

Systemic Module

MSS

“Anatomy”

Muscles of Foot

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Introduction

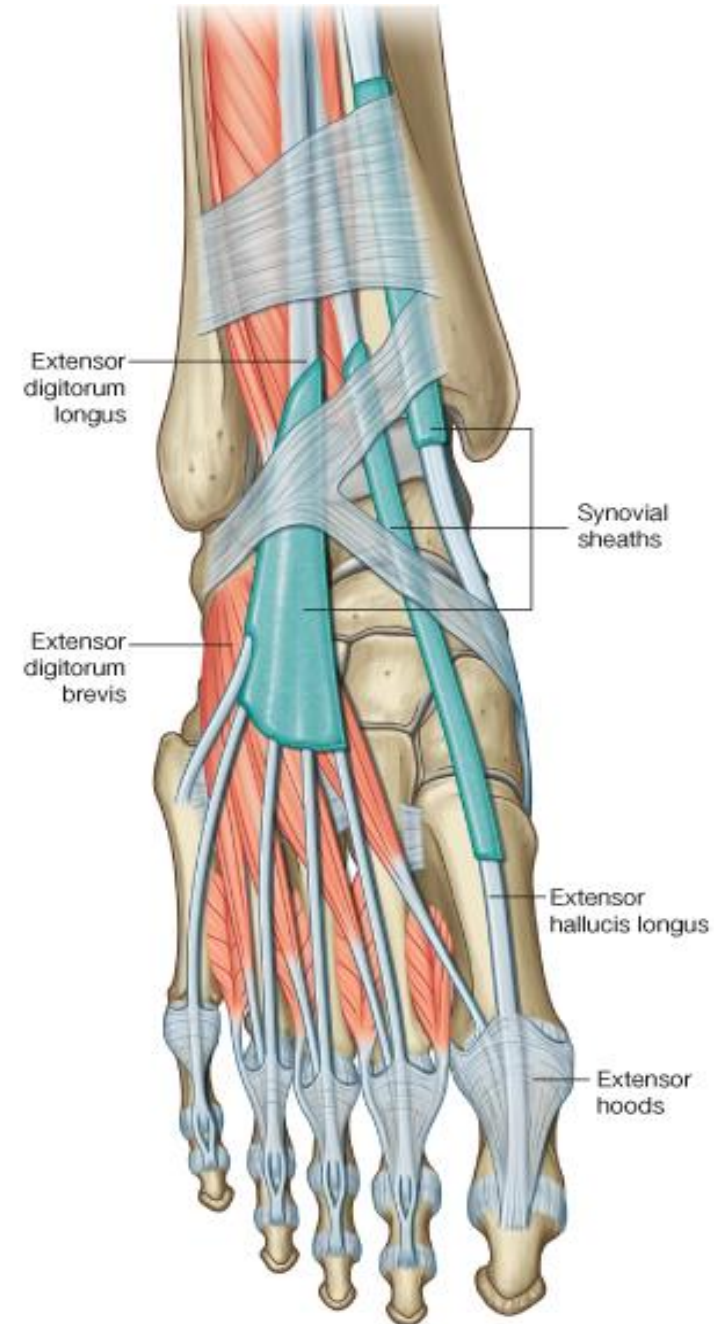
- The muscles acting on the foot can be divided into two groups:
 1. **The extrinsic muscles** arise from the anterior, posterior and lateral compartments of the leg. They are mainly responsible for actions such as eversion, inversion, plantarflexion and dorsiflexion of the foot.
 2. **The intrinsic muscles** are located within the foot and are responsible for the more fine motor actions of the foot, for example movement of individual digits.

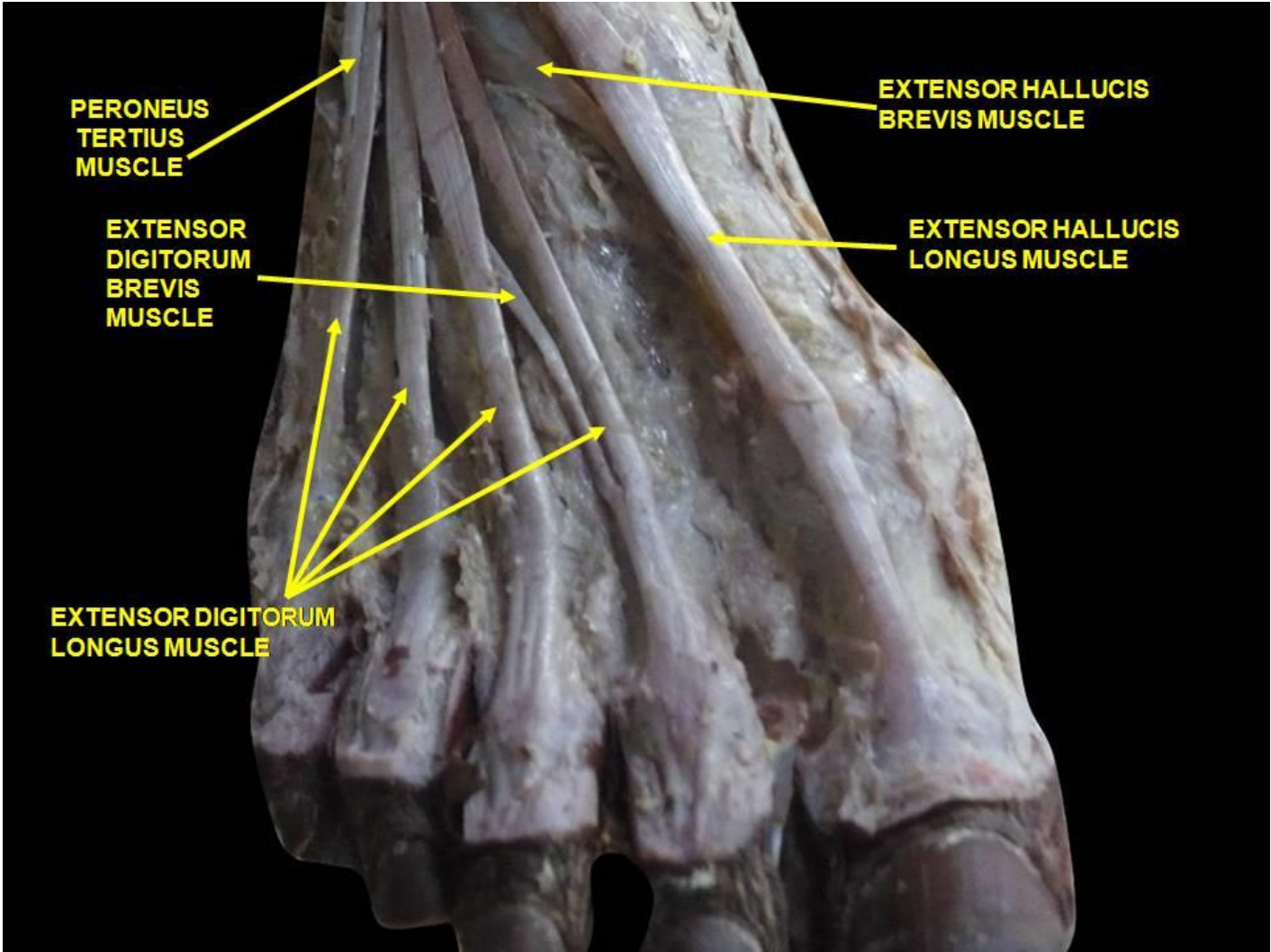
Intrinsic Muscles of Foot

- The Intrinsic muscles of the foot are:
 - One on the dorsal aspect of the foot -- **Extensor Digitorum Brevis**
 - All other are in the sole of foot -- Organized into **four layers**.
- All intrinsic muscles of the foot are innervated by **the medial and lateral plantar branches of the tibial nerve**, *except for the extensor digitorum brevis, which is innervated by the deep peroneal nerve.*

Extensor Digitorum Brevis

- **Origin:** The superolateral surface of the calcaneus
- **Insertion:** Four tendons for **medial four digits**. The tendon entering the great toe attaches to the base of the proximal phalanx while the tendons to the other three toes join the lateral sides of the tendons of extensor digitorum longus.
- **Action:** Extends the metatarsophalangeal joint
- **Nerve supply:** Deep peroneal nerve.





Sole of Foot

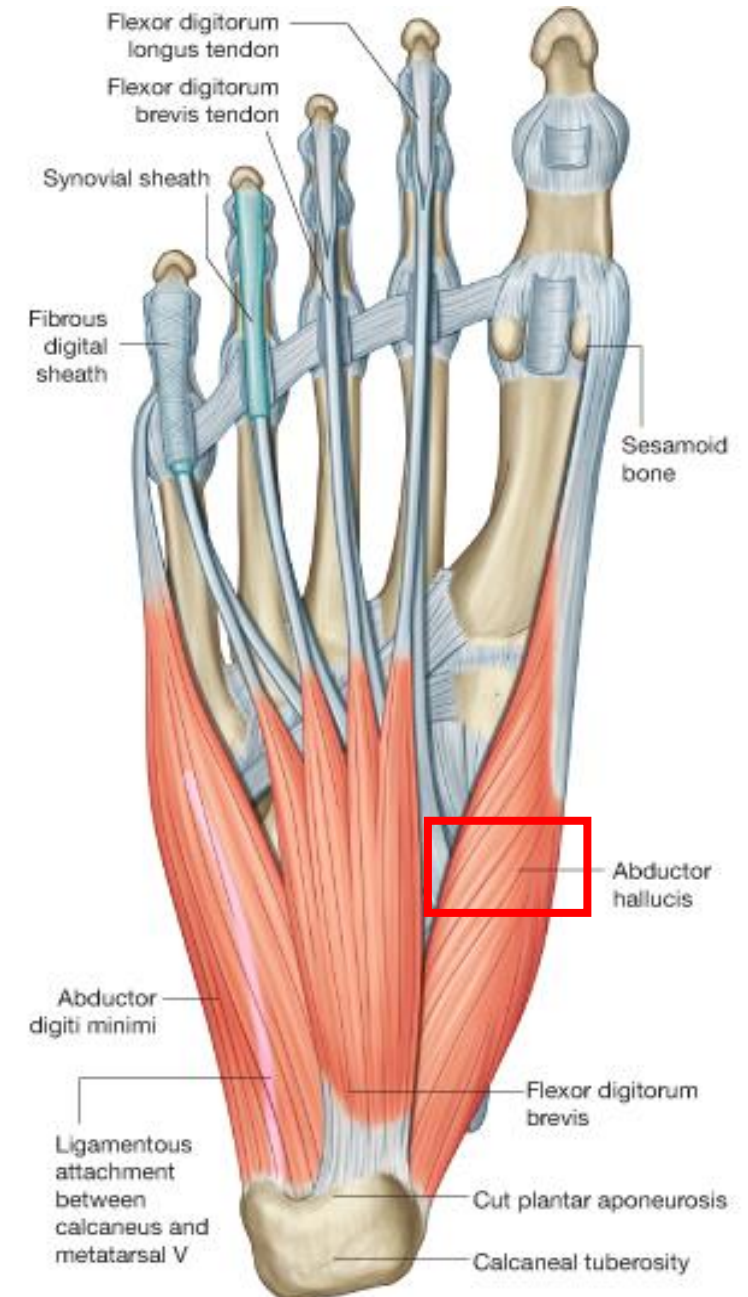
- The muscles in the sole of the foot are organized into four layers. From superficial to deep, these layers are the:
 1. **First layer** (3 Short muscles).
 2. **Second layer** (2 Long tendons and 2 short muscles).
 3. **Third layer** (3 Short muscles).
 4. **Fourth layer** (2 Long tendons and 2 groups of short muscles)

First Layer

- The most superficial and is **immediately deep to the plantar aponeurosis**.
- From medial to lateral, this layer consists of:
 1. **Abductor hallucis**
 2. **Flexor digitorum brevis**
 3. **Abductor digiti minimi**

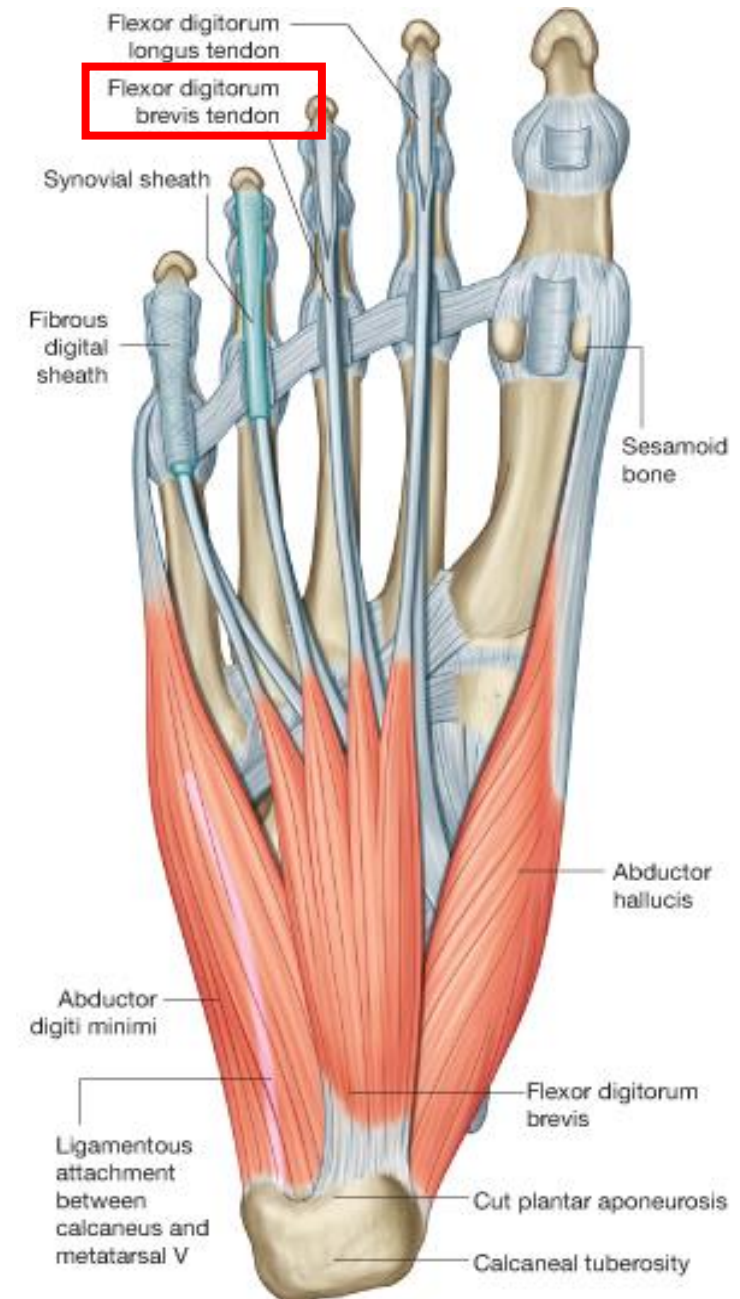
Abductor hallucis

- Forms the medial margin of the foot and contributes to a soft tissue bulge on the medial side of the sole.
- **Origin:** Medial tuberosity of calcaneum
- **Insertion:** The base of proximal phalanx of big toe.
- **Action:** Abducts great toe; Supports the medial longitudinal arch.
- **Nerve supply:** Medial plantar nerve



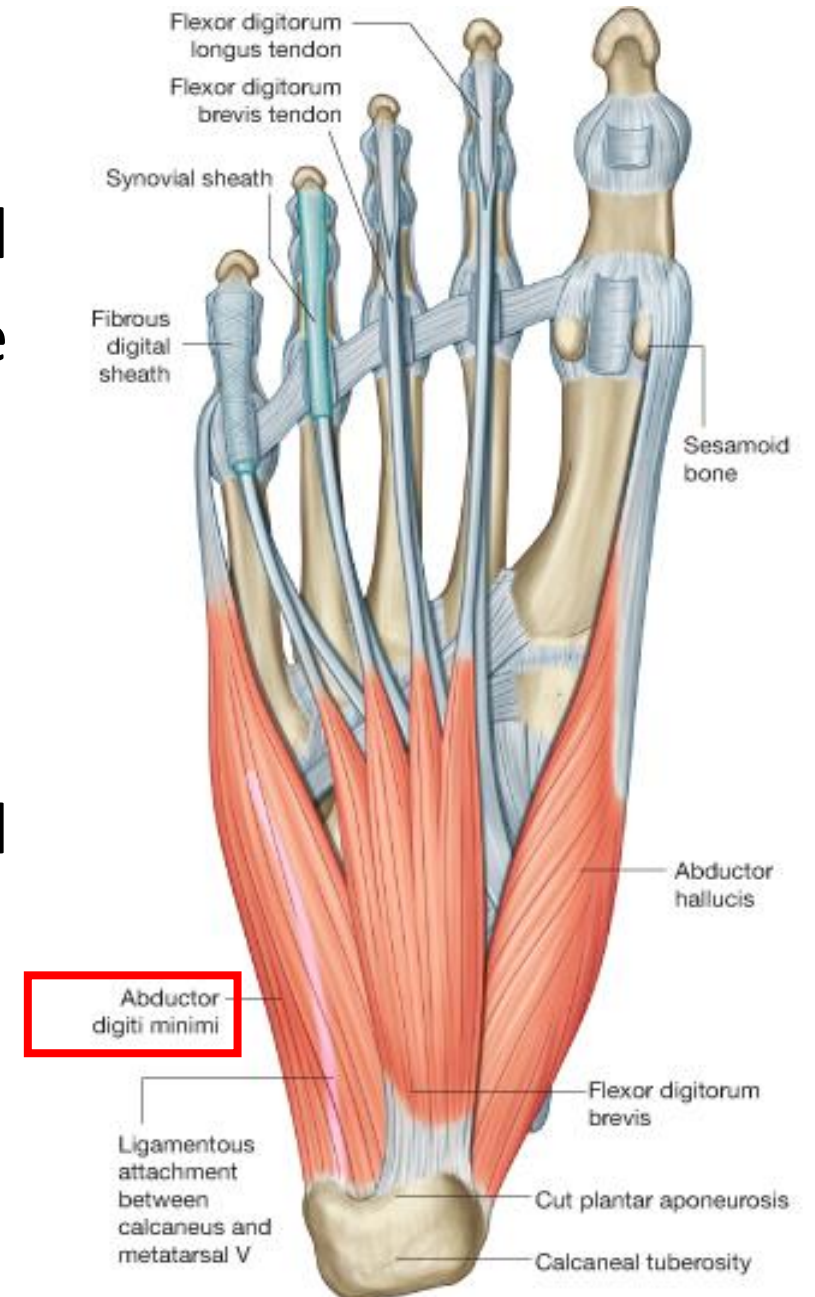
Flexor Digitorum Brevis

- The flexor digitorum muscle lies between the plantar aponeurosis and the tendons of the flexor digitorum longus in the sole of the foot.
- **Origin:** Medial tuberosity of calcaneum
- **Insertion:** Four tendons into the border of middle phalanx of the lateral four toes - *tendons are perforated by those of flexor digitorum longus.*
- **Action:** Flexes lateral four toes; supports the medial and lateral longitudinal arches.
- **Nerve supply:** Medial plantar nerve



Abductor Digiti Minimi

- The abductor digiti minimi muscle is on the lateral side of the foot and contributes to a soft tissue bulge on the lateral side of the sole.
- **Origin:** Medial and lateral tuberosity of calcaneum
- **Insertion:** Base of proximal phalanx of the 5th toe.
- **Action:** Abducts little toe; supports the lateral longitudinal arch.
- **Nerve supply:** Lateral plantar nerve.

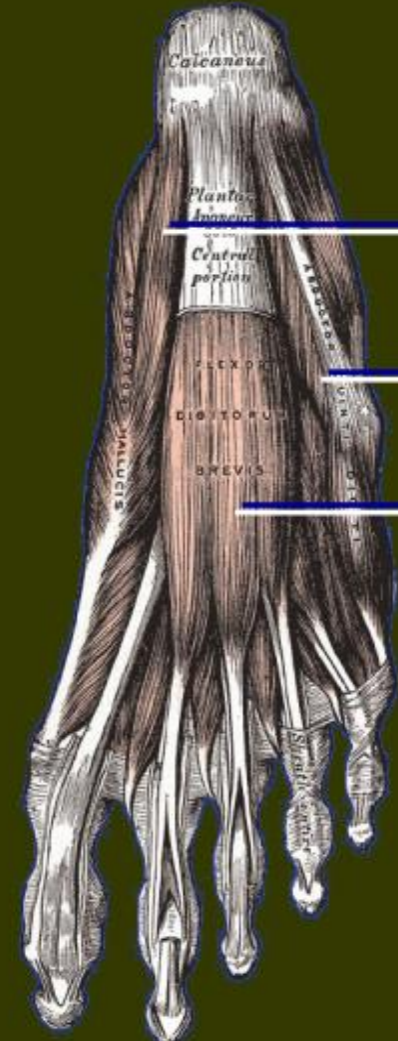


Sole of foot
4 layers



FIRST LAYER

3 Muscles



Abd. hallucis

Abd. Dig. Minimi

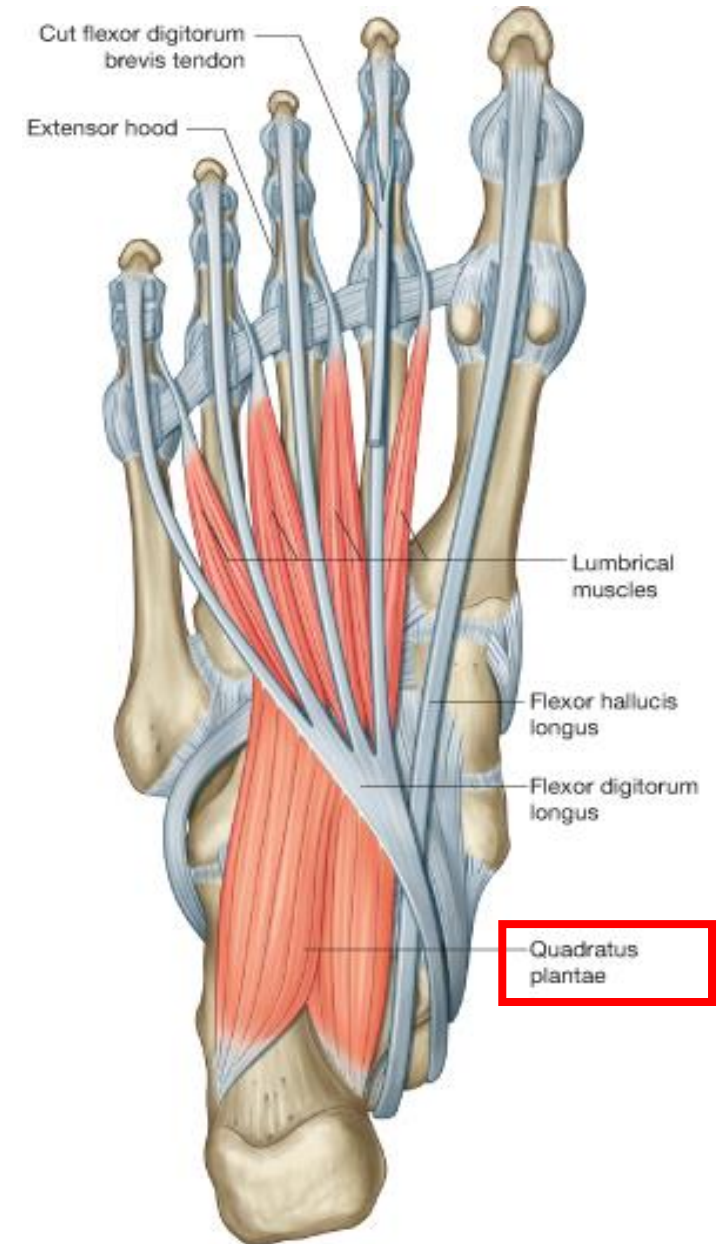
Flex.Dig.Brevis

Second Layer

- Associated with the tendons of **flexor digitorum longus** and **flexor hallucis longus muscle**, which pass through this layer.
- Consists of:
 1. **Quadratus plantae**
 2. **Four lumbrical muscles**

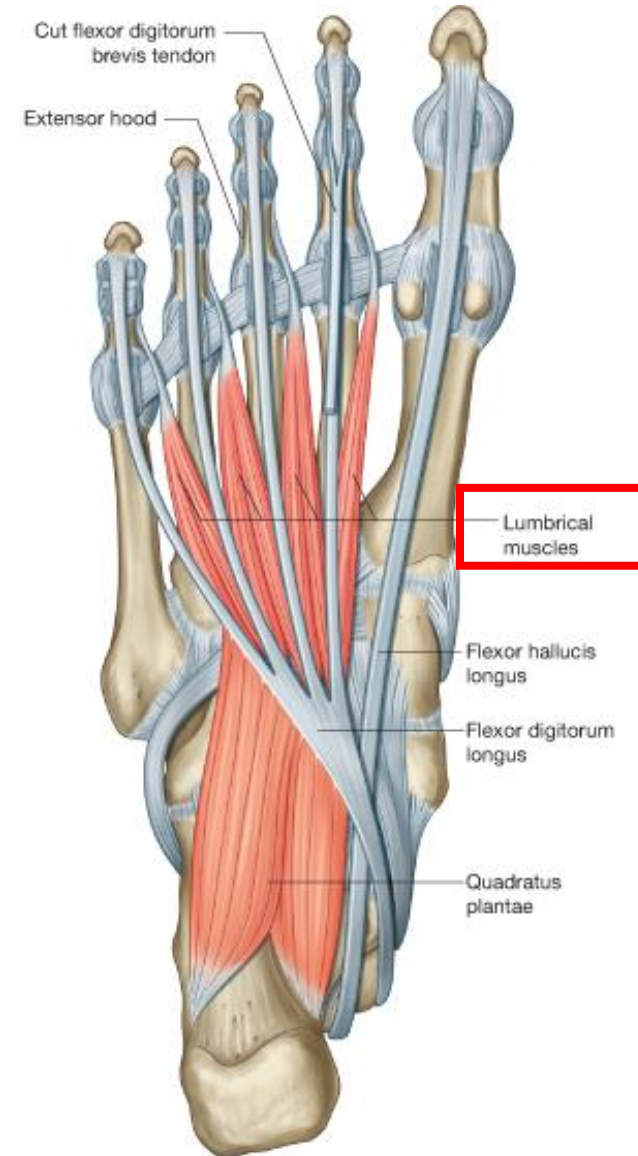
Quadratus Plantae

- **Origin:** Flat quadrangular muscle with two heads of origin from the medial and lateral sides calcaneum.
- **Insertion:** Lateral side of tendon of flexor digitorum longus in proximal sole of the foot.
- **Action:** Assists flexor digitorum longus tendon in flexing toes 2nd to 5th.
- **Nerve supply:** Lateral plantar nerve



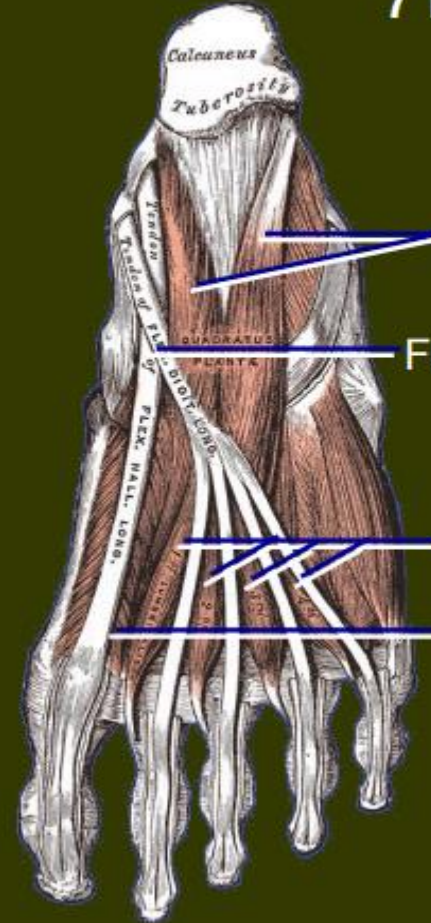
Lumbricals

- **Origin:** The tendons of flexor digitorum longus
- **Insertion:** Dorsal extensor expansion of lateral four toes.
- **Action:** Flexion of metatarsophalangeal joint and extension of interphalangeal joints
- **Nerve supply:**
 - 1ST lumbrical: medial plantar nerve.
 - 2ND , 3RD , and 4TH Lumbricals: lateral plantar nerve.



SECOND LAYER

7 Muscles



Flex.Dig.
Accessorius

Flex.Dig. Longus

Lumbricals

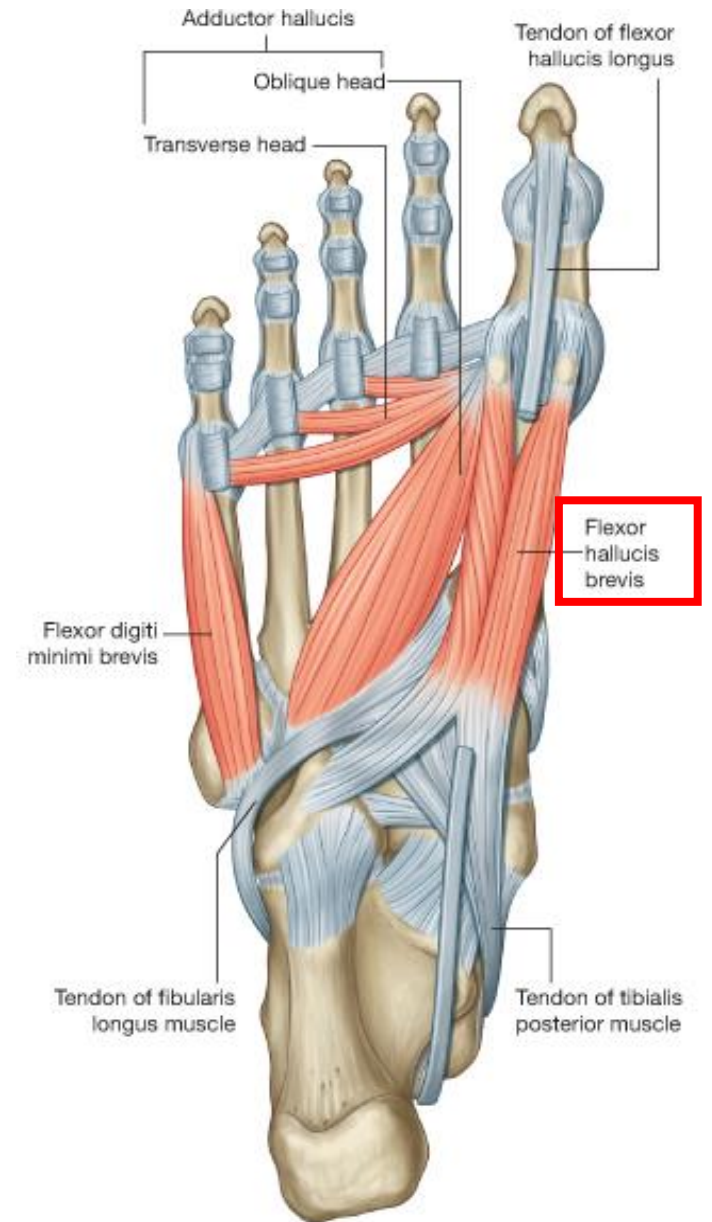
Flex.Hal.
Longus

Third Layer

- Three muscles in this layer:
 1. Two (**flexor hallucis brevis** and **adductor hallucis**) are associated with the great toe.
 2. The third (**flexor digiti minimi brevis**) is associated with the little toe.

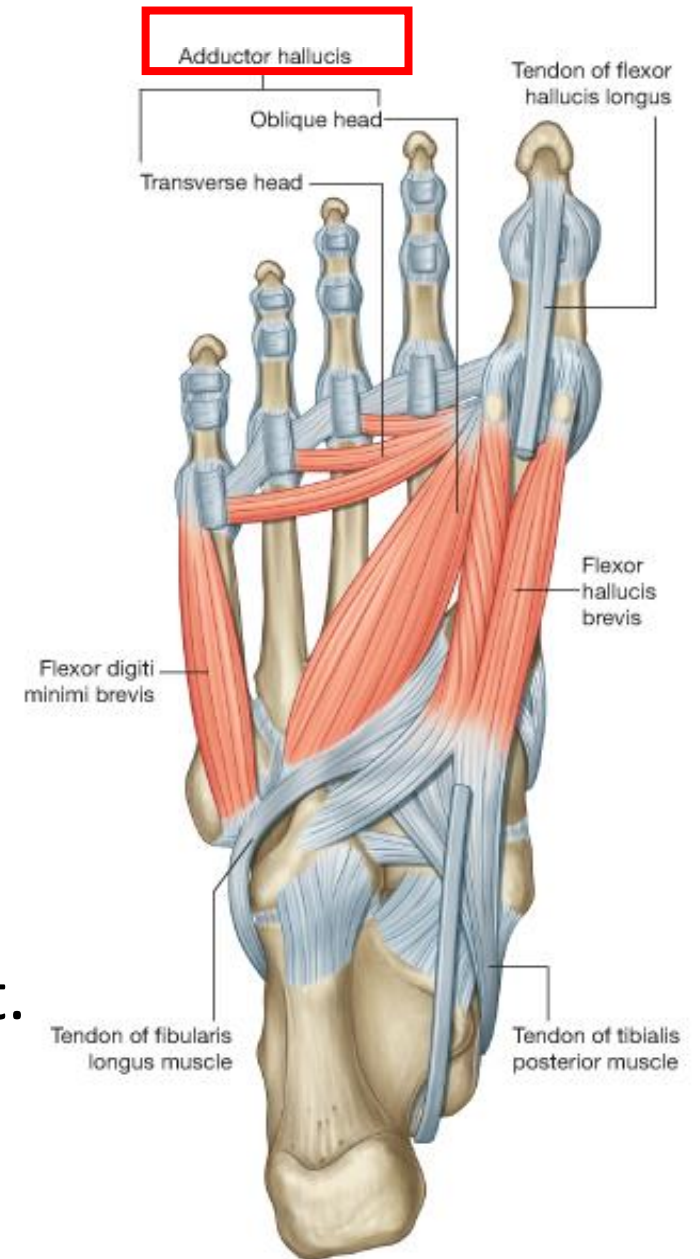
Flexor Hallucis Brevis

- The flexor hallucis brevis muscle has two tendinous heads.
- **Origin:** Cuboid and lateral cuneiform.
- **Insertion:** Lateral and medial sides of base of proximal phalanx of the big toe.
- **Action:** Flexes metatarsophalangeal joint of the great toe; supports the medial longitudinal arch.
- **Nerve supply:** Medial plantar nerve



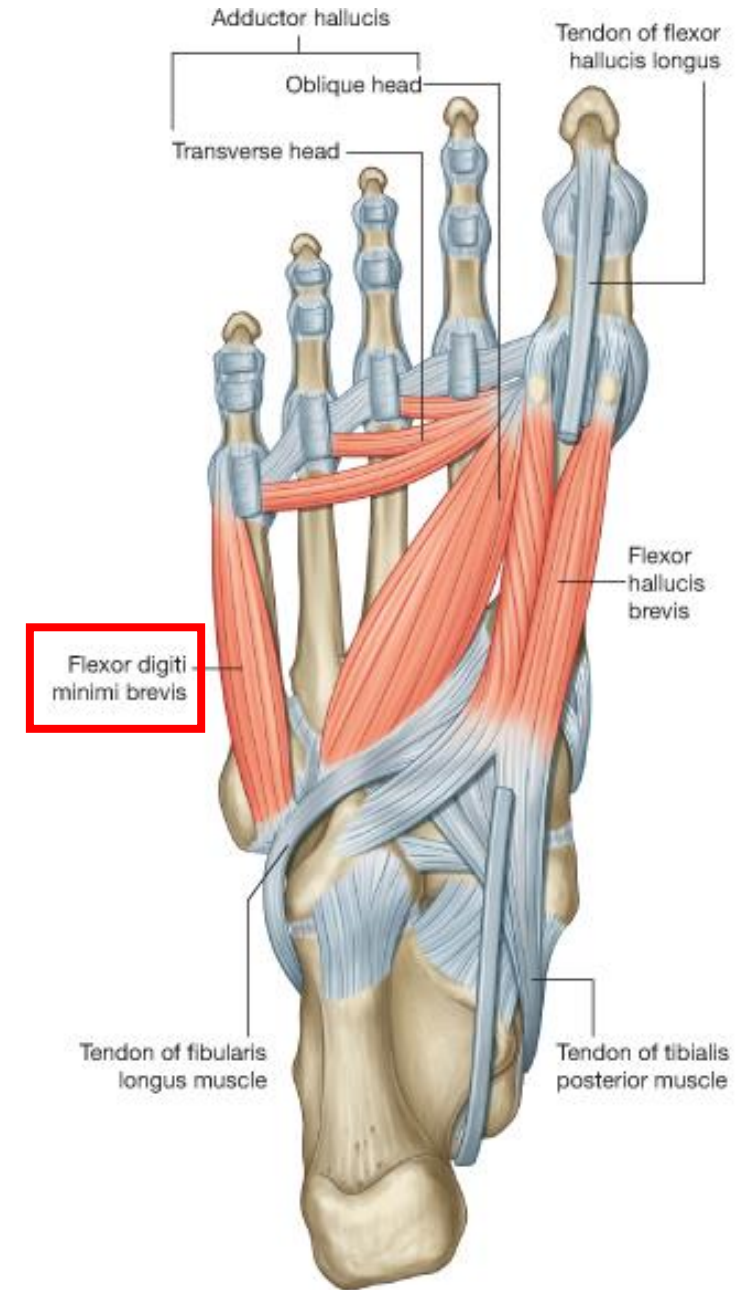
Adductor Hallucis

- **Origin:**
 - **Transverse head:** planter ligaments of metatarsophalangeal joint of lateral four toes
 - **Oblique head:** bases of 2nd to 4th metatarsals
- **Insertion:** lateral side of the base of the proximal phalanx of the big toe.
- **Action:** Adducts great toe at metatarsophalangeal joint.
- **Nerve supply:** lateral plantar nerve.



Flexor Digiti Minimi Brevis

- **Origin:** Base of 5th metatarsal.
- **Insertion:** Lateral side of base of proximal phalanx of little toe.
- **Action:** Flexes metatarsophalangeal joint of the toe.
- **Nerve supply:** Lateral plantar nerve.



THIRD LAYER

3 Muscles



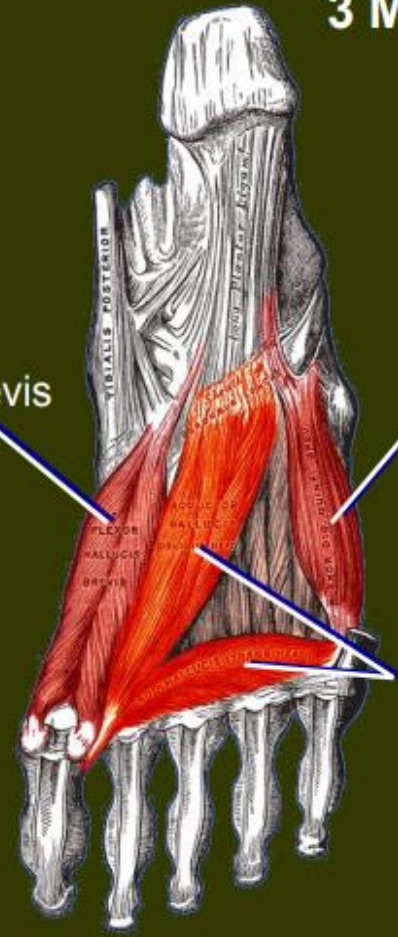
Flex.Hal.Brevis



Flex.Dig.Min.
Brevis



Add. Hallucis

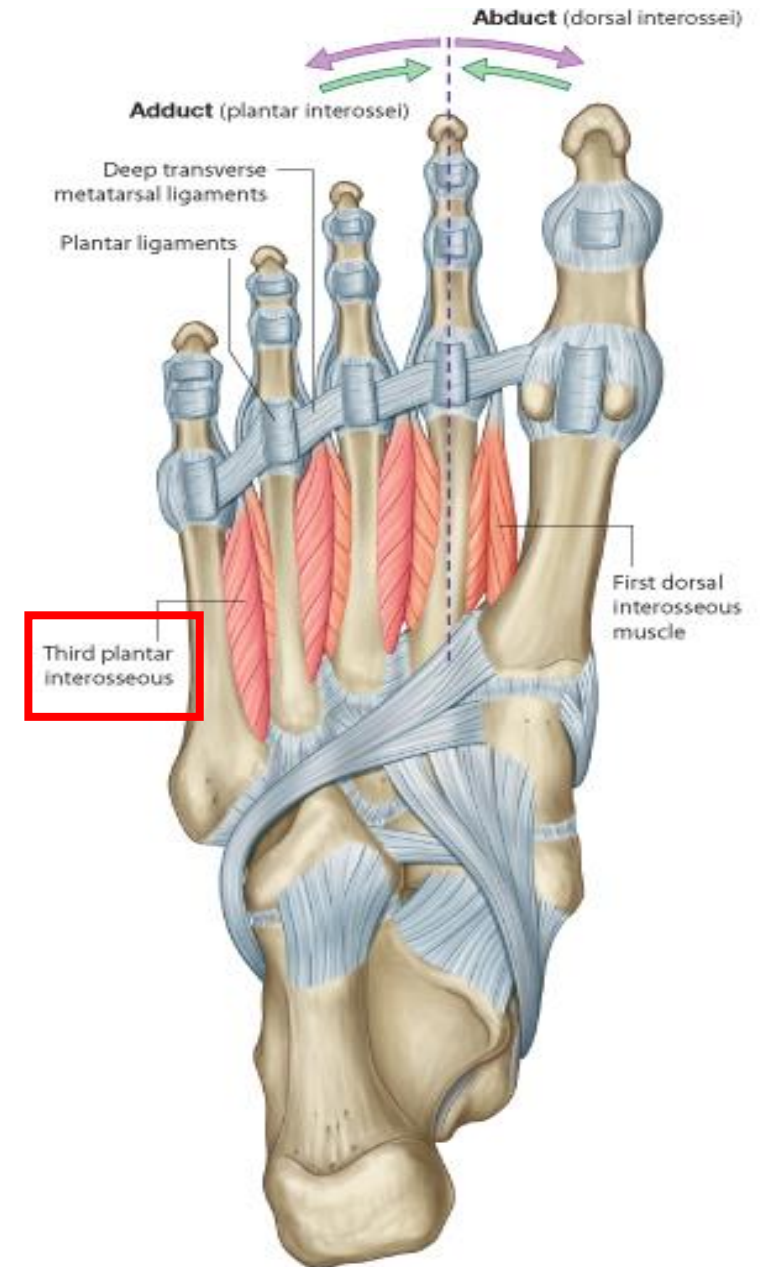


Fourth Layer

- Associated with:
 - **Two tendons:**
 1. Tendon of tibialis posterior
 2. Tendon of peroneus longus
 - **Two muscles:**
 1. 3 plantar interossei
 2. 4 dorsal interossei

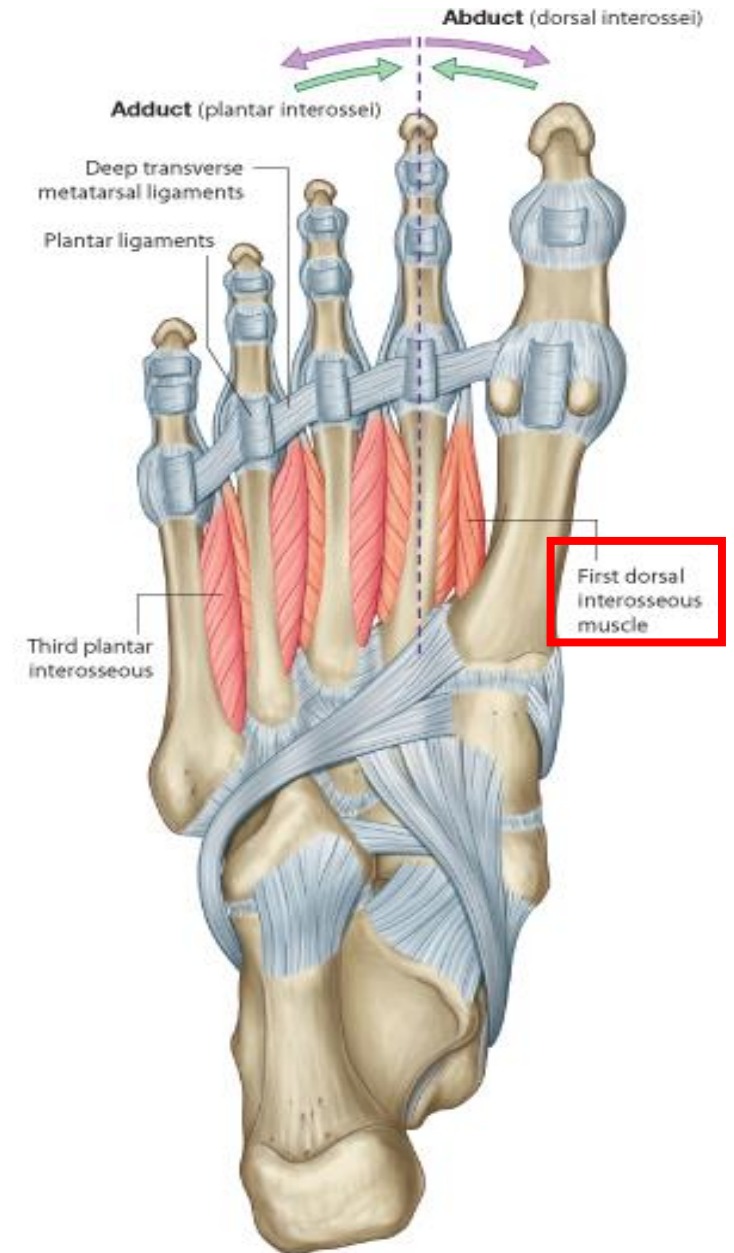
Plantar Interossei

- **Origin:** Lateral three metatarsals.
- **Insertion:** Extensor expansions and bases of proximal phalanx of lateral three toes.
- **Action:** Adduction of toes; flexion of metatarsophalangeal joints and extension of interphalangeal joints.
- **Nerve supply:** Lateral plantar nerve.

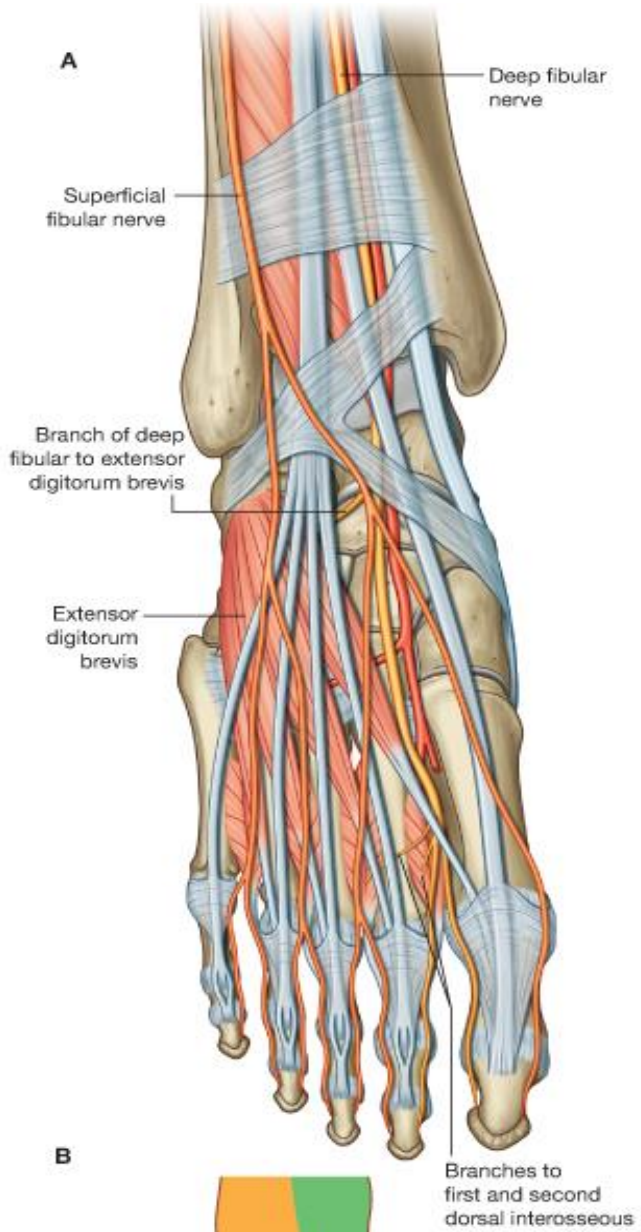


Dorsal Interossei

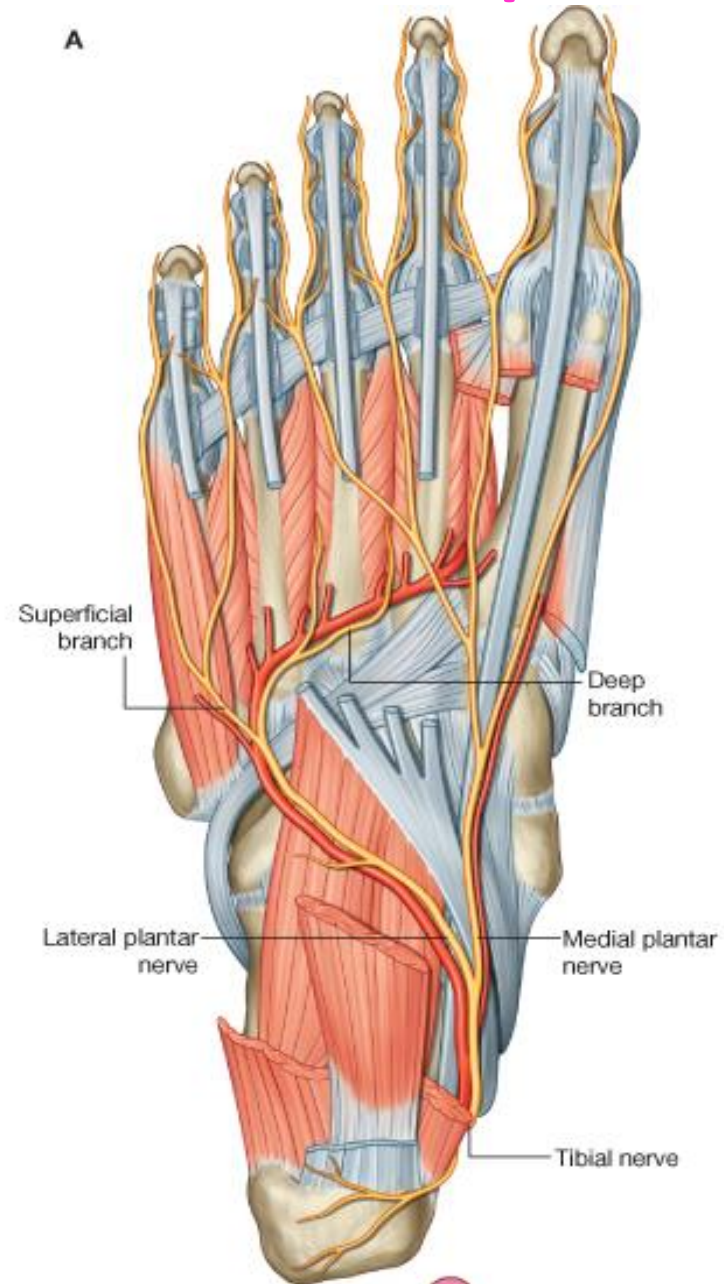
- **Origin:** The sides of adjacent metatarsals.
- **Insertion:** Extensor expansions and bases of proximal phalanx of 2nd to 4th toes.
- **Action:** Abduction of toes; flexion of metatarsophalangeal joints and extension of interphalangeal joints.
- **Nerve supply:** Lateral plantar nerve.



Deep Fibular (Peroneal) Nerve

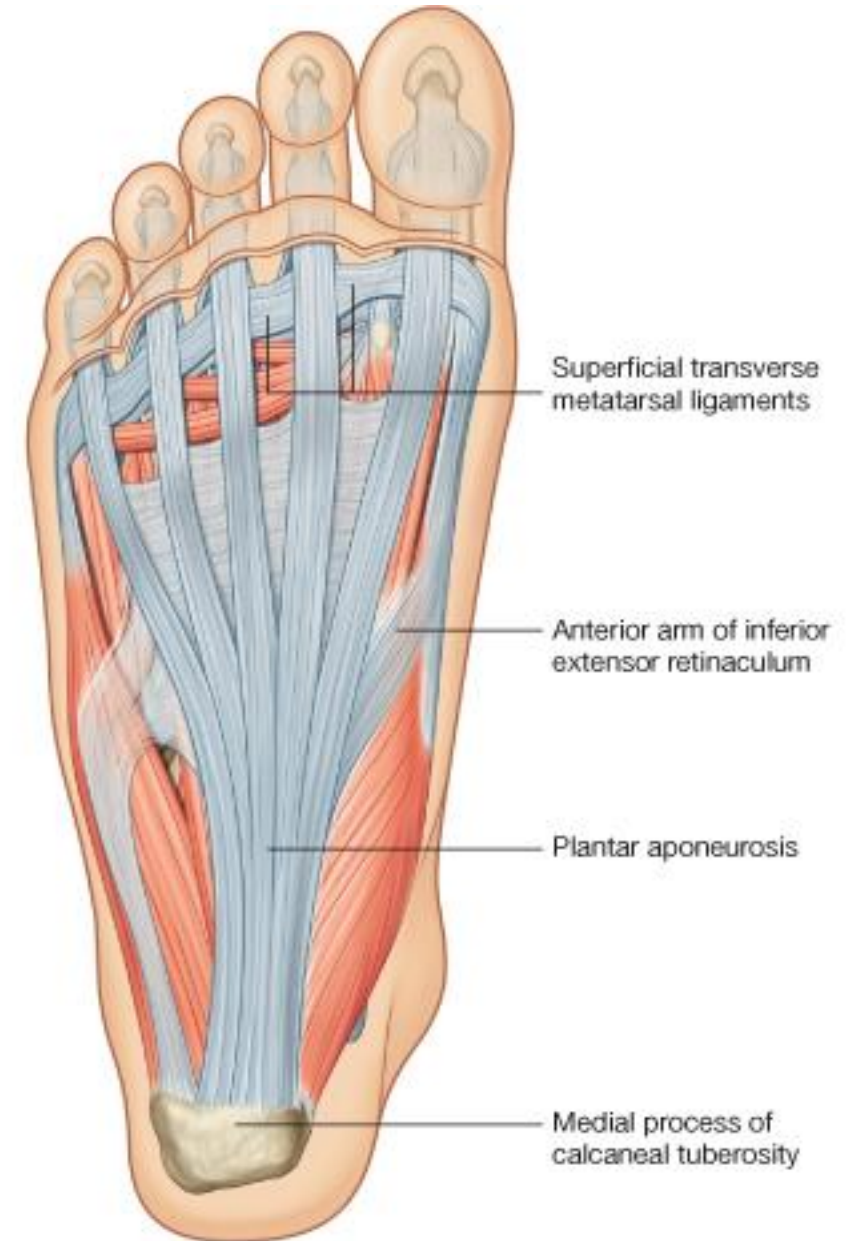


Lateral and medial plantar nerves



Plantar Aponeurosis

- It is triangular thickening of the deep fascia of the sole of the foot that protects the underlying vessels, nerves, and muscles.
- Its apex is attached to **medial and lateral tubercles of the calcaneus**.
- Its base divides into **five slips that pass into the toes**



Thank you

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