Lower limb (LL) Summary

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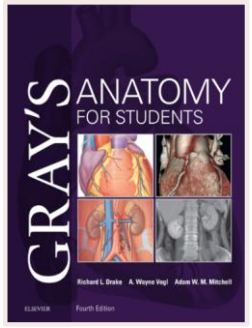

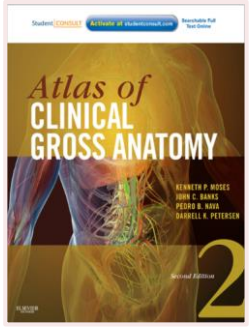

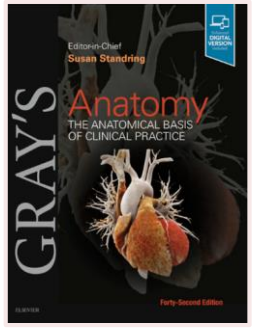

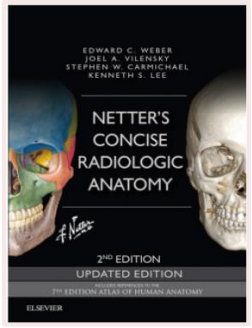

LÉKAŘSKÁ FAKULTA V PLZNI
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How to study the lower limb anatomy:

- You need to know the gross anatomy of the bones – the name and location of the structures in relation to the muscles, joints, or nerve (vascular) structures.
- Learn names of the **fascias**, notice the osteofascial (OF) **compartments**, their **nerves**, and muscles **function**.
- Learn the **muscles** regarding the OF compartments (each muscle is described by its name, origin, insertion, innervation, and function).
- ***Not for the upcoming test!*** *Learn names and course of the main* ***arteries and superficial veins.***

Tips and tricks:
Knowledge of the bony structures associated with **muscle attachments** helps to understand muscle function – every skeletal muscle runs over at least one joint usually as a vector from the origin to the insertion. **Joint mobility** is limited by the geometric shape of the articulating surfaces. **Muscles** in the same **OF compartment** have usually synergistic functions and share the **innervation**. The nerve (or vessel) needs to run near the structures it supplies. On the contrary, the nerve does not need to innervate the structures in its vicinity (e.g. the median nerve does not give off any branch in the arm, however it runs through it).

Final LEARNING GOALS (NOT for the upcoming test!)
Sectional anatomy*: femoral canal, thigh, popliteal fossa (knee regions), mid-calf, foot*
Regions (rgg.): *supra-/infrapiriform foramen, femoral trigone, popliteal fossa, malleolar rgg., dorsum and planta pedis*

Introduction, ie. What is this good for?!

Dear students, colleagues,

This presentation summarizes the content of the lecture. It also contains a list of required knowledge and allows its practice with regard to clinical use.

The following pictograms will accompany you:

 to recall or remember

 clinical notes

 to be completed

Lower limb – bones, joints, muscles

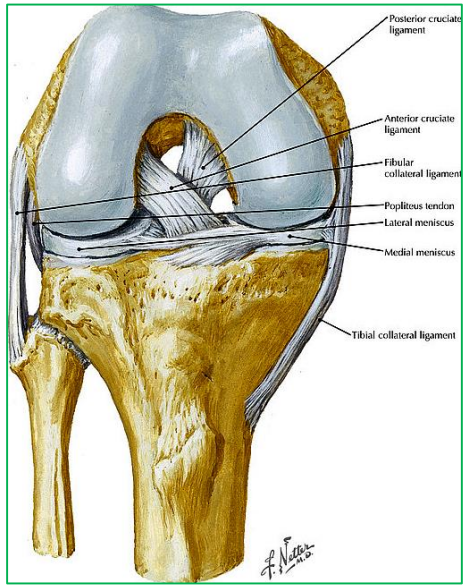
Bones
Joints
Muscles

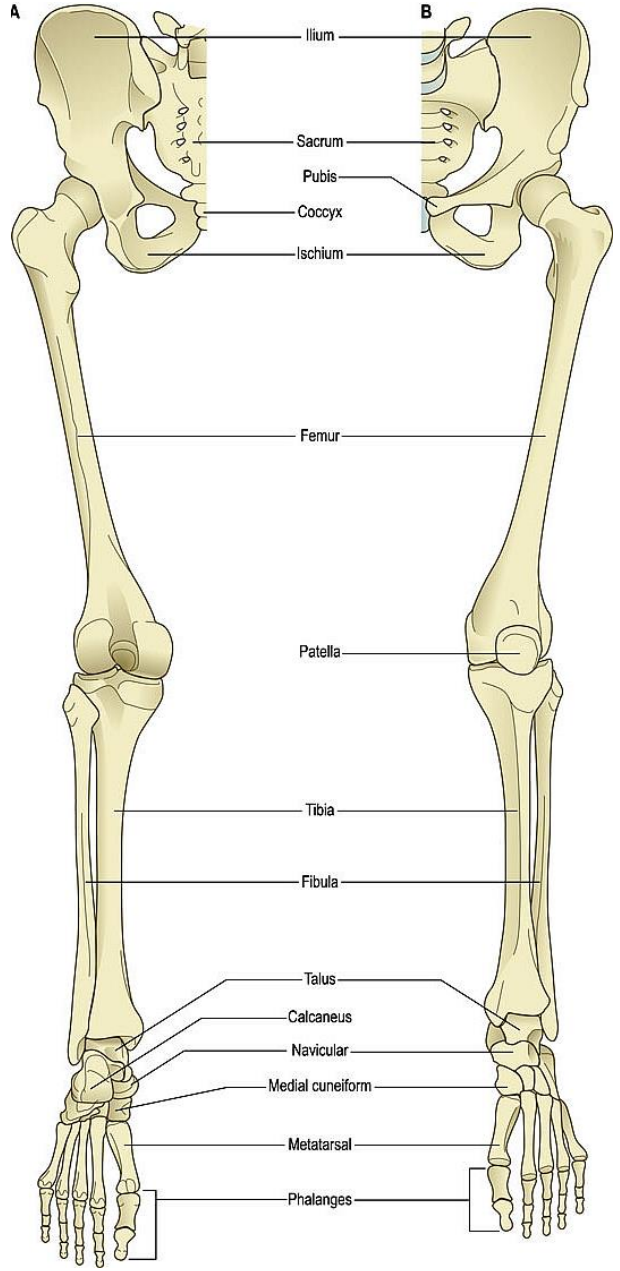
Name and location of bony structures is essential for the joints and skeletal muscles description, in muscles it helps to assume their function.

!Knowledge of the muscles is essential for the description of the course of the vessels and nerves, as well as for the orientation on the body during the dissection.

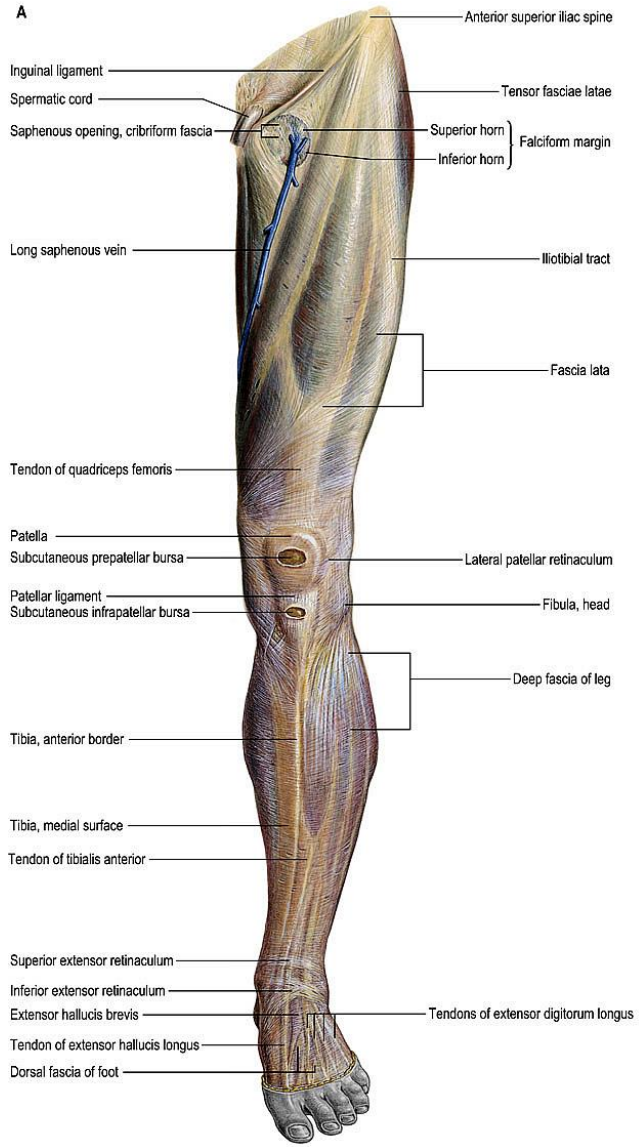
Synovial joints description:

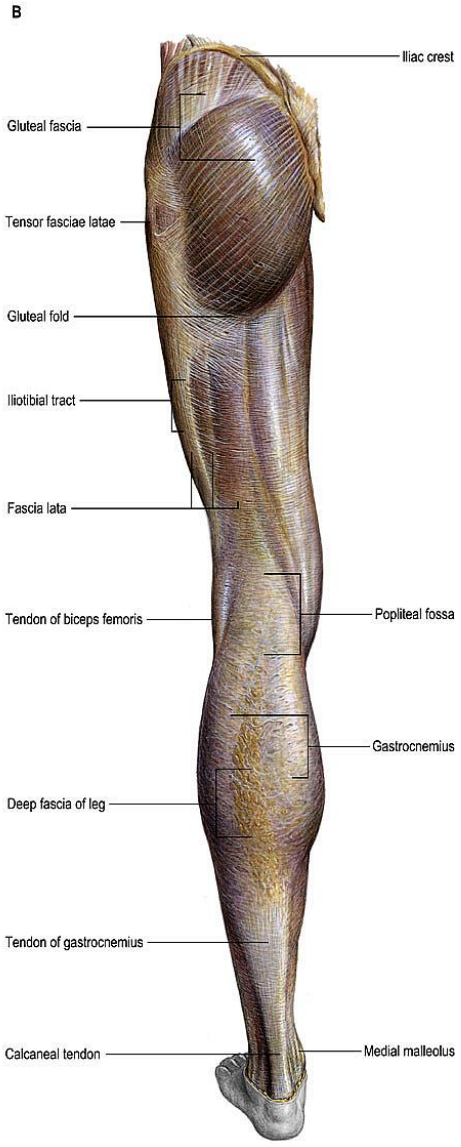
1. Name of the joint
2. Type of the joint (simple/compound, geometry)
3. Description of articular surfaces, event. of the auxiliary structures
4. Description of the joint capsule, joint ligaments (extra-/intraarticular)
5. Movements

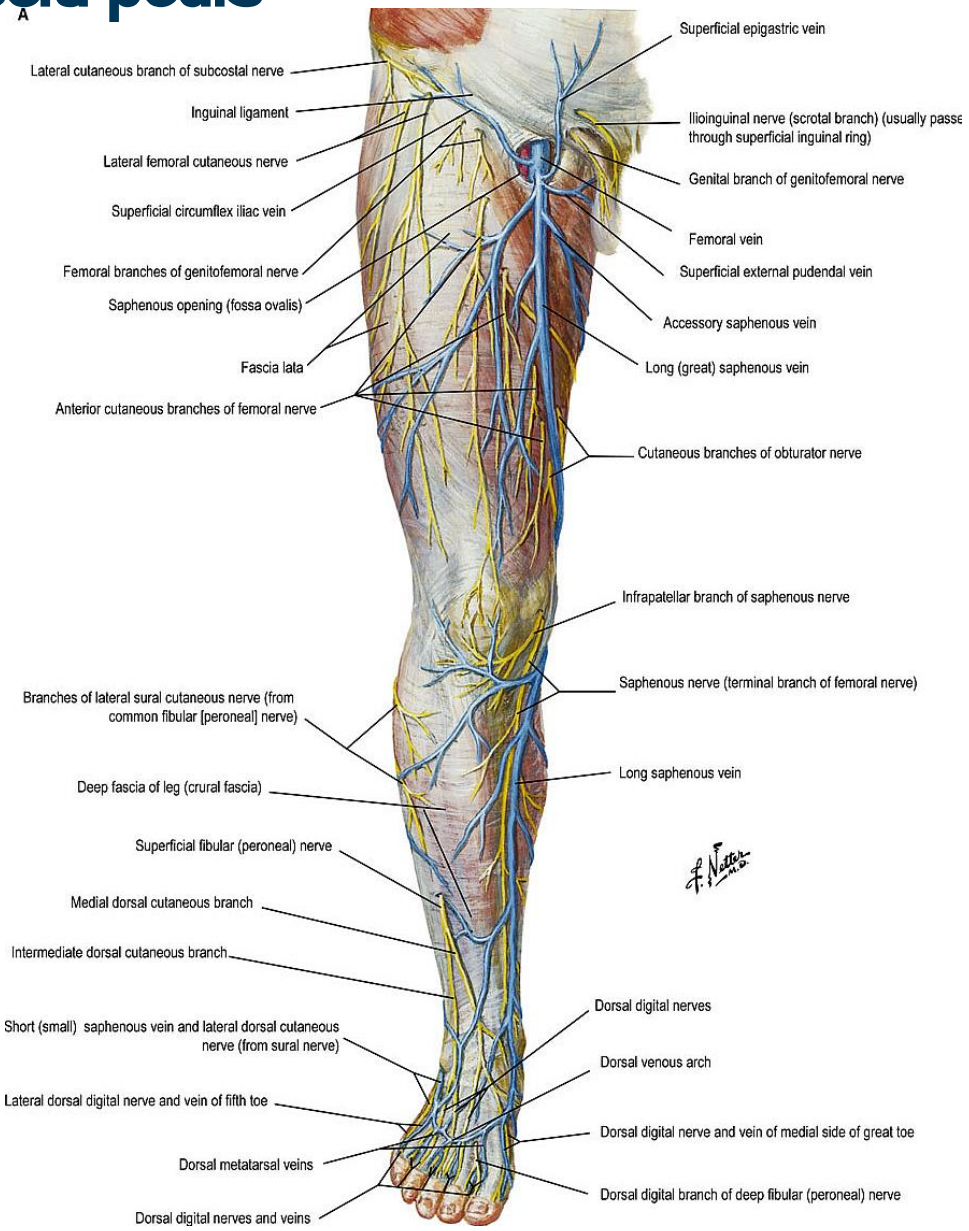




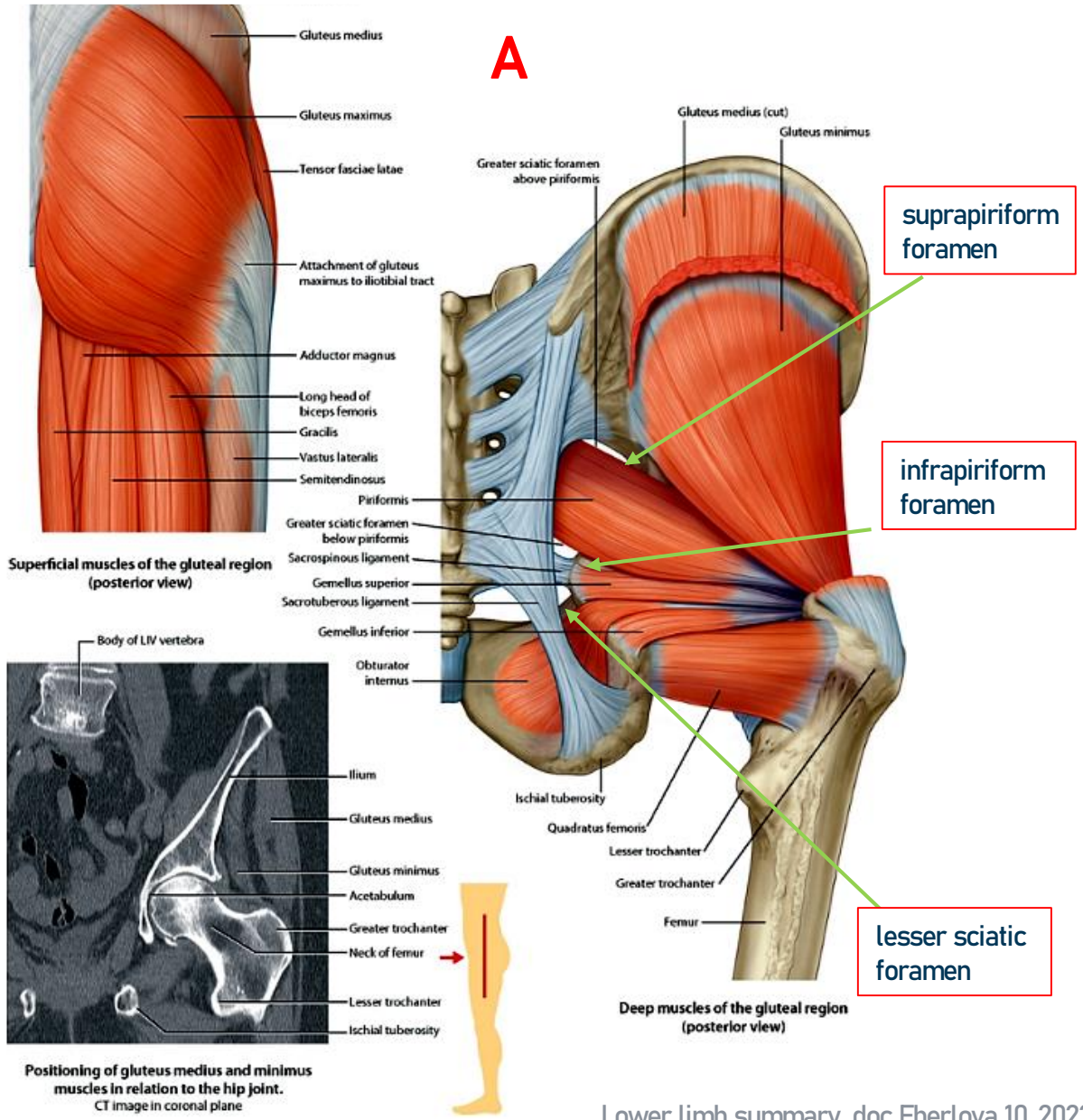
Fascias of the LL: Fascia lata, fascia cruris, fascia pedis

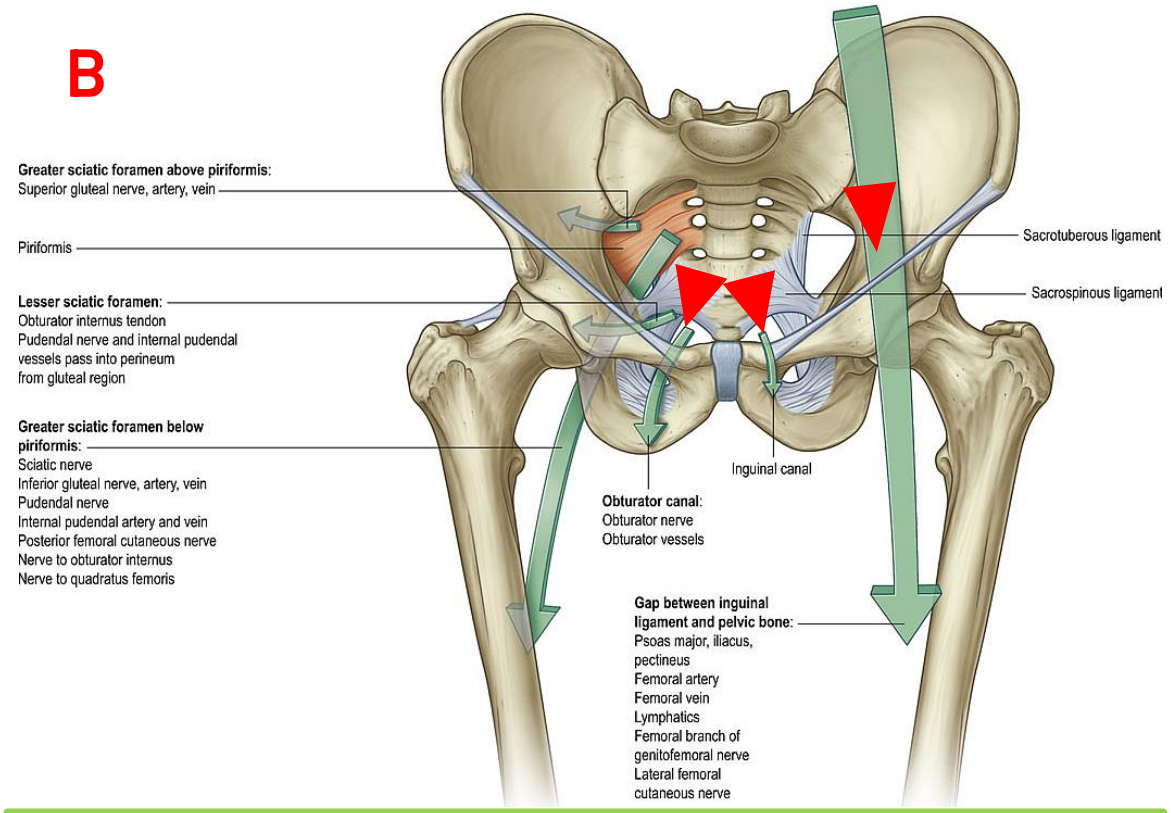






Pelvis and lower limb connections:





Spaces and canals connecting pelvis with lower limb:

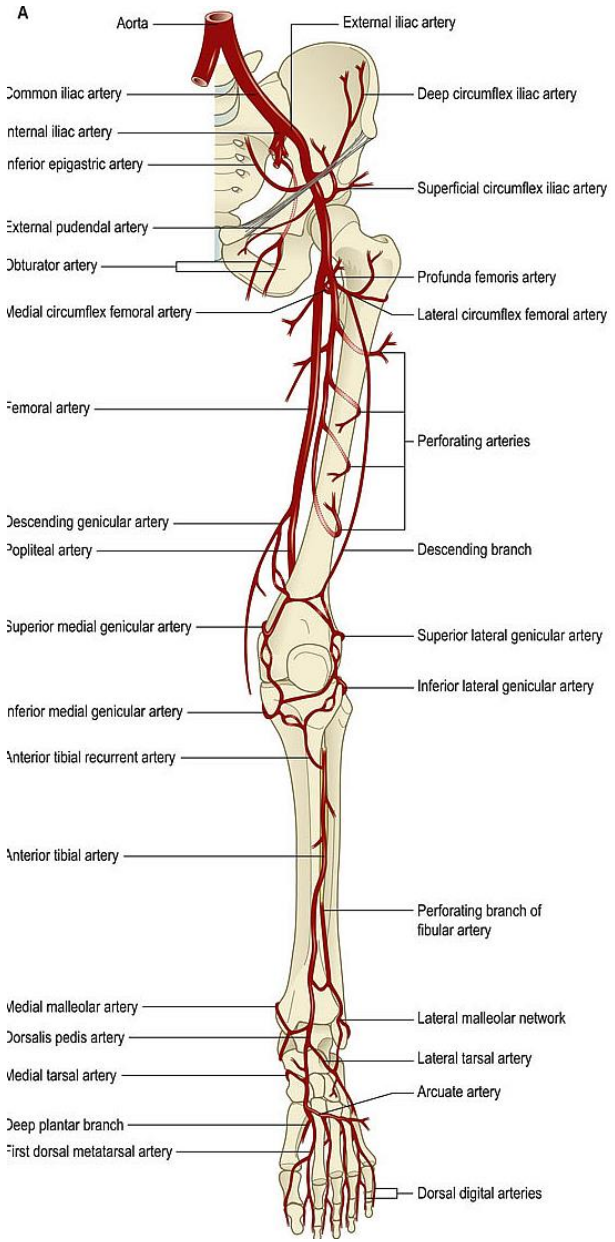
Dorsally (Fig. A):

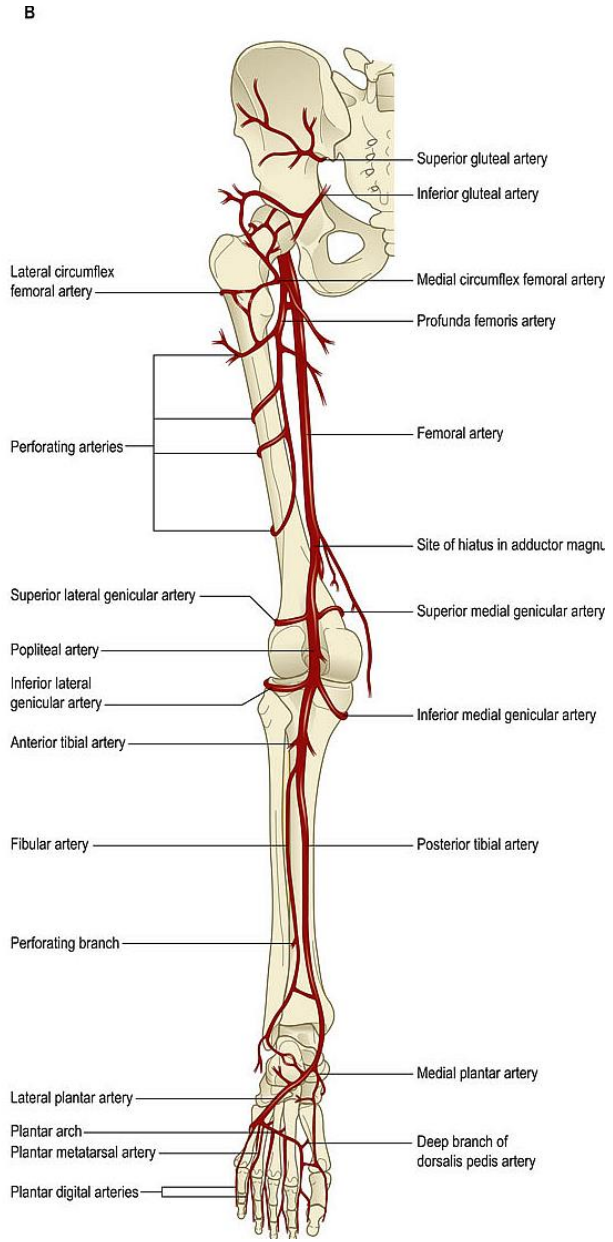
- Foramen ischiadicum majus – supra- and infrapiriform foramen
- Foramen ischiadicum minus

Ventrally (Fig. B):

- Femoral canal
- Obturator canal
- Inguinal canal

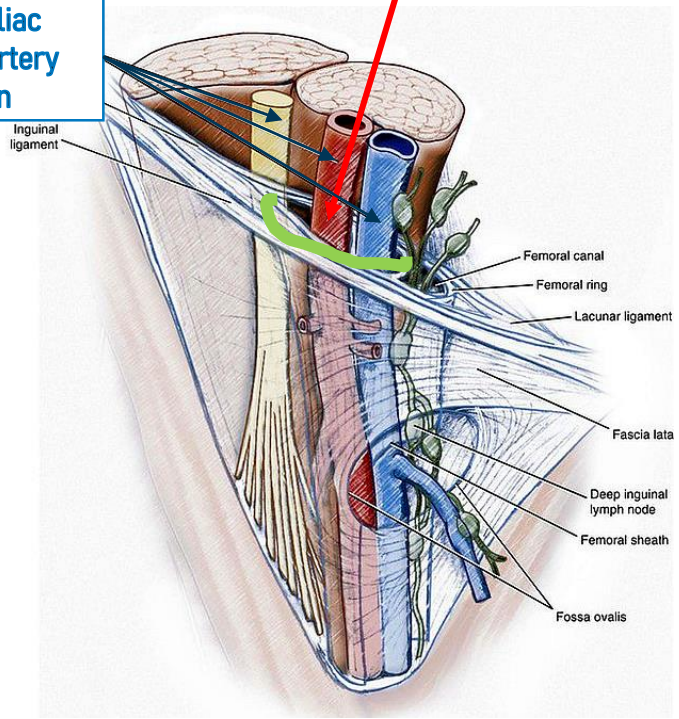
Arteries of the LL: femoral a., popliteal artery, anterior and posterior tibial aa., medial and lateral plantar aa., dorsal artery of foot





Femoral canal

Femoral nerve, external iliac (femoral) artery and vein



External iliac artery continues under the inguinal lig. through the **femoral canal** as the **femoral artery**. The femoral nerve is lateral to it (Fig.).

VEINS of the LL

i. The **deep** veins run along the arteries and share their names.
ii. The **superficial** veins run in the subcutis. Both the great and the small saphenous vv. originate on the dorsum od foot. **The great saphenous v.** runs medially and ends in the fmoral v., **the small saphenous vein** ascends laterally and ends in the popliteal vein.

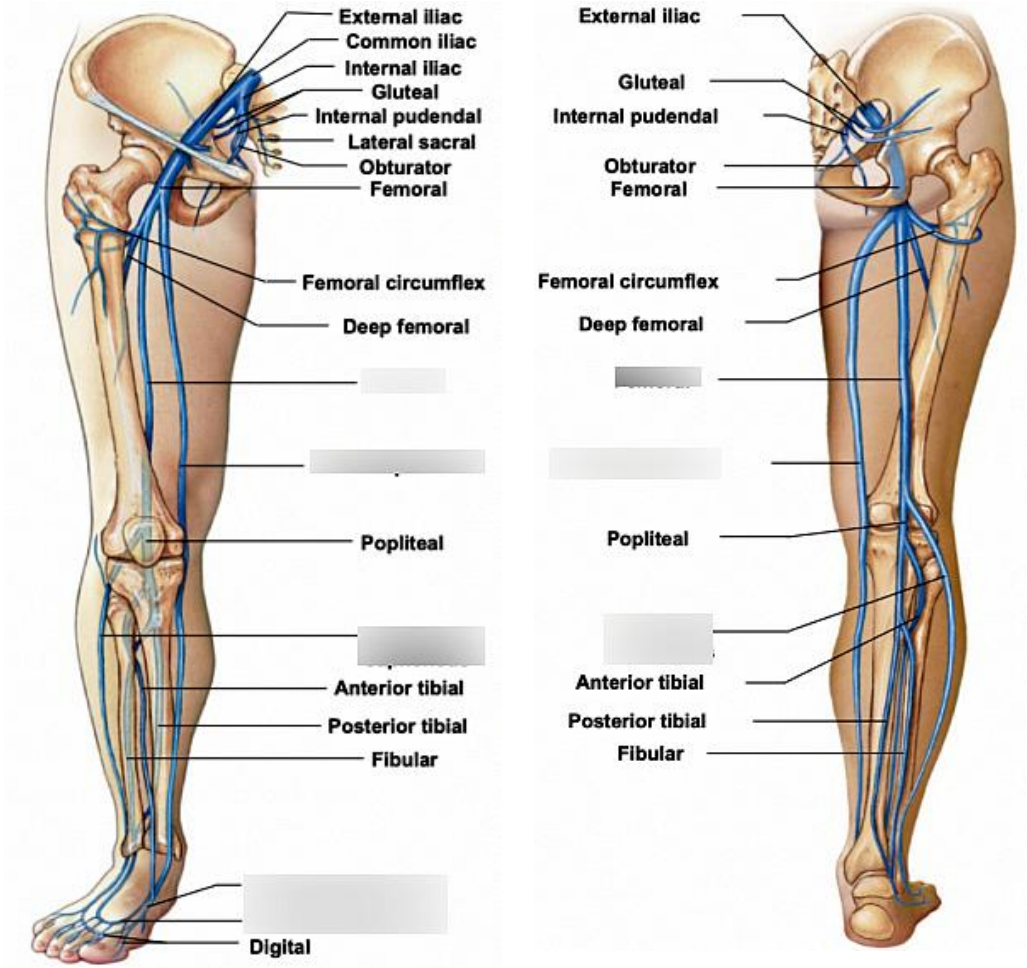


Fig.: Deep veins of the LL

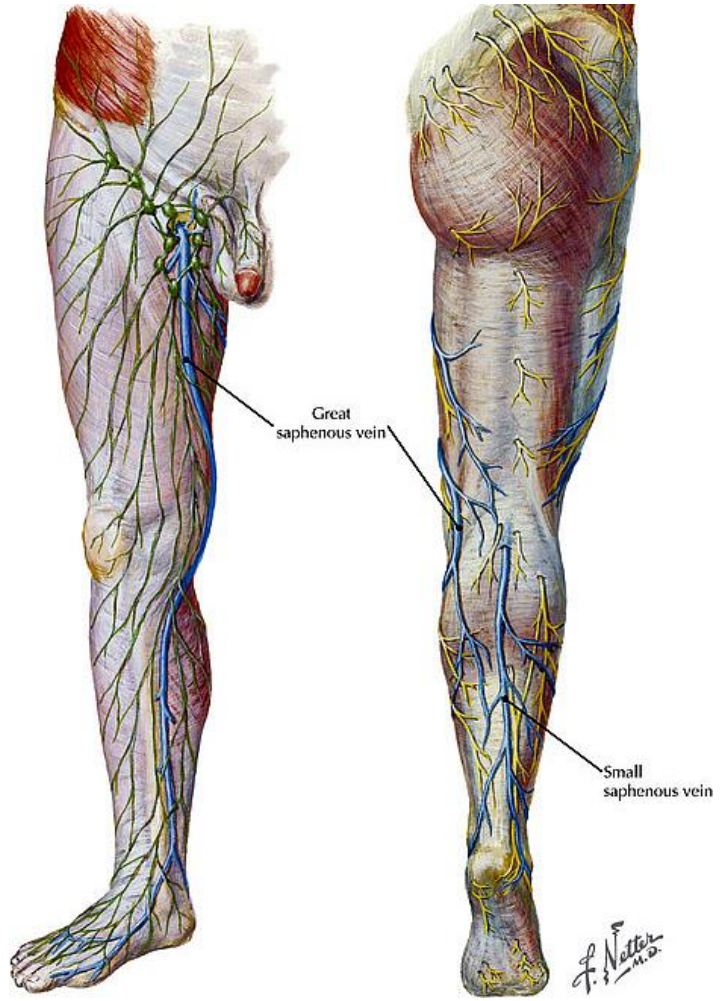
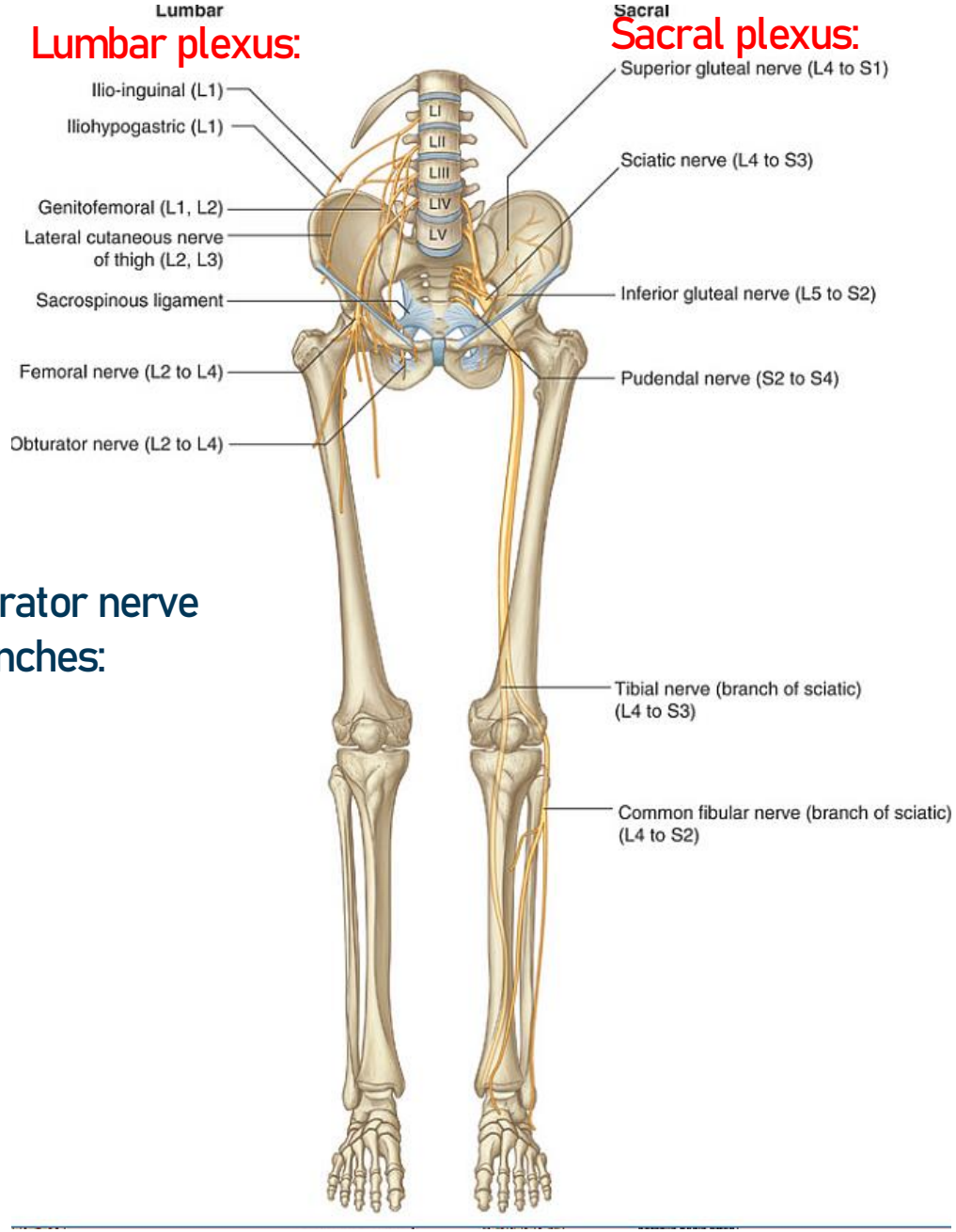
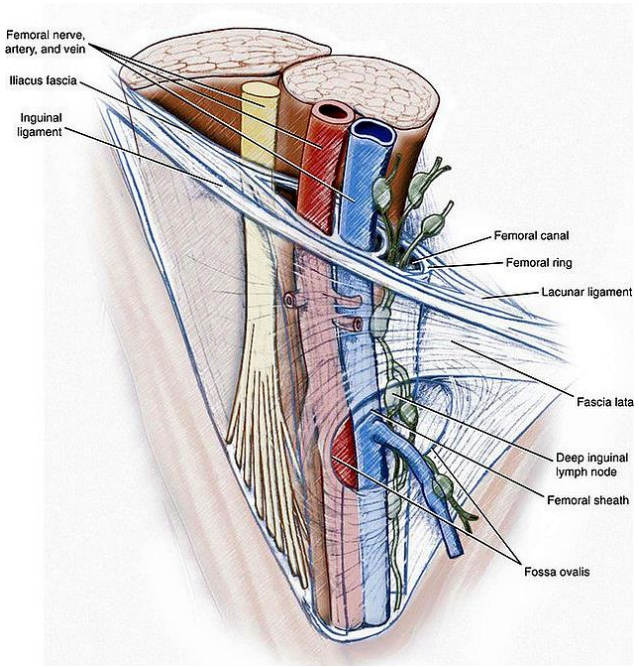


Fig.: Superficial veins of the LL

Nerves of the lower limb: peripheral nerves from the plexuses, ie. the anterior branches of the spinal nerves

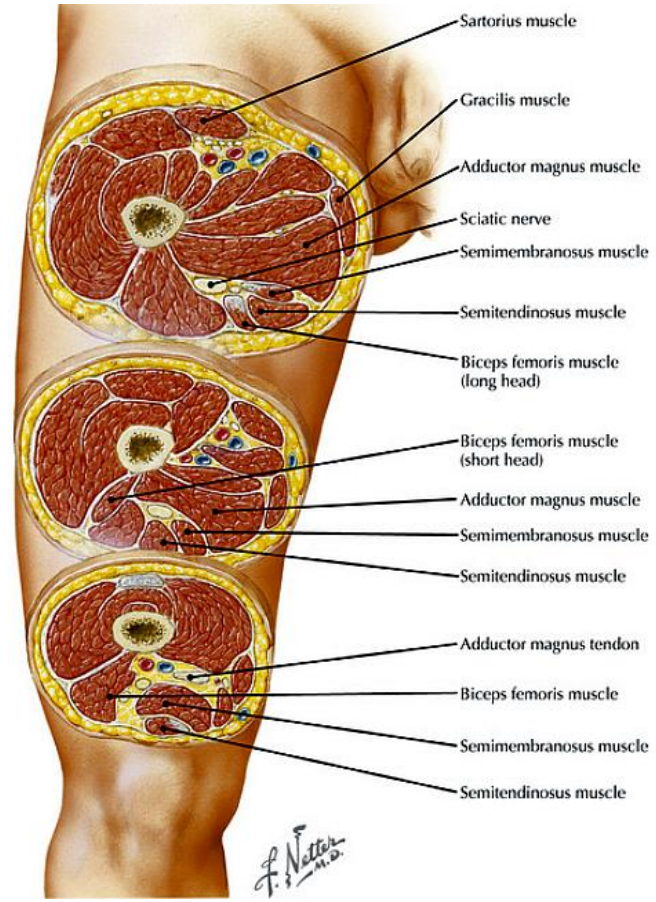


Lumbar plexus: femoral nerve, obturator nerve
Sacral plexus: sciatic nerve (its branches: fibular and tibial nn.)

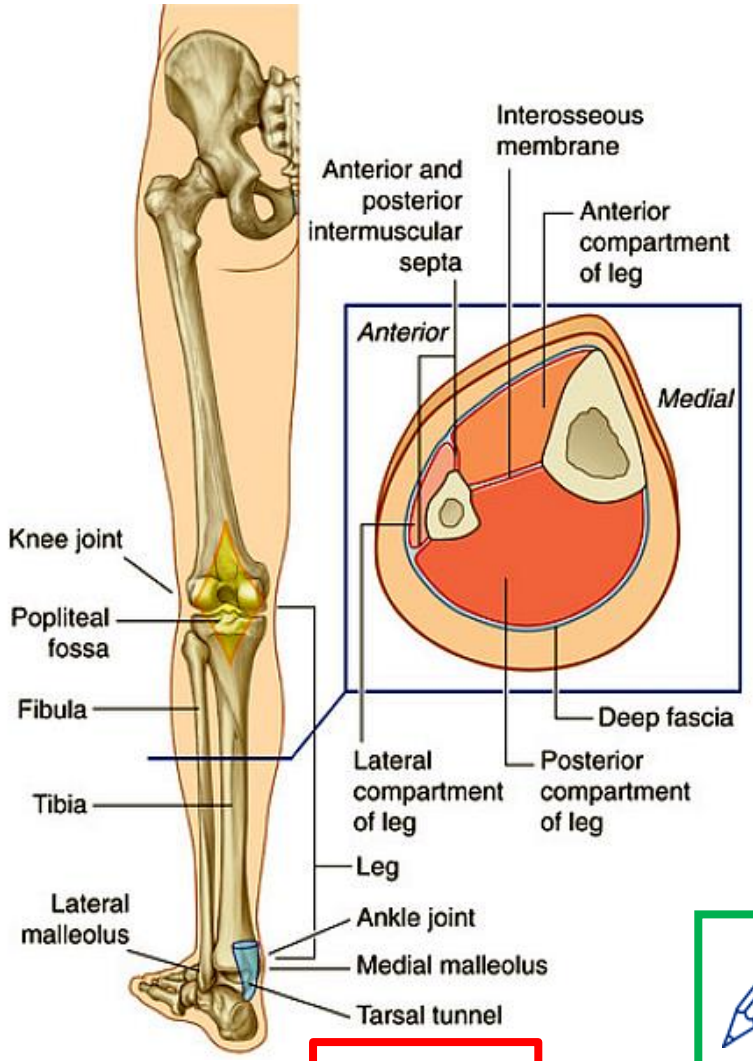


Femoral trigone

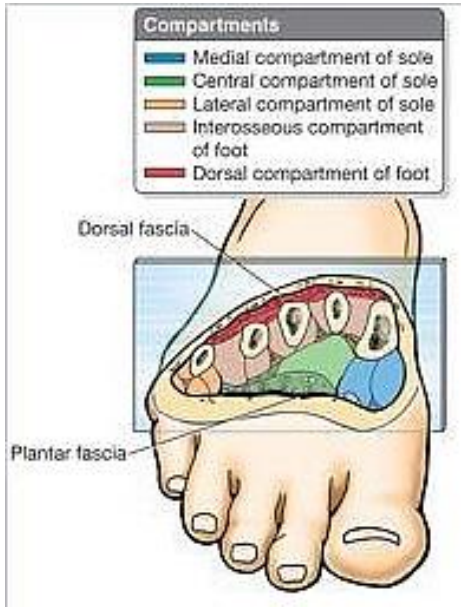
LOWER LIMB, OSTEOFASCIAL COMPARTMENTS (OFC)



Thigh, OFC:
Anterior
Medial
Posterior



Leg, OFC:
Anterior
Lateral
Posterior



OFC foot:
Medial
Lateral
Central
Dorsal

Complete the motor nerves of the particular OF compartments.
Eg.: Anterior OFC of thigh – femoral nerve
For the key see the next slide.

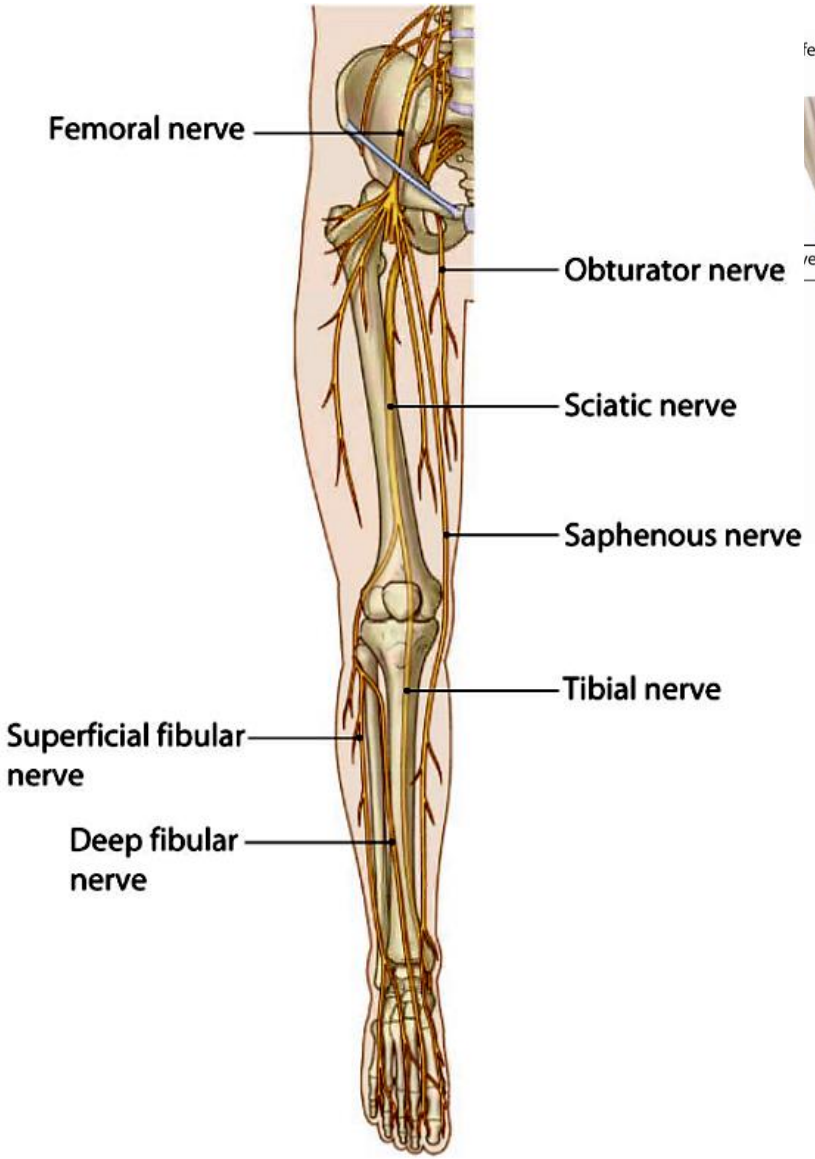
OSTEOFASCIAL COMPARTMENTS (OFC) and their nerves

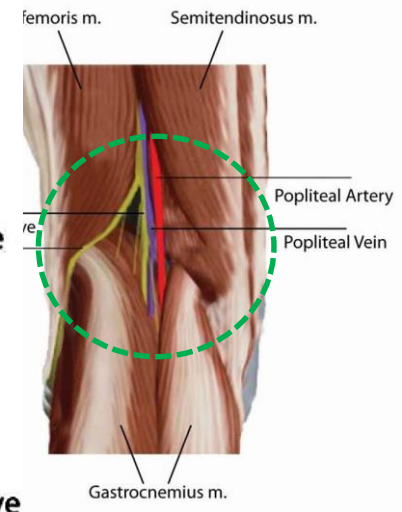
Thigh, OFC:
Anterior – femoral n.
Medial – obturator n., femoral n., sciatic n.
Posterior - sciatic n.

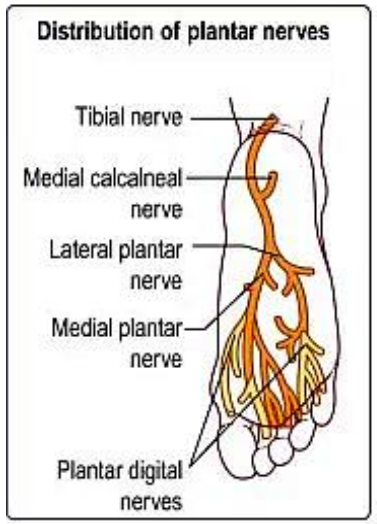
Leg, OFC:
Anterior – deep fibular n.
Lateral – spf. fibular n.
Posterior – tibial n.

OFC foot:
Medial - medial and lateral plantar n.
Lateral – lateral olantar n.
Central – medial and lateral plantar n.
Dorsal - deep fibular n.

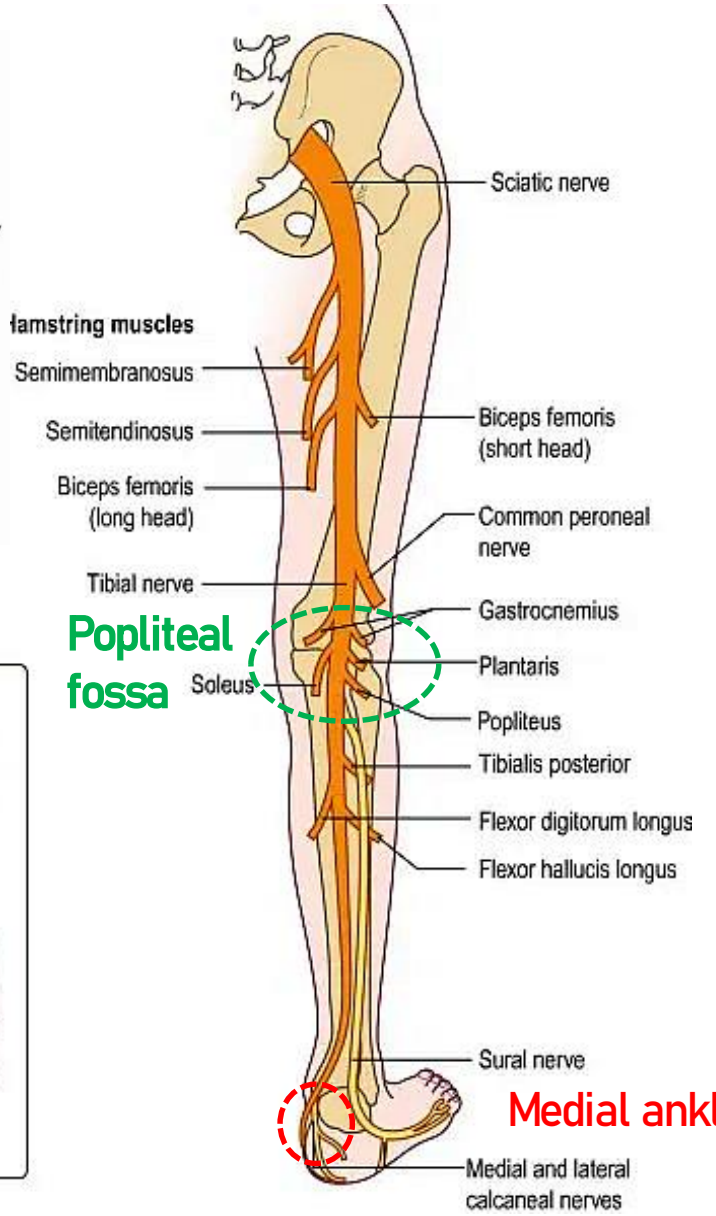
Nerves of the LL







Sciatic nerve



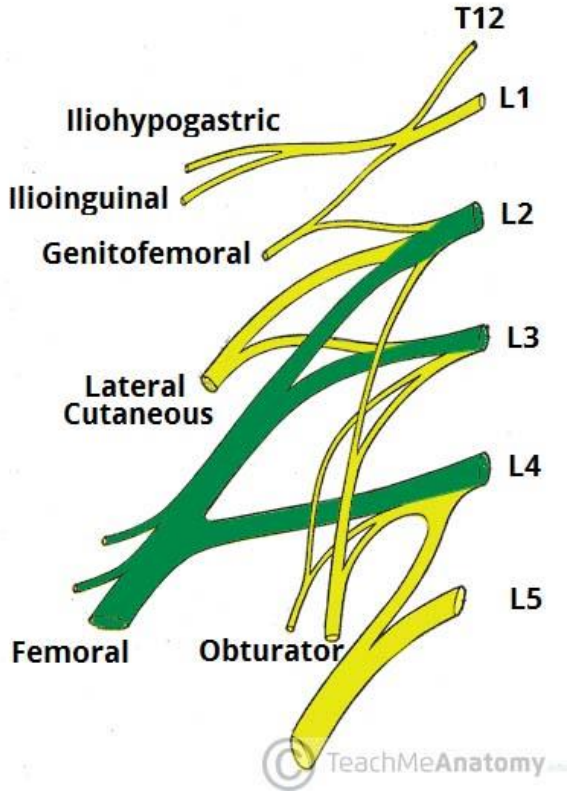
Popliteal fossa

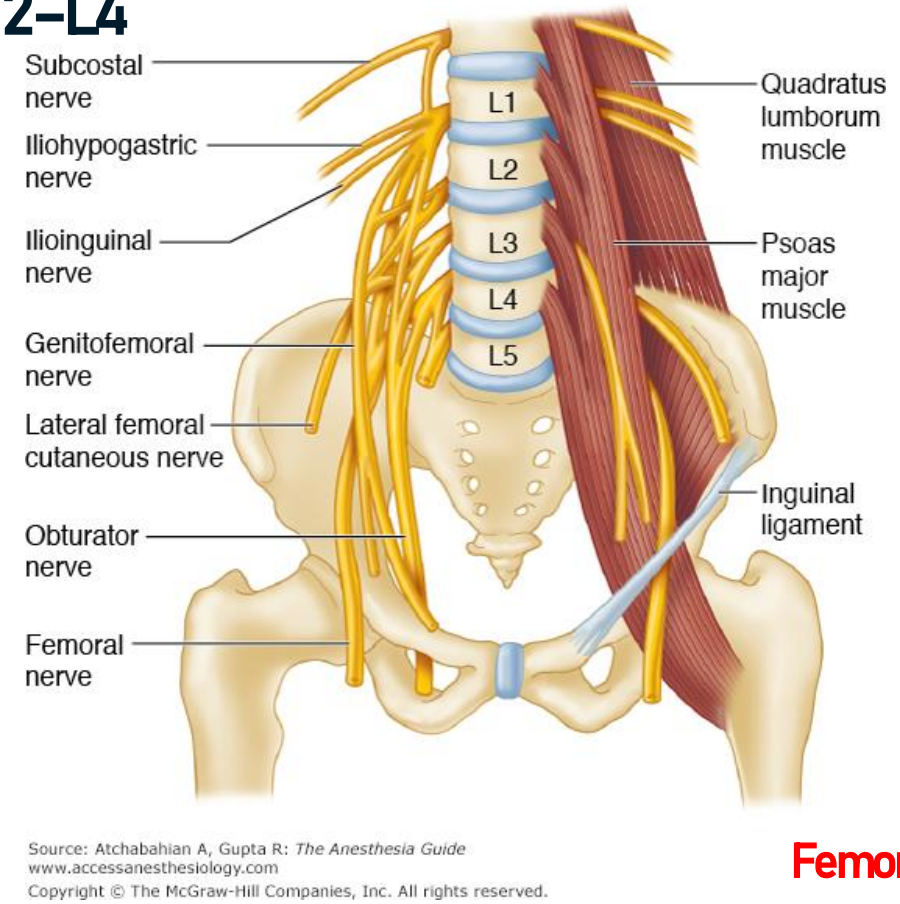
Medial ankle: TiDiANH

Eberlová et al., ELA 2021

source: musculosceletal key, web

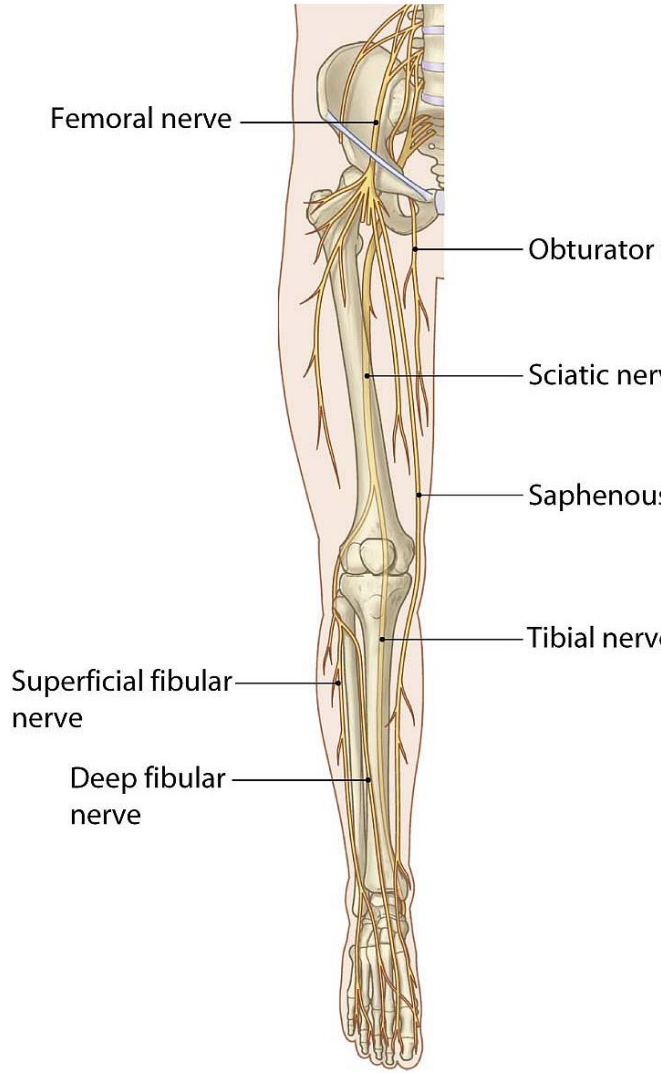
Lumbar plexus T12–L4





Source: Atchabahian A, Gupta R: *The Anesthesia Guide*
www.accessanesthesiology.com

m. psoas major

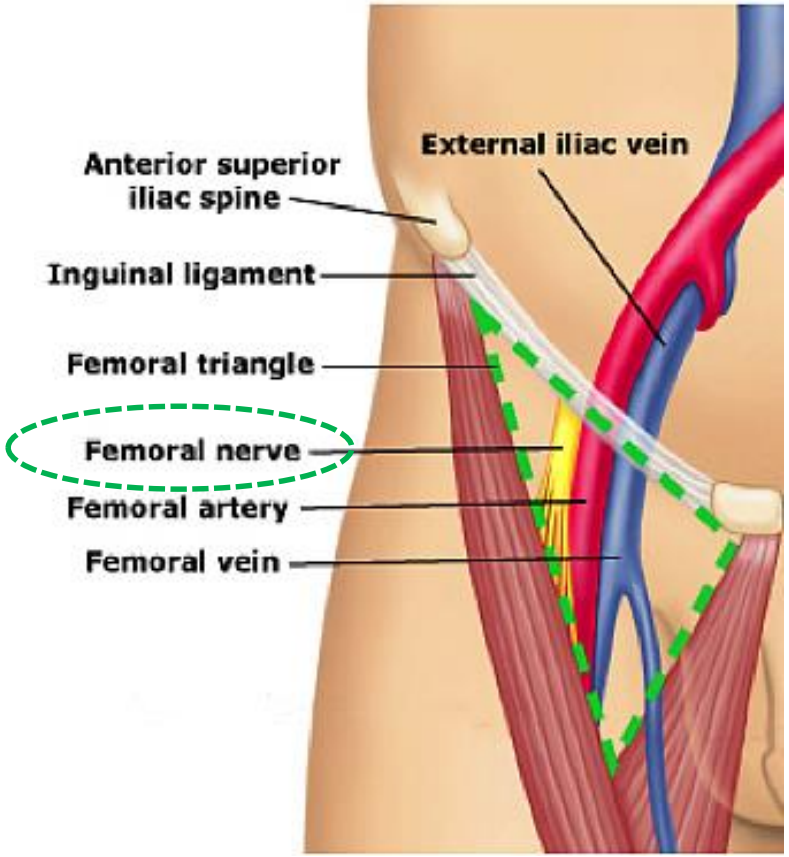


Femoral canal

Iliohypogastric n.
Ilioinguinal n.
Genitofemoral n.
Lateral femoral cutaneus n.
Obturator n. (L2 – L4)
Femoral n. (L2 – L4)

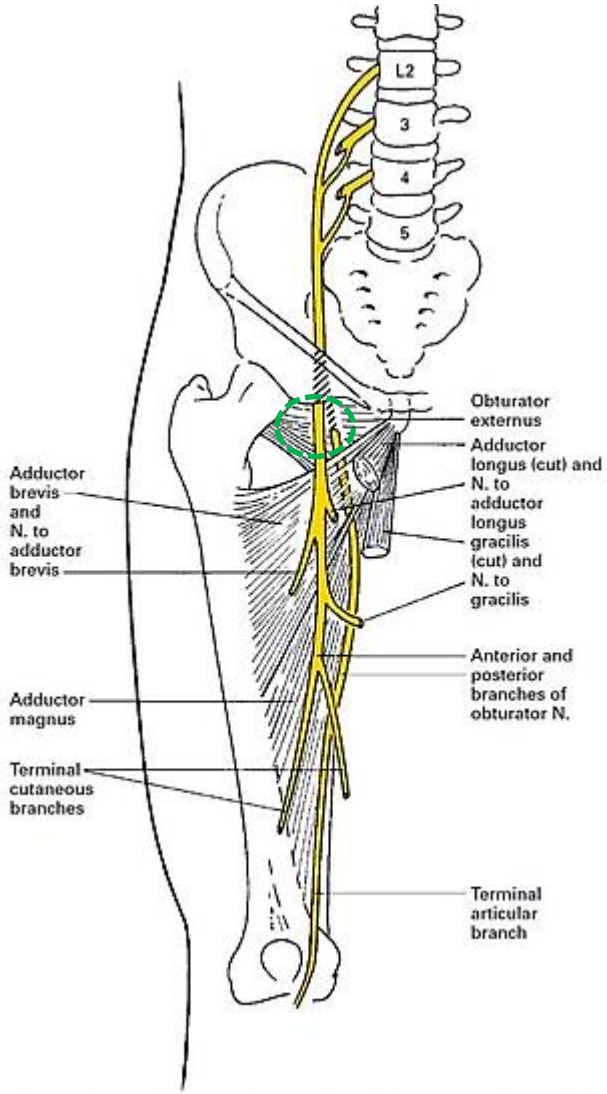
Anteriorly: Femoral canal

Femoral nerve, lumbar plexus



Eberlová et al., ELA 2021

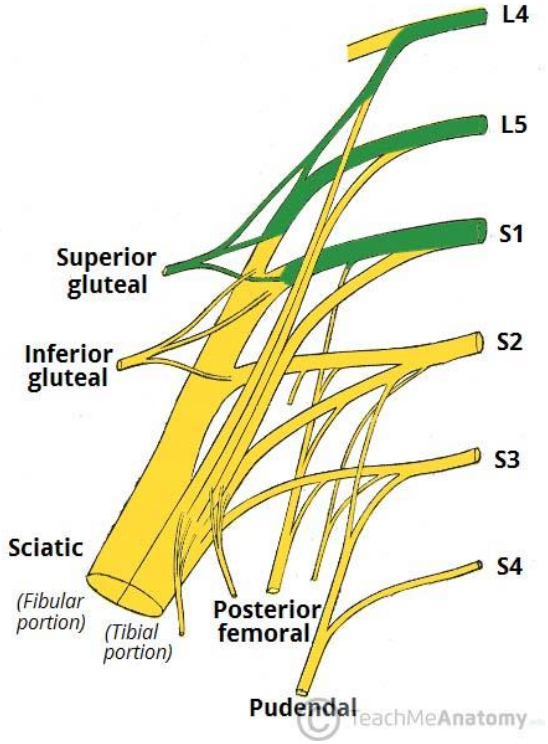
Obturator nerve, lumbar plexus

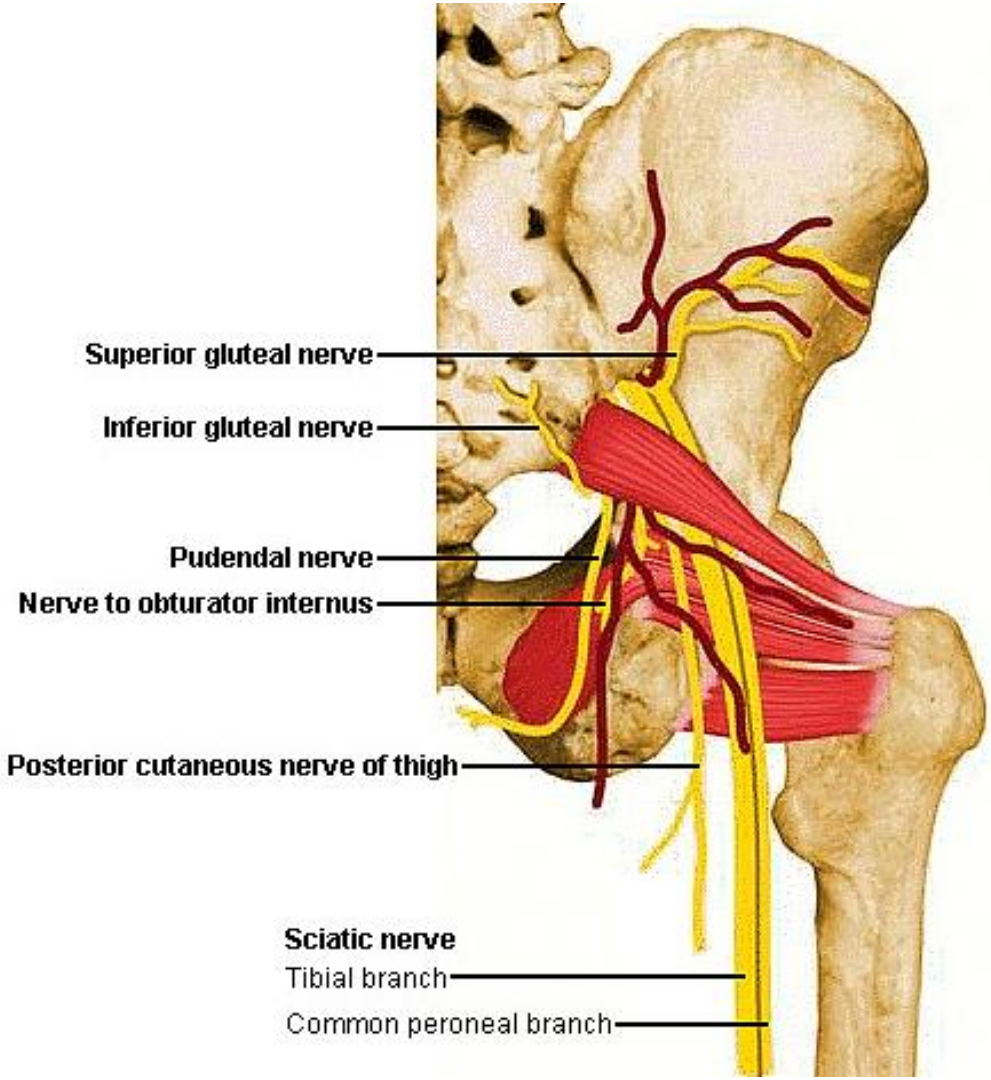


https://www.asra.com/asra-news/article/248/how-i-do-it-obturator-nerve-block

Sacral plexus

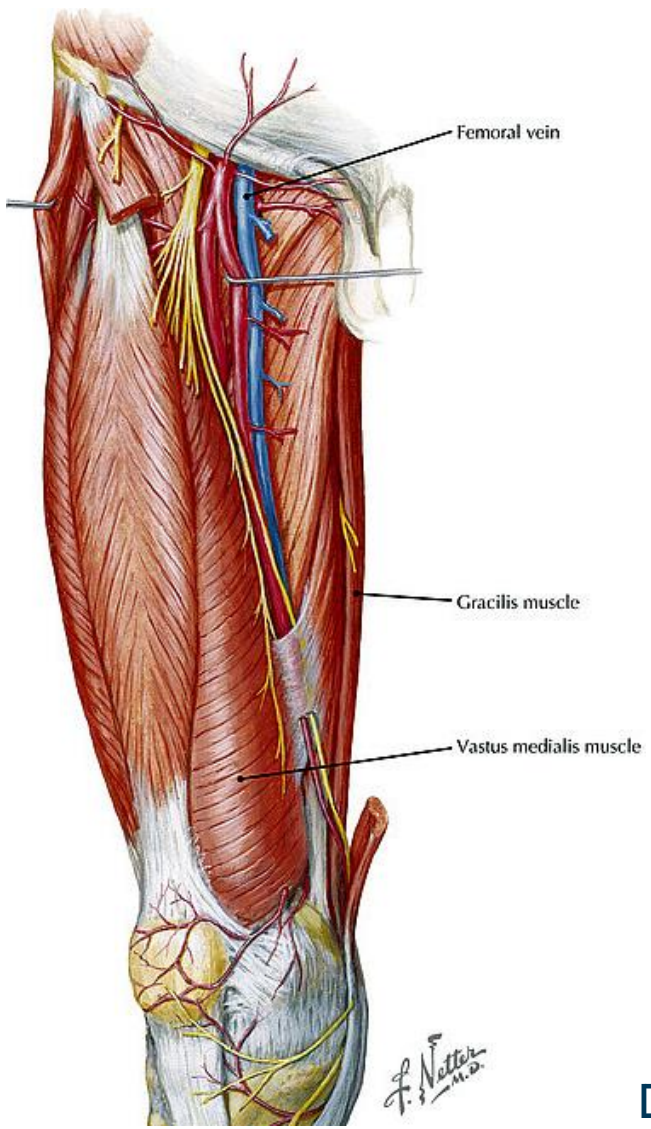
Posteriorly: **surpa-/infrapiriform foramen**

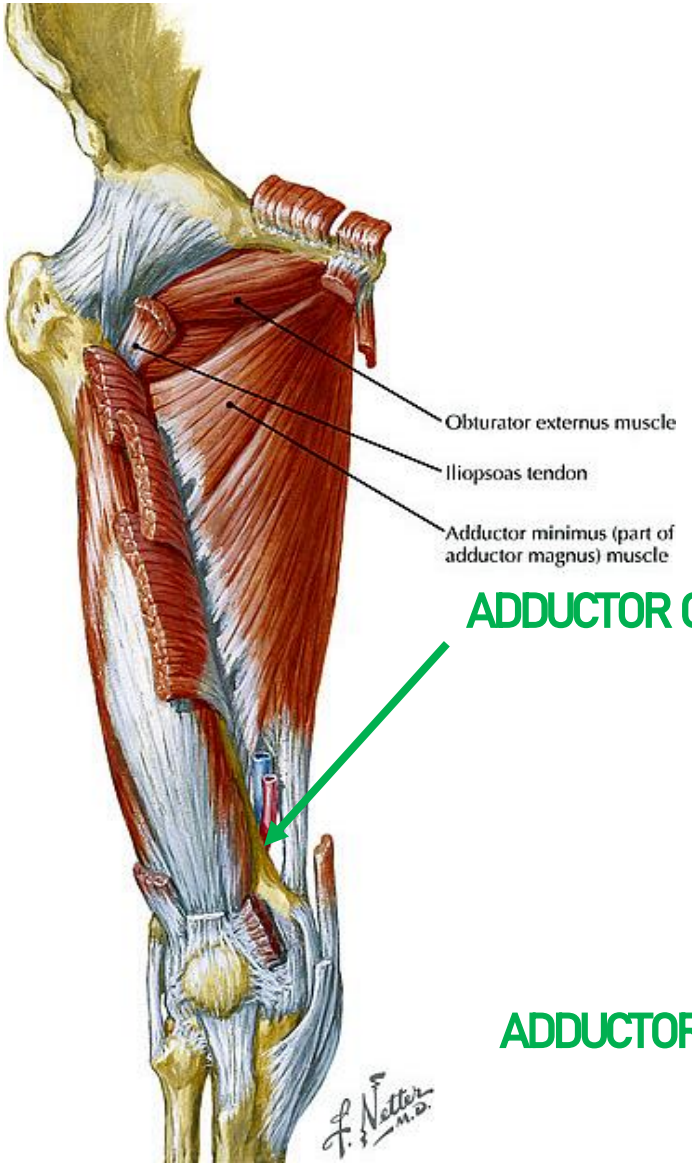




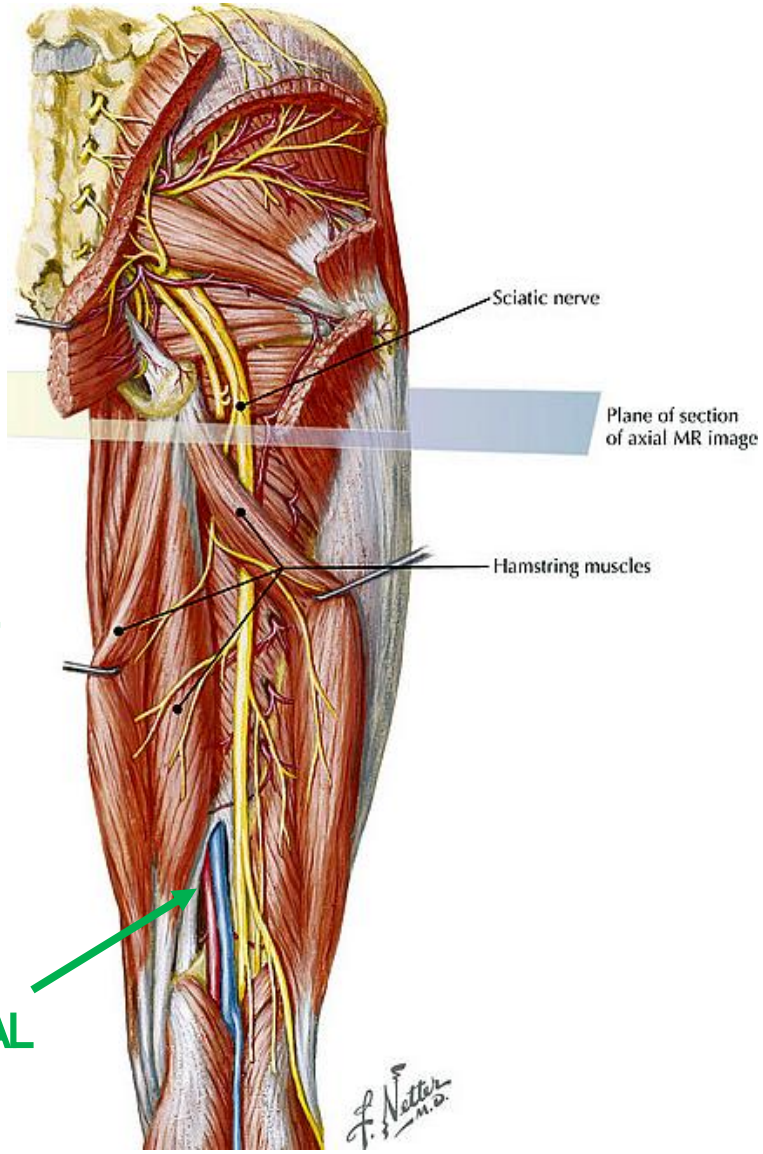
n. gluteus superior
n. gluteus inferior
n. cutaneus femoris posterior
n. ischiadicus (L4 – S3)
n. pudendus

Thigh



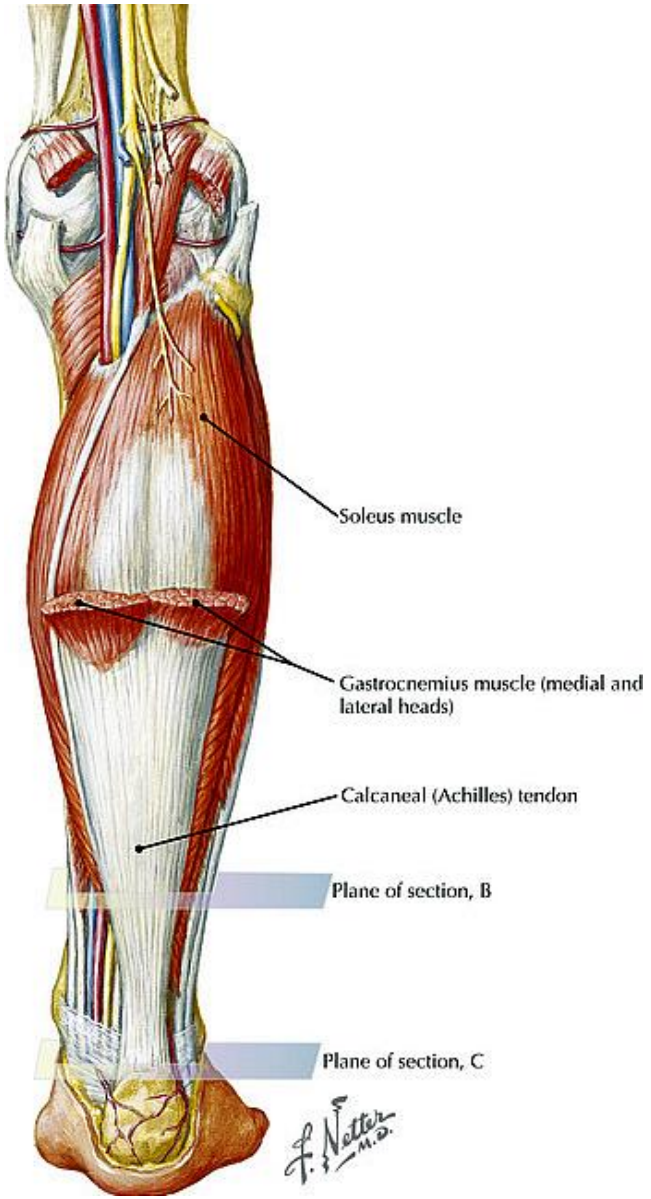


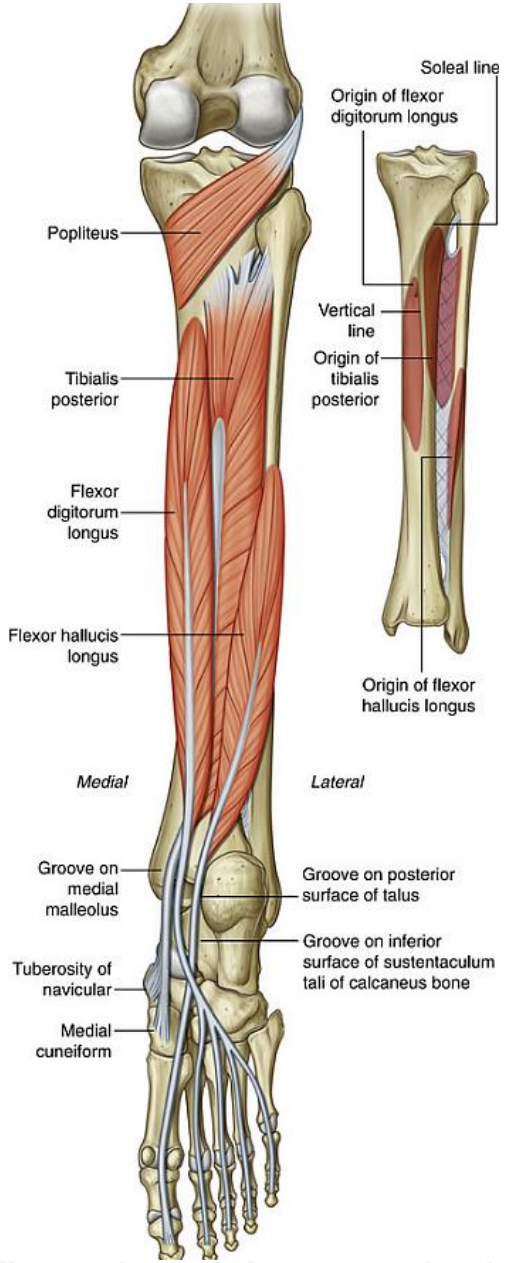
Deep dissection of the anterior thigh



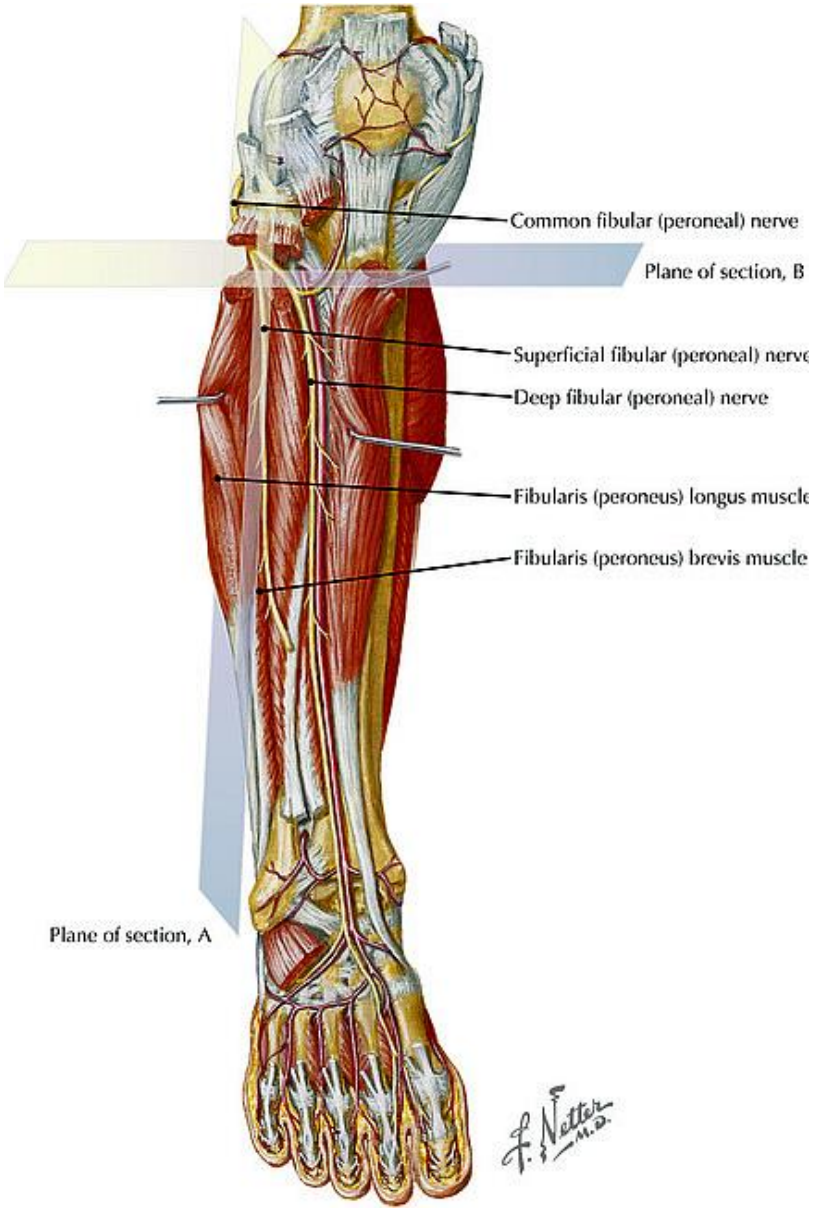
Deep dissection of the posterior thigh

Leg





Deep dissection of the posterior leg



Deep dissection of the anterior leg

Retromalleolar regions

Medial retromalleolar region, medio-laterally: TiDiANH
Tibialis posterior m.
Flexor digitorum longue m.
Posterior tibial a.
Tibial n.
Flexor hallucis longus m.

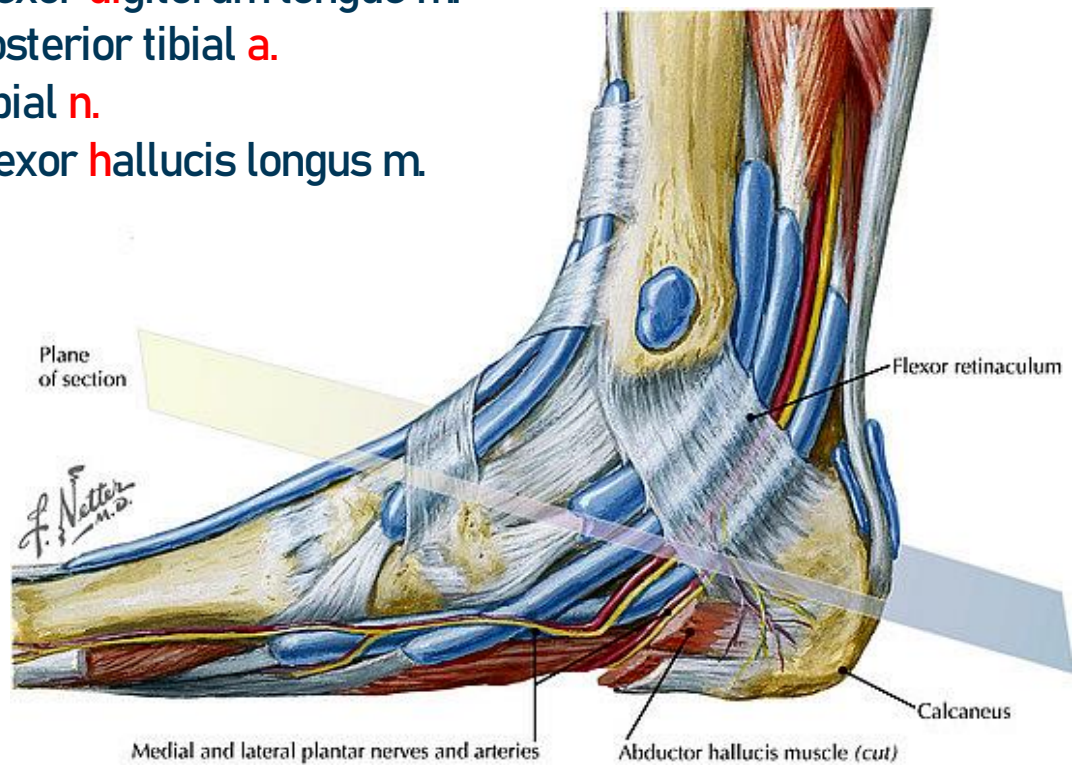
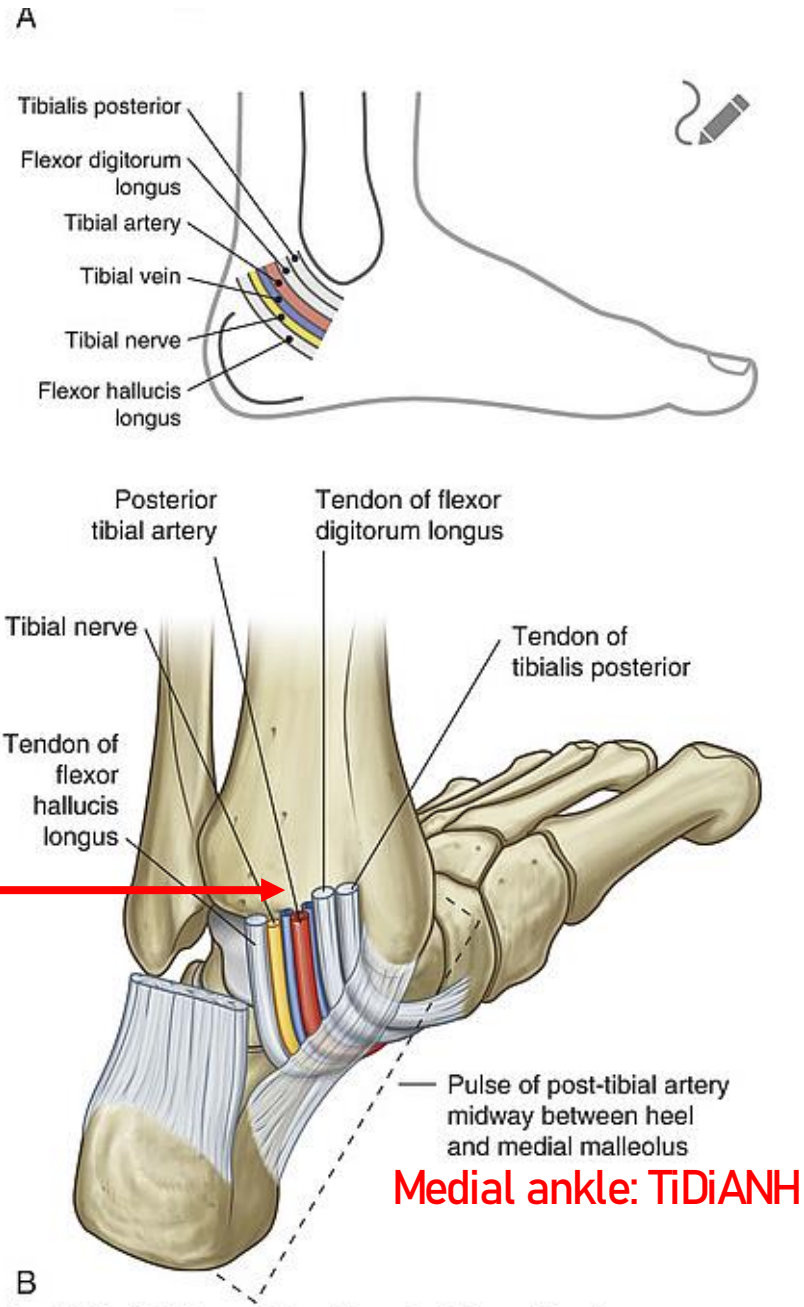


Fig.: Medial ankle tendons and tendon synovial and fibrous sheaths



Medial ankle: TiDiANH

FIG. 6.110 Tarsal tunnel and flexor retinaculum. Posteromedial view, right foot. A. Bones. B. Tarsal tunnel and flexor retinaculum.

Planta pedis

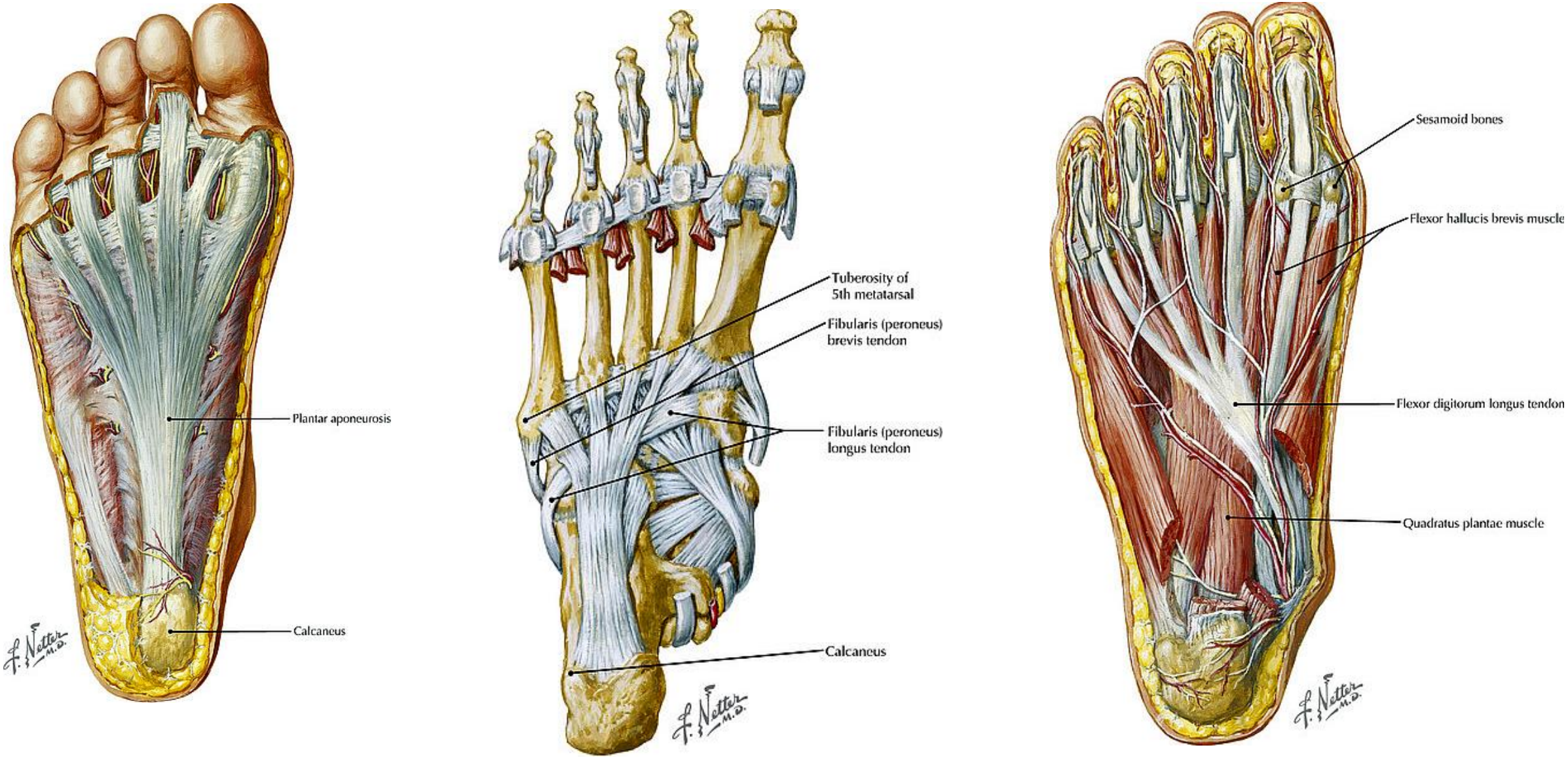


Fig.: Planta pedis

Longitudinal and transverse plantar arches top: navicular tuberosity

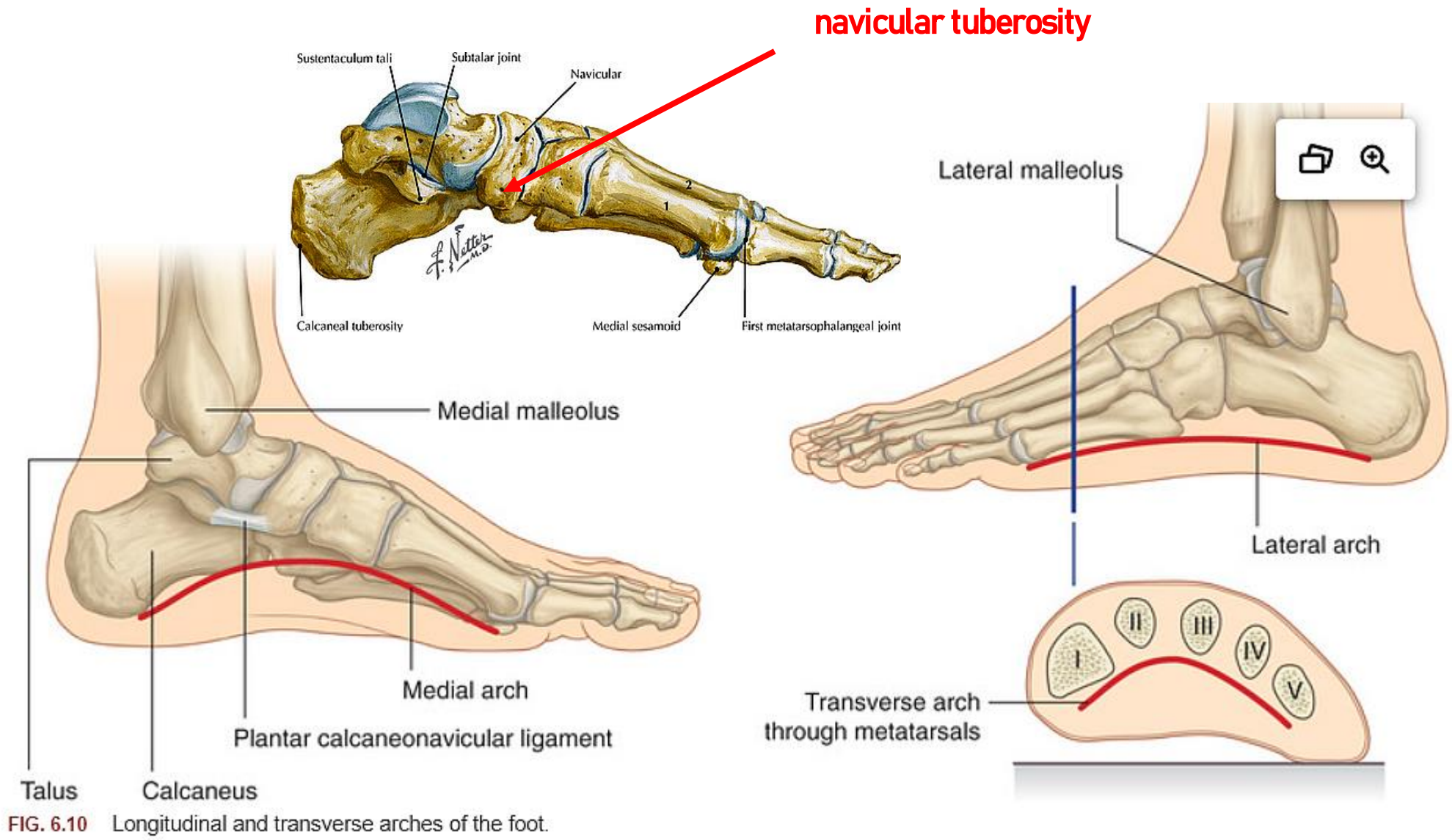


FIG. 6.10 Longitudinal and transverse arches of the foot.