The foot 2

The Dorsum of the Foot

Skin

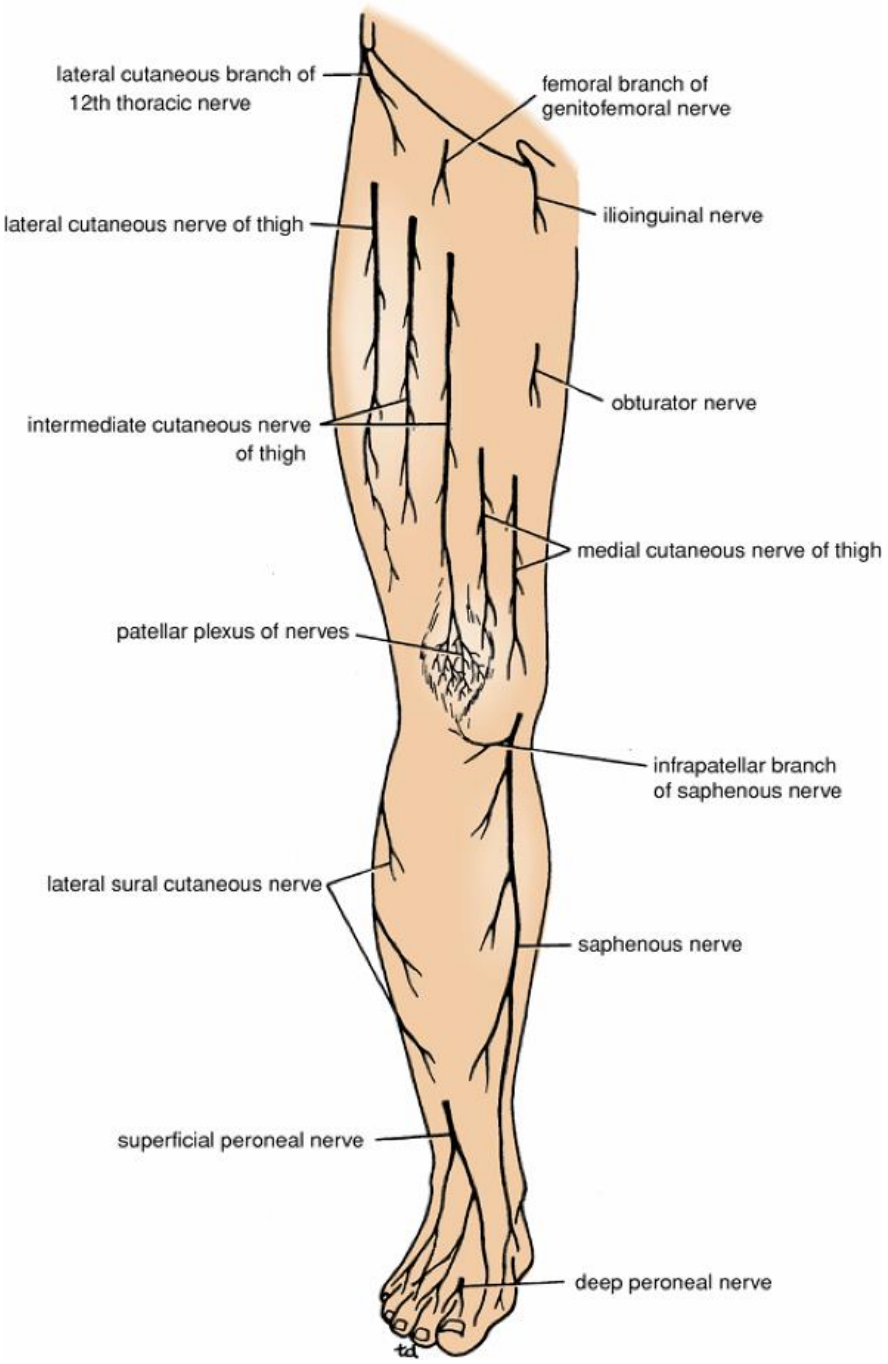
- The skin on the dorsum of the foot is thin, hairy, and freely mobile on the underlying tendons and bones.

- The sensory nerve supply to the skin on the dorsum of the foot is derived from **the superficial peroneal nerve, assisted by the deep peroneal, saphenous, and sural nerves.**

1- The superficial peroneal nerve

- emerges from between the peroneus brevis and the extensor digitorum longus muscle in the lower part of the leg

- It divides into medial and lateral cutaneous branches that supply the skin on the dorsum of the foot



The Dorsum of the Foot…….cont

2- The deep peroneal nerve supplies the skin of the adjacent sides of the big and second toes

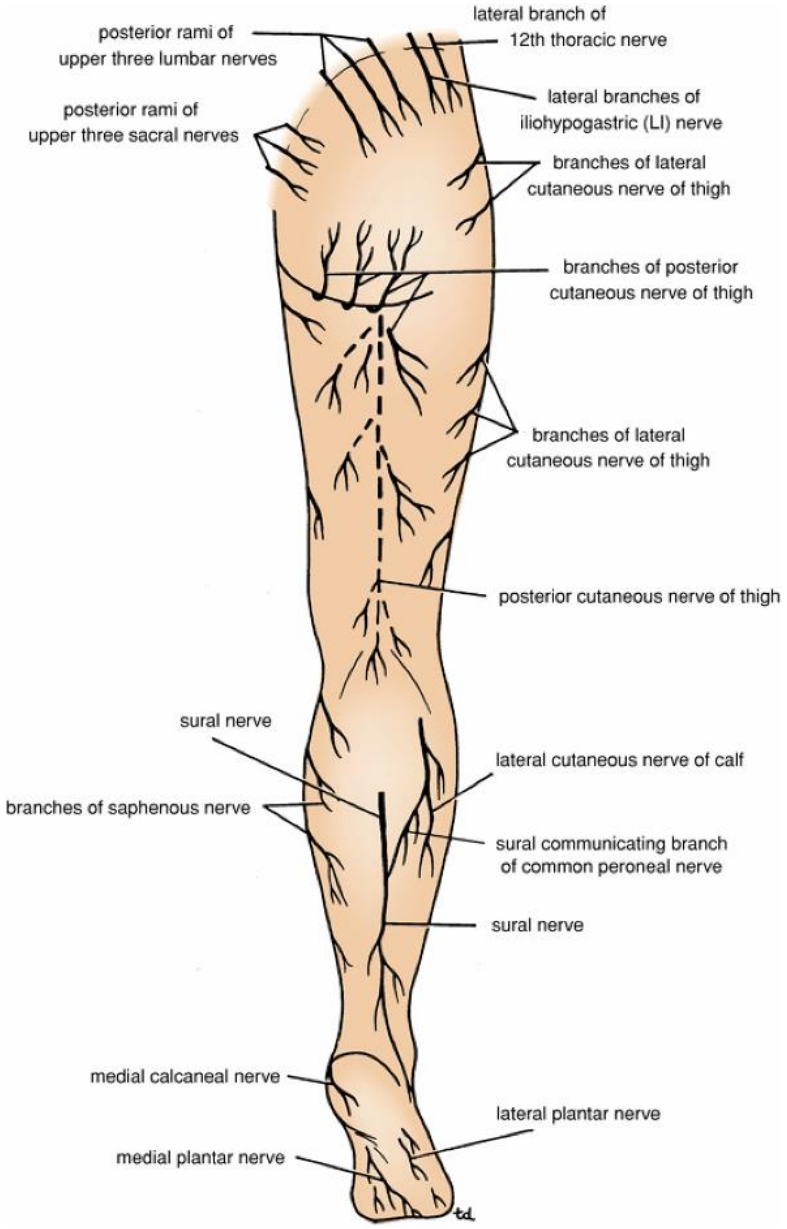
3- The saphenous nerve

- passes onto the dorsum of the foot in front of the medial malleolus

- It supplies the skin along the medial side of the foot as far forward as the head of the first metatarsal

4- The sural nerve enters the foot behind the lateral malleolus and supplies the skin along the lateral margin of the foot and the lateral side of the little toe.

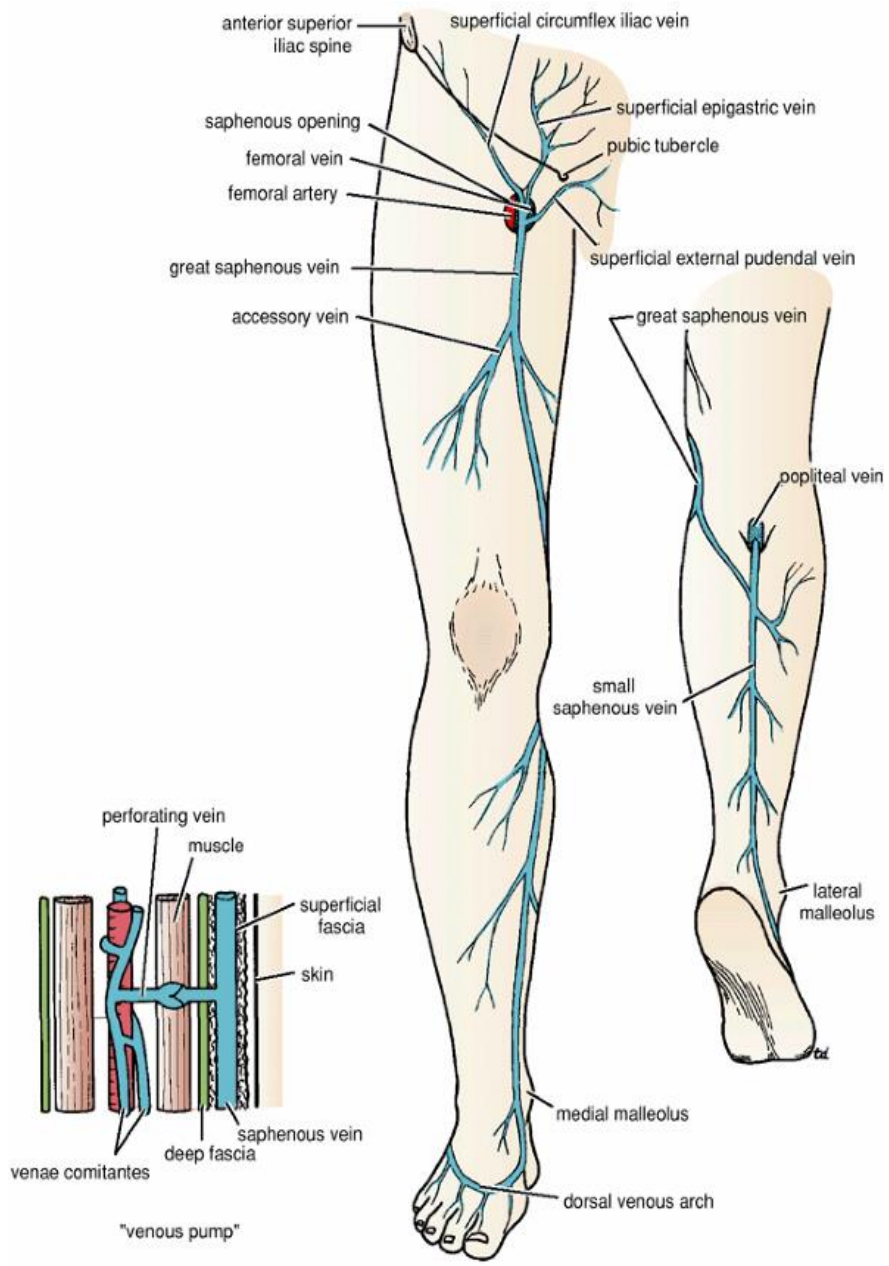
5- The nail beds and the skin covering the dorsal surfaces of the terminal phalanges are supplied by the medial and lateral plantar nerves



- **Dorsal Venous Arch (or Network)**

- The dorsal venous arch lies in the subcutaneous tissue over the heads of the metatarsal bones and drains on the medial side into **the great saphenous vein and on the lateral side into the small saphenous vein**

- **The great saphenous vein** leaves the dorsum of the foot by ascending into the leg in front of the medial malleolus. Its further course is described on



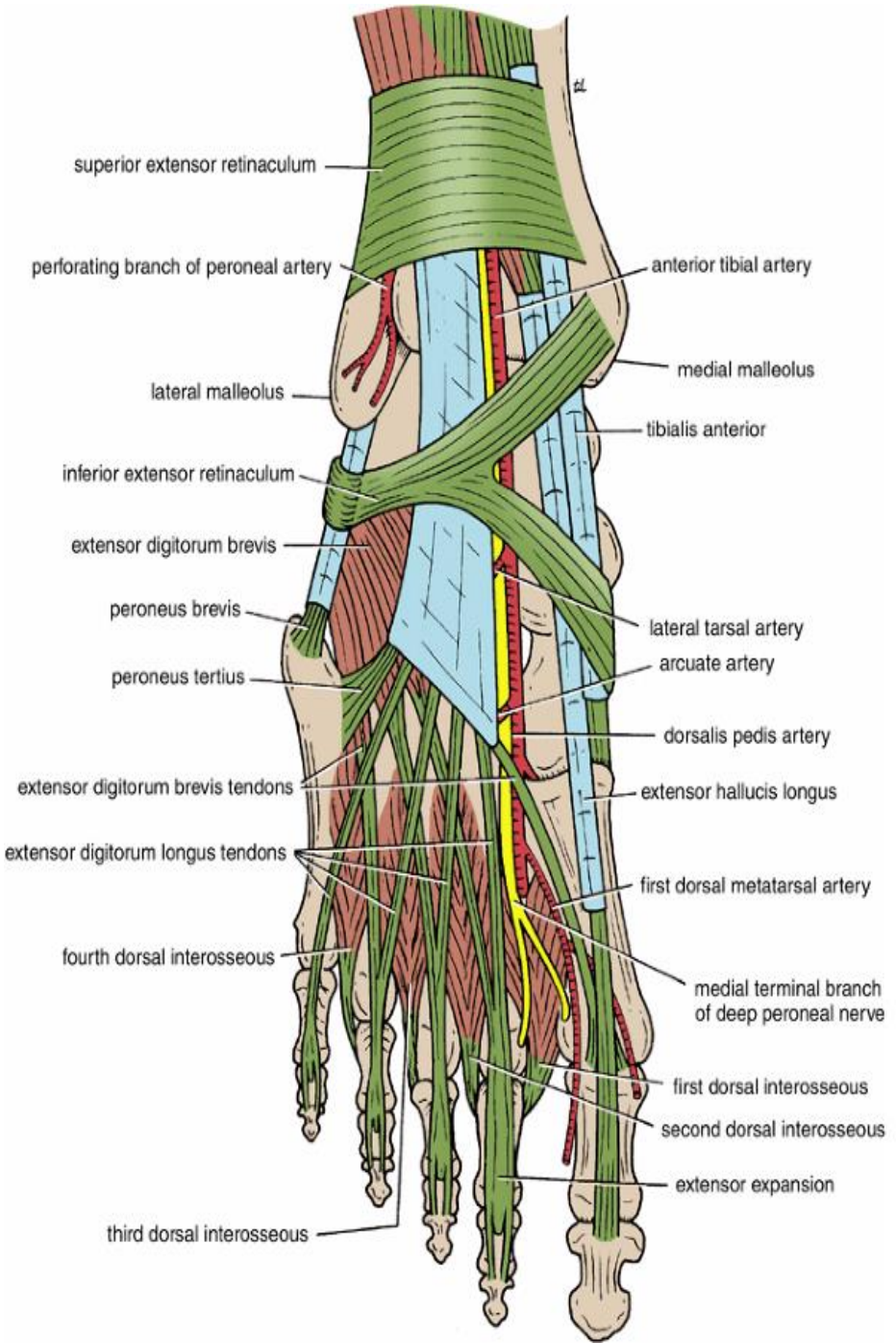
Dorsal Venous Arch…….cont

- **The small saphenous vein** ascends into the leg behind the lateral malleolus. Its course in the back of the leg as it described before

- The greater part of the blood from the whole foot drains into the arch via **digital veins** and **communicating veins** from the sole, which pass through the interosseous spaces.

Muscles of the Dorsum of the Foot

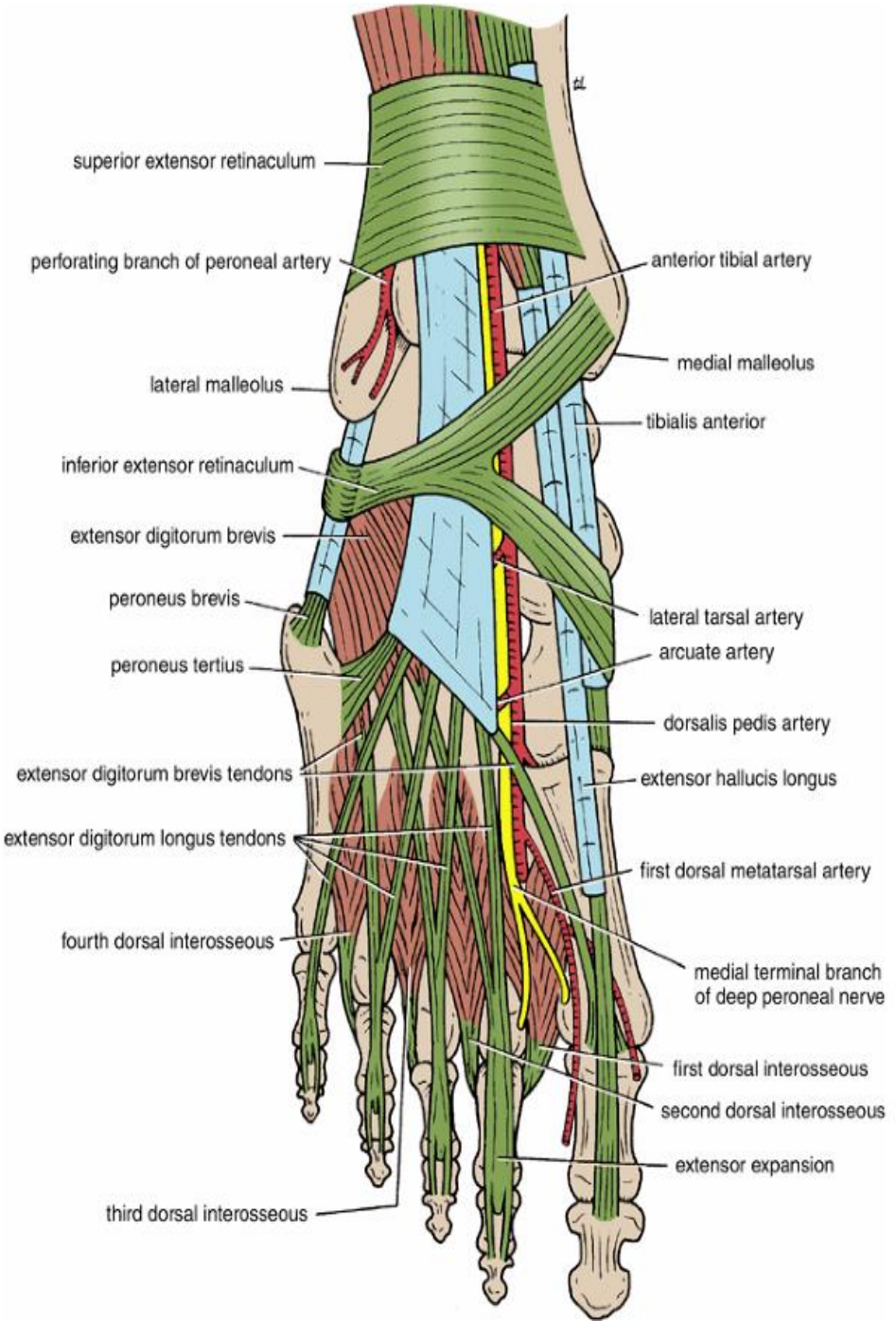
- The tendon of extensor digitorum longus passes beneath the superior extensor retinaculum and through the inferior extensor retinaculum, in company with the peroneus tertius muscle
- The tendon divides into four, which fan out over the dorsum of the foot and pass to the lateral four toes.
- Opposite the metatarsophalangeal joints of the second, third, and fourth toes, each tendon is joined on its lateral side by a tendon of extensor digitorum brevis



- On the dorsal surface of each toe, the extensor tendon joins the fascial expansion called the extensor expansion.

- Near the proximal interphalangeal joint, the extensor expansion splits into **three parts: a central part, which is inserted into the base of the middle phalanx, and two lateral parts, which converge to be inserted into the base of the distal phalanx**

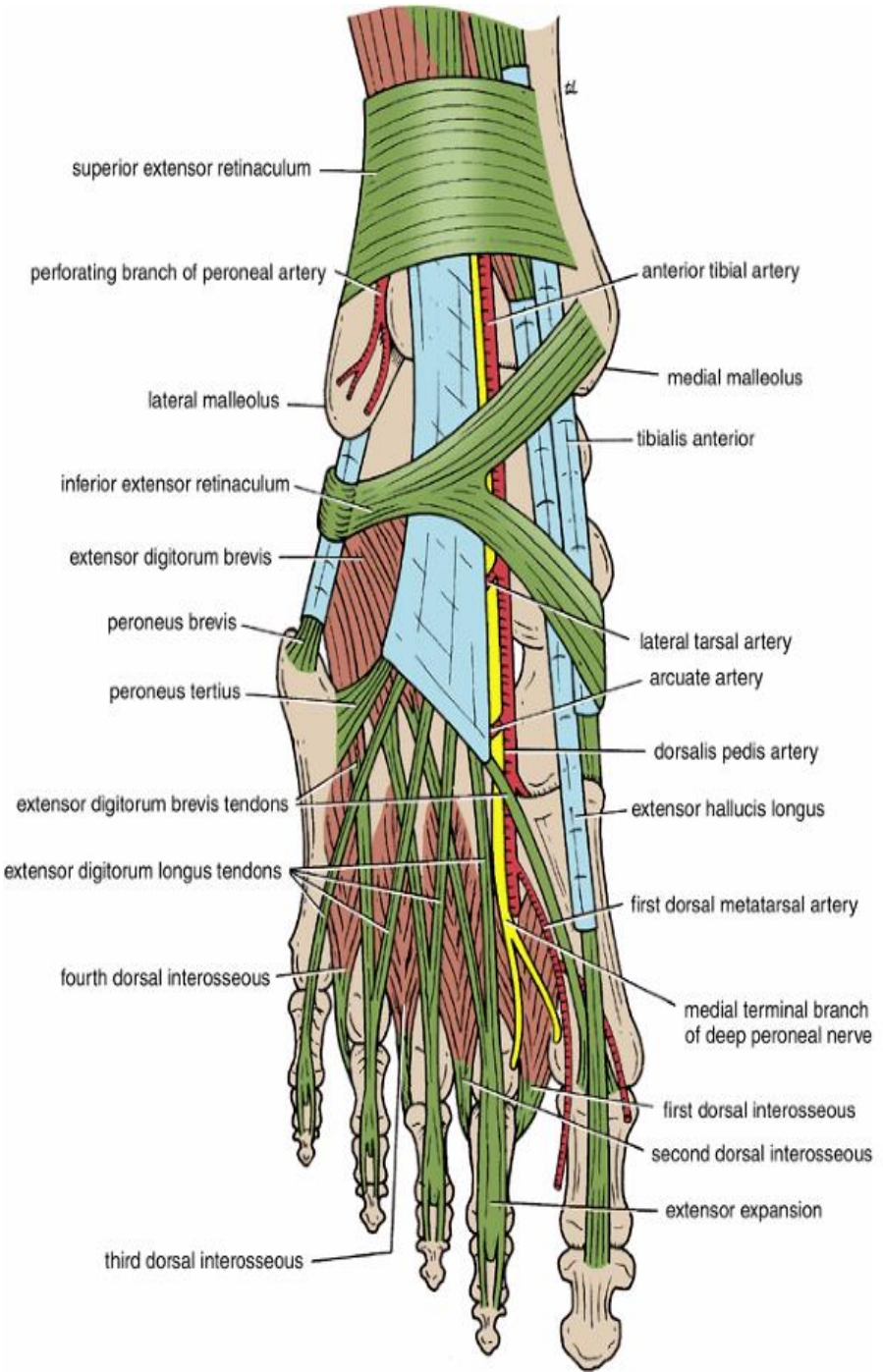
- **The dorsal expansion**, as in the fingers, receives the tendons of insertion of the interosseous and lumbrical muscles.



Synovial Sheath of the Tendon of Extensor Digitorum Longus

- The extensor digitorum longus and peroneus tertius tendons are surrounded by a common synovial sheath as they pass beneath the extensor retinacula

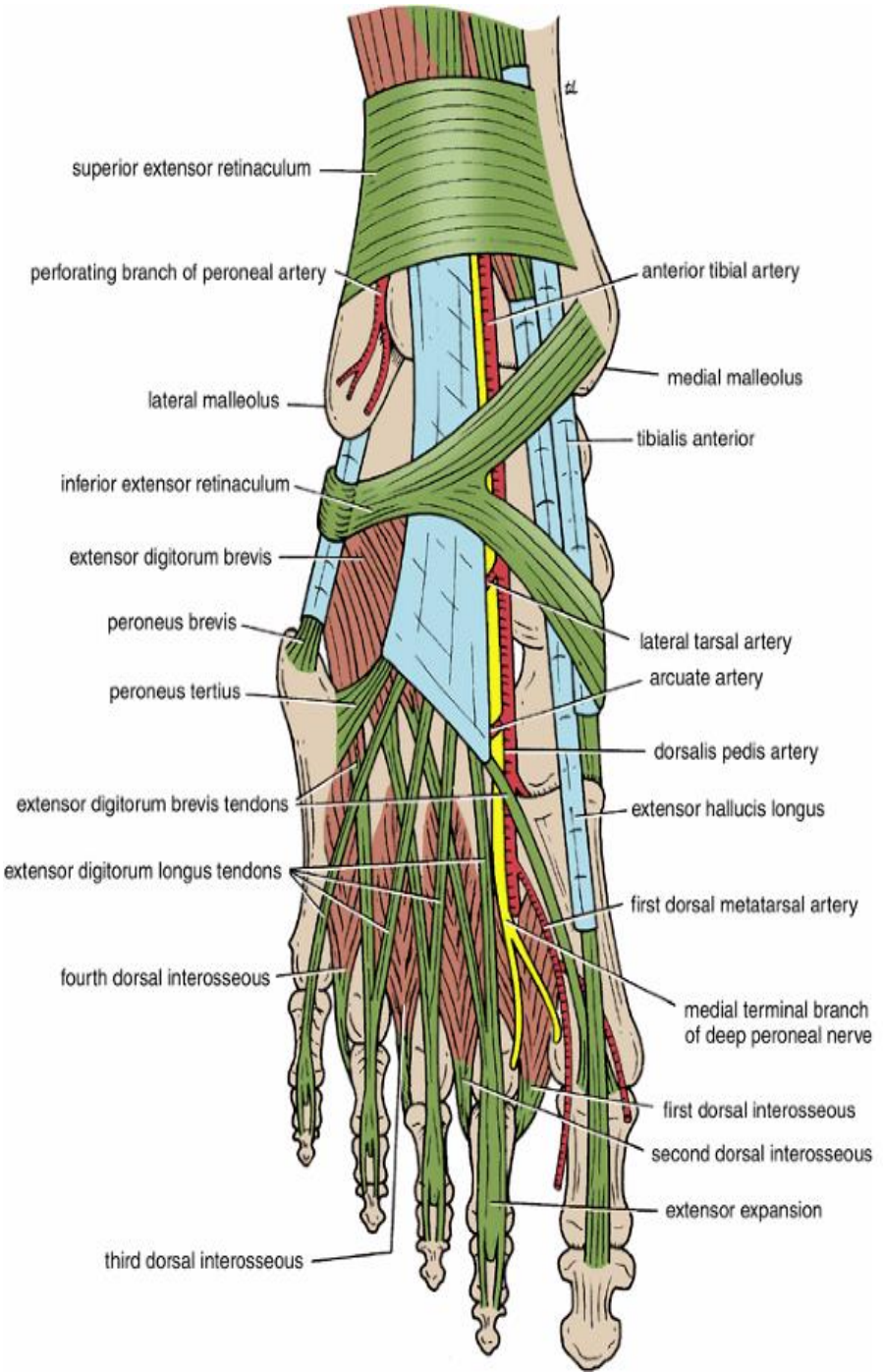
- The sheath extends proximally for a short distance above the malleoli and distally to the level of the base of the fifth metatarsal bone.



Artery of the Dorsum of the Foot

Dorsalis Pedis Artery (the Dorsal Artery of the Foot)

- The dorsalis pedis artery begins in front of the ankle joint as a continuation of the anterior tibial artery
- It terminates by passing downward into the sole between the two heads of the first dorsal interosseous muscle, where it joins the lateral plantar artery and completes the plantar arch
- It is superficial in position and is crossed by the inferior extensor retinaculum and the first tendon of extensor digitorum brevis



Dorsalis pedis artery……cont

- On its lateral side lie the terminal part of the deep peroneal nerve and the extensor digitorum longus tendons.
- On the medial side lies the tendon of extensor hallucis longus
- Its pulsations can easily be felt.

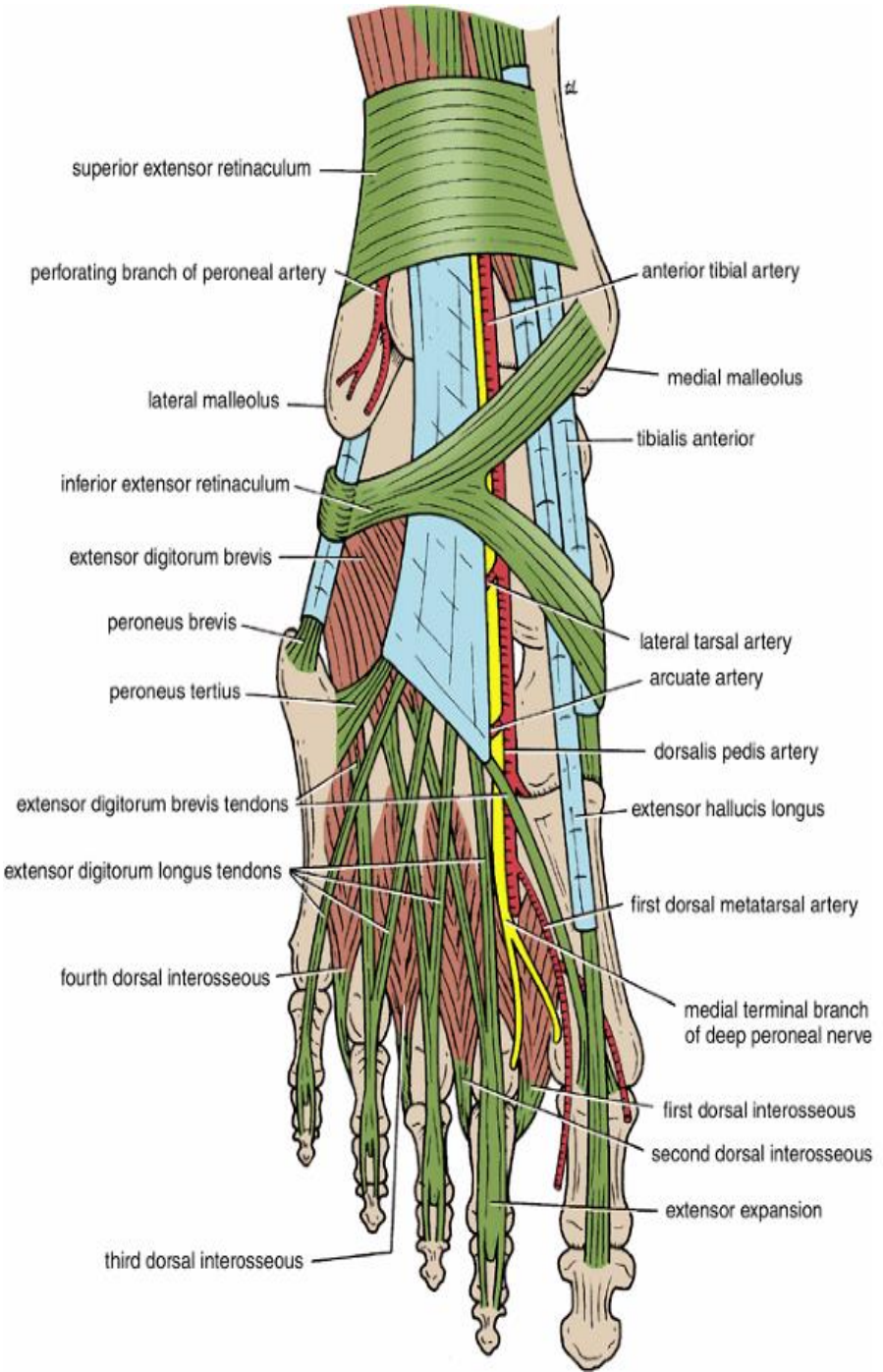
Branches of dorsalis pedis artery:

- **Lateral tarsal artery**, which crosses the dorsum of the foot just below the ankle joint

- **Arcuate artery,** which runs laterally under the extensor tendons opposite the bases of the metatarsal bones

- It gives off **metatarsal branches to the toes.**

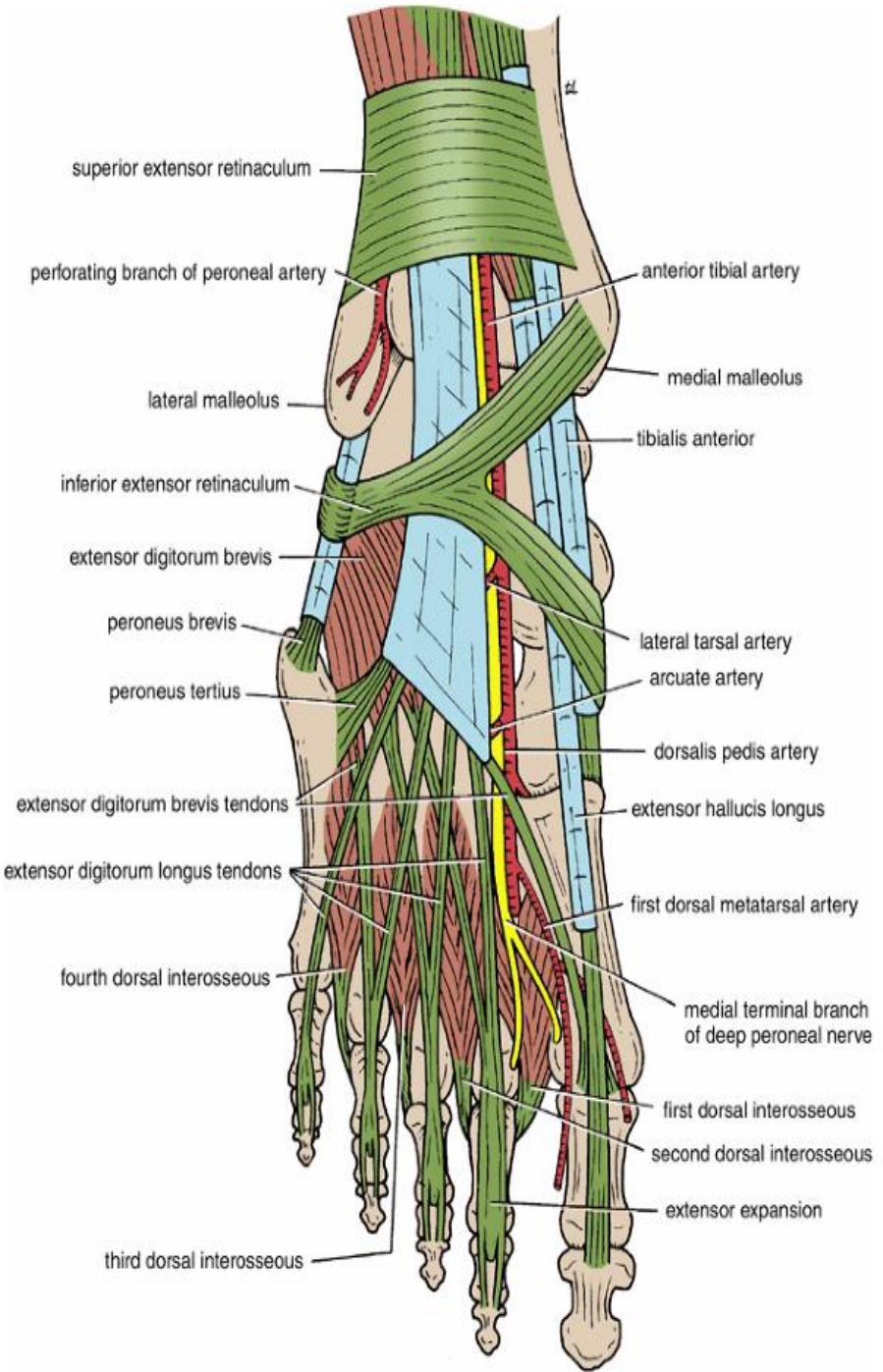
- **First dorsal metatarsal artery**, which supplies both sides of the big toe



Nerve Supply of the Dorsum of the Foot

Deep Peroneal Nerve:

- The deep peroneal nerve enters the dorsum of the foot by passing deep to the extensor retinacula on the lateral side of the dorsalis pedis artery
- It divides into terminal, medial, and lateral branches.
- The medial branch supplies the skin of the adjacent sides of the big and second toes
- The lateral branch supplies the extensor digitorum brevis muscle.
- Both terminal branches give articular branches to the joints of the foot.



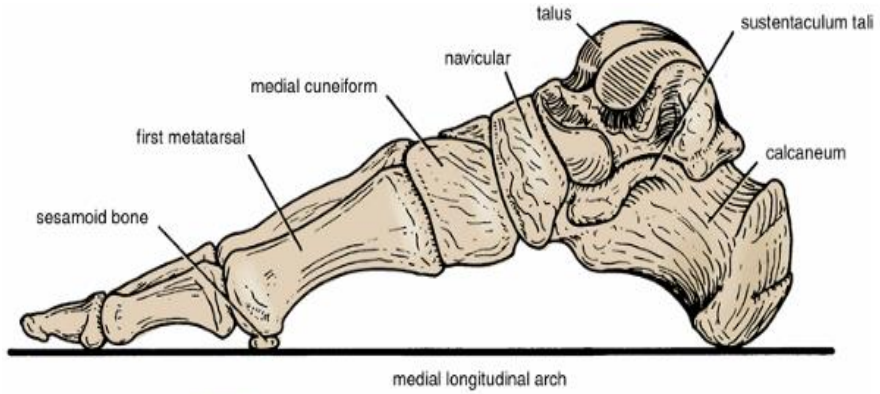
The Arches of the Foot

- **The Arches of the Foot**
- A segmented structure can hold up weight only if it is built in the form of an arch. The foot has three such arches, which are present at birth:

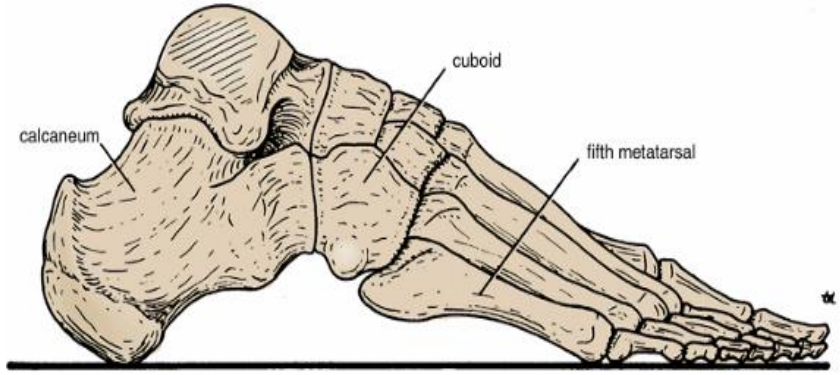
- **the medial longitudinal**
- **lateral longitudinal**
- **transverse arches**

- In the young child, the foot appears to be flat because of the presence of a large amount of subcutaneous fat on the sole of the foot.

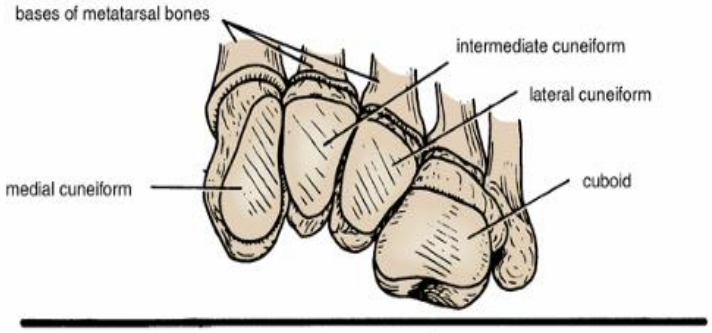
- On examination of the imprint of a wet foot on the floor made with the person in the standing position, one can see that the heel, the lateral margin of the foot, the pad under the metatarsal heads, and the pads of the distal phalanges are in contact with the ground



medial longitudinal arch



lateral longitudinal arch

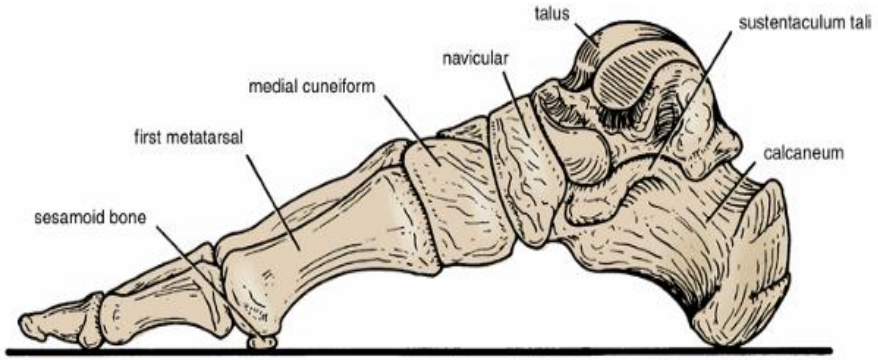


transverse arch

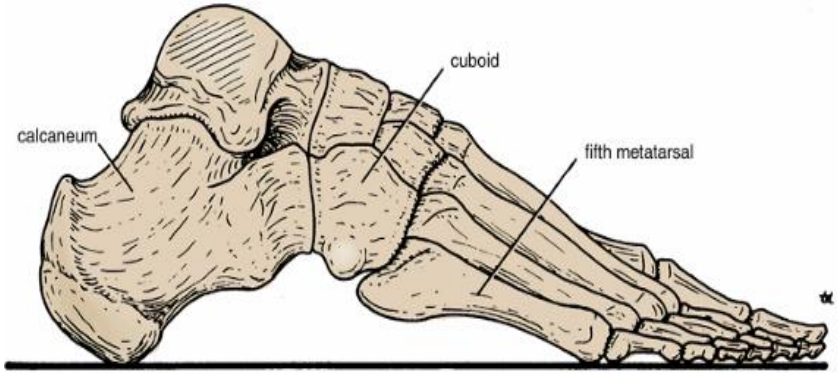
- The medial margin of the foot, from the heel to the first metatarsal head, is arched above the ground because of the important medial longitudinal arch.

- The pressure exerted on the ground by the lateral margin of the foot is greatest at the heel and the fifth metatarsal head and least between these areas because of the presence of the low-lying lateral longitudinal arch.

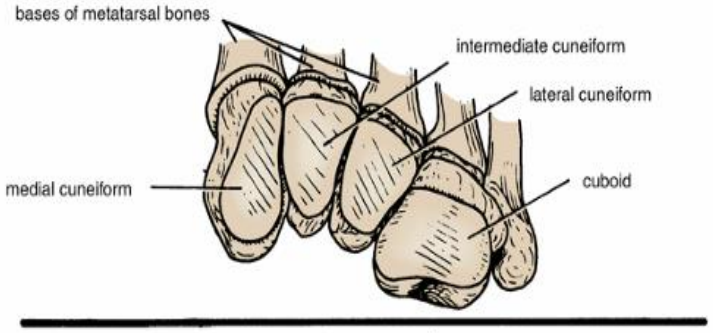
- The transverse arch involves the bases of the five metatarsals and the cuboid and cuneiform bones. This is, in fact, only half an arch, with its base on the lateral border of the foot and its summit on the foot's medial border. The foot has been likened to a half-dome, so that when the medial borders of the two feet are placed together, a complete dome is formed.



medial longitudinal arch



lateral longitudinal arch



transverse arch

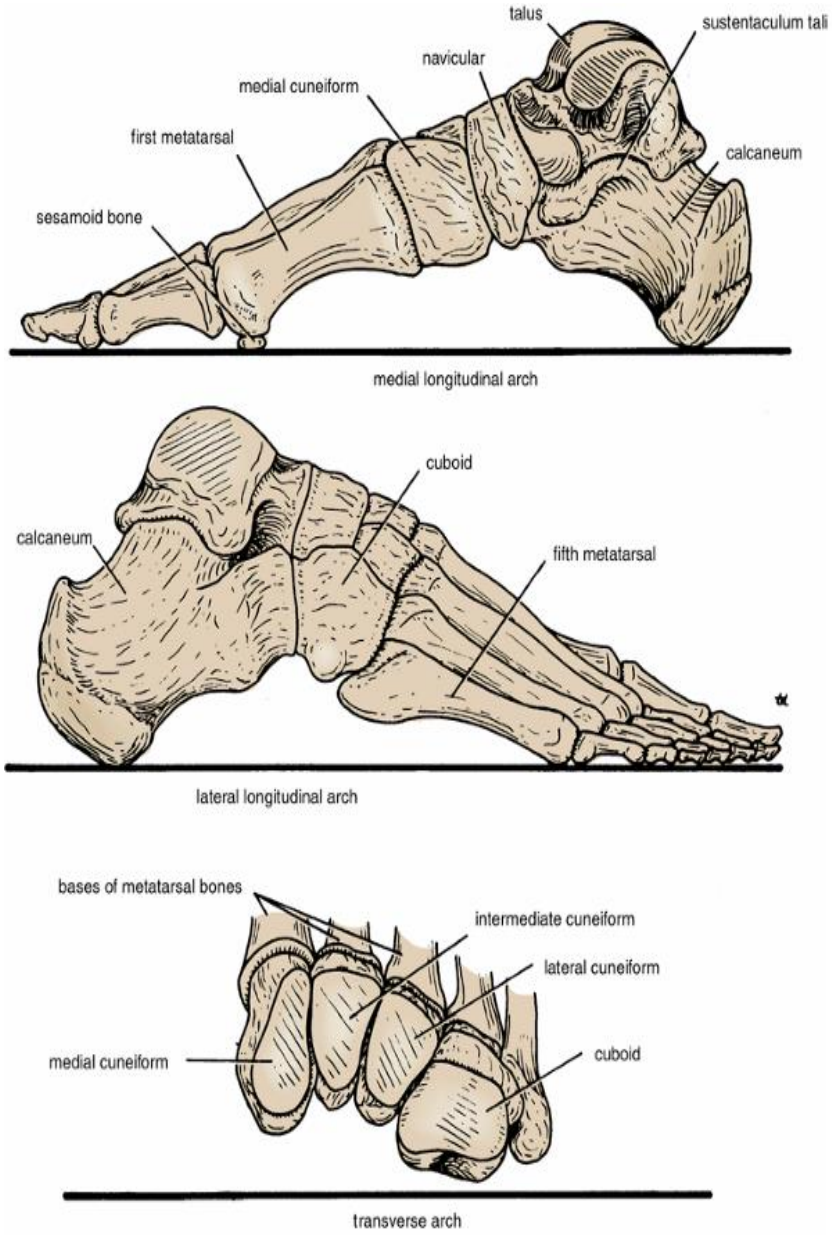
Function of the arch of the foot

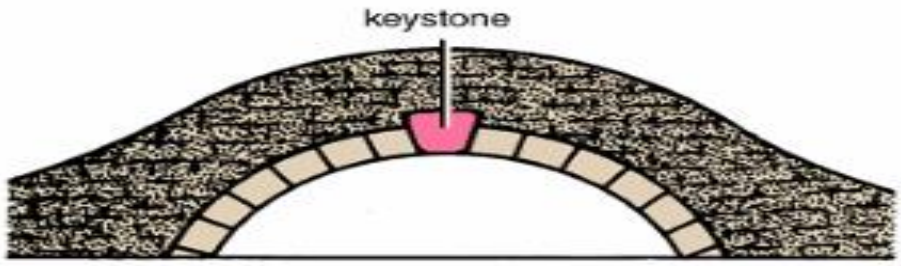
- Distribution of the body weight on standing through a foot via the heel behind and six points of contact with the ground in front, namely, the two sesamoid bones under the head of the first metatarsal and the heads of the remaining four metatarsals.
- Supporting body weight
- Process of walking (lever) & running

- **<u>The Bones of the Arches</u>**
- An examination of an articulated foot or a lateral radiograph of the foot shows the bones that form the arches.

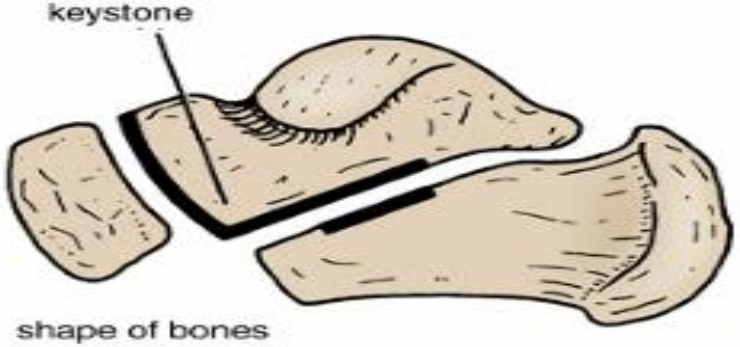
Maintenance (support)of the arches

- 1- shape of bones(wedege & keystone (center))
- Strong ligament→ tie the bone together
- Tone of the muscles → tie the pillers

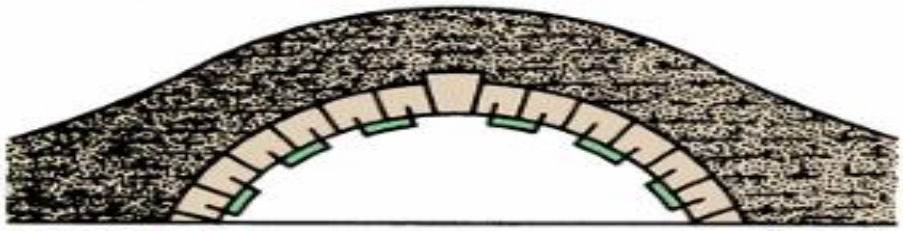




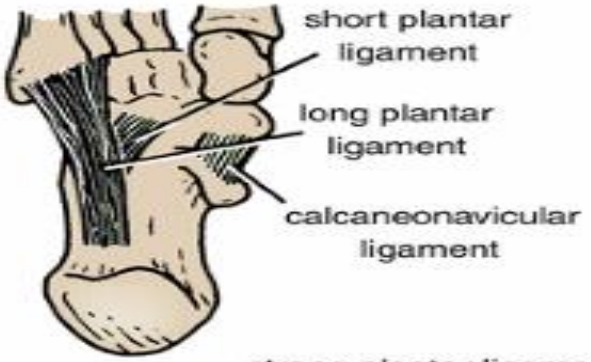
shape of stones



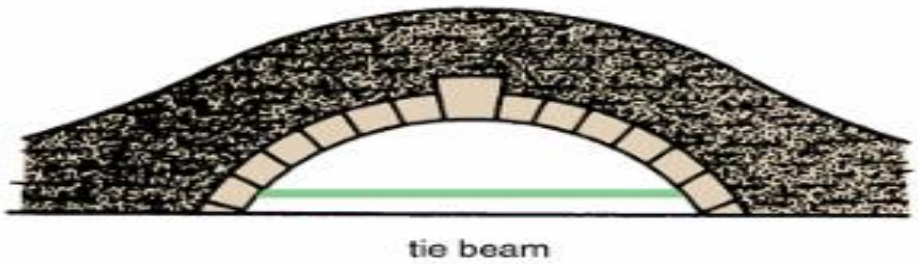
shape of bones



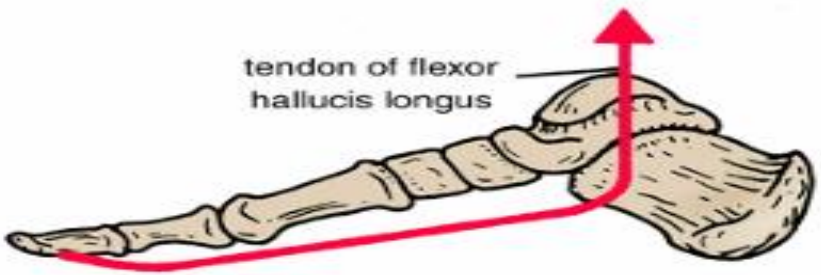
staples

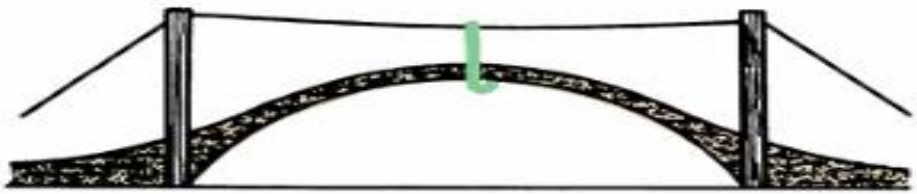


strong plantar ligaments

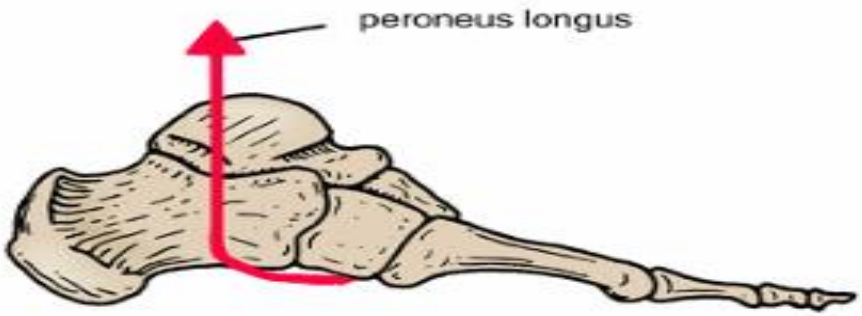


tie beam





suspension bridge



Medial longitudinal arch: This consists of :

- Key the → talus
- post.piller → the calcaneum
- Ant.piller → the navicular bone, the three cuneiform bones, and the first three metatarsal bones

Maintenance of the Medial Longitudinal Arch:

- Planter ligament, short muscle of the big toe(abd.H, flex.H.brevis,flex.H.longus,med.flex.digitorum),tibialis. Ant and post & planter. Apon & delotid lig

Lateral longitudinal arch:

- **Key stone**: lat.edge of talus & cuboid
- **Post. Piller** →calcaneum
- **Ant.piller** →the cuboid, and the fourth and fifth metatarsal bones

Maintenance of the Lateral Longitudinal Arch

- Tying the ends of the arch together are the plantar aponeurosis, the abductor digiti minimi, and the lateral part of the flexor digitorum longus and brevis.
- **Suspending the arch from above are the peroneus longus and the brevis**

Transverse arch:

- This consists of the bases of the metatarsal bones and the cuboid and the three cuneiform bones

Maintenance of the Transverse Arch

- The inferior edges of the bones are tied together by the deep transverse ligaments, the strong plantar ligaments, and the origins of the plantar muscles from the forepart of the foot; the dorsal interossei and the transverse head of the adductor hallucis are particularly important in this respect.
- Tying the ends of the arch together is **the peroneus longus tendon.**
- Suspending the arch from above are the peroneus longus tendon and the peroneus brevis.