

GSSE Anatomy Teaching: *From Hip to Foot*

Nick Skladnev

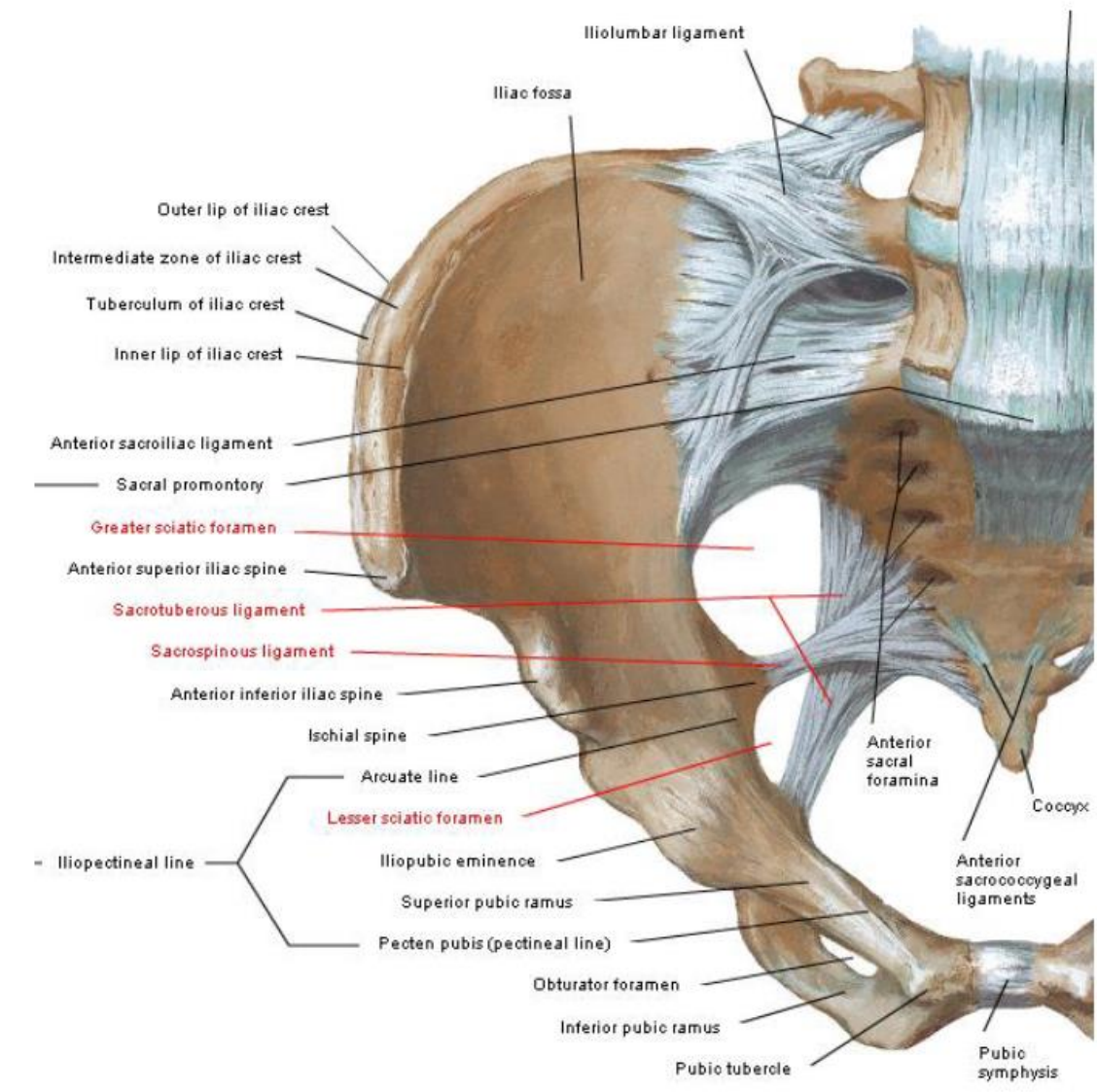
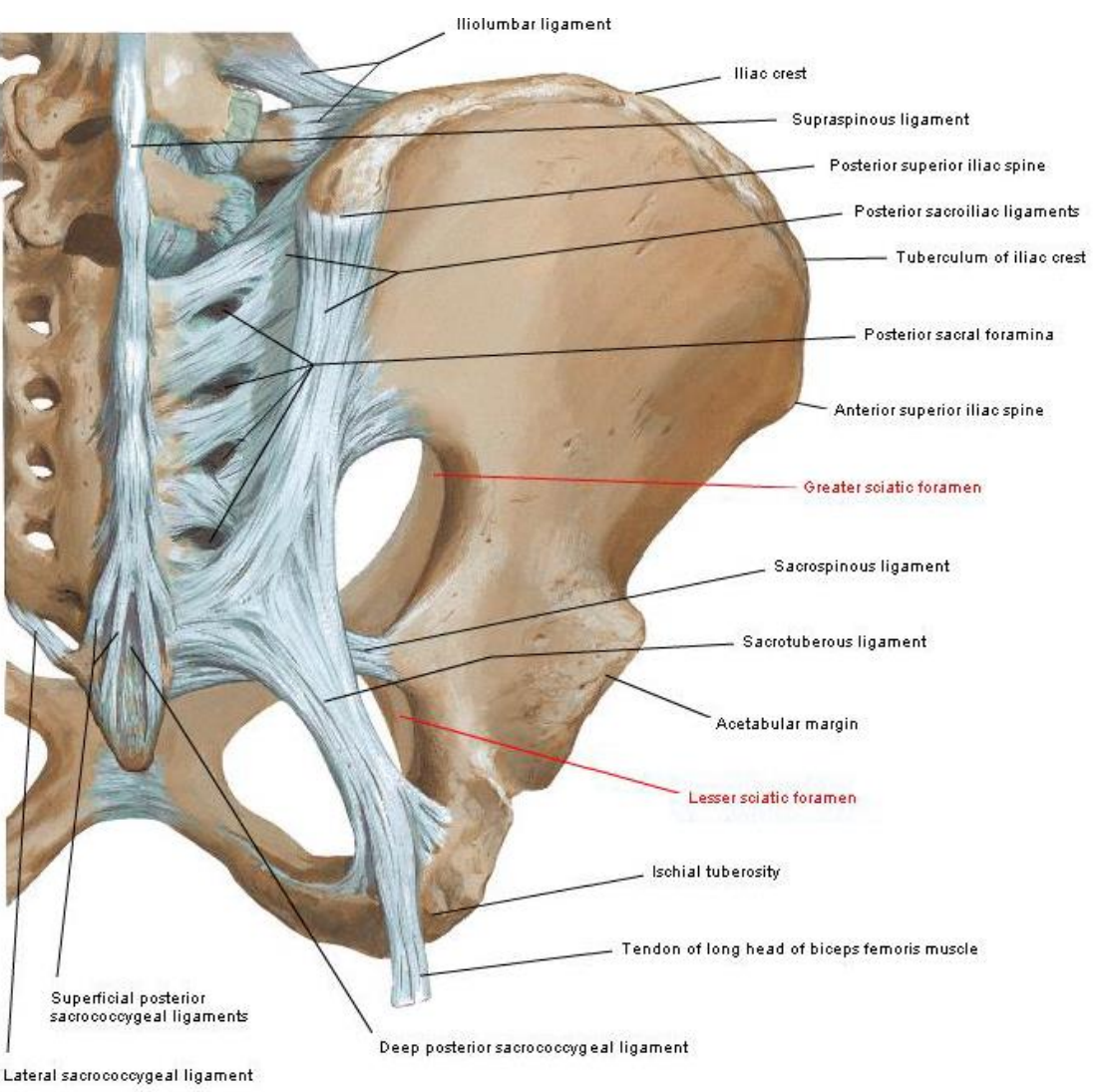


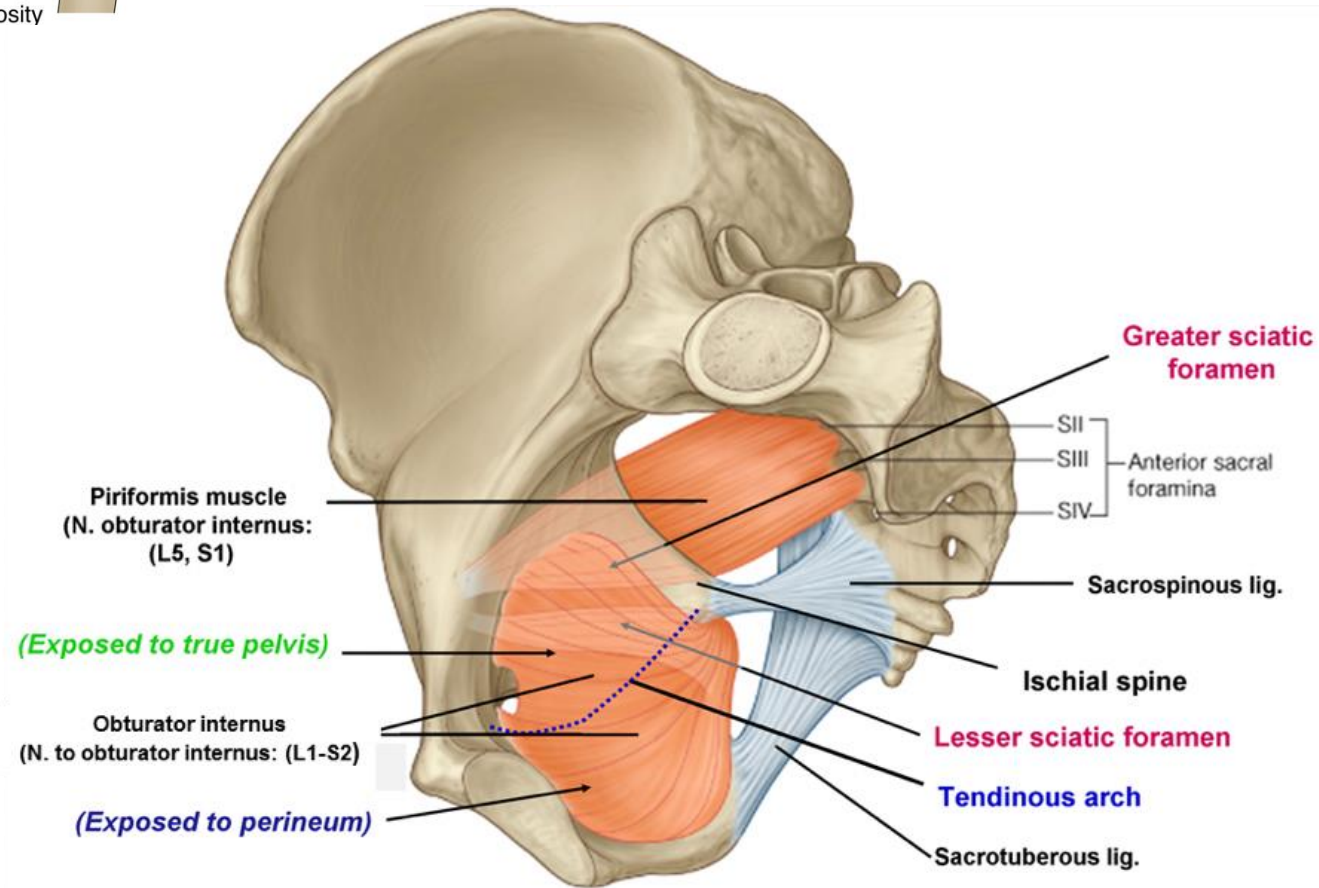
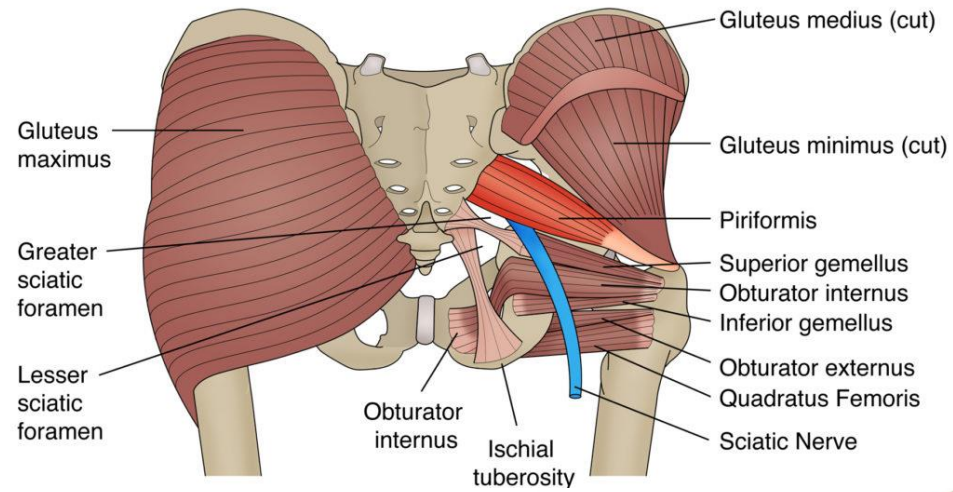
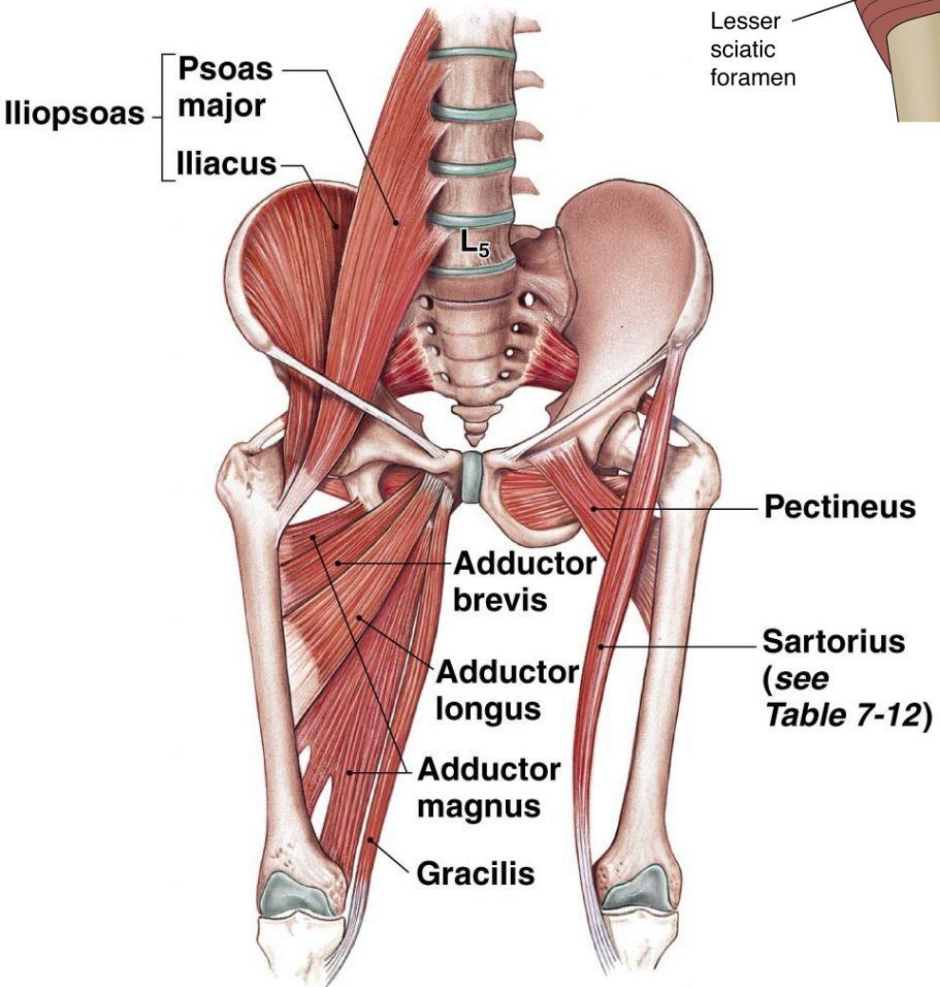
Overall structure and tips

- NOT EXHAUSTIVE – topics to help focus in on
- Cater to YOURSELF
- Become familiar with general course of musculature/vessels/nerves
- **Transition points!!!**
- Road maps – know the key turns/wrong turns.
- Knowledge 'Anchors'

**Pelvis detailed further on 3rd August by Tom Warburton*







(c) The iliopsoas muscle and the adductor group

STRUCTURES PASSING THROUGH THE GREATER & LESSER SCIATIC FORAMINA

VIA GREATER SCIATIC FORAMEN

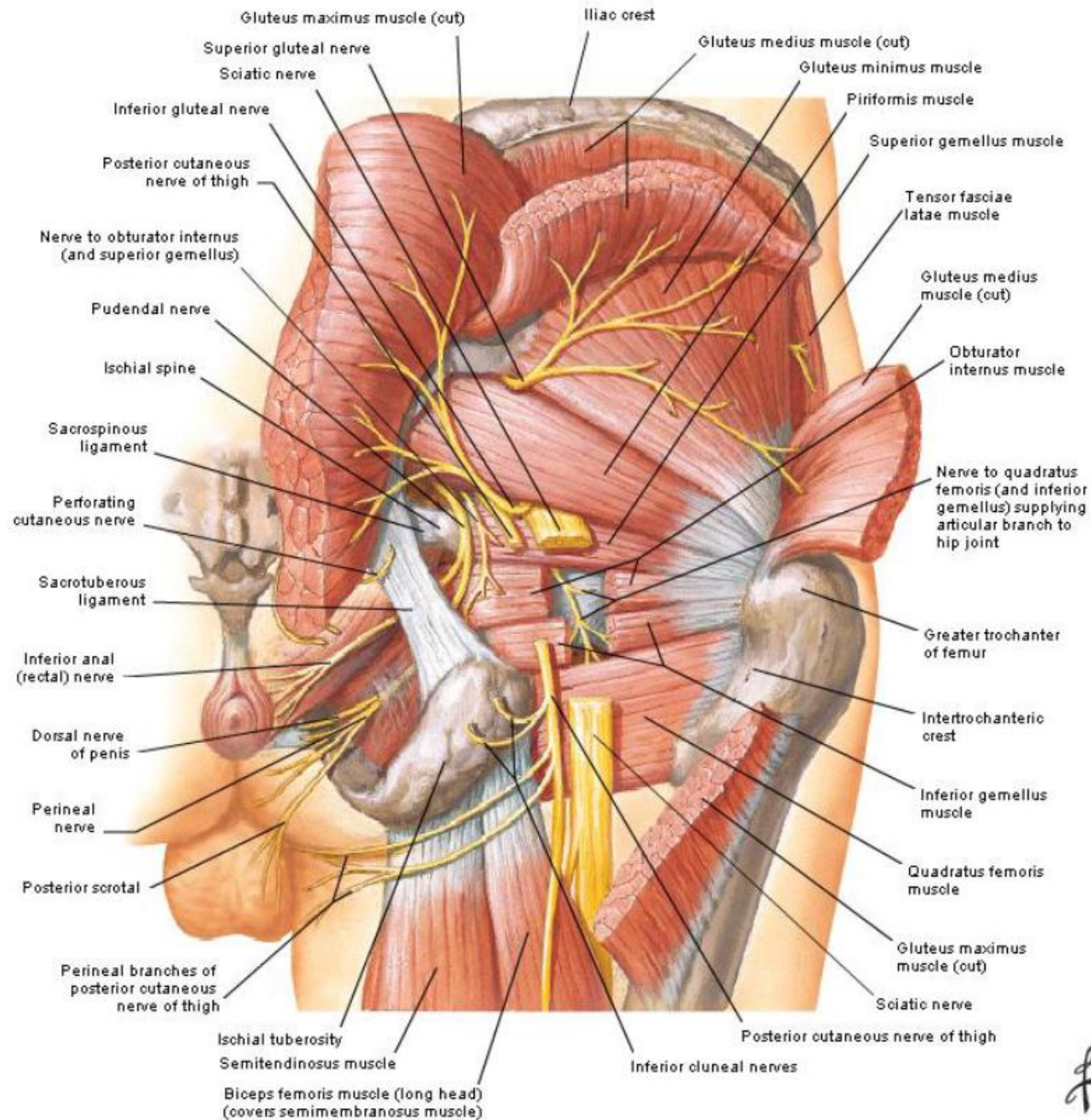
- Superior gluteal vessels
- Superior gluteal nerve

PIRIFORMIS

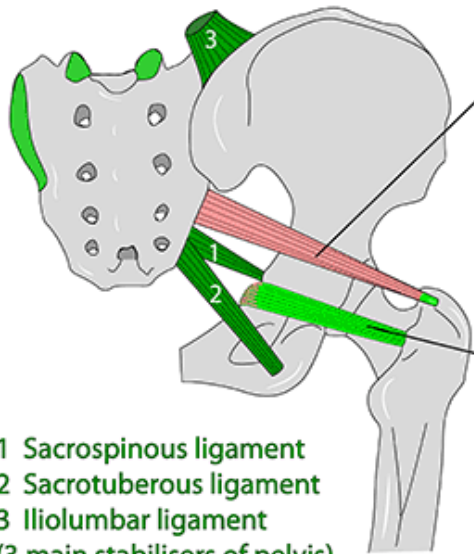
- Inferior gluteal vessels
- Inferior gluteal nerve
- Sciatic nerve
- Perforating cutaneous nerve
- Posterior femoral cutaneous nerve
- Nerve to quadratus femoris
- Nerve to obturator internus
- Pudendal nerve
- Internal pudendal vessels

VIA LESSER SCIATIC FORAMEN

- Tendon of obturator internus
- Nerve to obturator internus
- Internal pudendal vessels
- Pudendal nerve



GLUTEAL REGION - PIRIFORMIS & OBTURATOR INTERNUS



Piriformis

From: Ant surface of sacrum.
To: greater trochanter of femur via greater sciatic foramen.
Action: Lat rotator of hip
N: S1,2

Obturator internus

From: inner surface of obturator membrane
To: med aspect of greater trochanter of femur
Action: Lat rotator of hip
N: N to obturator internus (L5,S1,2)

- 1 Sacrospinous ligament
- 2 Sacrotuberous ligament
- 3 Iliolumbar ligament
(3 main stabilisers of pelvis)

Q: With respect to the greater sciatic foramen

- 1: Obturator internus passes solely through to reach its insertion on the medial surface of the greater trochanter
- 2: The inferior gluteal nerve emerges from the inferior border of piriformis
- 3: The superior gluteal nerve passes between gluteus medius and minimus
- 4: Both superior and inferior gemelli muscles are innervated by the nerve to obturator internus
- 5: The pudendal nerve crosses over the ischial spine

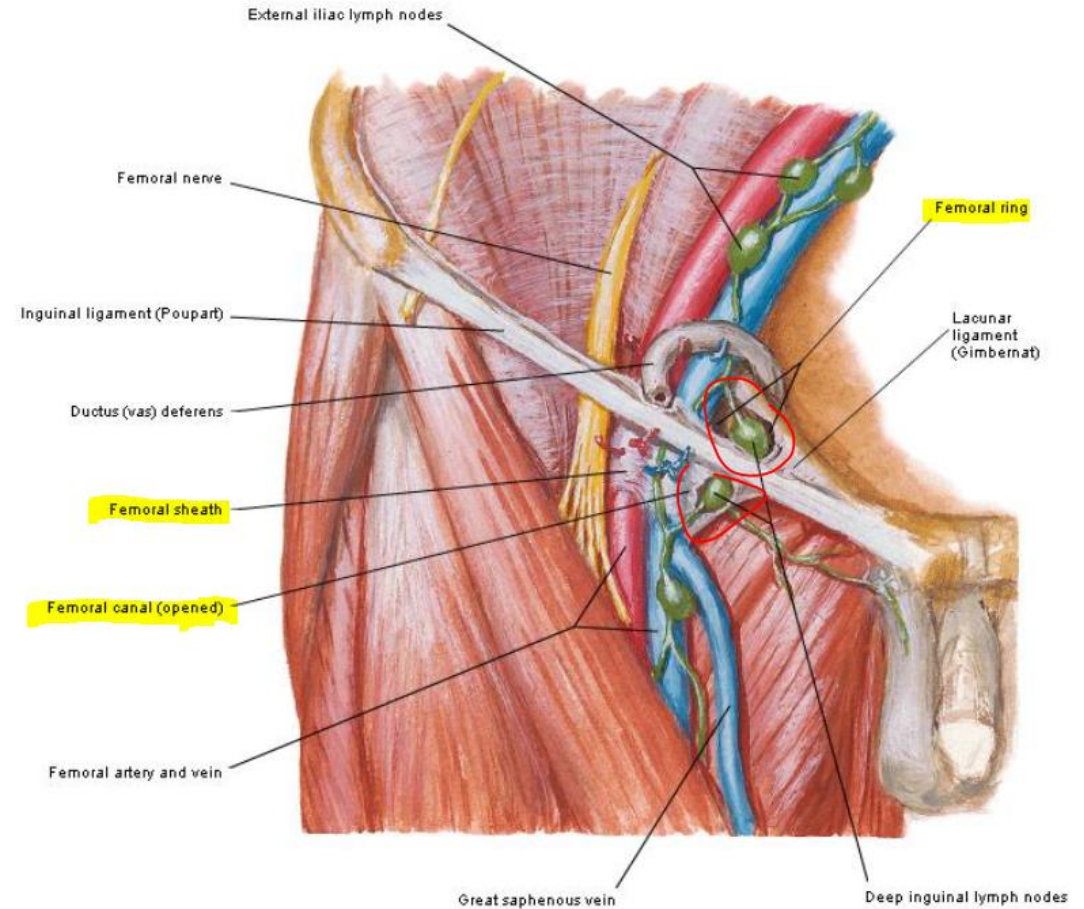
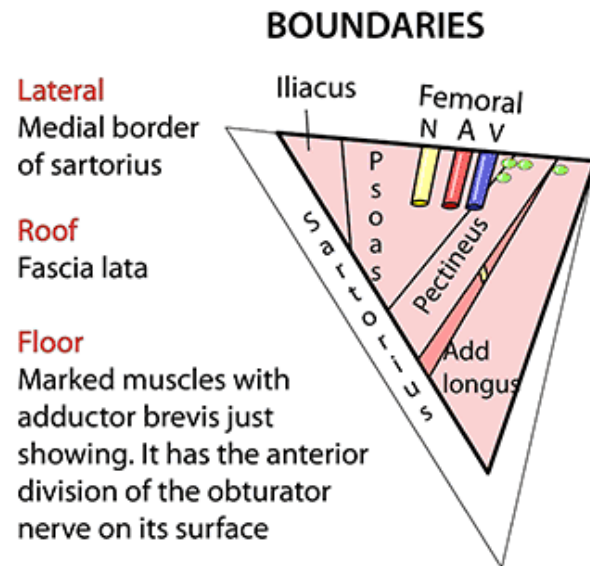
Q: With respect to the greater sciatic foramen

- 1: Obturator internus passes solely through to reach its insertion on the medial surface of the greater trochanter = **F**
- 2: The inferior gluteal nerve emerges from the inferior border of piriformis = **T**
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Femoral Triangle



- CONTENTS**
- Lateral cutaneous nerve thigh
 - Femoral nerve & Branches
 - Femoral Sheath + contents
 - Femoral artery + branches
 - Femoral Vein + GSV + Tributaries

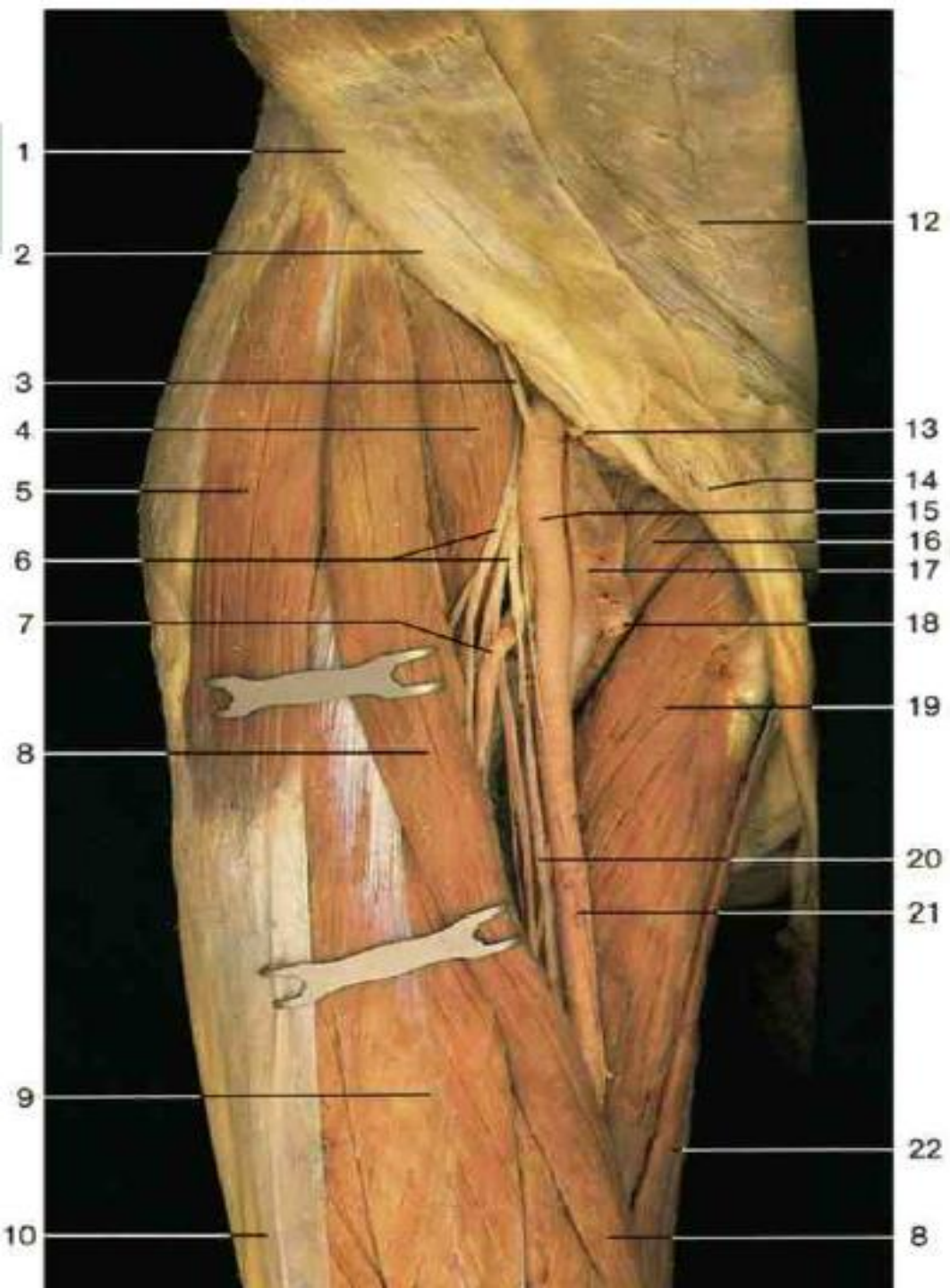


Superior
Inguinal ligament

Medial
Medial border of adductor longus

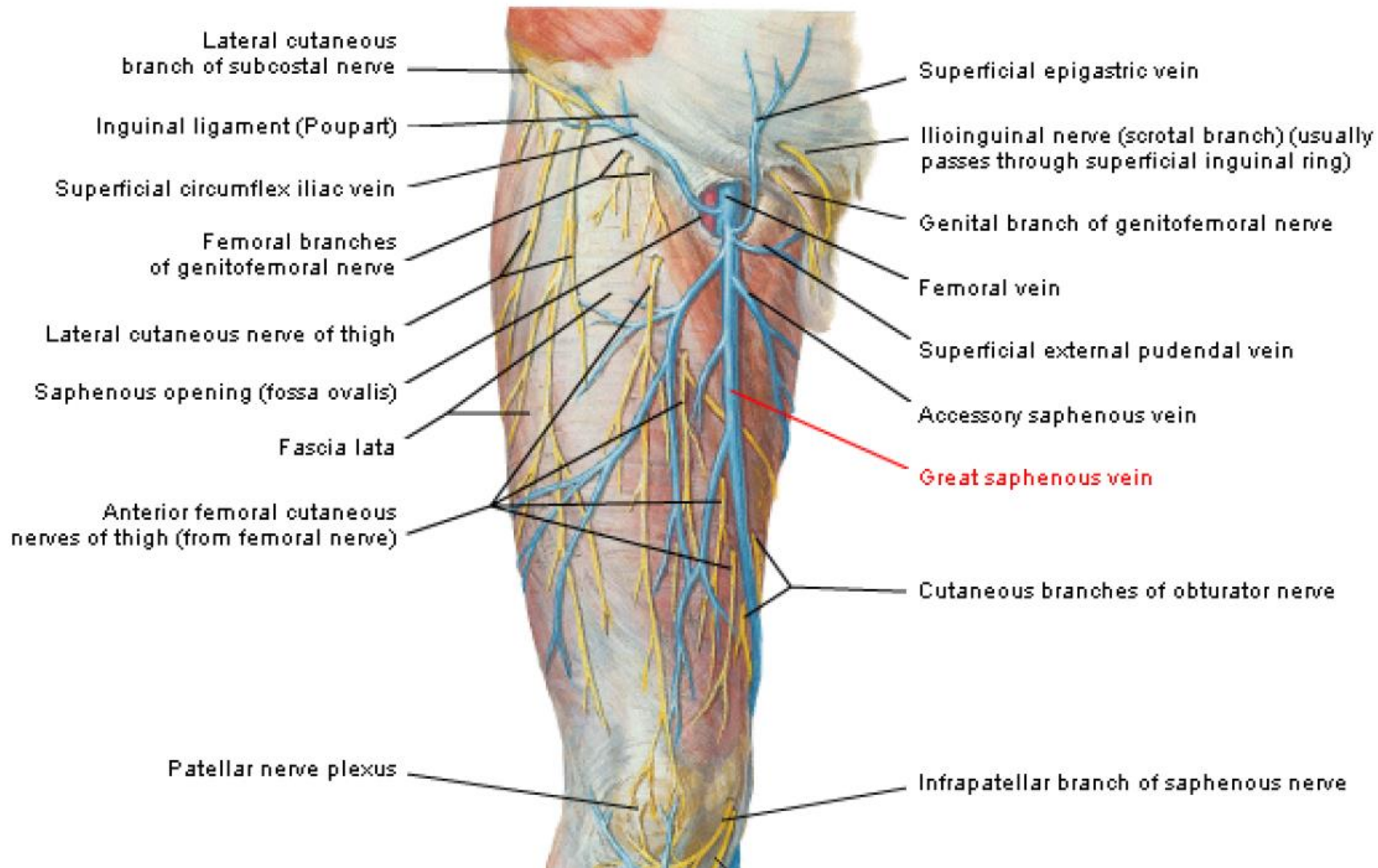
Contains
Femoral nerve
Femoral artery
Femoral vein
Deep inguinal nodes

MEDIAL EDGE of Adductor longus is the MEDIAL border!!



1. Identify structure labelled '15'
2. Identify structure labelled '19'
3. Identify structure labelled '18'
4. Name the nervous innervation to structure '19'
5. Describe the course of structure '18'

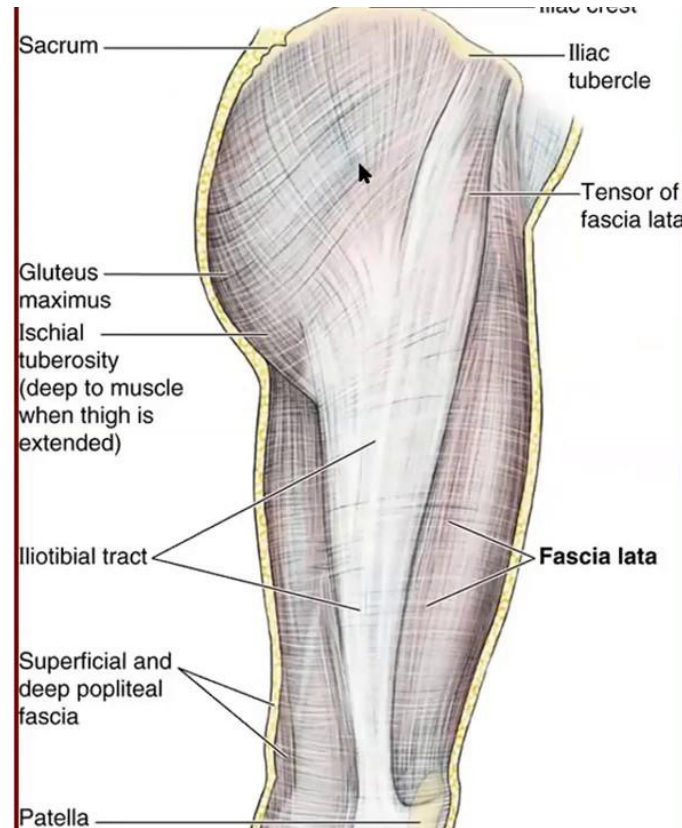
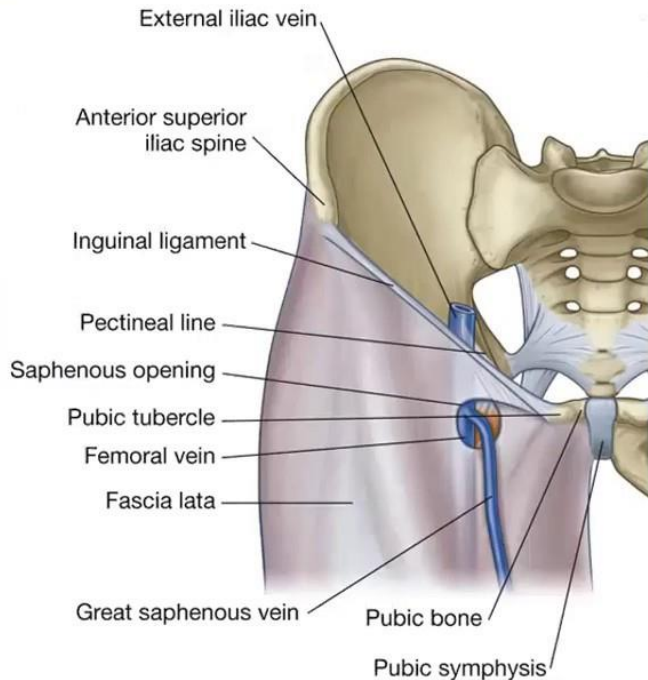
Sapheno-femoral junction



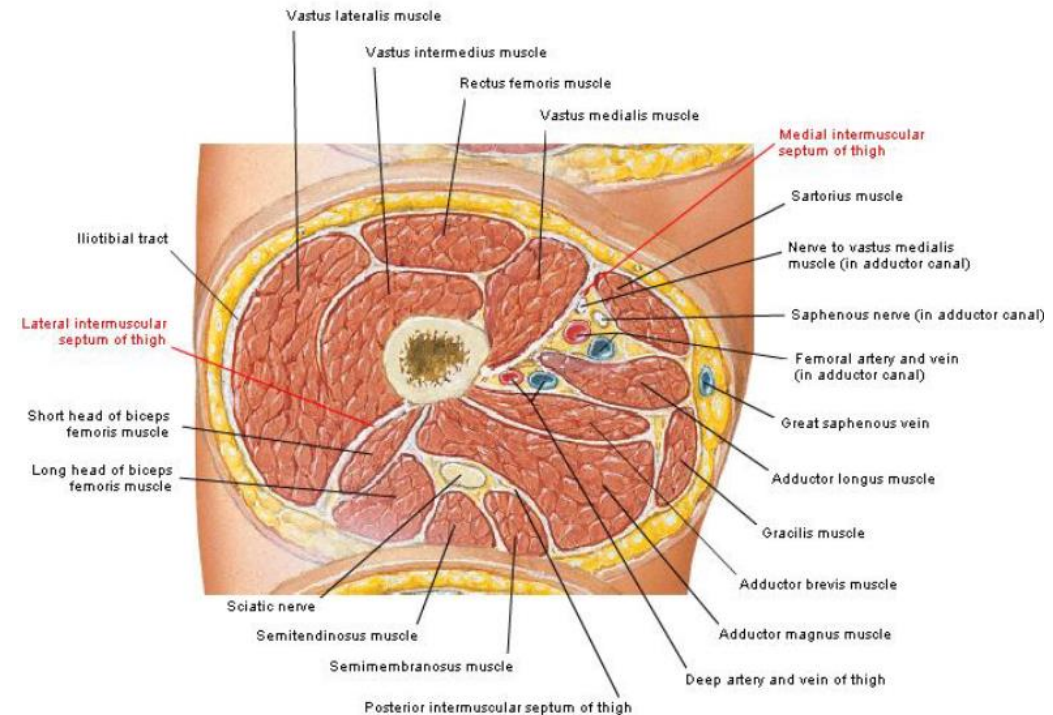
- GSV -> Femoral V
- Cribiform fascia overlying
- x4 superficial arteries (+vv)
- LN groups; vertical/lateral/medial

Fascia lata

- Attaches to IL, ASIS, Ext lip crest, sacrum, ST lig, Isch Tub, Ischiopub ramus.
- Splits to enclose Gmax + TFL
- Passes OVER pectineus to attach on pectineal line
- Deficiency = cribiform fascia
- Attaches distally to head of fib + below tib condyles



- **TFL** (L4/5/S1): from crest, inserts into ITB
- **ITB**: TFL + $\frac{3}{4}$ Gmax. Inserts into lat condyle
 - Maintains knee in hyperExt (lock)
 - Contributes to Lat IM septum



Q: With respect to venous drainage of the lower limb

- 1: The cribiform fascia is derived from Scarpa's fascia
- 2: The superficial inguinal lymph nodes drain directly to external iliac nodes
- 3: The lesser saphenous vein typically terminates via the saphenofemoral junction
- 4: The femoral vein is posterior to the femoral artery and the lower end of the femoral triangle
- 5: The long saphenous vein does not provide the principal drainage of the medial side of the leg between the tibia and tendo calcaneus

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Adductor Canal

Borders = Gutter b/w Vmed + Adductors

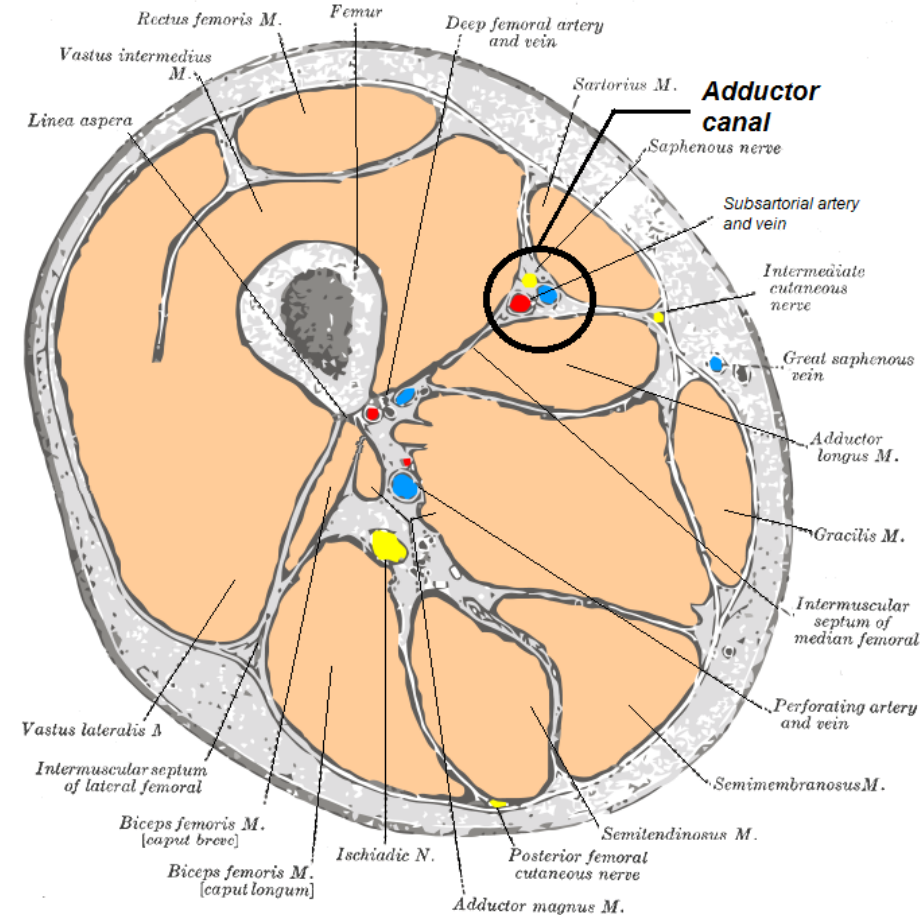
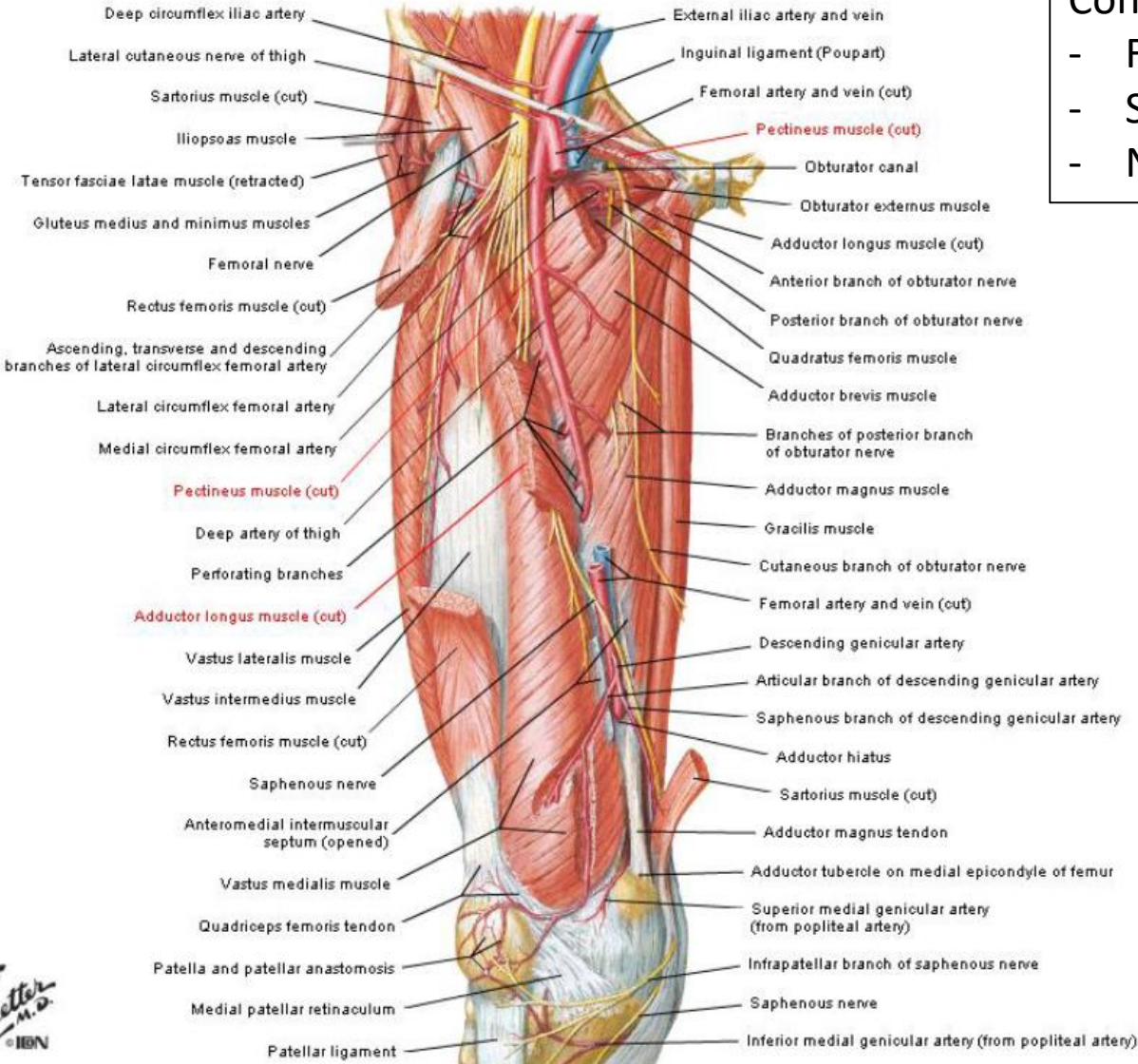
Floor = AddL + AddM

Roof = Sartorius

→ Adductor Hiatus

Contents:

- Femoral A+V
- Saphenous N
- N to Vastus medialis

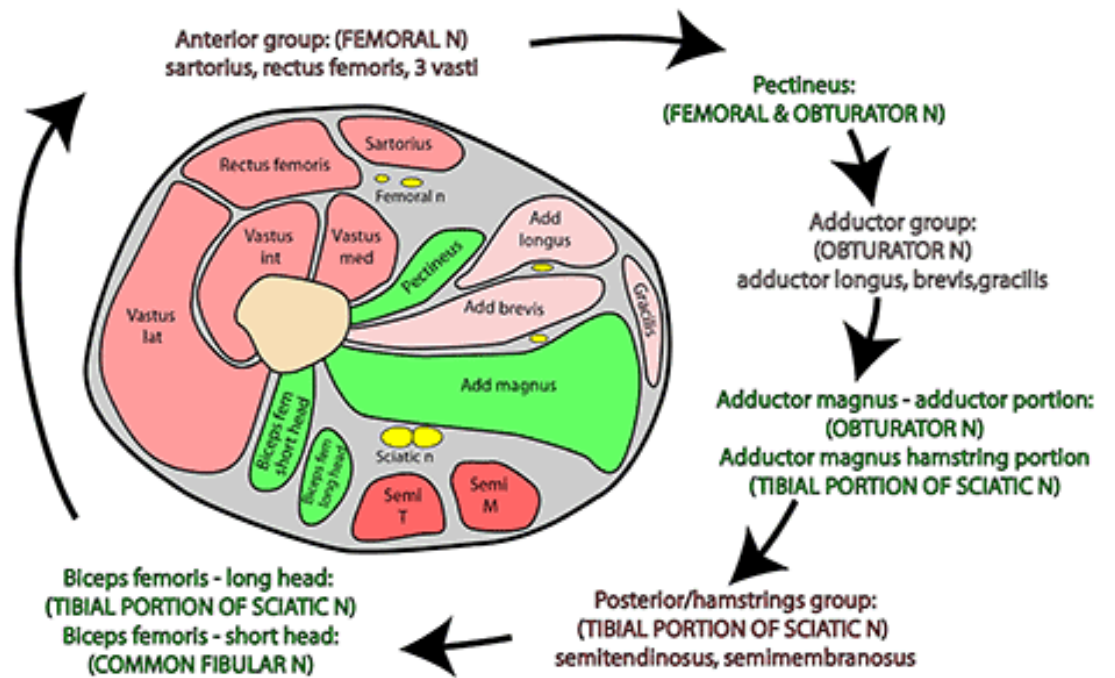


'Watershed' muscles of Thigh

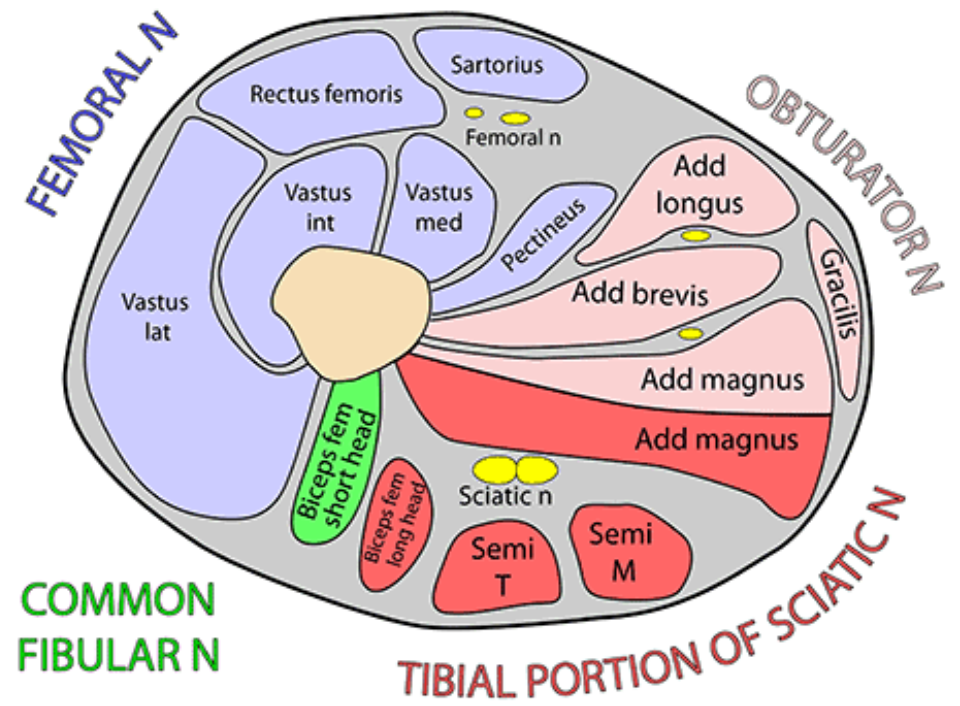
- Pectineus: Femoral + Obturator
- Adductor Magnus: Obturator + Sciatic
- Biceps Femoris: Sciatic + CPN

THE "3 WATERSHED MUSCLES" WAY OF REMEMBERING THIGH MUSCLES

The 3 muscles with dual nerve supply are interposed between the three groups of muscles in the thigh. If you can recall these 3 then the groups are easily remembered



CROSS (AXIAL) SECTION OF MID RIGHT THIGH LOOKING UP
ADDUCTOR AND HAMSTRING MUSCLES



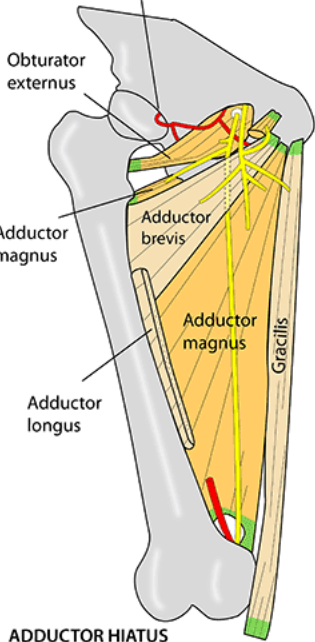
Note: There is no posterior intermuscular septum. It would divide adductor magnus if present.

Obturator nerve

MEDIAL THIGH

For details of muscles, please see muscle section in the book - Instant Anatomy, by R H Whitaker & N R Borley. 4th edition. Wiley-Blackwell 2010

Branch of obturator artery via ligamentum teres to fovea of head of femur



OBTURATOR NERVE

From anterior divisions of L2,3,4

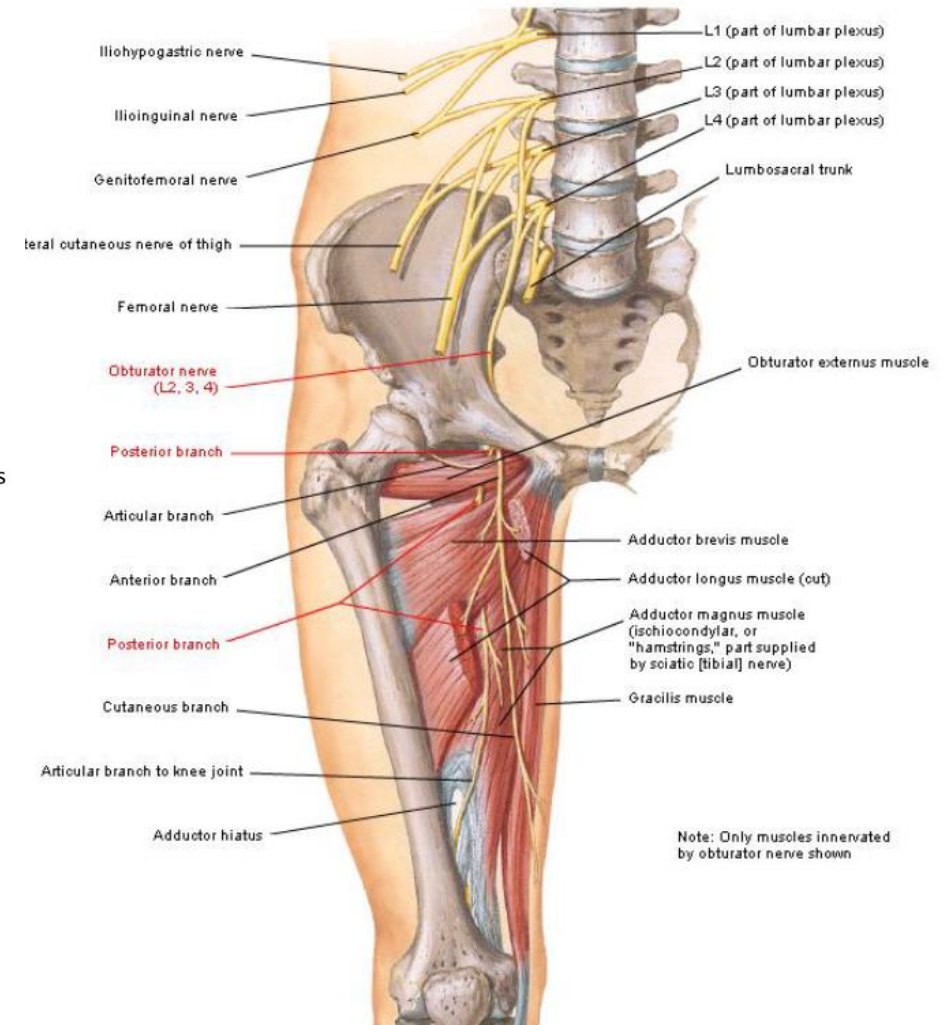
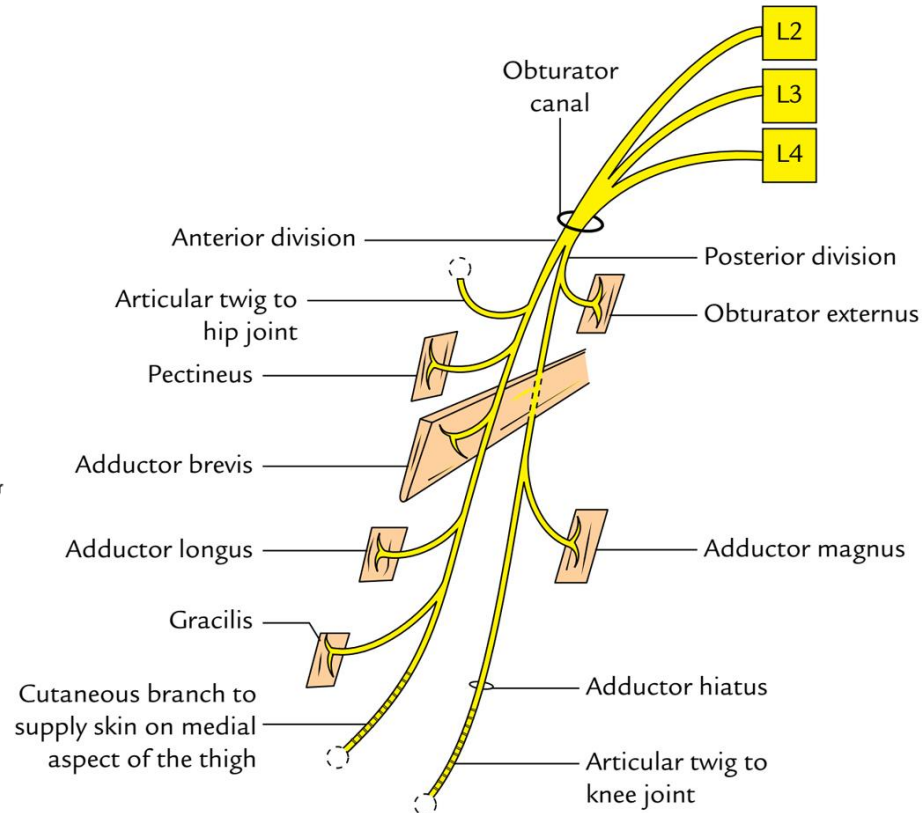
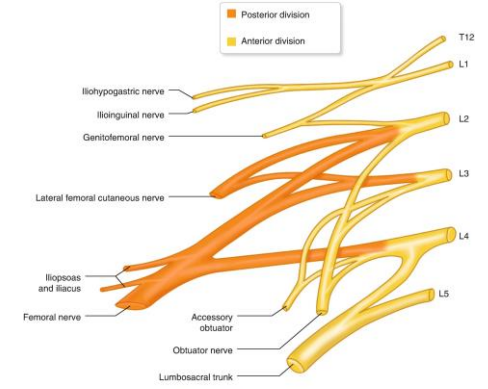
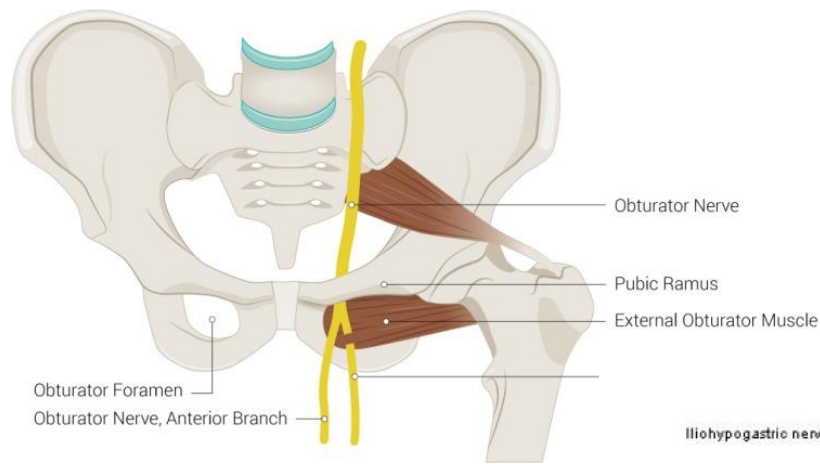
Anterior branch:
Lies between adductors longus & brevis, contributes to subsartorial plexus for medial thigh skin, supplies gracilis, adductors longus, brevis

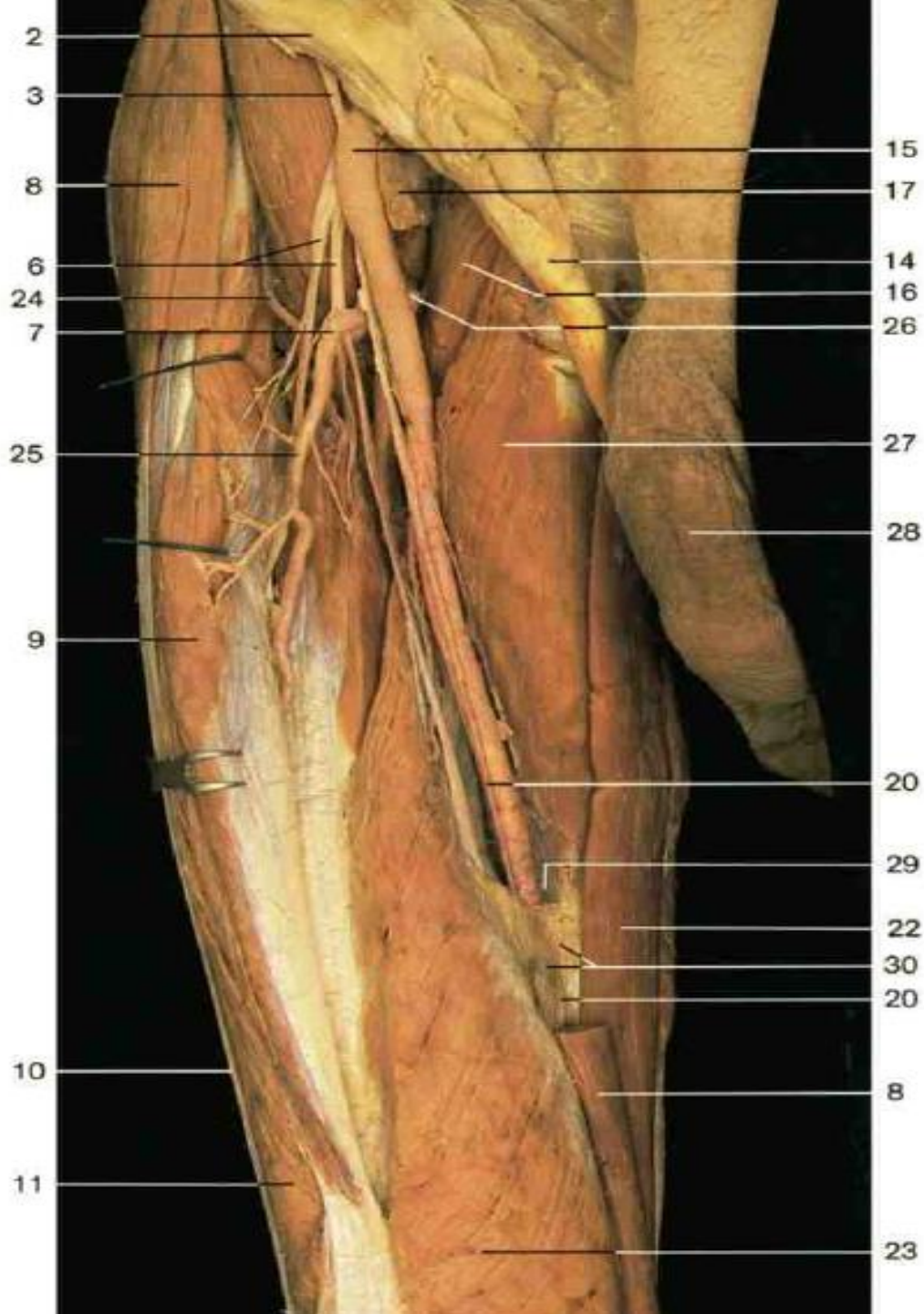
Posterior branch:
Lies between adductors brevis & magnus, supplies adductor portion of adductor magnus, obturator externus & knee joint via a small branch that passes through the adductor hiatus

Medial collateral ligament of knee is probably a remnant of the tendon of the hamstring portion of adductor magnus that was originally attached to the tibia

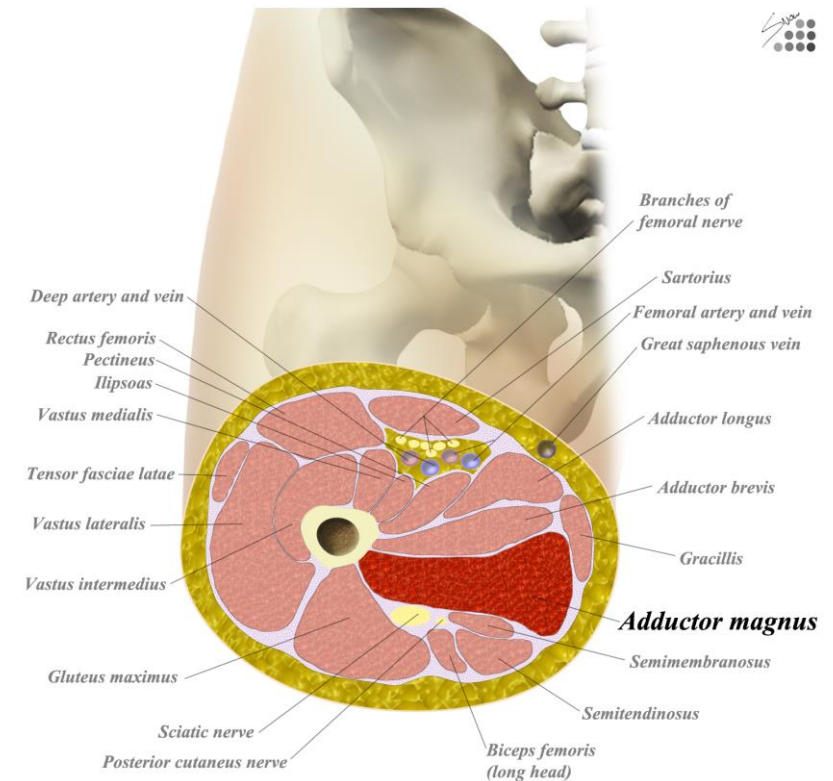
ADDUCTOR HIATUS

Transmits femoral artery, femoral vein, the small genicular branch of the posterior branch of the obturator nerve. The saphenous nerve may pass through it, but if so, then it immediately returns more superficially so that it does not enter the popliteal fossa

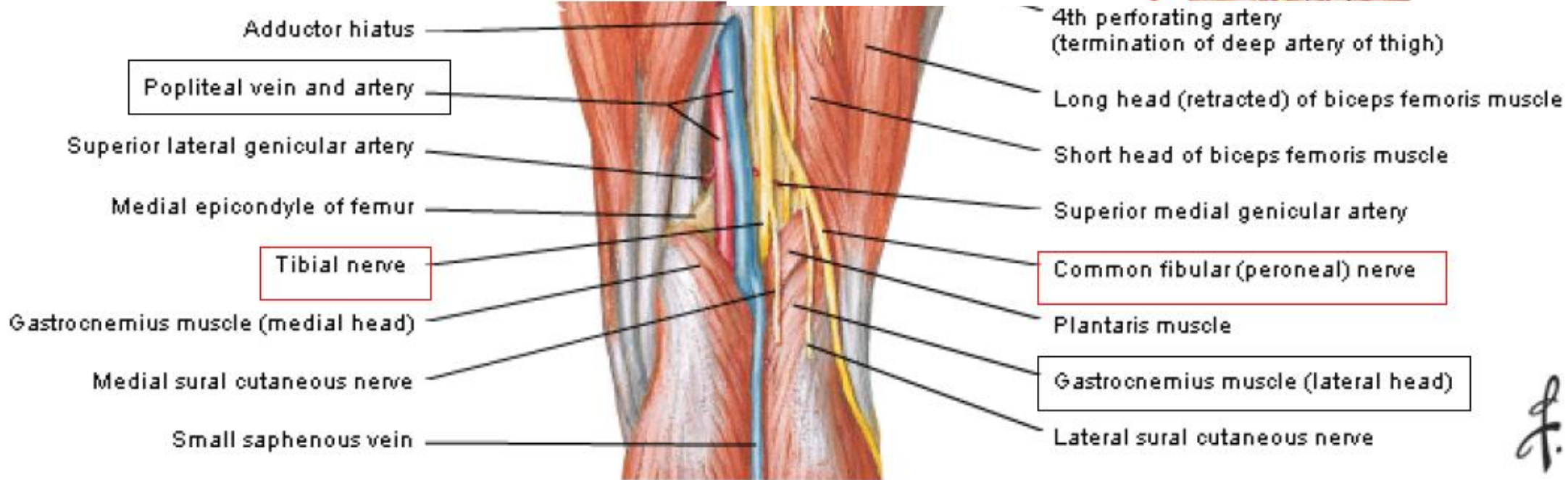
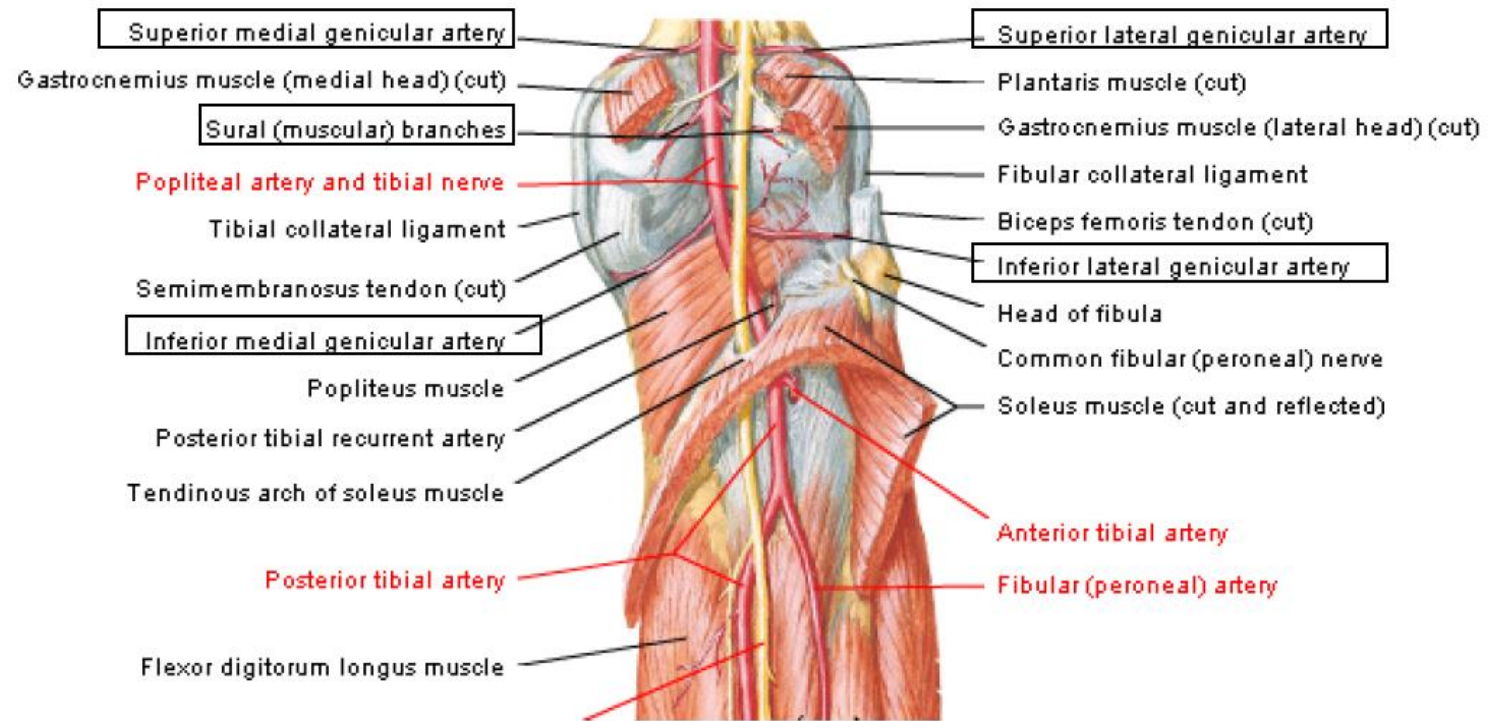




1. Identify structure labelled '29'
2. List the contents of structure '29'
3. Identify structure labelled '27'
4. Name the *specific* nervous innervation to structure '27'
5. Which muscle sits directly underneath structure '27'



Popliteal fossa



f.

Q: The popliteal artery

1: Is anterior to the popliteal vein

2: Is anterior to the tibial (medial popliteal) nerve

3: Is anterior to the popliteus muscle

4: Divides into the anterior and posterior tibial arteries

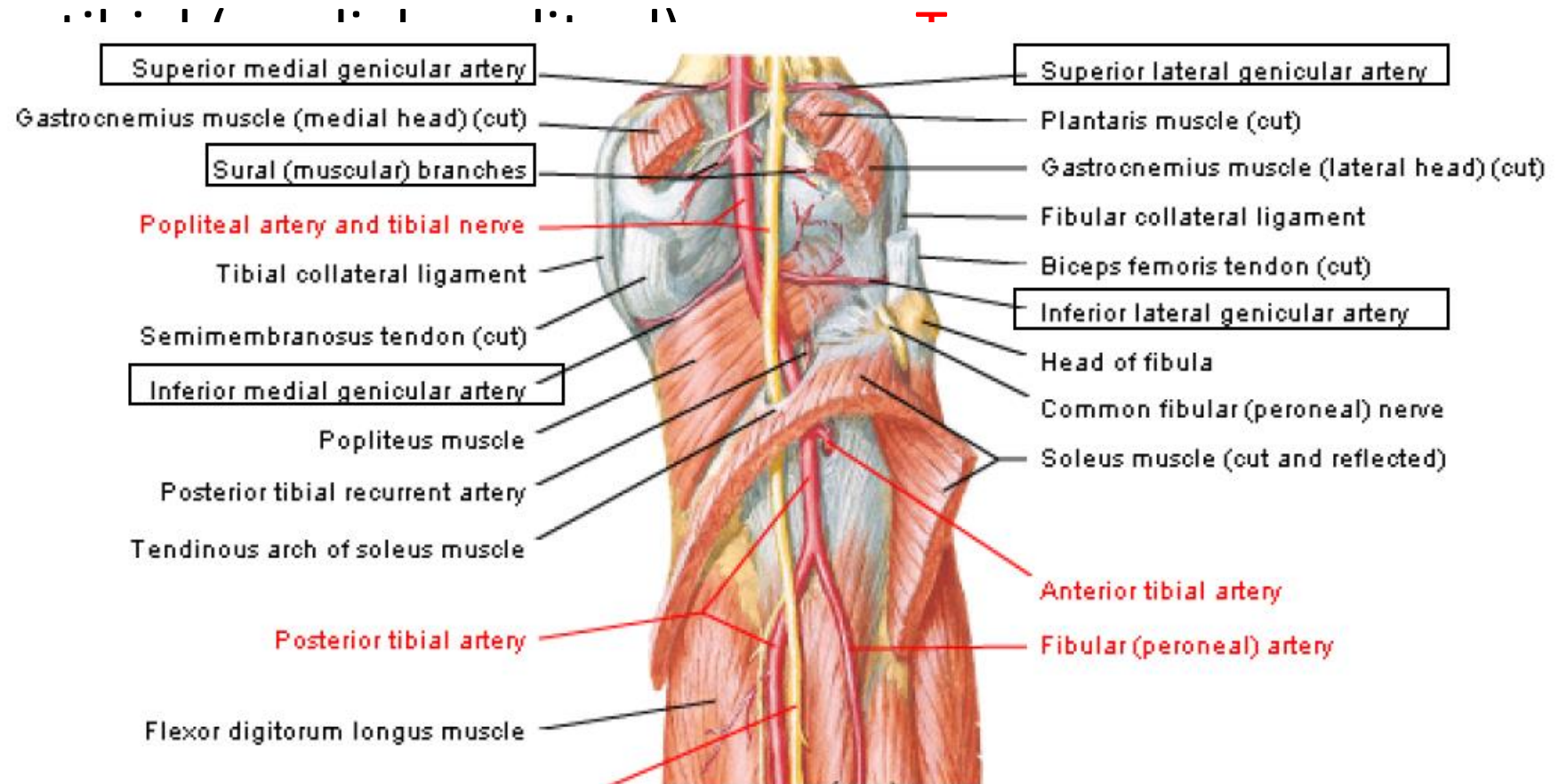
Q: The popliteal artery

1: Is anterior to the popliteal vein = T

2: Is anterior to th

3: Is anterior to th

4: Divides into the



Important Osteology

HIP

- Gluteal lines Posterior/Anterior/Inferior – Gluteus Max/Med/Min
- Reflected head biceps from upper margin acetabulum
- TFL from gluteal surface b/w ASIS + tub Iliac crest
- Pectineal line + Obturator crest on pubis – obturator groove below crest (N sits in it, vv below)
- Ischial spine – Relations with N to Ob Internus, Pudendal N, Int pudendal vessels

FEMUR

- Linea aspera – medial + lateral lips, attachments for adductors, biceps, VI+Vm
- Gluteal tuberosity – for lower ¼ of G Max
- Adductor tubercle

PATELLA

- Orientation - don't confuse superior/inferior with apex/base

TIBIA

- Tibial tuberosity – patella ligament insertion
- Gerdy's tubercle – insertion of ITB
- Soleal line – namesake muscle, popliteus arising above

FIBULA

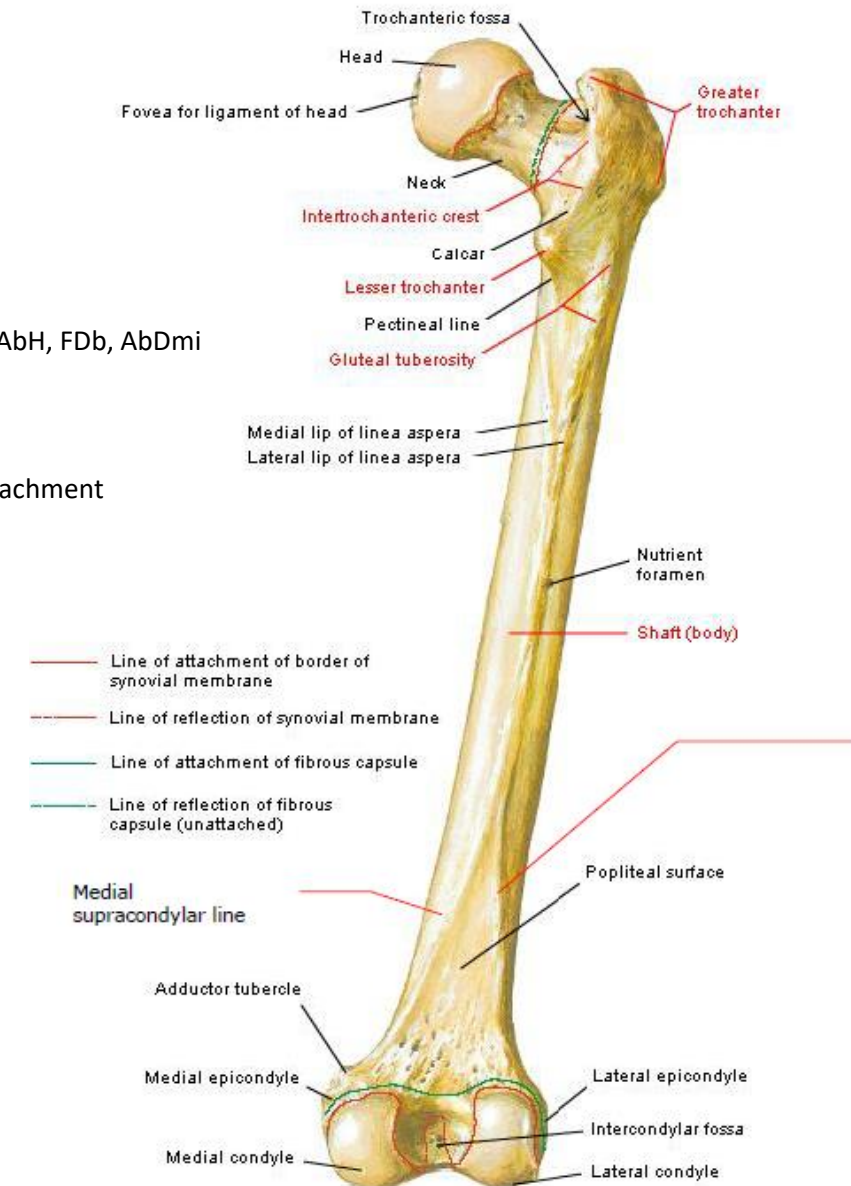
- Interosseus border/line
- Head – LCL + Biceps tendon attach in front of styloid process
- Neck – important landmark for CPN (dividing into its two branches shortly after)

CALCANEUS

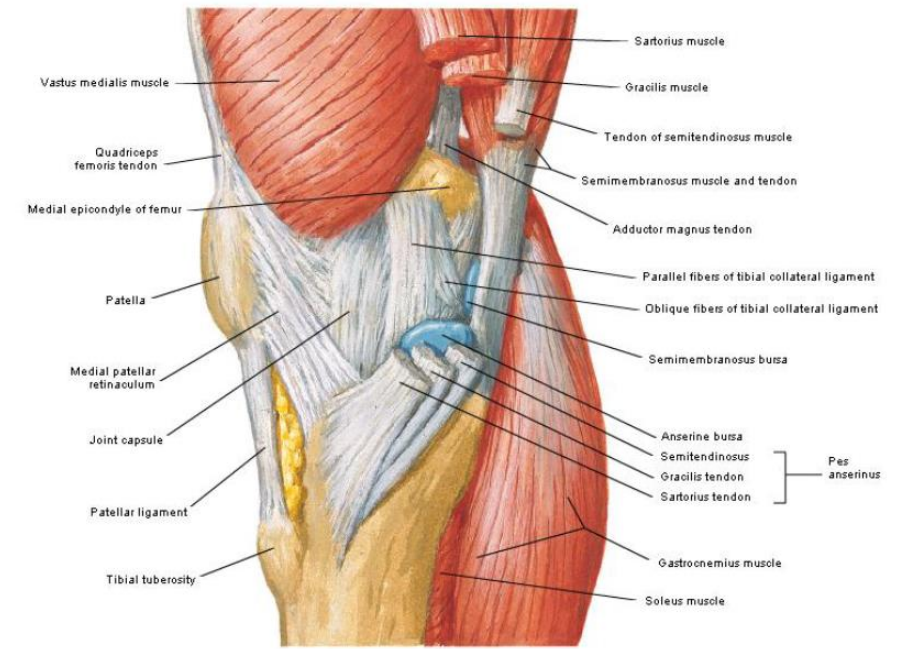
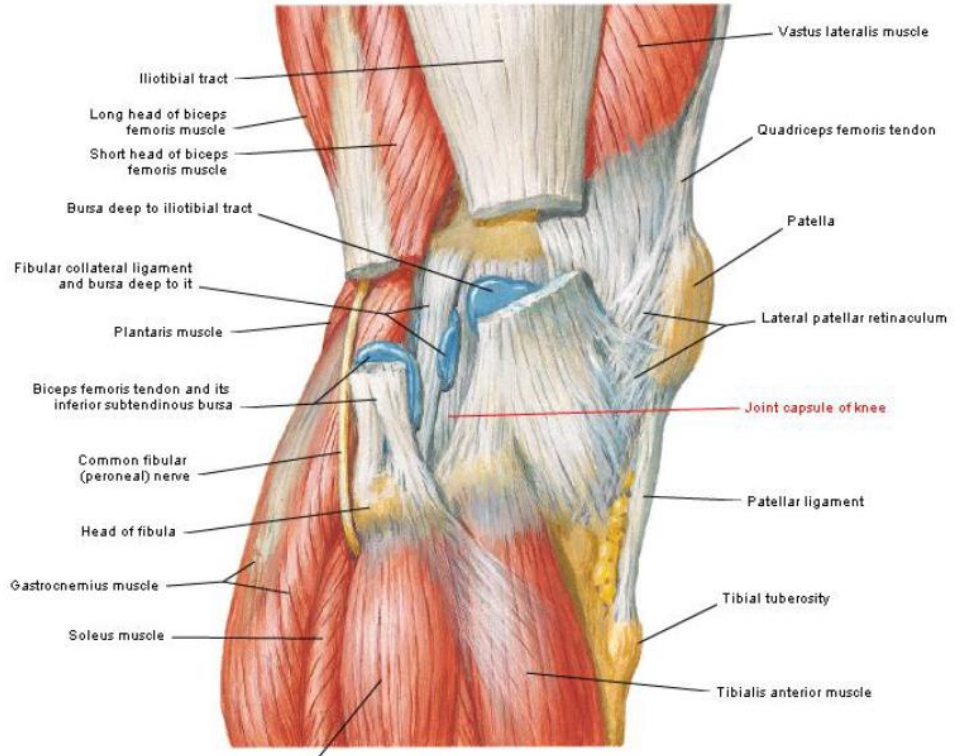
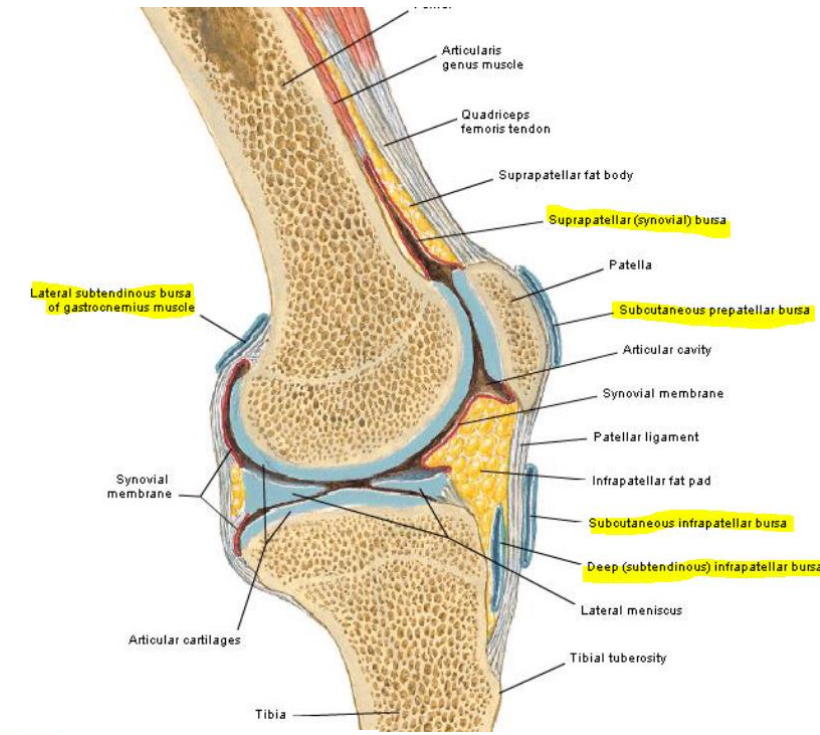
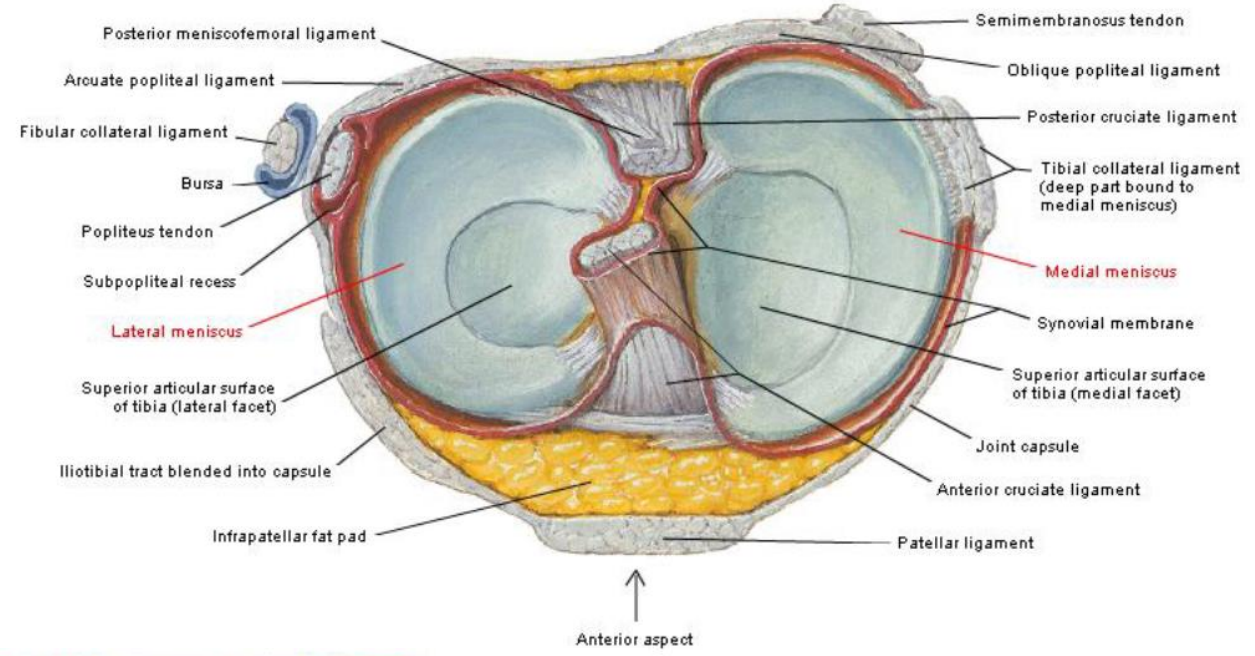
- Complex!
- Groove for FHL
- Inferior tubercles – AbH, FDb, AbDmi

TALUS

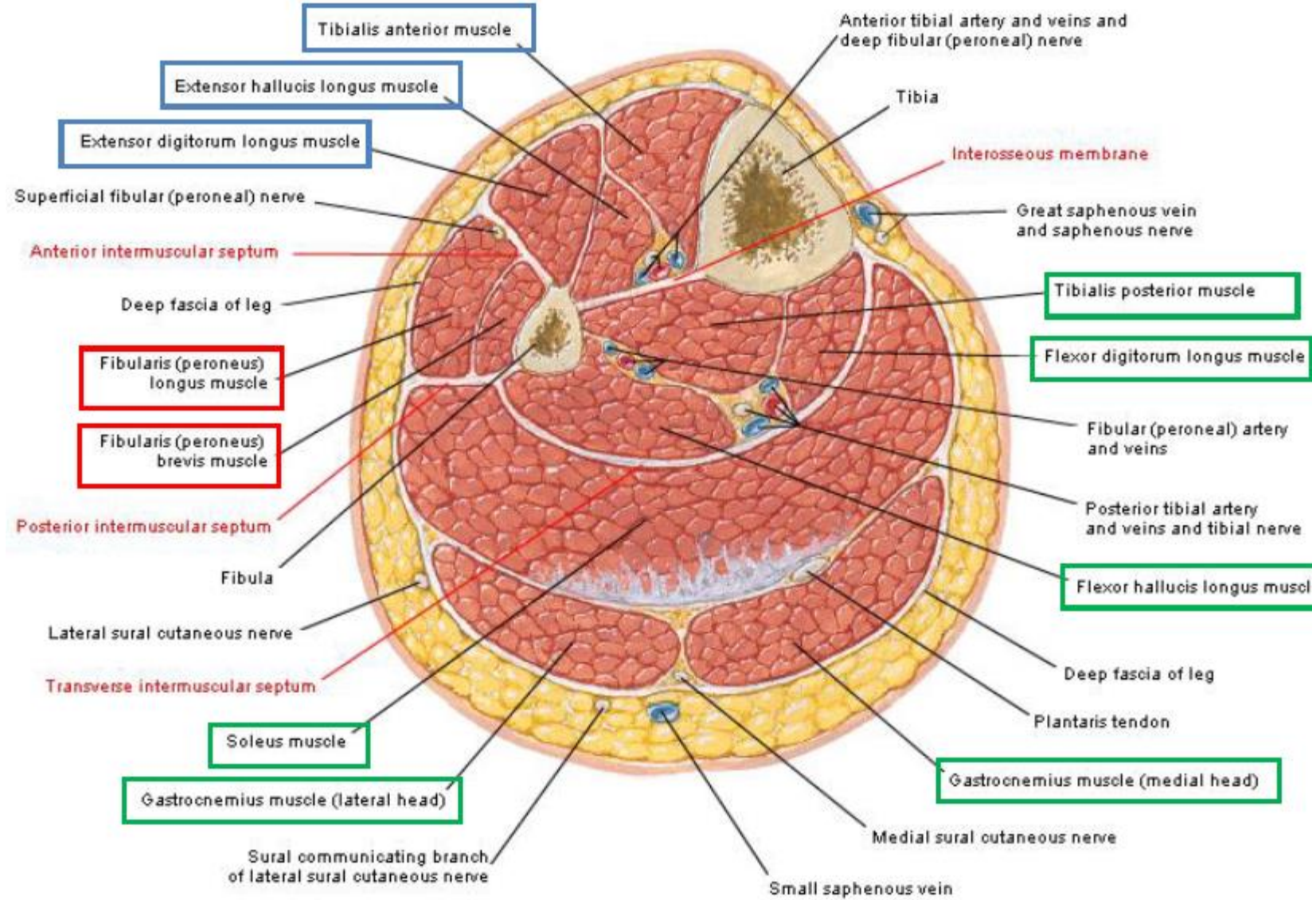
- Articulations
- Deltoid ligament attachment
- Sustentaculum tali
- Trochlea



Knee



Leg



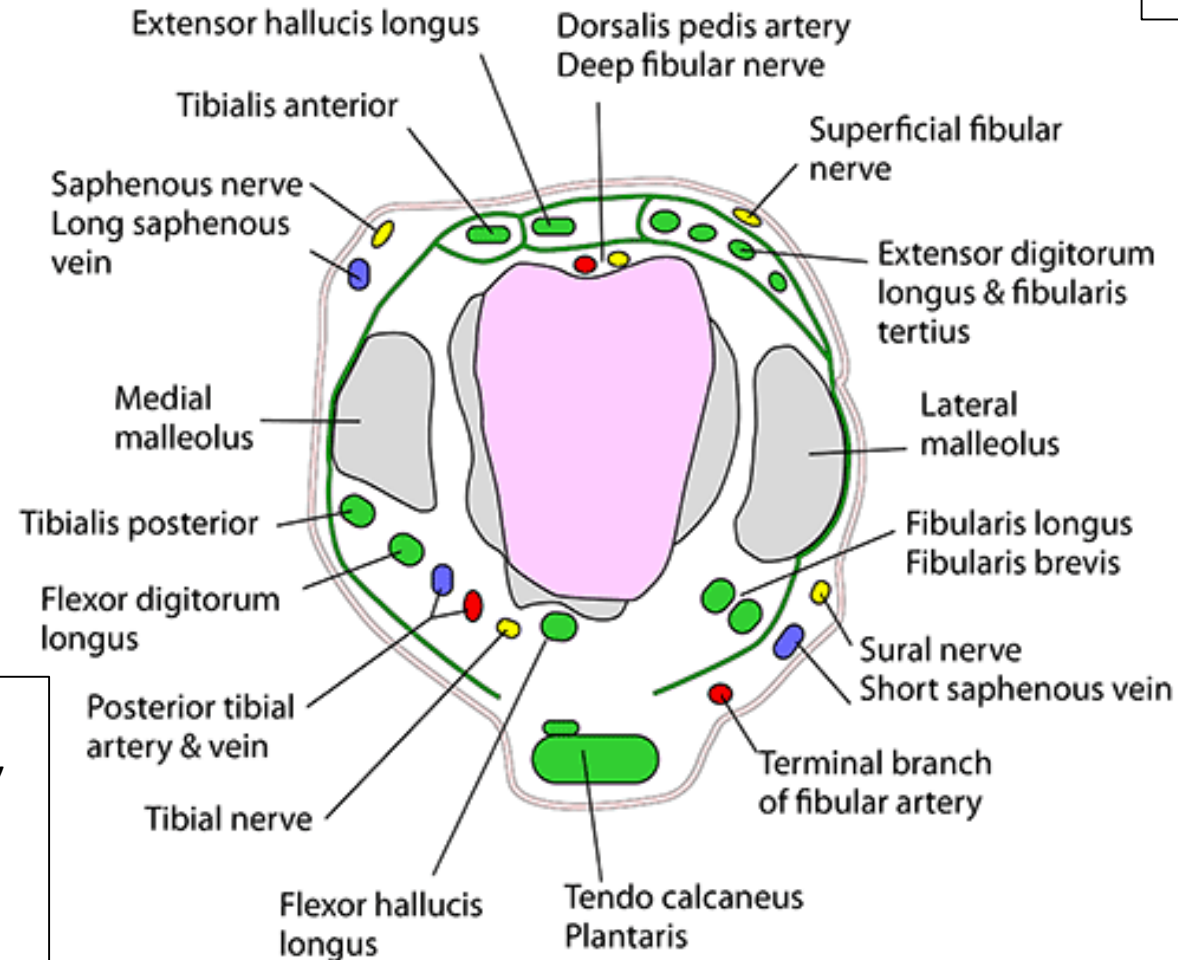
Ankle

Dorsal foot structures:

*Timothy Has A Very Nasty
Diseased Foot*

Tib Ant, EHL, DPA, DPV,
Deep Br CPN, EDL, Fib
Tertius, Fib brevis

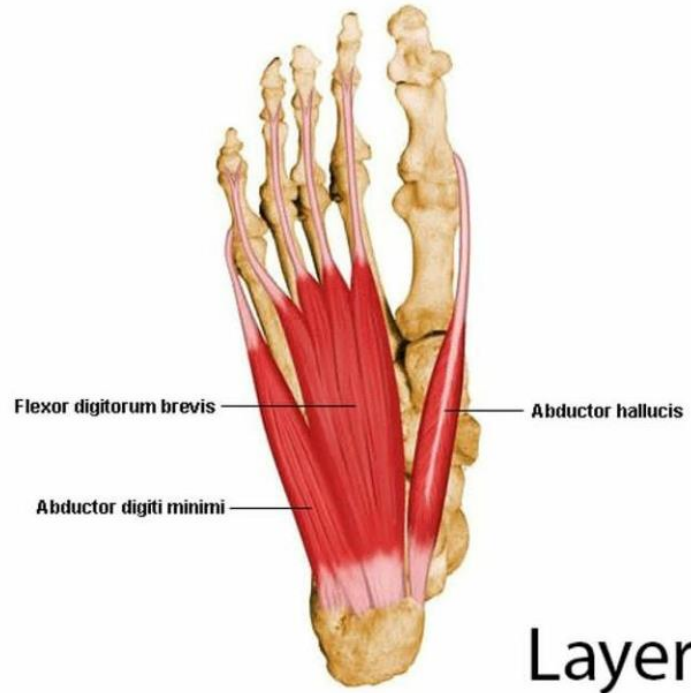
AXIAL (CROSS) SECTION THROUGH ANKLE RIGHT ANKLE



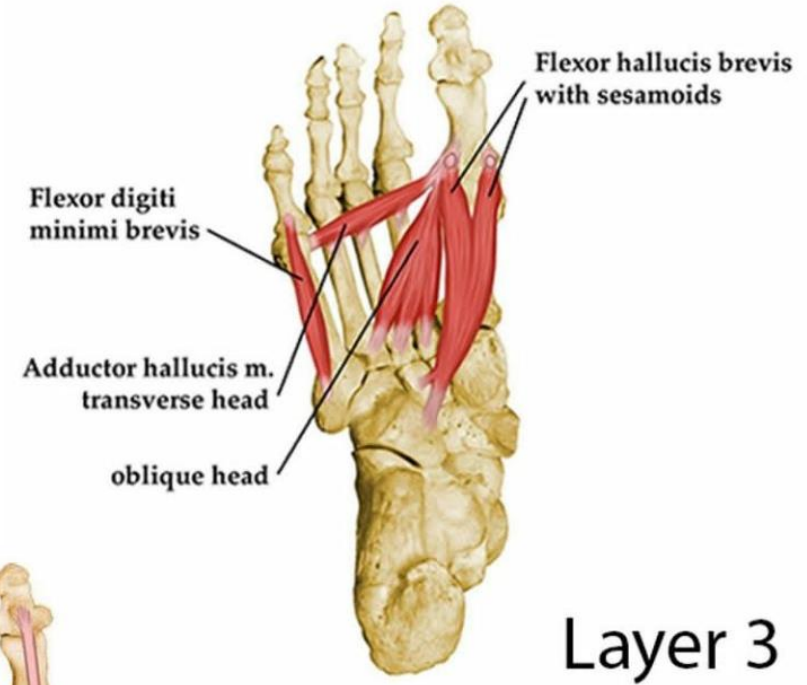
Tarsal tunnel Flexor retinaculum:

Tom, Dick, and Very Nervous Harry
Tib post, FDL, PTA, PTV, Tibial N,
FHL

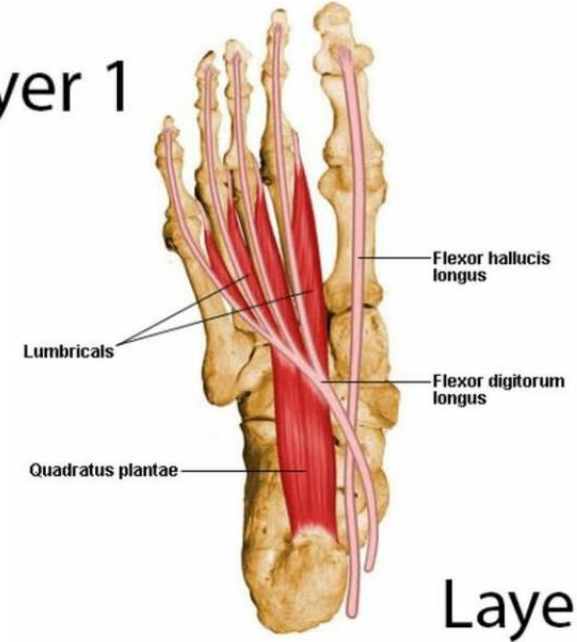
Layers of sole



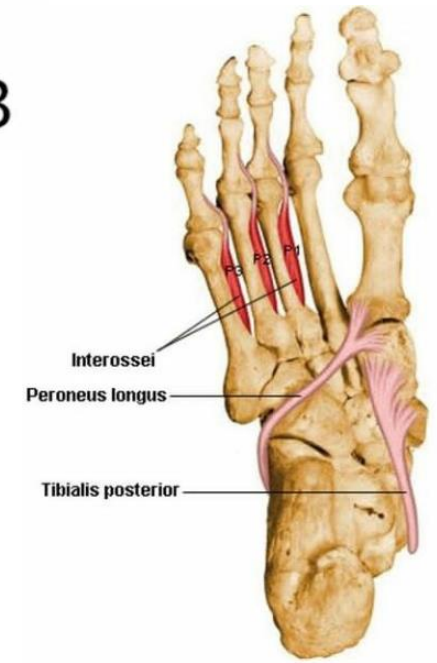
Layer 1



Layer 3



Layer 2



Layer 4

Q: Which of the following lies in the 3rd layer of the sole

1: Flexor digiti minimi brevis

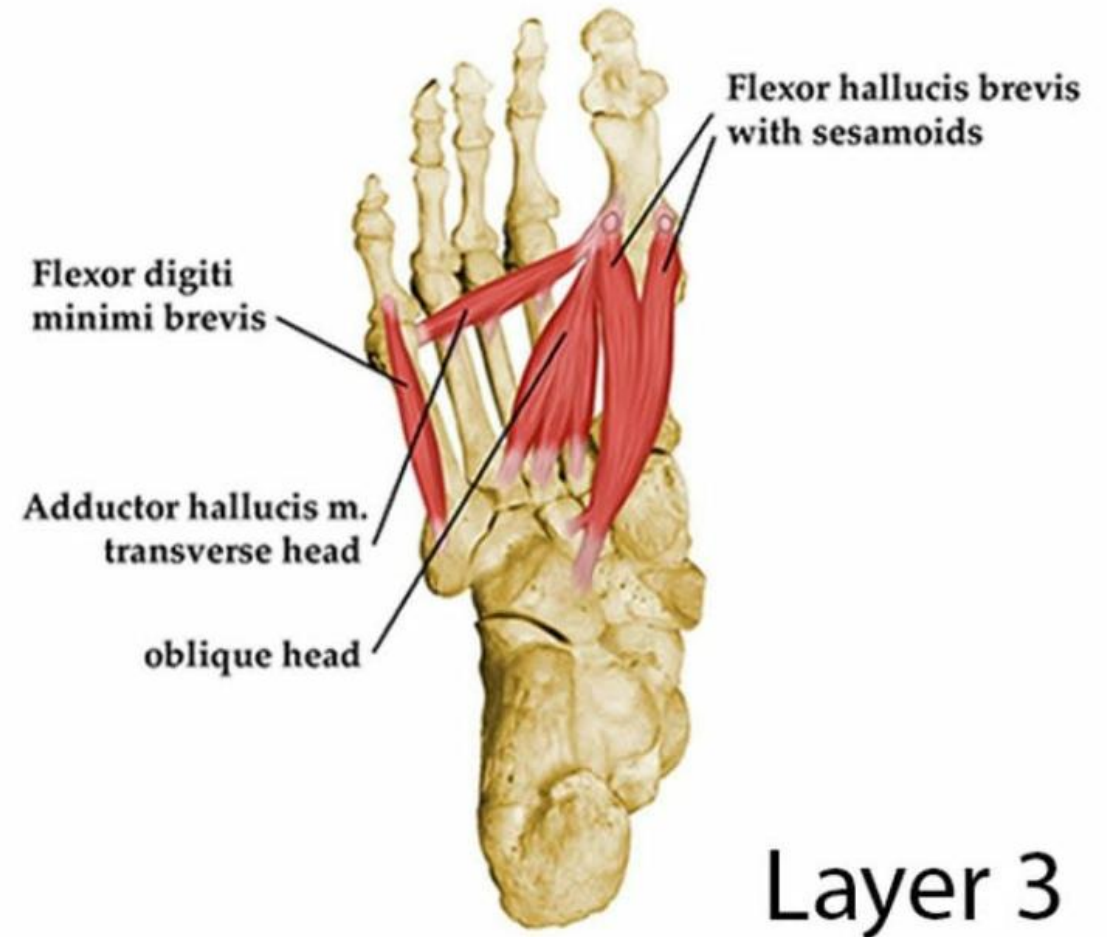
2: Flexor digitorum brevis

3: Lumbricals

4: Flexor hallicus brevis

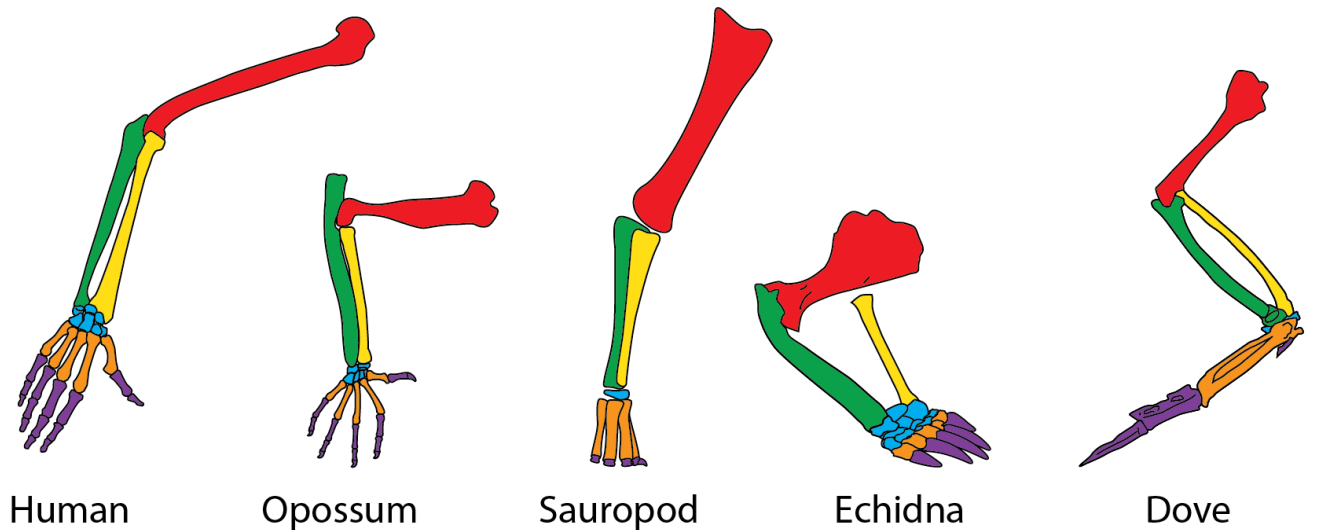
Q: Which of the following lies in the 3rd layer of the sole

- 1: Flexor digiti minimi brevis = T
- 2: Flexor digitorum brevis = F
- 3: Lumbricals = F
- 4: Flexor hallucis brevis = T

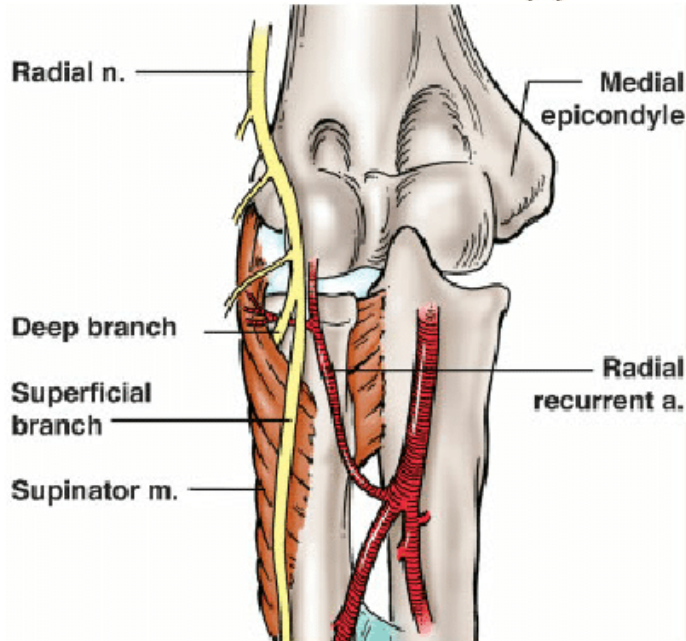
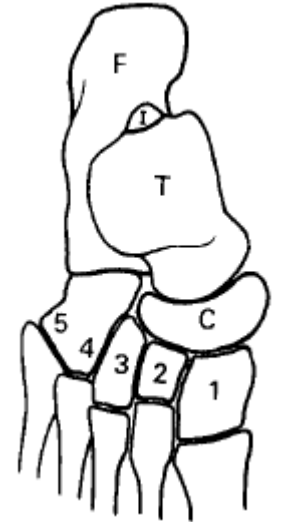
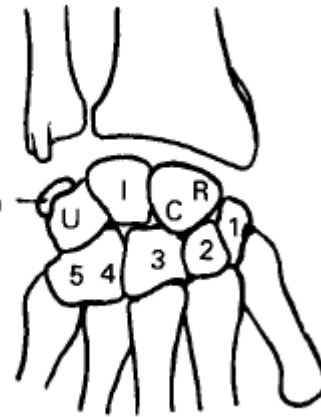
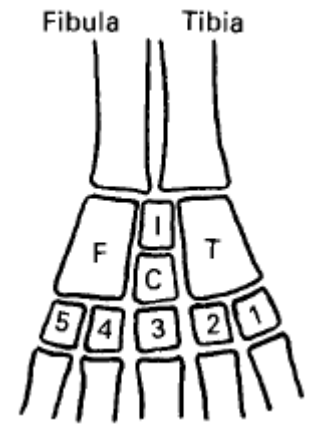
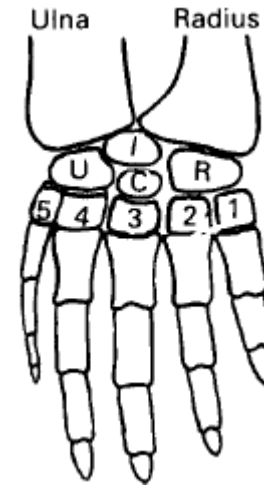


UL/LL similarities

- Read this segment, bang for buck
- Same blueprint – adapted for purpose
- Muscle insertion patterns
- Cribiform fascia : clavipectoral fascia
- Osseous similarities



e.g.



KEN HUB

Extras

- Loss of Gmin/Gmed = Trendelenburg
- Hip: M insertions, capsule, ligaments. ANATOMOSES.
- Knee: Lateral condyle (w.r.t patella), capsular contents, bursae

Thanks!