"If one dream should fall and break into a thousand pieces, never be afraid to pick one of those pieces up and begin again. "

Musculoskeletal Block

ANATOMY

team 435

COLOR CODES

- IMPORTANT NOTES
- EXTRA NOTES
- DEFINITION

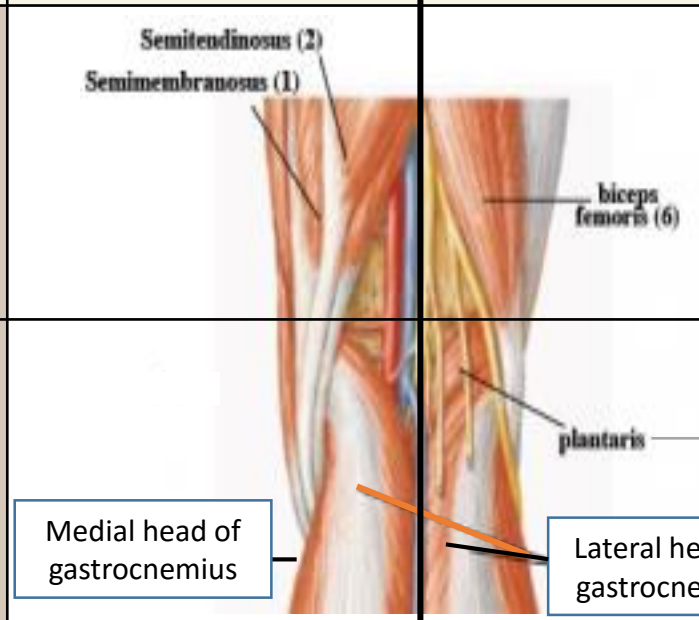
Objectives:

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 those form the arches of the foot.

Popliteal Fossa

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

Boundaries	*Medially	*Laterally
*Above		
*Below		

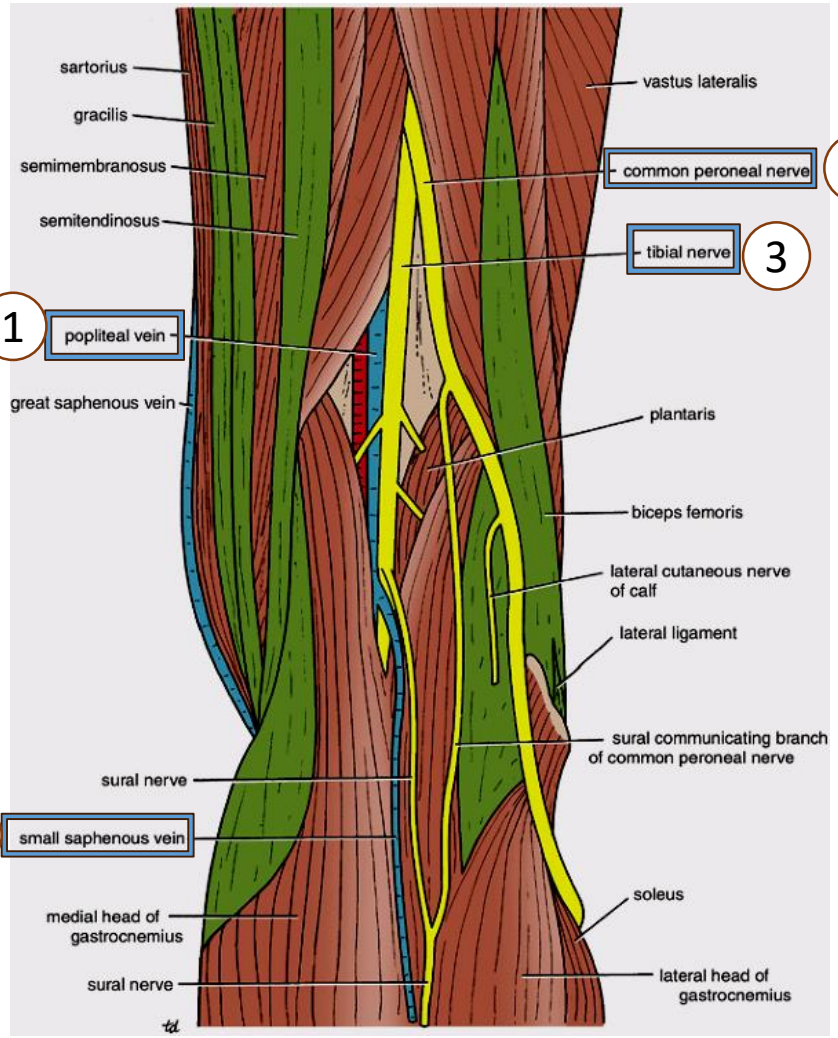
Plantaris is a very thin muscle (some people may not have it)

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

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

Content of Popliteal Fossa

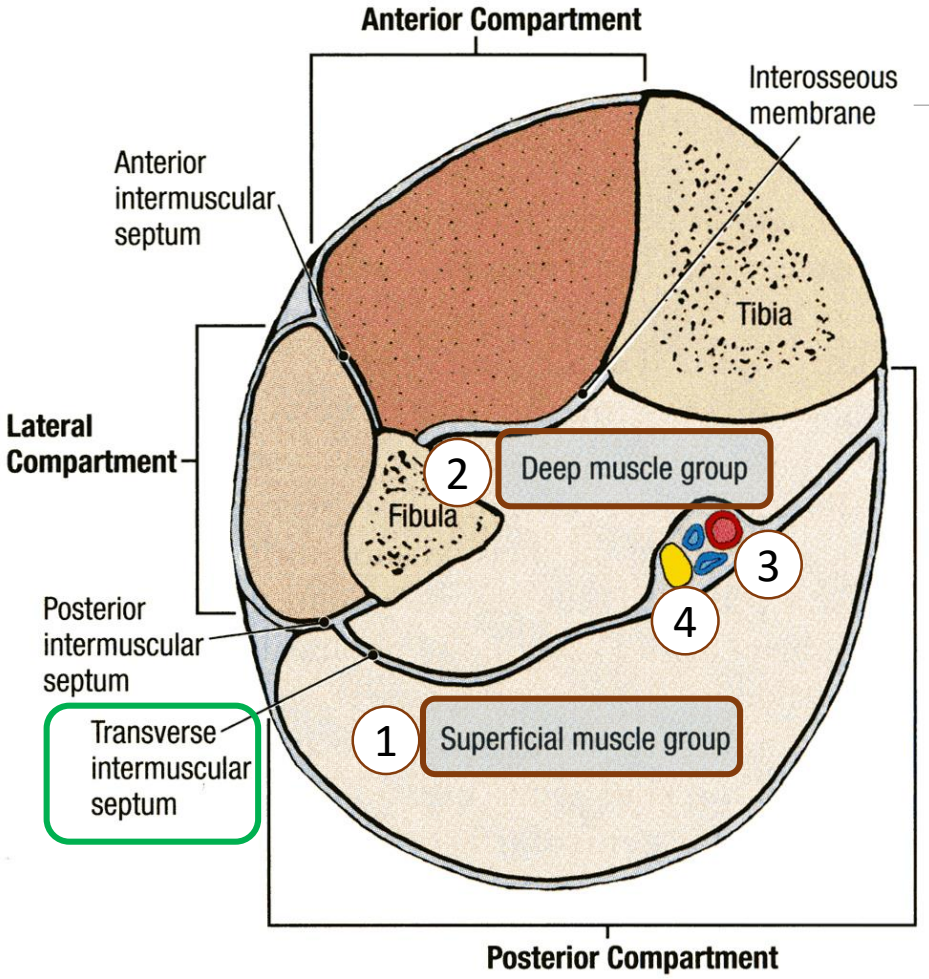
Contents of popliteal fossa: 3 vessels (1A 2V) 3 nerves 2 other things



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

The doctor said that they asked about it in the exam → **<u>The deepest structure</u> is popliteal artery.**

CONTENTS OF THE POSTERIOR FASCIAL COMPARTMENT OF THE LEG



The same as
"The deep transverse fascia of the leg"

The transverse intermuscular septum of the leg:

is a septum divides the muscles of the **posterior compartment** into:

1- superficial group 2- deep group

Interosseous membrane divides the leg into anterior and posterior compartments

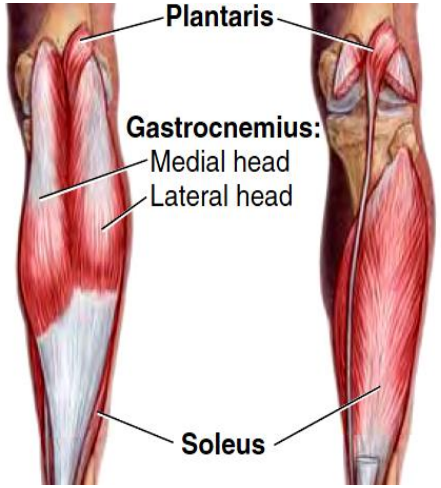
Contents

- 1/Superficial group of muscles
- 2/ Deep group of muscles
- 3/ Posterior tibial artery
- 4/Tibial nerve

Helping video

POSTERIOR COMPARTMENT

SUPERFICIAL GROUP

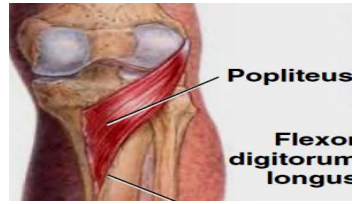


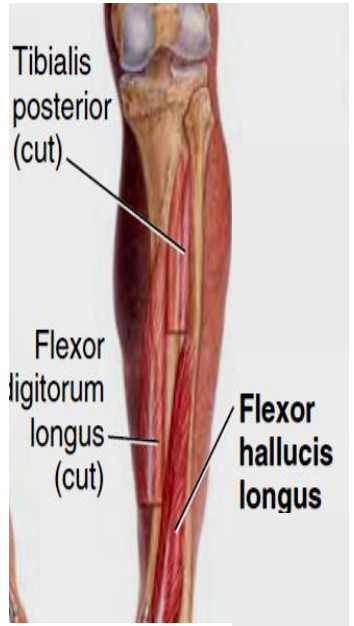
- Gastrocnemius
- plantaris
- Soleus

Memorize it as GPS

DEEP GROUP

- Popliteus
- Flexor Digitorum longus
- Flexor hallucis longus
- Tibialis posterior

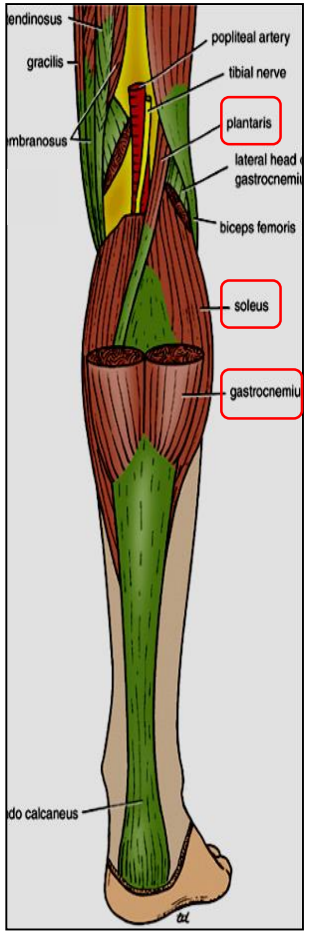




TEAM Anatomy

SUPERFICIAL GROUP

Plantar flexion of ankle = Plantar flexion of foot



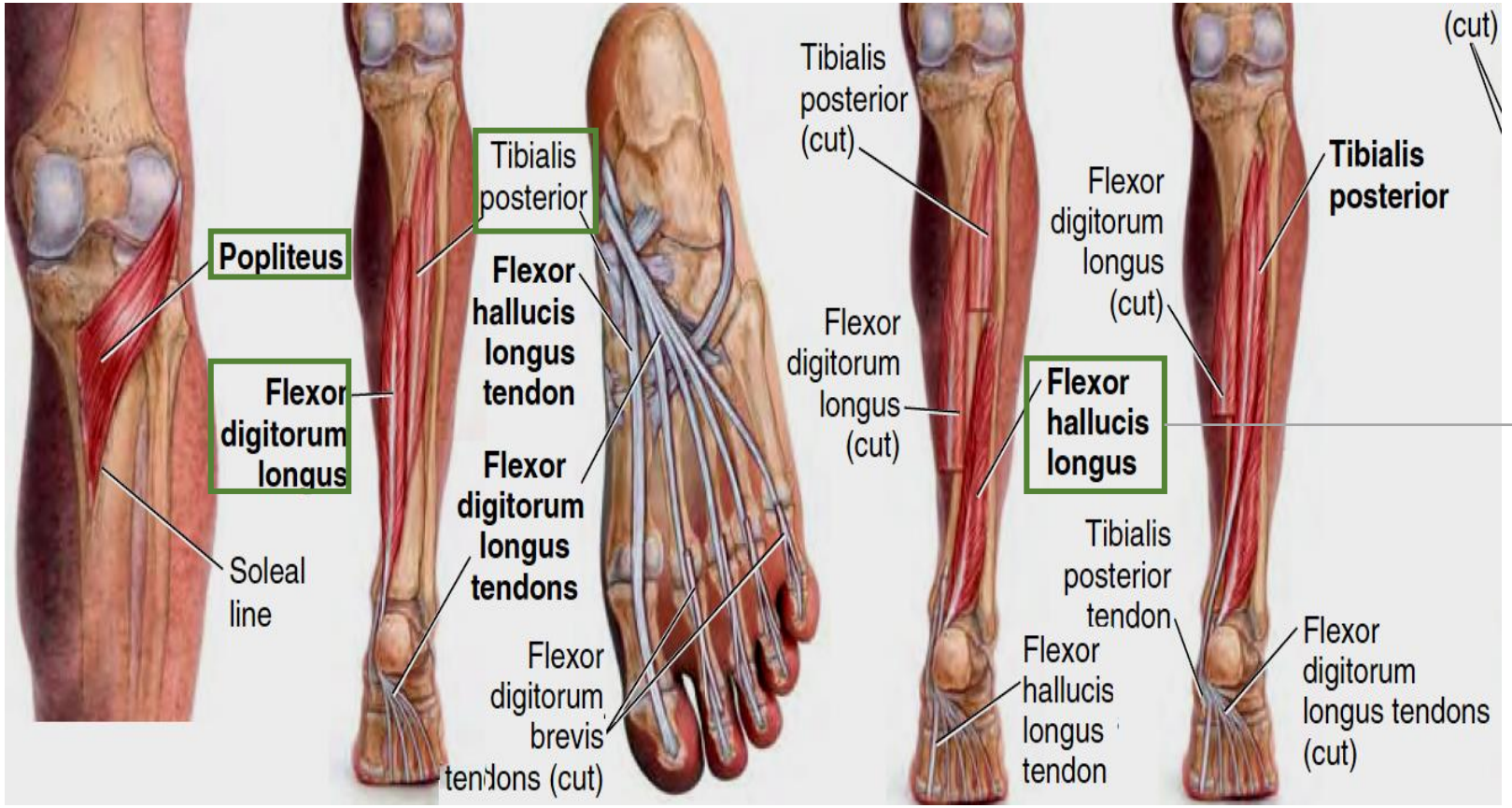
Muscle	Origin	Insertion	Nerve	Action
Gastrocnemius	-Lateral head: from lateral condyle of femur. -medial head: from above medial condyle of femur.	Posterior surface of calcaneum via tendo calcaneus	Tibial	1- Plantar flexes foot at ankle joint 2-flexes knee joint
Plantaris	Lateral supracondylar ridge of femur	Posterior surface of calcaneum	Tibial	
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

Plantar flexion= flexion of the ankle
Dorsi flexion= extension of the ankle

صغيرة جدًا لدرجة إن بعض لا تكون موجودة فيهم

لا تمر على الركبة فما تقدر تصلح لها فليكشن بالتالي يصير عندها حركة وحدة
Plantar flexion للكاحل فبتحط قوتها في هذه الحركة

DEEP GROUP



Flexor hallucis longus is beneath tibialis posterior

Popliteus

- **Origin:** Groove on Lateral surface of lateral condyle of femur (Intracapsular)
- **Insertion:** **Post** surface of shaft of tibia above soleal line
- **Nerve:** Tibial
- **Action:** Flexes leg at knee joint, Unlocks knee joint by lateral rotation of femur on tibia

Flexor digitorum longus

- **Origin:** Posterior surface of shaft of tibia
- **Insertion:** Bases of distal phalanges of lateral four toes
- **Nerve:**Tibial
- **Action:** Flexes distal phalanges of lateral four toes; plantar Flexes foot at ankle joint; Supports medial and lateral longitudinal arches

Tibialis anterior and tibialis posterior → inversion of foot
**Subtalar → beneath the talas

Tibialis posterior

- **Origin:** Posterior surface of shafts of tibia and fibula and interosseous membrane.
- **Insertion:** Tuberosity of navicular bone and other neighboring tarsal bones
- **Nerve:** Tibial
- **Action:** Plantar flexes foot at ankle joint; *inverts foot at **subtalar and transverse tarsal joints; supports medial longitudinal arch

Flexor hallucis longus

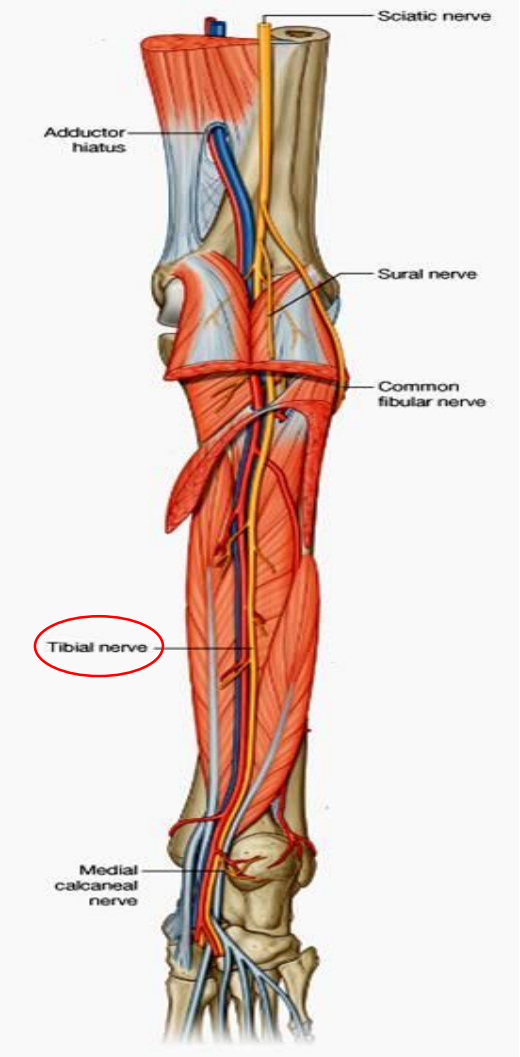
- **Origin:** Posterior surface of shaft of fibula
- **Insertion:** Base of distal phalanx of big toe
- **Nerve:** Tibial
- **Action:** Flexes distal phalanx of big toe; plantar flexes foot at ankle joint; supports medial longitudinal arch

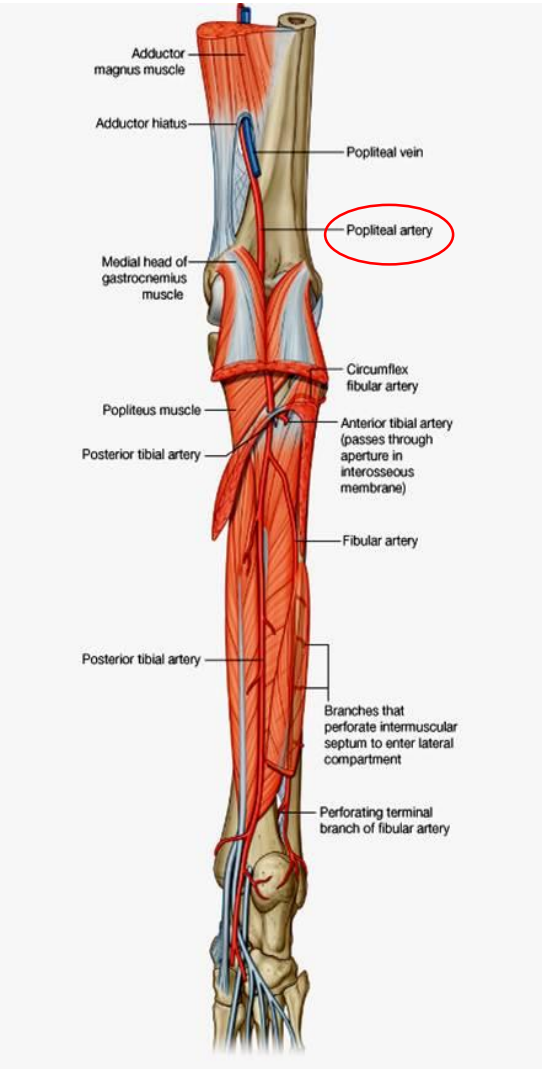
POSTERIOR TIBIAL ARTERY:

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

Flexor retinaculum "Tall doctors are never hungry": · From anterior to posterior:
-Tibialis
-Digitorum
-Artery
-Nerve
-Hallicus

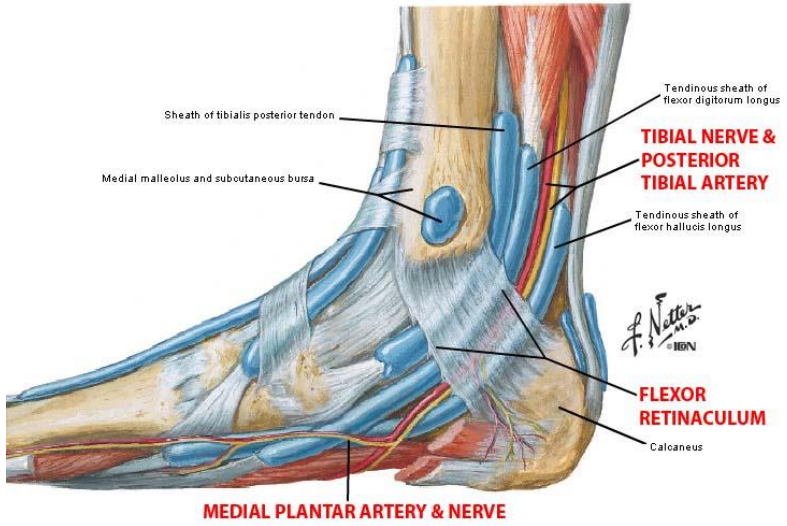
- Extend from the back of medial malleolus of tibia to medial calcaneum .

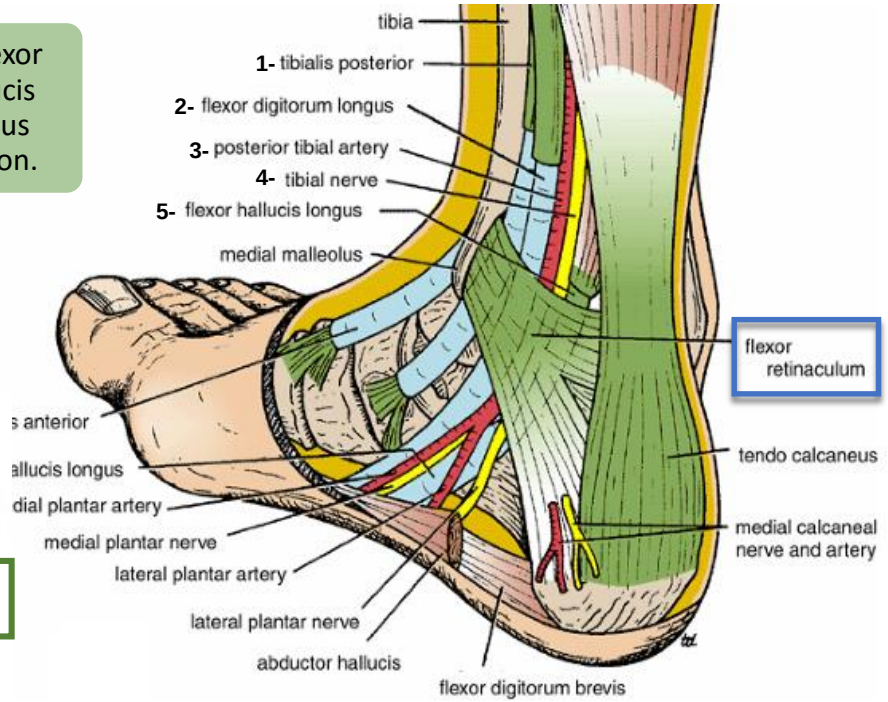
- **Structures that passing posterior to medial malleolus, deep to flexor retinaculum (Medial to lateral):**

1- Tibialis posterior tendon. → 2- Flexor digitorum longus tendon. → 3-Posterior tibial artery with vanae comitantes. → 4- Tibial nerve. → 5- Flexor hallucis longus tendon.

- All the tendons are surrounded by a shiny synovial sheath.

Very important!





Sole of the Foot

هذه الجزئية غير موجودة في درس الأولاد

The skin of the sole of the foot is **Thick and Hairless**

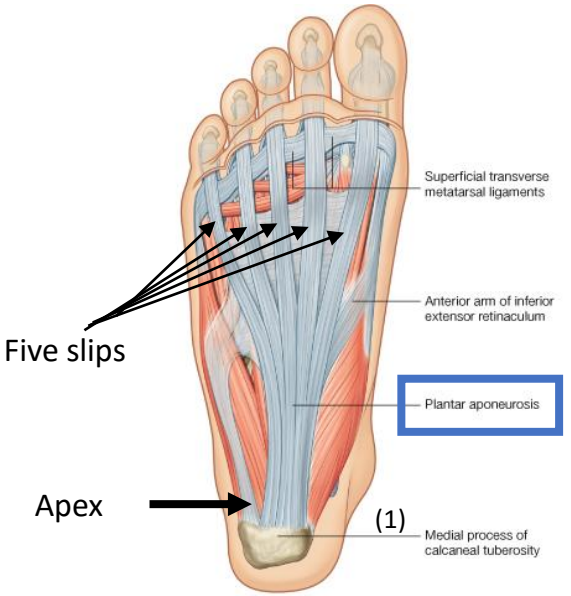
The skin of the sole shows a **Few Flexure creases** at site of skin movement.

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 muscle.

Planter aponeurosis → The **APEX** is attached to (1)the medial and lateral tubercle of the **Calcaneum.** → The **BASE** of the aponeurosis divides into **five slips** that pass into the **TOES.**

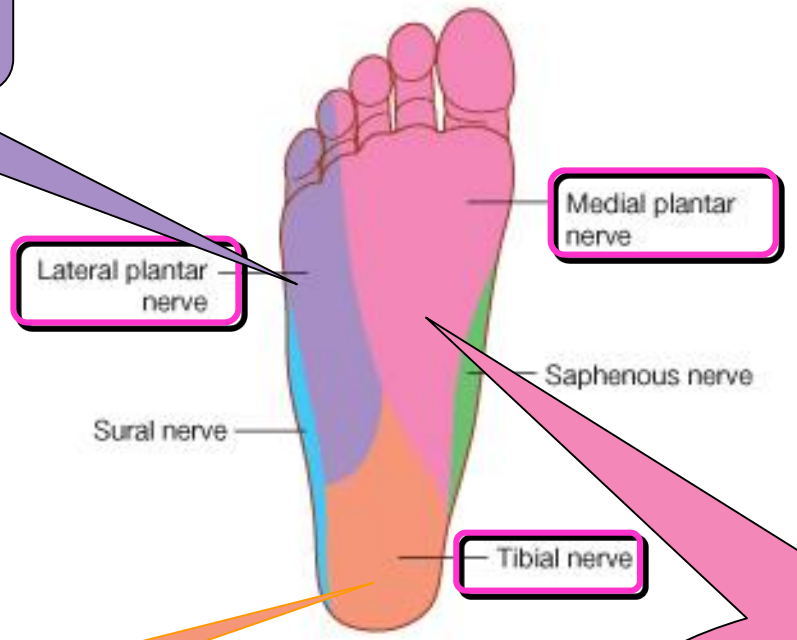


Sensory Nerve Supply

هذه السلايد غير موجودة بدرس البنات

The **sensory nerve supply** to the skin of the sole of the foot is derived from

1/Lateral plantar nerve innervate the lateral third of the sole



2/Tibial nerve innervates the medial side of the heel

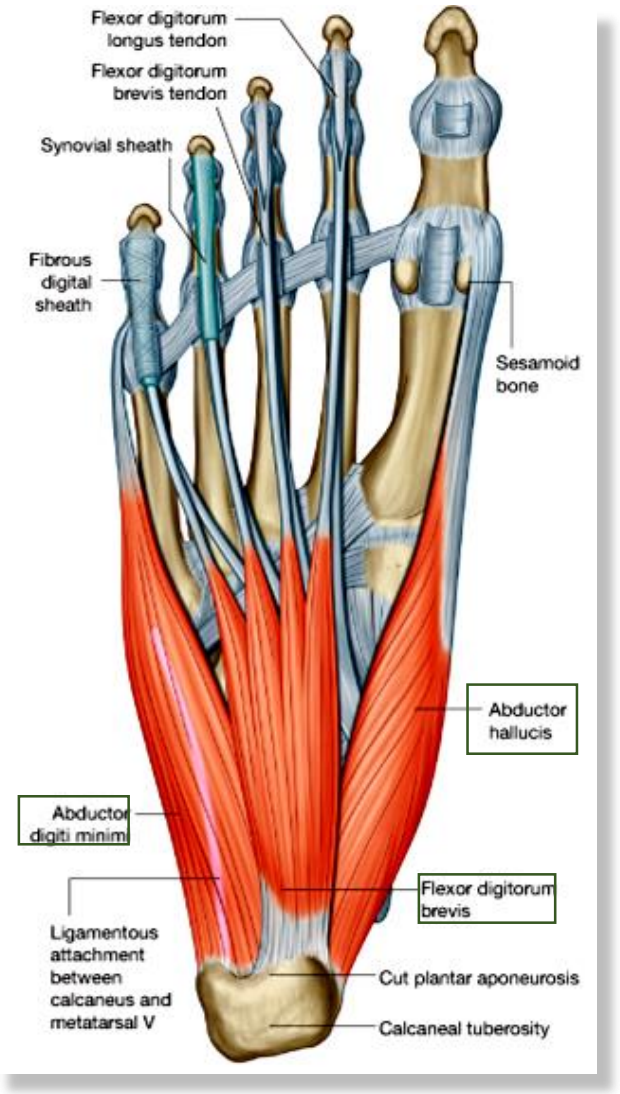
3/Medial plantar nerve innervate the medial two thirds of the sole

Muscles of The Sole of The Foot

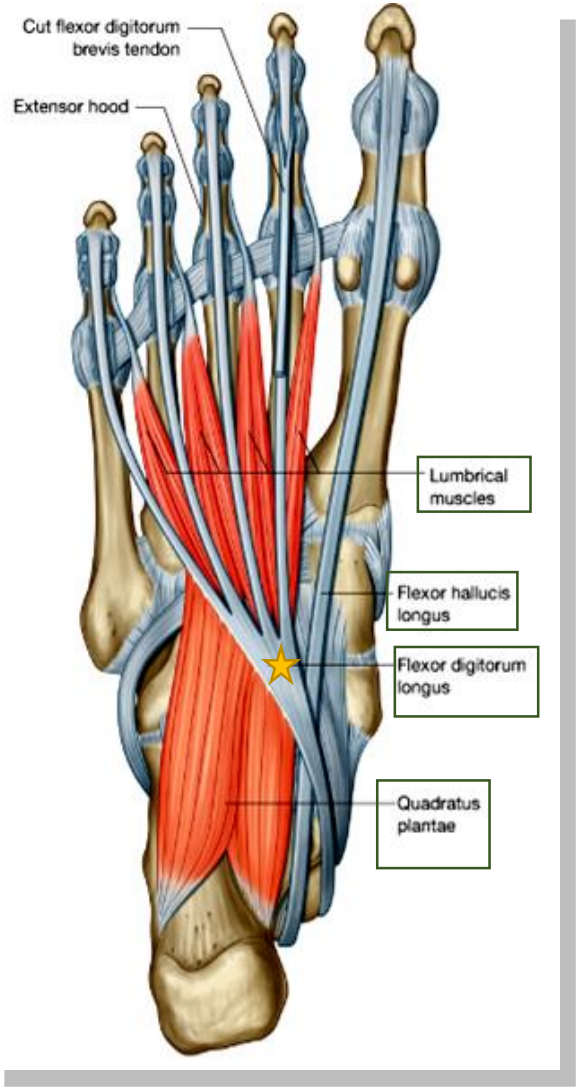
The muscles of the sole are conveniently described in **four layers** from superficial to deep:

LAYER	MUSCLES
FIRST (Superficial)	1- Abductor Hallucis 2- Flexor Digitorum Brevis 3- Abductor Digiti Minimi
SECOND	1- Quadratus Plantea 2- Lumbricals (4 muscles) 3- Flexor Digitorum Longus Tendon 4- Flexor Hallucis Longus Tendon
THIRD	1- Flexor Hallucis Brevis 2- Adductor Hallucis 3- Flexor Digiti Minimi Brevis
FOURTH (Deep)	1- Interossei (3 planter + 4 dorsal) 2- Peroneus Longus Tendon 3- Tibialis Posterior Tendon

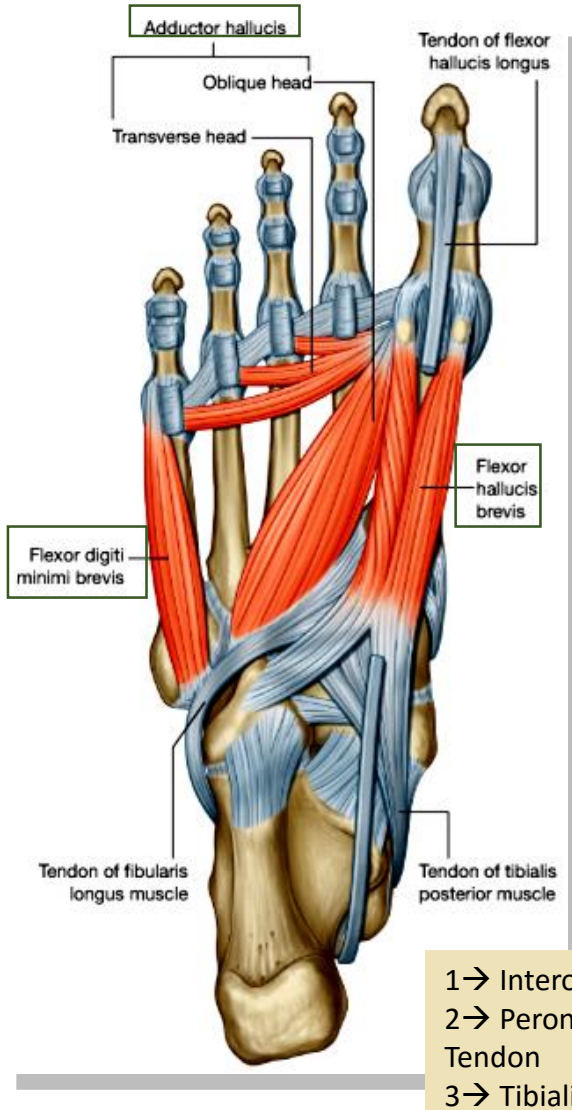
Peroneus longus and brevis are the only muscles of lateral compartment of leg



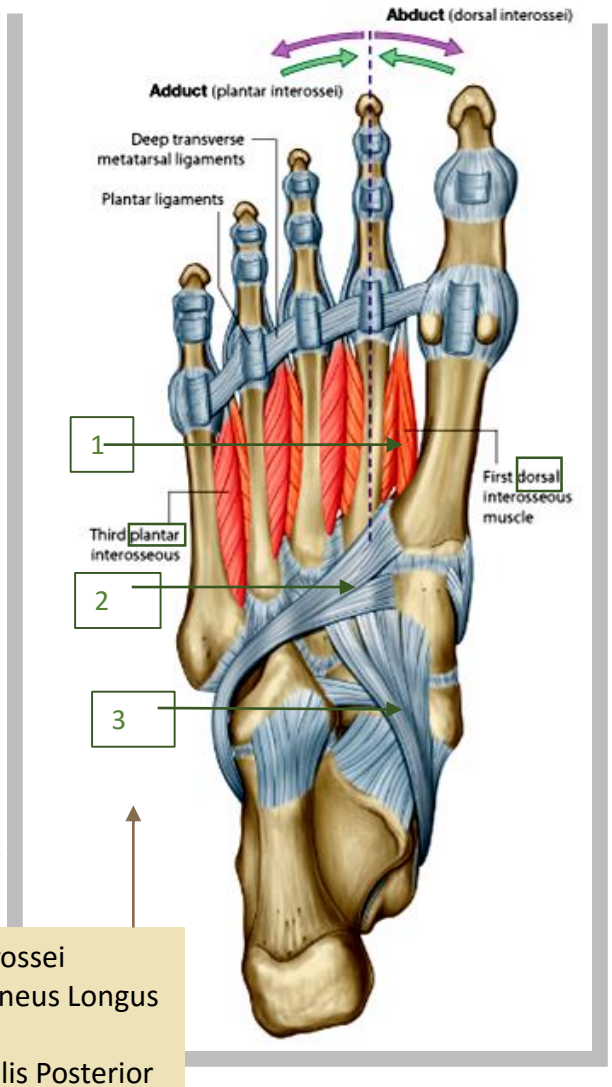
First Layer



Second Layer



Third Layer

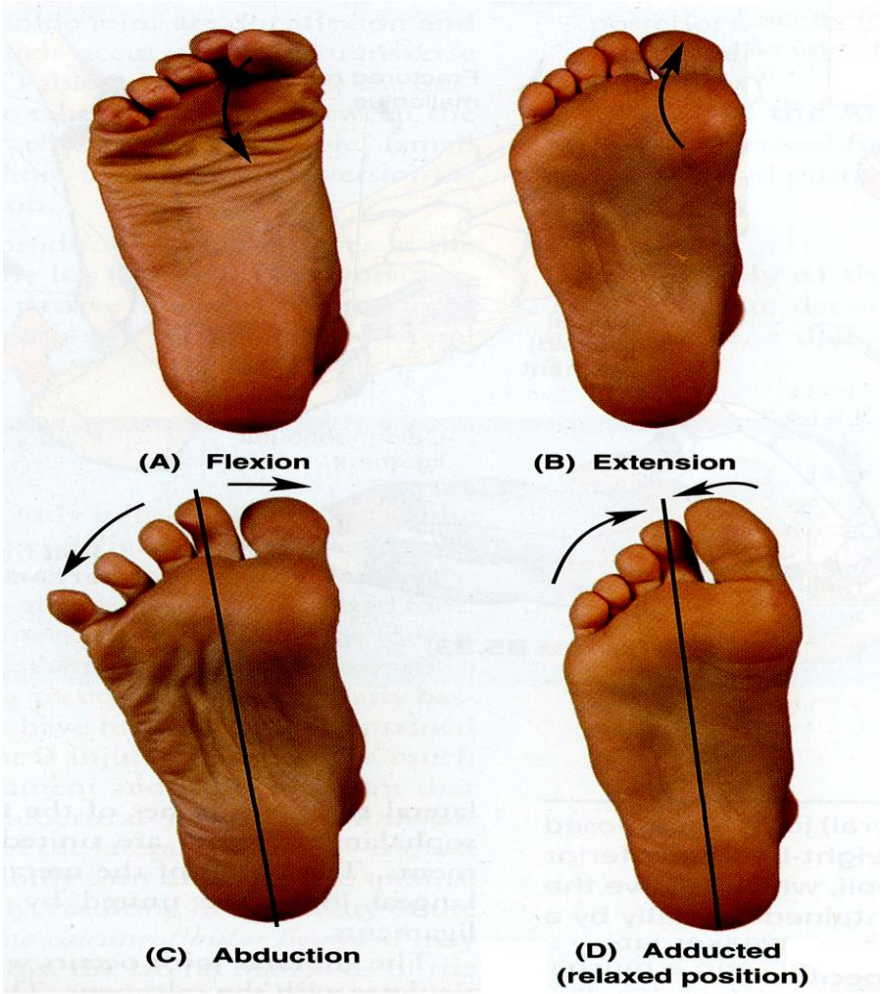


1→ Interossei
2→ Peroneus Longus Tendon
3→ Tibialis Posterior Tendon

Fourth Layer

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.
Although their names would suggest control movements of individual toes, this function is **rarely used** in most people



Metatarsophalangeal joints

Movement	Muscle
Flexion (A)	**Flexor digitorum brevis.** **Lumbricals.** **interossei** → The main **Flexor hallucis brevis.** **Flexor hallucis longus.** Flexor digiti minimi brevis. Flexor digitorum longus.
Extention (B)	**Extensor hallucis longus.** **Extensor digitorum longus.** **Extensor digitorum brevis.**
Abduction (C)	**Abductor hallucis .** **Abductor digiti minimi.** **Dorsal interossei.**
Adduction (D)	**Adductor hallucis.** **Plantar interossei.**

Muscles in **boldface** are chiefly responsible for the movement; the other muscles assist them

See the picture in the previous slide

Interphalangeal joints

Movement	Muscle
Flexion (A)	**Flexor hallucis longus.** **Flexor digitorum longus.** **Flexor digitorum brevis.** Quadratus plantae.
Extention (B)	**Extensor hallucis longus.** **Extensor digitorum longus.** **Extensor digitorum brevis.**

Arches of Foot

✓ **Medial longitudinal arch:**

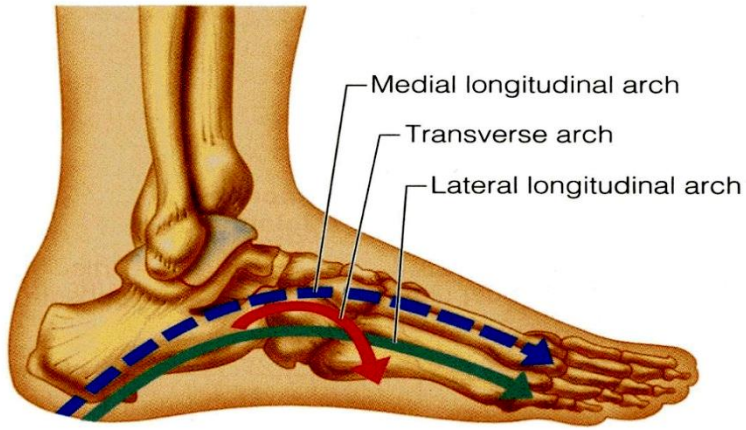
Is formed of: calcaneum, talus, navicular, 3 cuneiform bones & first medial 3 metatarsal bones (bases).

✓ **Lateral longitudinal arch:**

Is formed of: calcaneum, cuboid & lateral 4th & 5th metatarsal bones (bases).

✓ **Transverse arch:**

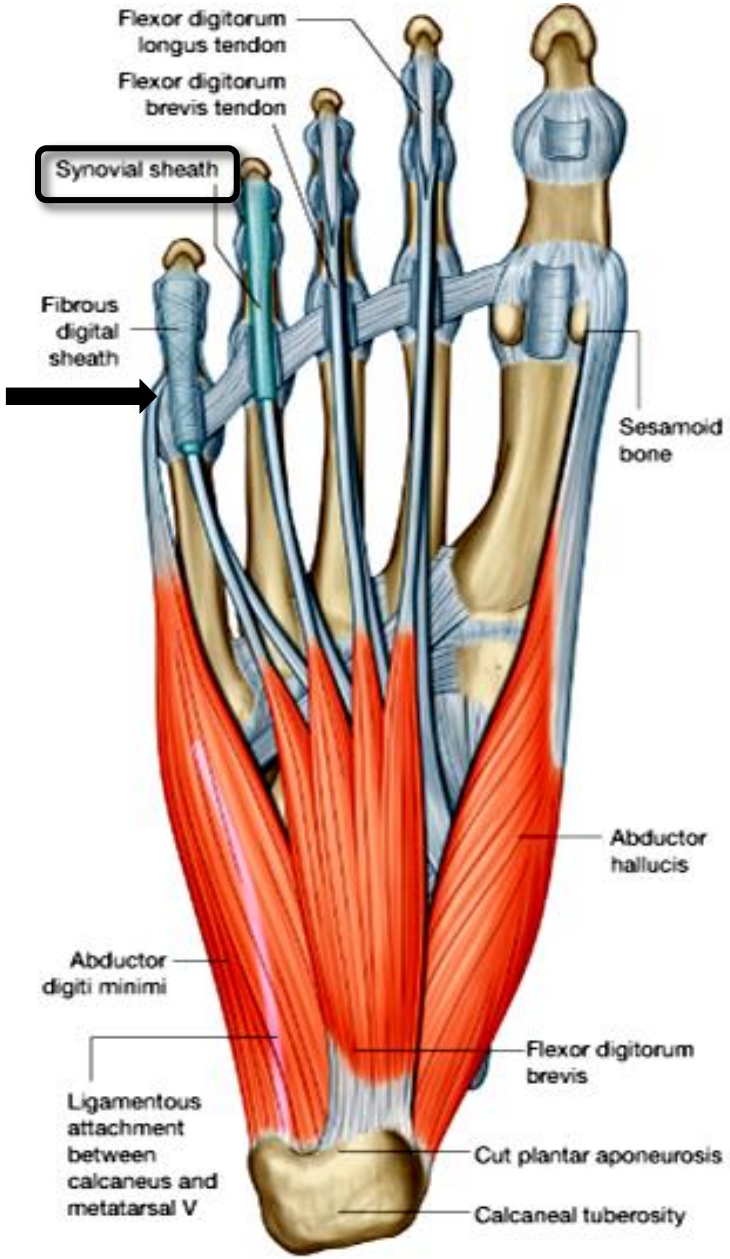
Lies at the level of ***tarso-metatarsal joints***, formed of: bases of metatarsal bones, cuboid & 3 cuneiform bones.



Function of Arches of the Foot :

1. Weight bearing.
2. Support walking & running.
3. Provide potential space for neurovascular bundle of the sole.
4. 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 sheath:

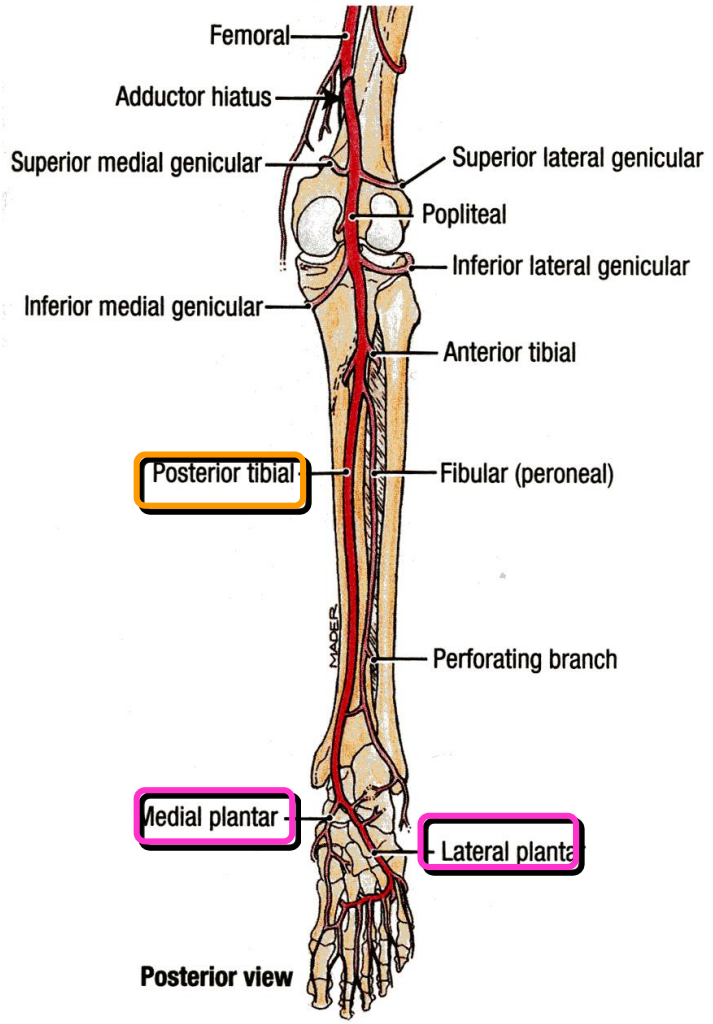
- The inferior surface of each toe, from the head of the metatarsal bone to the base of the distal phalanx, is provided with a strong fibrous sheath, which is attached to **the sides of the phalanges**.
- The fibrous sheath, together with the inferior surfaces of the phalanges and the interphalangeal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

synovial Flexor sheath:

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

Medial & Lateral Plantar Arteries

هذه السلايد
غير موجودة
بدرس البنات



The **medial plantar artery** is the smaller & **lateral plantar artery** is the larger of the terminal branches of the *posterior tibial artery*

Medial & Lateral Plantar Nerve

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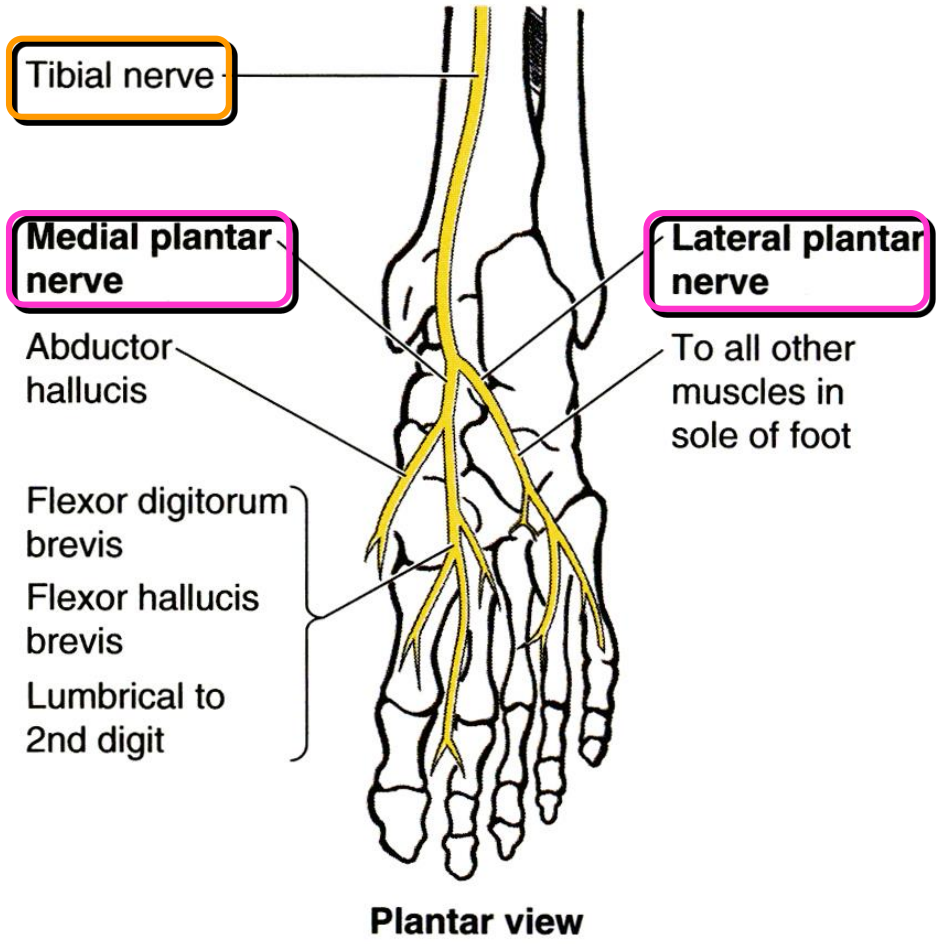
بدرس البنات



Plantar view

The **medial plantar nerve and lateral plantar nerve** are terminal branches of the **tibial nerve.**

summary

Popliteal Fossa (diamond-shaped intermuscular space at the back of knee)	
Laterally	Above: biceps femoris
	Below: lateral head of gastrocnemius & plantaris
Medially	above: semitendinosus, semimembranosus
	Below: medial head of gastrocnemius.
Floor	Skin, superficial fascia and deep fascia of the thigh
Roof	popliteal surface of femur, posterior ligament of knee joint and popliteus muscle.
Contents	Popliteal vessels, small saphenous vein, tibial nerve, common peroneal nerve Posterior cutaneous nerve of thigh, connective tissue & popliteal lymph node * The deepest structure is popliteal artery.

CONTENTS OF THE POSTERIOR FASCIAL COMPARTMENT OF THE LEG

- superficial and deep groups of muscles "divided by the transverse intermuscular septum".
- Posterior tibial artery
- Tibial nerve

POSTERIOR TIBIAL ARTERY	TIBIAL NERVE
It is one of the terminal branches of the popliteal artery.	It is the larger terminal branch of the sciatic nerve in the lower 1/3 of the back of the thigh

Superficial group of muscles

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 of muscles

Muscle	Origin	Insertion	Nerve	Action
Popliteus	Groove on Lateral surface of lateral condyle of femur (Intracapsular)	Post surface of shaft of tibia above soleal line	Tibial	Flexes leg at knee joint , Unlocks knee joint by lateral rotation of femur on tibia
Flexor digitorum longus	Posterior surface of shaft of tibia	Bases of distal phalanges of lateral four toes	Tibial	Flexes distal phalanges of lateral four toes; plantar Flexes foot at ankle joint; Supports medial and lateral longitudinal arches
Flexor hallucis 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

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 "tall doctor are never hungry" 1. Tibialis posterior tendon 2. Flexor digitorum longus tendon 3. Posterior tibial artery with venae comitantes 4. Tibial nerve 5. Flexor hallucis longus tendon * All the tendons are surrounded by a synovial sheath

Sole of the foot		
Features		thick and hairless skin with few flexure creases and large numbers of sweat glands.
Deep fascia		plantar aponeurosis = triangular thickening of the deep fascia for protection. apex → medial and lateral tubercles of the calcaneum. Base → five slips that pass into the toes.
Muscles	1st Layer	Abductor hallucis + flexor digitorum brevis + abductor digiti minimi
	2nd Layer	Quadratus plantae + lumbricals + flexor digitorum longus tendon + flexor hallucis longus tendon
	3rd Layer	Flexor hallucis brevis + adductor hallucis + flexor digiti minimi brevis
	4th Layer	Interossei (3 plantar & 4 dorsal) + peroneus longus tendon + tibialis posterior tendon
Function of small muscles		supporting the arches of the foot

Metatarsophalangeal joints

movement	muscles
flexion	Lumbricals interossei Flexor hallucis longus Flexor hallucis brevis Flexor digiti minimi brevis Flexor digitorum longus Flexor digitorum brevis
extention	Extensor hallucis longus Extensor digitorum longus Extensor digitorum brevis
Abduction	Abductor hallucis Abductor digiti minimi Dorsal interossei
Adduction	Adductor hallucis Planter interossei

Interphalangeal joints

movement	muscles
flexion	Quadratus plantae Flexor hallucis longus Flexor digitorum longus Flexor digitorum brevis
extention	Extensor hallucis longus Extensor digitorum longus Extensor digitorum brevis

Arches of foot

Medial longitudinal arch	Calcaneum + talus + navicular + three cuneiform bones + first medial 3 metatarsal bones
Lateral longitudinal arch	Calcaneum + cuboid + lateral 4th & 5th metatarsal bones
Transverse arch	at the level of tarso-metatarsal joints, formed of: bases of metatarsal bones + cuboid & 3 cuneiform bones

Function of arches of foot

1. Weight bearing.
2. Support walking & running.
3. Provide potential space for neurovascular bundle.
4. Act as shock absorber.

Fibrous Flexor Sheaths	Synovial Flexor Sheaths
Around the inferior surface of each toe (from the head of the metatarsal bone to the base of the distal phalanx)	Around the tendons of the flexor hallucis longus + the flexor digitorum longus

- The fibrous sheath + the inferior surfaces of the phalanges + the interphalangeal joints = " a blind tunnel"
- The flexor tendons of the toes lie in that tunnel.

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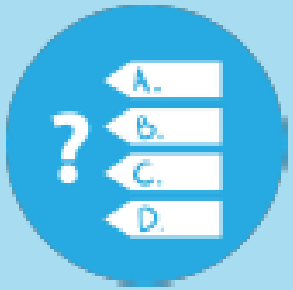

https://www.onlineexambuilder.com/popliteal-fossa-post.-comp-of-leg/exam-53001

هذا العمل إجتهاد من طلاب و طالبات

إن أصبنا فمن الله و إن أخطأنا فمن أنفسنا و من الشيطان

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- For questions and suggestions you can contact us on Anatomy435@gmial.com