

Systemic Module

MSS

“Anatomy”

Muscles of Leg

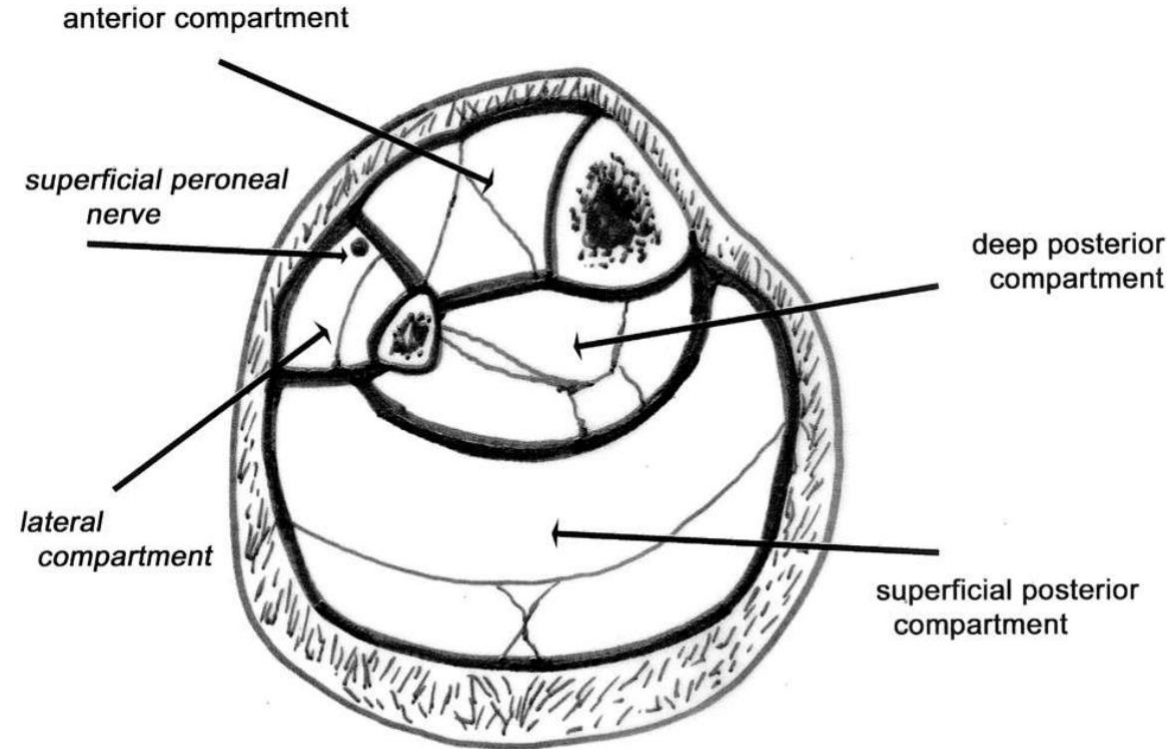
Dr. Ayman Alzubi

Faculty of Medicine, Yarmouk University

Compartments of Leg

- The leg is divided into four compartments

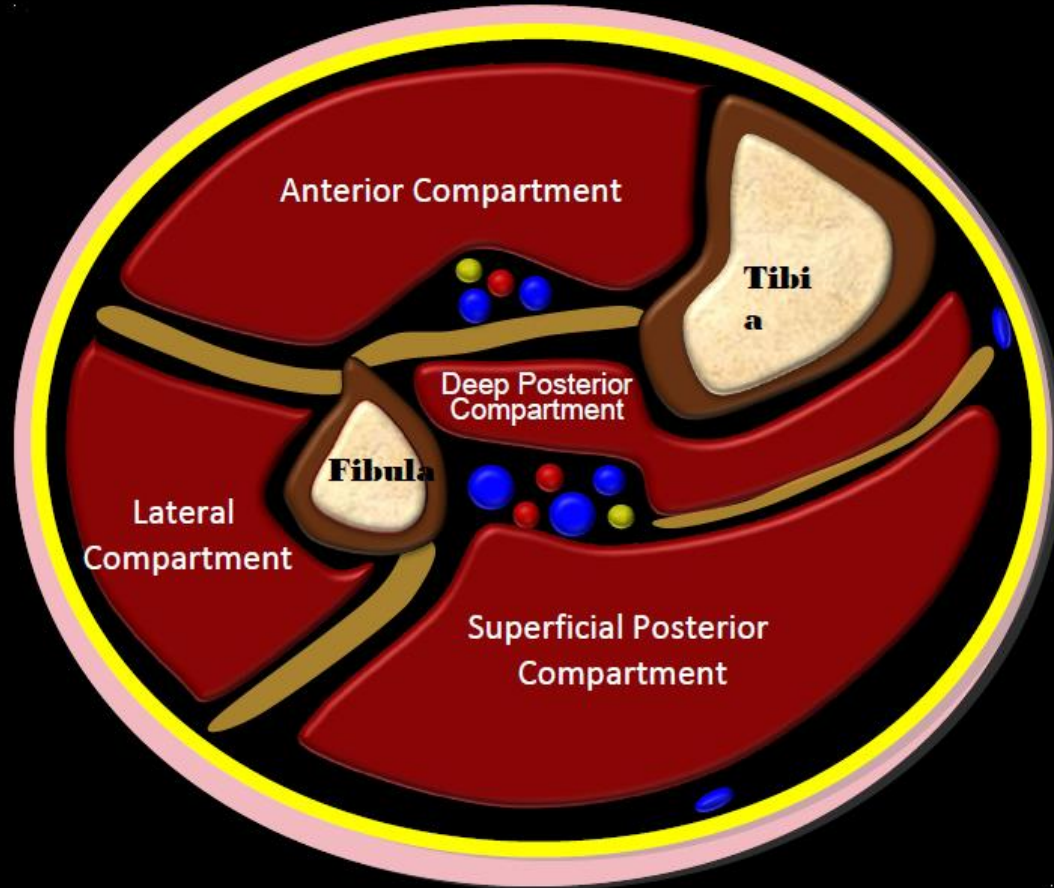
1. Anterior compartment
2. Lateral compartment
3. Superficial posterior compartment
4. Deep posterior compartment



Cross Section through middle of right leg looking up from foot

anterior

L
A
T
E
R
A
L

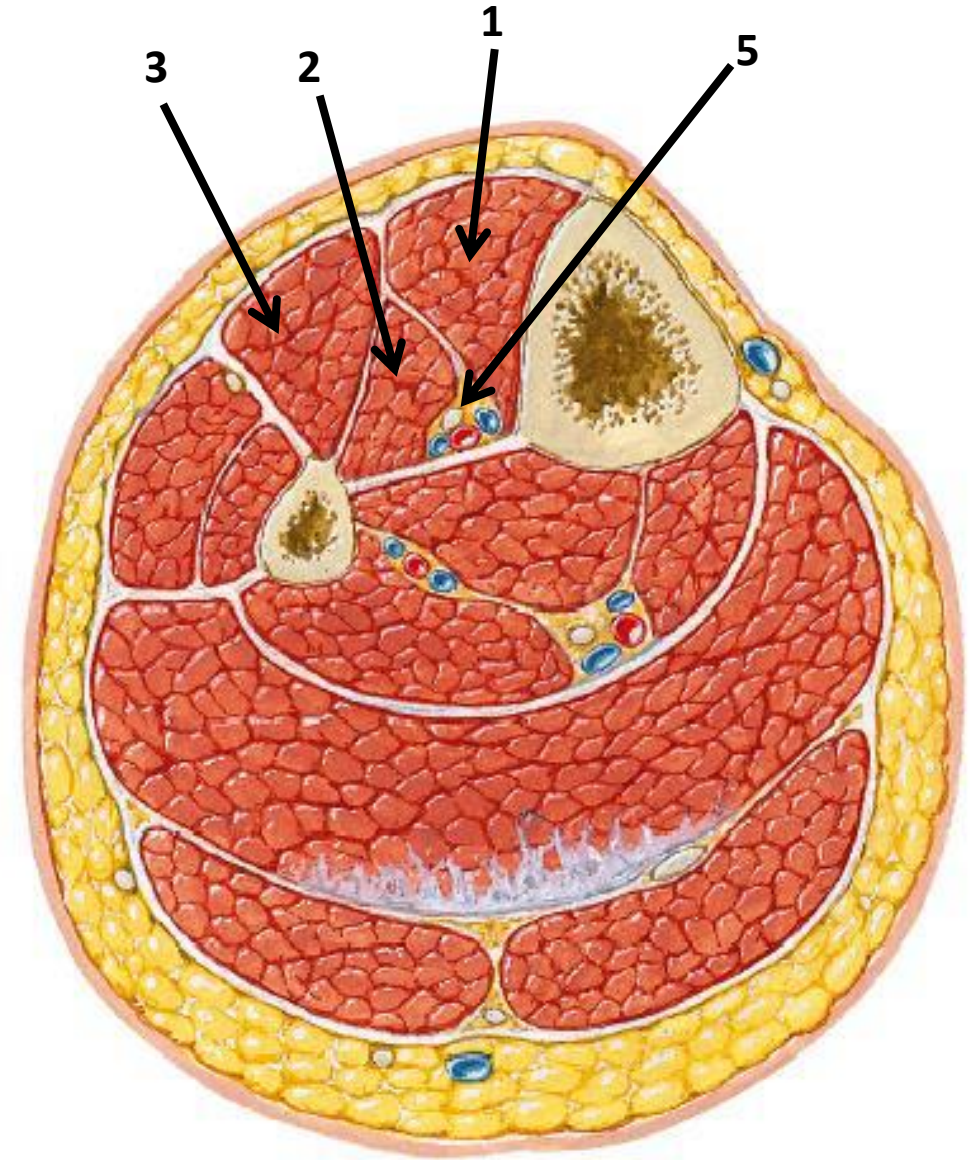


M
E
D
I
A
L

posterior

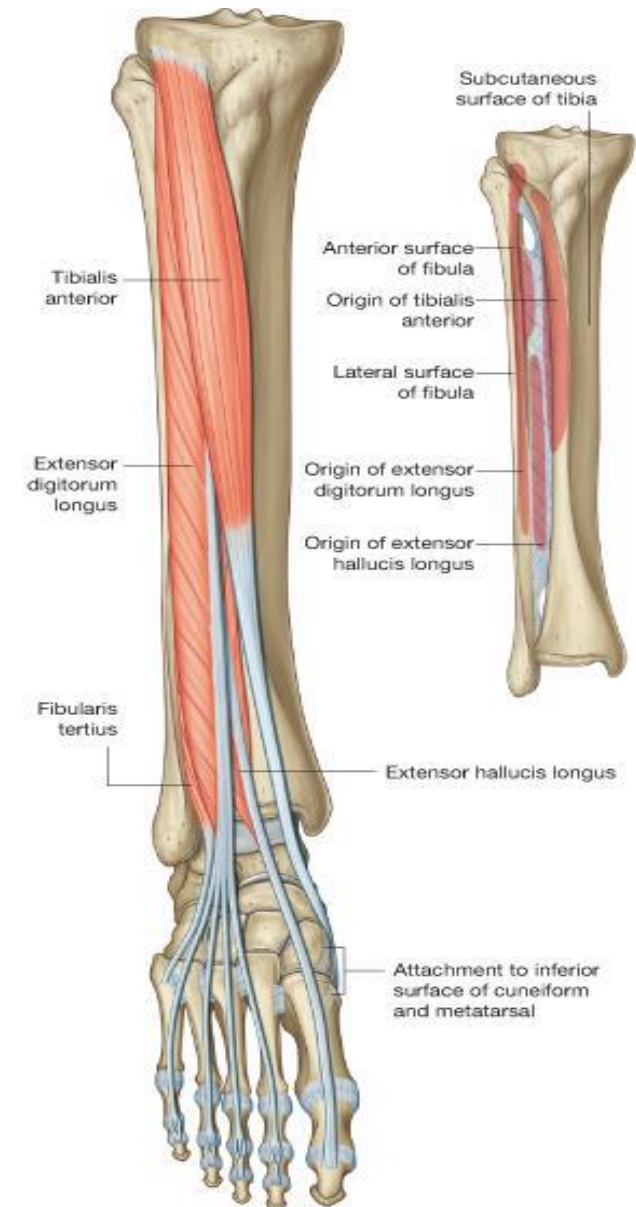
The Anterior Compartment

- Content of anterior compartment :
 1. **Tibialis anterior**
 2. **Extensor hallucis longus**
 3. **Extensor digitorum longus**
 4. **Peroneus tertius**
 5. **Deep peroneal nerve**
 6. **Anterior tibial artery and vein**



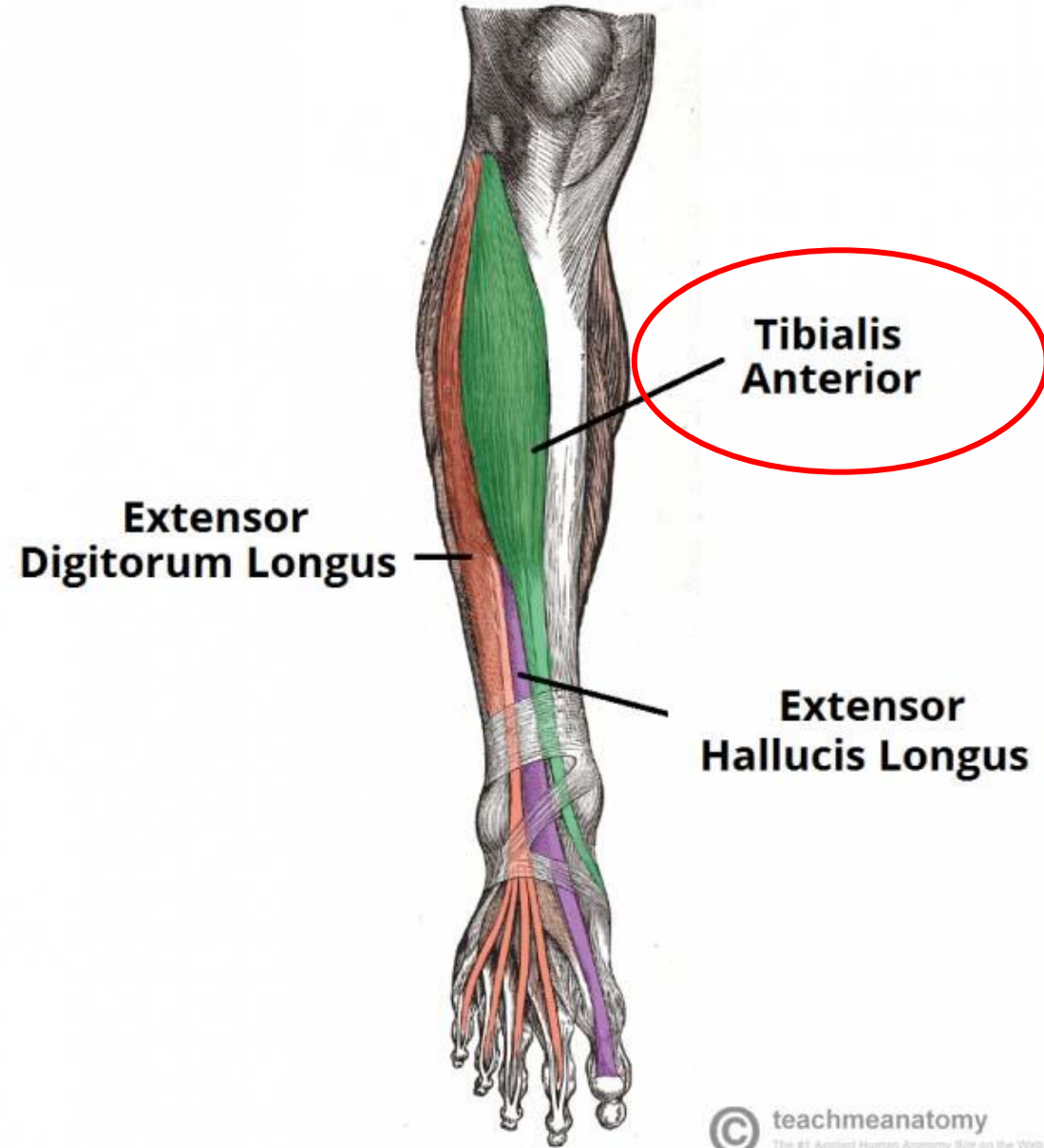
Muscles of Anterior Compartment

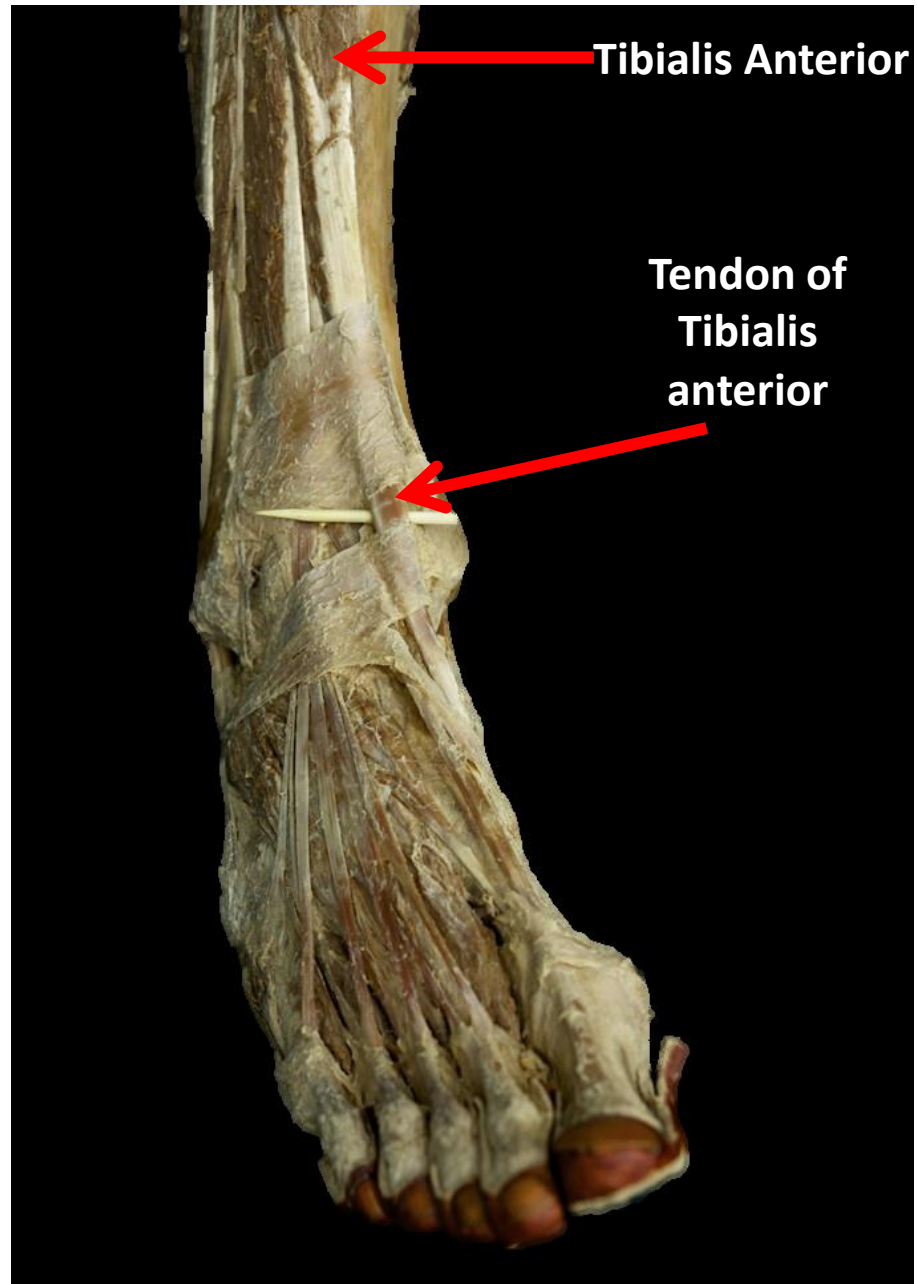
- **Four muscles:**
 1. Tibialis anterior
 2. Extensor hallucis longus
 3. Extensor digitorum longus
 4. Peroneus tertius
- **Action:**
 1. Dorsiflex the foot at the ankle joint
 2. Extend the toes
 3. Invert the foot



Tibialis Anterior

- **Origin:** Lateral surface of the tibia
- **Insertion:** medial cuneiform and base of 1st metatarsal bone.
- **Action:** Dorsiflexion and inversion of the foot.
- **Nerve Supply:** Deep peroneal nerve.



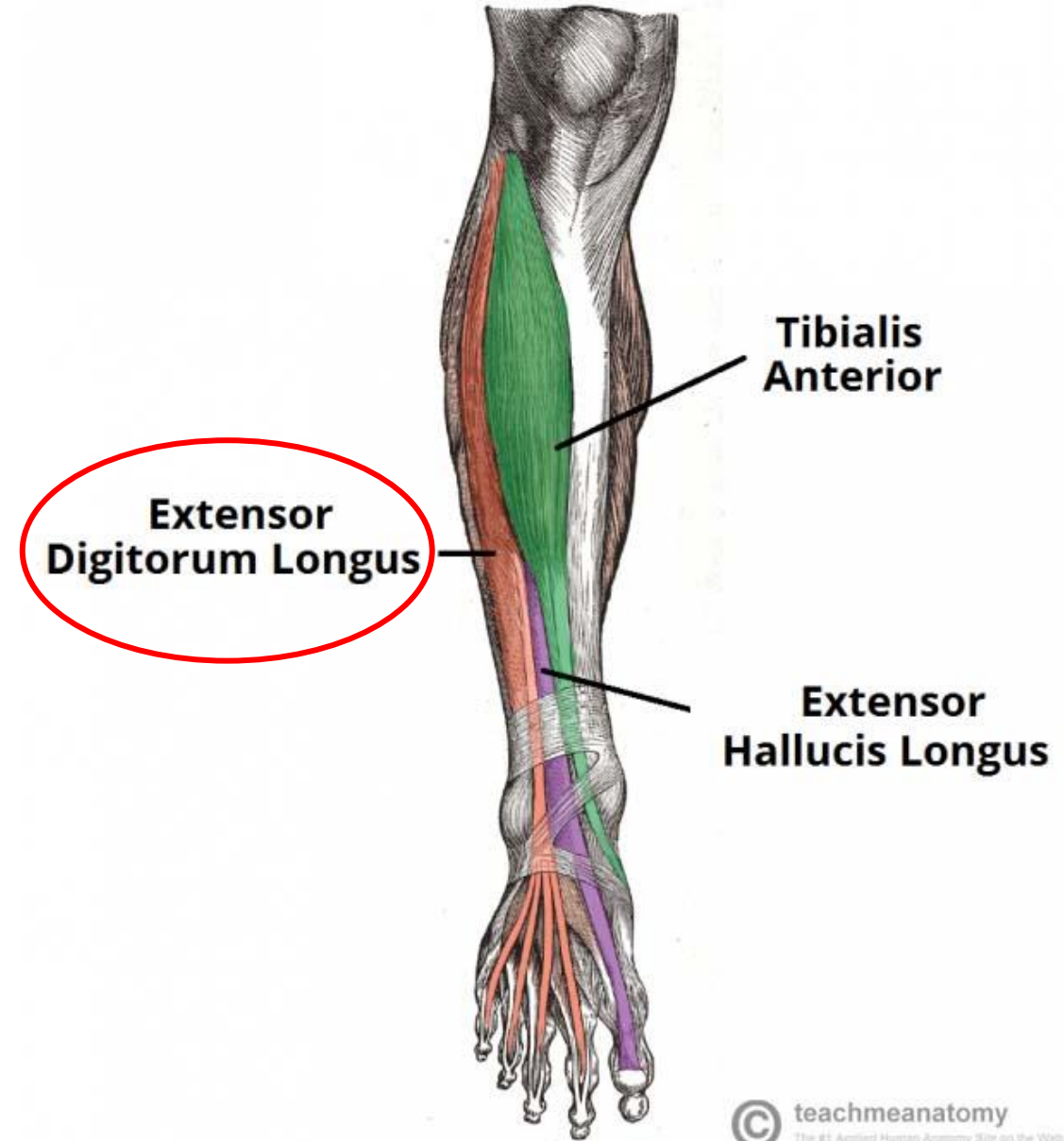


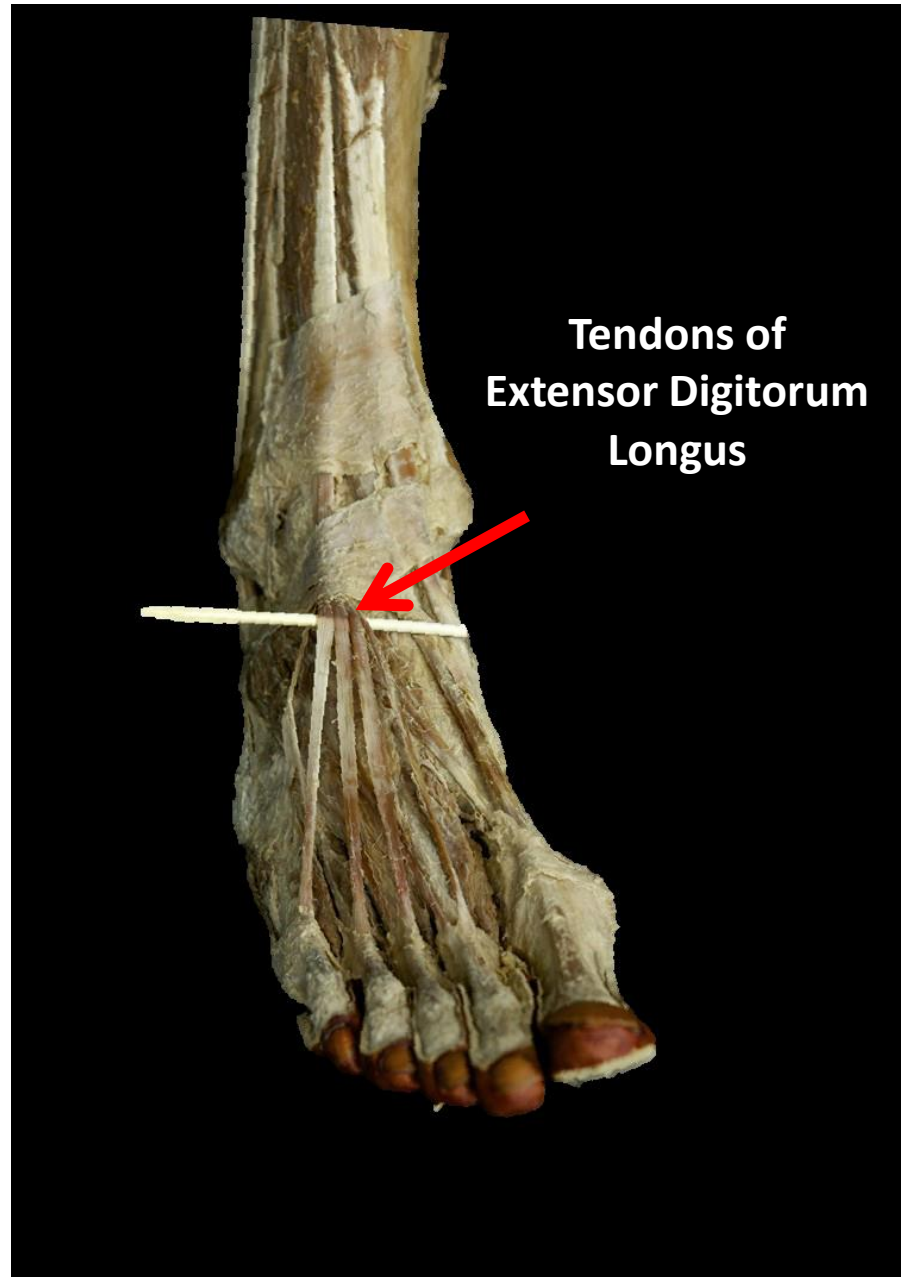
Action of Tibialis Anterior



Extensor Digitorum Longus

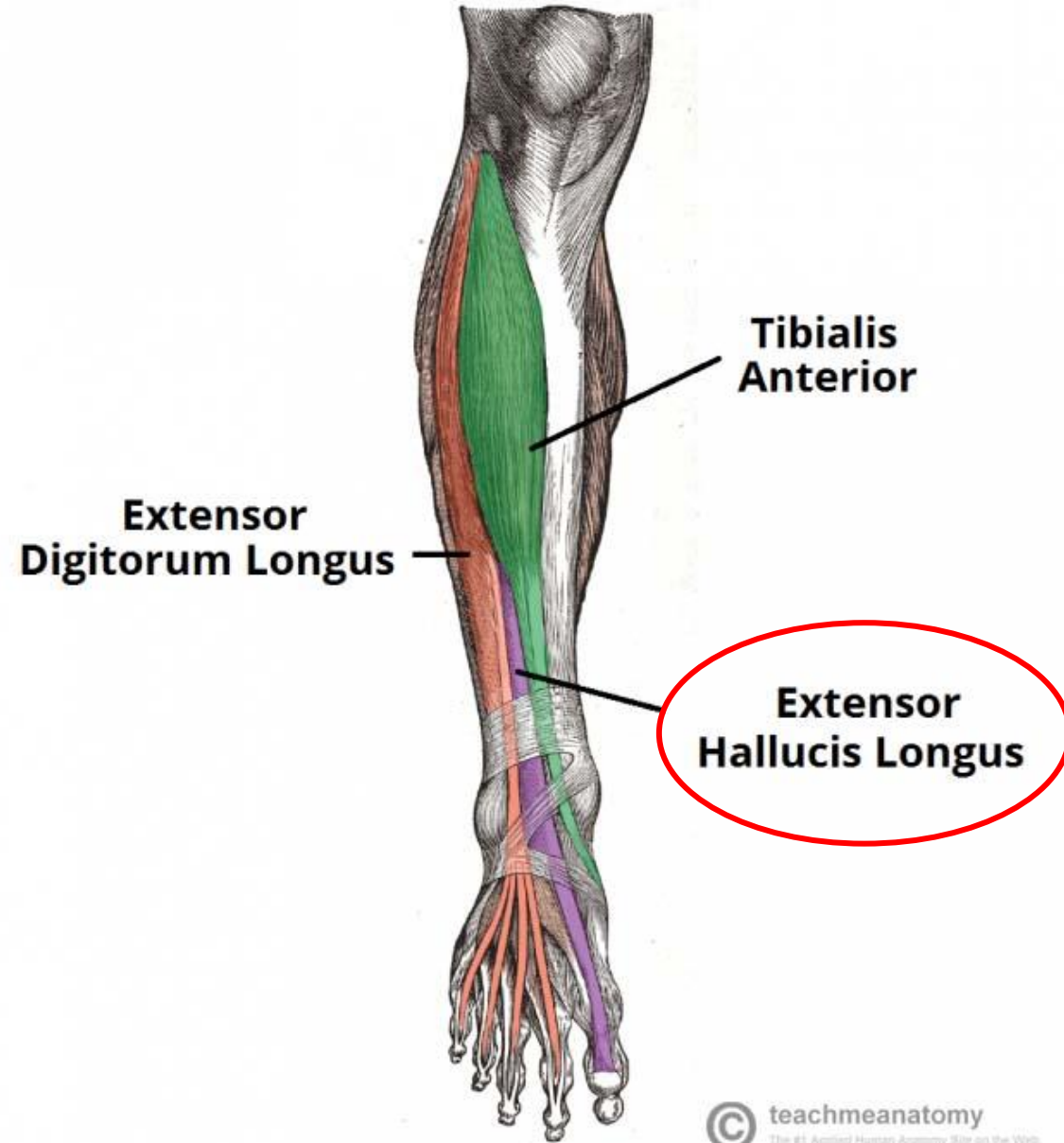
- **Origin:** Lateral condyle of the tibia and the medial surface of the fibula.
- **Insertion:** The tendon divides into four slips and these insert into the dorsal expansions of toes 2-5.
- **Action:**
 - Dorsiflexes the ankle joint.
 - Extends the toes.
- **Nerve Supply:** Deep peroneal nerve.

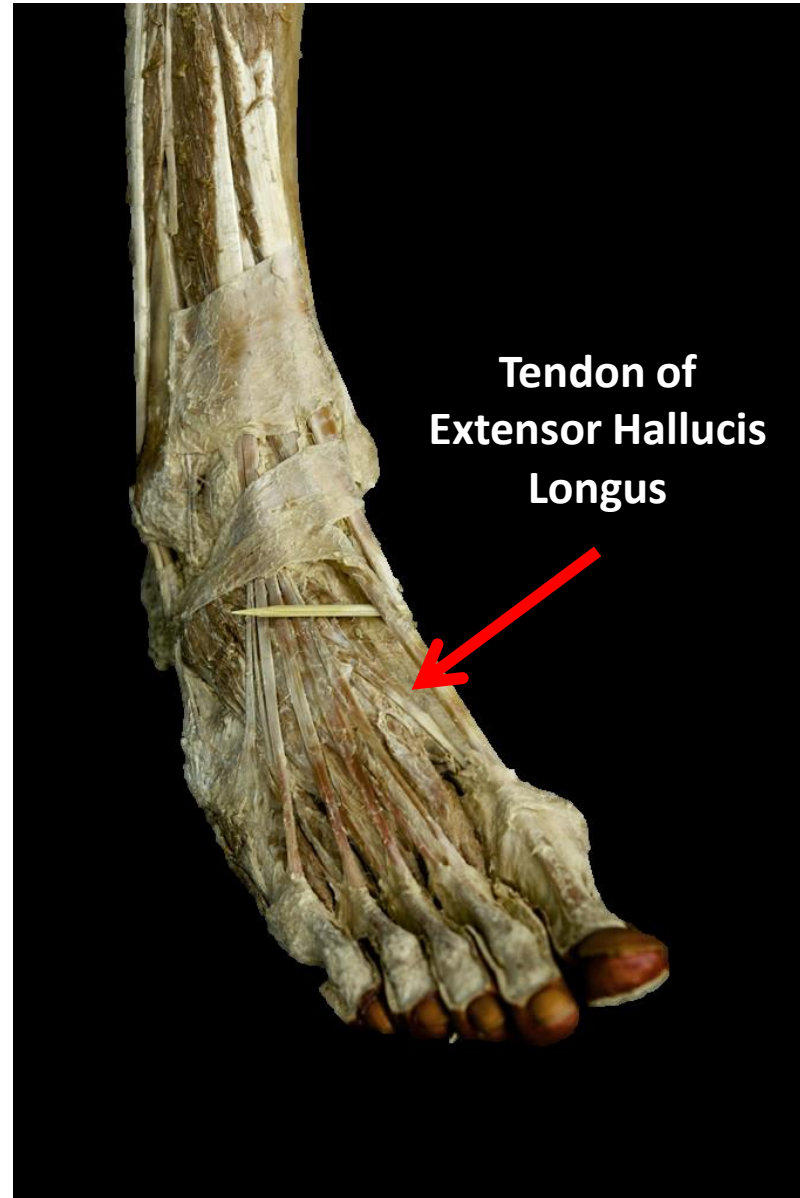




Extensor Hallucis Longus

- **Origin:** Medial surface of the fibula.
- **Insertion:** base of the distal phalanx of the great toe.
- **Action:**
 - Extension of the great toe
 - Dorsiflexion of the foot
- **Nerve Supply:** Deep peroneal nerve.





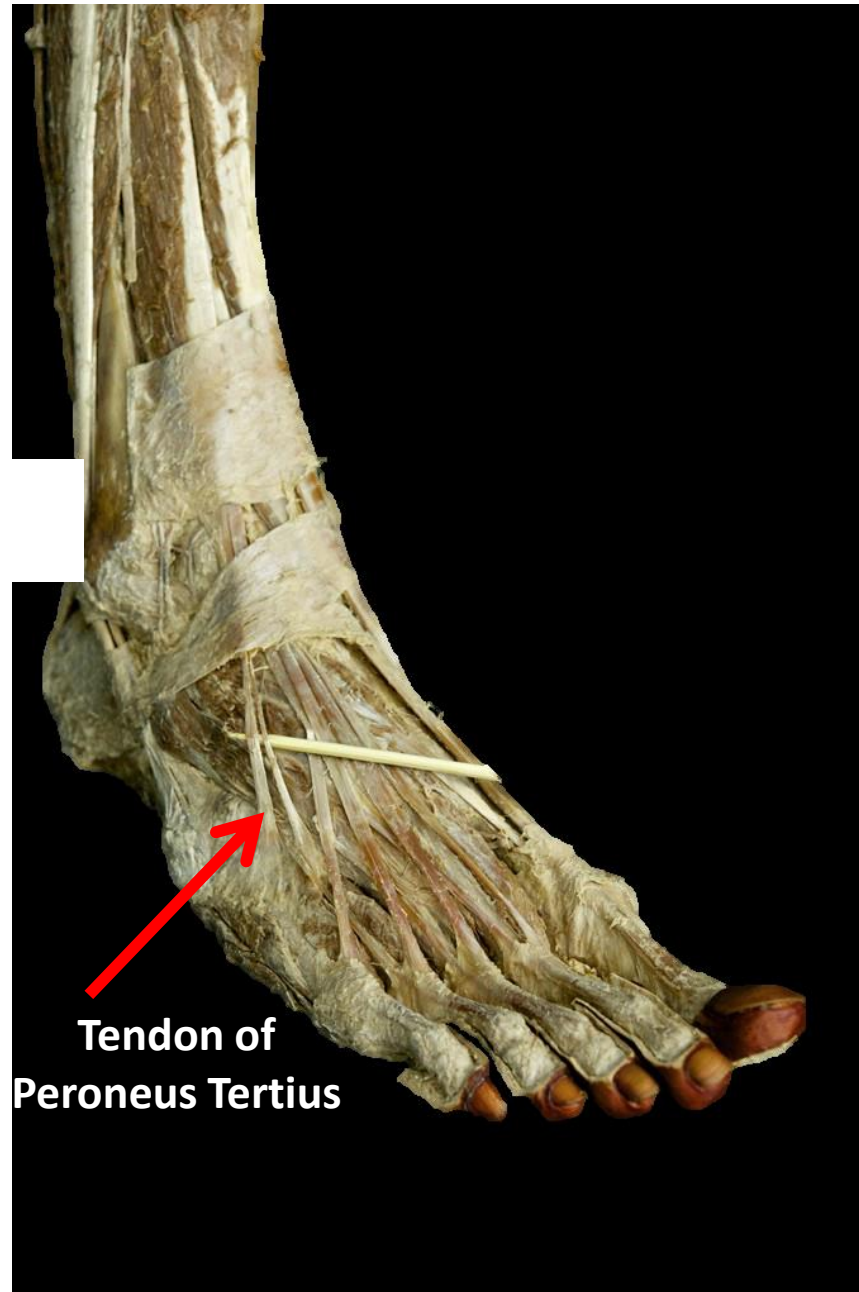
Action of Extensor Hallucis Longus



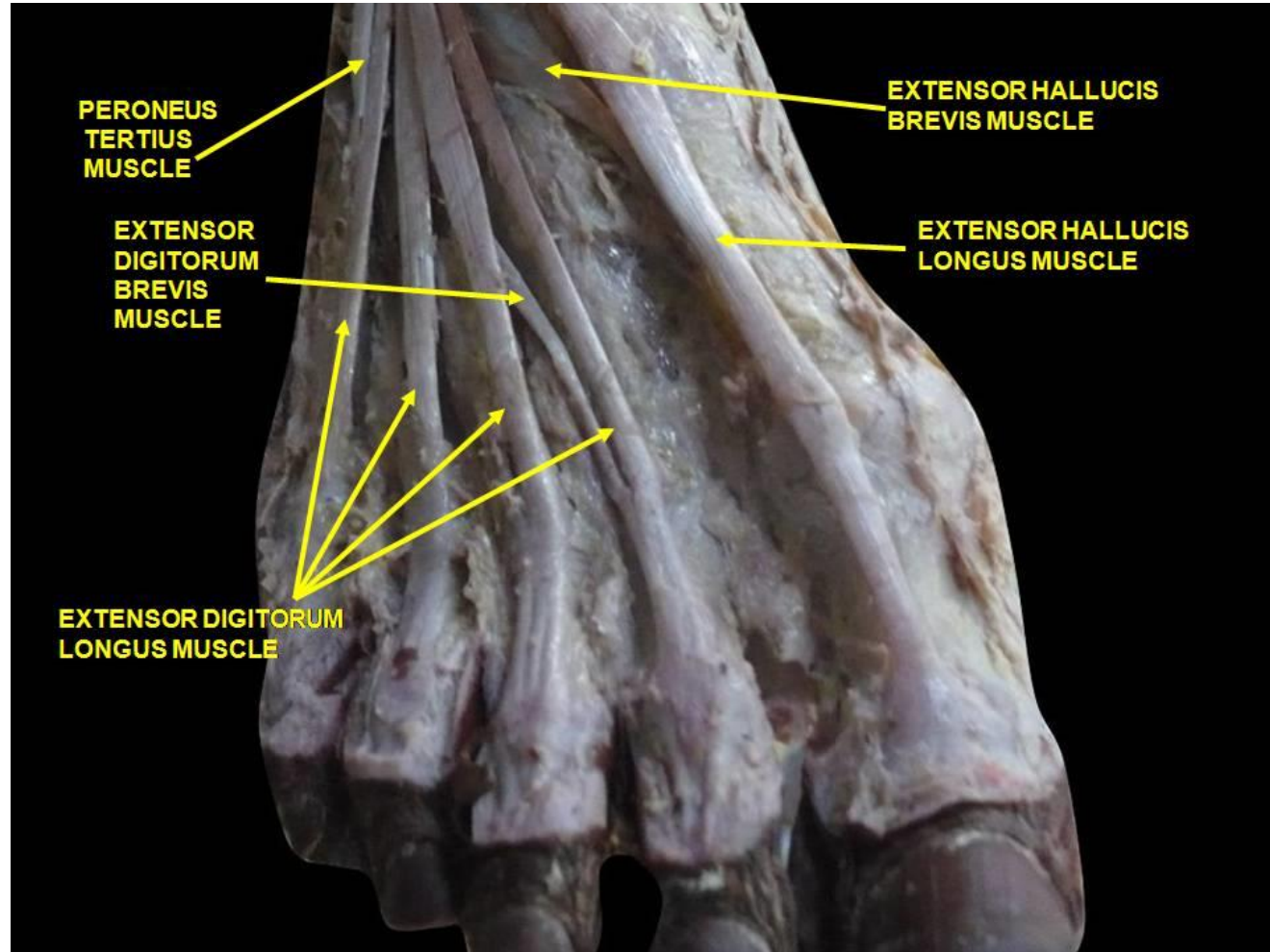
Peroneus Tertius (may be absent)

- **Origin:** Originates with the extensor digitorum longus from the medial surface of the fibula.
- **Insertion:** Base of 5th metatarsal bone.
- **Action:** Eversion and dorsiflexion of the foot.
- **Nerve Supply:** Deep peroneal nerve.





**Tendon of
Peroneus Tertius**

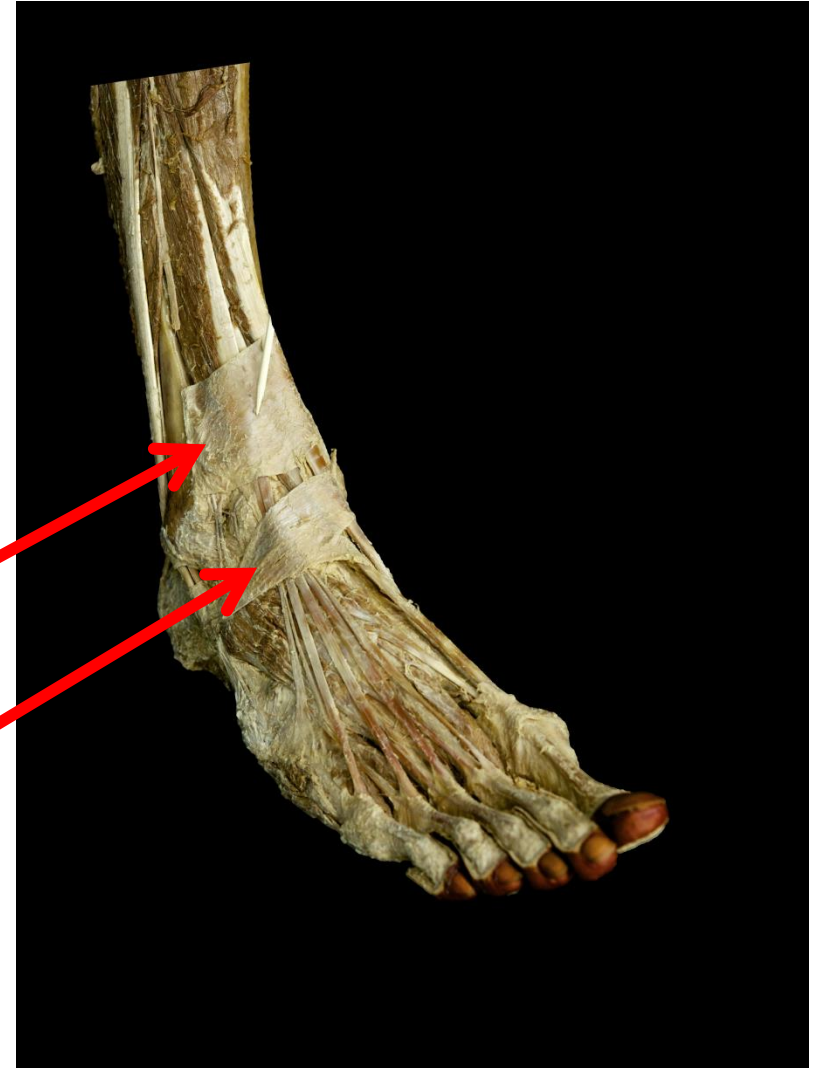


Extensor Retinacula

- Thickenings of deep fascia in the region of ankle which keep the tendons in position during contraction of the muscles and movements of the joints - **prevent the 'bowstringing' of the extensor tendons.**

Superior extensor retinaculum

Inferior extensor retinaculum



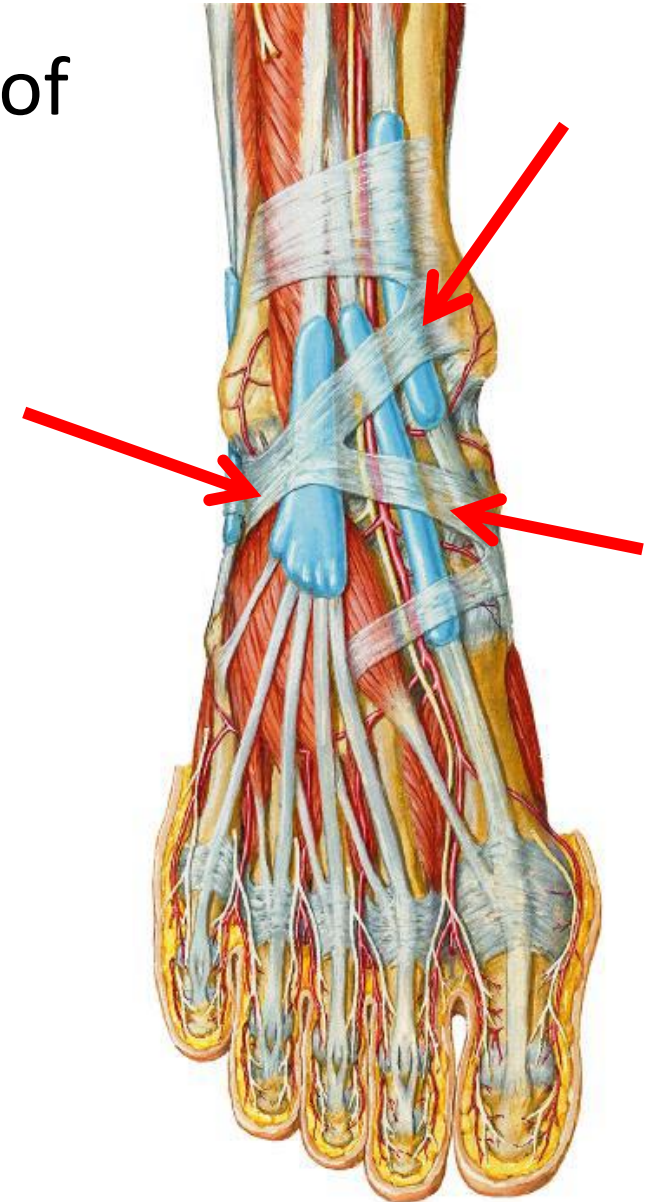
Superior Extensor Retinaculum

- Attached between lower part of anterior border of tibia and fibula.
- Structures passing deep to superior extensor retinaculum:
 1. **Tibialis anterior**
 2. **Anterior tibial vessels**
 3. **Deep peroneal nerve**
 4. **Extensor hallucis long**
 5. **Extensor digitorum longus**
 6. **Peroneus tertius.**



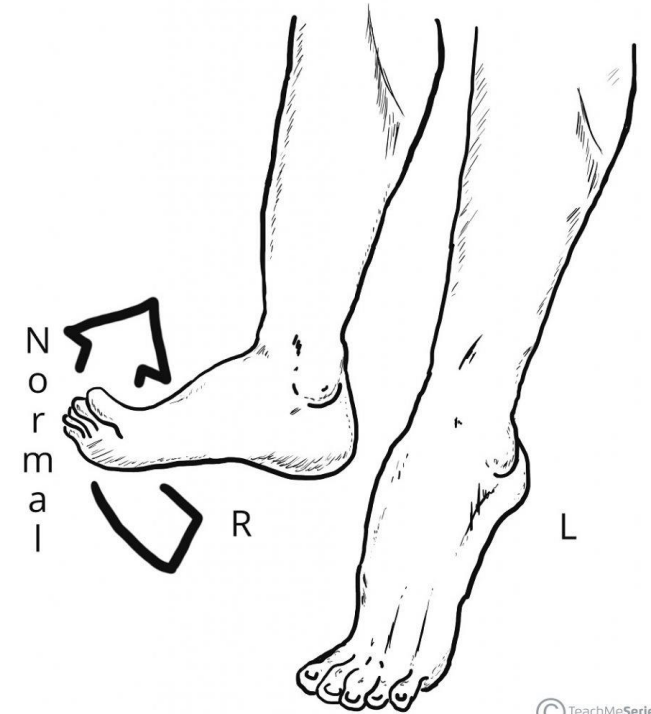
Inferior Extensor Retinaculum

- A Y-shaped band of deep fascia across dorsum of foot just distal to ankle joint.
- Structures passing deep to superior extensor retinaculum:
 1. **Tibialis anterior**
 2. **Dorsalis pedis Vessels**
 3. **Deep peroneal nerve**
 4. **Extensor hallucis long**
 5. **Extensor digitorum longus**
 6. **Peroneus tertius.**



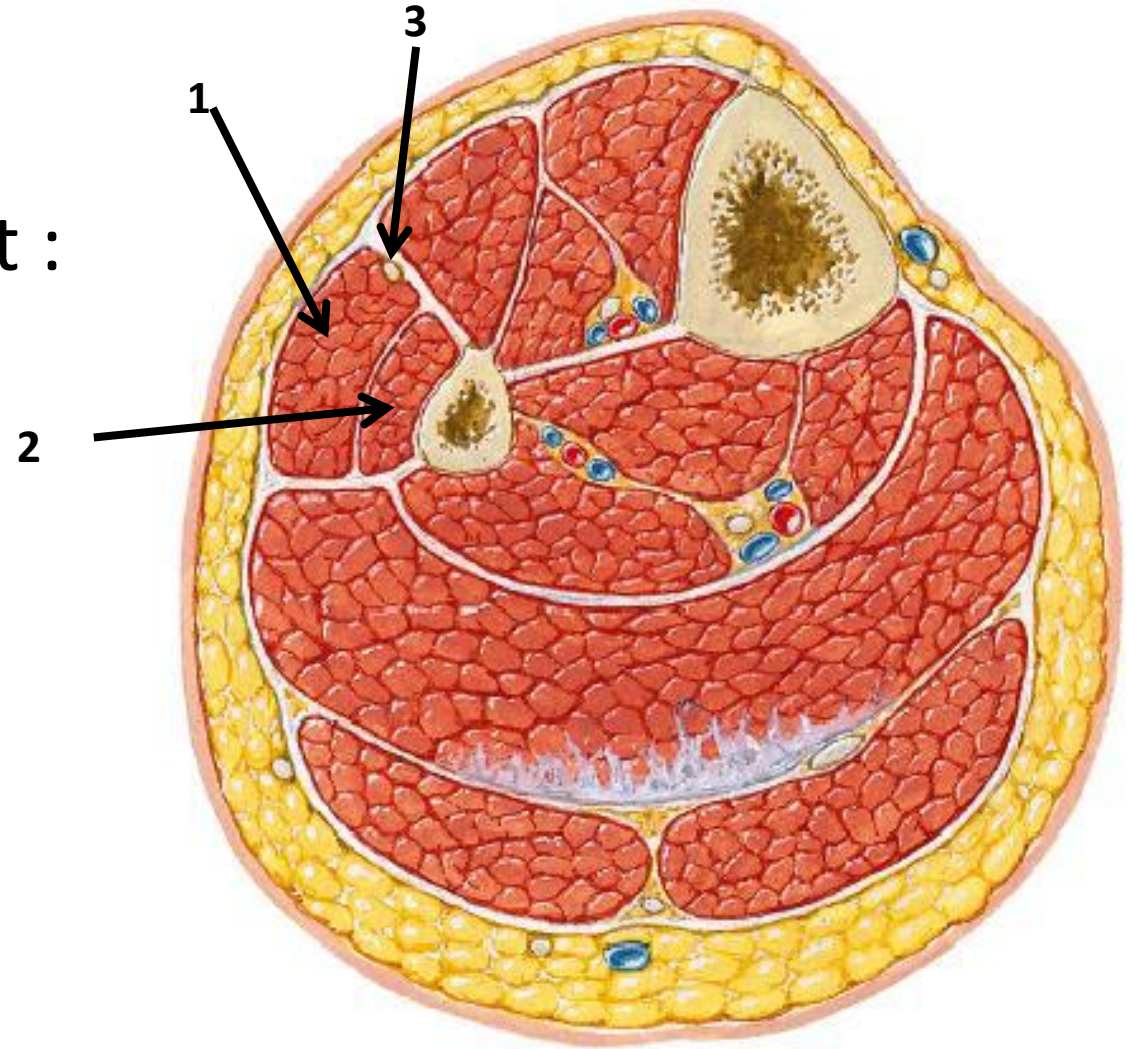
Clinical Relevance: Footdrop

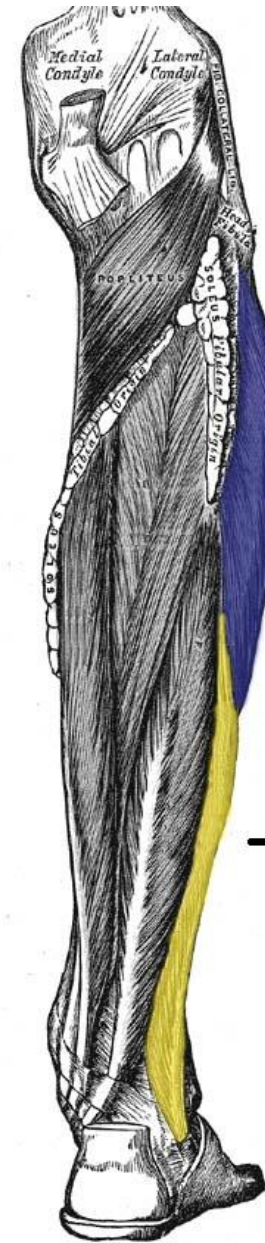
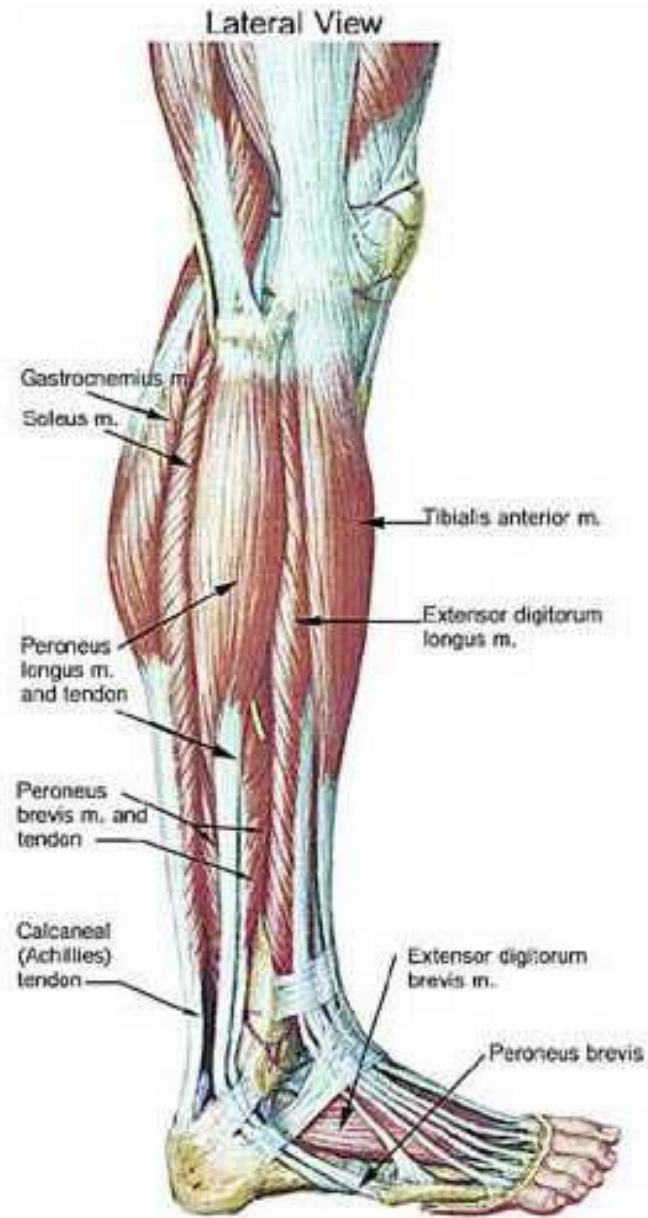
- **Footdrop** is a clinical sign indicating paralysis of the muscles in the anterior compartment of the leg.
- Typically occurs as a consequence of **damage to the common peroneal nerve** – from which the deep peroneal nerve arises.
- Anterior compartment are paralysed → The unopposed pull of the muscles in the posterior leg produce permanent plantarflexion
- The knee has to be lifted much higher in order to prevent the foot from dragging on the ground. This is called **'High Stepping Gait'**



The Lateral Compartment

- Content of lateral compartment :
 1. Peroneus longus
 2. Peroneus brevis
 3. Superficial peroneal nerve



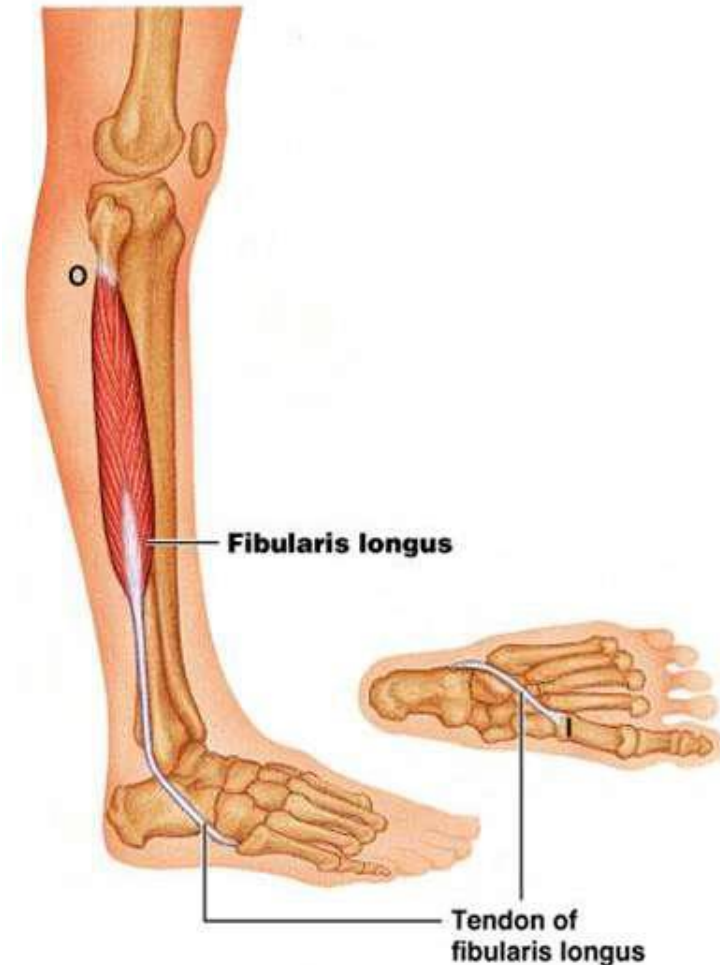


Fibularis longus

Fibularis brevis

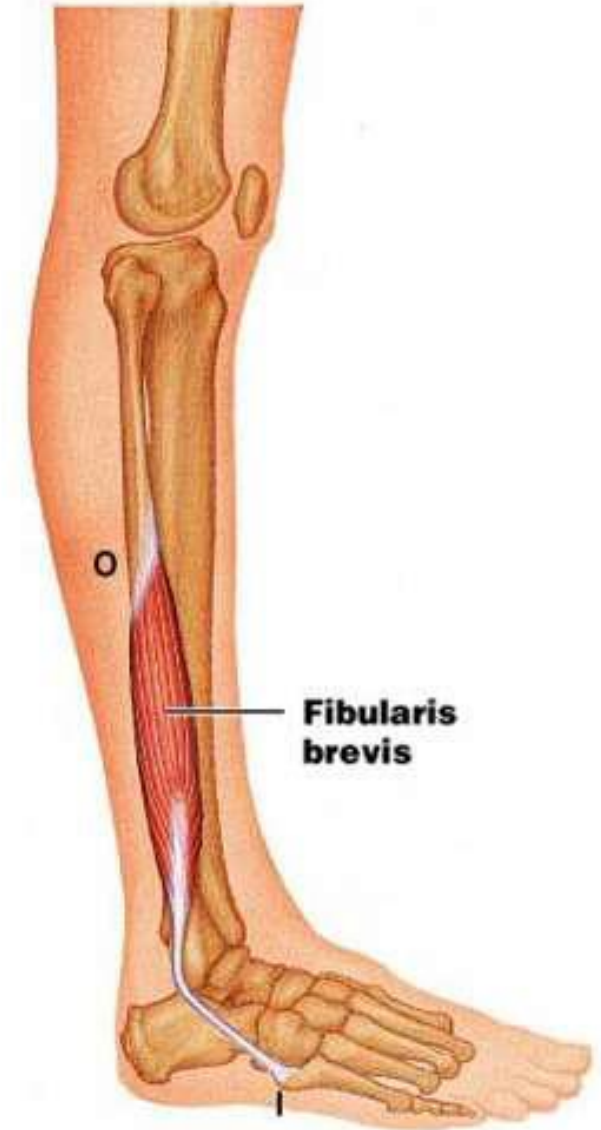
Peroneus Longus

- **Origin:** Upper 2/3rds of the lateral surface of the Fibula.
- **Insertion:** The tendon runs obliquely in the sole of the foot and inserts onto the:
 - Medial cuneiform
 - base of 1st metatarsal
- **Action:**
 - Eversion and plantarflexion of the foot.
 - Supports the lateral and transverse arches of the foot.
- **Nerve Supply:** Superficial peroneal nerve.

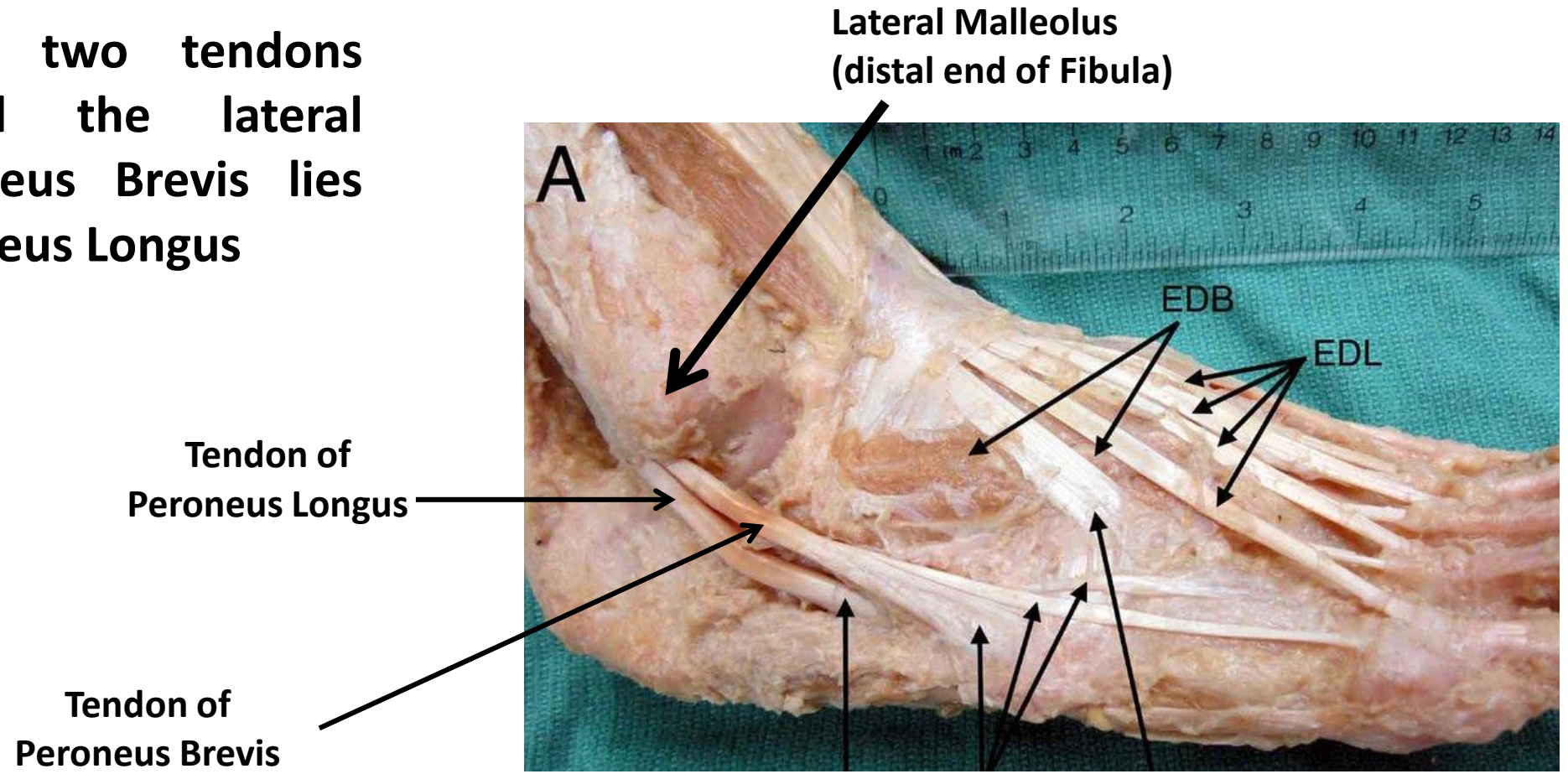


Peroneus Brevis

- The peroneus brevis muscle is deeper and shorter than the peroneus longus.
- **Origin:** Lower 2/3rds of the lateral surface of the Fibula.
- **Insertion:** The tuberosity at the base of the 5th metatarsal.
- **Action:** Eversion and plantarflexion of the foot.
- **Nerve Supply:** Superficial peroneal nerve.

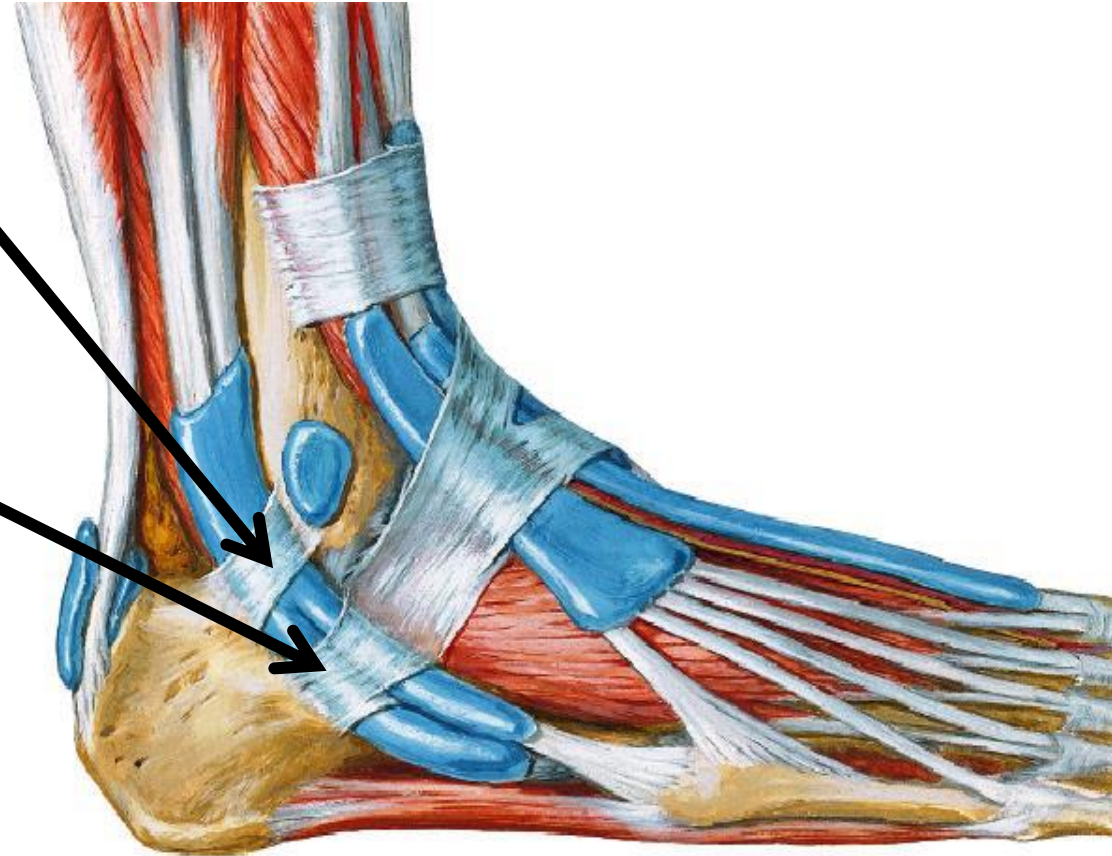


**** Where the two tendons overlap behind the lateral malleolus Peroneus Brevis lies anterior to Peroneus Longus**



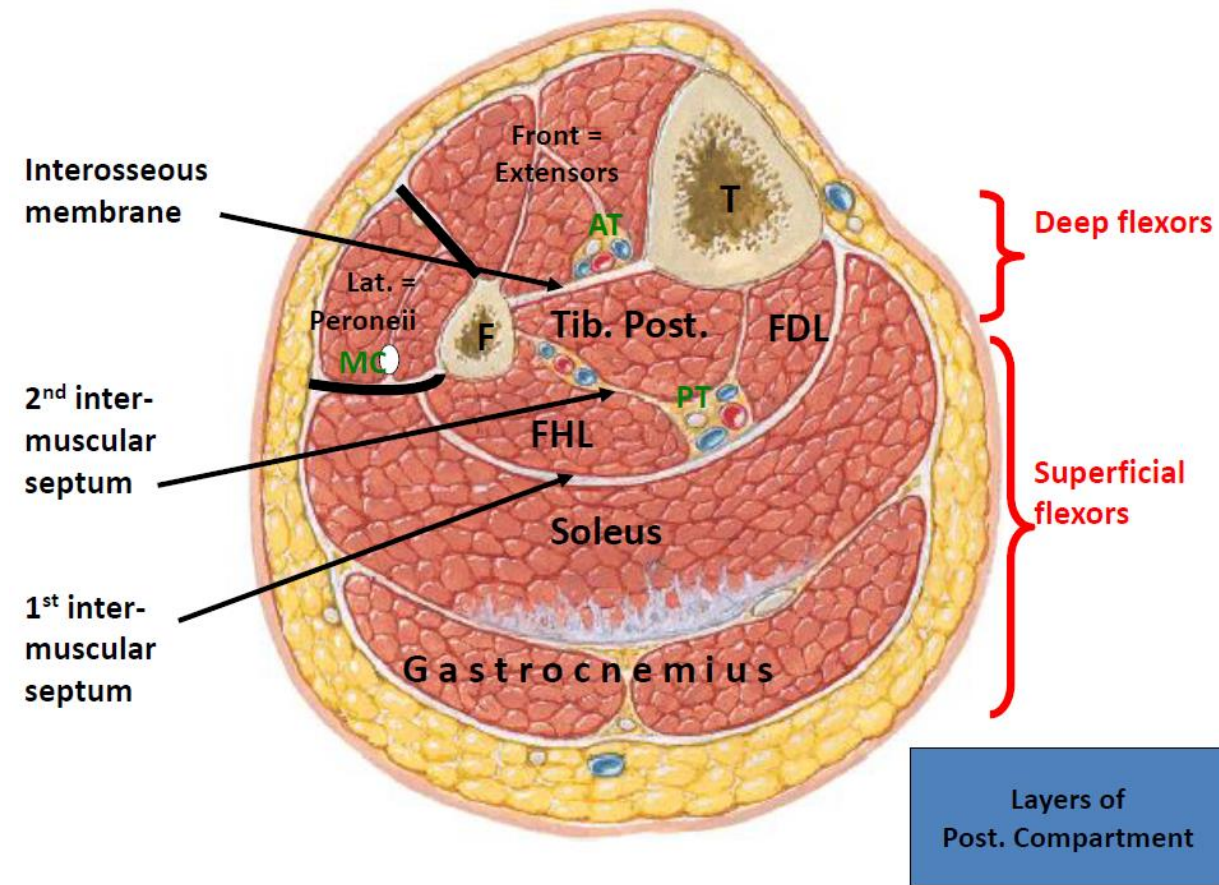
Peroneal Retinacula

- **Superior Peroneal Retinaculum** covers the tendons of the 2 peroneal muscles behind the lateral malleolus.
- **Inferior Peroneal Retinaculum** covers the tendons of the 2 peroneal muscles below the lateral malleolus on the lateral surface of the calcaneus.



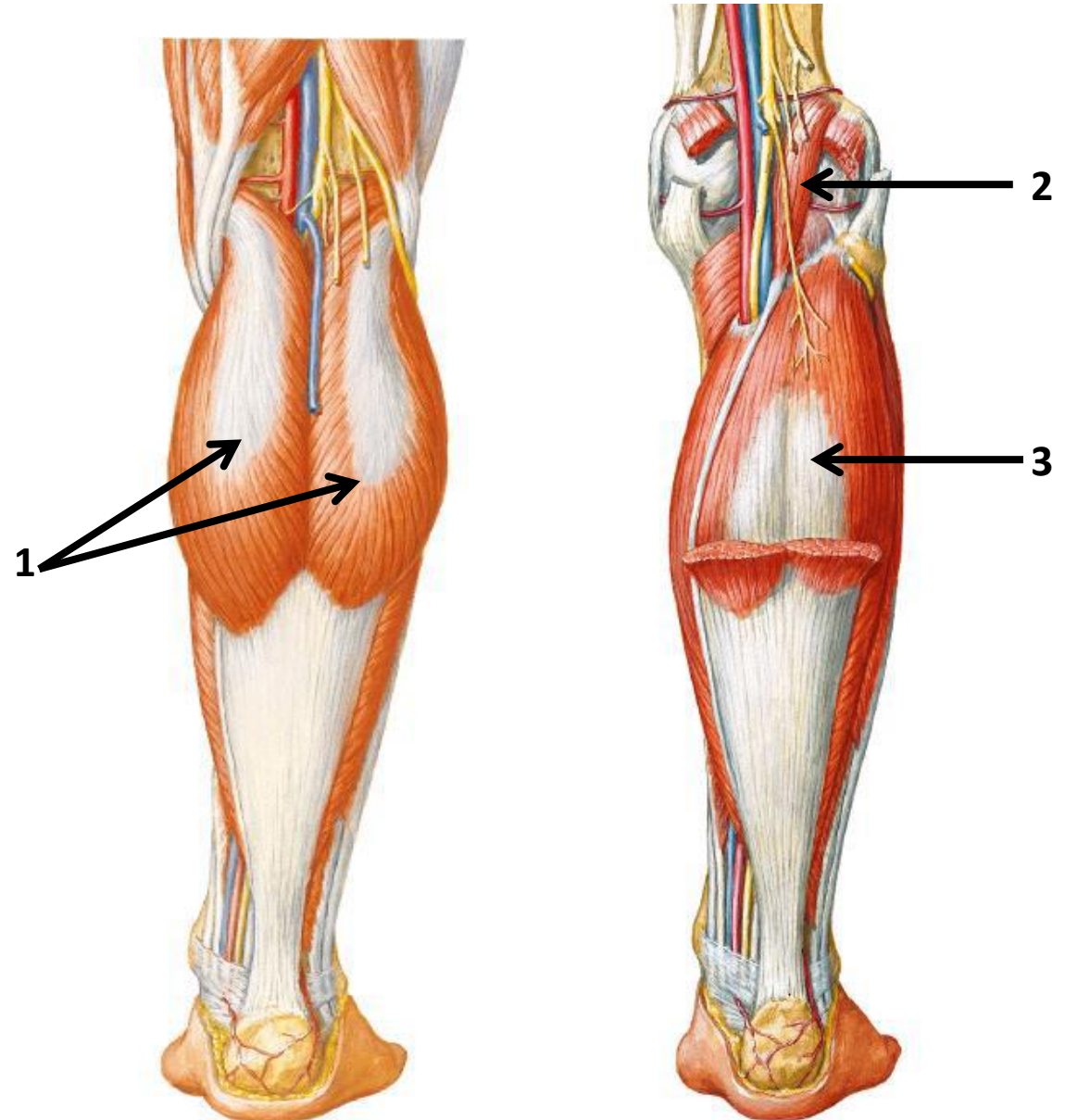
Posterior Compartment

- Posterior compartment contains the plantar flexors muscles (**muscles of the calf**).
- These muscles are arranged as two groups; **superficial** and **deep**.
- They are innervated by the **tibial nerve**, a terminal branch of the **sciatic nerve**.



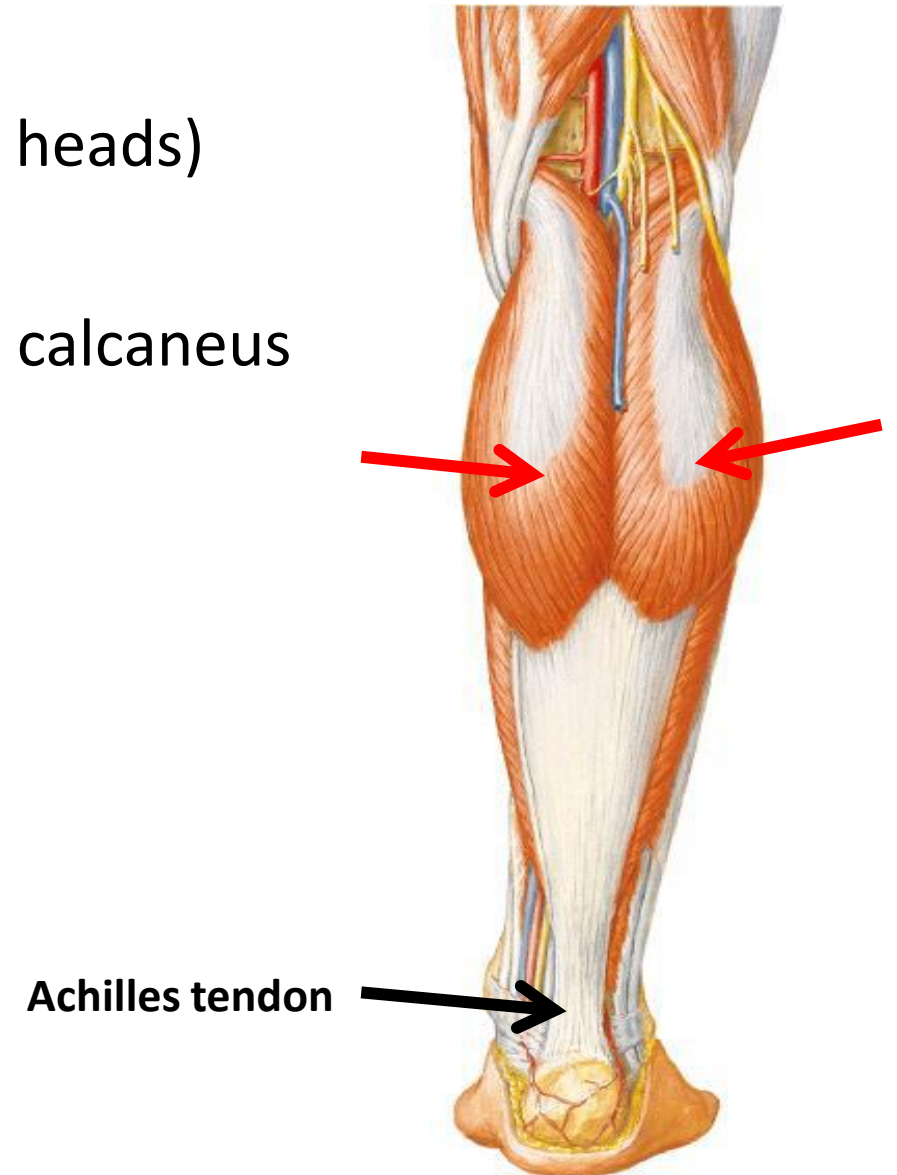
The Superficial Muscles of Posterior Compartment

- They are:
 1. **Gastrocnemius**
 2. **Plantaris**
 3. **Soleus**



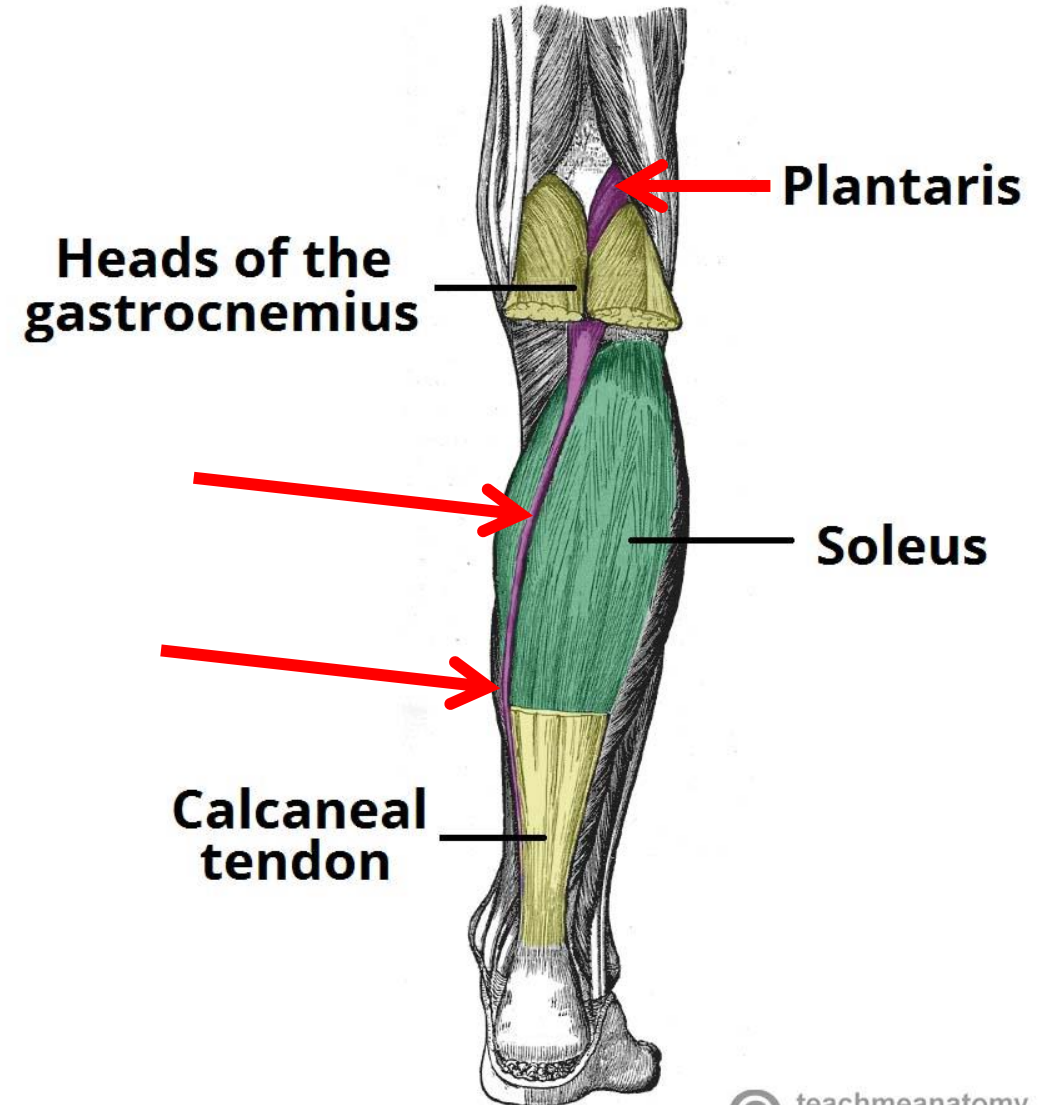
Gastrocnemius

- **Origin:** Lateral and medial femoral condyles (2 heads)
- **Insertion:** Achilles tendon (tendocalcaneus) to calcaneus
- **Action:**
 - Plantar flexes the foot
 - Flexes the leg
- **Nerve Supply:** Tibial nerve.



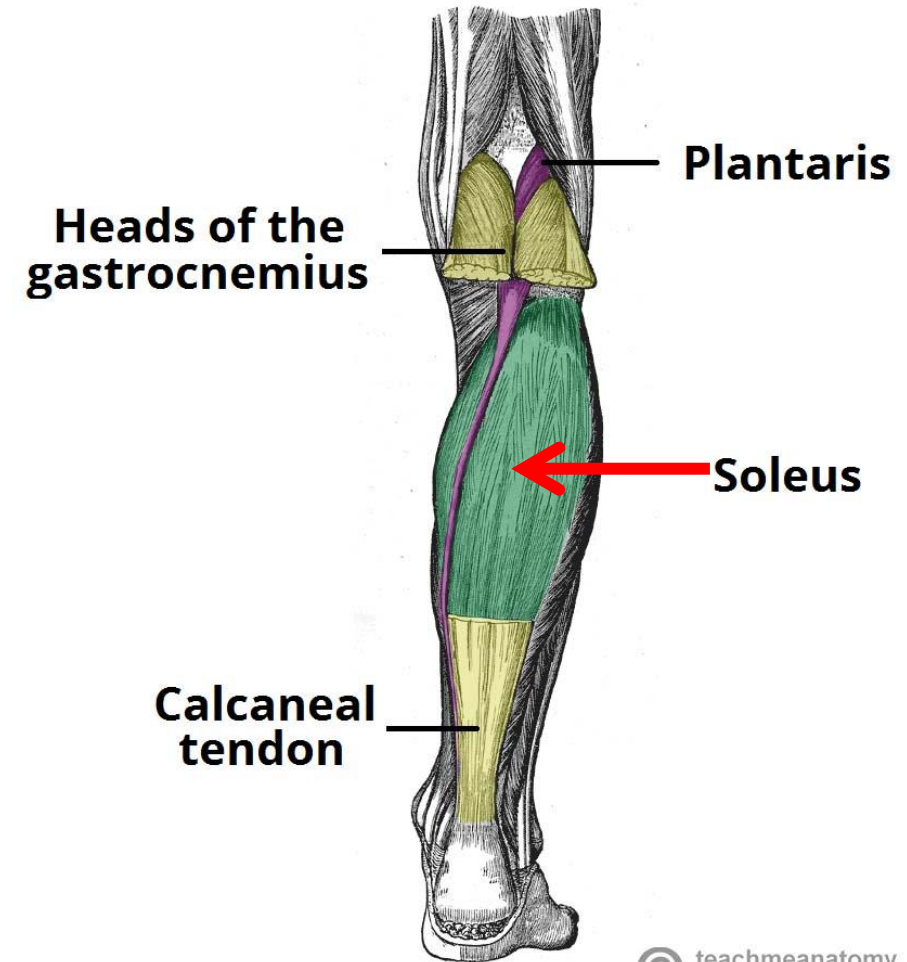
Plantaris (absent in 10% of people.)

- **Origin:** Lower part of the lateral supracondylar line.
- **Insertion:** Its long tendon joins the Achilles tendon to calcaneus.
- **Action:**
 - Plantar flexes the foot
 - Flexes the leg
- **Nerve Supply:** Tibial nerve.



Soleus

- **Origin:** Shafts of tibia and fibula
- **Insertion:** The muscle narrows in the lower part of the leg, and joins the Achilles tendon to calcaneus.
- **Action:** Plantar flexes the foot.
- **Nerve Supply:** Tibial nerve.



Action of the superficial muscles of the calf

- The superficial muscles of the calf are **powerful plantar flexor** of ankle Joint (**very important in walking and running**).
- During standing, calf muscles (specially soleus) **stabilize the leg on the foot**.
- Contraction of the calf muscles (calf pump) **plays an important role in venous return from the lower limb**, specially the soleus which is known as peripheral venous heart.



The Deep Muscles of Posterior Compartment

- They are:

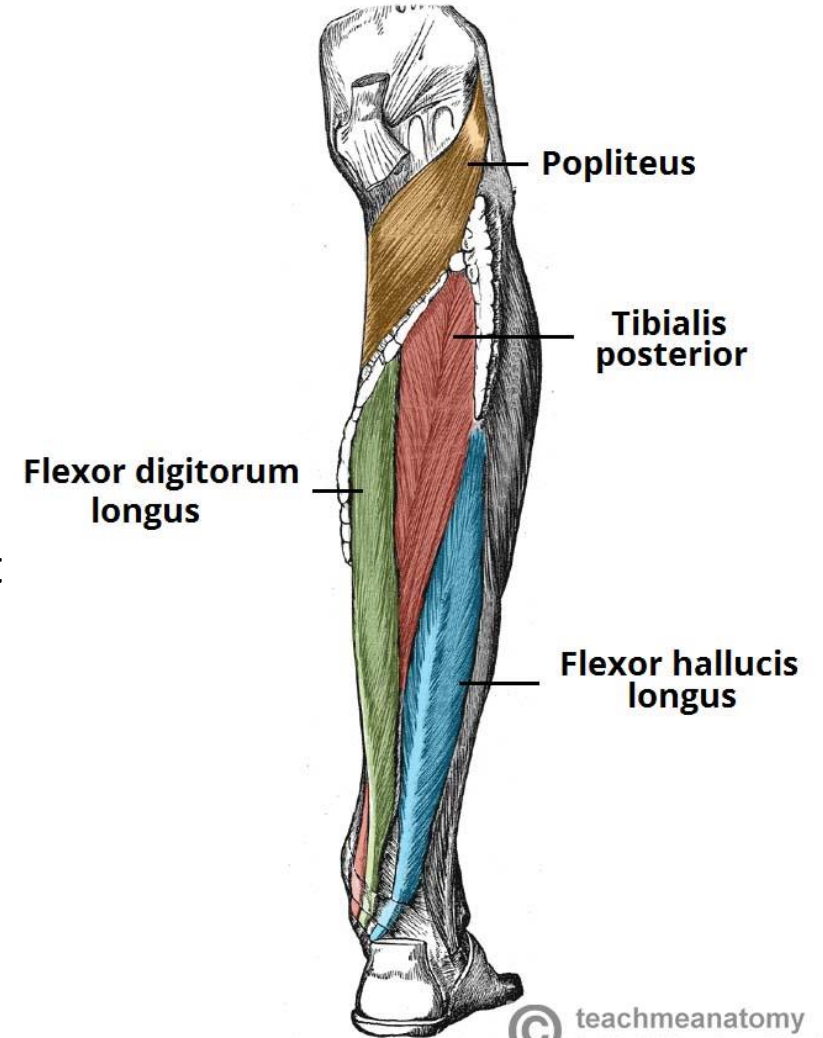
1. **Popliteus** (acts only on the knee joint)

2. **Flexor hallucis longus**

3. **Flexor digitorum longus**

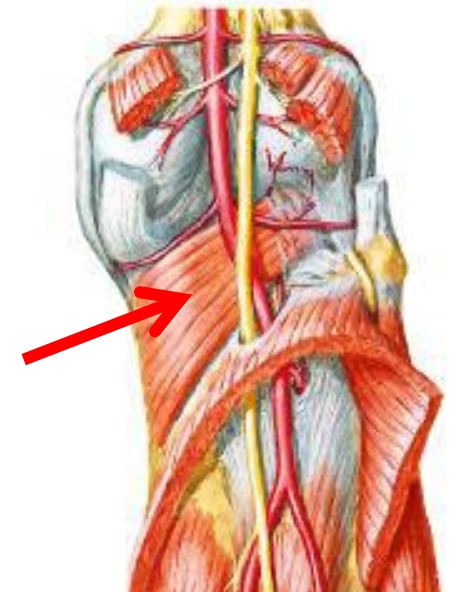
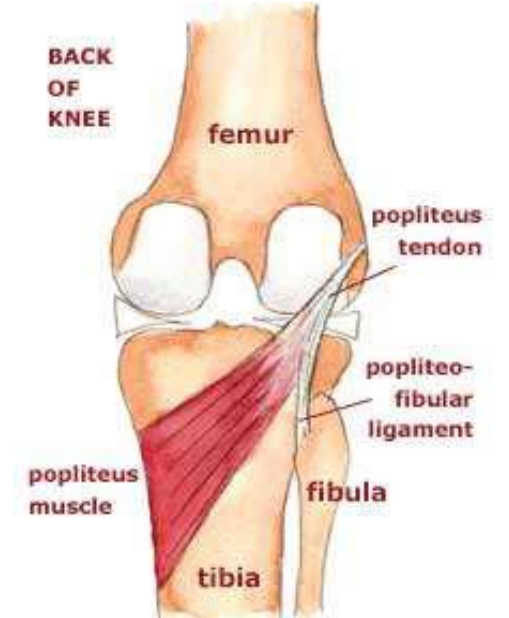
4. **Tibialis posterior**

act on the ankle and foot



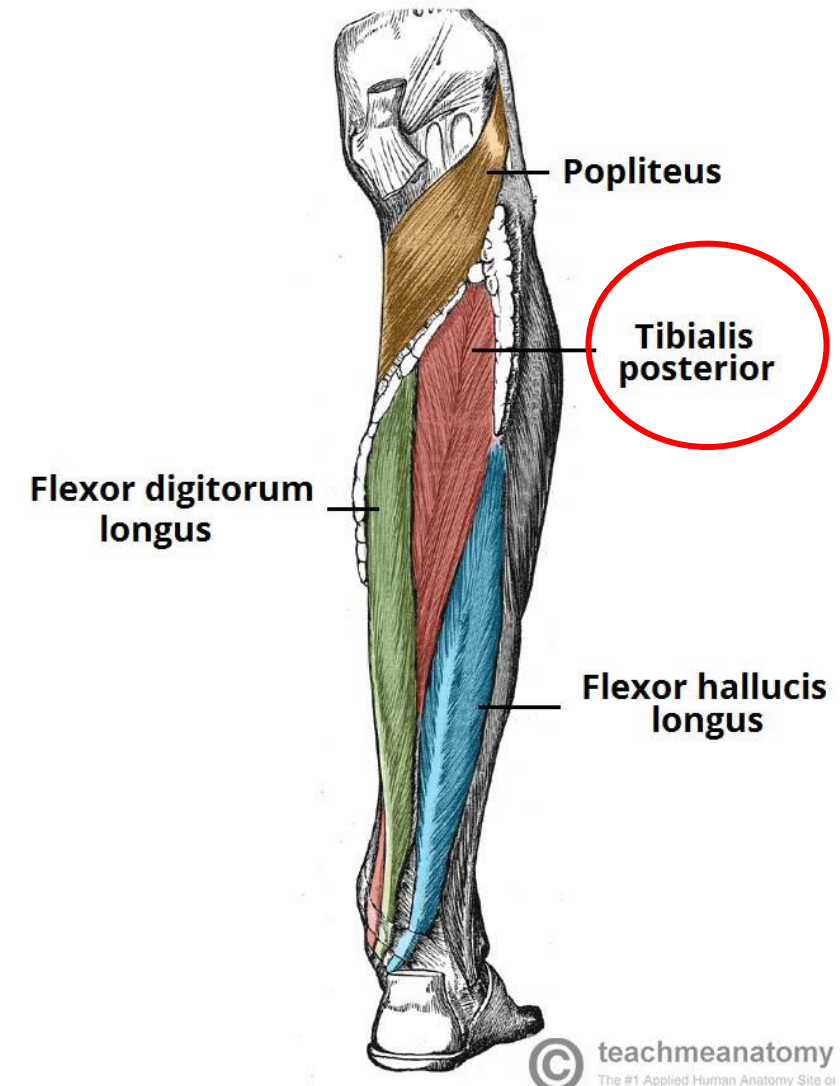
Popliteus

- **Origin:** lateral condyle of femur and lateral meniscus
- **Insertion:** Runs inferomedially towards the tibia and inserts above the origin of the soleus muscle.
- **Action:** Unlocking' the knee joint (slight medial rotation of the tibia at beginning of flexion of knee) → So that flexion can occur.
- **Nerve Supply:** Tibial nerve.



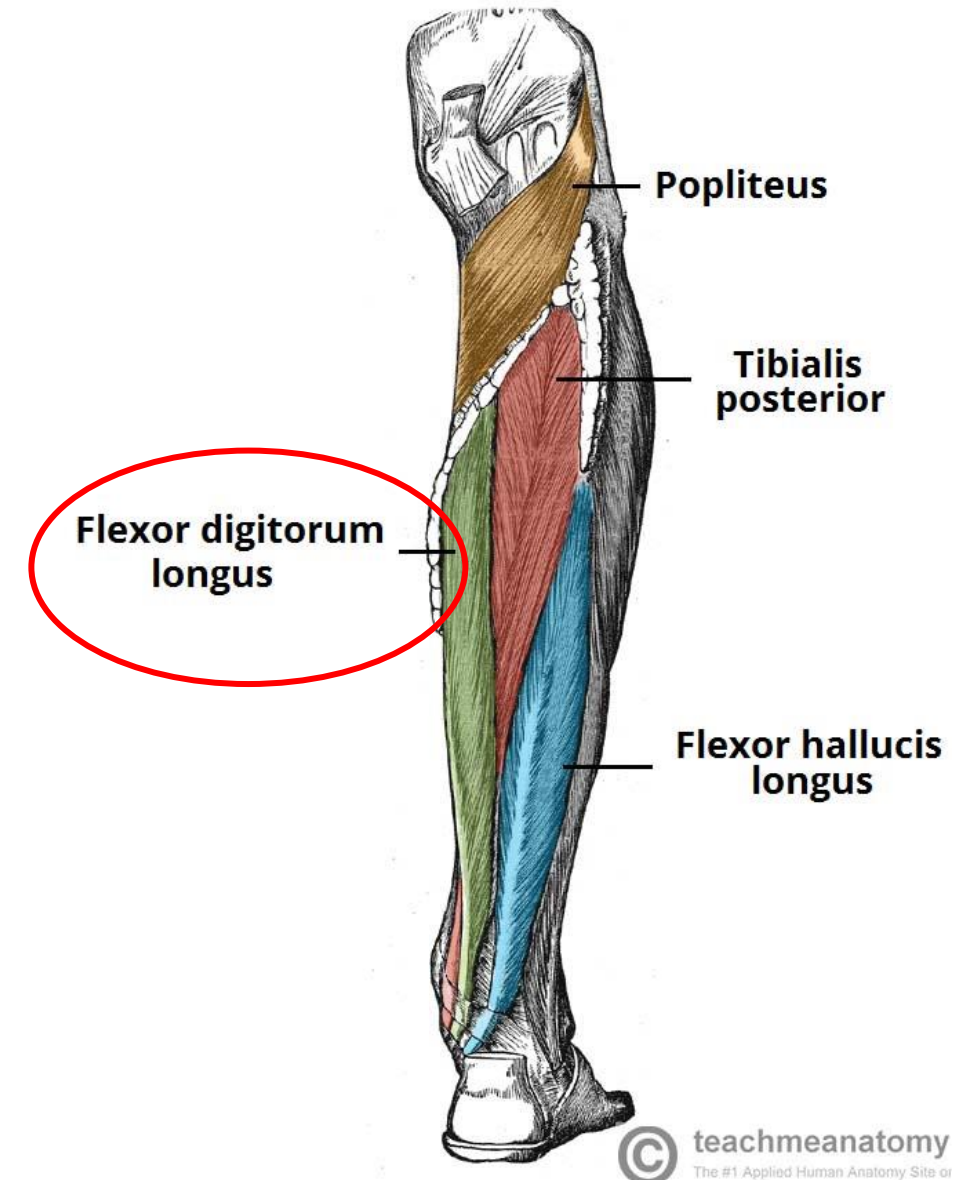
Tibialis Posterior

- **Origin:** posterior surface of tibia and fibula.
- **Insertion:** The tendon enters the foot posterior to the medial malleolus, and attaches to the plantar surfaces of the medial tarsal bones.
- **Action:**
 - Inverts and plantar flexes the foot.
 - Supports the medial arch of the foot.
- **Nerve Supply:** Tibial nerve.

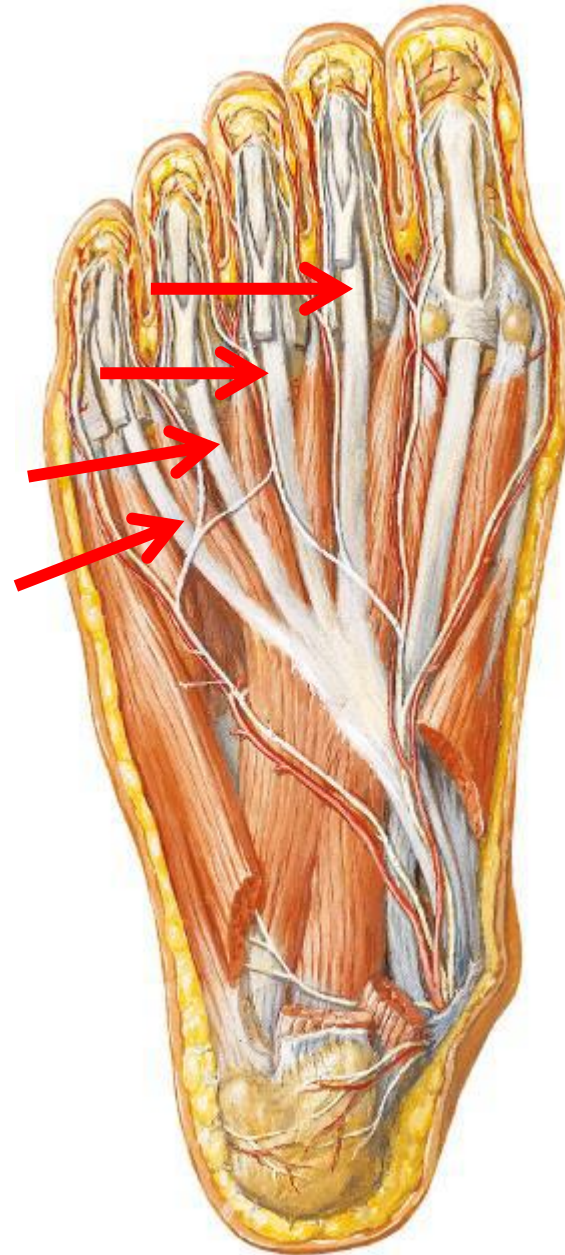


Flexor Digitorum Longus

- It is located medially in the posterior leg.
- **Origin:** Posterior surface of tibia.
- **Insertion:** The tendon divides into 4 slips which are inserted into the distal phalanges of the lateral 4 toes.
- **Action:**
 - Flexes the lateral four toes
 - Supports the medial arch of the foot.
- **Nerve Supply:** Tibial nerve.

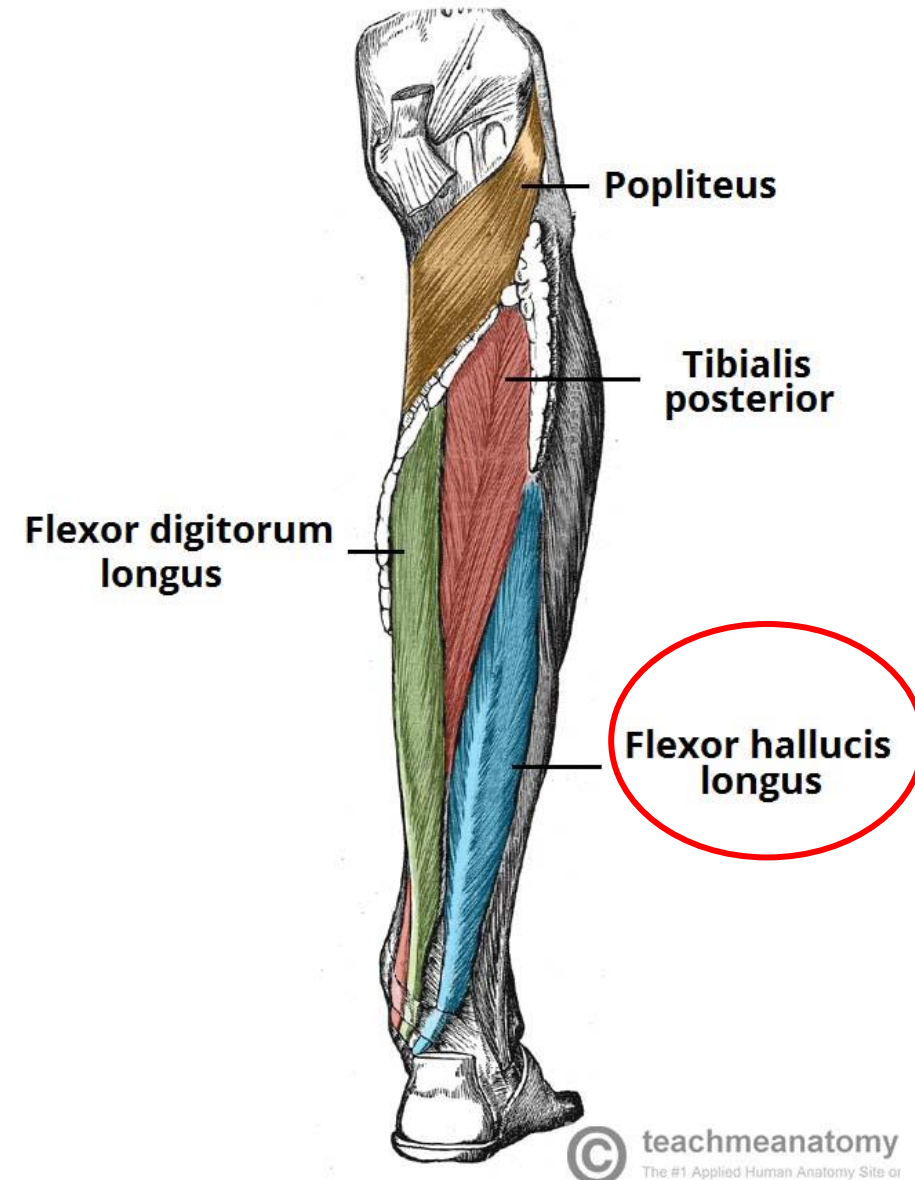


**Tendons of Flexor
Digitorum Longus**

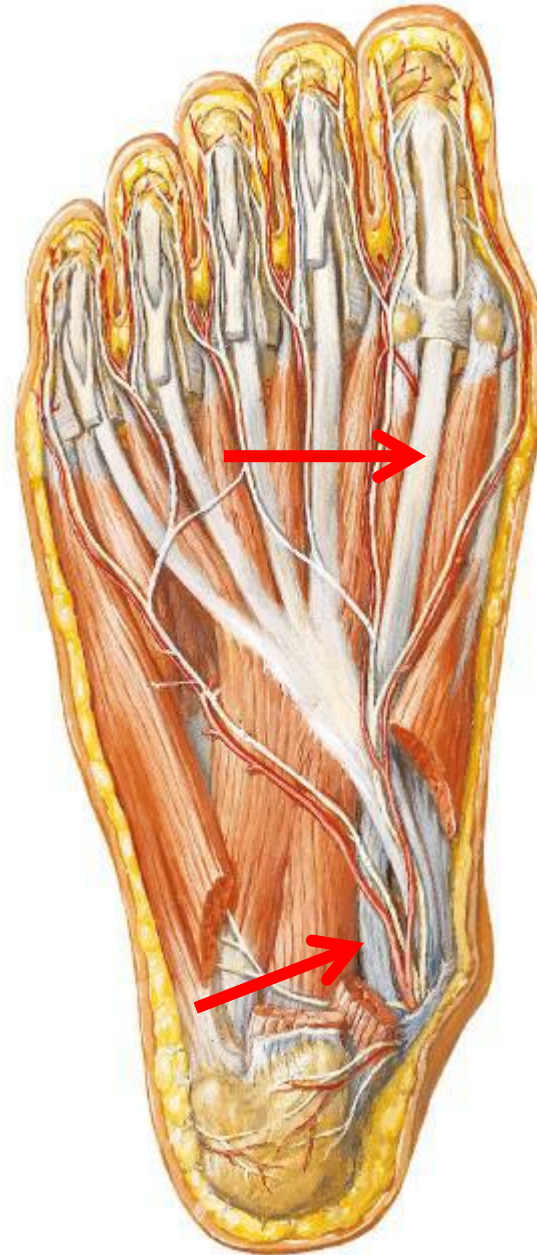






Flexor Hallucis Longus

- It is located laterally in the posterior leg.
- **Origin:** Posterior surface of fibula.
- **Insertion:** The base of the distal phalanx of the big toe.
- **Action:**
 - Flexes the big toe.
 - Supports the medial arch of the foot.
- **Nerve Supply:** Tibial nerve.

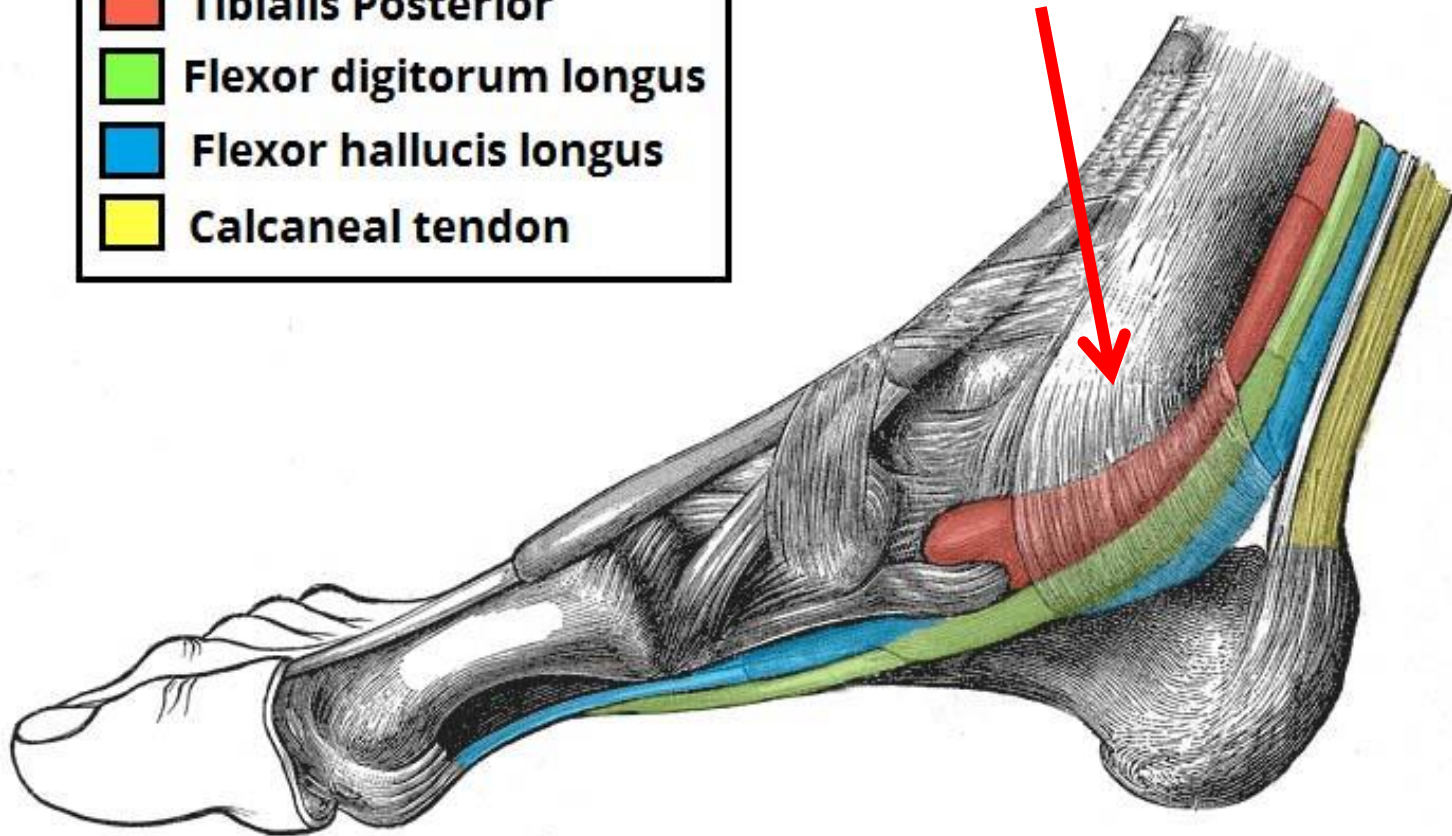


**Tendon of Flexor
Hallucis Longus**



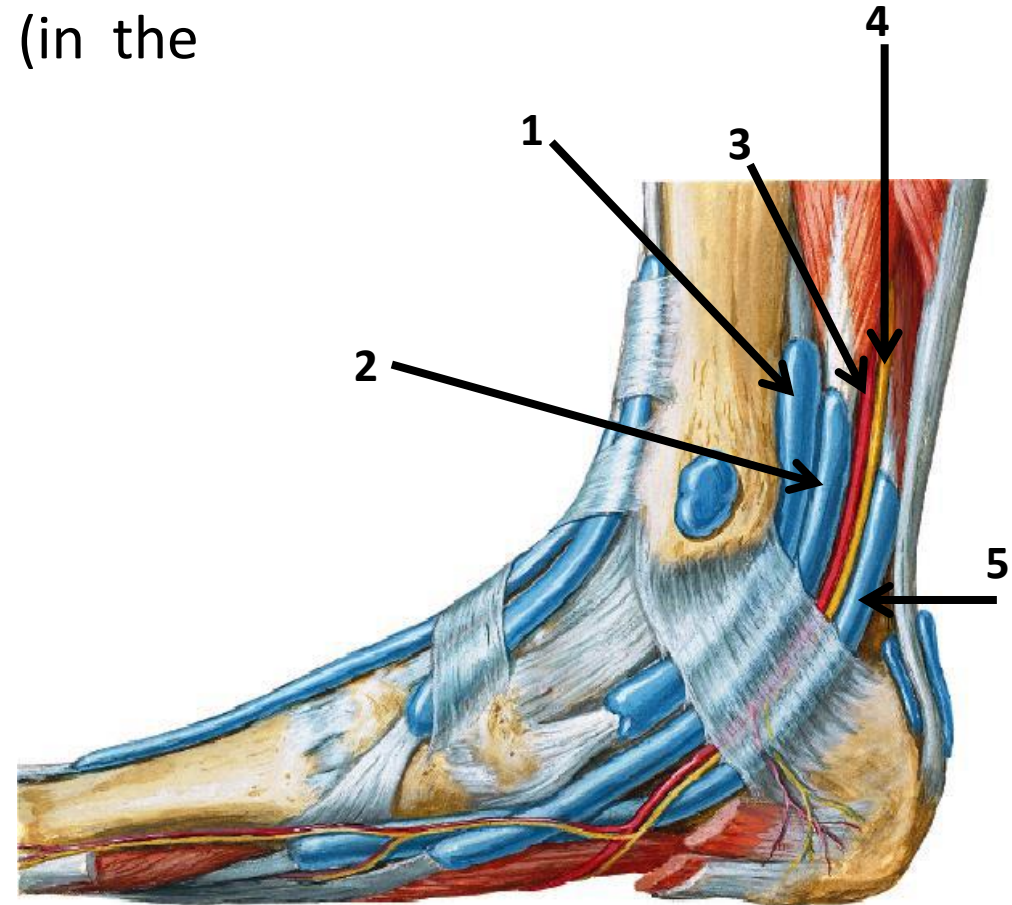
-  Tibialis Posterior
-  Flexor digitorum longus
-  Flexor hallucis longus
-  Calcaneal tendon

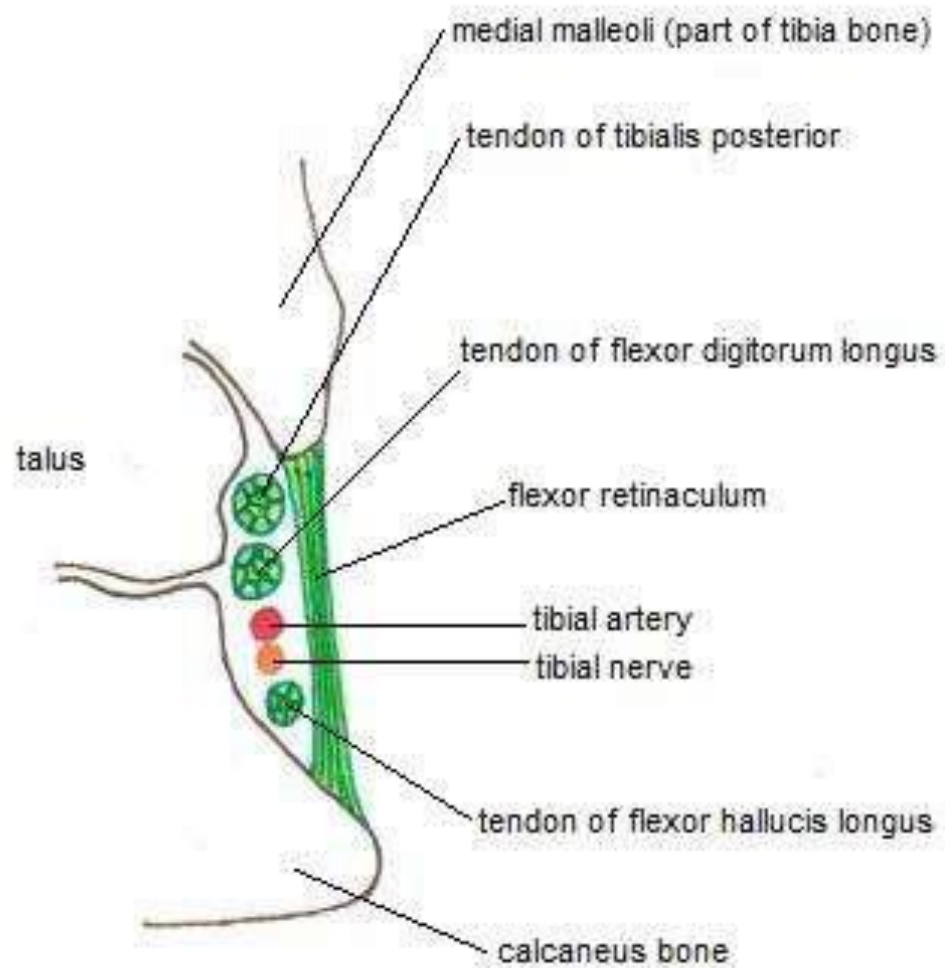
Medial malleolus



Tarsal Tunnel and Flexor Retinaculum

- Attached to the posterior border of the medial malleolus the medial surface of calcaneus.
- Structures passing deep to the flexor retinaculum (in the **tarsal tunnel**), from anterior to posterior:
 1. **Tibialis posterior tendon**
 2. **Flexor digitorum longus tendon**
 3. **Posterior tibial artery and vein**
 4. **Tibial nerve**
 5. **Flexor hallucis longus tendon**





CROSS SECTION OF TARSAL TUNNEL

Tarsal Tunnel Syndrome ??

Thank you

Ayman.alzubi@yu.edu.jo