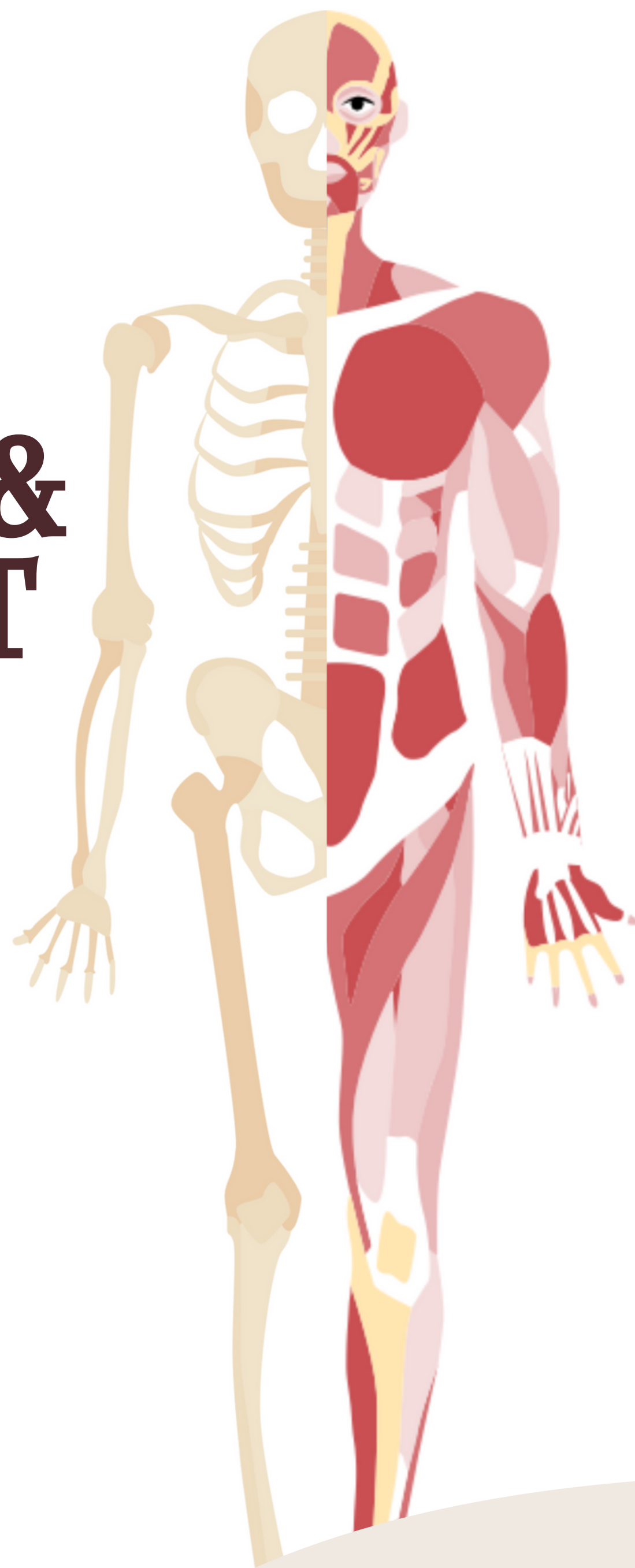


# Lecture 16

## POPLITEAL FOSSA, BACK OF THE LEG & SOLE OF THE FOOT

### OBJECTIVES

- Know the location, boundaries & contents of the popliteal fossa.
- Know the contents of posterior fascial compartment of Leg.
- Know the structures held by retinacula at ankle.
- Know the layers forming in the sole of foot & bones forming the arches of the foot.



#### Color Index:

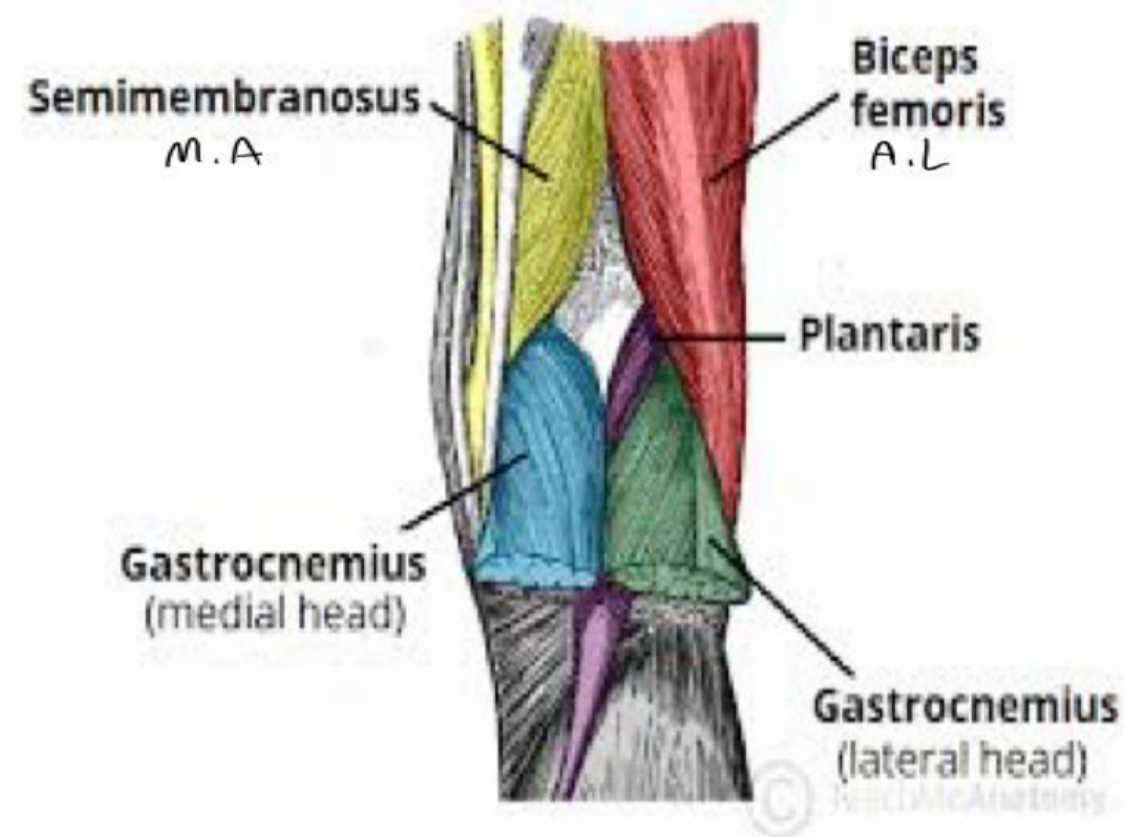
- Main text
- Boys' Slides
- Girls' Slides
- Important
- Dr's Notes
- Extra



[Editing File](#)

# Popliteal Fossa

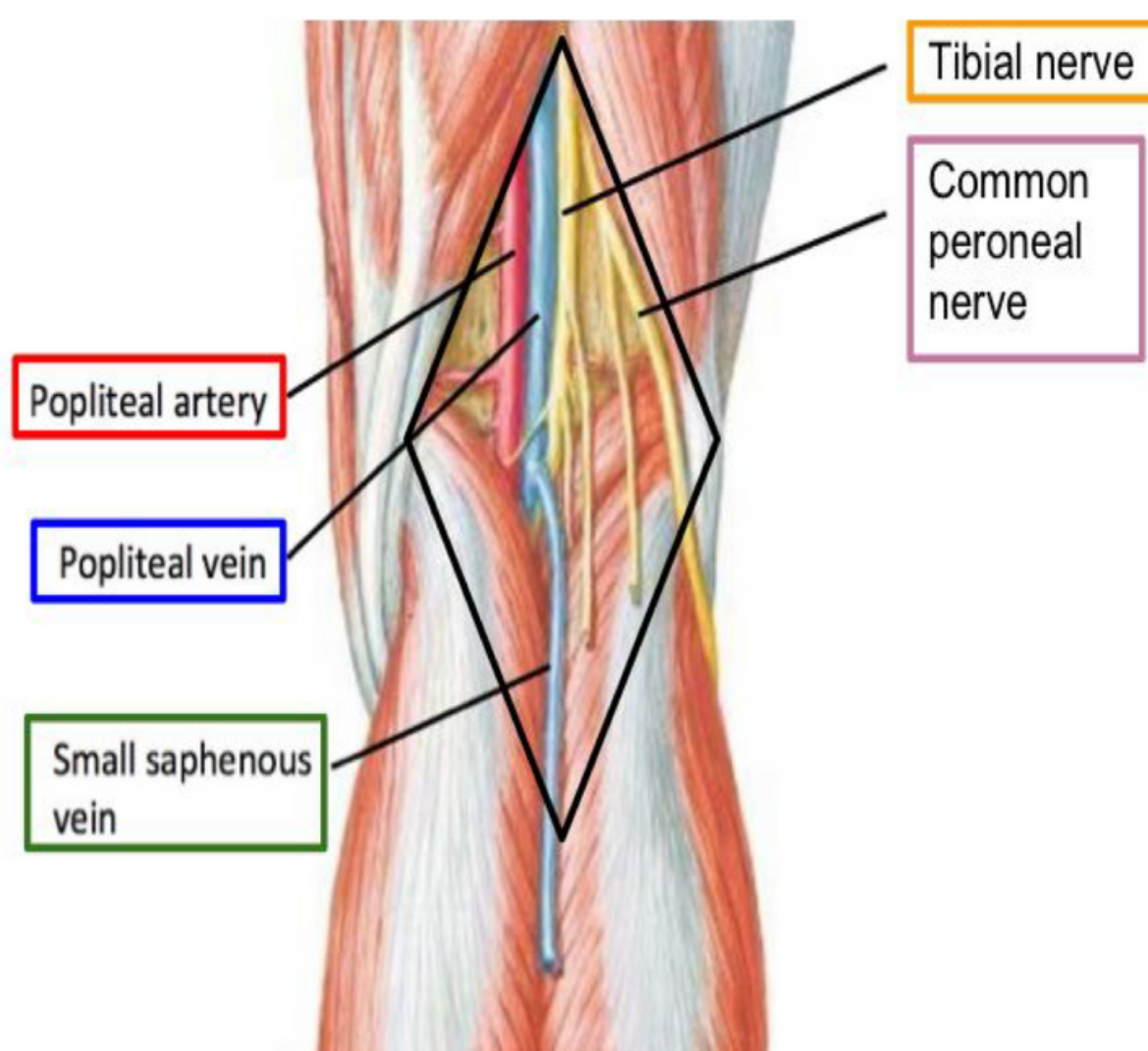
- Is the distal continuation of the adductor canal. and Is a closely packed compartment.
- Becomes the rhomboid (diamond)-shaped space of anatomical diagrams ONLY when opened up at operation or by dissection.
- It is a diamond-shaped intermuscular space at the back of the knee



## Boundaries:

Lateral	Medial	Roof	Floor
<p><b>from above:</b> biceps femoris.</p>	<p><b>from above:</b></p> <ul style="list-style-type: none"> <li>• semimembranosus</li> <li>• semitendinosus</li> </ul>	<ul style="list-style-type: none"> <li>• Skin</li> <li>• superficial fascia and deep fascia of the thigh.</li> </ul>	<p>from above to downward :</p> <ul style="list-style-type: none"> <li>• popliteal surface of femur</li> <li>• posterior ligament of knee joint</li> <li>• popliteus muscle</li> </ul>
<p><b>from below:</b></p> <ul style="list-style-type: none"> <li>• lateral head of gastrocnemius</li> <li>• plantaris</li> </ul>	<p><b>from below:</b> medial head of gastrocnemius</p>		

**IMPORTANT!**



## Contents of the popliteal fossa (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.
- The superficial structure is tibial nerve.

Serve And Volley Next Ball

- S-semimembranosus/semitendinosus
- A-Artery
- V-Vein
- N-Nerve
- B-Biceps femoris

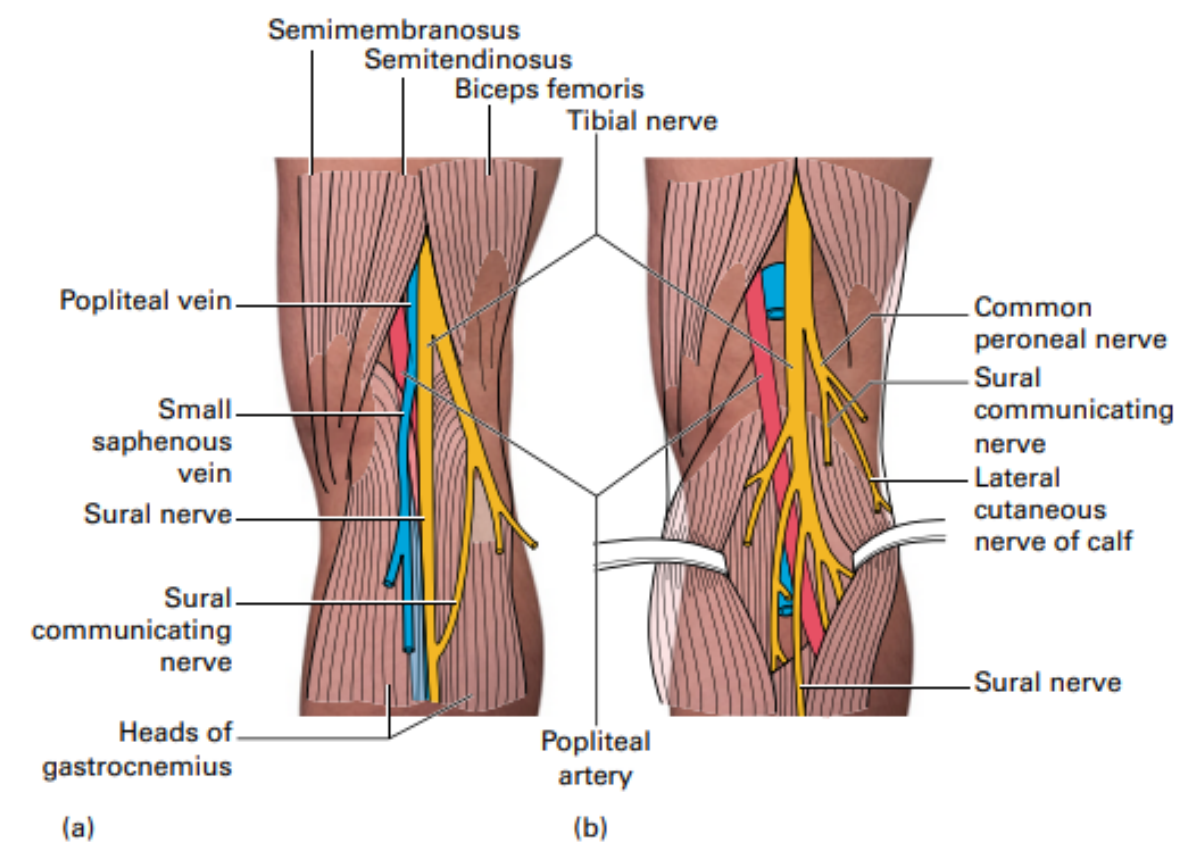


# Contents of the Popliteal Fossa

## SOME DETAILS

- From without in, the popliteal fossa contains nerves, vein and artery.
- The common peroneal nerve passes out of the fossa along the medial border of the biceps tendon;
- The tibial nerve is first lateral to the popliteal vessels and then crosses superficial to these vessels to lie on their medial side.
- The popliteal vein lies immediately superficial to the artery.
- The popliteal artery itself lies deepest of all in the fossa.
- The fossa also contains fat, popliteal lymph nodes and a variable number of thin-walled sacs termed bursae

### The right popliteal fossa



## Clinical Features - Popliteal Fossa

### The differential diagnosis of a mass/ lump in the popliteal region:

- Skin and soft tissues - Sebaceous cyst, lipoma, sarcoma;
- Vein - Varicosities of the short saphenous vein in the roof of the fossa;
- Artery - Popliteal aneurysm;
- Lymph nodes – infection secondary to suppuration in the foot;
- Knee joint – joint effusion;
- Tendons – enlarged bursae, especially those beneath semimembranosus and the heads of gastrocnemius;
- Bones – a tumor of the lower end of the femur or upper end of the tibia



# The posterior compartment of the leg

The transverse intermuscular septum of the leg divides the muscles of the posterior compartment into:

1. Superficial muscles group
2. Deep muscles group

## CONTENTS OF THE POSTERIOR FASCIAL COMPARTMENT OF THE LEG

### Superficial group of muscles

1. Gastrocnemius
2. Plantaris
3. Soleus

### Deep group of muscles

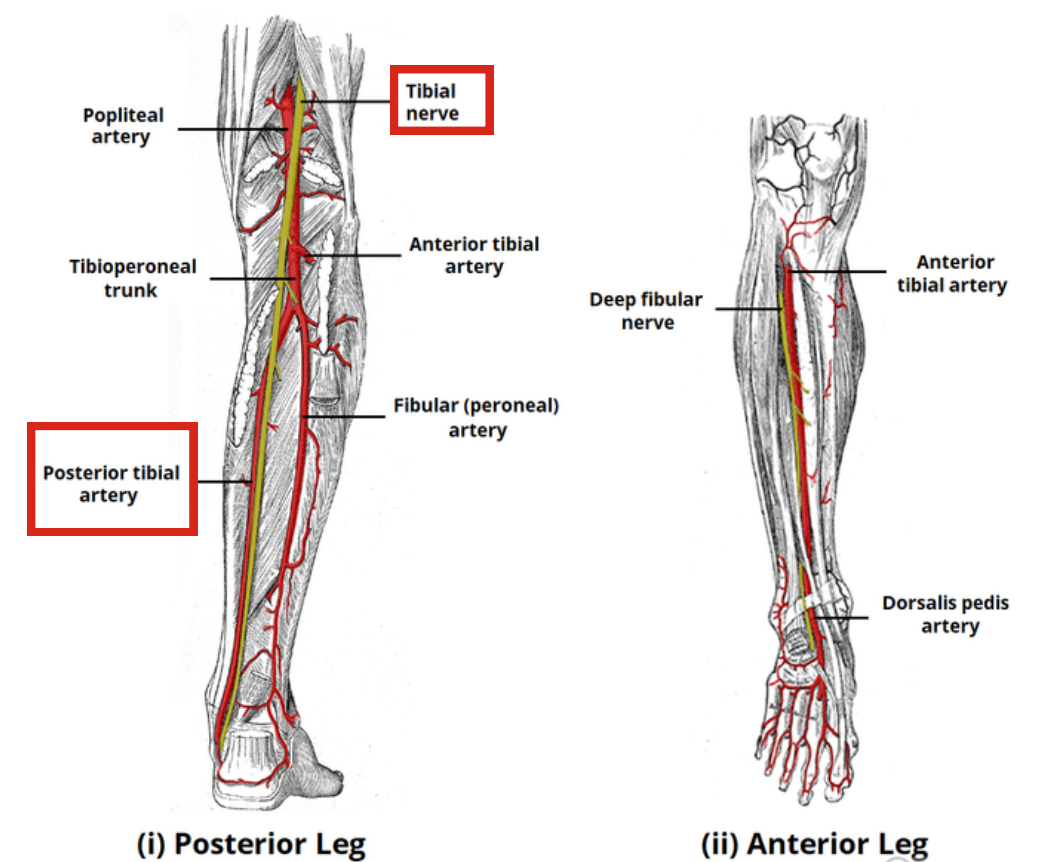
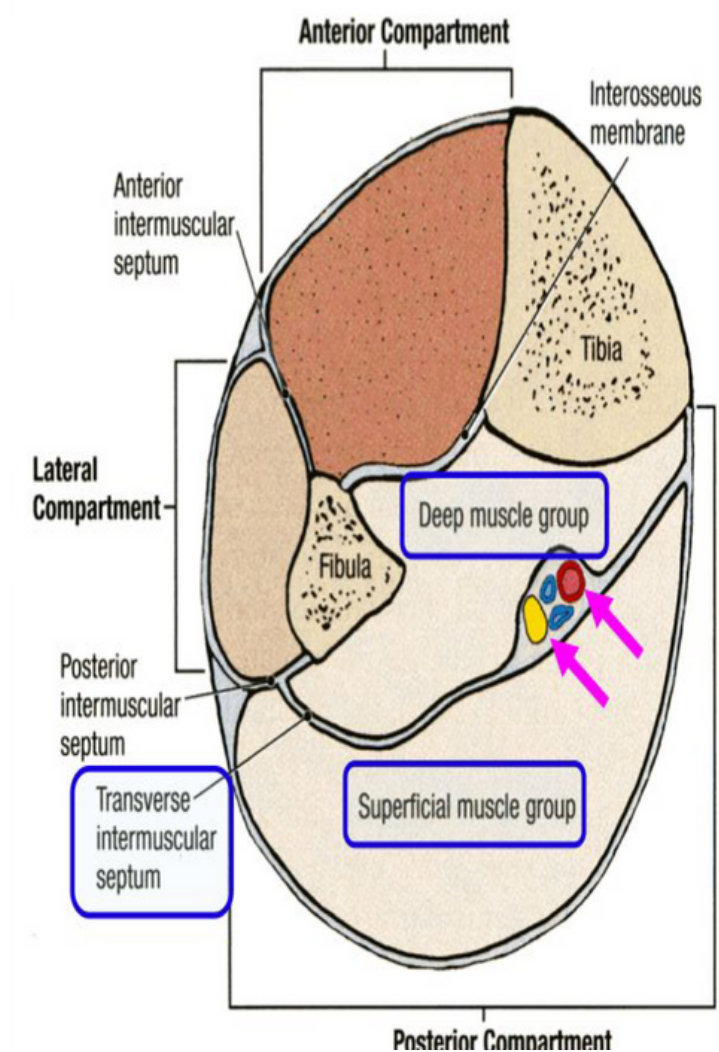
1. Popliteus
2. Flexor digitorum longus
3. Tibialis posterior
4. Flexor hallucis longus

### 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



## POSTERIOR TIBIAL ARTERY

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

- Circumflex
- Fibular (Peroneal)
- Nutrient to tibia
- Muscular
- Perforating,
- Communicating,
- Medial malleolar,
- Calcaneal
- Terminal branches: Lateral plantar and medial plantar arteries

## TIBIAL NERVE

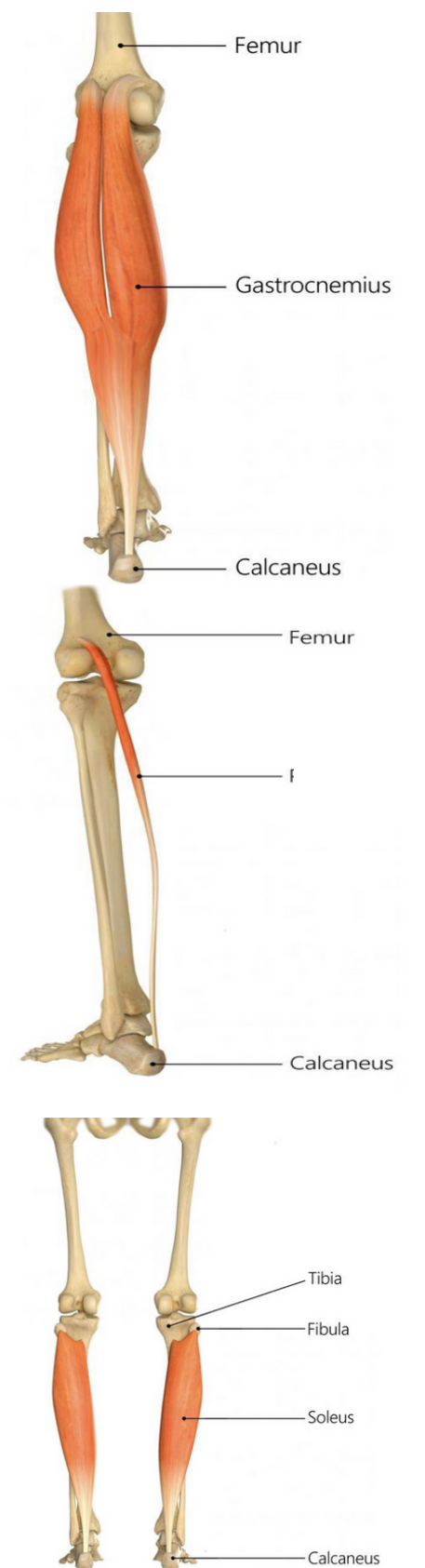
It is the larger terminal branch of the sciatic nerve in the lower 1/3 of the back of the thigh.

- Sensory: Innervates the skin of the posterolateral leg, lateral foot and the sole of the foot.
- Motor: Innervates the posterior compartment of the leg and the majority of the intrinsic foot muscles.

The medial and lateral plantar branches of the tibial nerve provide innervation to all the intrinsic muscles of the foot (except the extensor digitorum brevis, which is innervated by the deep fibular nerve).

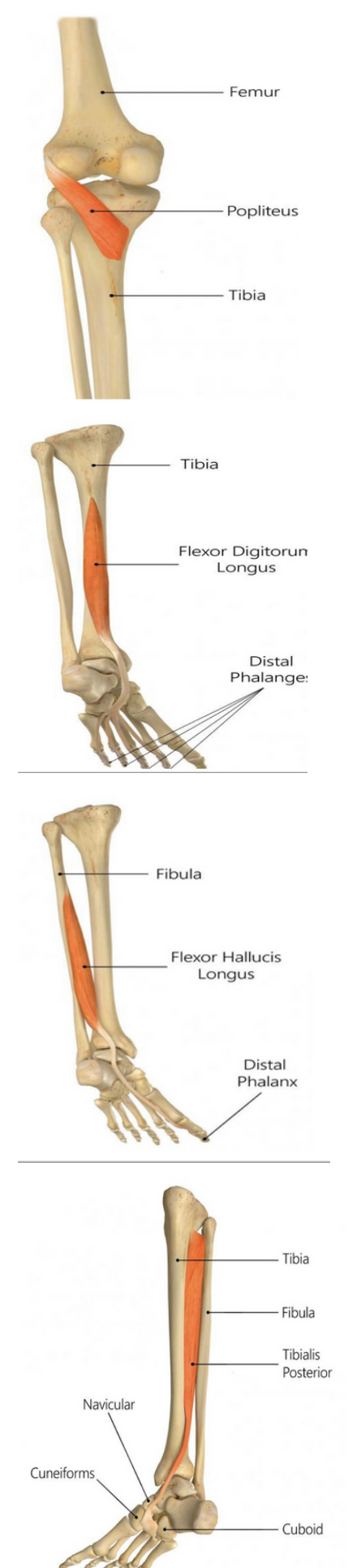
# Superficial Muscles Group

Muscle	Origin	Insertion	Action	Nerve
<b>Gastrocnemius</b>	Lateral head: from lateral condyle of femur medial head: from above medial condyle	Posterior surface of calcaneum via tendo calcaneus	Plantar flexes foot at ankle joint; flexes knee joint	Tibial Nerve
<b>Plantaris</b>	Lower Lateral supracondylar ridge of femur	Posterior surface of calcaneum		
<b>Soleus</b>	<ul style="list-style-type: none"> <li>Shafts of tibia and fibula</li> <li>upper fibula head, soleal line on tibia</li> </ul>	Posterior surface of calcaneum via tendo calcaneus	Together with gastrocnemius and plantaris is powerful plantar flexor of ankle joint, provides main propulsive force in walking and running planter flexes foot	



# Deep Muscles Group

Muscle	Origin	Insertion	Action	Nerve
<b>Popliteus</b>	Groove on Lateral surface of lateral condyle of femur (Intracapsular)	Post surface of shaft of tibia above soleal line	Flexes knee joint : <b>Unlocks knee joint</b> by medial rotation of tibia (leg) at beginning of flexion of knee joint. <b>initiates flexion of knee joint</b>	Tibial Nerve
<b>Flexor digitorum longus</b>	Posterior surface of shaft tibia	Bases of distal of phalanges of lateral 4 toes	Flexes distal phalanges of lateral four toes; plantar Flexes foot at ankle joint; Supports medial and lateral longitudinal arches	
<b>Flexor hallucis longus</b>	Posterior surface of shaft of fibula	Base of distal phalanx of big toe	Flexes distal phalanx of big toe; plantar flexes foot at ankle joint; <b>supports medial longitudinal</b>	
<b>Tibialis Posterior</b>	Posterior surface of shafts of tibia and fibula and interosseous membrane	Tuberosity of navicular bone and other neighboring tarsal bones.	Plantar flexes foot at ankle joint; inverts foot at subtalar and transverse tarsal joints; supports medial longitudinal arch	



# Flexor Retinaculum

- It is thickening of deep fascia on medial side of ankle
- Extends from back of medial malleolus of tibia to medial side of calcaneum

Structures passing posterior to medial malleolus, deep to flexor retinaculum(from medial to lateral):

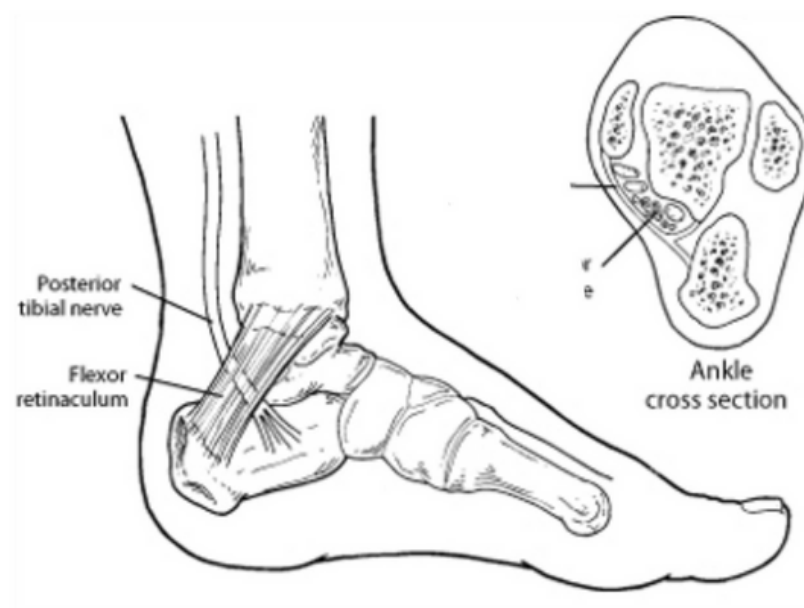
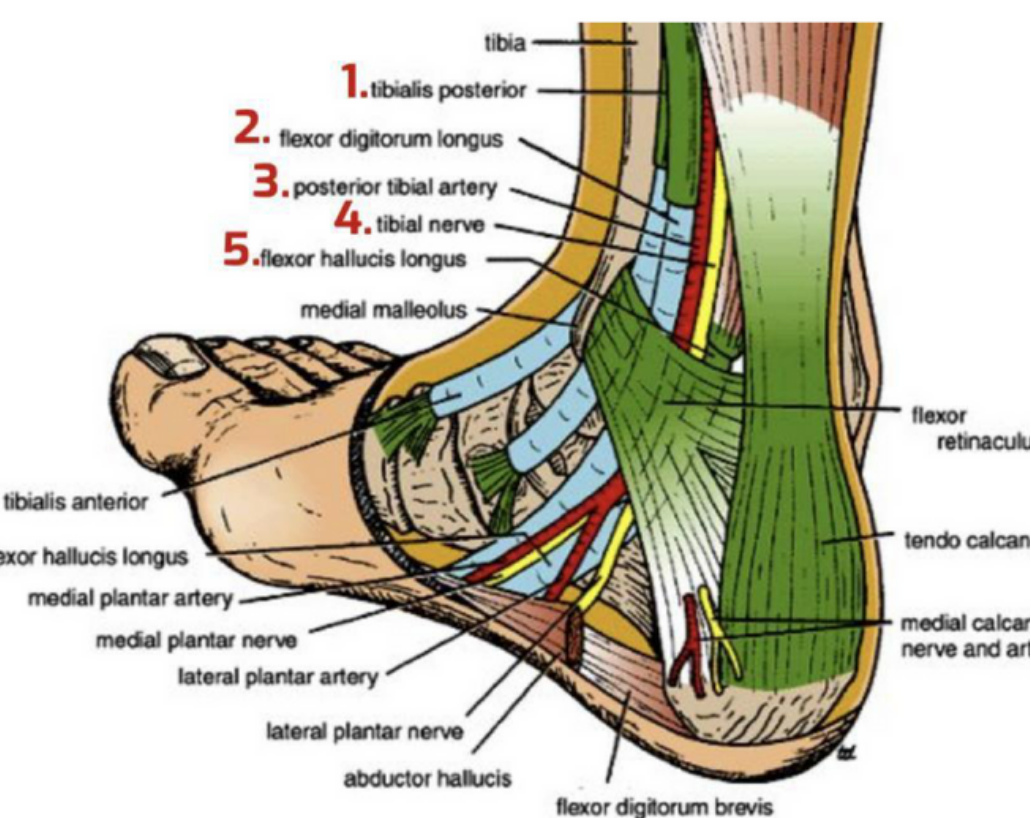
1-Tibialis posterior tendon

2-Flexor digitorum longus tendon

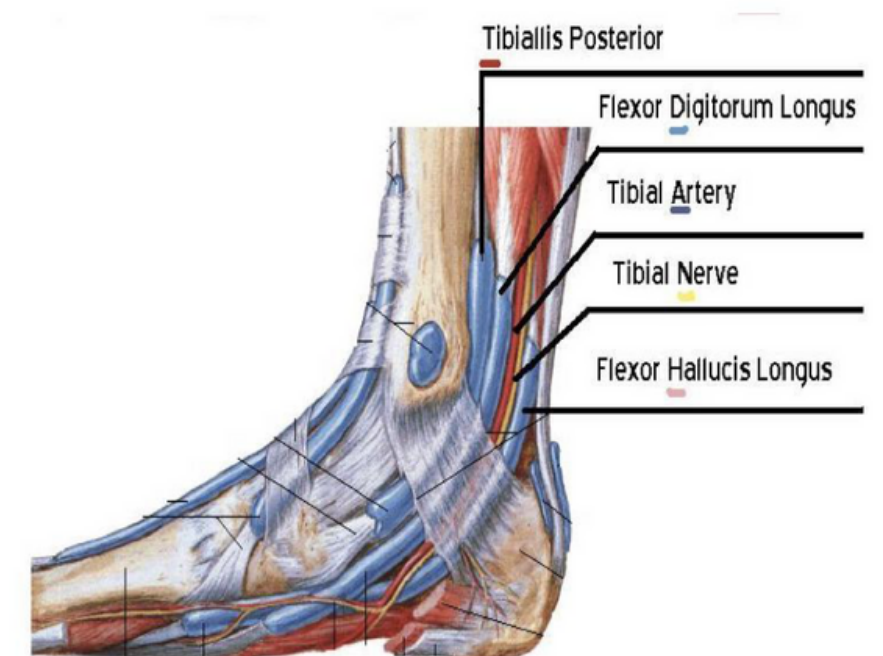
3-Posterior tibial artery with venae comitantes

4-Tibial nerve

5-Flexor hallucis longus tendon



Team441: Tom Does A Very Nice Hat  
Or : Tom Drives A Nice Honda



- All the tendons are surrounded by a synovial sheath

### Important note from 443 :

Structures passing anterior to medial malleolus:  
Great saphenous vein+saphenous nerve

## Sole of the foot

The skin of the sole of the foot is **thick and hairless**

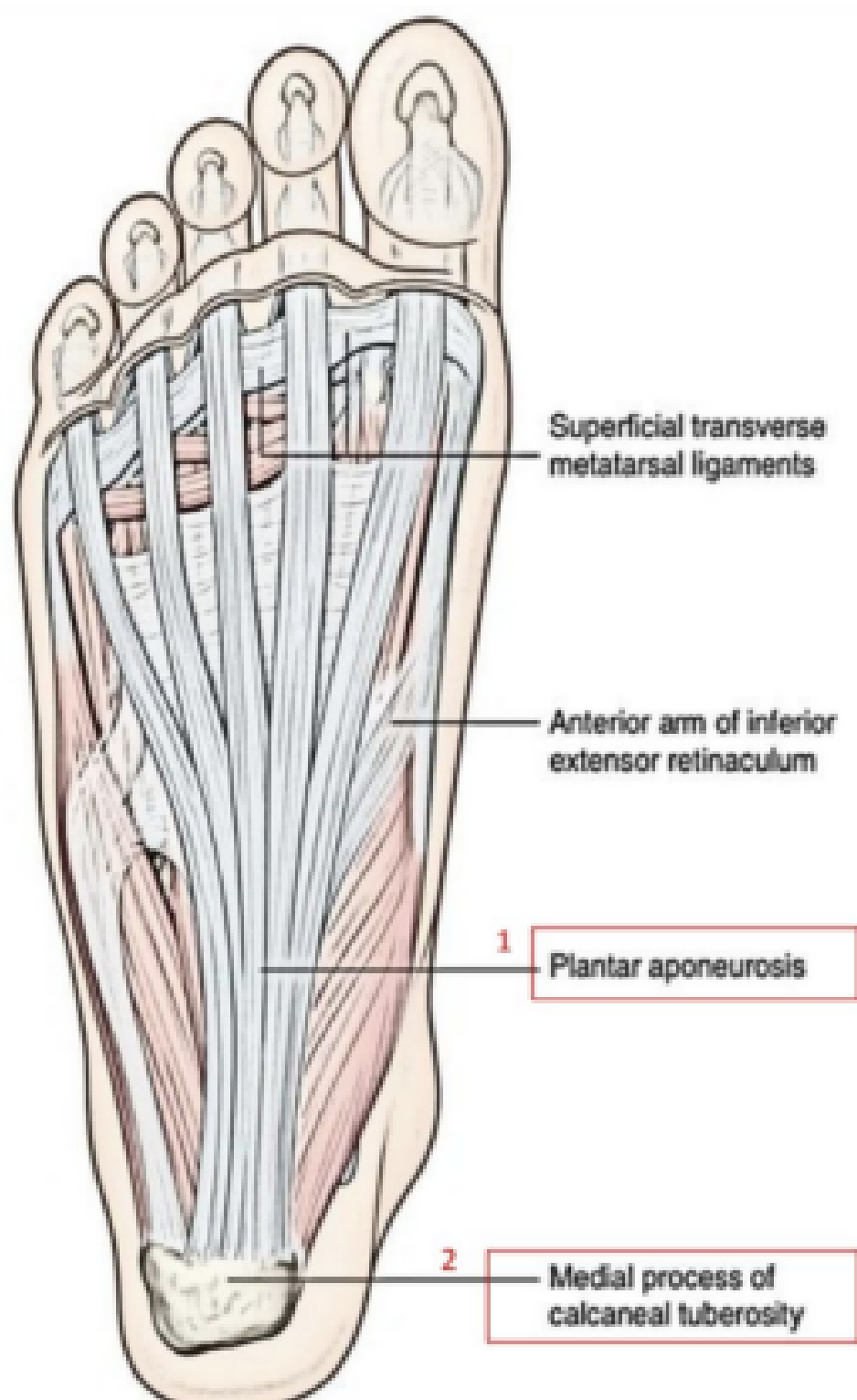
It show a **few flexure creases** at the sites of skin movement

Sweat glands are present in **large numbers**

**1** The plantar aponeurosis is a **triangular thickening of the deep fascia** that protects the underlying nerves, blood vessels, and muscles.

**2** Its apex is attached to the **medial and lateral tubercles** of the calcaneum

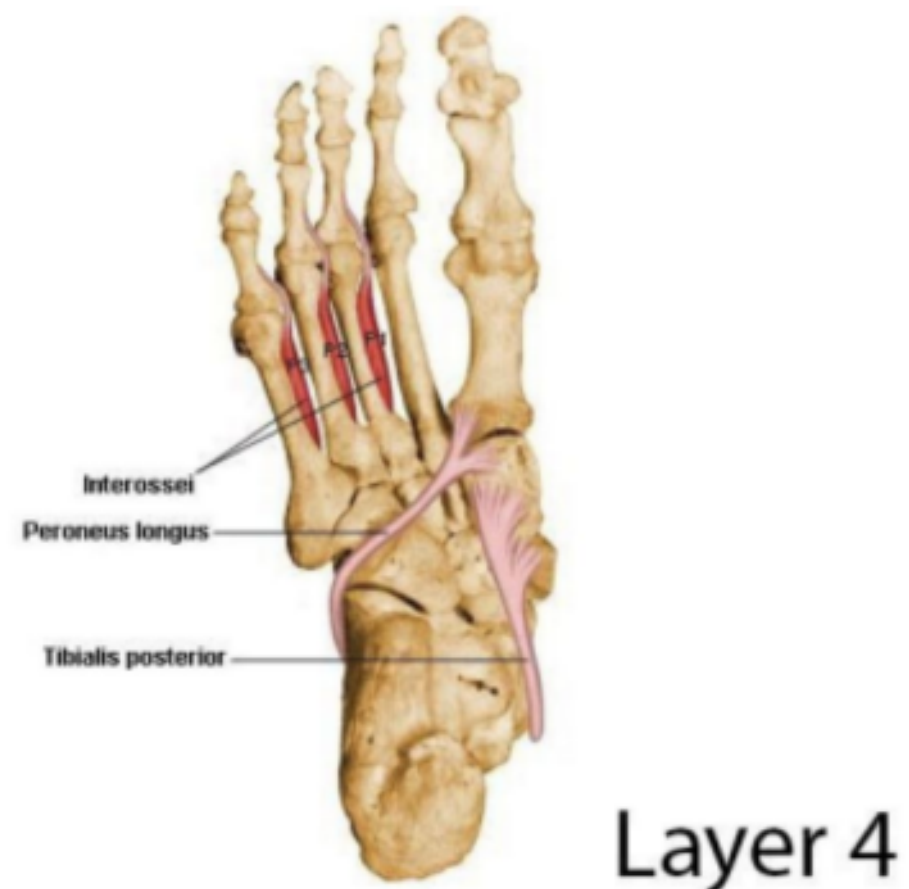
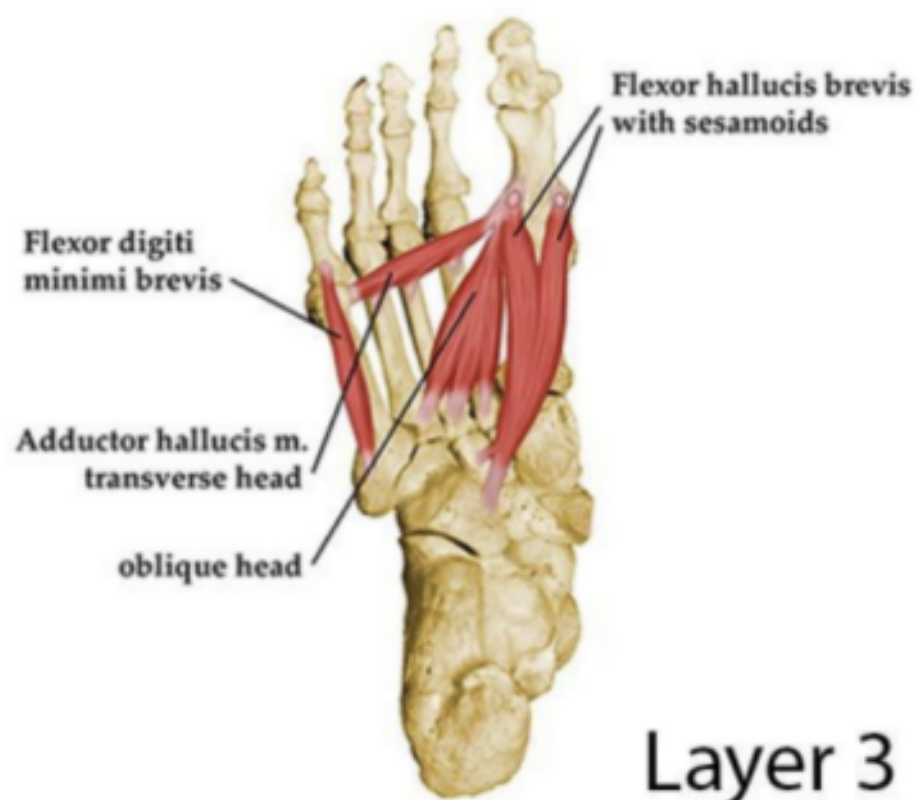
**3** The base of the aponeurosis divides into **five slips** that pass into the **toes**.



# 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 <b>3- Flexor digitorum longus tendon</b> <b>4- Flexor hallucis longus tendon</b>
☆ Third Layer	1- Flexor hallucis brevis 2- Adductor hallucis 3- Flexor digiti minimi brevis
☆ Fourth Layer	1- Interossei (3 plantar + 4 dorsal) <b>2- Peroneus longus tendon</b> <b>3- Tibialis posterior tendon</b>





# 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.

## 1. Metatarsophalangeal joints: ☆

Flexion	<ul style="list-style-type: none"> <li>• Flexor digitorum brevis.</li> <li>• Lumbricals.</li> <li>• Interossei.</li> </ul>	<ul style="list-style-type: none"> <li>• Flexor hallucis brevis.</li> <li>• Flexor hallucis longus.</li> <li>• Flexor digiti minimi brevis.</li> <li>• Flexor digitorum longus.</li> </ul>
Extension	<ul style="list-style-type: none"> <li>• Extensor hallucis longus.</li> <li>• Extensor digitorum longus.</li> <li>• Extensor digitorum brevis</li> </ul>	
Abduction	<ul style="list-style-type: none"> <li>• Abductor hallucis.</li> <li>• Abductor digiti minimi.</li> <li>• Dorsal interossei.</li> </ul>	
Adduction	<ul style="list-style-type: none"> <li>• Adductor hallucis.</li> <li>• Plantar interossei.</li> </ul>	

## 2. Interphalangeal joints: ☆

Flexion	<ul style="list-style-type: none"> <li>• Flexor hallucis longus.</li> <li>• Flexor digitorum longus.</li> <li>• Flexor digitorum brevis.</li> <li>• Quadratus plantae.</li> </ul>
Extension	<ul style="list-style-type: none"> <li>• Extensor hallucis longus.</li> <li>• Extensor digitorum longus.</li> <li>• Extensor digitorum brevis.</li> </ul>

## Arches of the Foot

### Medial Longitudinal arch:

- Is formed of calcaneum, talus, navicular, 3 cuneiform bones, and 3 medial metatarsal bones.
- **Keystone** is the head of the talus
- Is supported by the spring ligament (Plantar calcaneonavicular) and the tendon of the flexor hallucis longus.

### Lateral Longitudinal Arch:

- Is formed of calcaneum, cuboid & lateral 4th & 5th metatarsal bones.
- The **Keystone** is the cuboid bone.
- Is supported by the peroneus longus tendon and the long and short plantar ligaments.
- Supports the body in the erect position and acts as a spring in locomotion.

### Transverse arch:

- **Proximal Metatarsal arch:** Lies at the level of tarso-metatarsal joints, formed of bases of metatarsal bones, cuboid & 3 cuneiform bones.
- **Distal Metatarsal arch:** is formed by the heads of five metatarsal bones.

## Function of arches of the Foot

Weight bearing

Support walking and running

Act as a shock absorber

Provide potential space for neurovascular bundle of the sole

# Arches of the Foot cont.

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

Team 441: Flat arch in adults is abnormal



## Clinical Correlation:

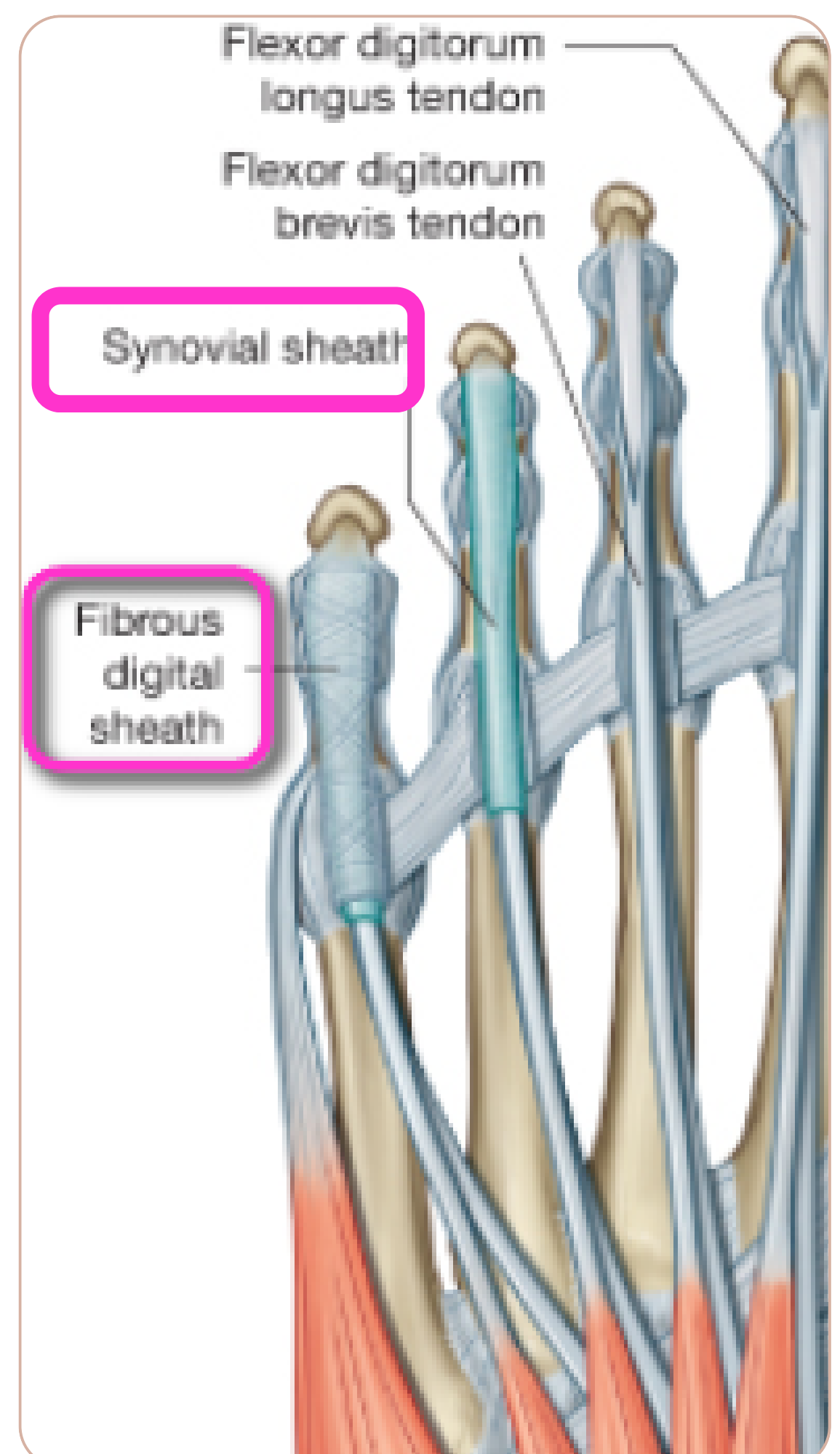
- **Flat foot (pes planus or tailpes planus)** is a condition of disappearance or collapse of the medial longitudinal arch with **eversion and abduction of the forefoot** and causes greater wear on the inner border of the soles and heels of shoes than on the outer border. It causes pain as a result of stretching of the plantar muscles and straining of the spring ligament and the long and short plantar ligaments.
- **Pes cavus** (too much arching) exhibits an exaggerated height of the medial longitudinal arch of the foot.

## Fibrous Flexor Sheaths

- **Extension:** 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.
- **Function:** 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.



# MCQs

1

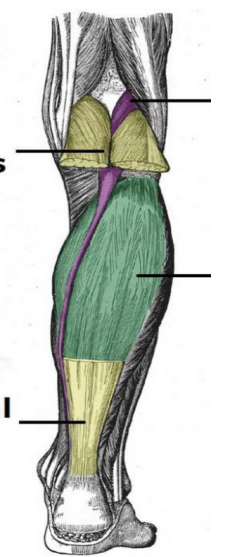
Which of the following is the deepest structure in the popliteal fossa?

A. Tibial nerve	b. Common fibular nerve	C. Popliteal vein	D. Popliteal Artery
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2

Identify the muscle in green:

A. Plantaris	B. Soleus	C. Gastrocnemius	D. Flexor Digitorum longus
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3

Which of the following muscles flexes at the knee and plantar flexes at the ankle?

A. Gastrocnemius	B. Tibialis Posterior	C. Soleus	D. Popliteus
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4

In which direction does the femur move (relative to the tibia) to unlock the knee?

A. Anteriorly	B. Posteriorly	C. Lateral Rotation	D. Medial Rotation
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5

Which of the following structures is NOT part of the medial longitudinal arch of the foot?

A. Calcaneus	B. Talus	C. Metatarsals 1,2,3	D. Metatarsals 4,5
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1-D 2-B 3-A 4-C 5-D

# SAQs

1

Dr. Question: Which tendon attaches at the same place that tendon of tibialis anterior attaches at (1st metatarsal bone)?

 Peroneus longus

2

Name the structure passing deep to flexor retinaculum, and is lateral to tibial nerve?

 Flexor hallucis longus tendon

3

Is it normal for a baby to have a flat foot? And why?

 Yes, because there's large amount of subcutaneous fat on the sole of the foot

4

What muscles make up the fourth layer of sole of the foot?

 Interossei (3 plantar + 4 dorsal) , Peroneus longus tendon , Tibialis posterior tendon



# LECTURE DONE BY

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