Popliteal fossa, back of leg & Sole of foot

Musculoskeletal block- Anatomy-lecture 16

Editing file

Objectives

Color guide :
Only in boys slides in **Blue**
Only in girls slides in **Purple**
important in **Red**
Doctor note in **Green**
Extra information in **Grey**

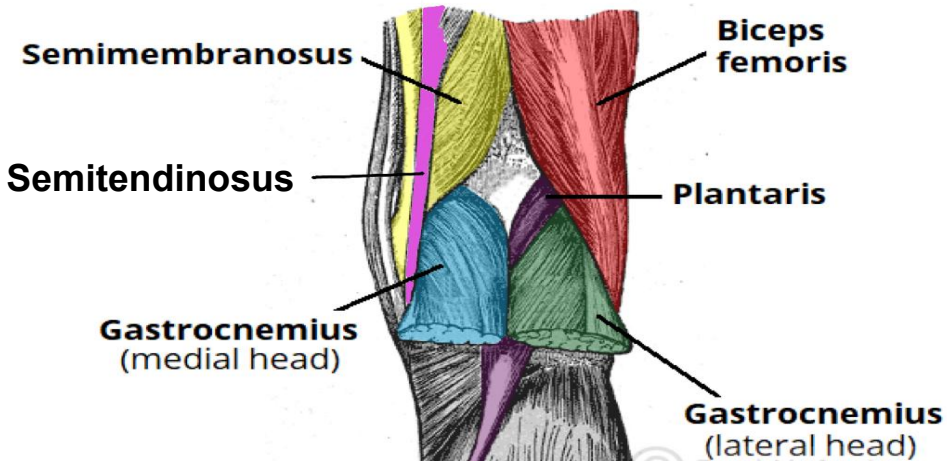
By the end of the lecture, students should be able to:

- ✓ The location , boundaries & contents of the popliteal fossa.
- ✓ The contents of posterior fascial compartment of the leg.
- ✓ The structures hold by retinacula at the ankle joint.
- ✓ 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 the knee

Boundaries



Laterally

(above)
biceps femoris.

(Below)
Lateral head of gastrocnemius & plantaris

Medially

(above)
semimembranosus & semitendinosus

(Below)
Medial head of gastrocnemius

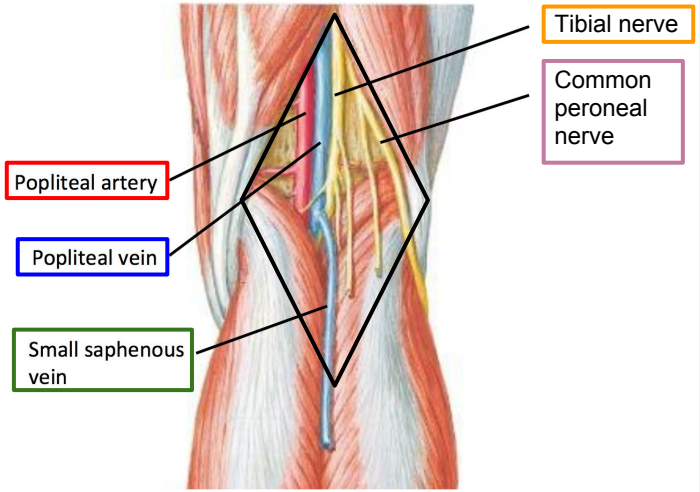
Roof

1.Skin
2.superficial fascia & deep fascia of the thigh.

Floor

1.popliteal surface of femur
2.posterior ligament of knee joint
3.popliteus muscle.

Contents



From medial to lateral

1. Popliteal vessels (artery/vein)
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.* (VERY IMPORTANT)

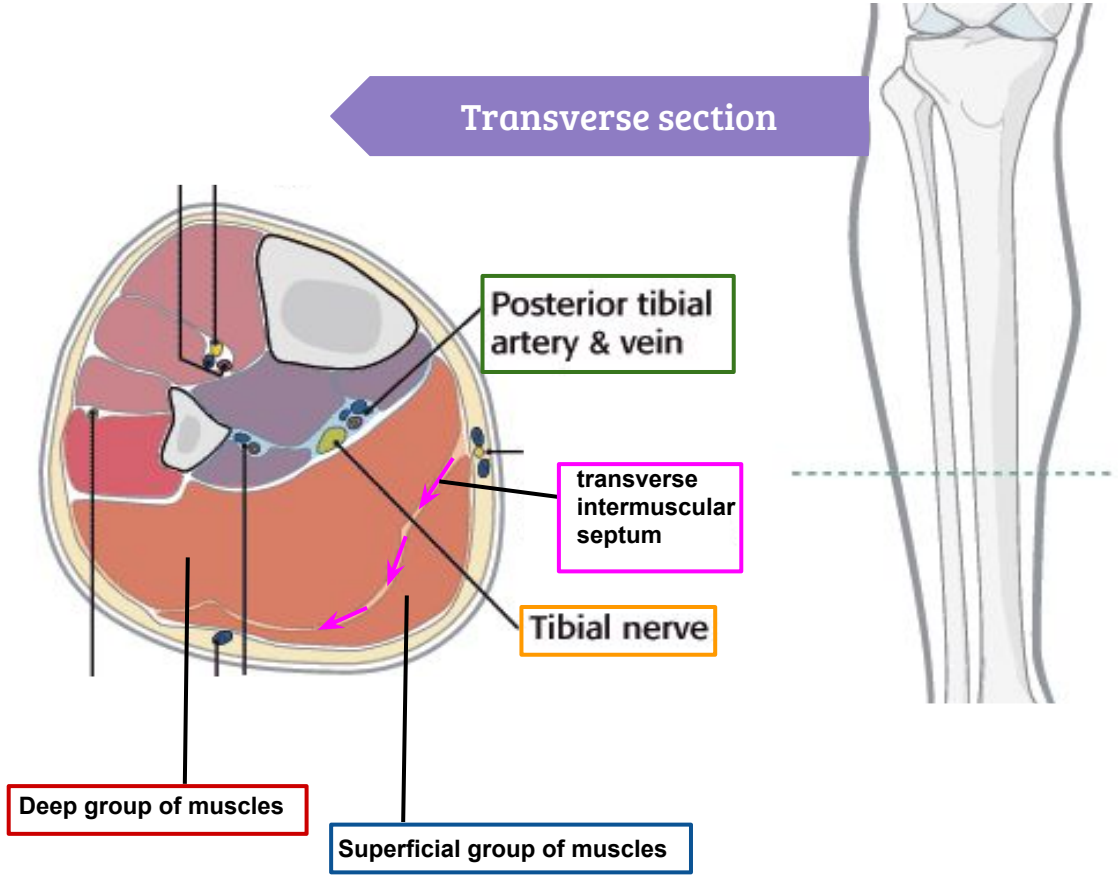
CONTENTS OF THE POSTERIOR FASCIAL COMPARTMENT OF THE LEG

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

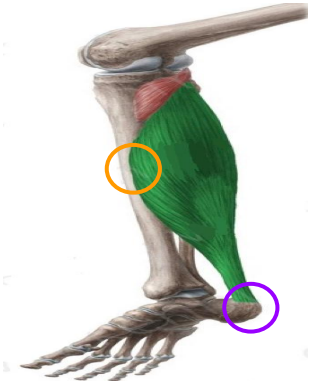
Contents

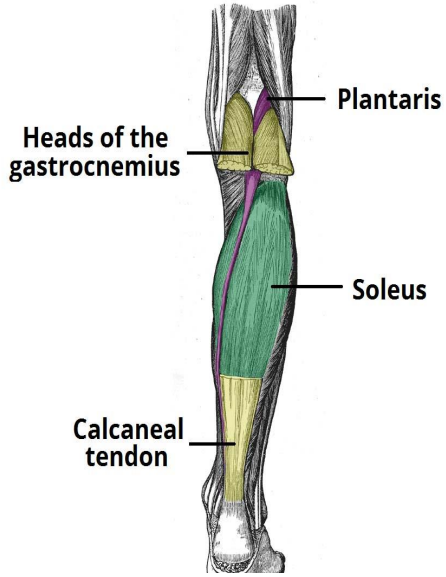
1. Superficial group of muscles
2. Deep group of muscles
3. Posterior tibial artery
4. Tibial nerve

Superficial group	Deep group
1. Gastrocnemius 2. Plantaris 3. Soleus	1. Popliteus 2. Flexor digitorum longus 3. Tibialis posterior 4. Flexor hallucis longus



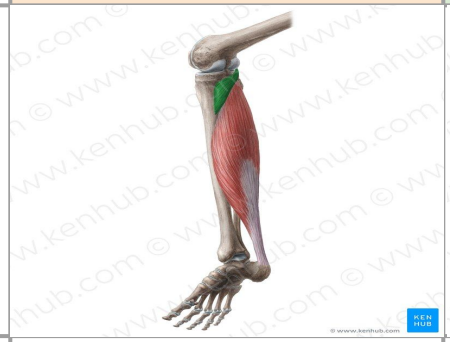
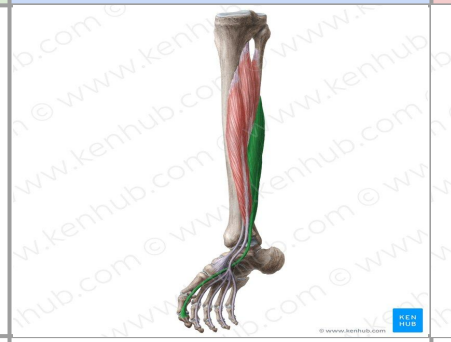
Superficial Group Muscles

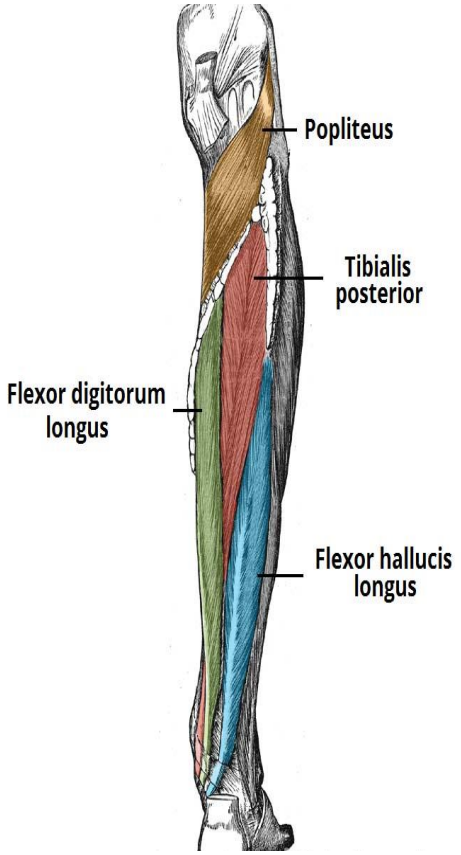
	Gastrocnemius	Plantaris	Soleus
Muscle			
Origin	-Lateral head from lateral condyle of femur -Medial head from above medial condyle	Lateral supracondylar ridge of femur	Shafts of tibia and fibula
Insertion	Posterior surface of calcaneum via tendo calcaneus	Posterior surface of calcaneum	Posterior surface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



NOTE:
We can't see the "Soleus muscle" until we remove the "Gastrocnemius muscle" which lays above it.

Deep Group Muscles

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



Flexor Retinaculum:

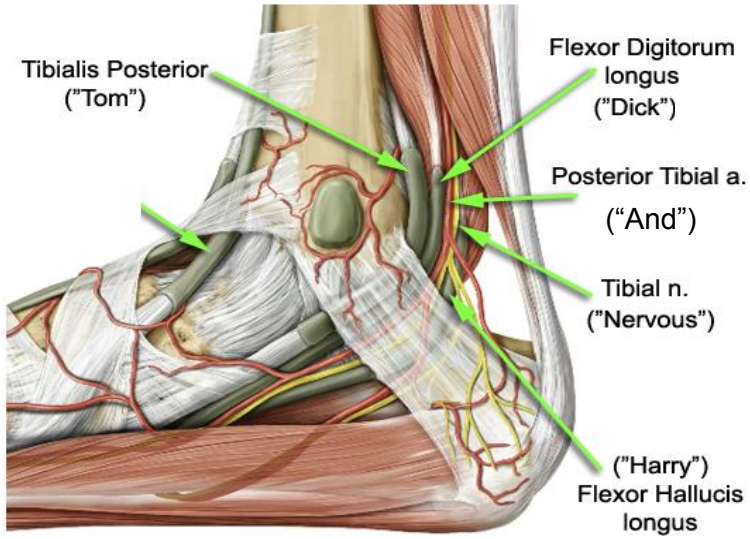
Extends from back of medial malleolus of tibia to medial side of calcaneum

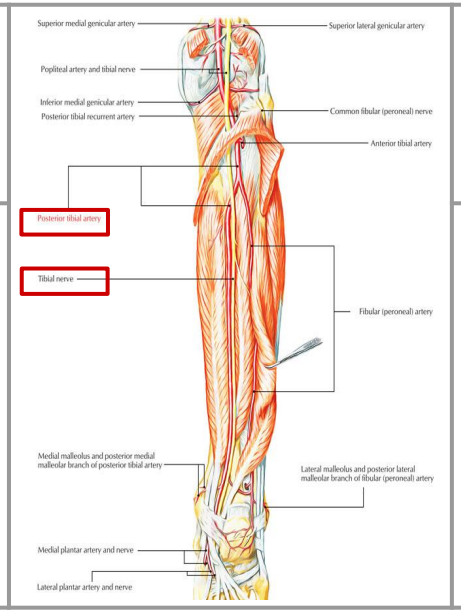
Structures passing posterior to medial malleolus, deep to flexor retinaculum:

Medial to lateral: "Tom, Does A very nice head " -IMPORTANT-

I. Tibialis posterior tendon
II. Flexor digitorum longus tendon
III. Posterior tibial artery with venae comitantes
IV. Tibial nerve
V. Flexor hallucis longus tendon

(All the tendons are surrounded by a synovial sheath)



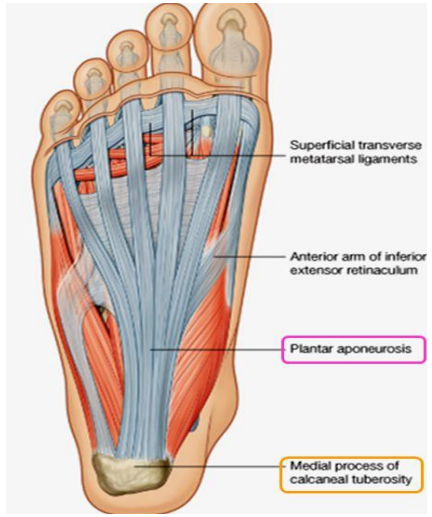
Posterior tibial artery		Tibial nerve
It is one of the terminal branches of the popliteal artery.		It is the larger terminal branch of the sciatic nerve in the lower ⅓ of the back of the thigh

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:

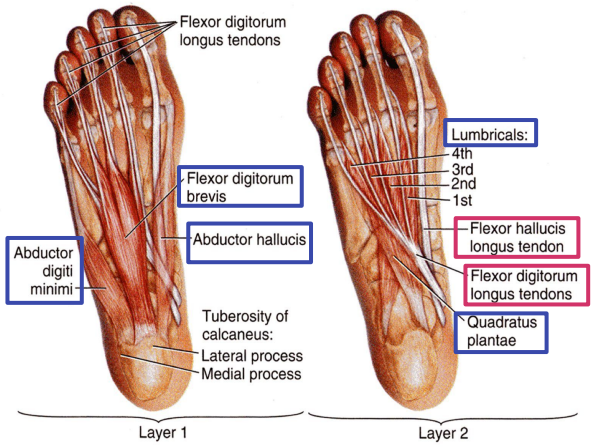
- The plantar aponeurosis is a triangular thickening of the deep fascia that protects the underlying nerves, blood vessels, and muscles.
- Its **apex** is attached to the **medial** and lateral tubercles of the calcaneum.
- The **base** of the aponeurosis divides into five slips that pass into the toes.

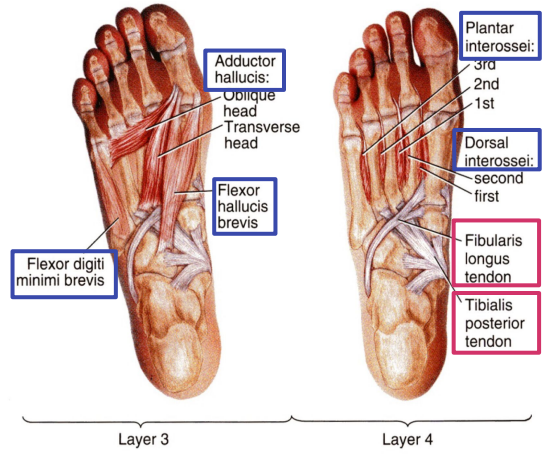


Function of small muscles of sole of Foot

- 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.

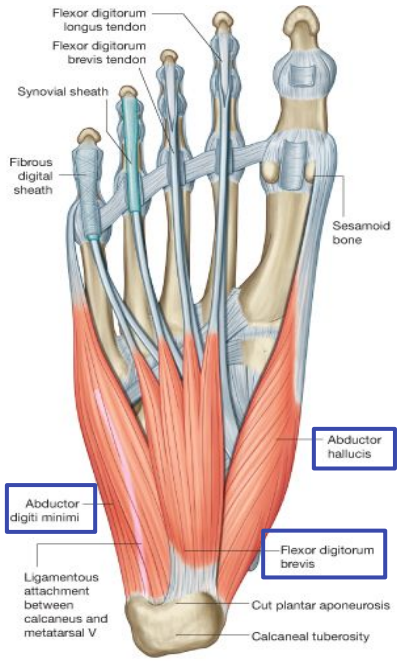
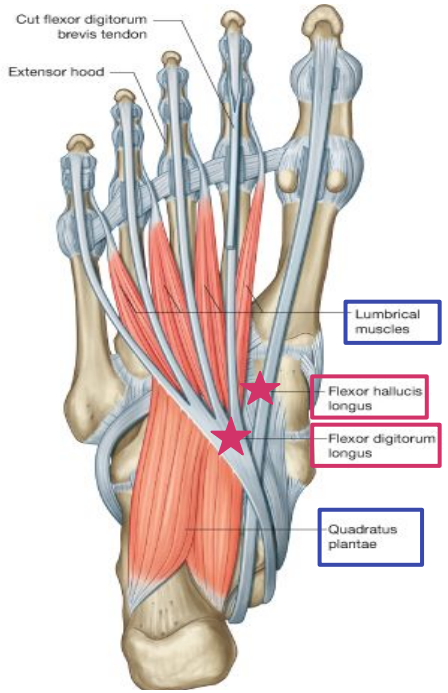
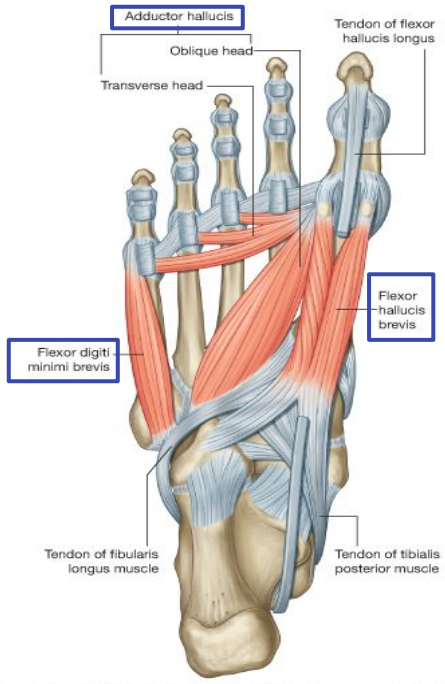
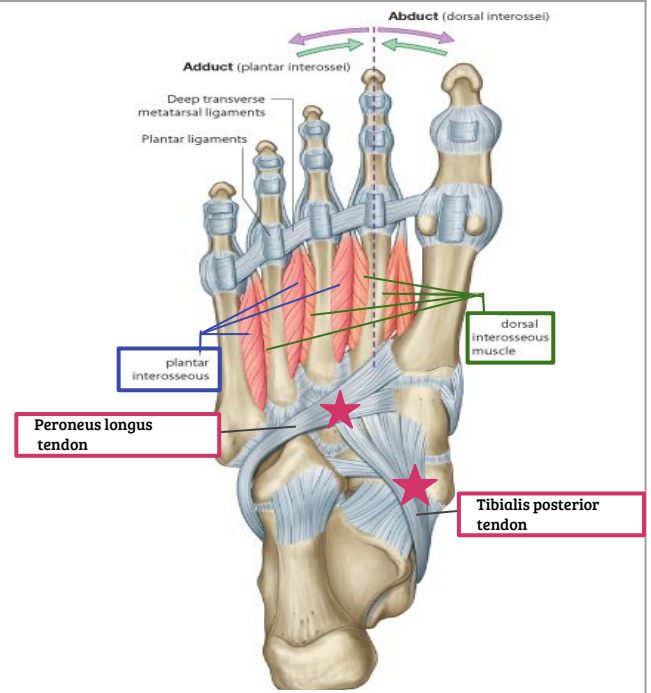
(usually we don't hold anything by our foot so no need for this function)





Muscles of the sole of the foot

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

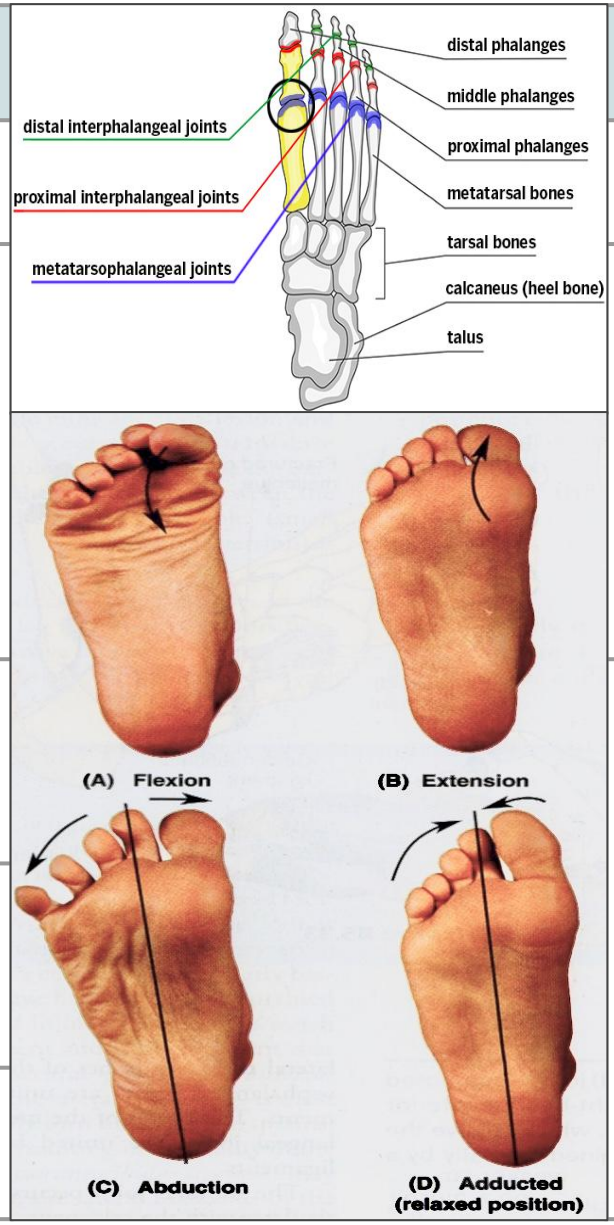
First layer	Second layer	Third layer	Fourth layer
1. Abductor hallucis. 2. Flexor digitorum brevis. 3. Abductor digiti minimi	1. Quadratus plantae. 2. Lumbricals. 3. Flexor digitorum longus tendon. 4. Flexor hallucis longus tendon.	1. Flexor hallucis brevis. 2. Adductor hallucis. 3. Flexor digiti minimi brevis	1. Interossei; (3 plantar + 4 dorsal). 2. Peroneus longus tendon. 3. Tibialis posterior tendon.
			

Function of small muscles of sole of foot

*Muscles in bold are chiefly responsible for the movement, others assist them.

Metatarsophalangeal joints

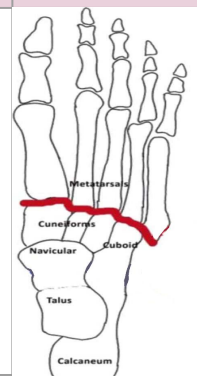
Movement	Muscles*
Flexion (A)	• **Flexor digitorum brevis.** • **Lumbricals.** • **Interossei.** • **Flexor hallucis brevis.** • **Flexor hallucis longus.** • Flexor digiti minimi brevis. • Flexor digitorum longus.
Extension (B)	• **Extensor hallucis longus.** • **Extensor digitorum longus.** • **Extensor digitorum brevis.**
Abduction (C)	• **Abductor hallucis.** • **Abductor digiti minimi.** • **Dorsal interossei.**
Adduction (D)	• **Adductor hallucis.** • **Plantar interossei.**

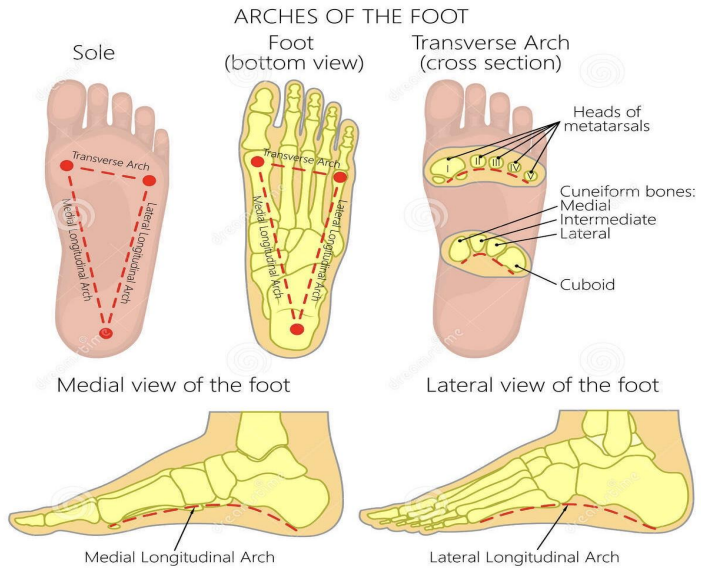


Interphalangeal joints

Movement	Muscles*
Flexion (A)	• **Flexor hallucis longus.** • **Flexor digitorum longus.** • **Flexor digitorum brevis.** • Quadratus plantae.
Extension (B)	• **Extensor hallucis longus.** • **Extensor digitorum longus.** • **Extensor digitorum brevis.**

Arches of foot

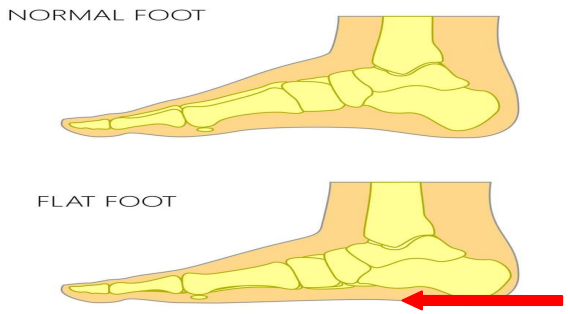
Medial longitudinal arches	Lateral longitudinal arch	Transverse arch	
Is formed of calcaneum, talus, navicular, **3** cuneiform bones, and **3** medial metatarsal bones.	Is formed of calcaneum, cuboid & lateral **4th** & **5th** metatarsal bones.	Lies at the level of tarso-metatarsal joints, formed of **bases** of metatarsal bones, cuboid & **3** cuneiform bones.	



Function of the arches:

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

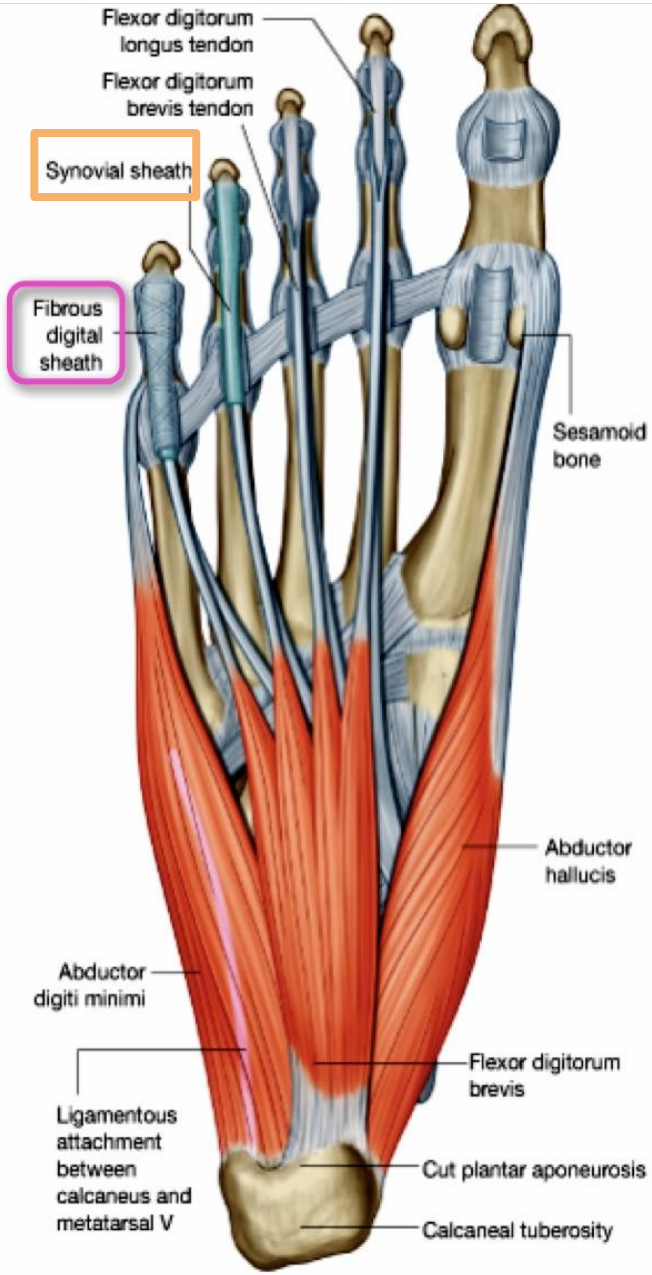
In young child, the foot appears to be flat because of presence of a large amount of subcutaneous fat on the sole of foot. (flat foot of adults is abnormal)



Fibrous flexor sheaths

Strong fibrous sheath that provide the inferior surface of each toes (sole), from the **head** of the metatarsal bone to the **base** of the distal phalanx.
It is attached to the sides of the phalanges.

The fibrous sheath together with the inferior surface of phalanges and the interphalangeal joints, forms a blind tunnel in which lies the flexor tendons of the toes.
(these tendons pass under the sheath)



Synovial flexor sheaths

Surround the tendons of the flexor hallucis longus and the flexor digitorum longus.

MCQs

Question 1: what is the lateral border of popliteal fossa is?

A. Superficial fascia and deep fascia of the thigh.

B. Biceps femoris and plantaris.

C. Semimembranosus and semitendinosus

D. Popliteal surface of femur.

Question 2: which of the following is the origin of the Plantaris muscle?

A. Posterior surface of shaft of tibia.

B. Shafts of tibia and fibula

C. Lateral supracondylar ridge of femur.

D. Groove on Lateral surface of lateral condyle of femur.

Question 3: Tibialis posterior is inserted in all tarsal bones except talus:

A. True

B. False

Question 4: which one of the following muscles originate from posterior surface of shaft of fibula?

A. Popliteus

B. Flexor hallucis longus

C. Flexor digitorum longus

D.Tibialis posterior

Question 5: flexor digiti minimi brevis is found in which layer of muscles of the sole of the foot?

A. Third layer

B. First layer

C. Fourth layer

D. Second layer

Question 6: The chief function of the small muscles of the foot is to:

A. Help thicken the skin of the sole.

B. Support the arches of the foot.

C.fix the toes in place.

D. Support sweat glands.

Question 7: Transverse arch is lies at the level of:

A.Tarso-metatarsal joints

B. Metatarsophalangeal joints

C. Interphalangeal joints

D.intermetatarsal joints

Question 8: plantar interossei muscle responsible for:

A.flexion

B. Adduction

C. Extension

D.abduction

Answers: Q1.B- Q2.C -Q3.A -Q4.B- Q5.A- Q6.B-Q7.A- Q8.B

Team members

Boys team:

- Khalid AL-Dossari
- Naif Al-Dossari
- Faisal Alqifari
- Salman Alagla
- Ziyad Al-jofan
- Suhail Basuhail
- Ali Aldawood
- Khalid Nagshabandi
- Mohammed Al-huqbani
- Jehad Alorainy
- Khalid AlKhani
- Omar Alammari

Girls team :

- ★ Ajeed Al Rashoud
- ★ Taif Alotaibi
- ★ Noura Al Turki
- Amirah Al-Zahrani
- ★ Alhanouf Al-haluli
- Sara Al-Abdulkarem
- Rawan Al Zayed
- Reema Al Masoud
- Renad Al Haqbani
- ★ Nouf Al Humaidhi
- Fay Al Buqami
- Jude Al Khalifah
- Nouf Al Hussaini
- Alwateen Al Balawi
- Rahaf Al Shabri
- Danah Al Halees
- Haifa Al Waily
- Rema Al Mutawa
- Amirah Al Dakhilallah
- Maha Al Nahdi
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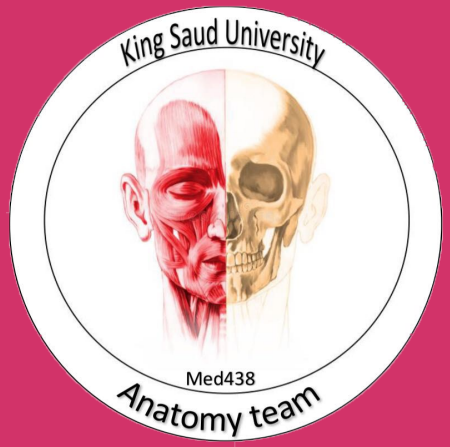
Team leaders

- Abdulrahman Shadid
- Ateen Almutairi

★ =This lecture done by

Special thank for Anatomy team 436



Good luck

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