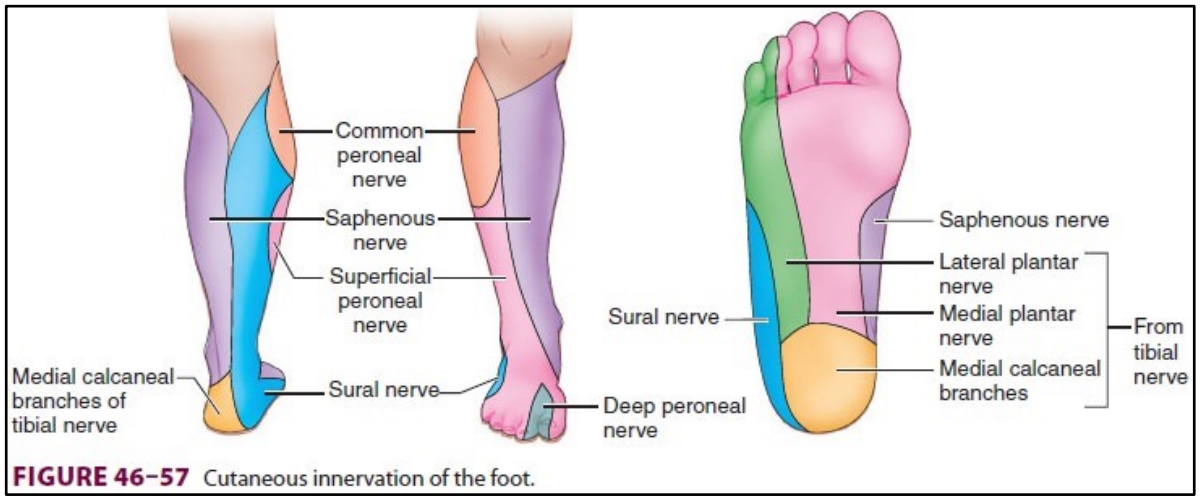

FIGURE 46–57 Cutaneous innervation of the foot.