# Popliteal fossa,
# Posterior compartment of leg
# &
# Sole of foot

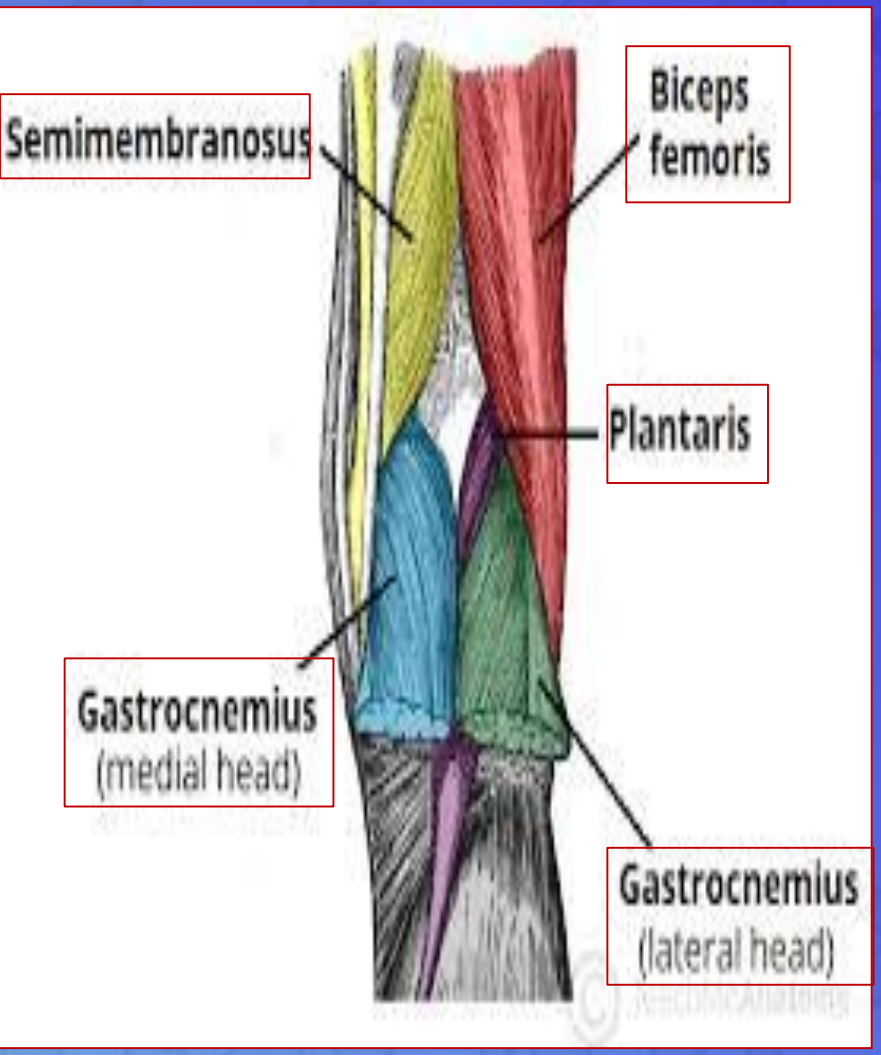
# OBJECTIVES

***At the end of this lecture the students should be able to know:***

- **The location, boundaries & contents of the popliteal fossa**
- **The contents of posterior fascial compartment of Leg.**
- **The structures hold by retinacula at ankle.**
- **Layers forming in the sole of foot & bone forming the arches of the foot.**

# Popliteal Fossa

Is a diamond-shaped intermuscular space at the back of knee




## Boundaries :

**Laterally:** ***above:*** biceps femoris.

***Below:*** lateral head of gastrocnemius & plantaris

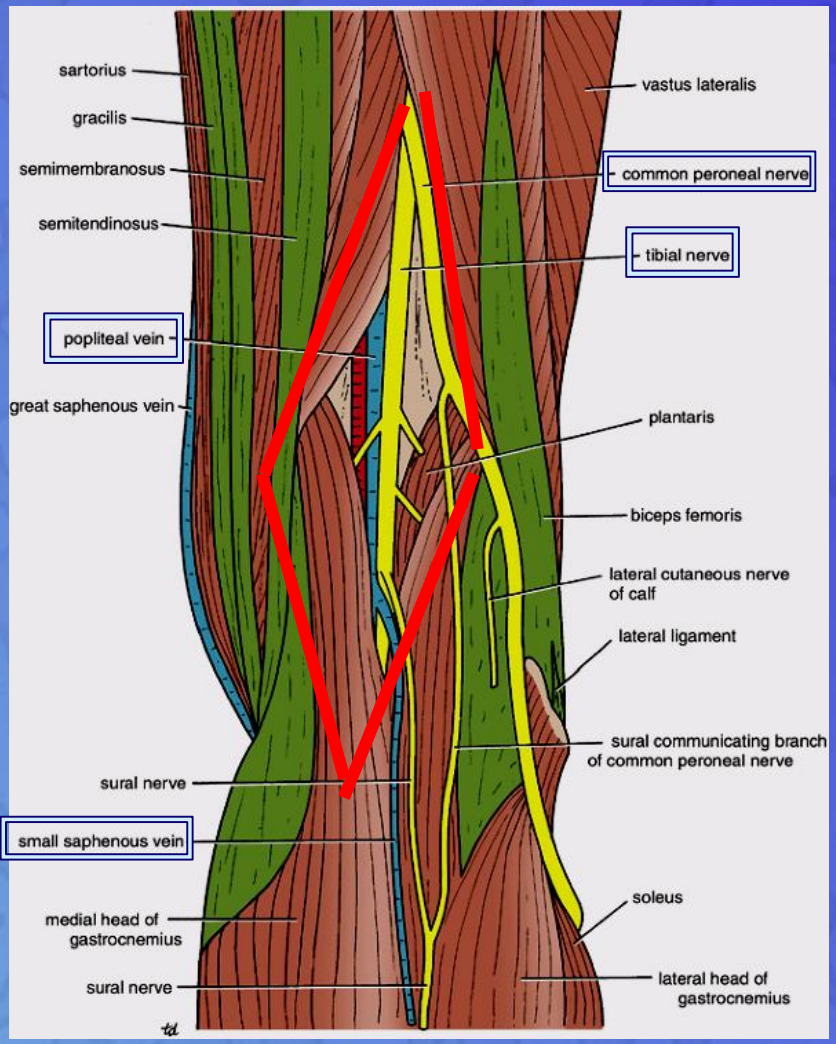
**Medially:** ***above:*** semimembranosus & semitendinosus.

***Below:*** medial head of gastrocnemius

**Roof:** Skin, superficial fascia and deep fascia of the thigh.

**Floor:** popliteal surface of femur, posterior ligament of knee joint and popliteus muscle.

# Popliteal Fossa



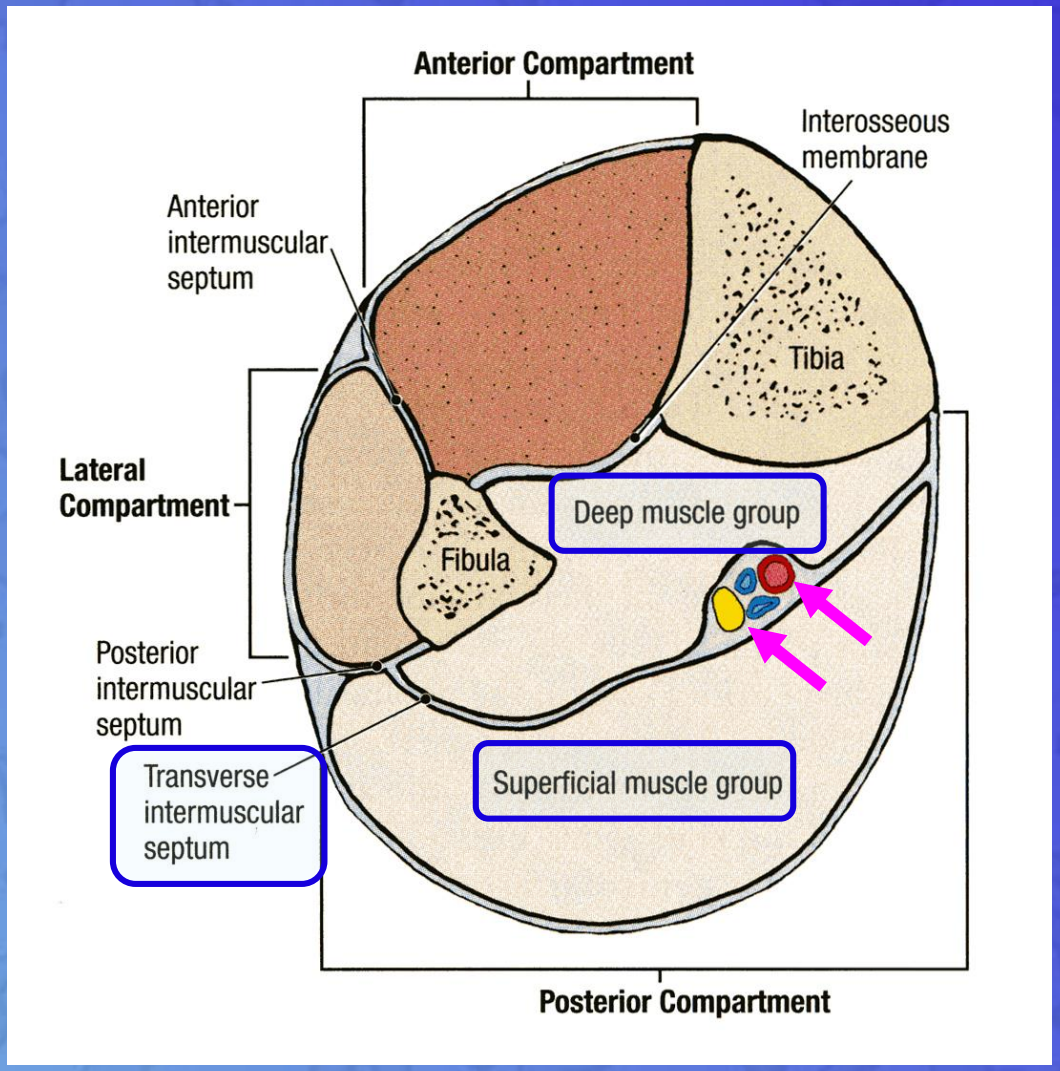

## Contents:

From medial to lateral

1. Popliteal vessels
2. Small saphenous vein
3. Tibial nerve.
4. Common peroneal nerve.
5. Posterior cut. nerve of thigh.
6. Connective tissue & popliteal lymph nodes.

**The deepest structure is popliteal artery.**

# CONTENTS OF THE POSTERIOR FASCIAL COMPARTMENT OF THE LEG



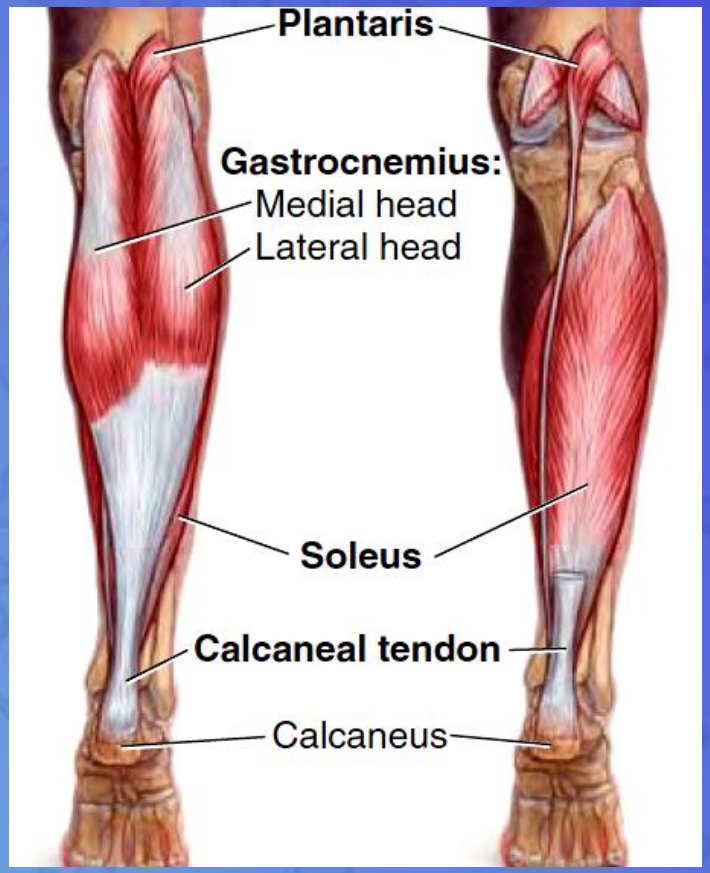

**The transverse intermuscular septum of the leg is a septum divides the muscles of the posterior compartment into superficial and deep groups.**

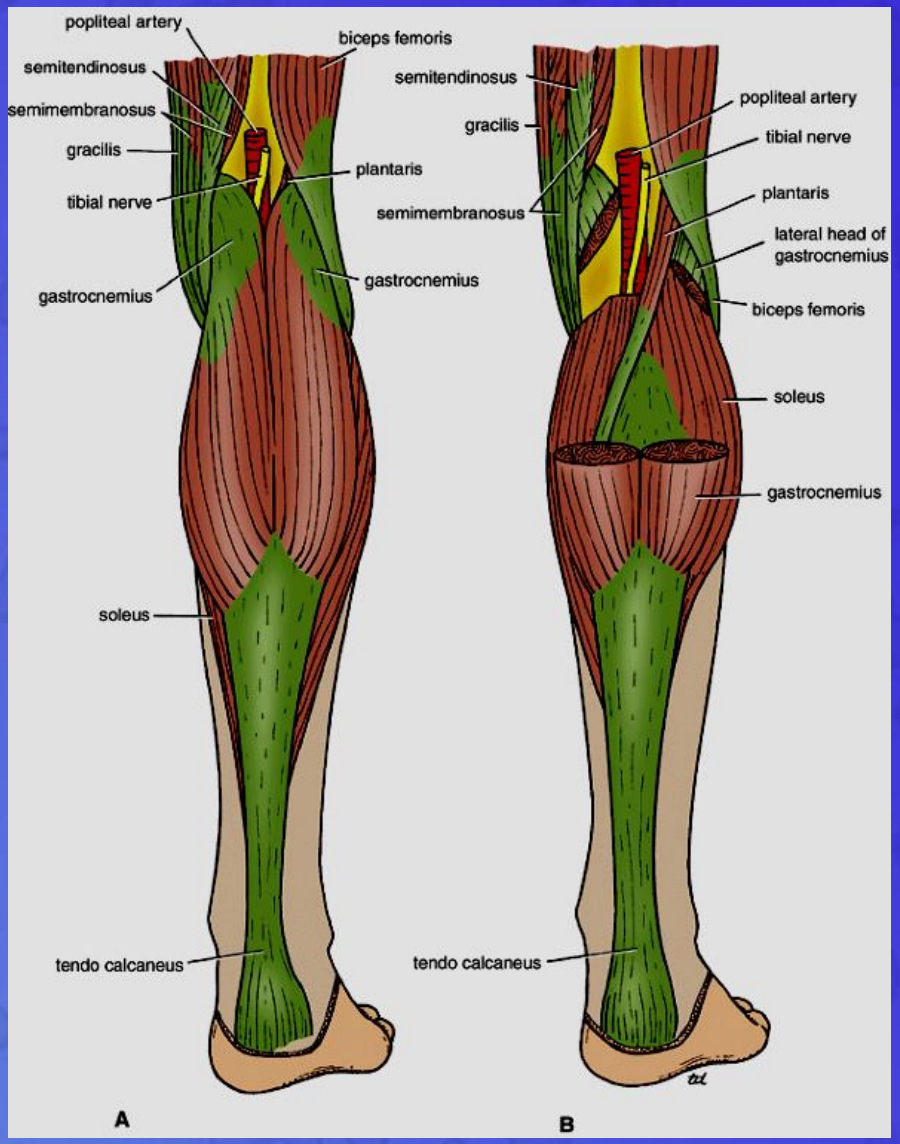
**Contents:**

1. **Superficial group of muscles**
2. **Deep group of muscles**
3. **Posterior tibial artery**
4. **Tibial nerve**

# SUPERFICIAL GROUP

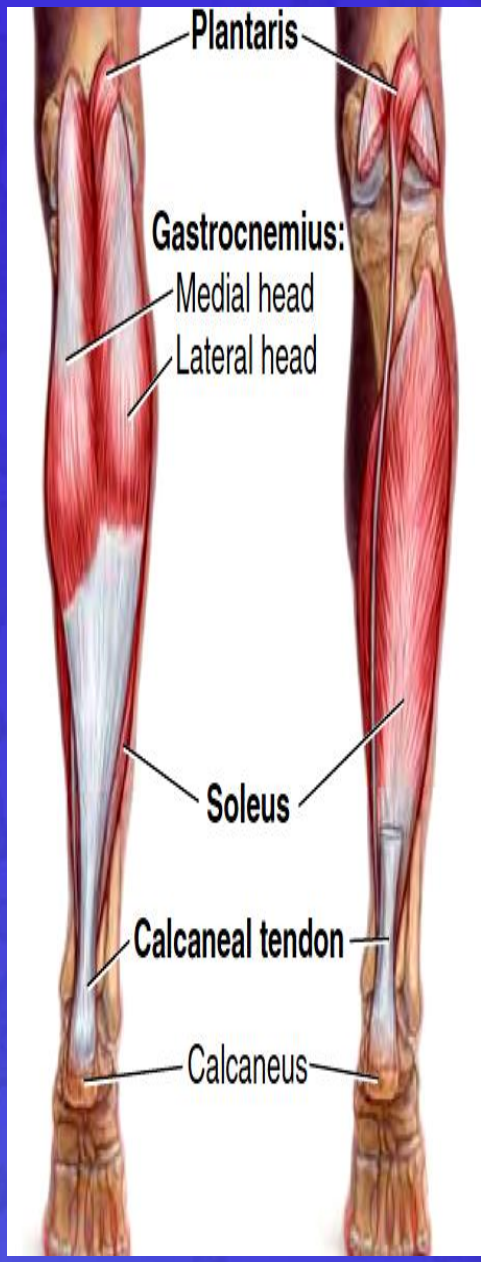
1. Gastrocnemius 2. Plantaris 3. Soleus



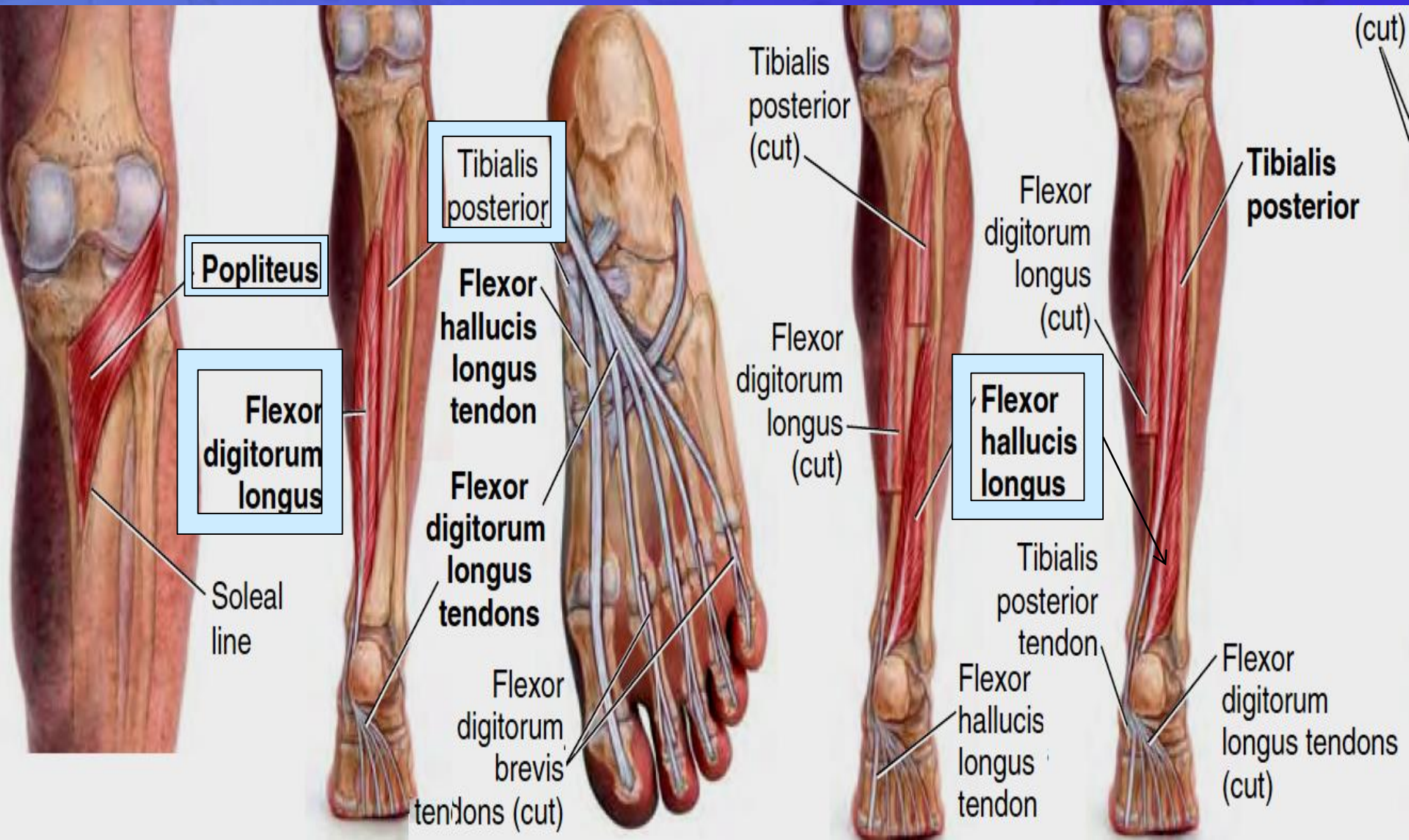
# SUPERFICIAL GROUP

| Muscle | Origin | Insertion | Nerve | Action |
|---|---|---|---|---|
| **Gastrocnemius** | **Lateral head** from lateral condyle of femur & **medial head** from above medial condyle | **Posterior surface of calcaneum via tendo calcaneus** | Tibial | Plantar flexes foot at ankle joint; flexes knee joint |
| **Plantaris** | Lateral supracondylar ridge of femur | **Posterior surface of calcaneum** | Tibial | Plantar flexes foot at ankle joint; flexes knee joint |
| **Soleus** | Shafts of **tibia** and **fibula** | **Posterior surface of calcaneum via tendo calcaneus** | Tibial | Together with gastrocnemius and plantaris is powerful plantar flexor of ankle joint; provides main propulsive force in walking and running |



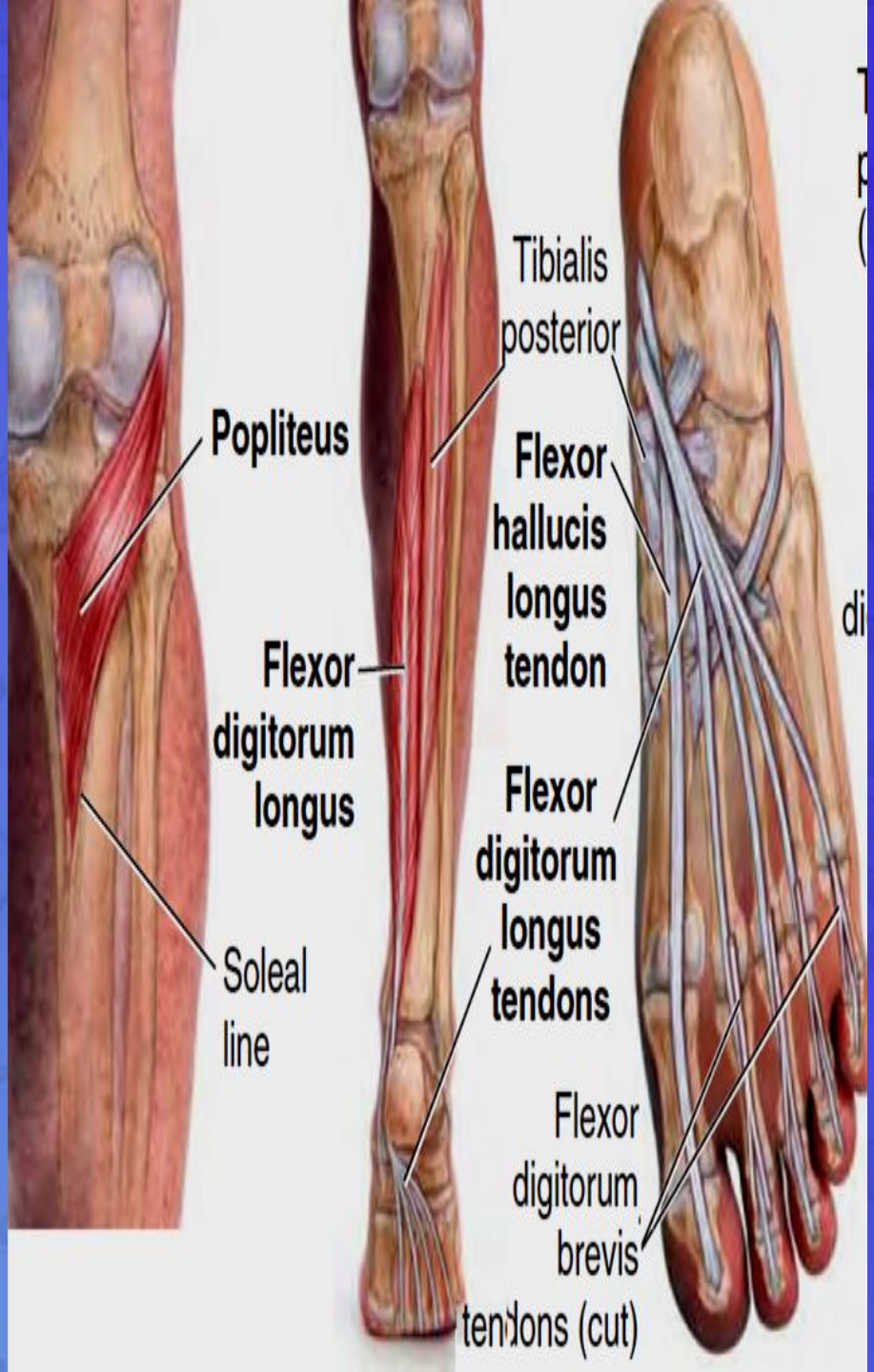
# DEEP GROUP

1. Popliteus 2. Flexor digitorum longus 3. Tibialis posterior
4. Flexor hallucis longus

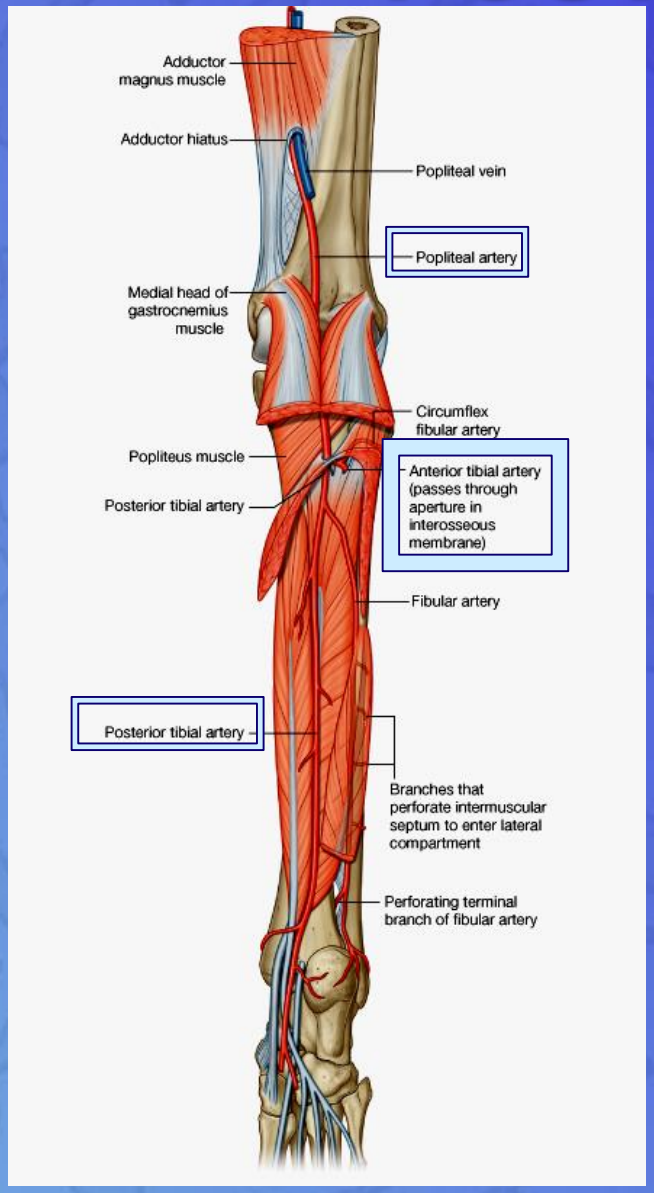


# DEEP GROUP

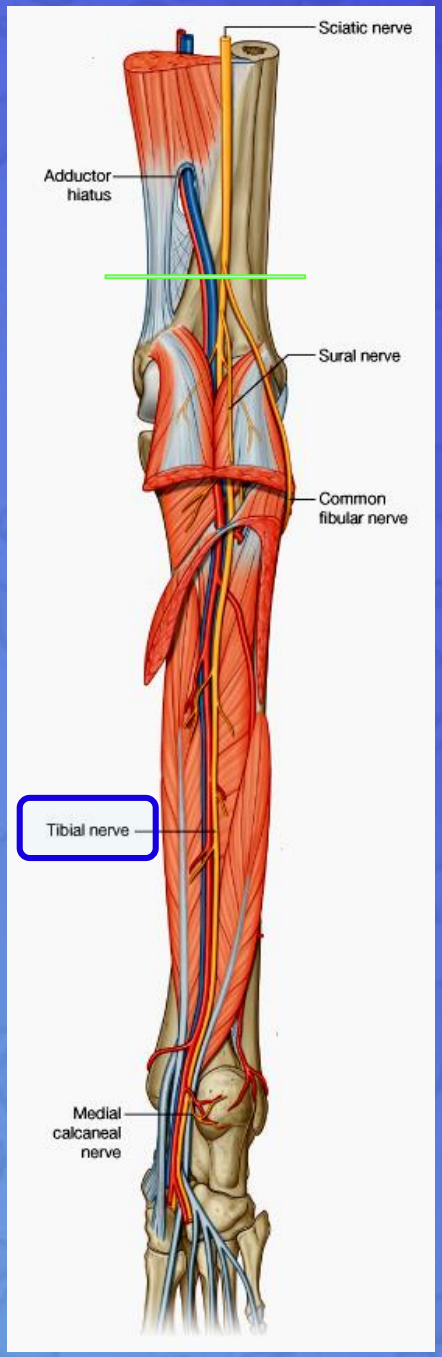
| | | | | |
|---|---|---|---|---|
| **Popliteus** | Groove on Lateral surface of lateral condyle of femur (Intracapsular) | Post surface of shaft of tibia above soleal line | Tibial | Flexes knee joint : Unlocks knee joint by lateral rotation of femur on tibia(or slight medial rotation of leg which accompanies the flexion) |
| **Flexor digitorum longus** | Posterior surface of shaft of tibia | Bases of distal phalanges of lateral 4 toes | Tibial | Flexes distal phalanges of lateral four toes; plantar Flexes foot at ankle joint; Supports medial and lateral longitudinal arches |
| **Flexor halluces longus** | Posterior surface of shaft of fibula | Base of distal phalanx of big toe | Tibial | Flexes distal phalanx of big toe; plantar flexes foot at ankle joint; supports medial longitudinal arch |
| **Tibialis posterior** | Posterior surface of shafts of tibia and fibula and interosseous membrane | Tuberosity of navicular bone and other neighboring tarsal bones. | Tibial | Plantar flexes foot at ankle joint; inverts foot at subtalar and transverse tarsal joints; supports medial longitudinal arch |


Tibialis posterior
Popliteus
Flexor hallucis longus tendon
Flexor digitorum longus
Flexor digitorum longus tendons
Soleal line
Flexor digitorum brevis
tendons (cut)

# POSTERIOR TIBIAL ARTERY




- **It is one of the terminal branches of the popliteal artery.**

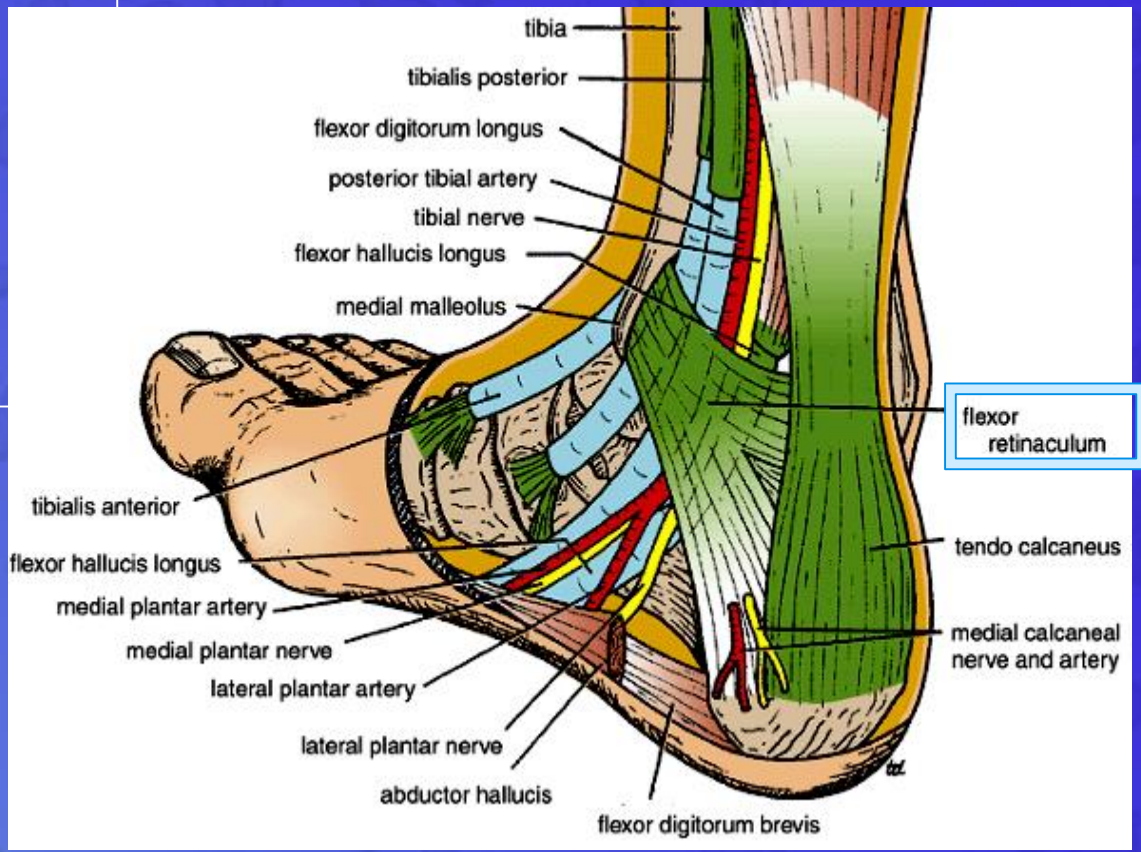



# TIBIAL NERVE

- **It is the larger terminal branch of the sciatic nerve in the lower 1/3 of the back of the thigh**

# Flexor Retinaculum

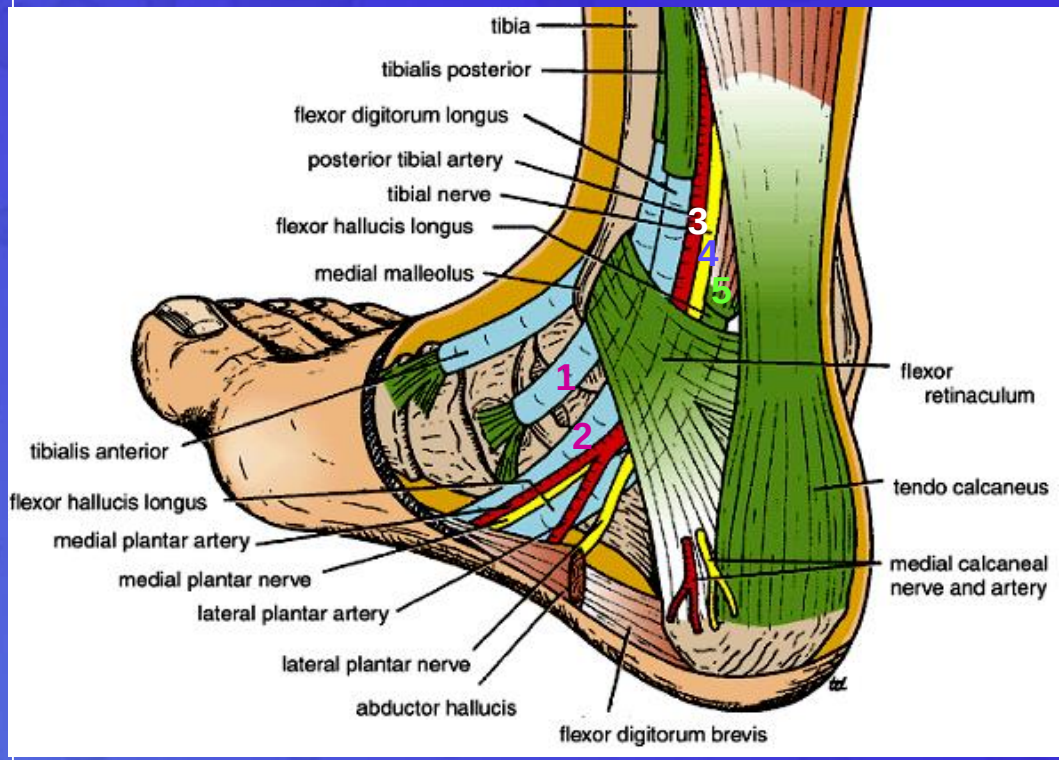
Extends from back of medial malleolus of tibia to medial side of calcaneum

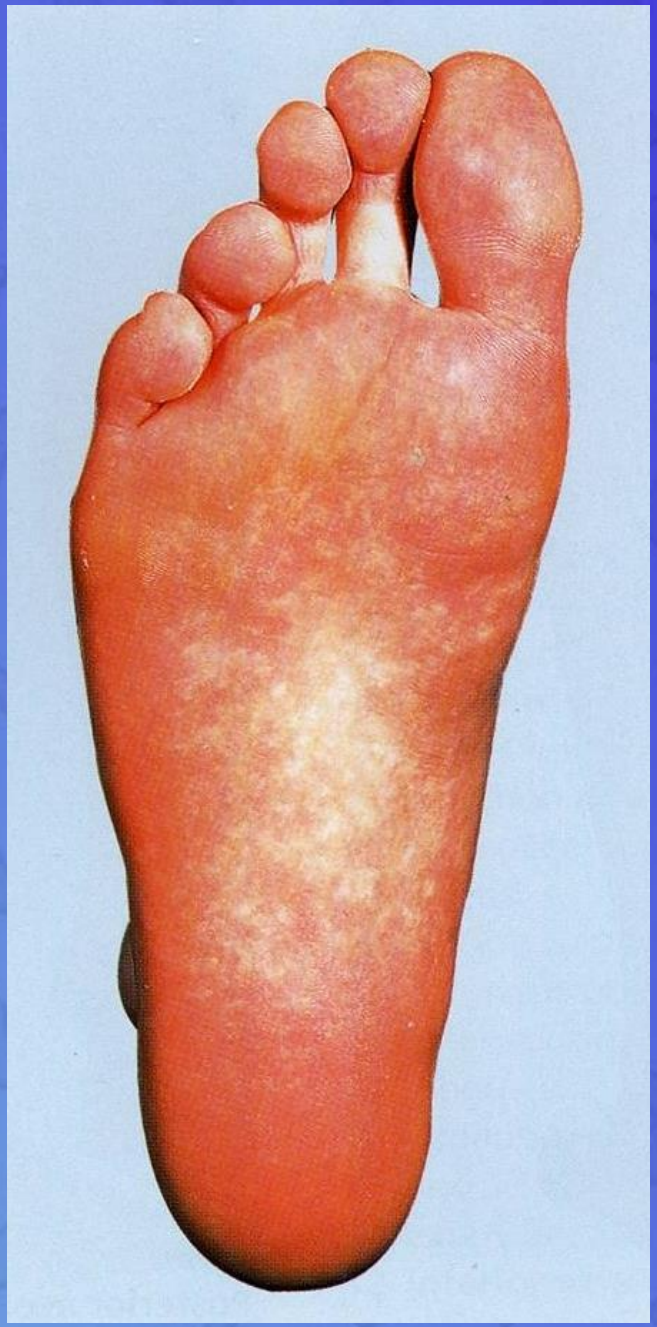


# Structures passing posterior to medial malleolus, deep to flexor retinaculum

- *Medial to lateral*
- Tibialis posterior tendon
- Flexor digitorum longus tendon
- Posterior tibial artery with venae comitantes
- Tibial nerve
- Flexor hallucis longus tendon

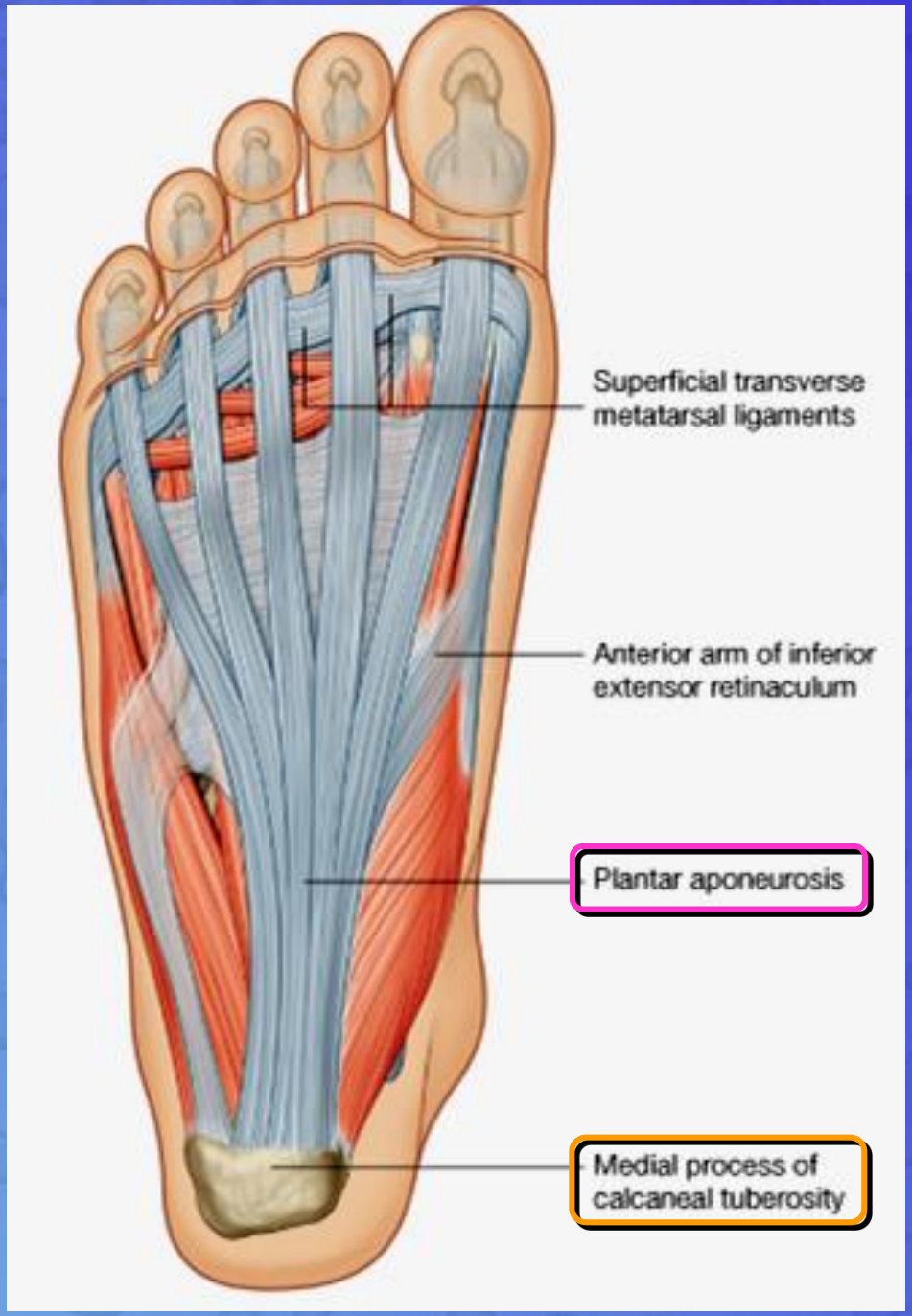
*All the tendons are surrounded by a synovial sheath*





# SOLE OF THE FOOT

- **The skin** of the sole of the foot is **thick and hairless**
- It shows a **few flexure creases** at the sites of skin movement
- **Sweat glands** are present in large numbers

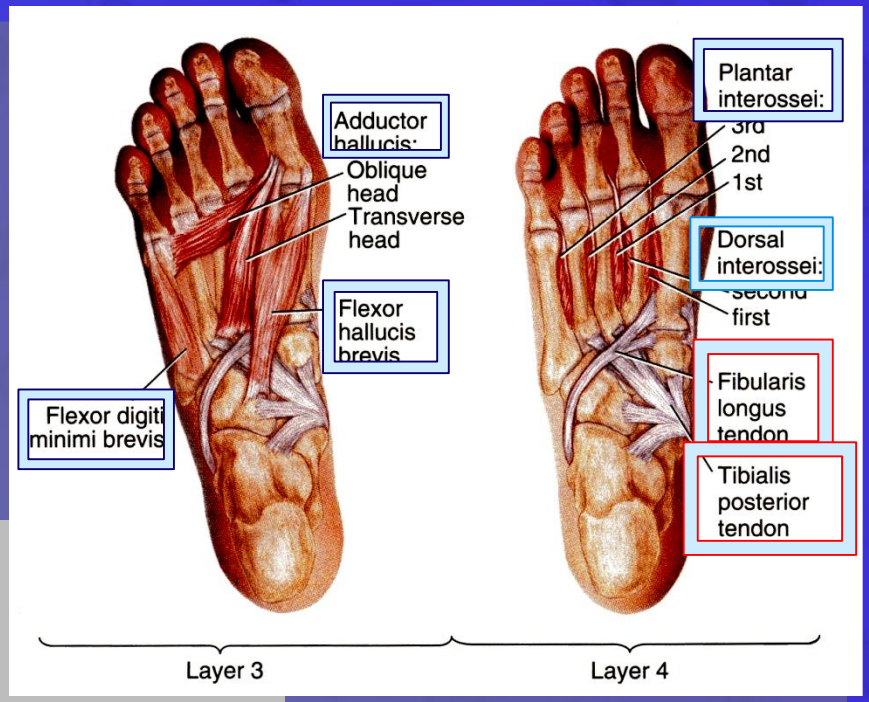


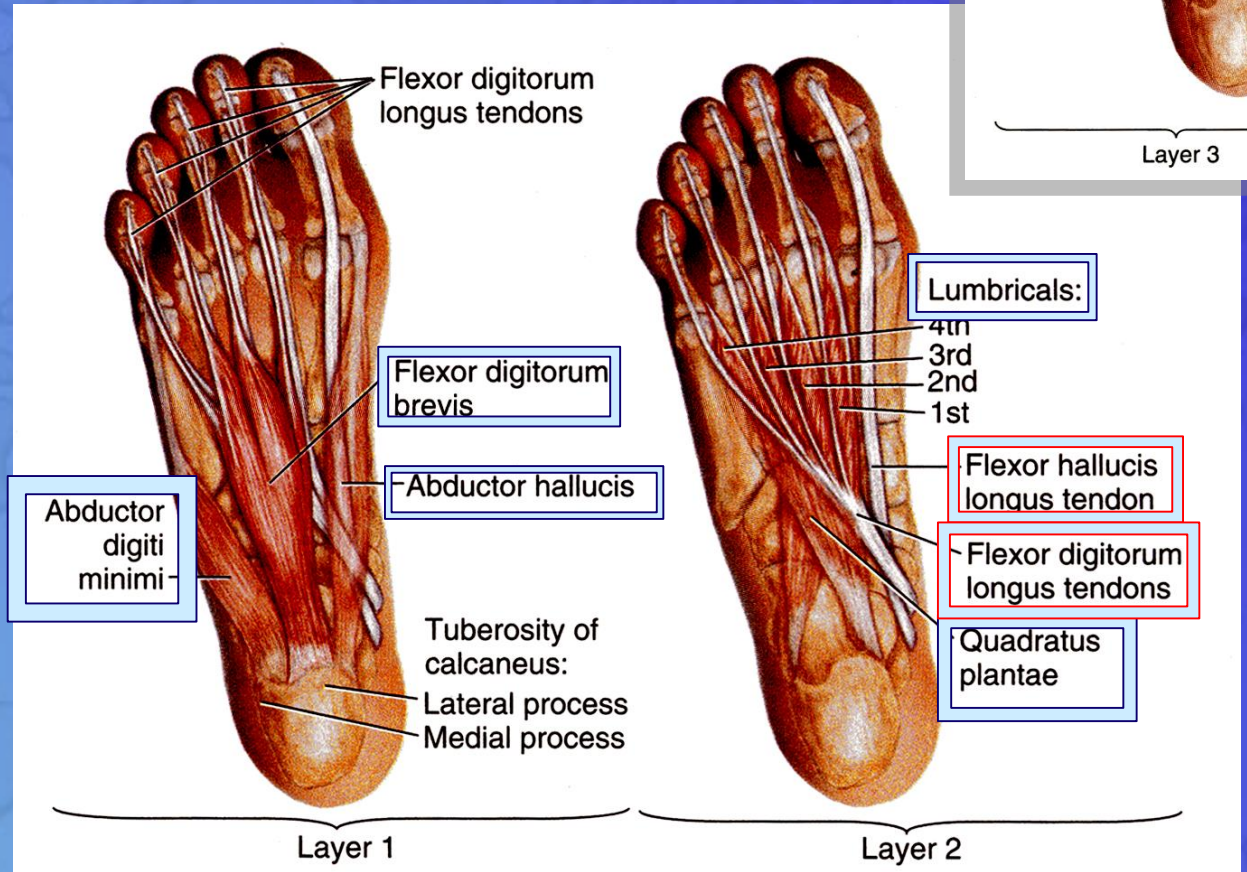

# DEEP FASCIA

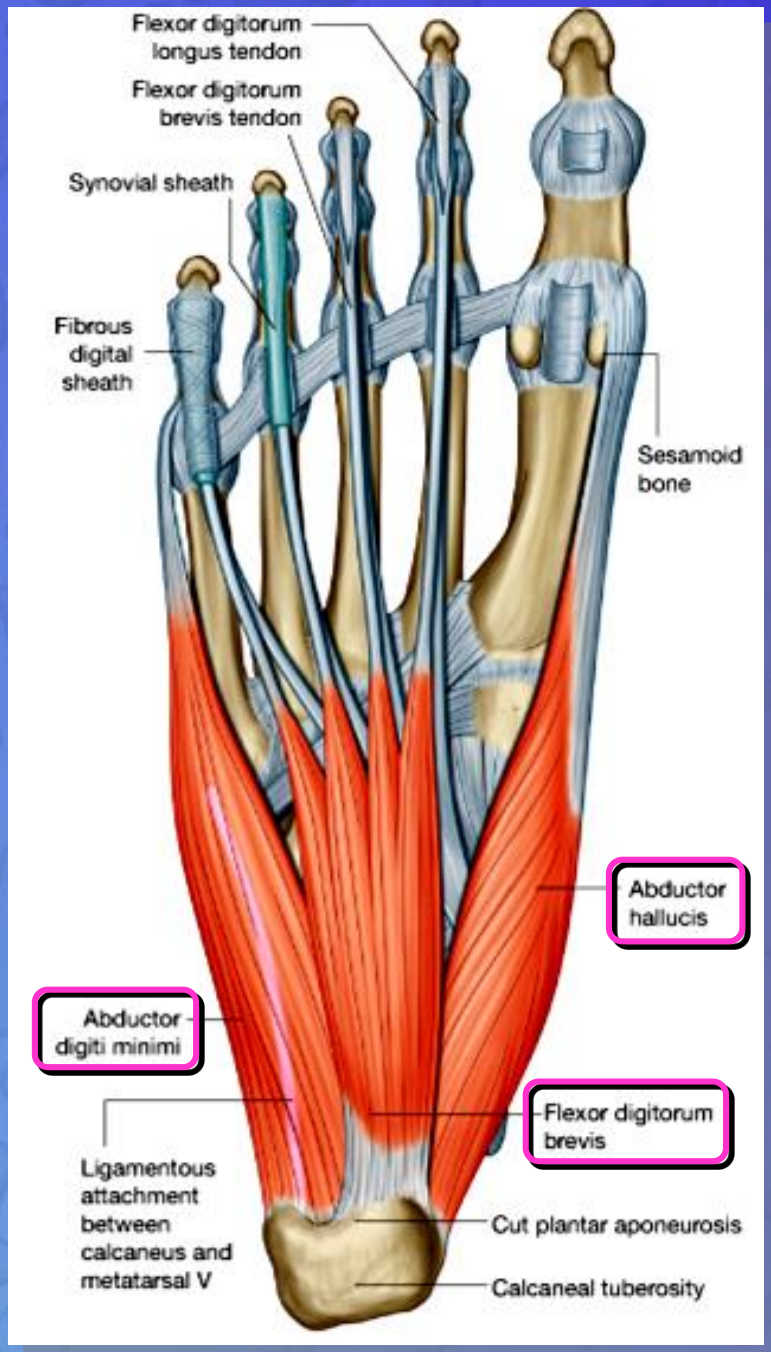
- The **plantar aponeurosis** is a triangular thickening of the deep fascia that protects the underlying nerves, blood vessels, and muscles.
- Its apex is attached to the *medial and lateral tubercles* of the calcaneum.
- The base of the aponeurosis divides into five slips that pass into the toes.

# MUSCLES OF THE SOLE OF THE FOOT

The muscles of the sole are conveniently described in four layers from superficial to deep.

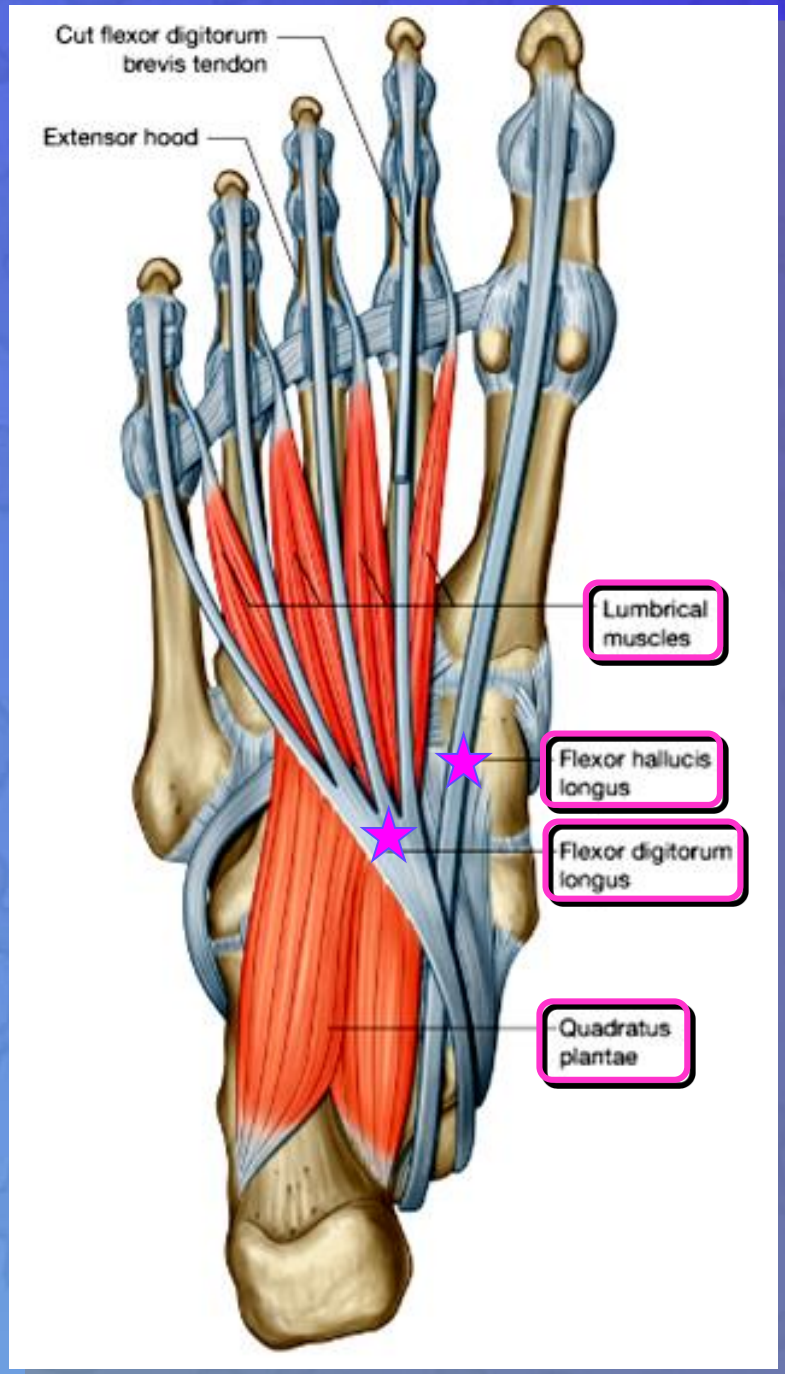




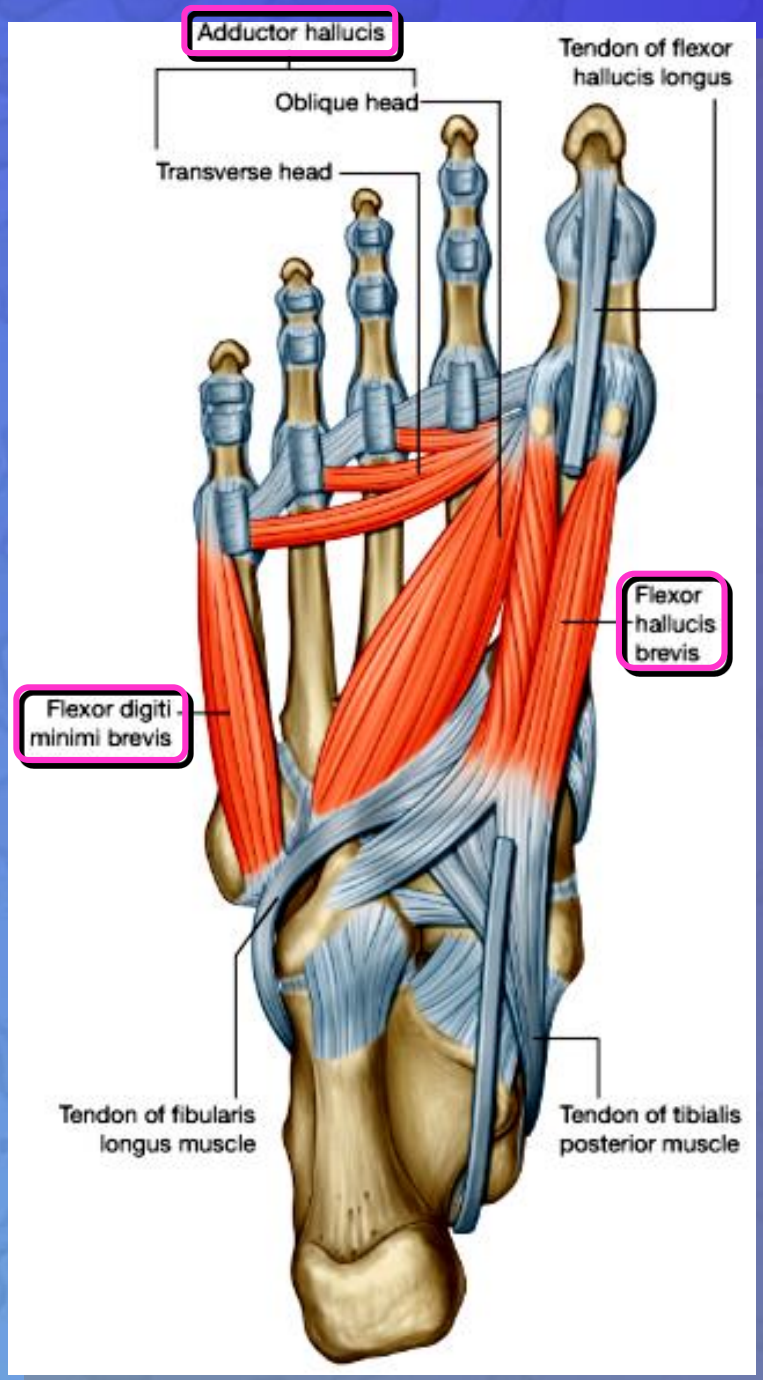

# First Layer

1. Abductor hallucis,
2. Flexor digitorum brevis,
3. Abductor digiti minimi



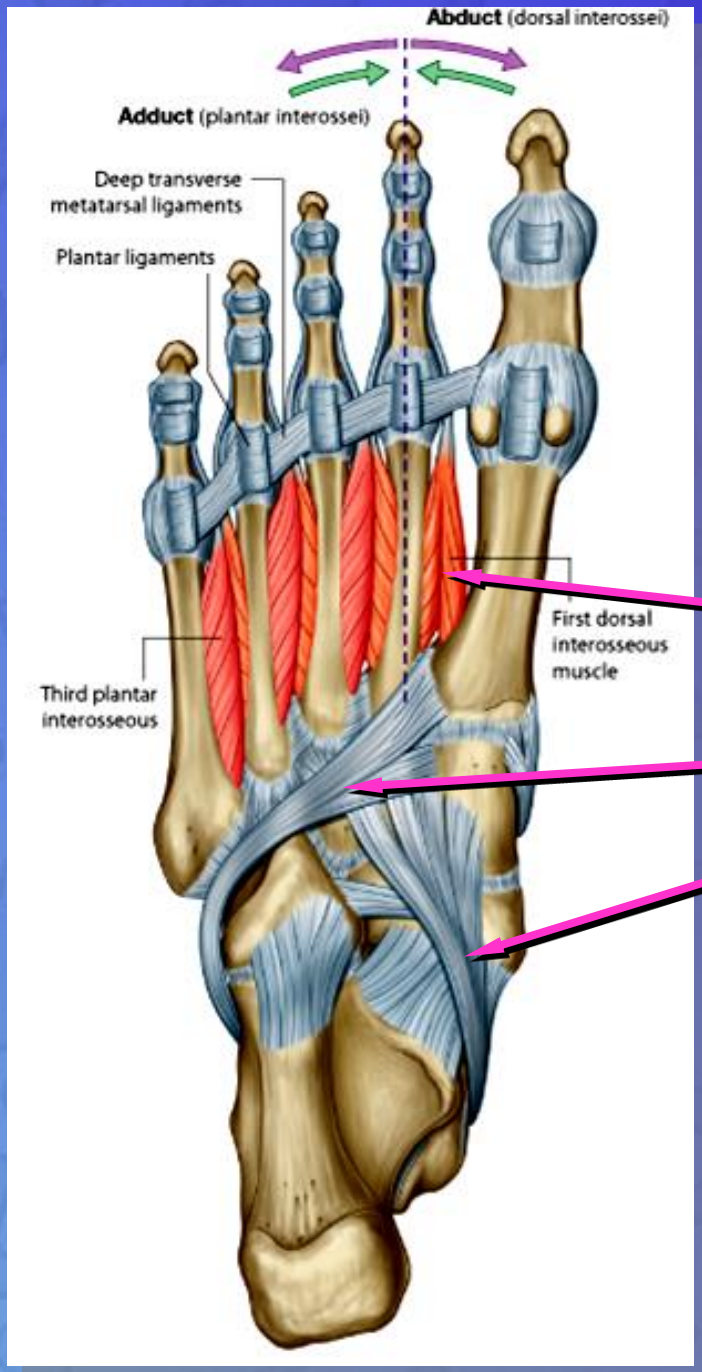

# Second Layer

1. Quadratus plantae,
2. Lumbricals,
3. Flexor digitorum longus tendon,
4. Flexor hallucis longus tendon



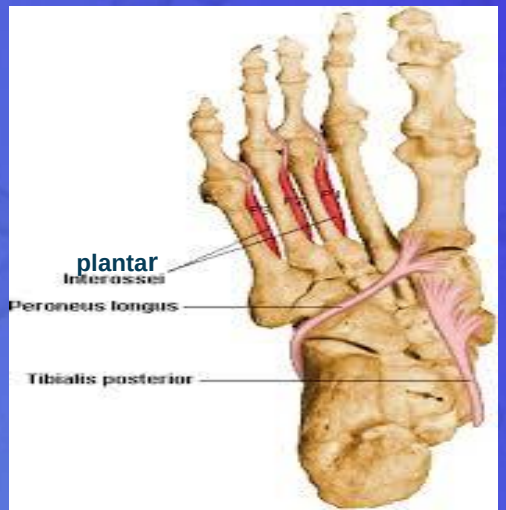

# Third Layer

1. Flexor hallucis brevis
2. Adductor hallucis
3. Flexor digiti minimi brevis

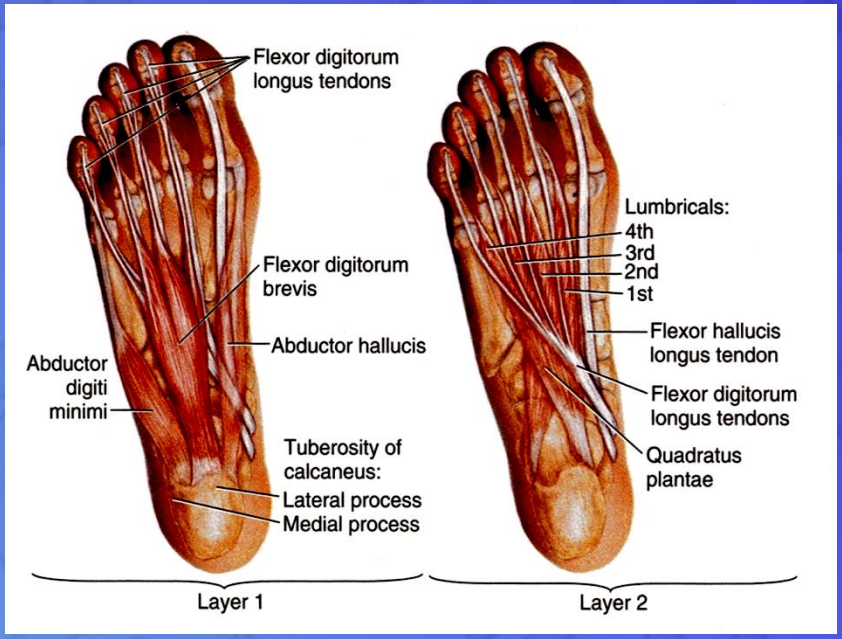


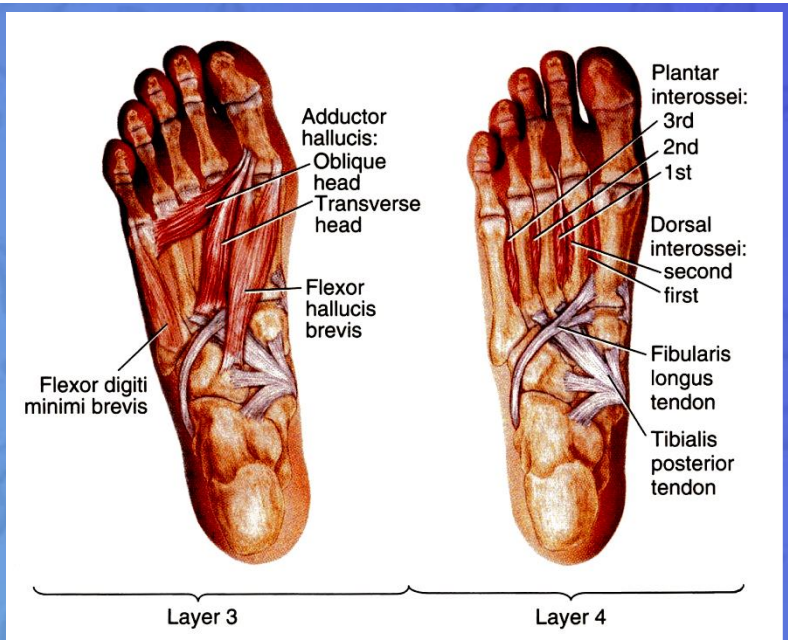

# Fourth Layer

1. Interossei;
   (3 plantar + 4 dorsal).
2. Peroneus longus tendon,
3. Tibialis posterior tendon

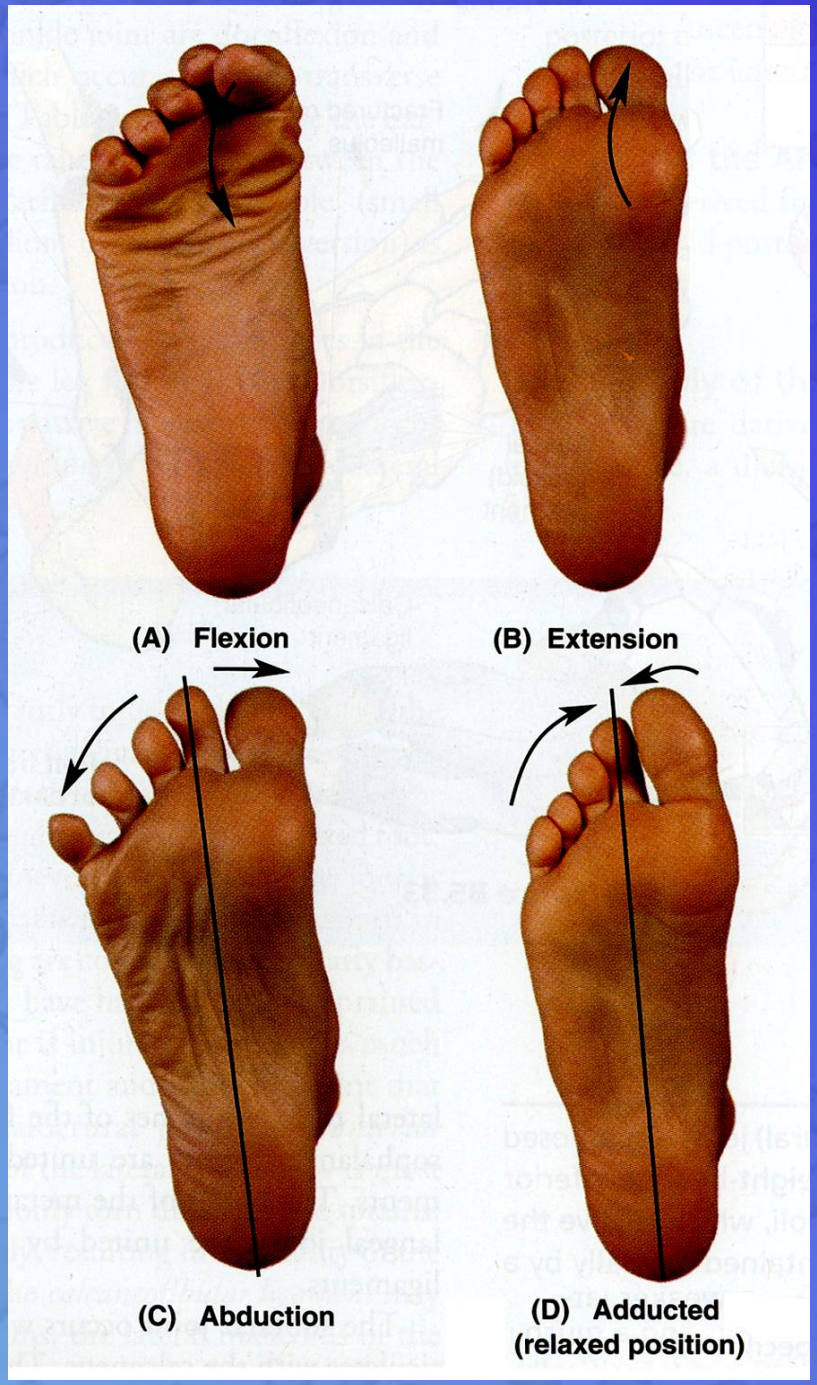



# Function of small muscles of sole of Foot



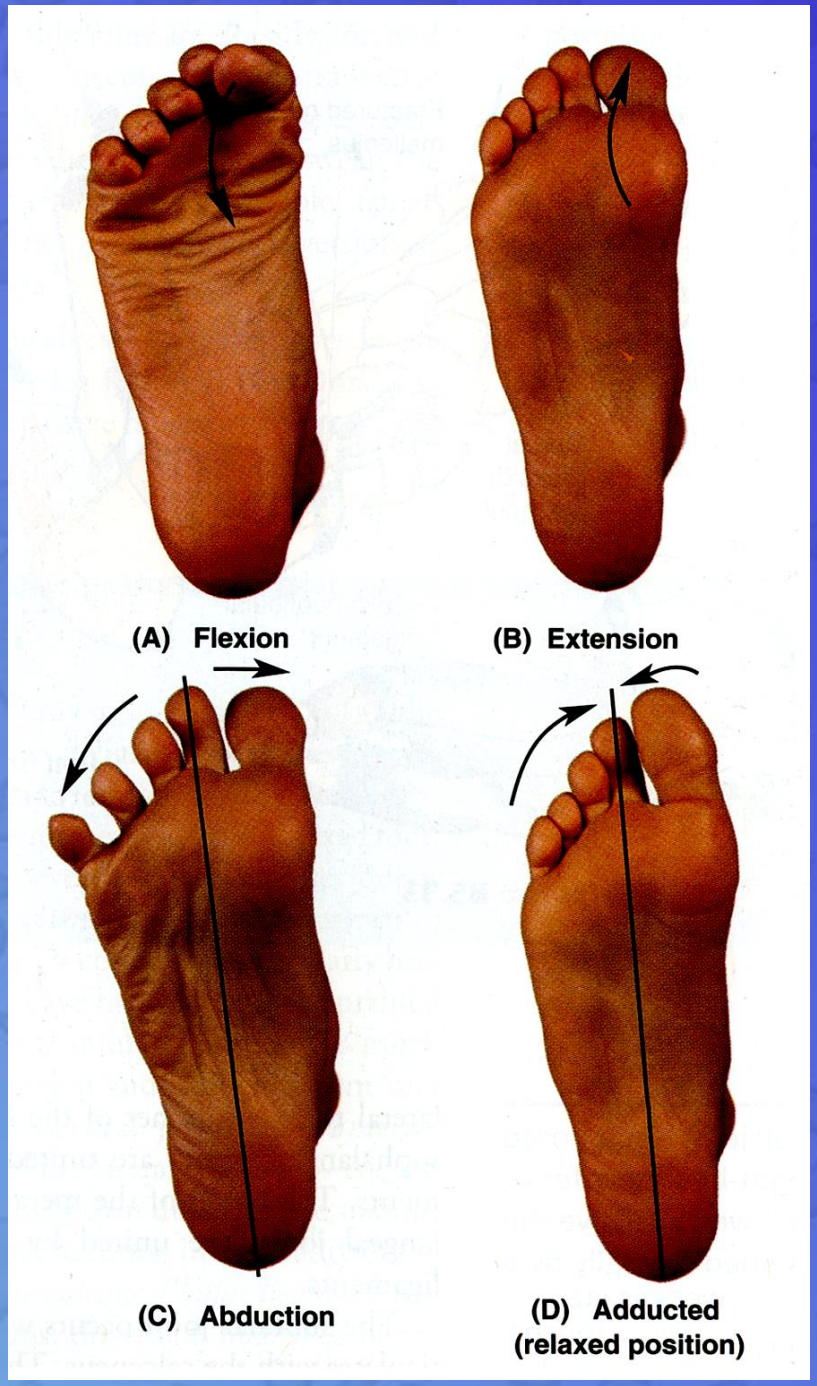




- Unlike the small muscles of the hand, the **sole muscles** have few delicate functions and are chiefly concerned with supporting the arches of the foot.
- They control movements of individual toes, **this function is rarely used** in most people




| Movement | Muscles[a] |
|---|---|
| Metatarsophalangeal joints | |
| Flexion (*A*) | **Flexor digitorum brevis**<br>**Lumbricals**<br>**Interossei**<br>**Flexor hallucis brevis**<br>**Flexor hallucis longus**<br>Flexor digit minimi brevis<br>Flexor digitorum longus |
| Extension (*B*) | **Extensor hallucis longus**<br>**Extensor digitorum longus**<br>**Extensor digitorum brevis** |
| Abduction (*C*) | **Abductor hallucis**<br>**Abductor digiti minimi**<br>**Dorsal interossei** |
| Adduction (*D*) | **Adductor hallucis**<br>**Plantar interossei** |

[a]Muscles in boldface are chiefly responsible for the movement; the other muscles assist them.




| Movement | Muscles[a] |
|---|---|
| Interphalangeal joints | |
| Flexion (fig. *A*) | **Flexor hallucis longus**<br>**Flexor digitorum longus**<br>**Flexor digitorum brevis**<br>Quadratus plantae |
| Extension (fig. *B*) | **Extensor hallucis longus**<br>**Extensor digitorum longus**<br>**Extensor digitorum brevis** |

[a]Muscles in boldface are chiefly responsible for the movement; the other muscles assist them.

# Arches of Foot


- **Medial longitudinal arch**

  Is formed of calcaneum, talus, navicular, 3 cuneiform bones, and 3 medial metatarsal bones.

- **Lateral longitudinal arch**

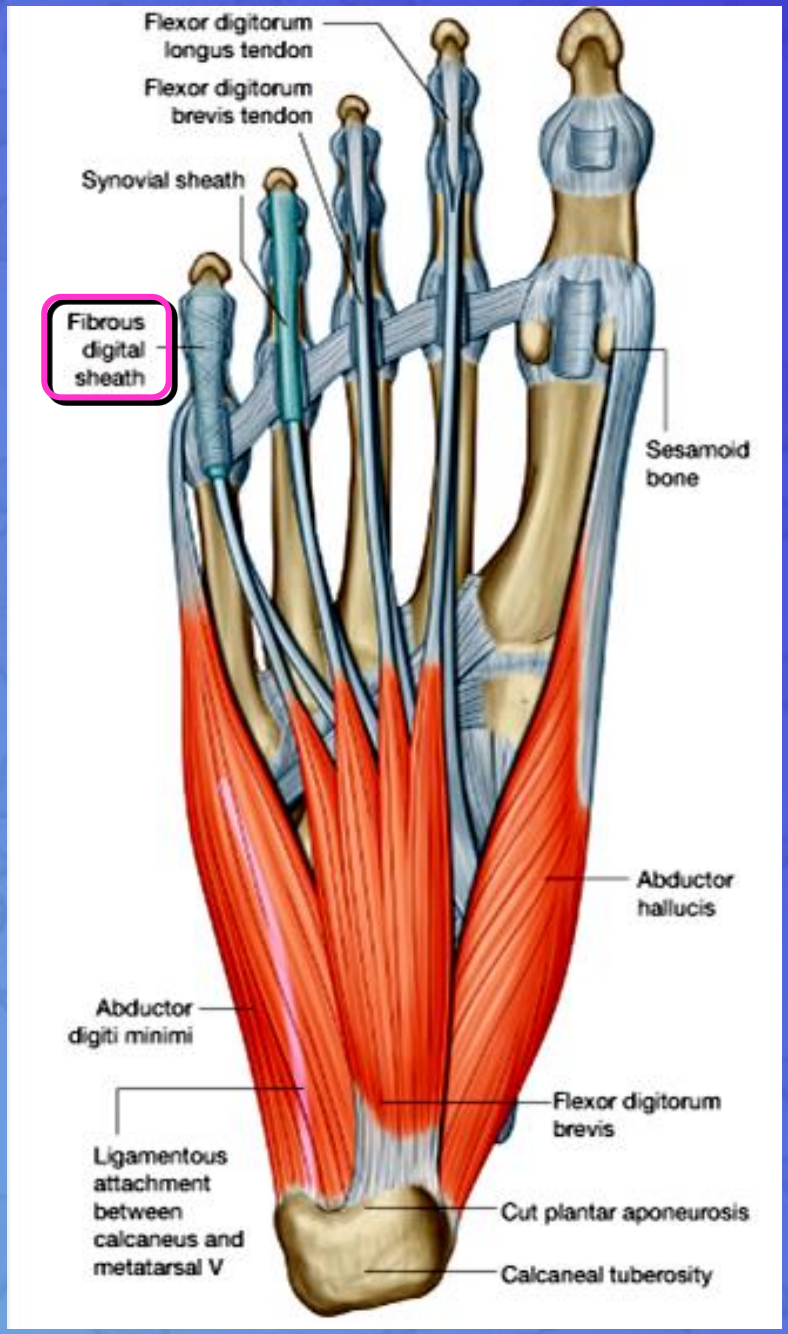
  Is formed of calcaneum, cuboid & lateral $4^{th}$ & $5^{th}$ metatarsal bones

- **Transverse arch**

  Lies at the level of tarso-metatarsal joints, formed of bases of metatarsal bones, cuboid & 3 cuneiform bones.

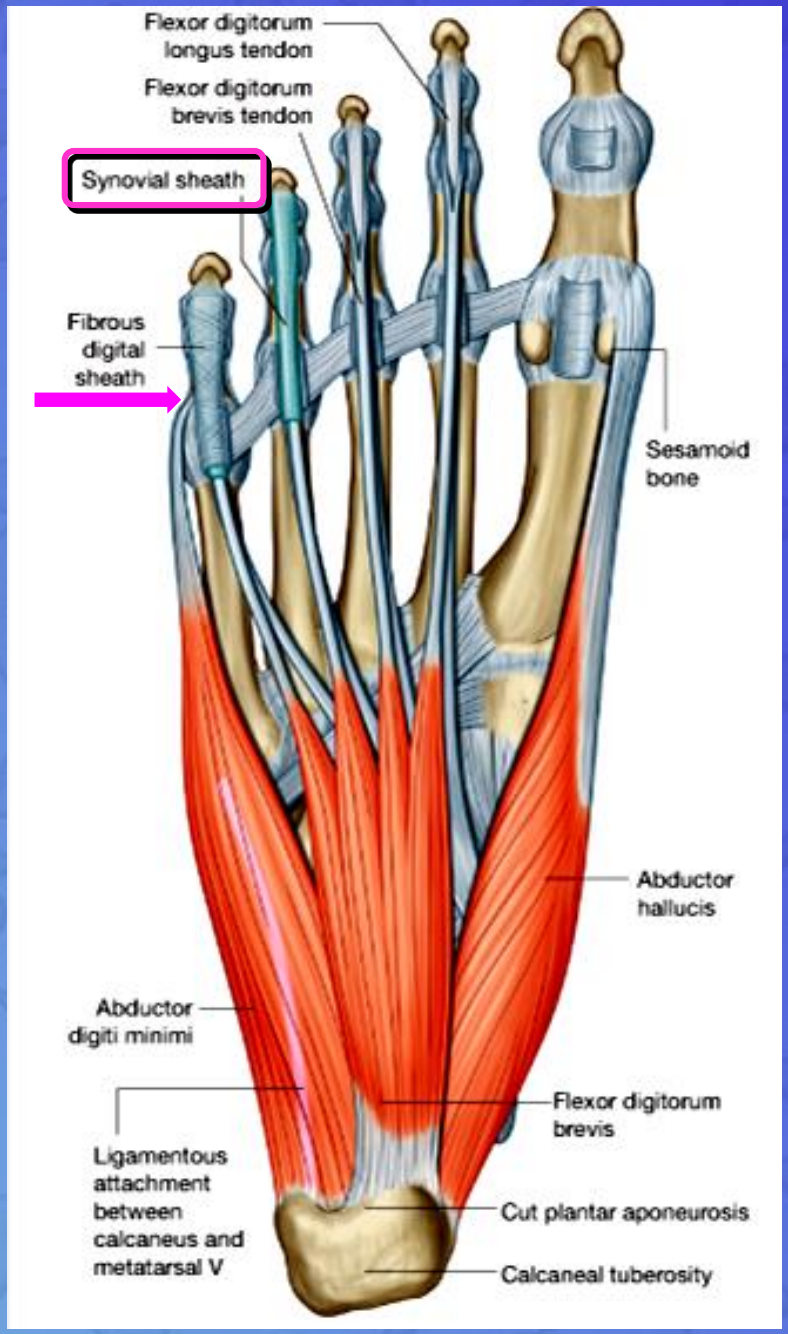
# Function of Arches of the Foot

- **Weight bearing**
- **Support walking & running**
- **Provide potential space for neurovascular bundle of the sole**
- **Act as shock absorber**
- ***In young child, the foot appears to be flat because of presence of a large amount of subcutaneous fat on the sole of foot***




# Fibrous Flexor Sheaths

- The inferior surface of each toe, from the head of the metatarsal bone to the base of the distal phalanx, is provided with a strong fibrous sheath, which is attached to the sides of the phalanges.
- The fibrous sheath, together with the inferior surfaces of the phalanges and the interphalangeal joints, forms a *blind tunnel* in which lie the flexor tendons of the toes.




# Synovial Flexor Sheaths

**The tendons** of the **flexor hallucis longus** and the **flexor digitorum longus** are surrounded by **synovial sheaths**

# THANK YOU