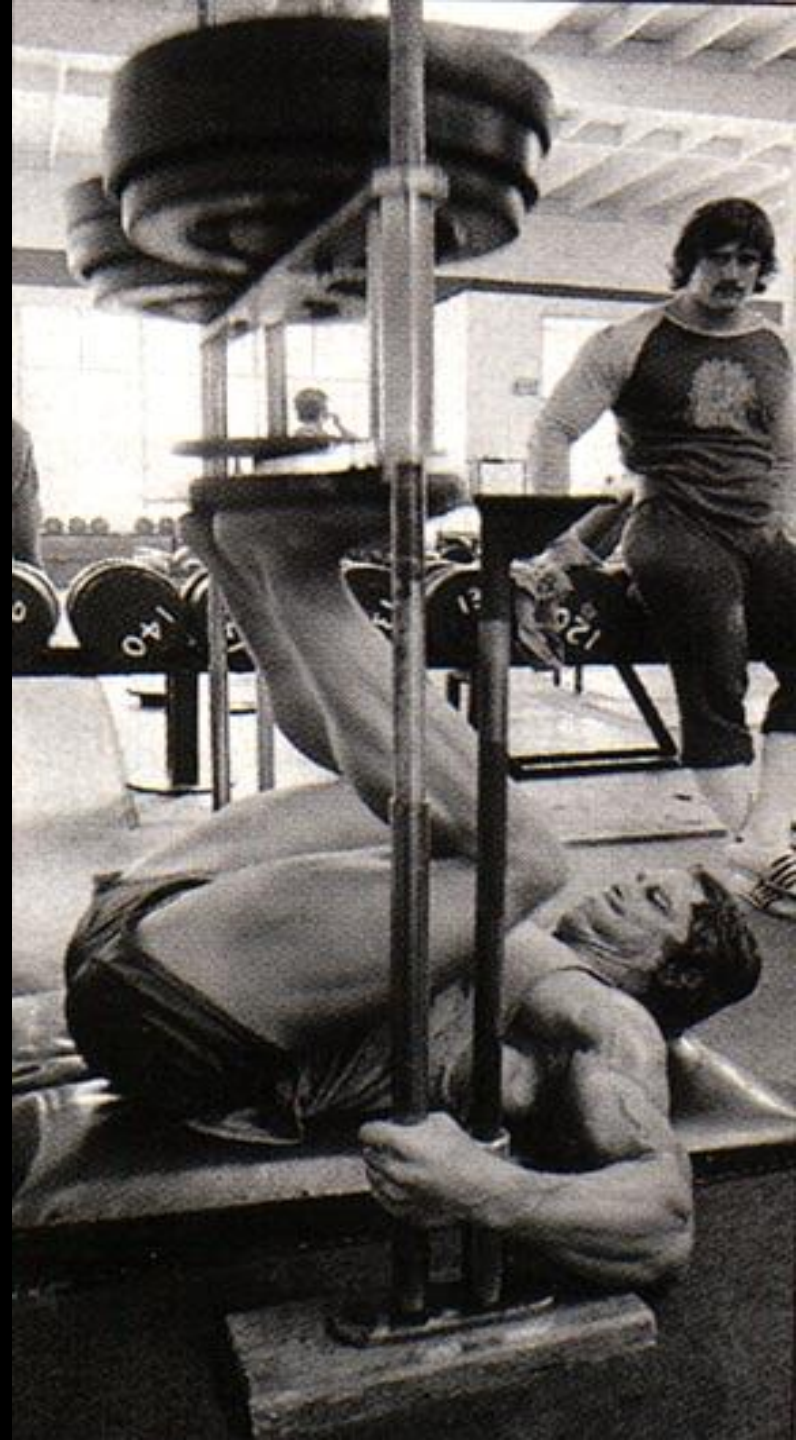
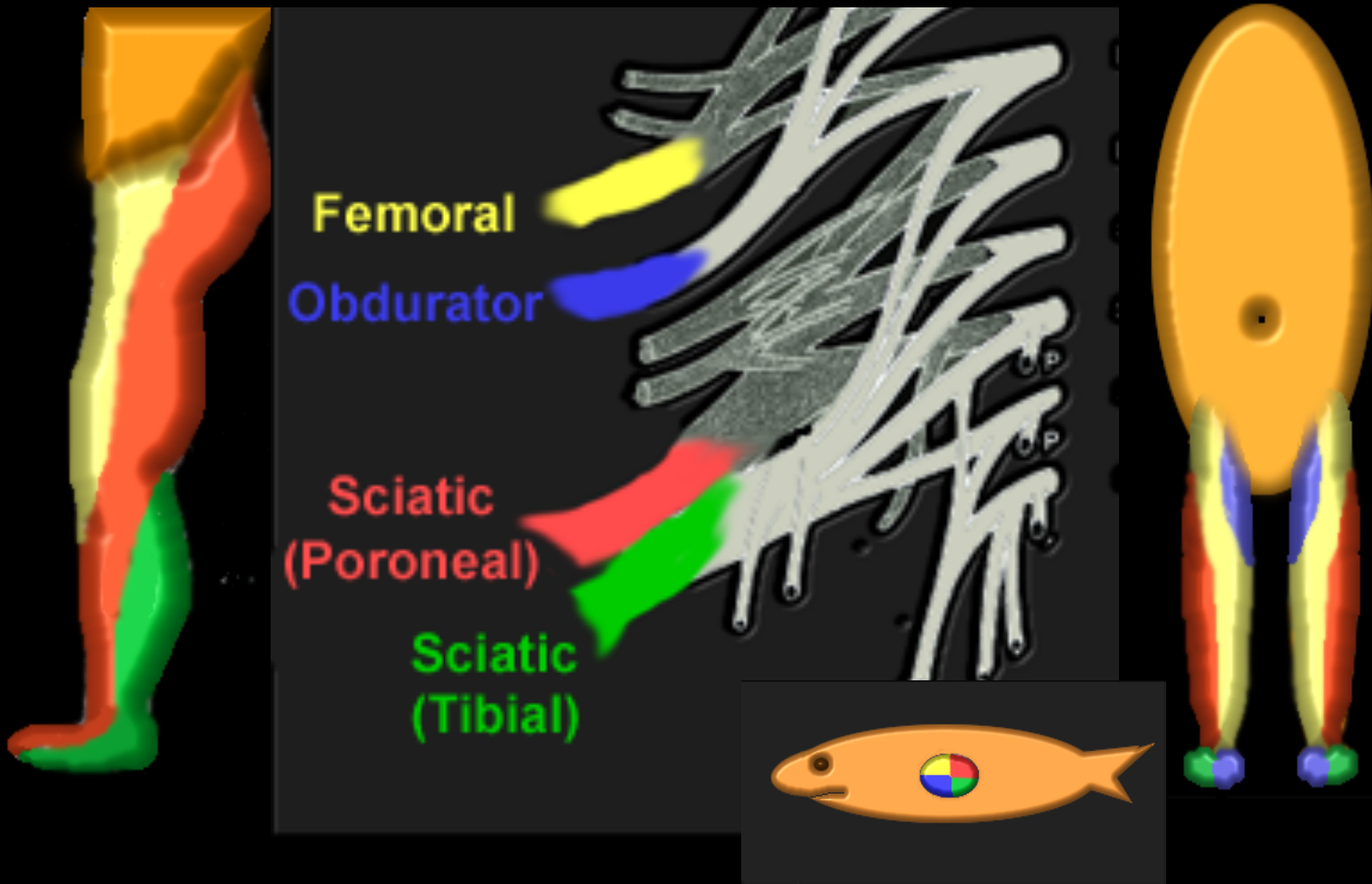


Biology 323
Human Anatomy for Biology Majors
Lecture 7
Dr. Stuart S. Sumida

Appendicular Musculature



The Lumbosacral Plexus



Superior/Posterior (Cranial/dorsal) QUADRICEPS

FEMORAL NERVE

Sartorius

Rectus Femoris

Vastus
Medialis

Vastus
Lateralis

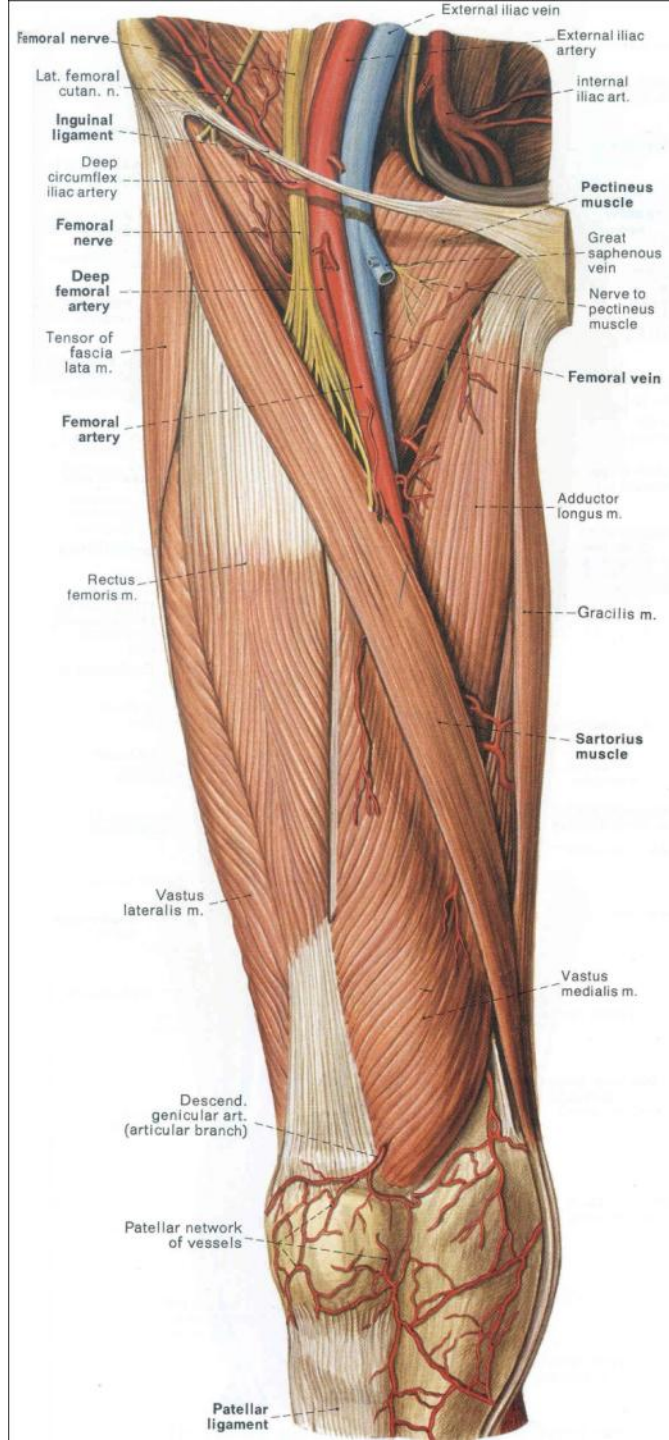
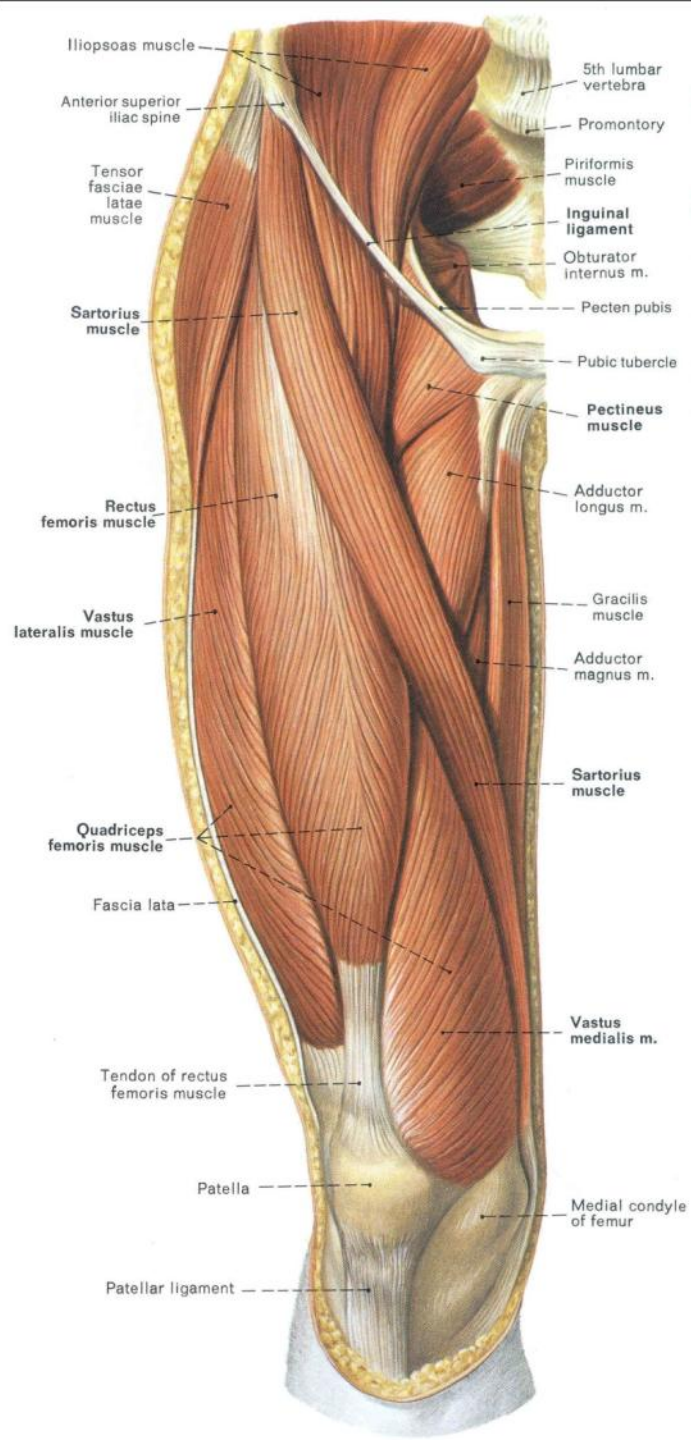
Femoral

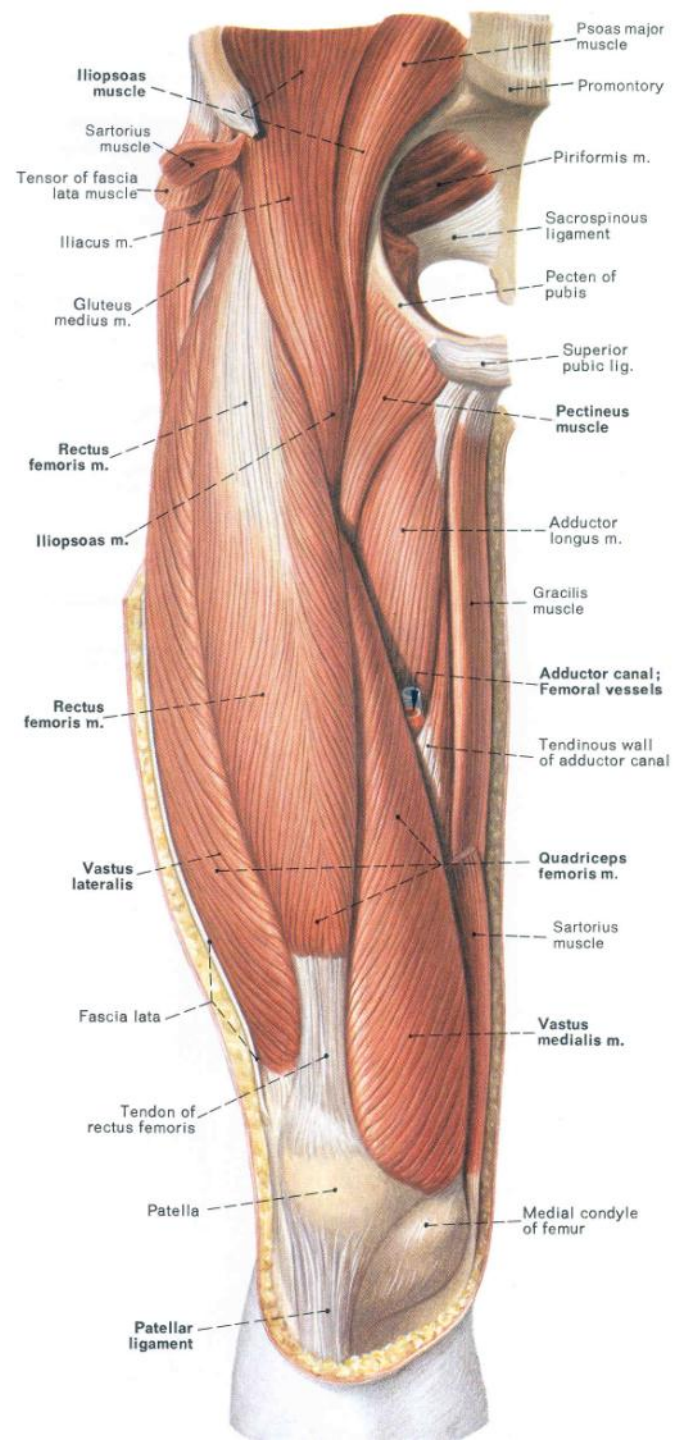
Obturator

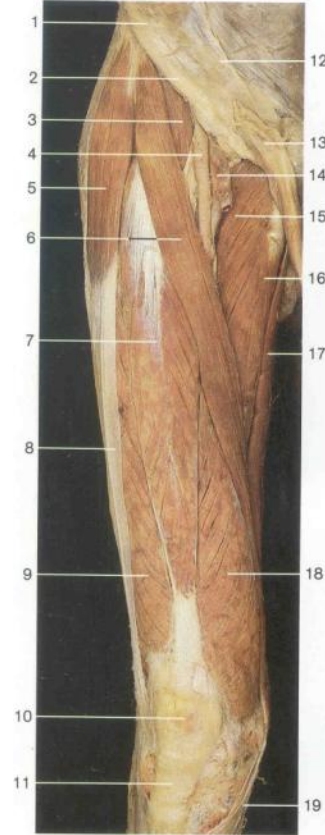
(Sciatic)
Peroneal

Sciatic
(Tibial)

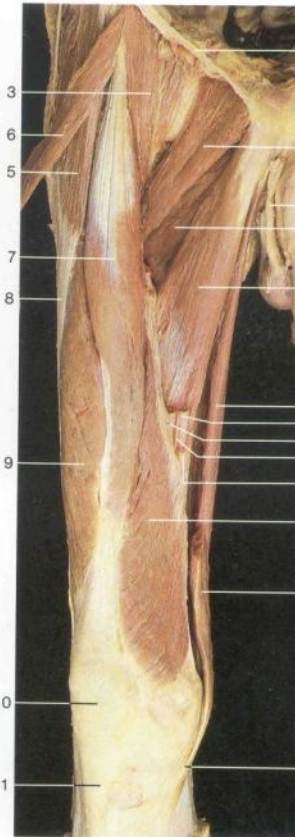




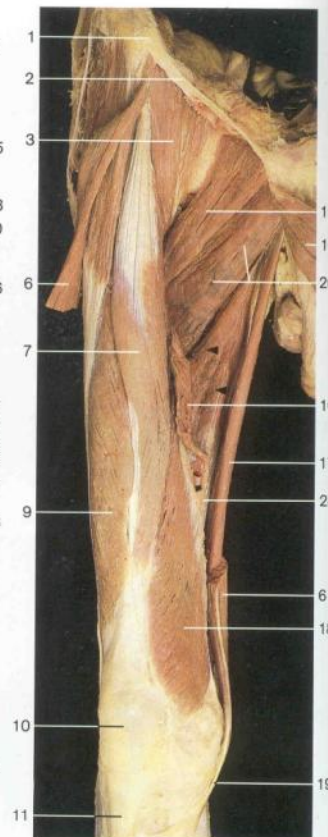




Extensor and adductor muscles of thigh, right thigh (ventral aspect).



Quadriceps femoris and superficial layer of adductor muscles, right thigh (ventral aspect). The sartorius has been divided.



Quadriceps and middle layer of adductor muscles, right thigh (ventral aspect). The sartorius and adductor longus have been divided. Arrowheads: adductor magnus.

- 1 Anterior superior iliac spine
- 2 Inguinal ligament
- 3 Iliopsoas
- 4 Femoral artery
- 5 Tensor fasciae latae
- 6 Sartorius
- 7 Rectus femoris
- 8 Iliotibial tract
- 9 Vastus lateralis
- 10 Patella
- 11 Patellar ligament
- 12 Aponeurosis of external abdominal oblique

- 13 Spermatic cord
- 14 Femoral vein
- 15 **Pectineus**
- 16 **Adductor longus**
- 17 Gracilis
- 18 Vastus medialis
- 19 Common tendon of sartorius, gracilis and semitendinosus
- 20 **Adductor brevis**
- 21 Femoral artery
- 22 Femoral vein
- 23 Saphenous nerve
- 24 Vastoadductory lamina of fascia beneath sartorius

} entering the
adductor canal

Inferior/Posterior (Caudal/dorsal) GLUTEAL GROUP

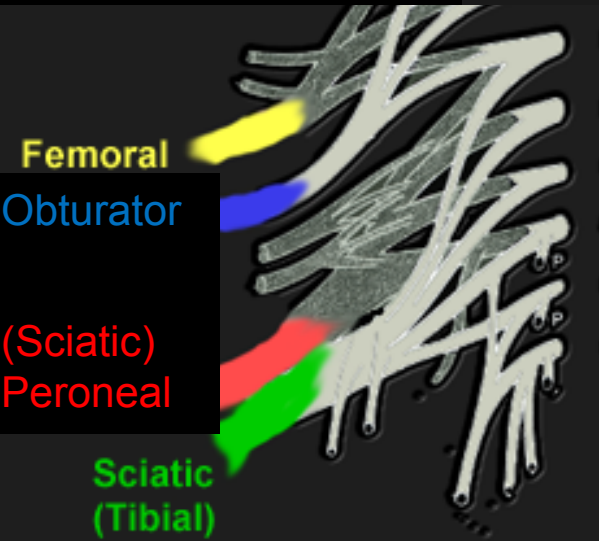
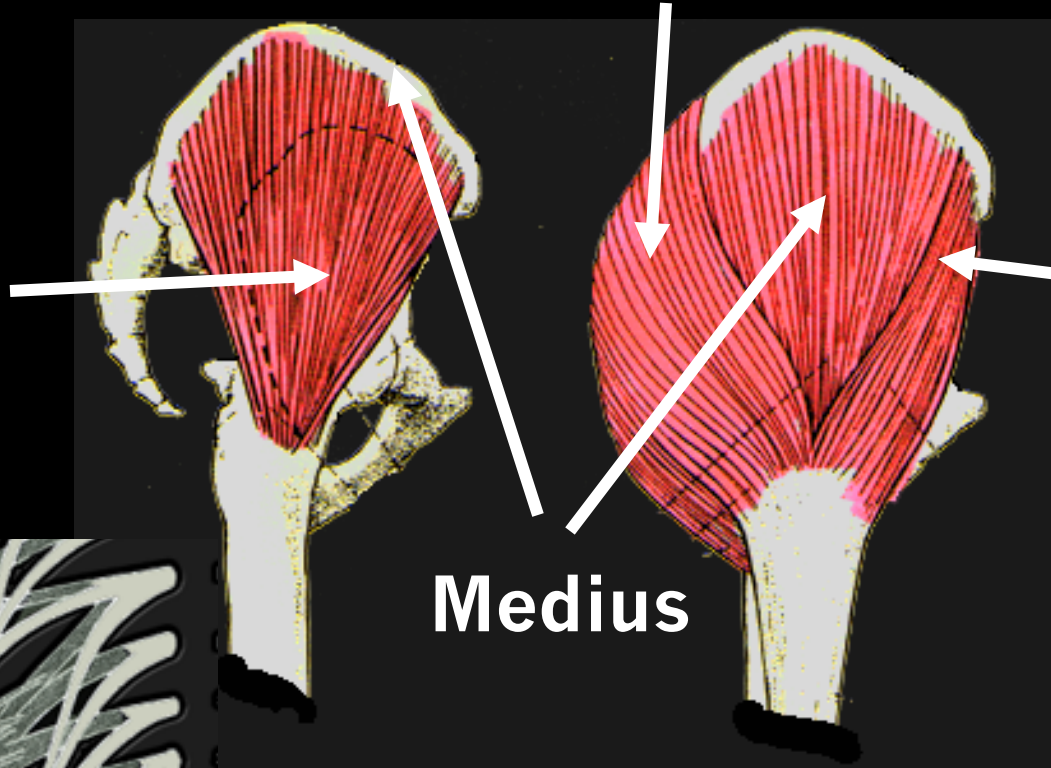
SCIATIC NERVE (PERONEAL)

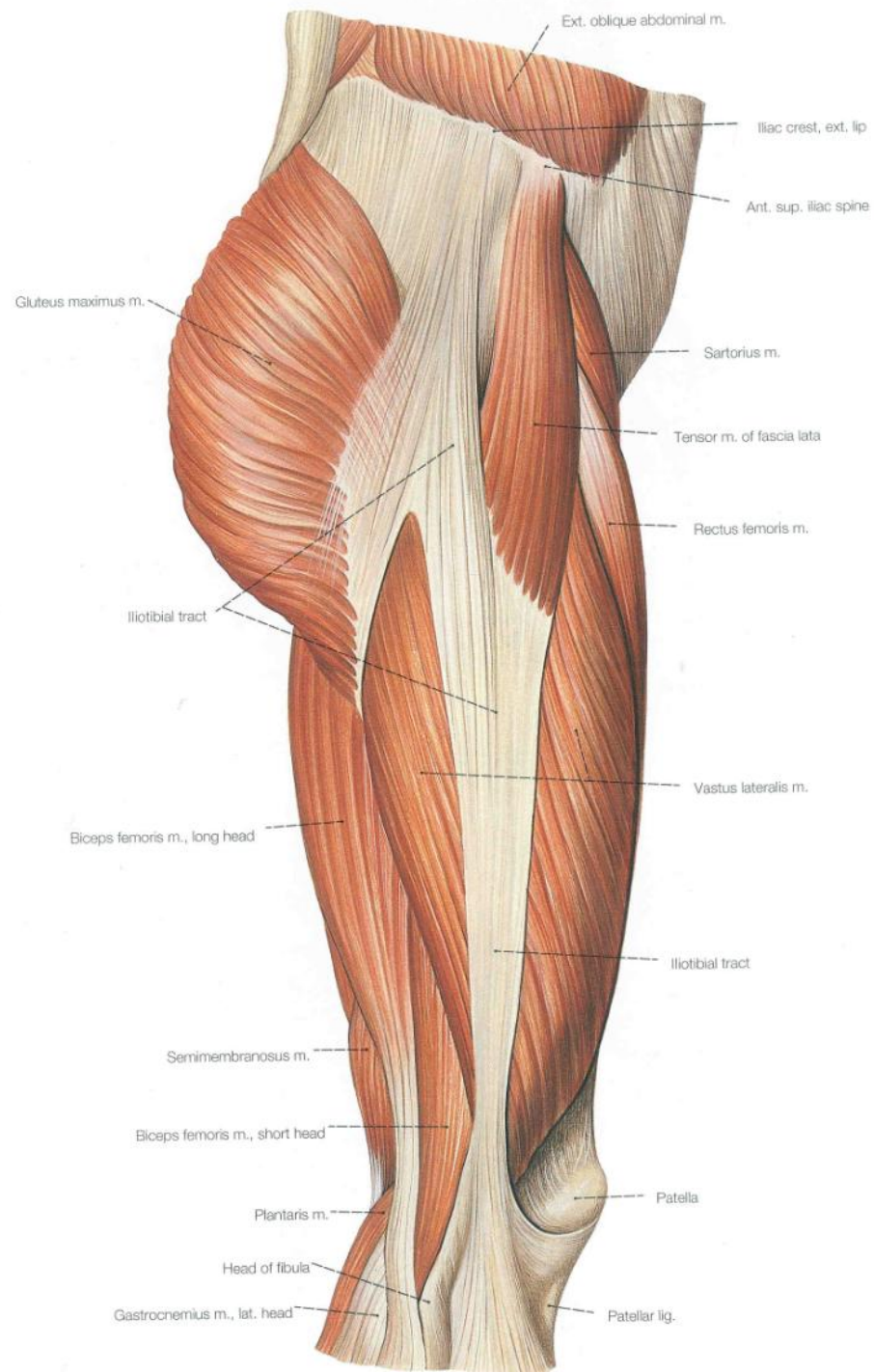
Maximus

Tensor
Fascia
Latae

Medius

Minimus

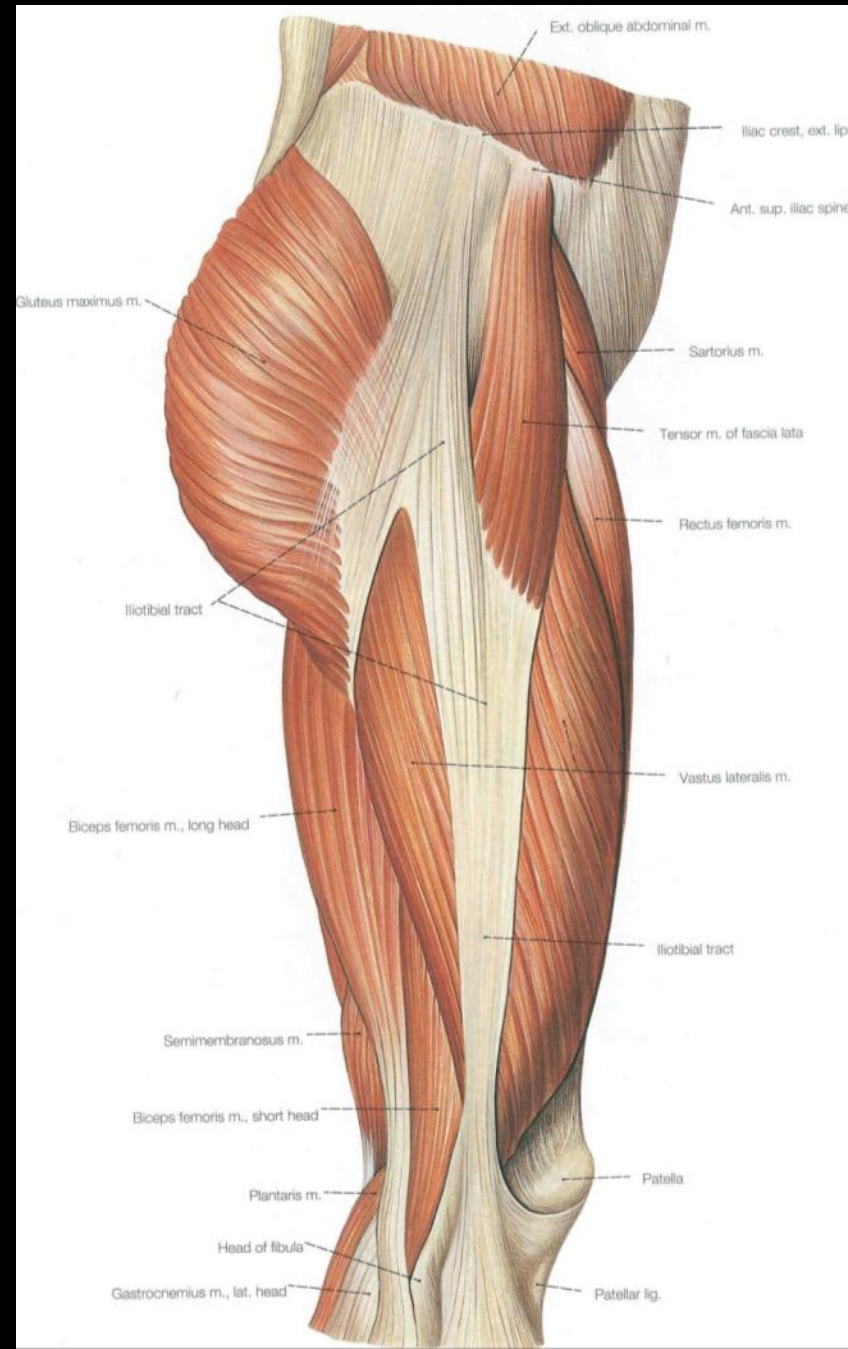
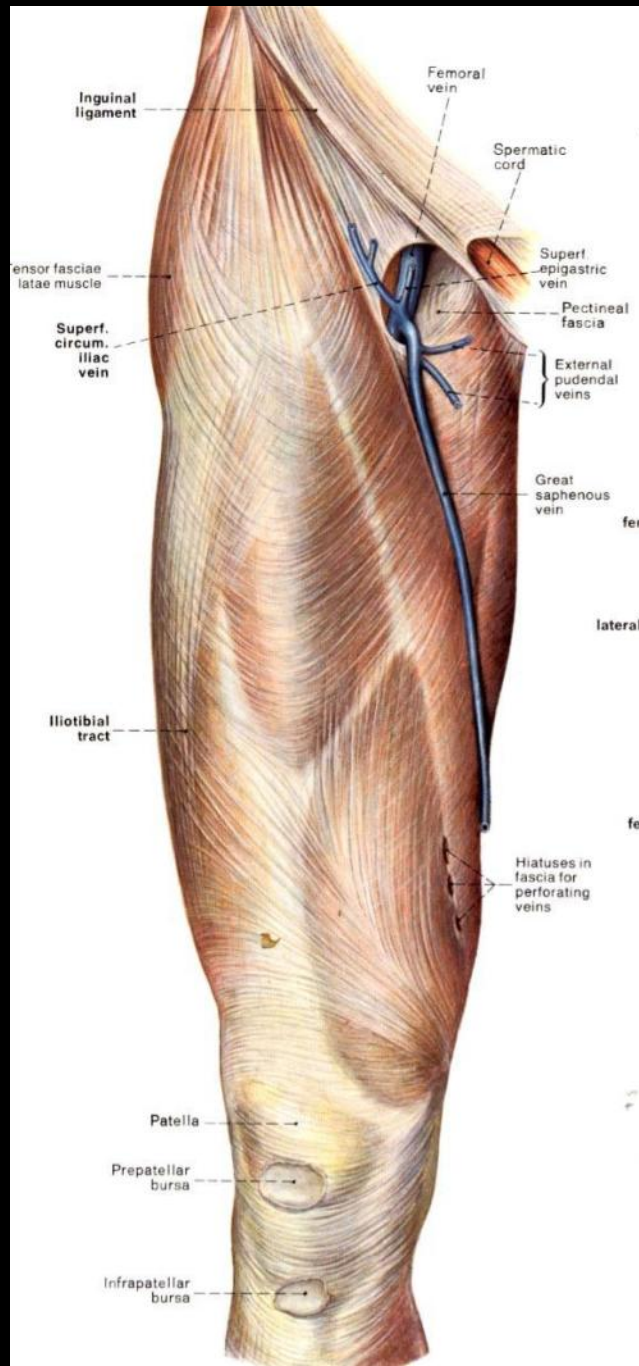


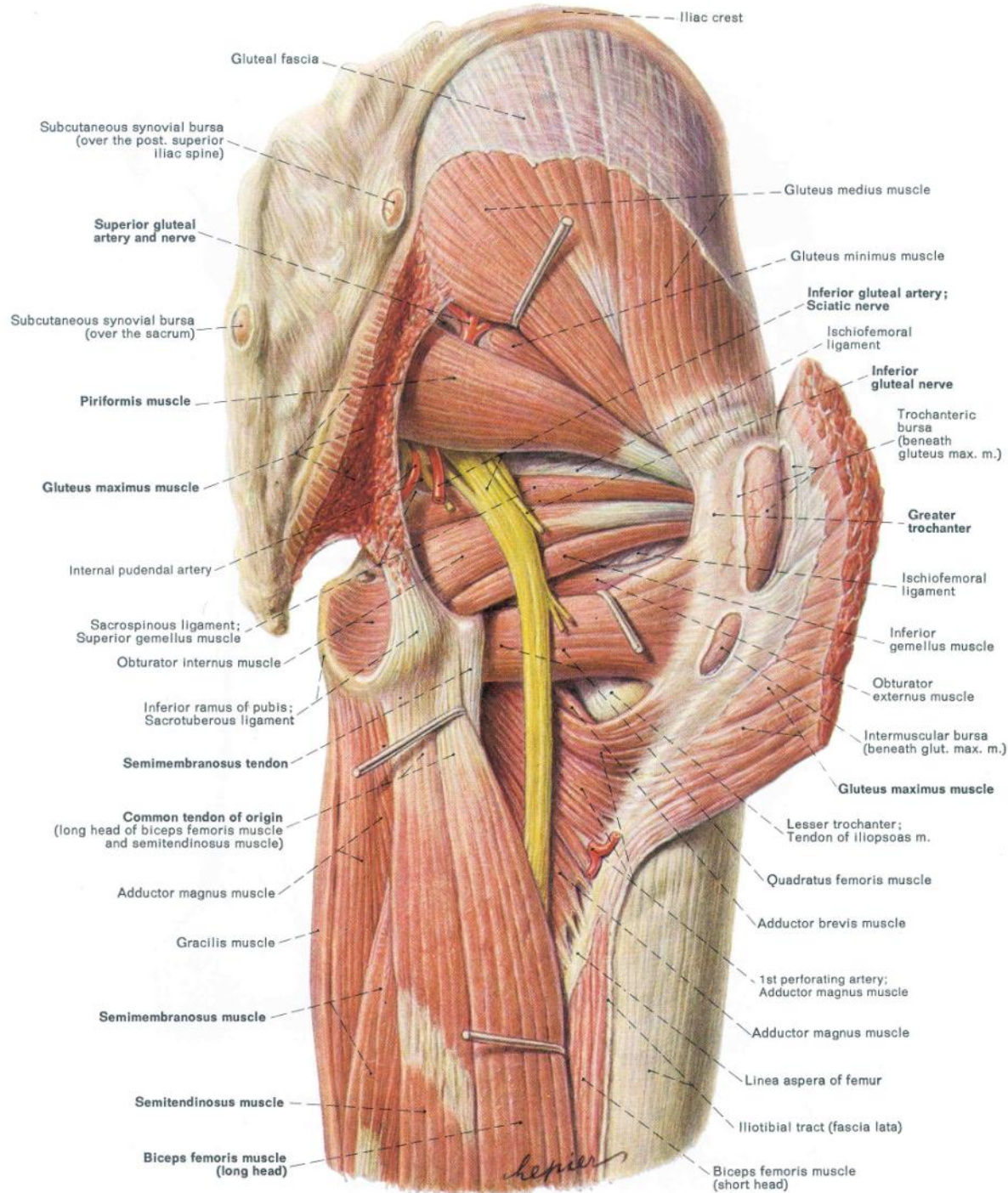


Invests thigh, leg and dorsal foot.
It is milky-white so it is called the *fascia lata*

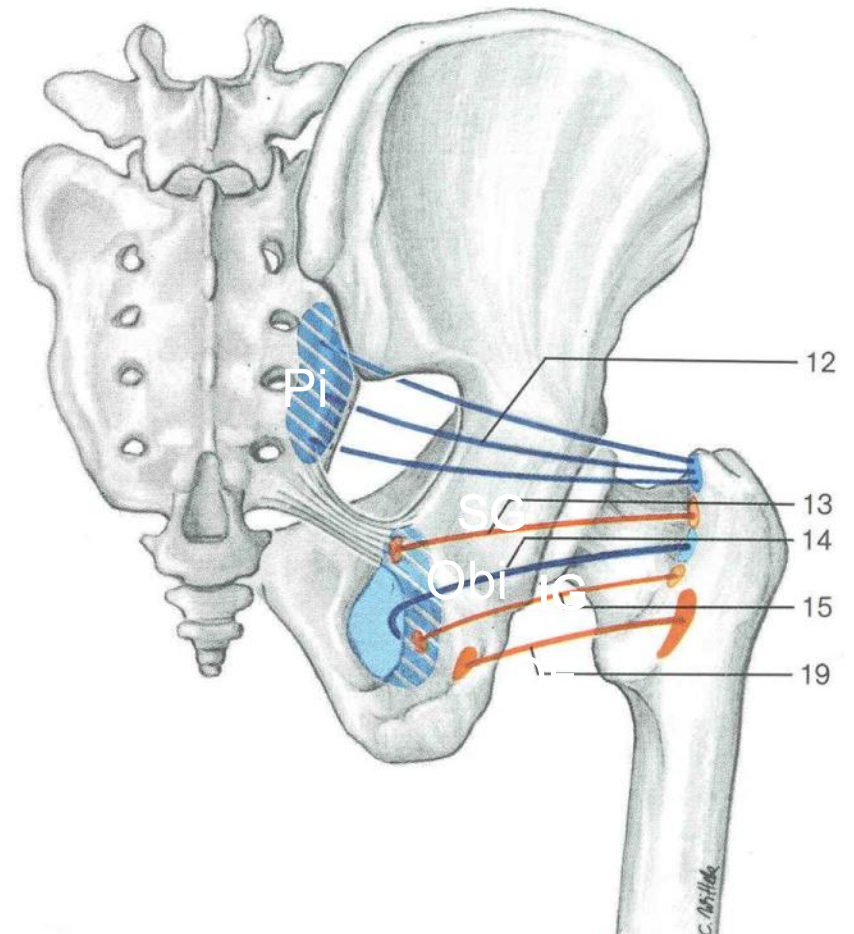
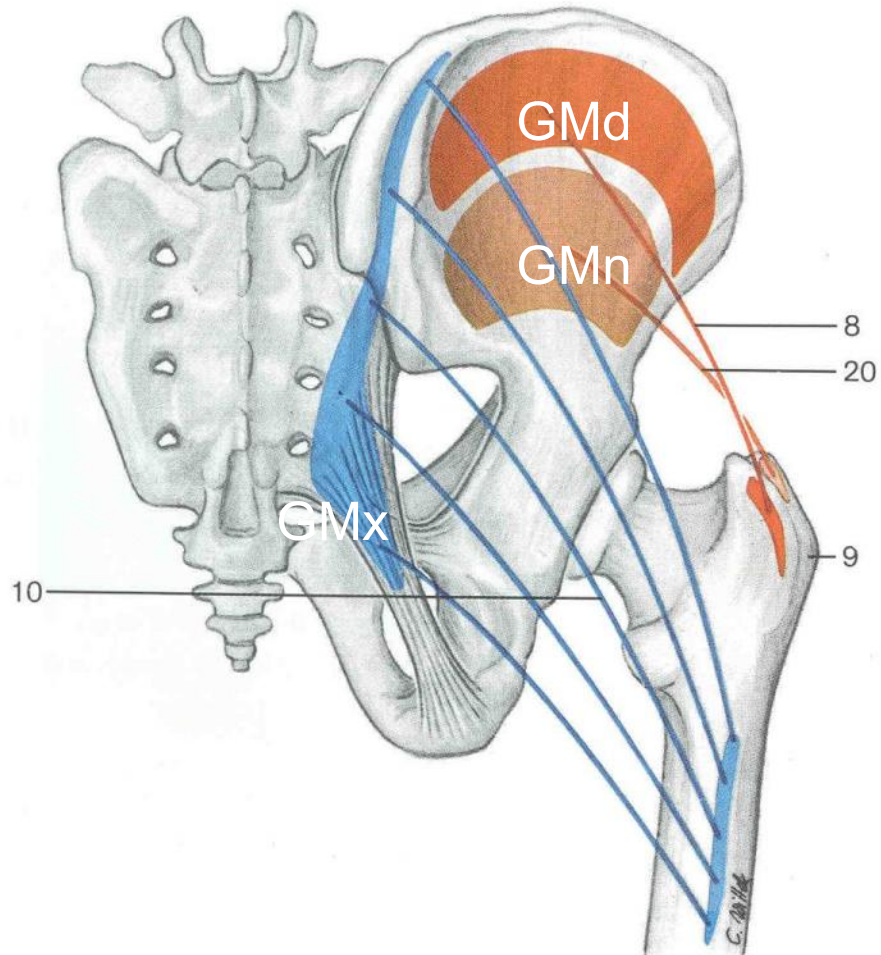
THICK lateral aspect = Ilio-tibial band

IT tract = Ilio-tibial band + gluteus maximus fibers inserting on it + tensor fascia lata



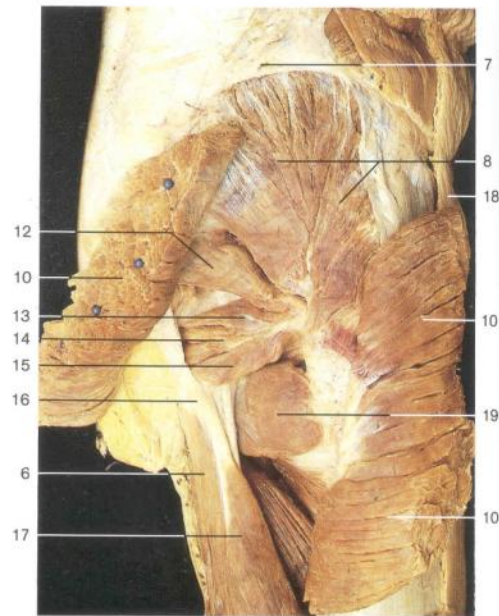


Hip (coxal) joint / Gluteal muscle group osseous attachments

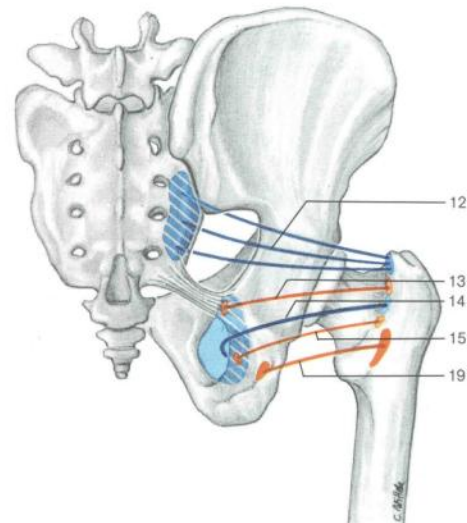
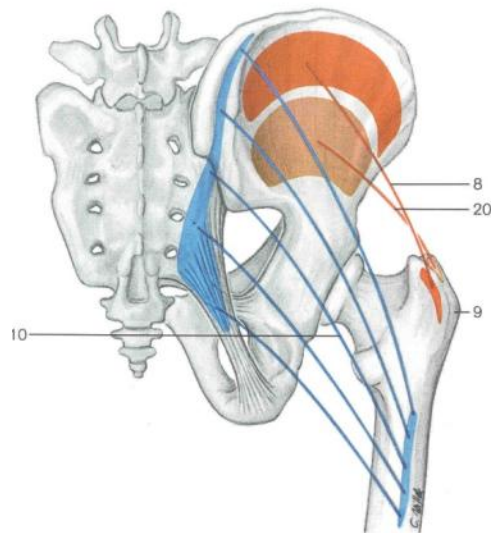




Gluteal muscles, superficial layer (dorsal aspect).

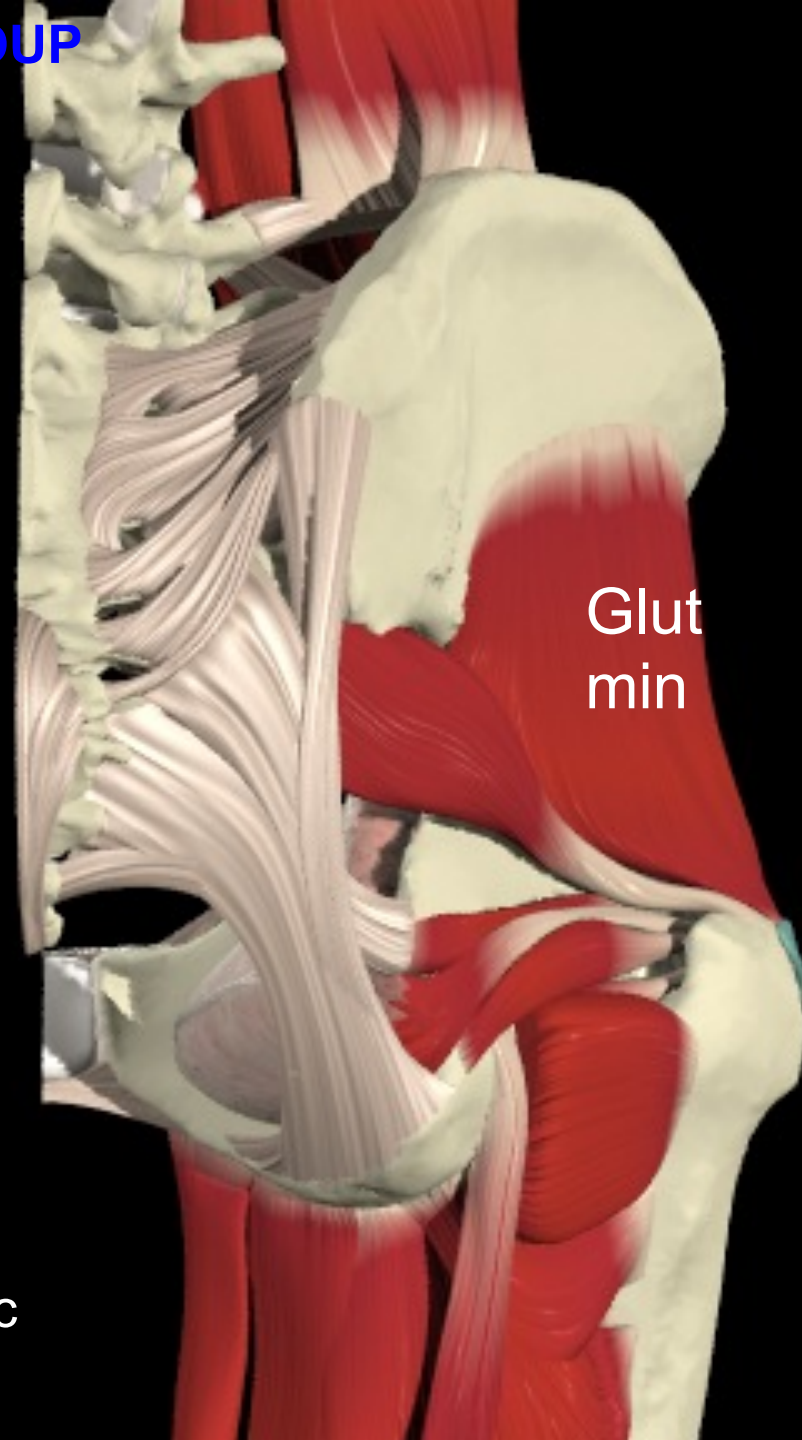
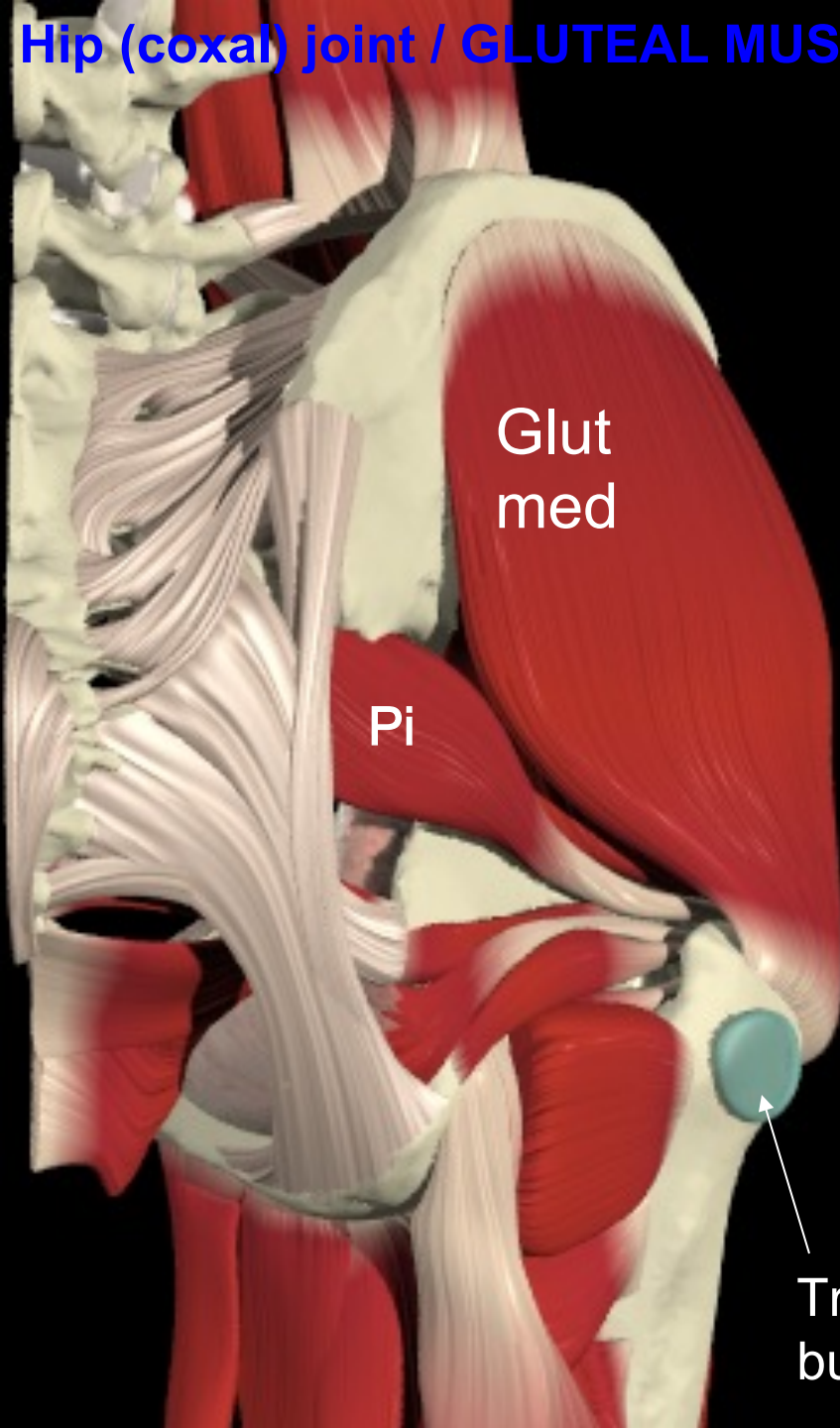


Gluteal muscles, deeper layer (dorsal aspect).

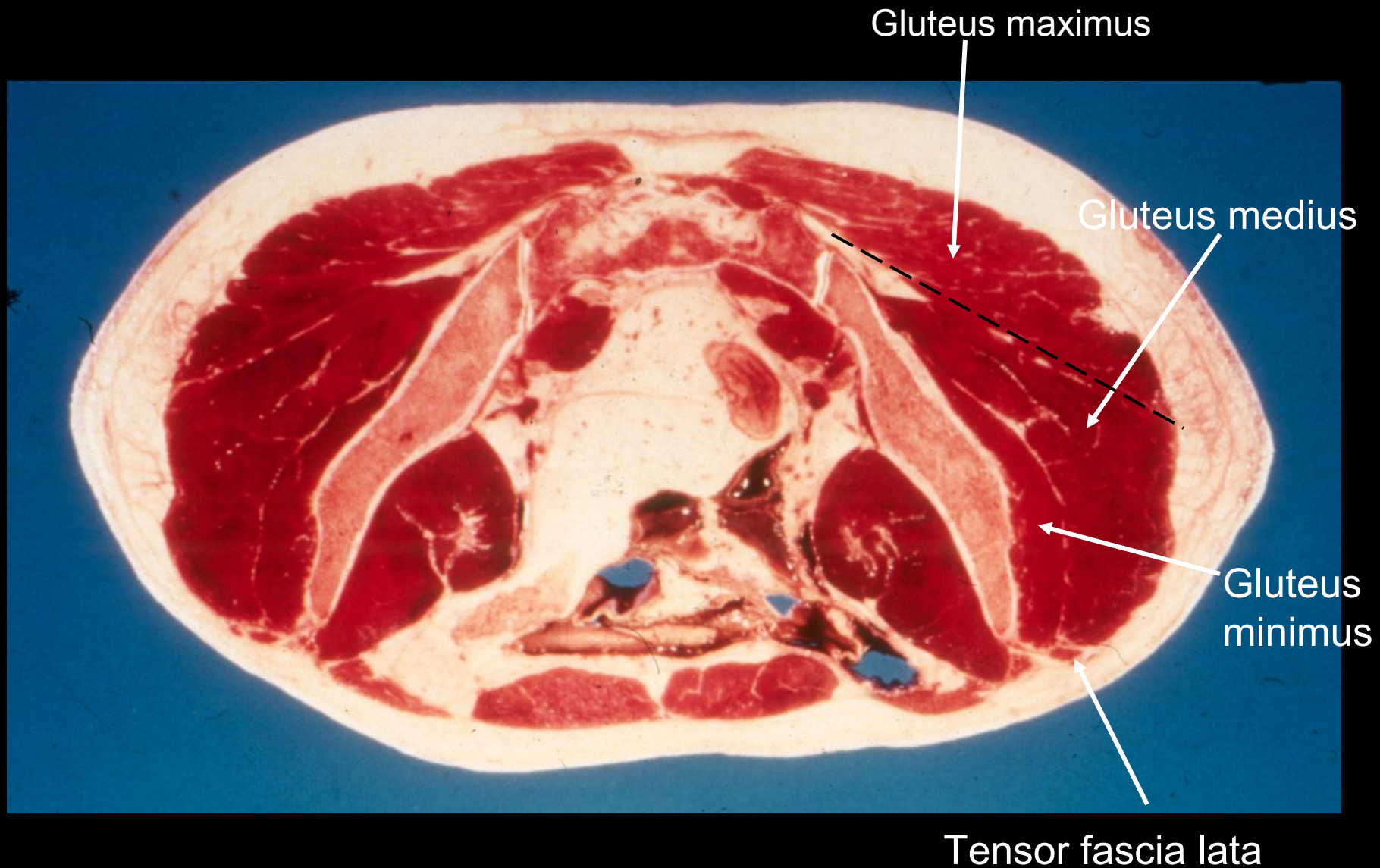


Course of gluteal muscles of superficial (left) and deep layers (right). (Schematic drawing.)

Hip (coxal) joint / GLUTEAL MUSCLE GROUP



Trochanteric
bursa.



Hip (coxal) joint / GLUTEAL MUSCLE GROUP FUNCTIONS

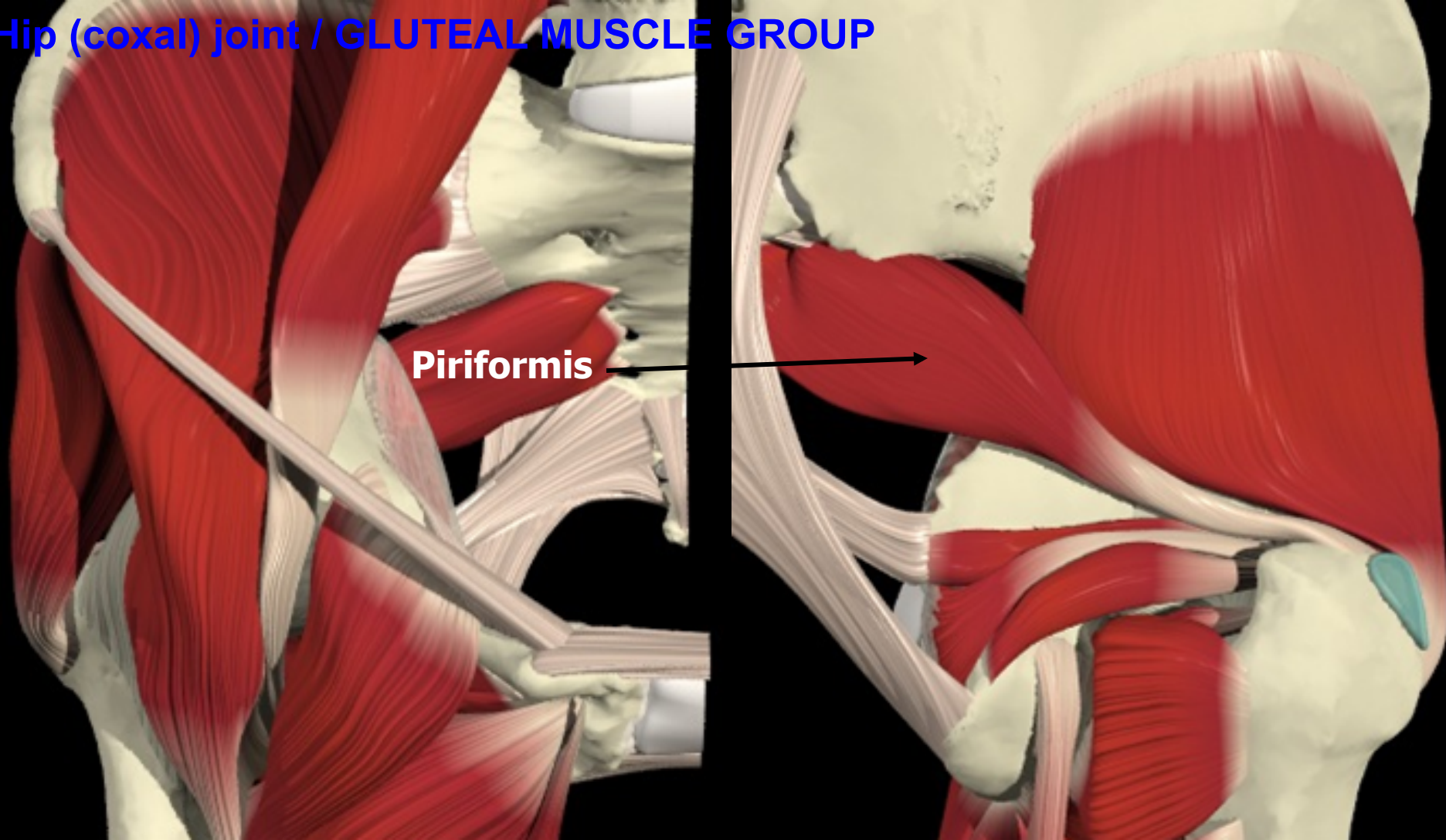


Powerful hip extensor

Functions:

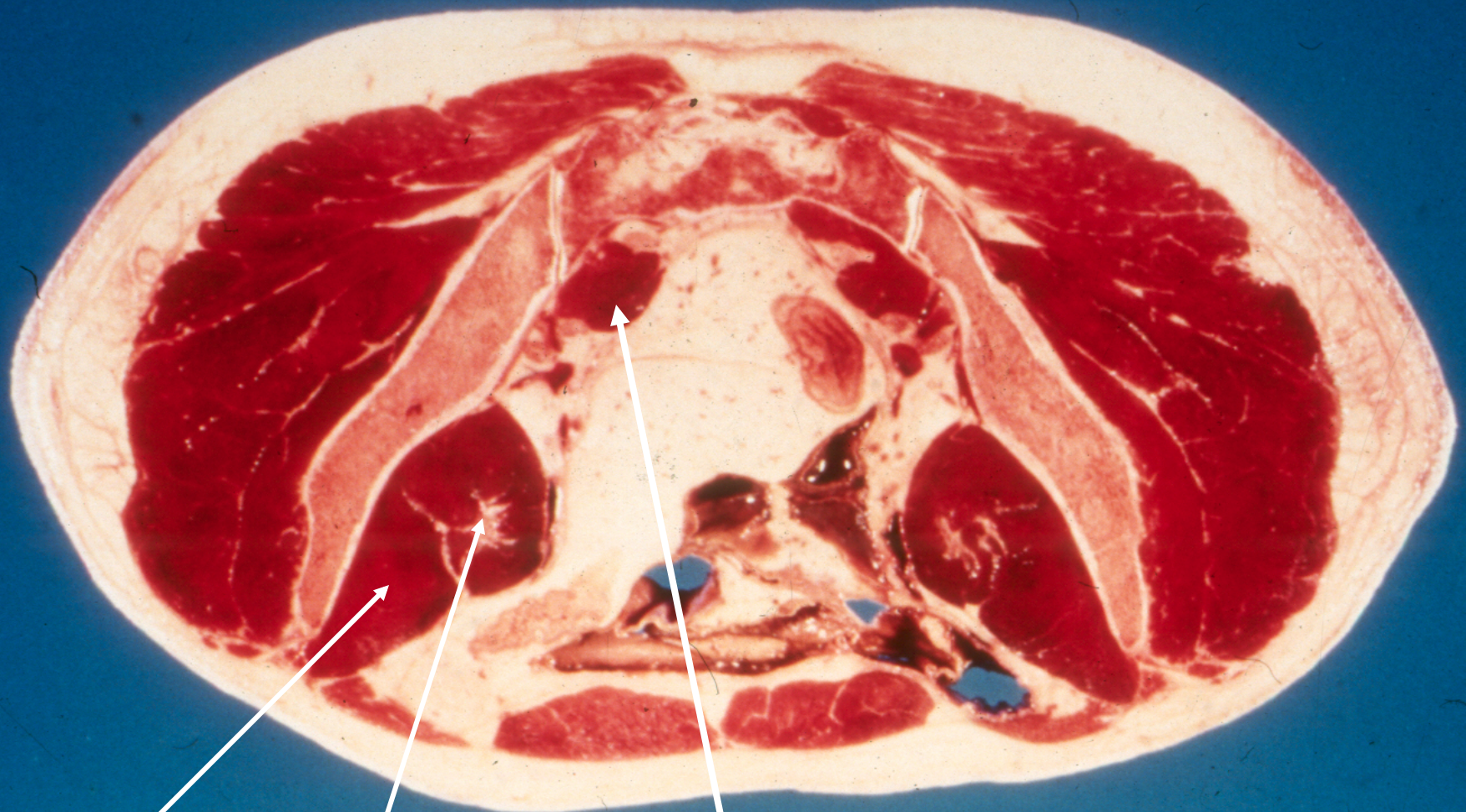
- Climbing
- Walking uphill
- Regaining upright posture from squatting
- NOT in normal walking

Hip (coxal) joint / GLUTEAL MUSCLE GROUP



Piriformis action: Piriformis laterally rotates the extended hip joint and abducts the flexed hip joint.

Hip (coxal) joint / LATERAL ROTATOR MUSCLE GROUP



Iliacus

Psoas major

Piriformis

**Inferior/Posterior
(Caudal/dorsal)**

**ANTERIOR TIBIAL GROUP
PERONEI**

**Peronius
Longus**

**Peronius
Brevis**

**SCIATIC NERVE
(PERONEAL)**

**Tibialis
Anterior**

**Extensor
Digitorum
Longus**

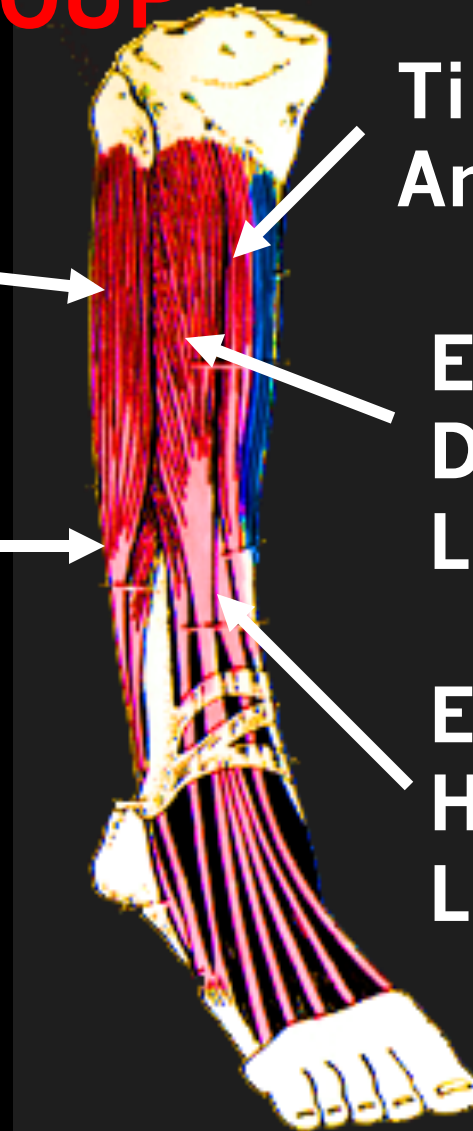
**Extensor
Hallucis
Longus**

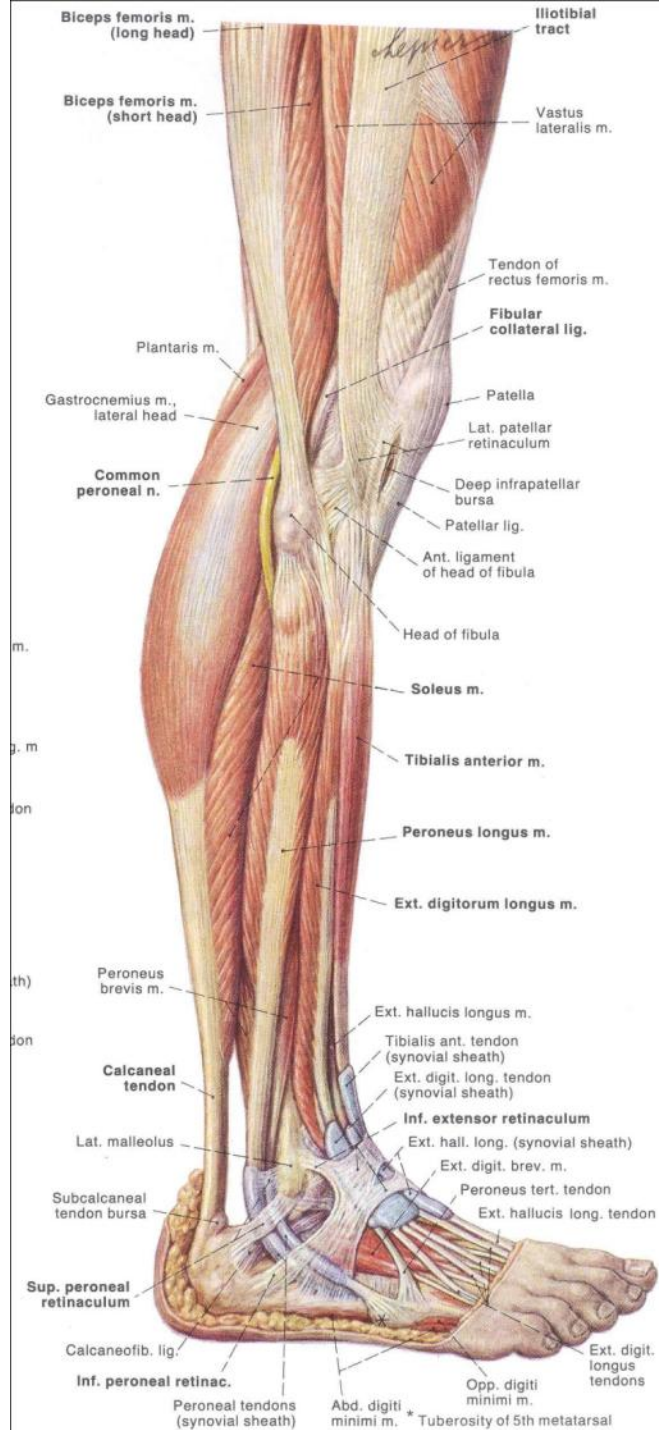
Femoral

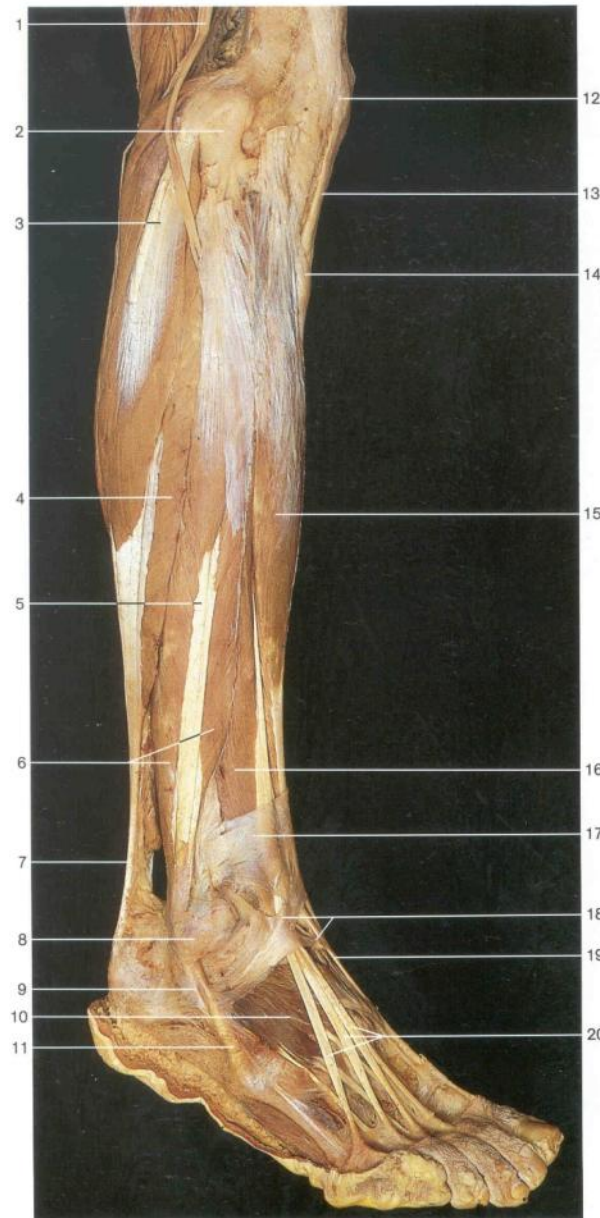
Obturator

**(Sciatic)
Peroneal**

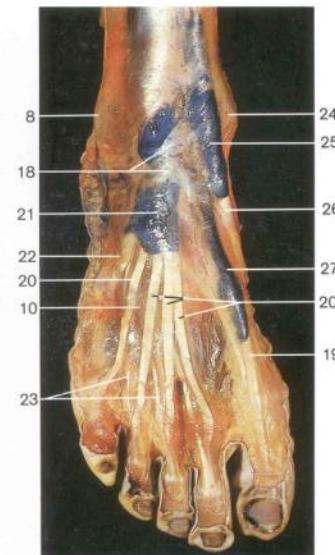
**Sciatic
(Tibial)**





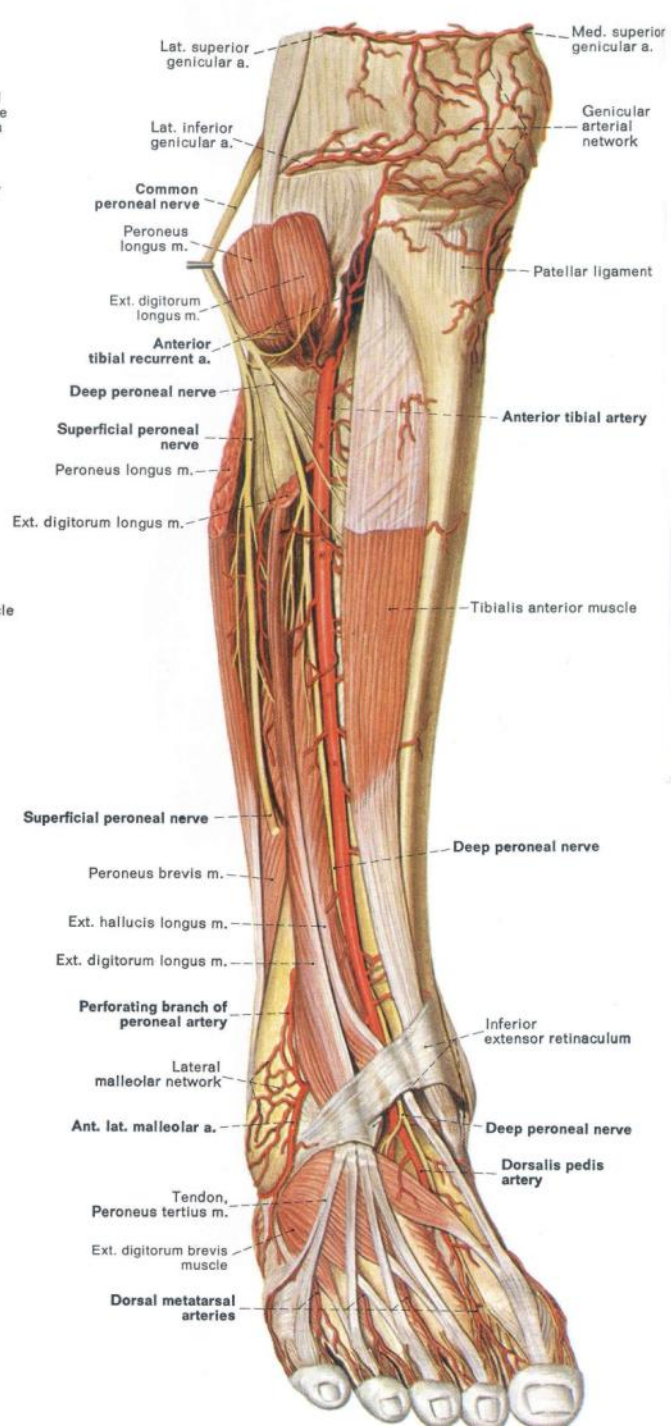
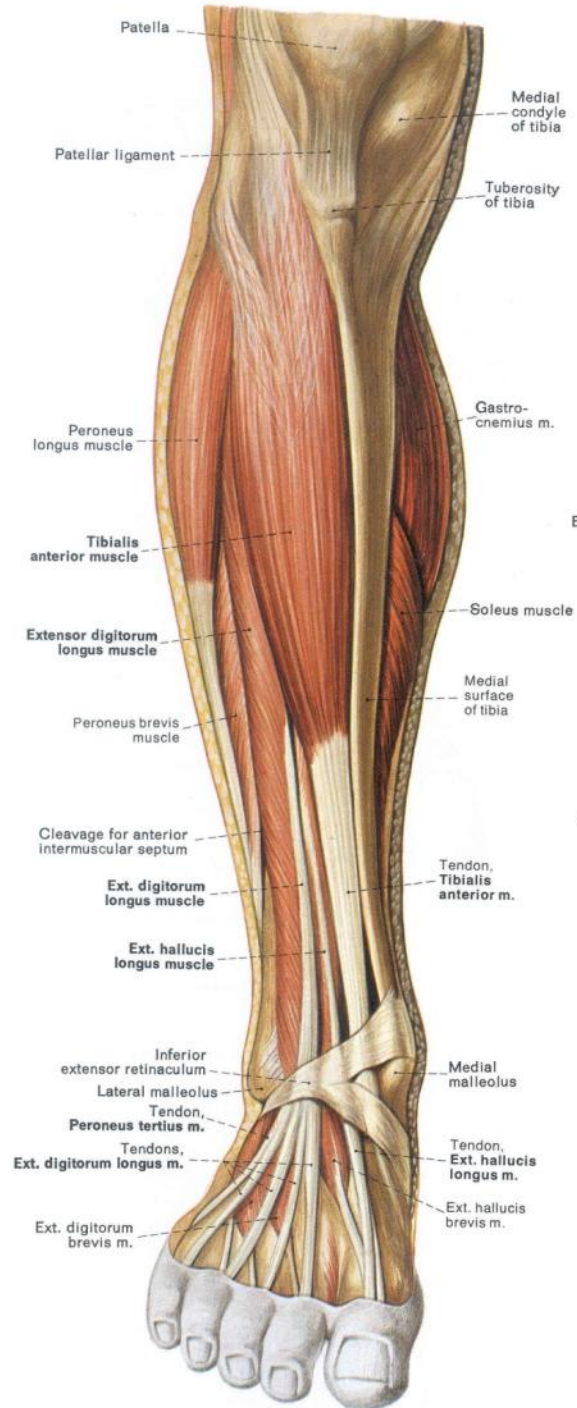


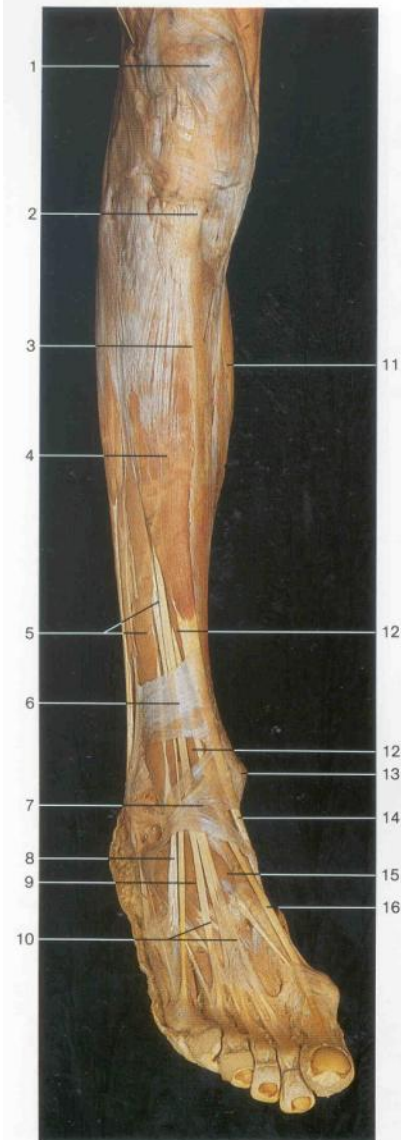
Muscles of right leg and foot (lateral aspect).



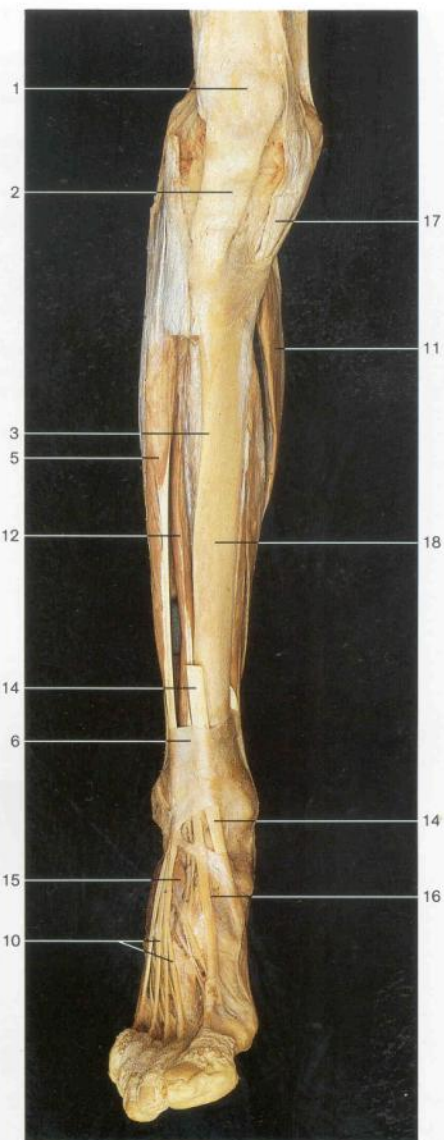
Right foot with synovial sheaths of extensor muscles (dorsal aspect).
The synovial sheaths have been injected with blue solution.

- 1 Common peroneal nerve
- 2 Head of fibula
- 3 Lateral head of gastrocnemius
- 4 Soleus
- 5 Peroneus longus
- 6 Peroneus brevis
- 7 Calcaneal or Achilles tendon
- 8 Lateral malleolus
- 9 Tendon of peroneus longus
- 10 Extensor digitorum brevis
- 11 Tendon of peroneus brevis
- 12 Patella
- 13 Patellar ligament
- 14 Tuberosity of tibia
- 15 Tibialis anterior
- 16 Extensor digitorum longus
- 17 Superior extensor retinaculum
- 18 Inferior extensor retinaculum
- 19 Tendon of extensor hallucis longus
- 20 Tendons of extensor digitorum longus
- 21 Common synovial sheath of extensor digitorum longus
- 22 Tendon of peroneus tertius to the lateral margin of foot
- 23 Tendons of extensor digitorum brevis
- 24 Medial malleolus
- 25 Synovial sheath of tendon of tibialis anterior
- 26 Tendon of tibialis anterior
- 27 Synovial sheath of tendon of extensor hallucis longus





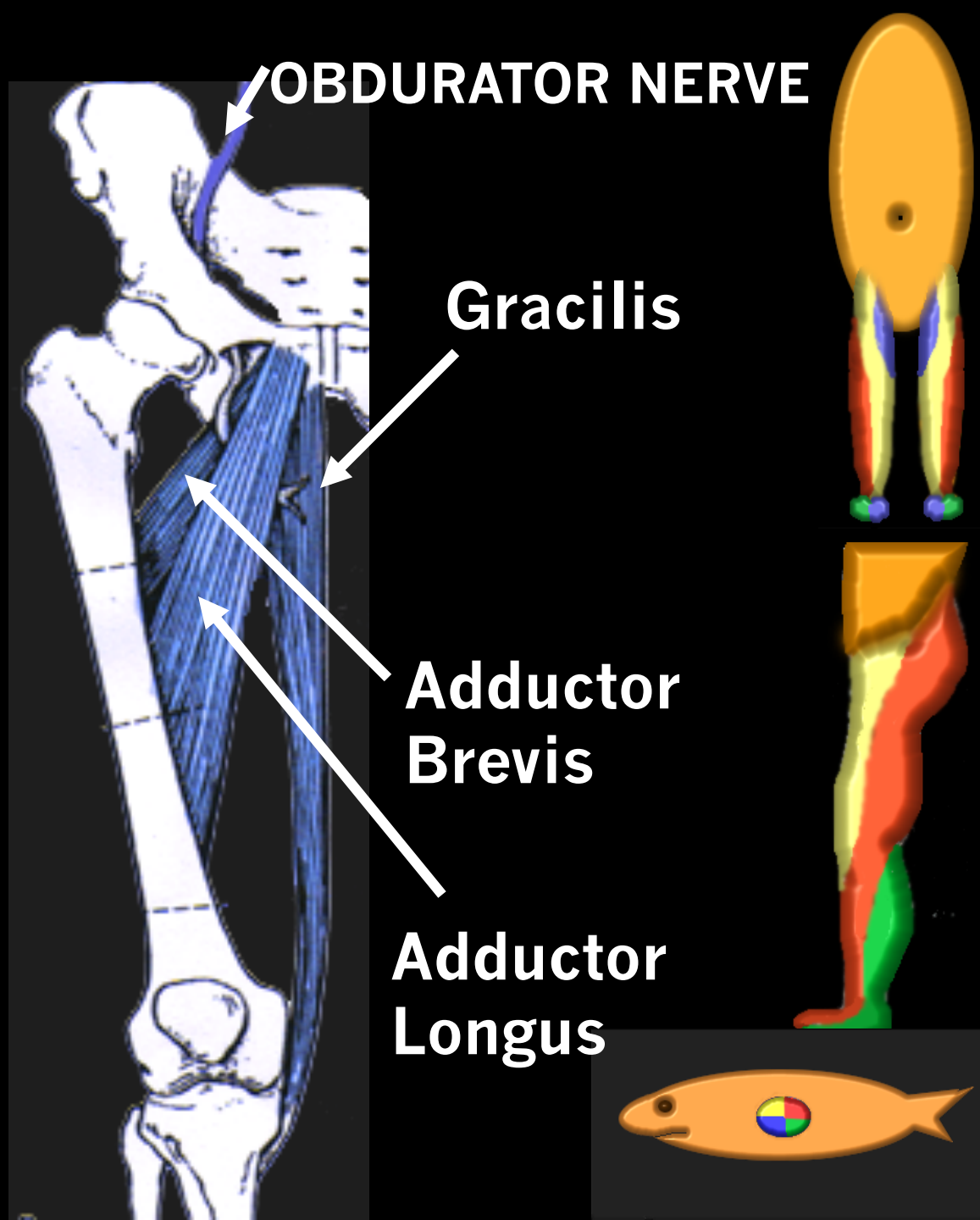
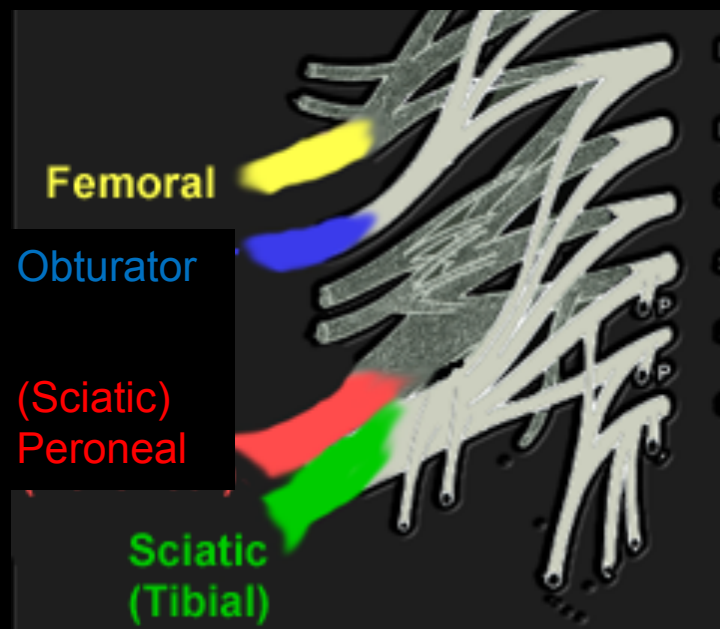
Extensor muscles of right leg and foot
(oblique anterolateral aspect).



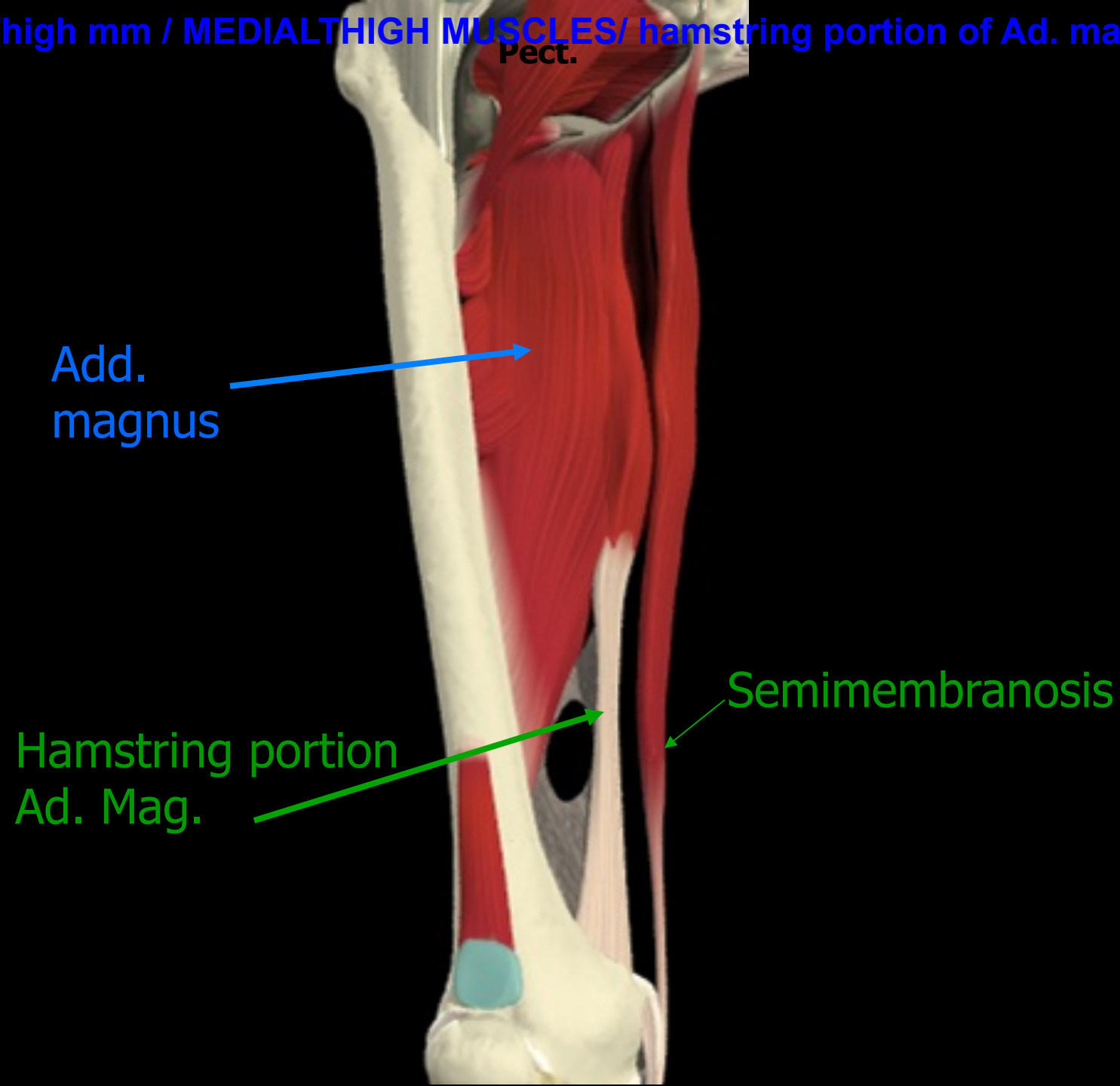
Extensors of the right leg and foot
(anterior aspect). Part of the tibialis anterior has been removed.

- | | | |
|---------------------------------|---|--|
| 1 Patella | 8 Tendon of peroneus tertius | 15 Extensor hallucis brevis |
| 2 Patellar ligament | 9 Extensor digitorum brevis | 16 Tendon of extensor hallucis longus |
| 3 Anterior margin of tibia | 10 Tendons of extensor digitorum longus | 17 Common tendon of gracilis, semitendinosus and sartorius |
| 4 Tibialis anterior | 11 Soleus | 18 Tibia |
| 5 Extensor digitorum longus | 12 Extensor hallucis longus | |
| 6 Superior extensor retinaculum | 13 Medial malleolus | |
| 7 Inferior extensor retinaculum | 14 Tendon of tibialis anterior | |

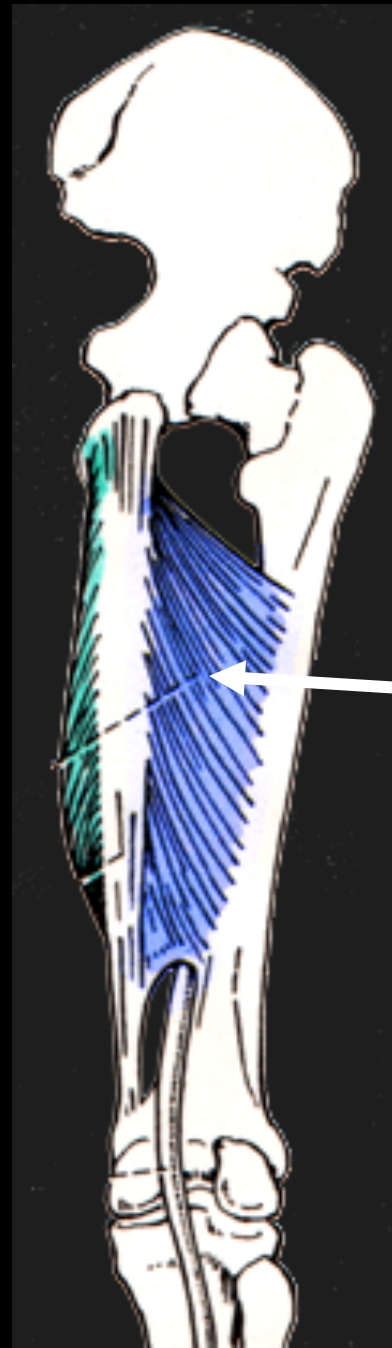
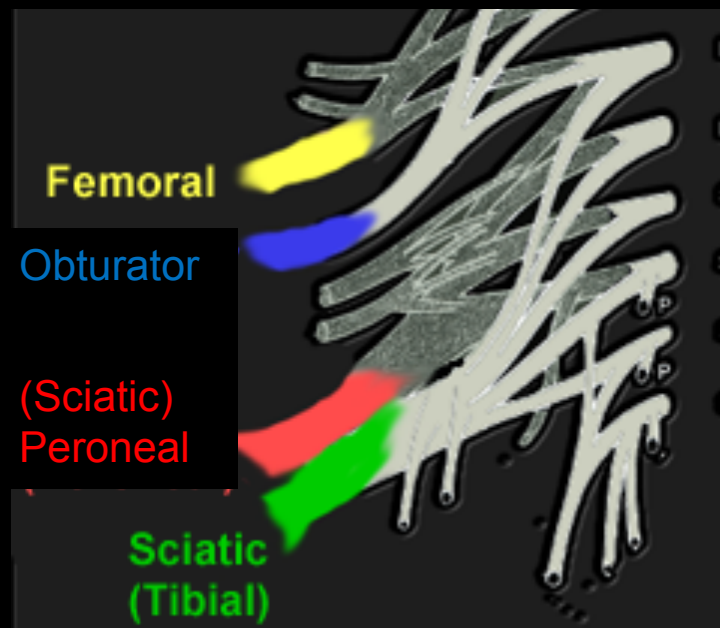
Superior/Anterior (Cranial/ventral) ADDUCTORS



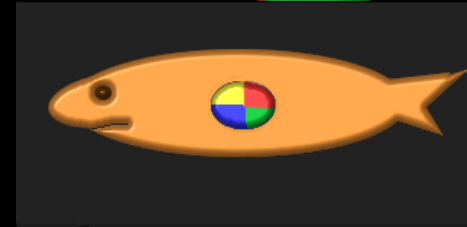
Thigh mm / MEDIALTHIGH MUSCLES/ hamstring portion of Ad. mag.



Inferior/Anterior (Caudal/ventral)



**Adductor
Magnus**
(adductor part)

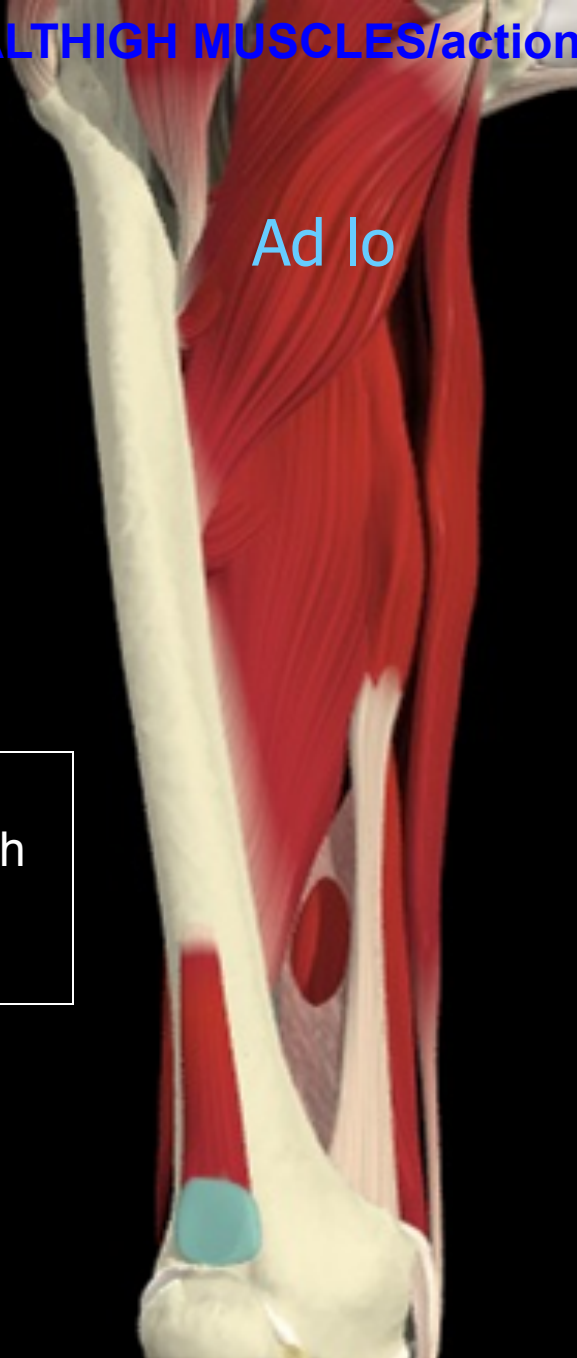


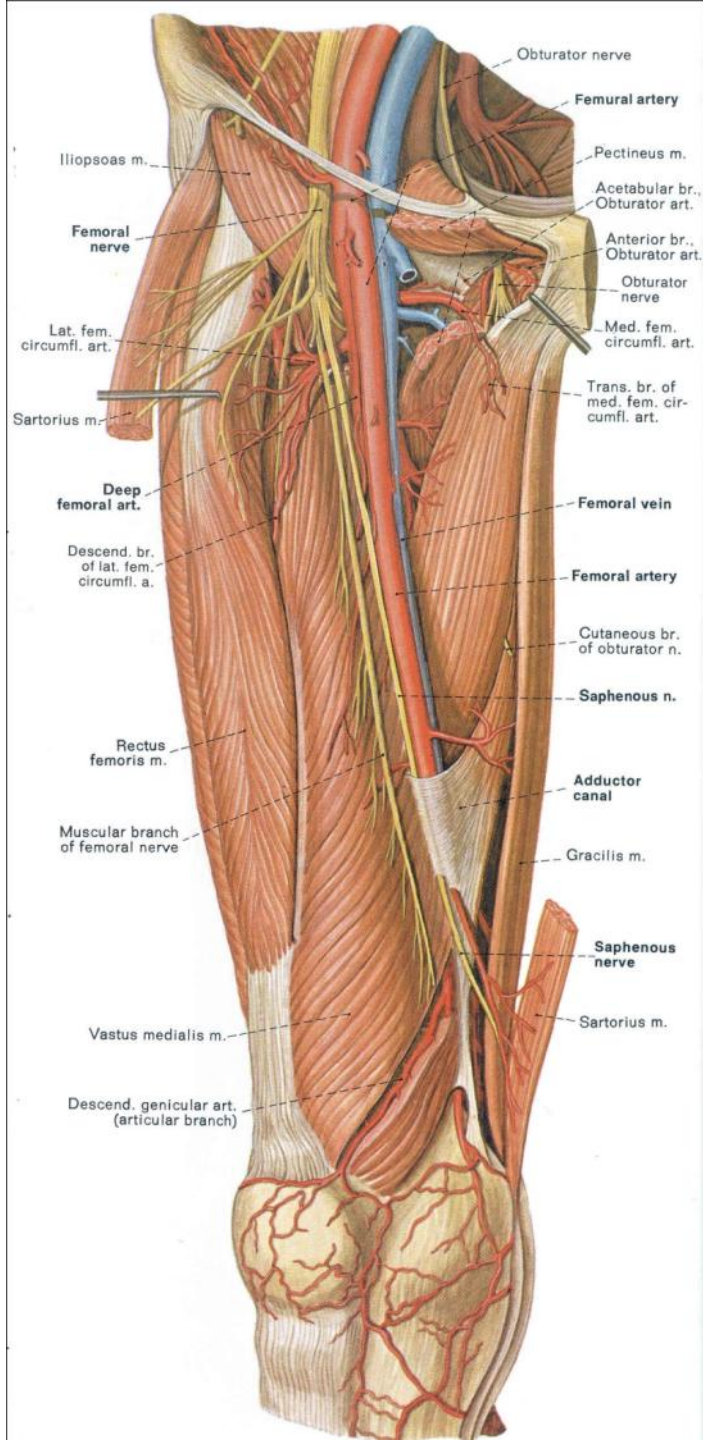
Thigh mm / MEDIALTHIGH MUSCLES/actions & function

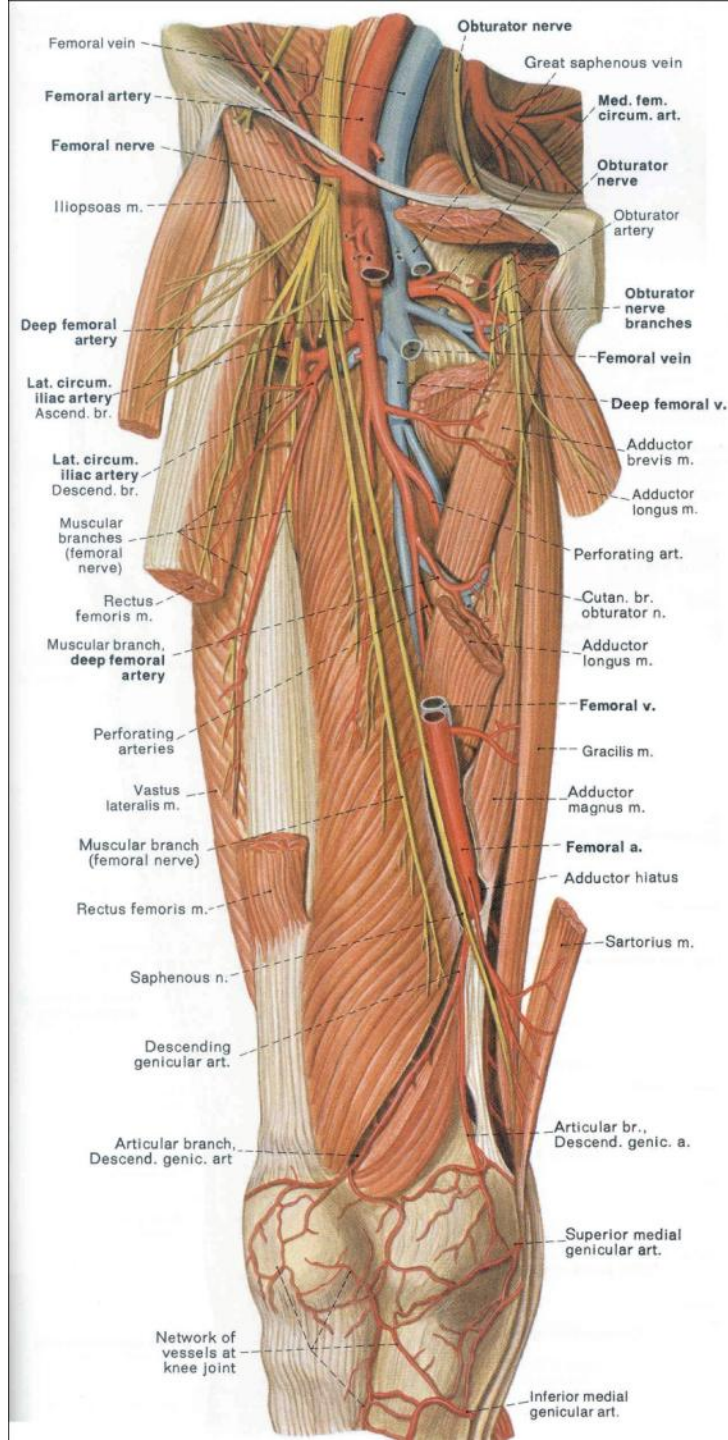
Ad lo

Other medial rotators of the thigh include gluteus medius.

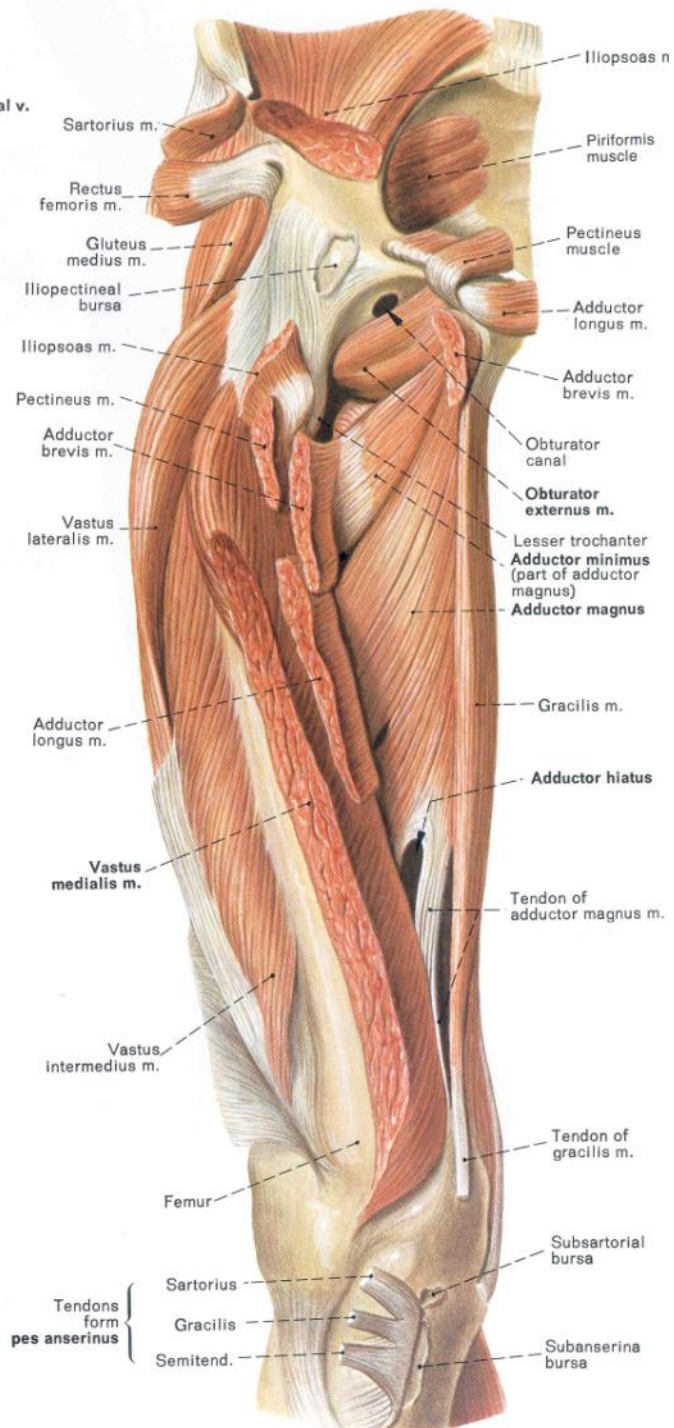
- Adductors of the thigh,
- Flexors (especially when hip is extended)
- *Adductor longus* and *magnus mm.* also can act as medial rotators of thigh, when already laterally rotated
- **Function: Stabilizers of the hip during closed-chain action (stance).**

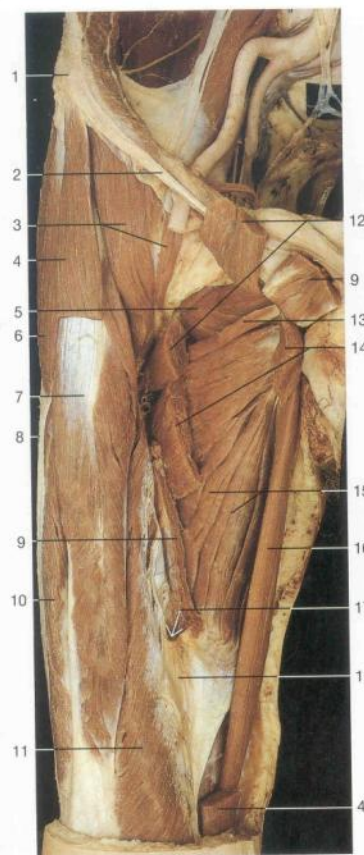






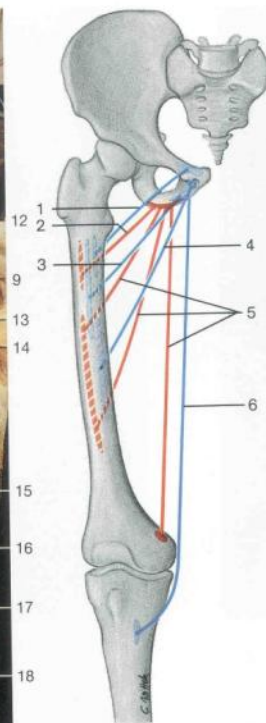
al v.





Deep layer of adductor muscles.
Adductor magnus (ventral aspect).
 Pectineus, adductor longus and brevis
 have been divided.

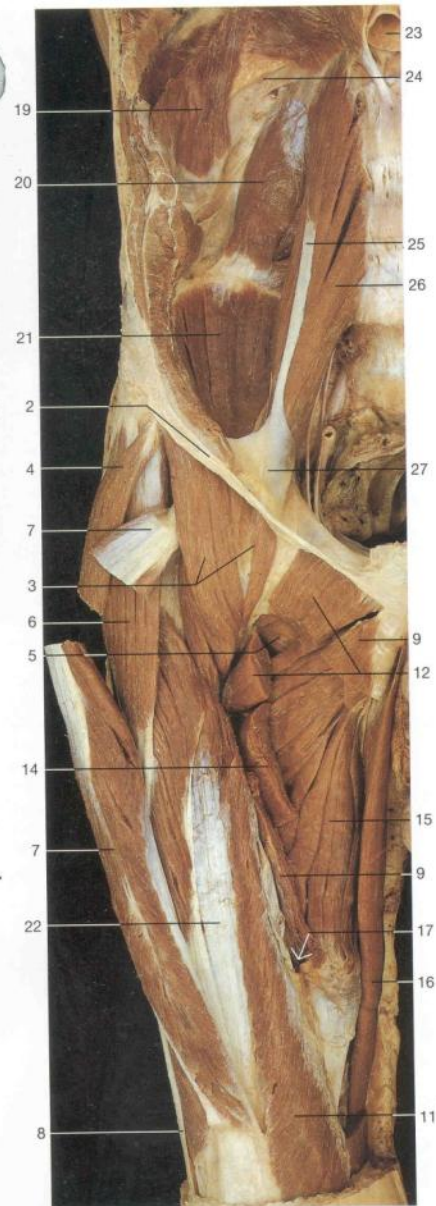
- 1 Anterior superior iliac spine
- 2 Inguinal ligament
- 3 **Iliopsoas muscle**
- 4 Sartorius
- 5 Obturator externus
- 6 Tensor fasciae latae
- 7 Rectus femoris
- 8 Iliotibial tract
- 9 Adductor longus (divided)
- 10 Vastus lateralis
- 11 Vastus medialis
- 12 Pectineus (divided)
- 13 Adductor minimus
- 14 Adductor brevis (divided)



Course of adductor muscles.
 (Schematic drawing.)

- 1 Pectineus (blue)
- 2 Adductor minimus (red)
- 3 Adductor brevis (blue)
- 4 Adductor longus (blue)
- 5 Adductor magnus (red)
- 6 Gracilis (blue)

- 15 **Adductor magnus**
- 16 Gracilis
- 17 Adductor hiatus
- 18 Vastoadductor membrane
- 19 Diaphragm
- 20 Quadratus lumborum
- 21 **Iliacus**
- 22 Vastus intermedius
- 23 Aorta in aortic hiatus
- 24 Twelfth rib
- 25 **Psoas minor**
- 26 **Psoas major**
- 27 Iliopectineal arch



Iliopsoas and adductor muscles; deepest layer
 (ventral aspect). Pectineus, adductor longus and
 brevis, rectus femoris have been divided.

Femoral triangle / BORDERS

Femoral Triangle

Base
(Inguinal Ligament)

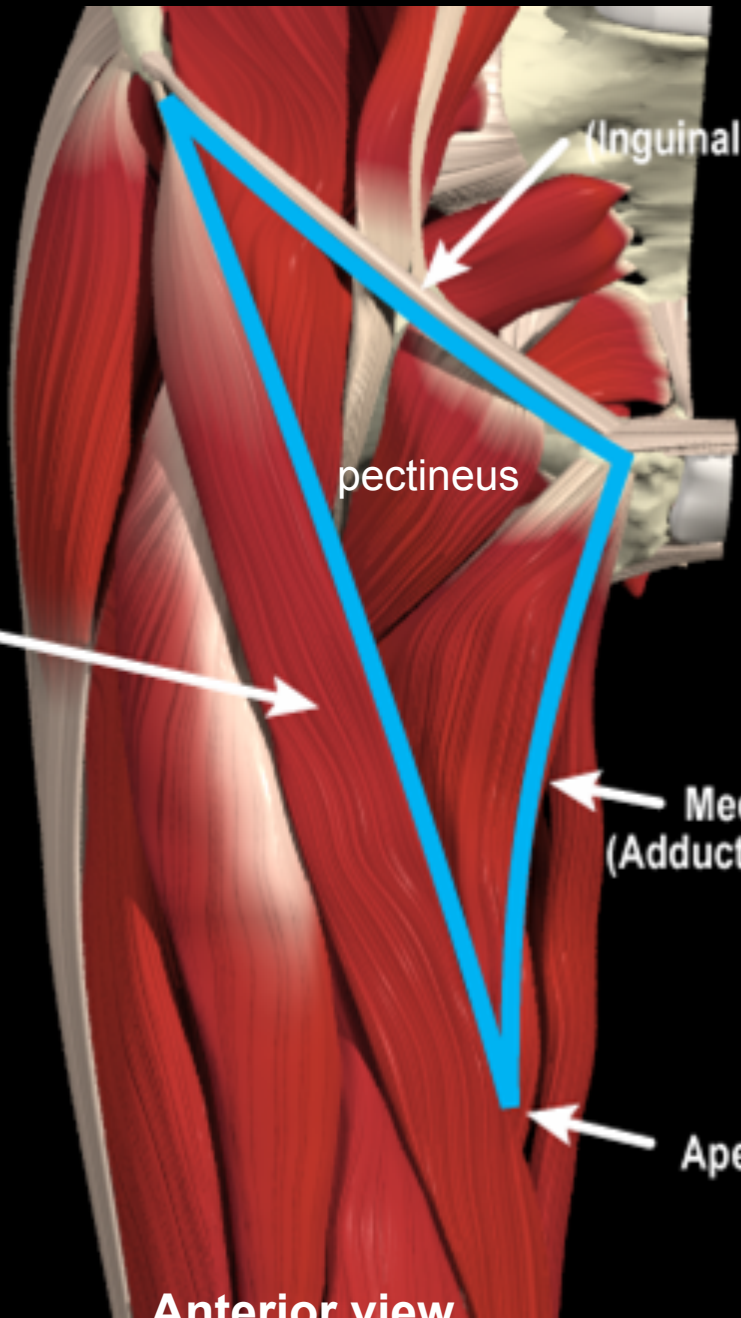
pectineus

Lateral border
(Sartorius)

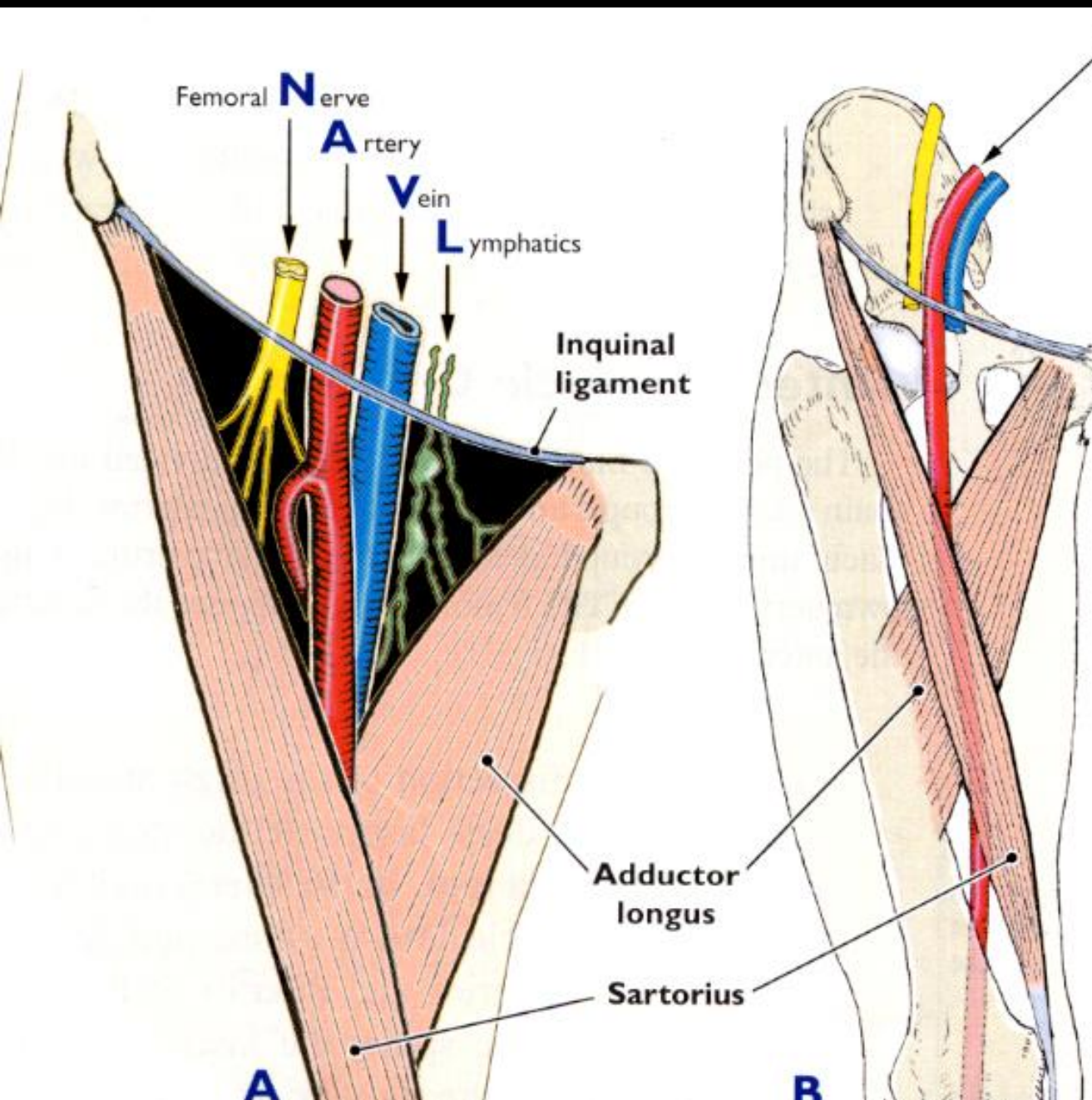
Medial border
(Adductor longus)

Apex

Anterior view



Femoral triangle / RELATIONS



Deep contents

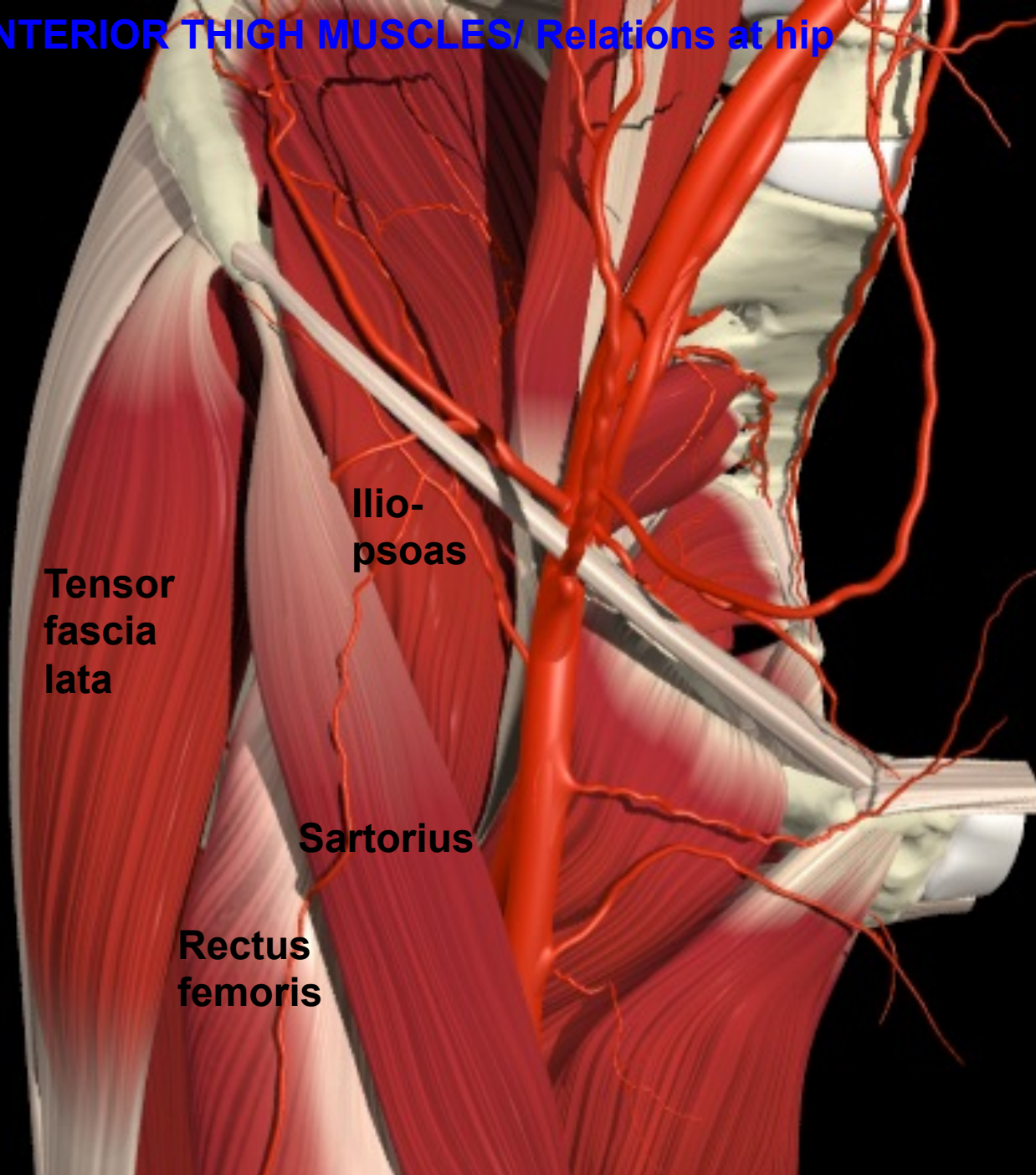
- *Femoral a. & v. surrounded by femoral sheath*
- *Profunda femoris a. – principal artery of thigh*
- *Lat and med. femoral circumflex aa.*
- *Deep external pudendal a.*
- *Femoral n.*
- *A few deeper lymph nodes --*

Femoral triangle / DEEP VESSELS AND NERVES

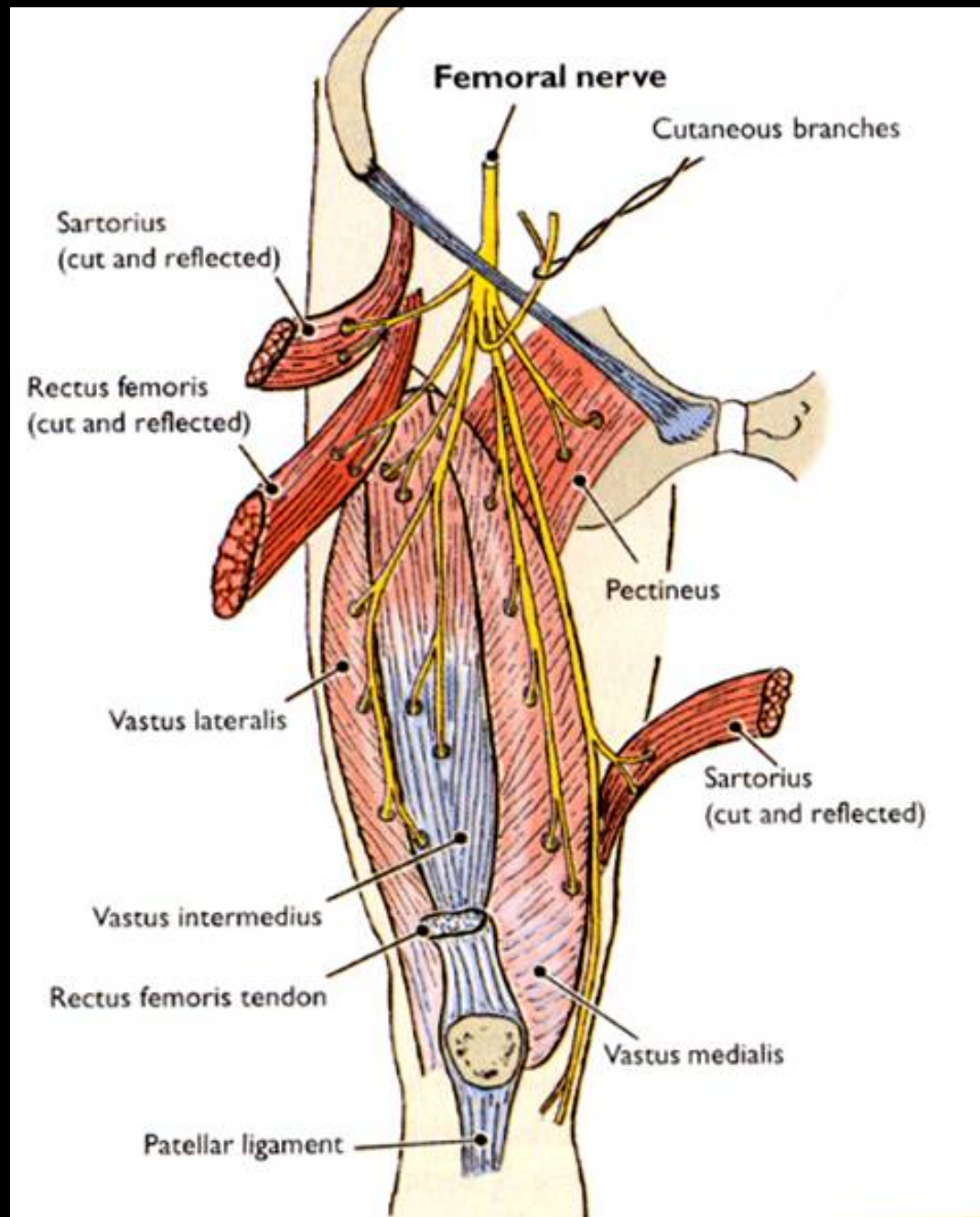


Lateral
femoral
circumflex
artery
transverse
branch

Thigh mm / ANTERIOR THIGH MUSCLES/ Relations at hip



Thigh mm / ANTERIOR THIGH MUSCLES/ femoral nerve distribution



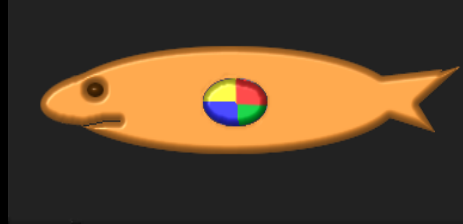
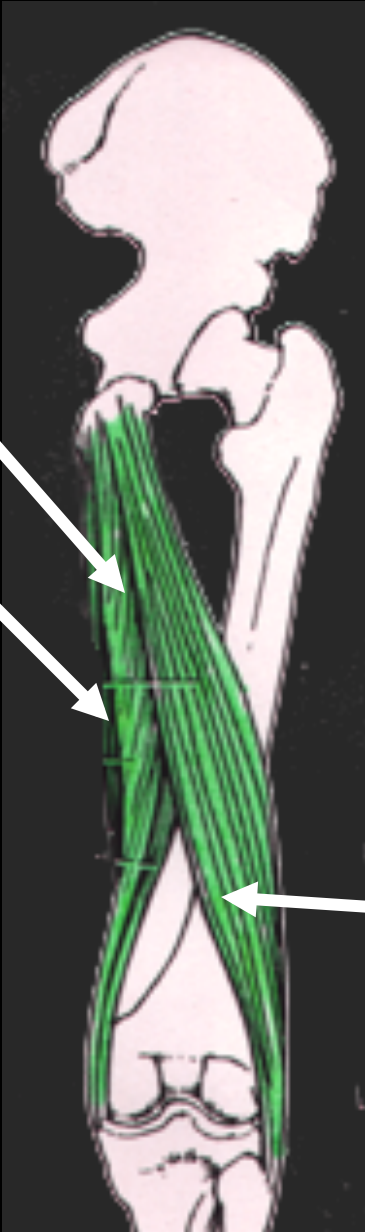
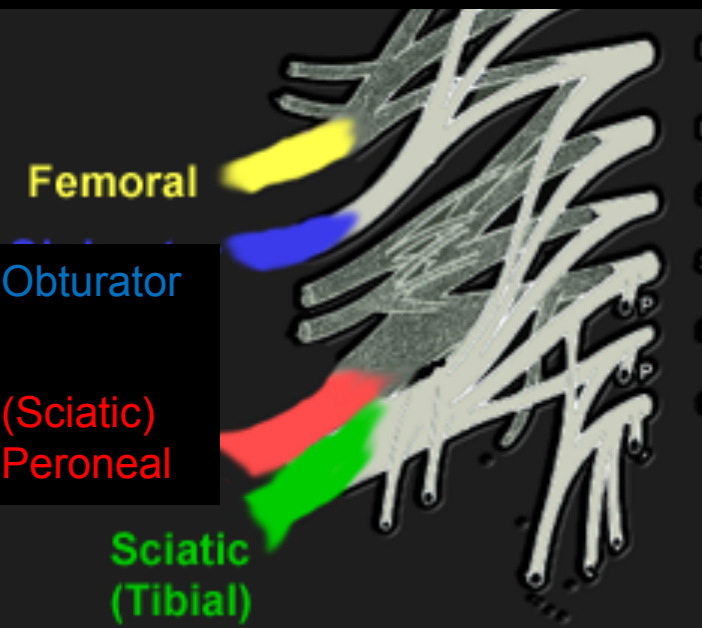
Inferior/Anterior (Caudal/ventral) HAMSTRINGS

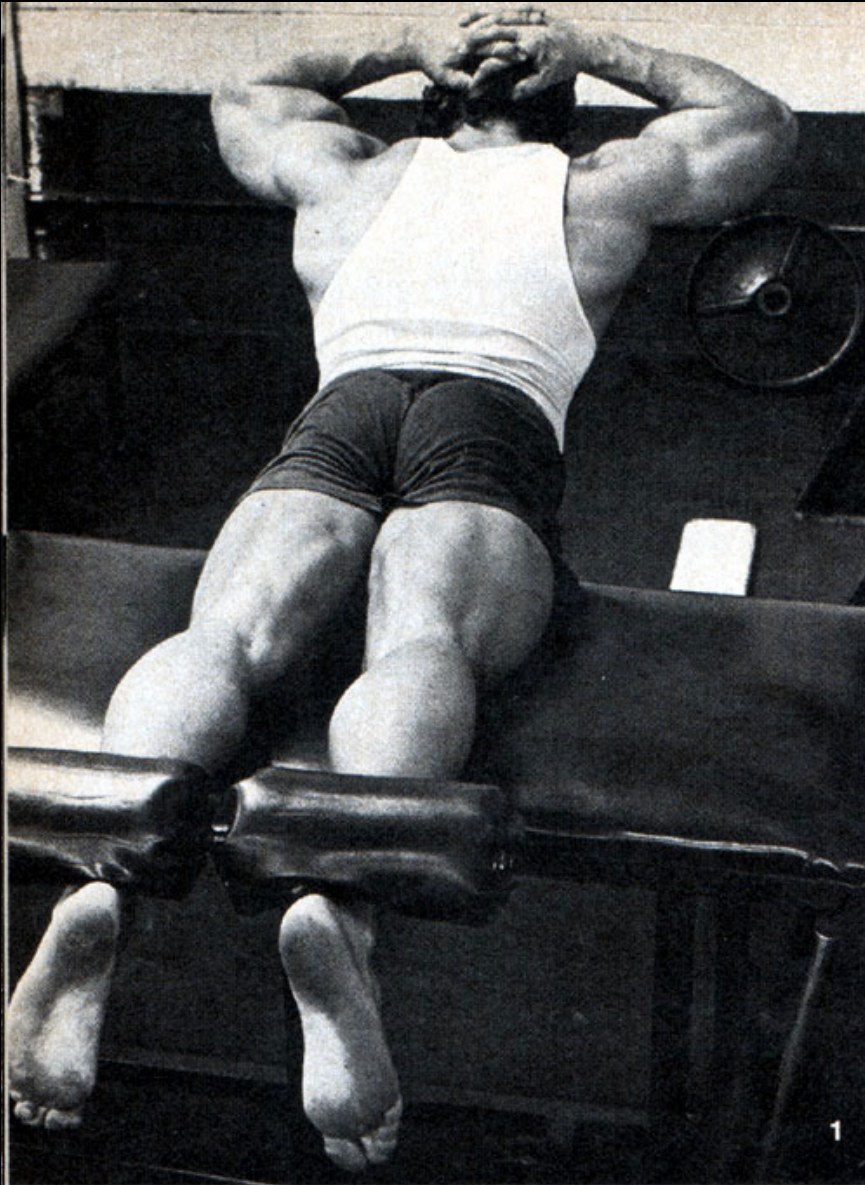
Semitendinosus

Semimembranosus

SCIATIC
NERVE
(TIBIAL)

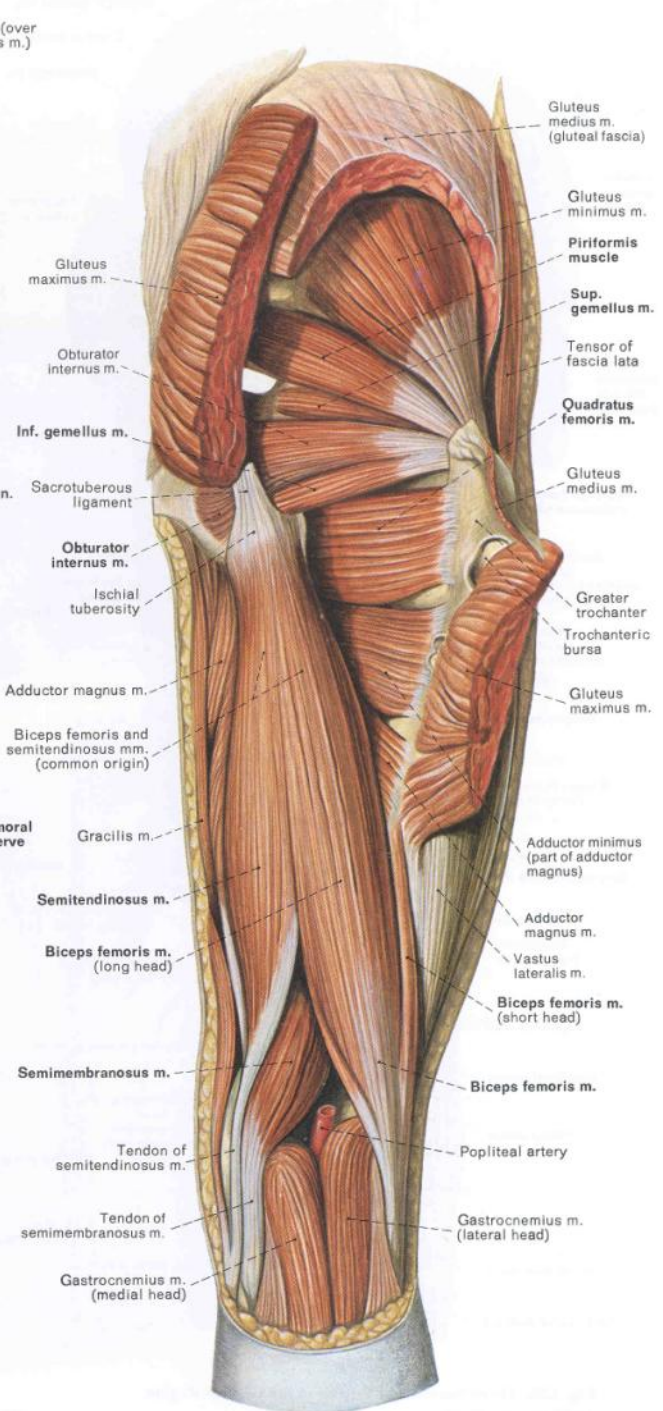
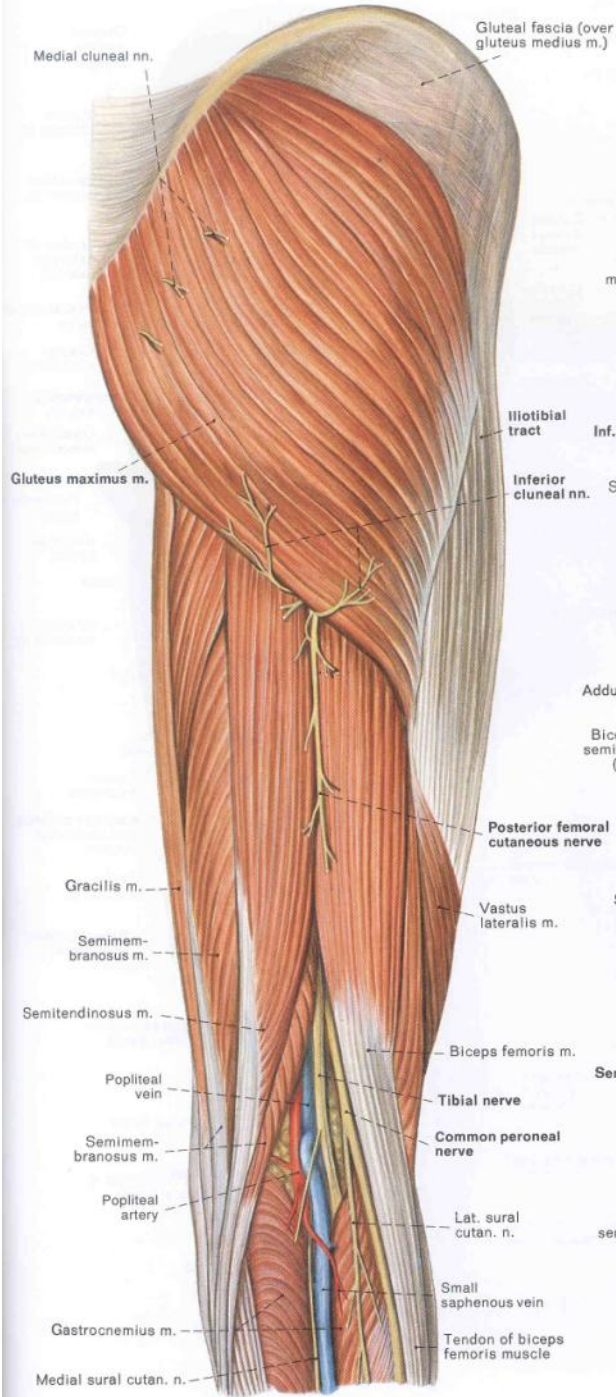
Biceps
Femoris

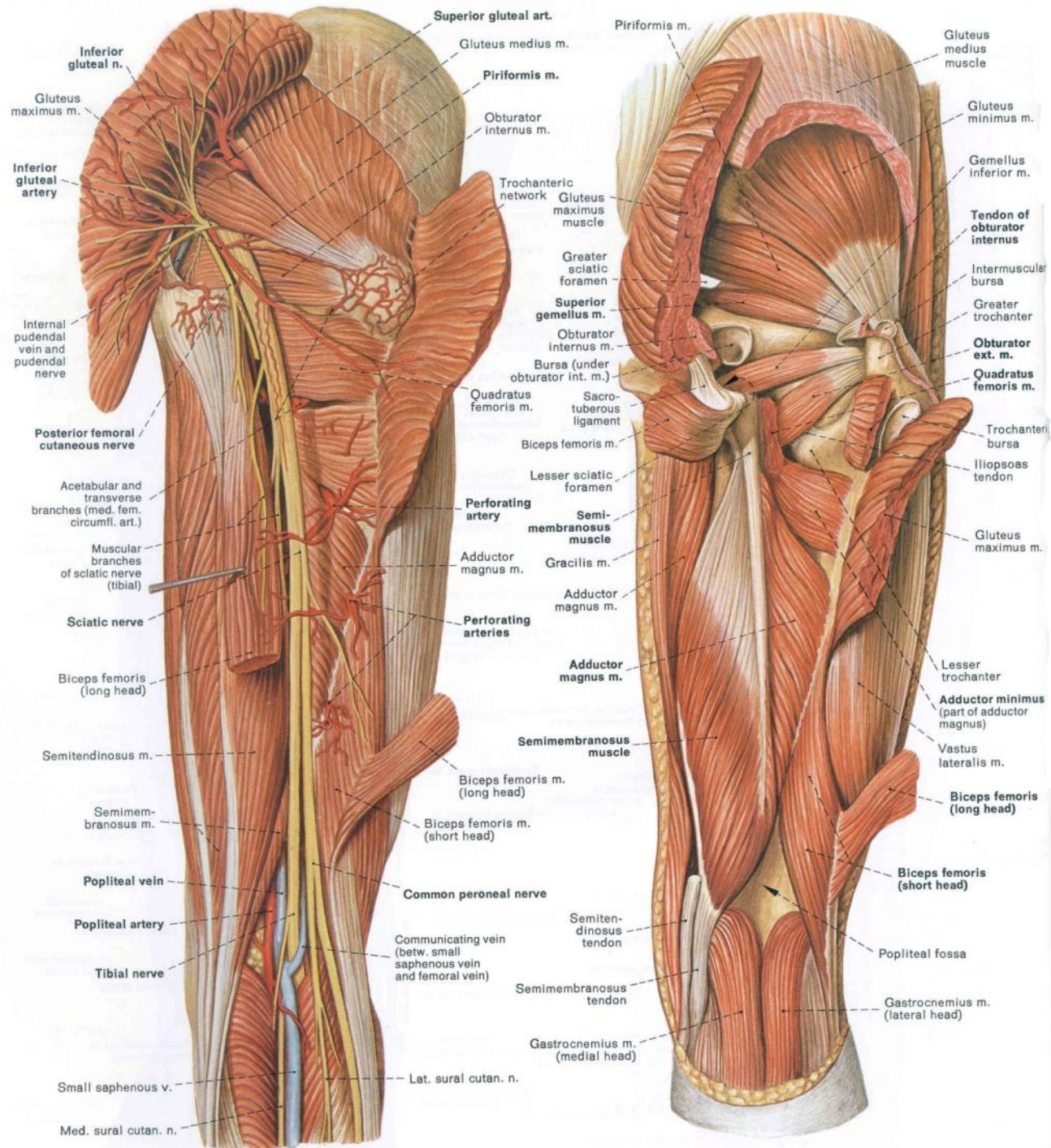


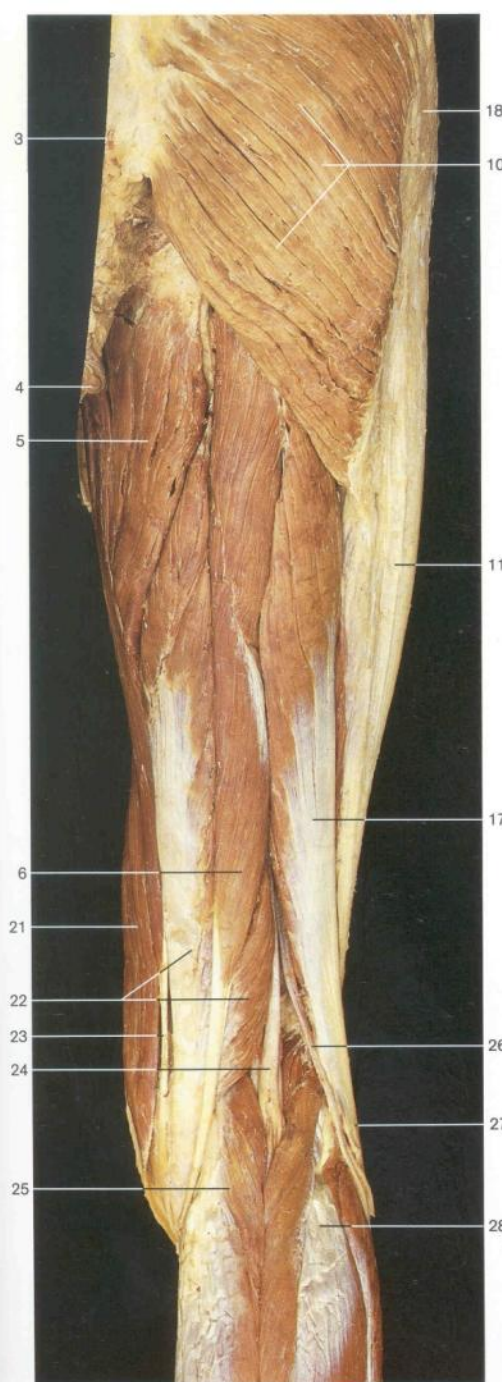


HAMSTRINGS are CRITICAL
IN RUNNING.

RUNNER'S "STARTING
BLOCK" POSTURE
MAXIMIZES EFFICIENCY OF
HAMSTRINGS BY
POSITIONING
ISHIAL TUBEROSITY
POSTERIOR & *maximizing
lever arm length*

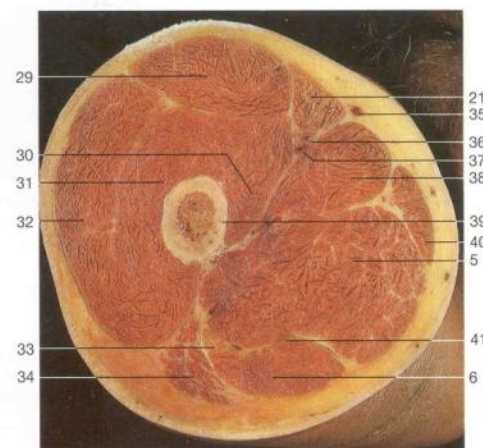




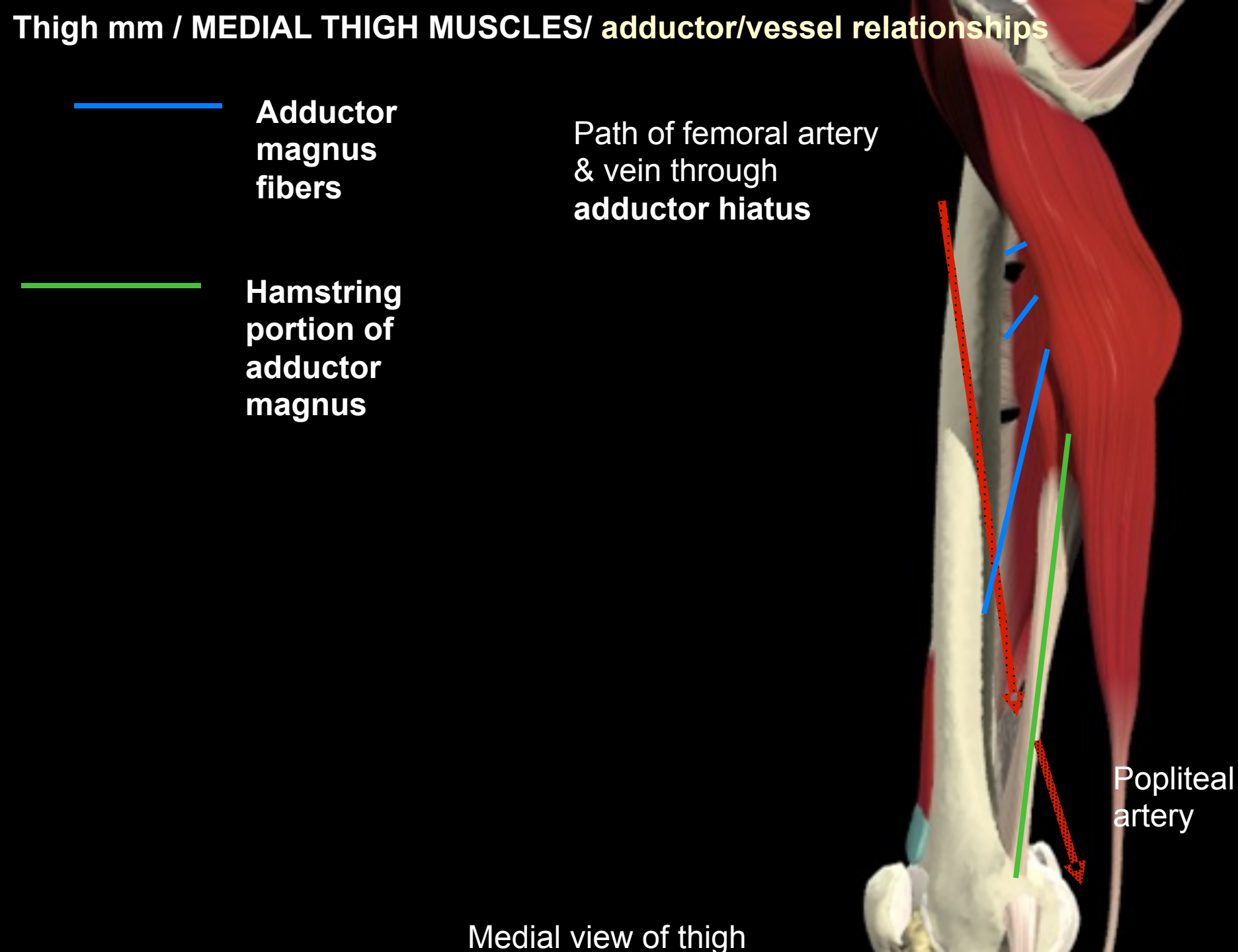


Flexors of the right thigh, superficial layer (dorsal aspect).

- 1 Thoracolumbar fascia
- 2 Spinous processes of lumbar vertebrae
- 3 Coccyx
- 4 Anus
- 5 Adductor magnus
- 6 Semitendinosus
- 7 Iliac crest
- 8 **Gluteus medius**
- 9 Greater trochanter
- 10 **Gluteus maximus**
- 11 Iliotibial tract
- 12 Piriformis
- 13 Superior gemellus
- 14 Obturator internus
- 15 Inferior gemellus
- 16 Ischial tuberosity
- 17 Biceps femoris
- 18 Tensor fasciae latae
- 19 Quadratus femoris
- 20 **Gluteus minimus**
- 21 Sartorius
- 22 Semimembranosus
- 23 Tendon of gracilis
- 24 Tibial nerve
- 25 Medial head of gastrocnemius
- 26 Common peroneal nerve
- 27 Tendon of biceps femoris
- 28 Lateral head of gastrocnemius
- 29 Rectus femoris
- 30 Vastus medialis
- 31 Vastus intermedius
- 32 Vastus lateralis
- 33 Sciatic nerve
- 34 Gluteus maximus (insertion)
- 35 Great saphenous vein
- 36 Femoral artery
- 37 Femoral vein
- 38 Adductor longus
- 39 Femur
- 40 Gracilis
- 41 Septum between semitendinosus and semimembranosus



Cross section of right thigh (inferior aspect). Ventral side on top.

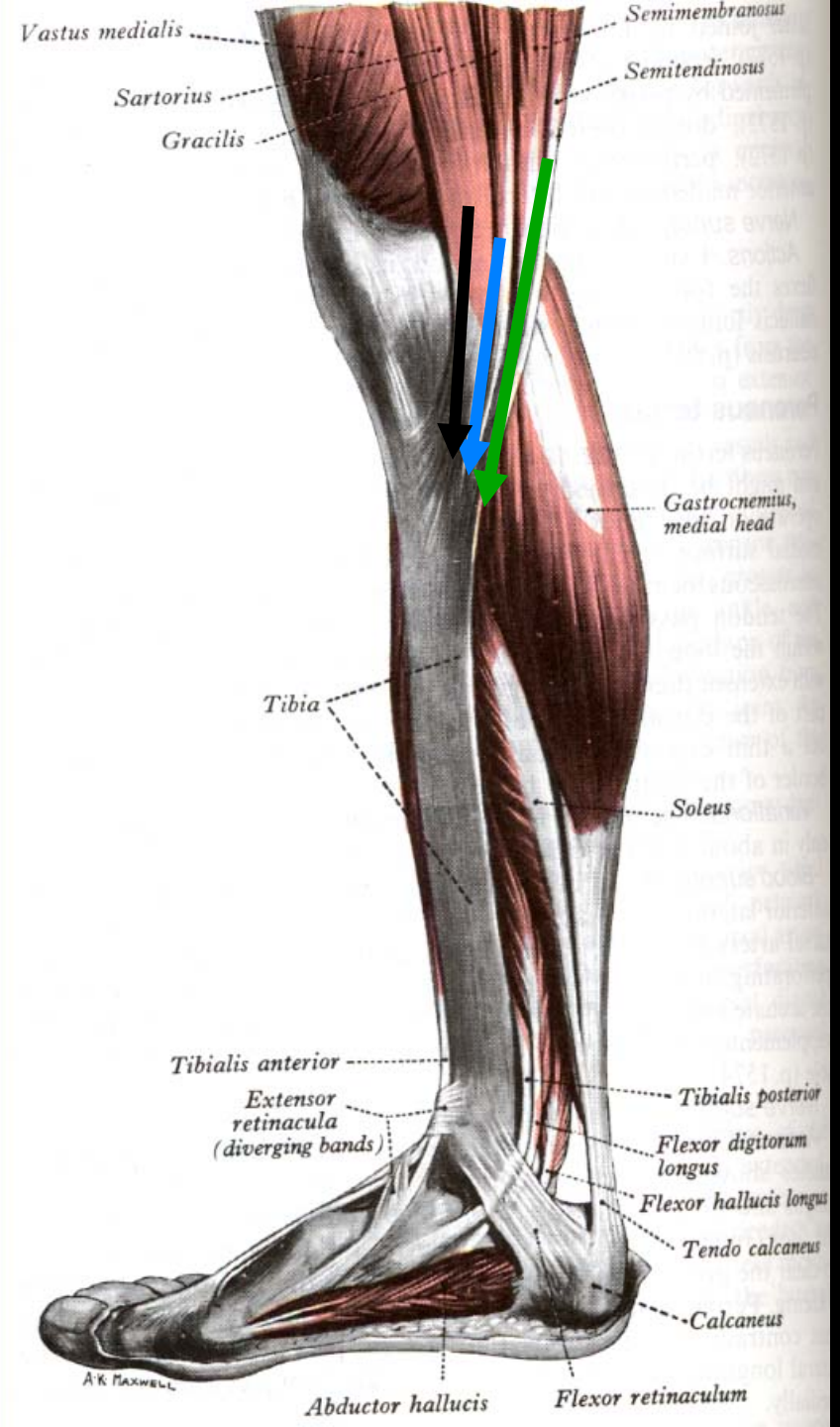


Pes Anserinus: "goose foot"

Gracilis – insertion just
distal to medial condyle
of tibia **OBTURATOR
NERVE**

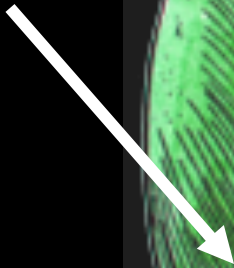
Sartorius – superficial
to gracilis

Semitendinosus –
distal to gracilis **TIBIAL
DIVISION OF SCIATIC
NERVE**

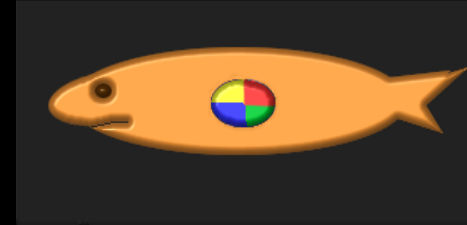
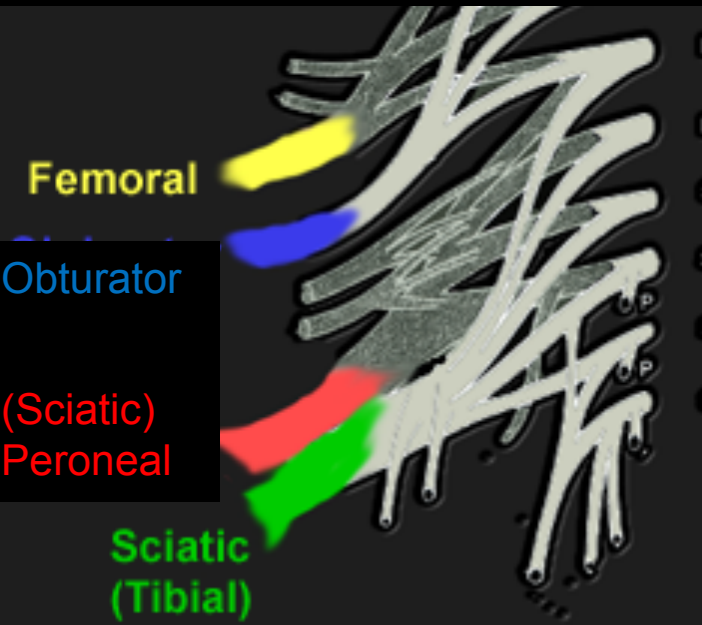


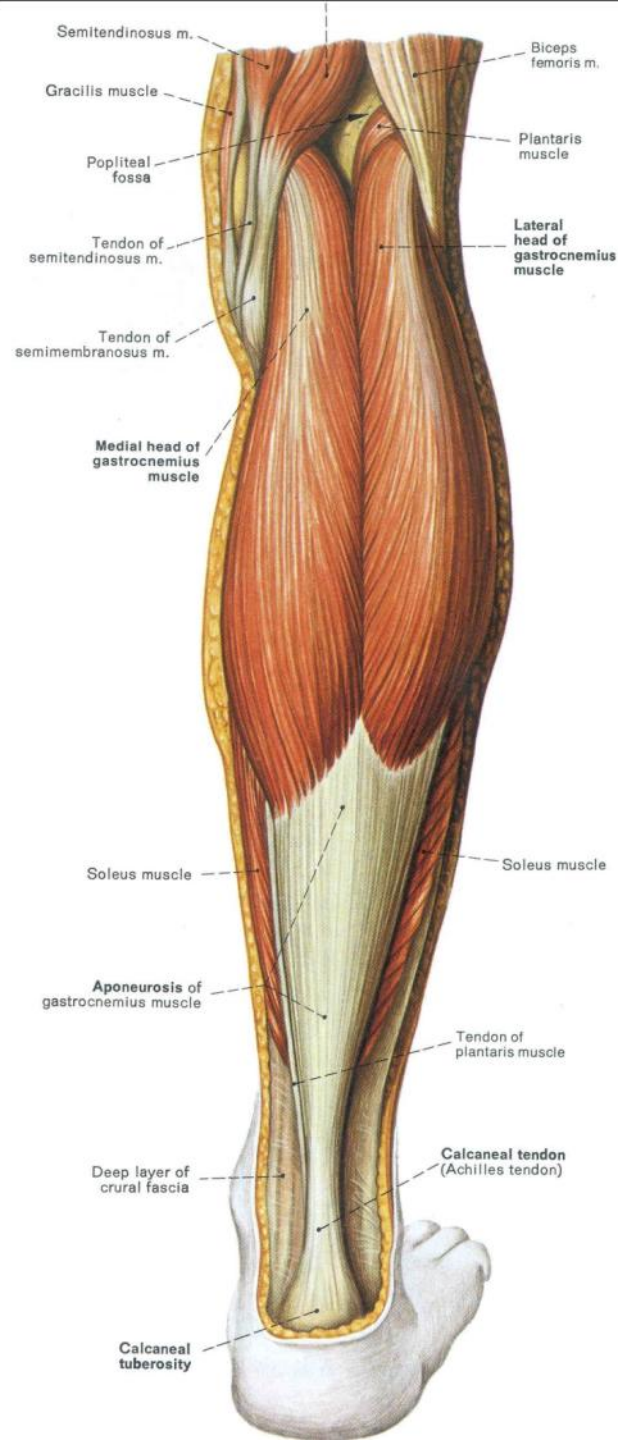
Inferior/Anterior
(Caudal/ventral)

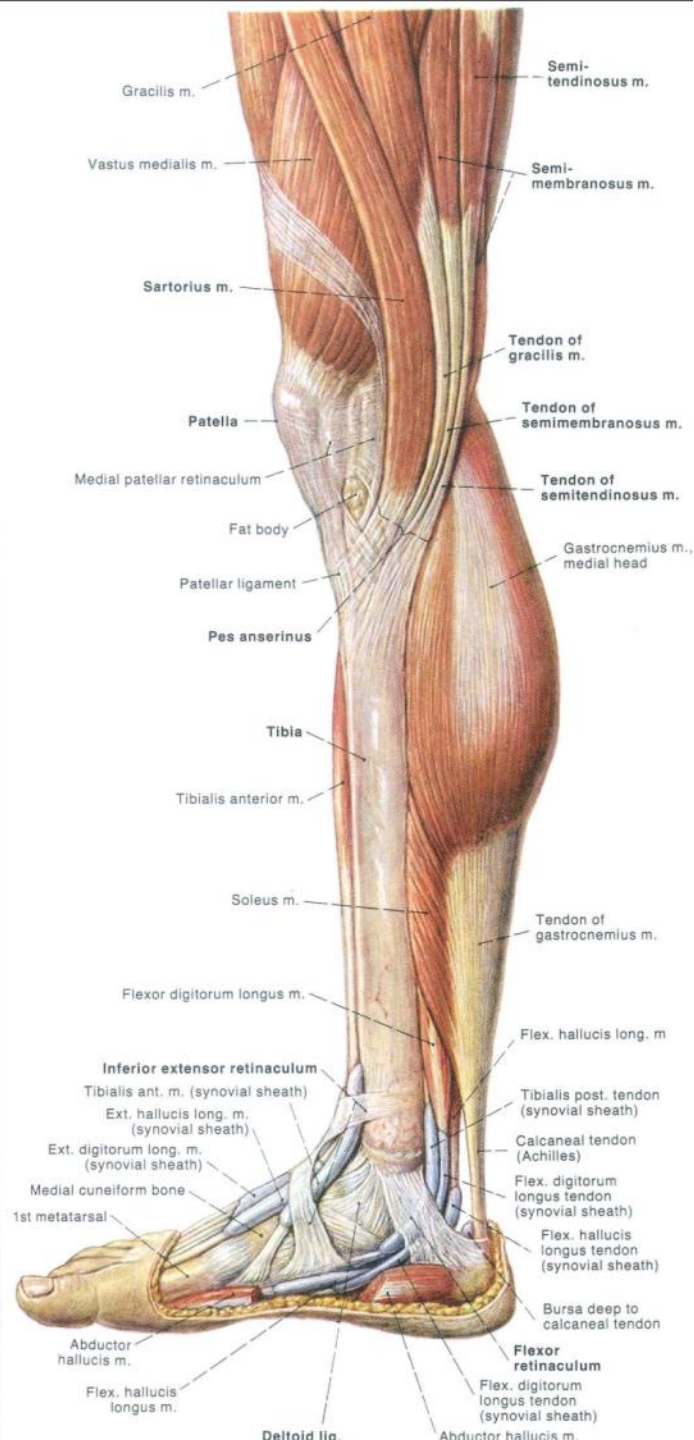
Gastrocnemius



SCIATIC
NERVE
(TIBIAL)





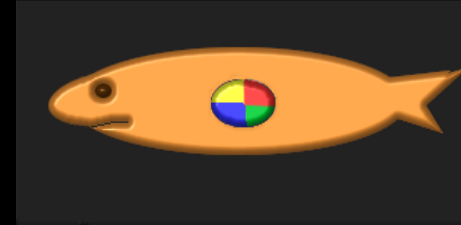
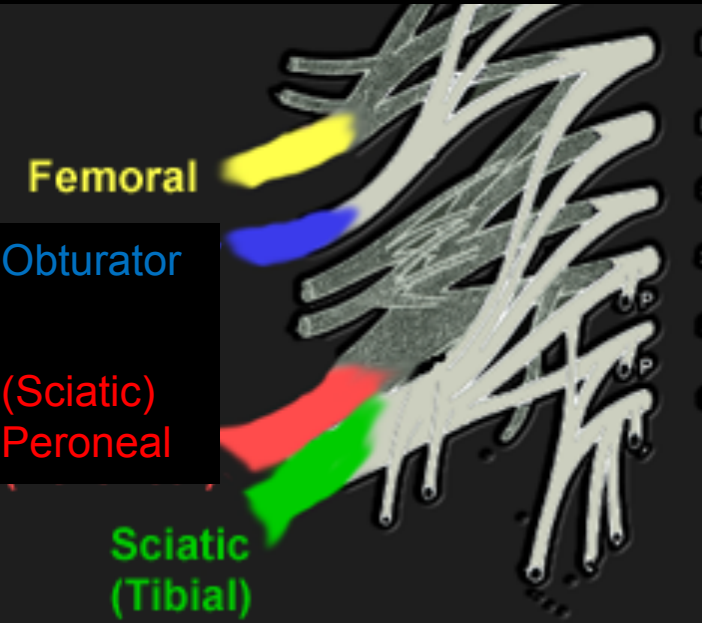


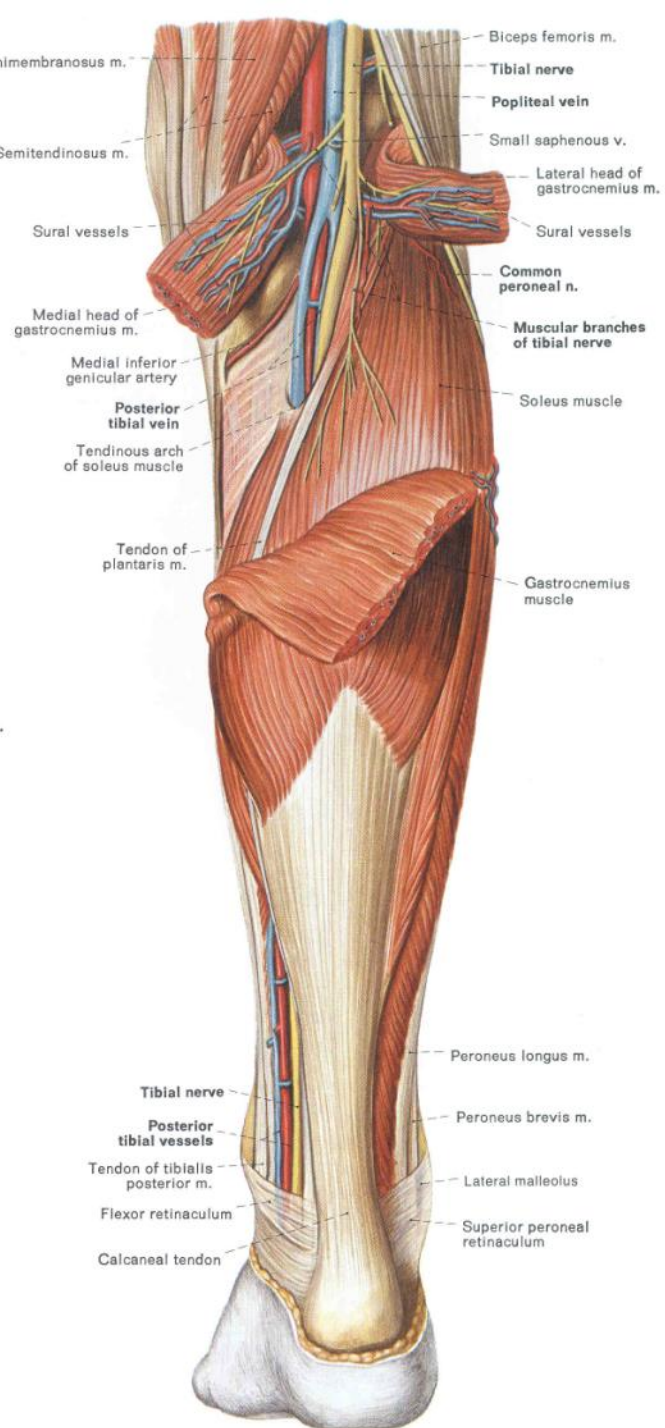
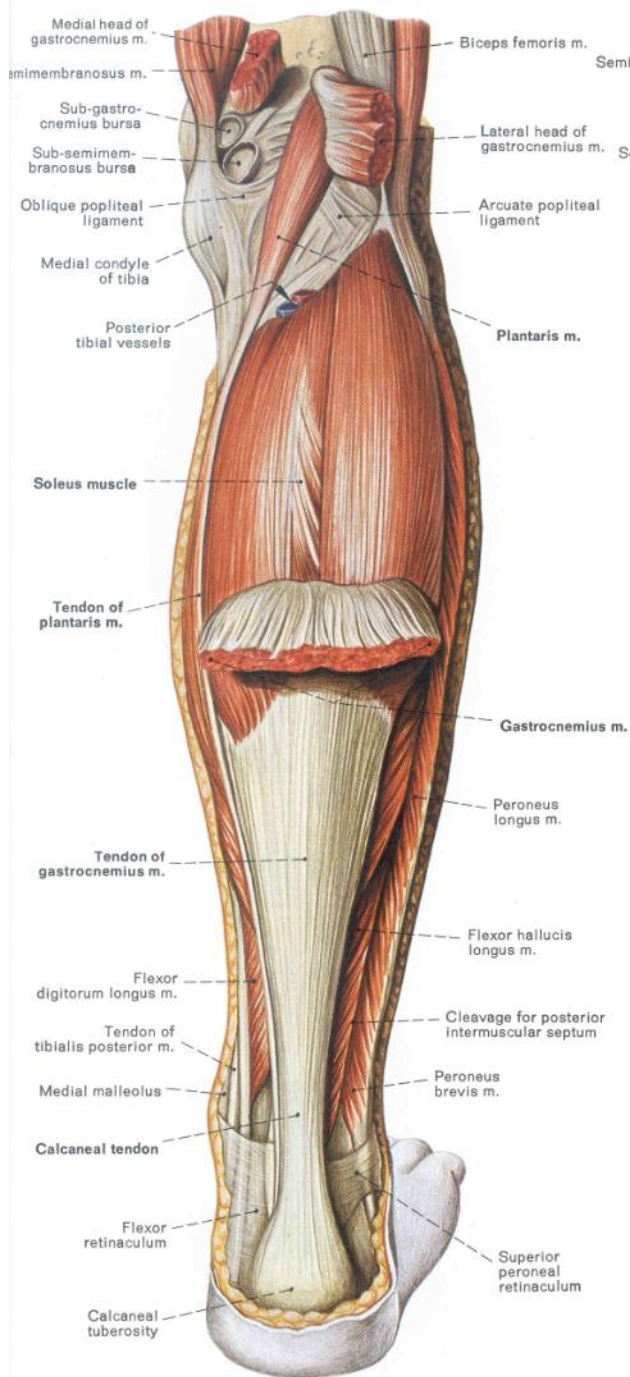
Inferior/Anterior
(Caudal/ventral)

Soleus



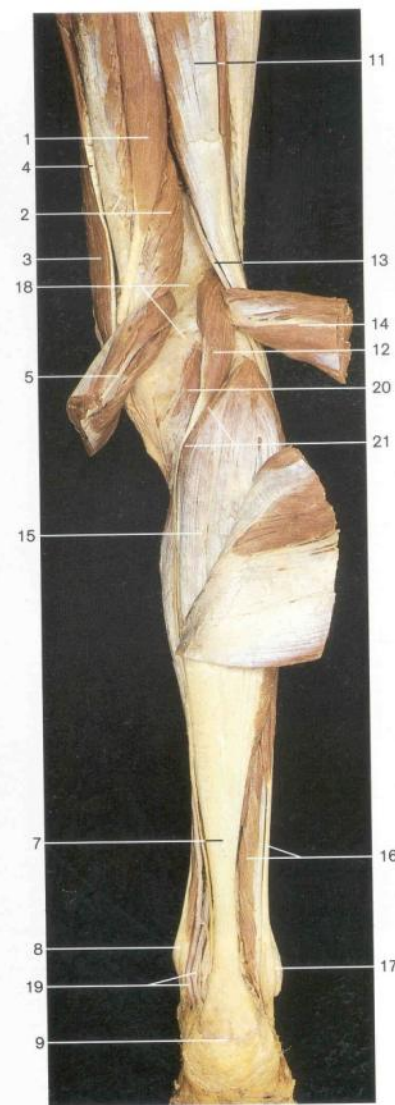
SCIATIC
NERVE
(TIBIAL)







Flexor muscles of right leg (dorsal aspect).



Flexor muscles of right leg (dorsal aspect).
Both heads of the gastrocnemius have been divided and reflected.

- 1 Semitendinosus
- 2 Semimembranosus
- 3 Sartorius
- 4 Tendon of gracilis
- 5 **Medial head of gastrocnemius**
- 6 Common tendon of gracilis, sartorius and semitendinosus
- 7 Calcaneal or Achilles tendon

- 8 Medial malleolus
- 9 Calcaneal tuberosity
- 10 Tibial nerve
- 11 Biceps femoris
- 12 Plantaris
- 13 Common peroneal nerve
- 14 **Lateral head of gastrocnemius**
- 15 **Soleus**

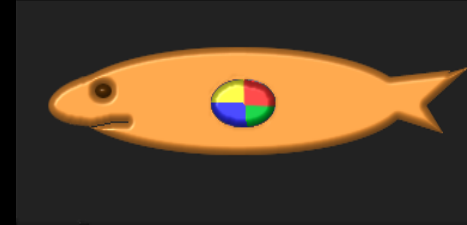
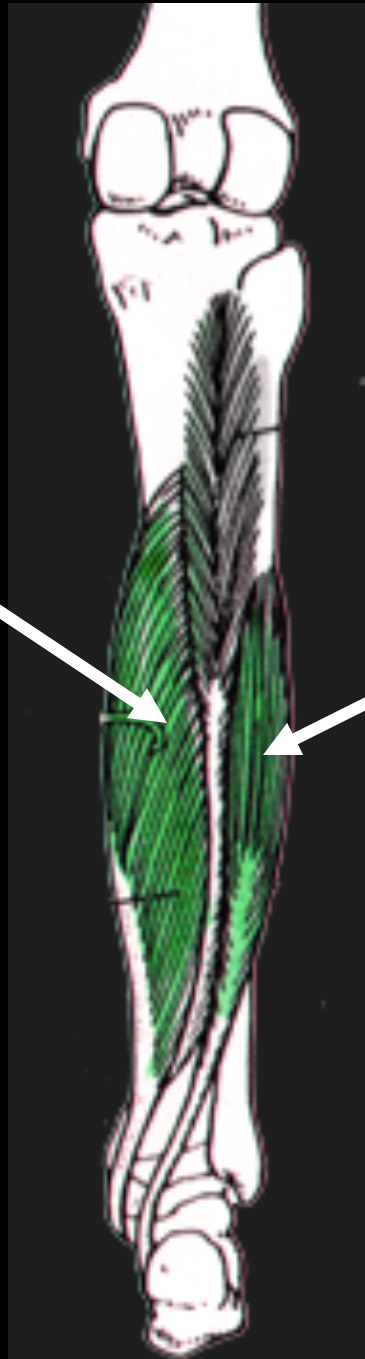
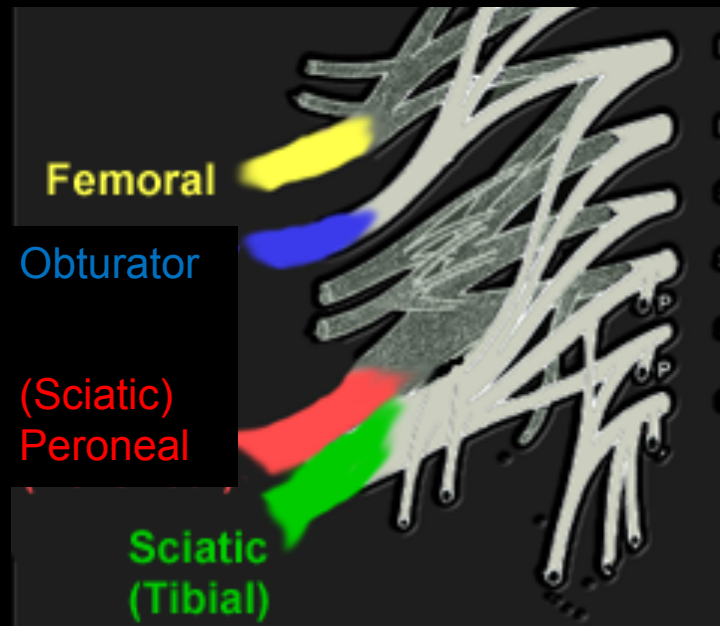
- 16 Peroneus longus and brevis
- 17 Lateral malleolus
- 18 Popliteal fossa
- 19 Tibial nerve and posterior tibial artery
- 20 Popliteus
- 21 Tendinous arch of soleus

**Inferior/Anterior
(Caudal/ventral)**

**Flexor
Digitorum
Longus**

**SCIATIC
NERVE
(TIBIAL)**

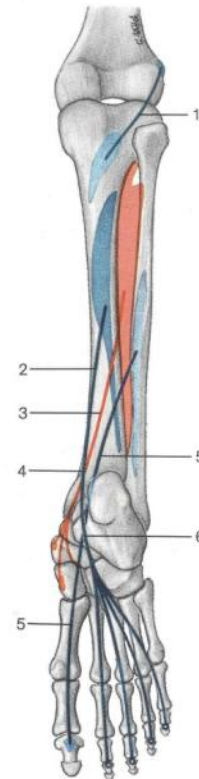
**Flexor
Hallucis
Longus**





Deep flexors of right leg (dorsal aspect).

- 1 Medial condyle of femur
- 2 Popliteus
- 3 Flexor digitorum longus
- 4 Crossing of tendons in leg
- 5 Tendon of tibialis posterior
- 6 Tendon of flexor digitorum longus
- 7 Medial malleolus
- 8 Lateral condyle of femur
- 9 Head of fibula
- 10 Tibialis posterior
- 11 Flexor hallucis longus
- 12 Peroneus longus
- 13 Peroneus brevis
- 14 Tendon of flexor hallucis longus
- 15 Calcaneal tendon (divided)
- 16 Lateral malleolus



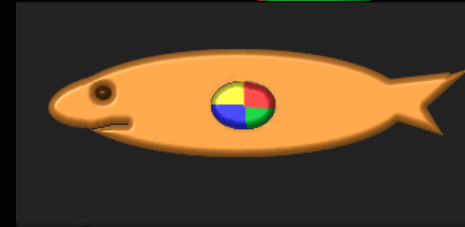
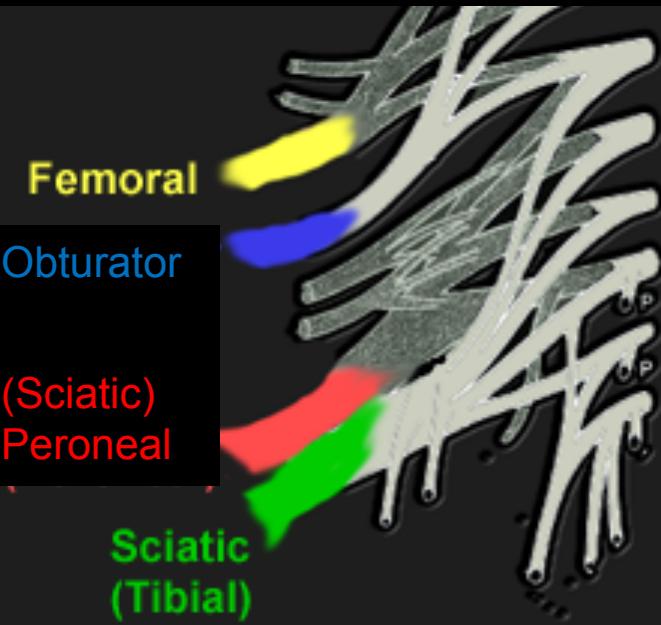
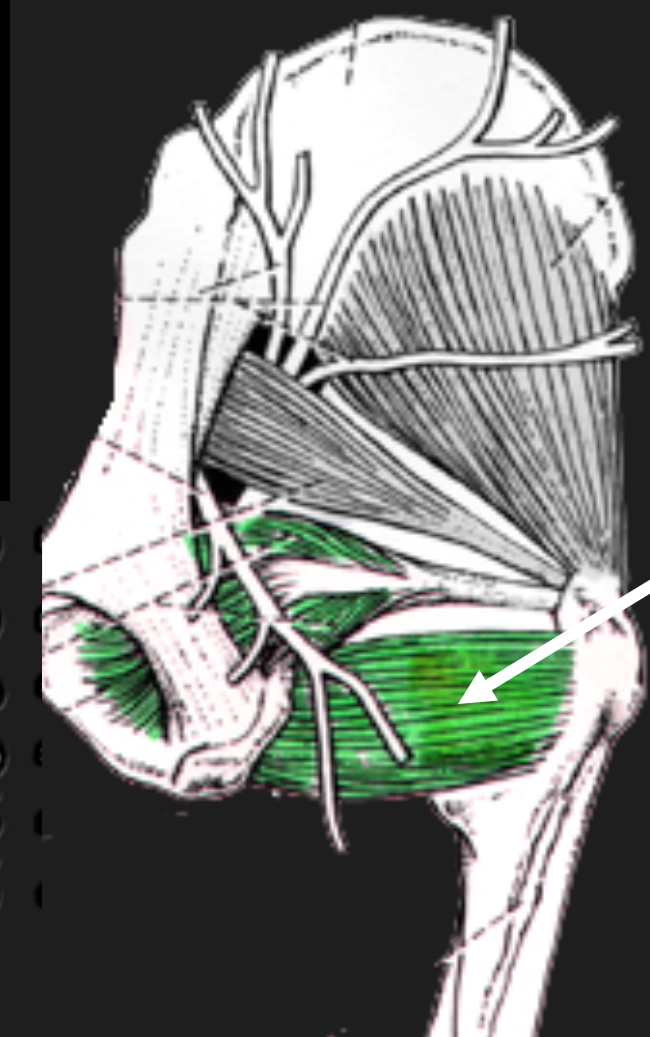
Course of deep flexors of leg. (Schematic drawing.)

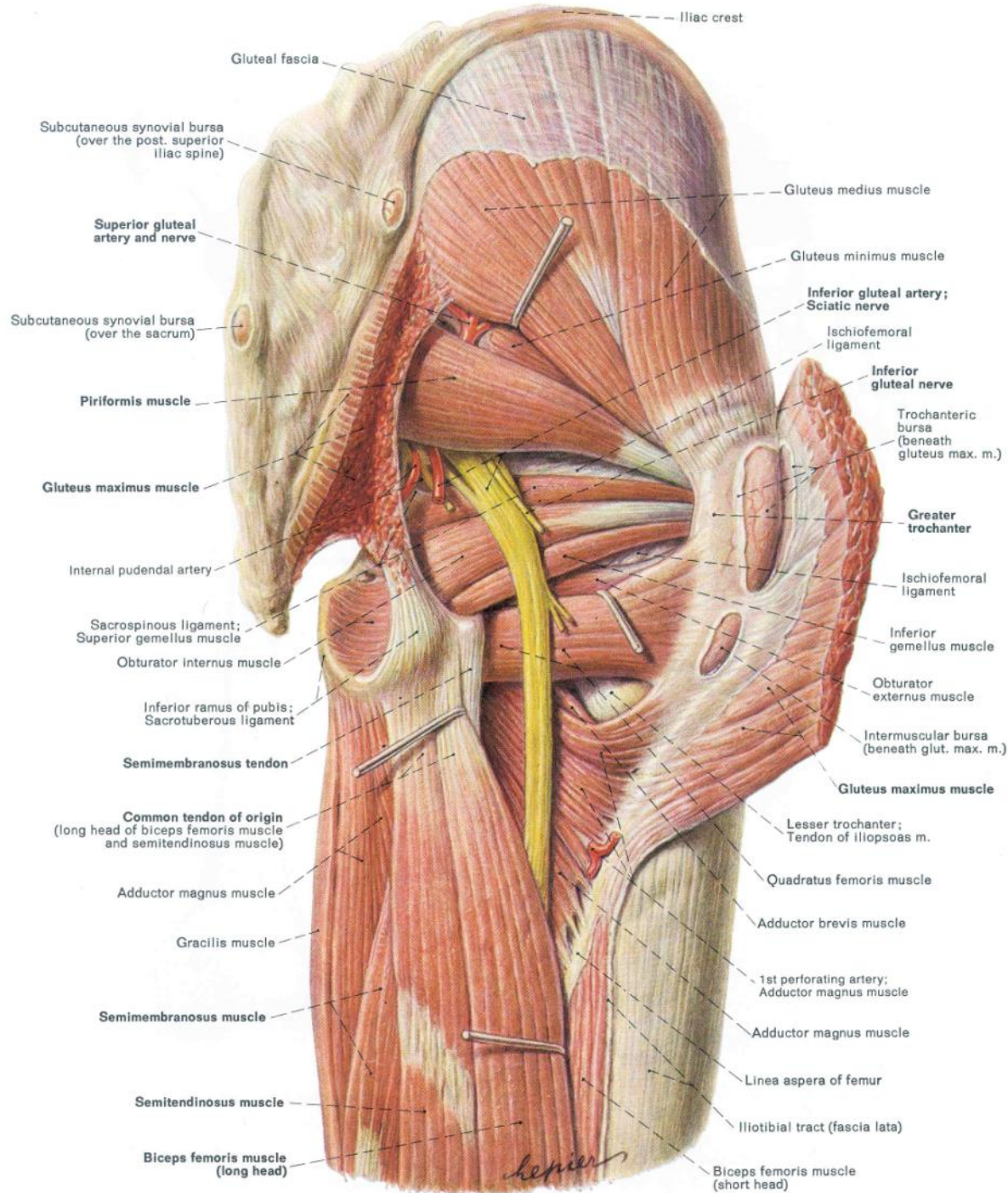
- 1 Popliteus (blue)
- 2 Flexor digitorum longus (blue)
- 3 Tibialis posterior (red)
- 4 Crossing of tendons in leg
- 5 Flexor hallucis longus (blue)
- 6 Crossing of tendons in sole

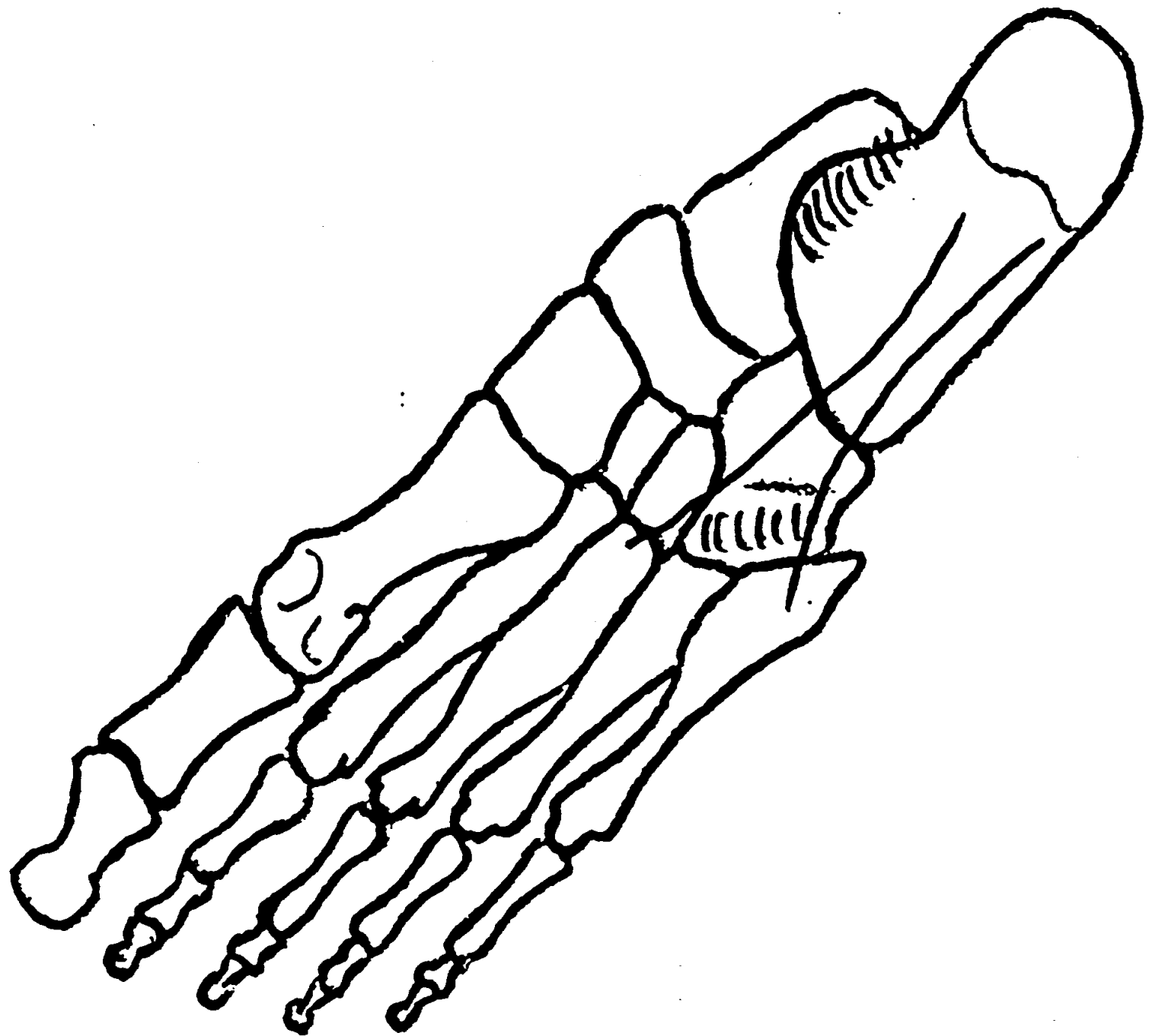
Inferior/Anterior (Caudal/ventral) LATERAL HIP ROTATORS

SCIATIC
NERVE
(TIBIAL)

Quadratis
Femoris







MUSCULAR STRUCTURES

ENTERING FOOT:

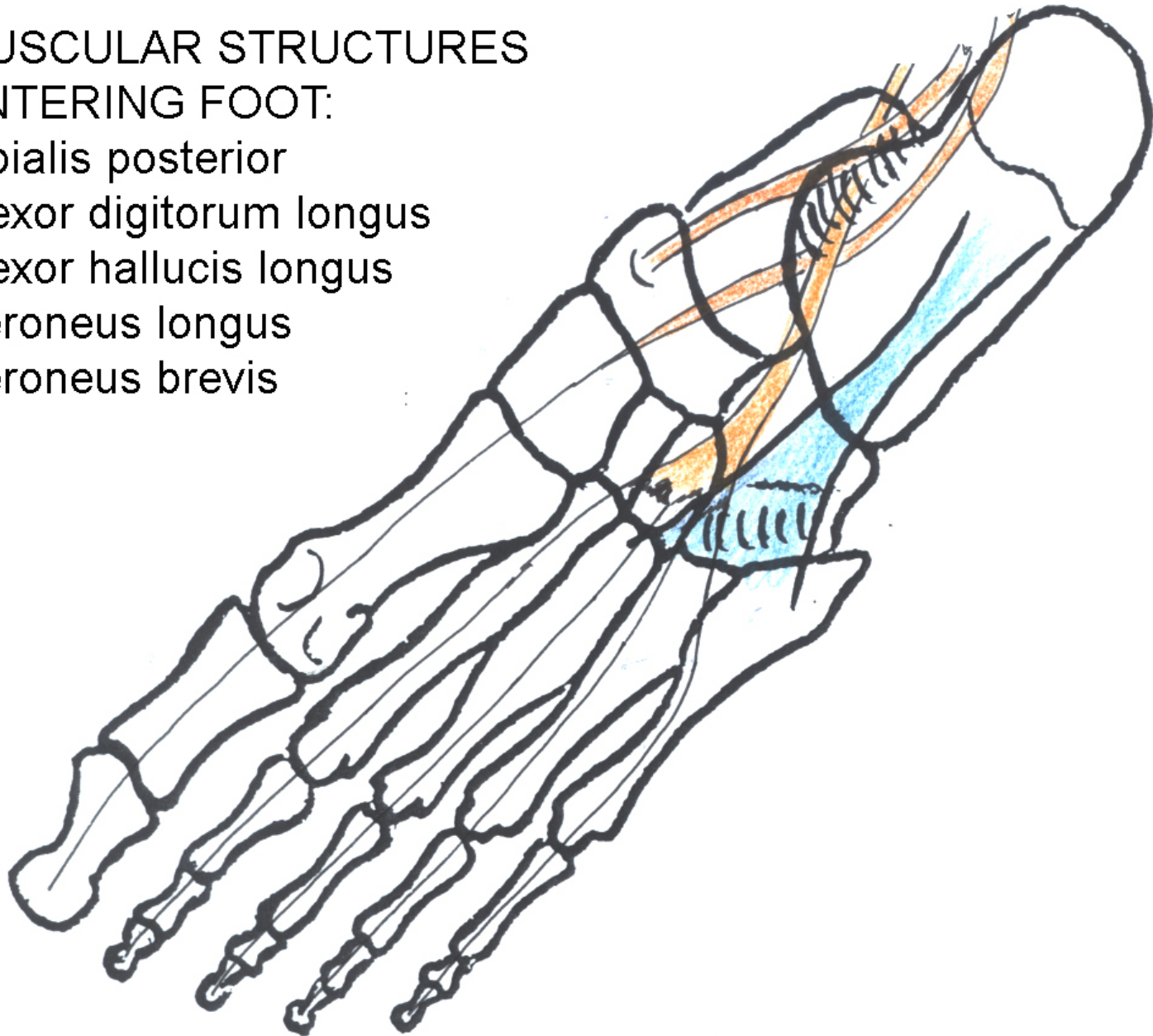
Tibialis posterior

Flexor digitorum longus

Flexor hallucis longus

Peroneus longus

Peroneus brevis



ARTERIAL AND NERVOUS SUPPLY OF VENTRAL FOOT:

Medial plantar artery

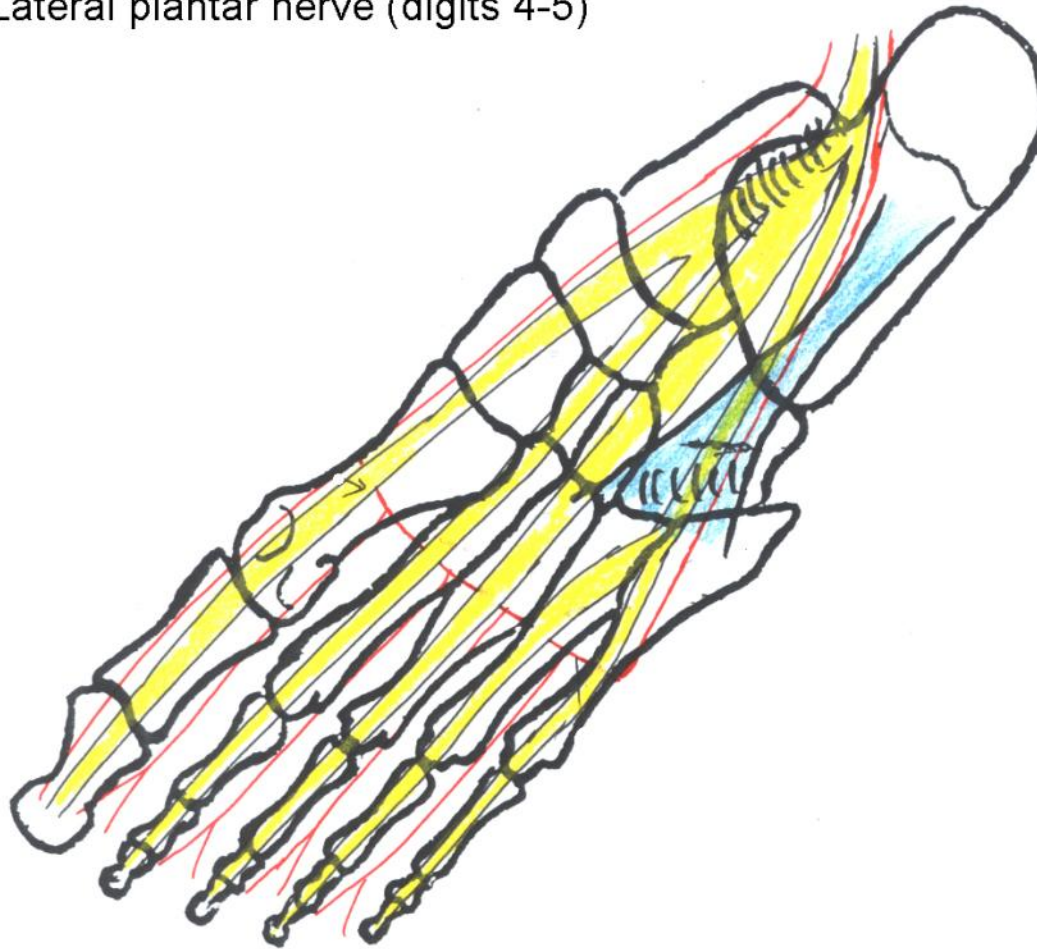
Lateral plantar artery

-Dorsalis pedis artery hooks up with both to
complete arterial arch

Plantar nerve (continuation of tibial nerve)

- Medial plantar nerve (digits 1-3)

- Lateral plantar nerve (digits 4-5)

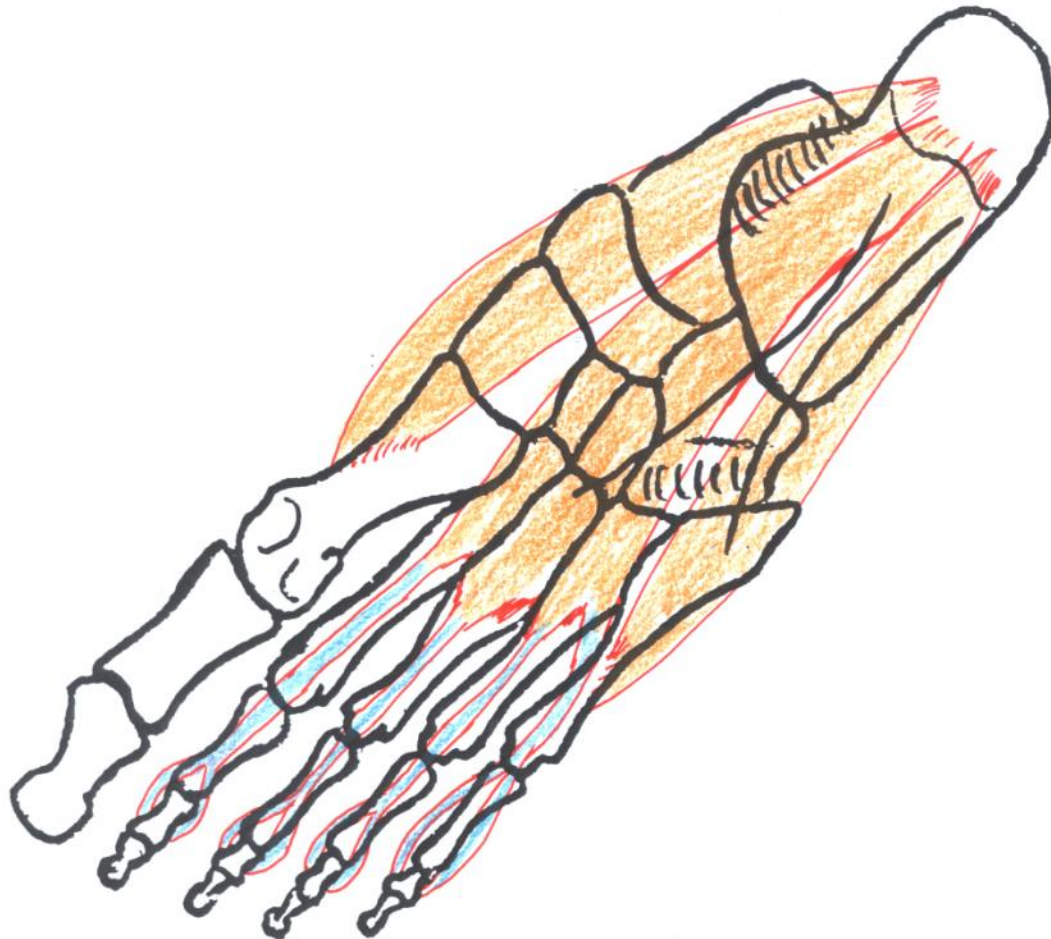


VENTRAL FOOT, Layer 1 (Most Superficial)

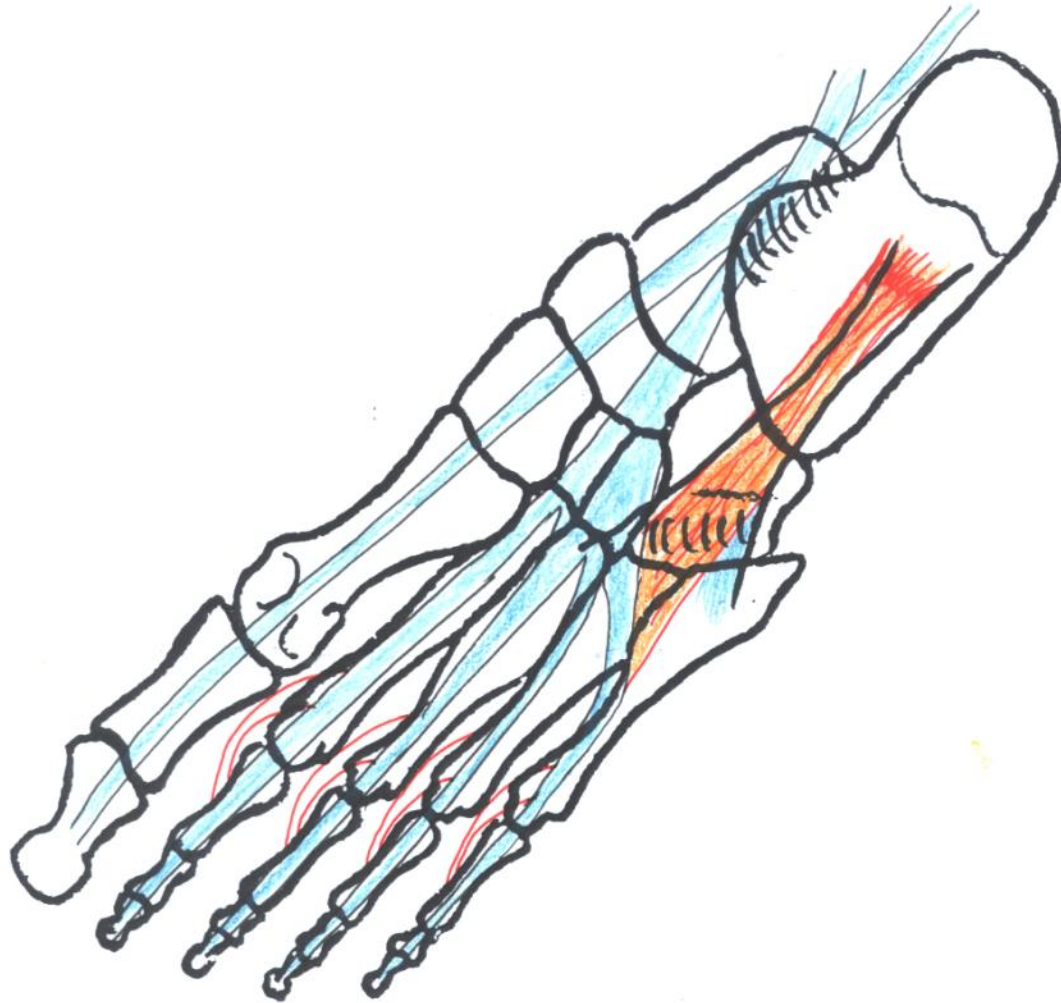
Abductor hallucis

Flexor digitorum brevis

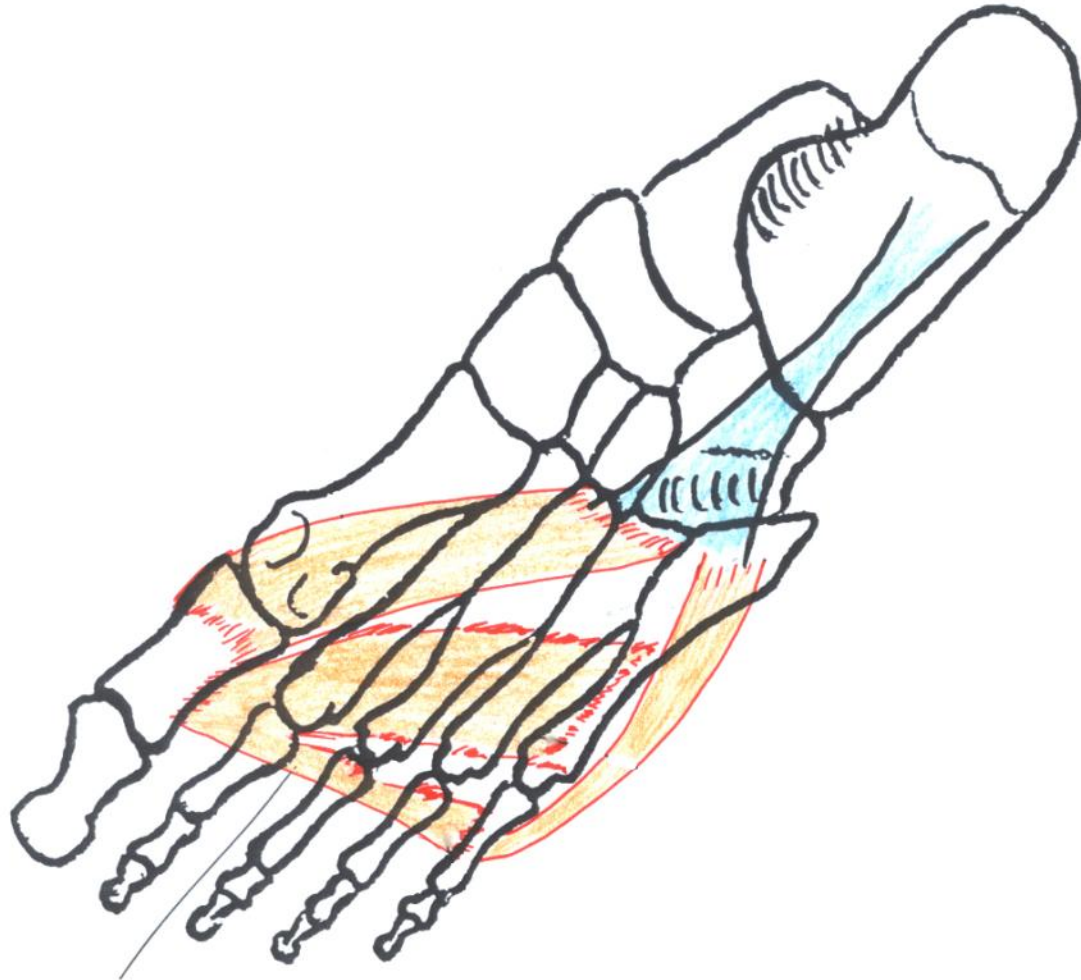
Abductor digiti minimi



VENTRAL FOOT, Layer 2
Quadratus plantae
Lumbricales (4)



VENTRAL FOOT, Layer 3
Flexor hallucis brevis
Adductor hallucis
Flexor digiti minimi brevis

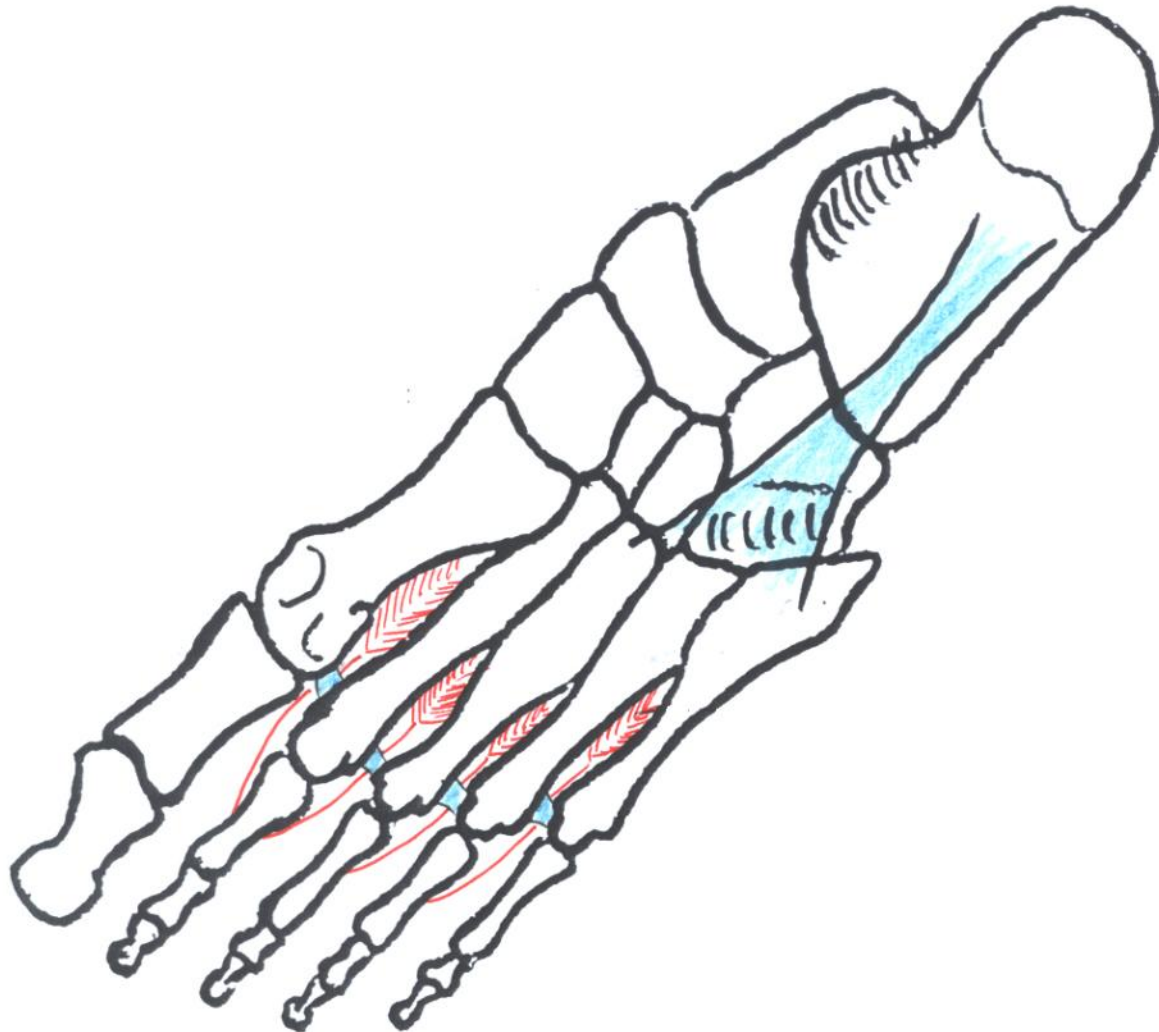


VENTRAL FOOT, LAYER 4 (Deepest)

Plantar interossei (3)

Dorsal interossei (4)

Long plantar tendon





Extrinsic muscles:

Posterior compartment

Superficial – triceps surae

Deep - TDH

Anterior compartment

Lateral compartment



Posterior compartment

**Deep – Tibialis posterior
insertions**



Posterior compartment

Deep –
Tibialis posterior
Flexor digitorum
Flexor hallucis
longus insertions

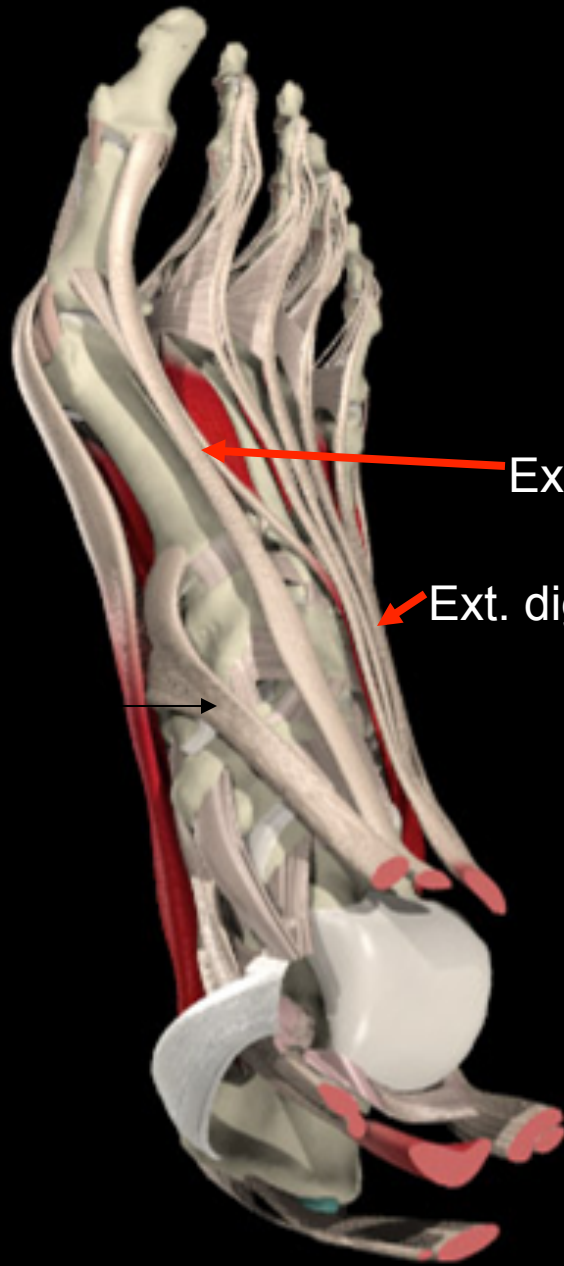
Peroneus
brevis



Peroneus longus



Tibialis anterior

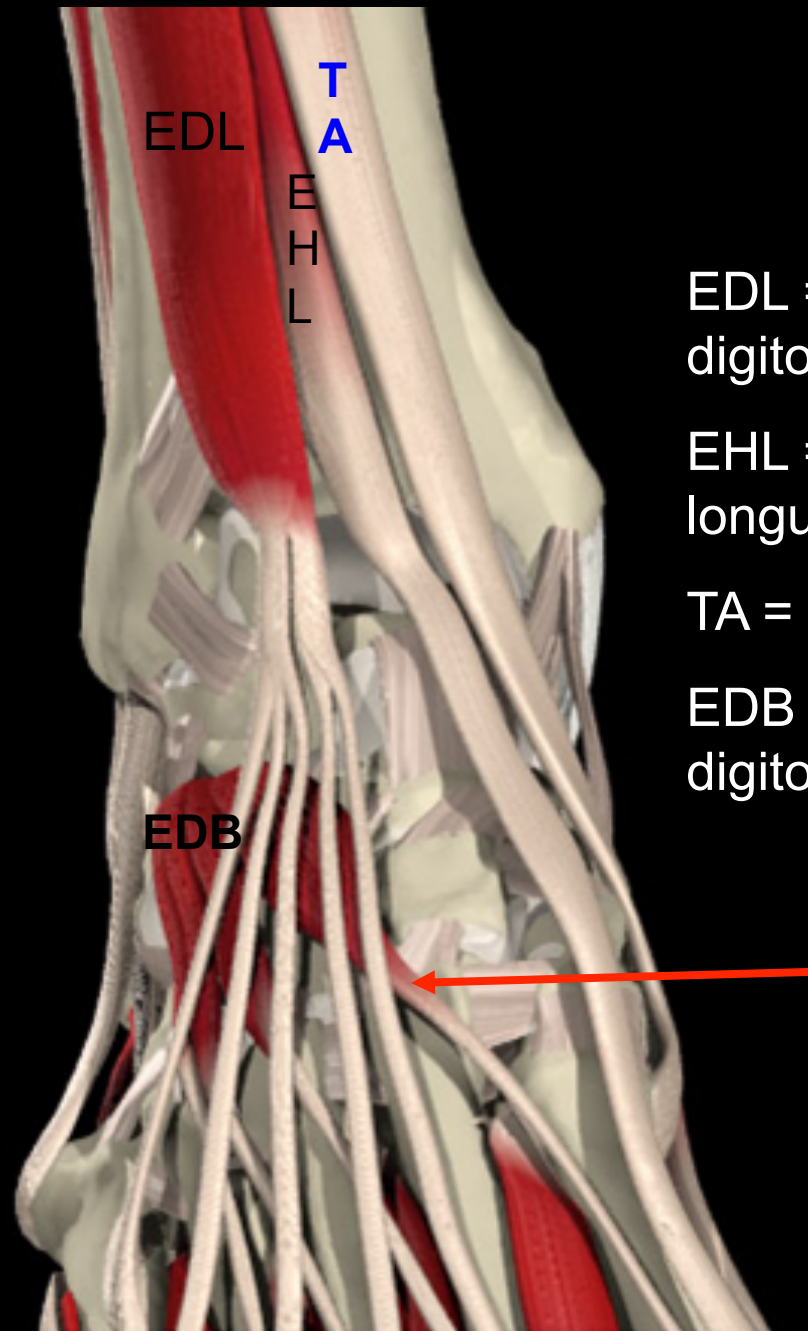


Ext. hallicus longus

Ext. digitorum



Ext. dig. brevis



EDL

TA

EHL

EDB

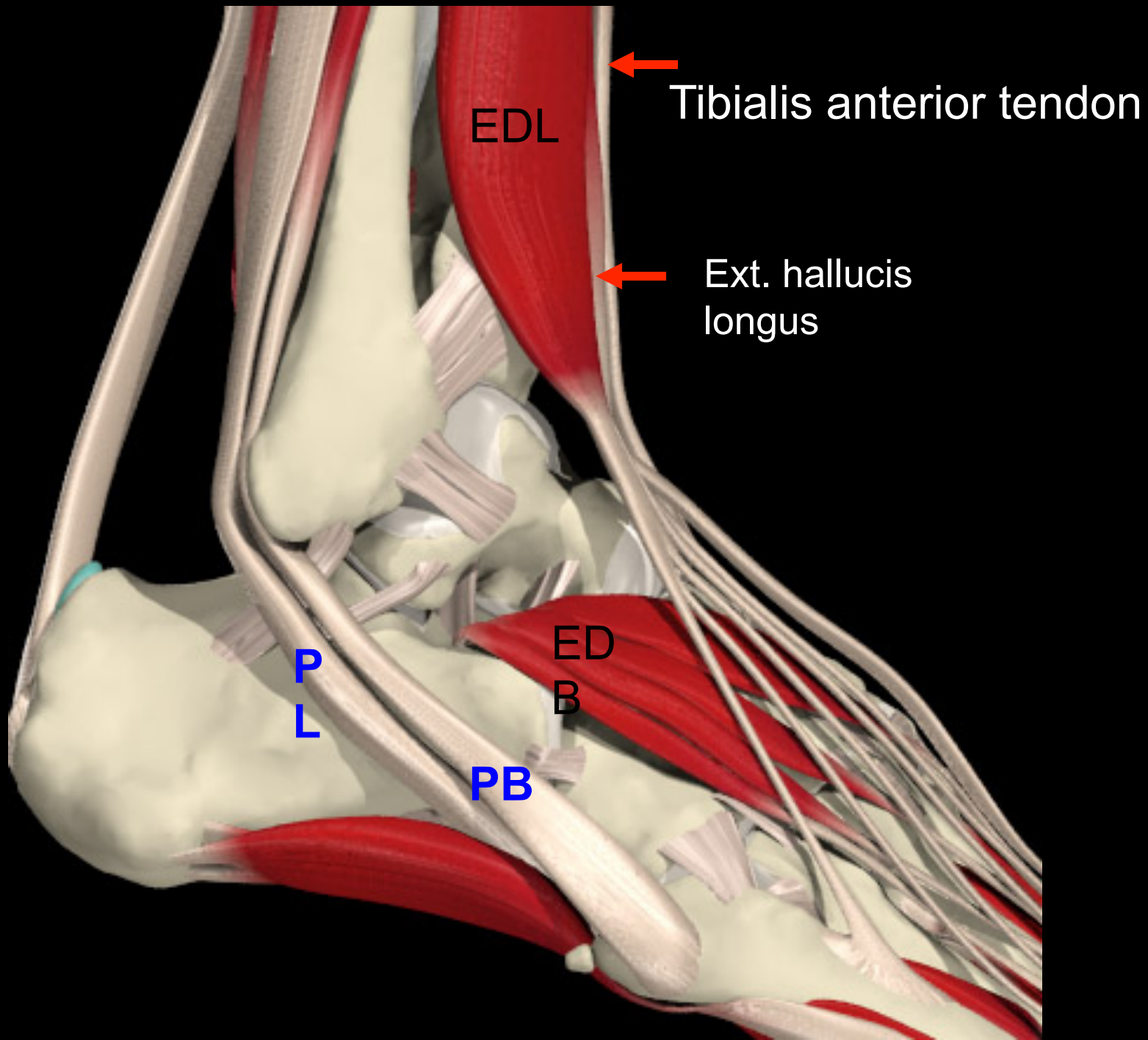
EDL = extensor
digitorum longus

EHL = extensor hallucis
longus

TA = tibialis anterior

EDB = extensor
digitorum brevis

Tendon of
extensor
hallucis
brevis



Perforating
branch of
peroneal a.

Ant.
Tibial a.

Anterio-lateral view

ant. lateral
malleolar a.

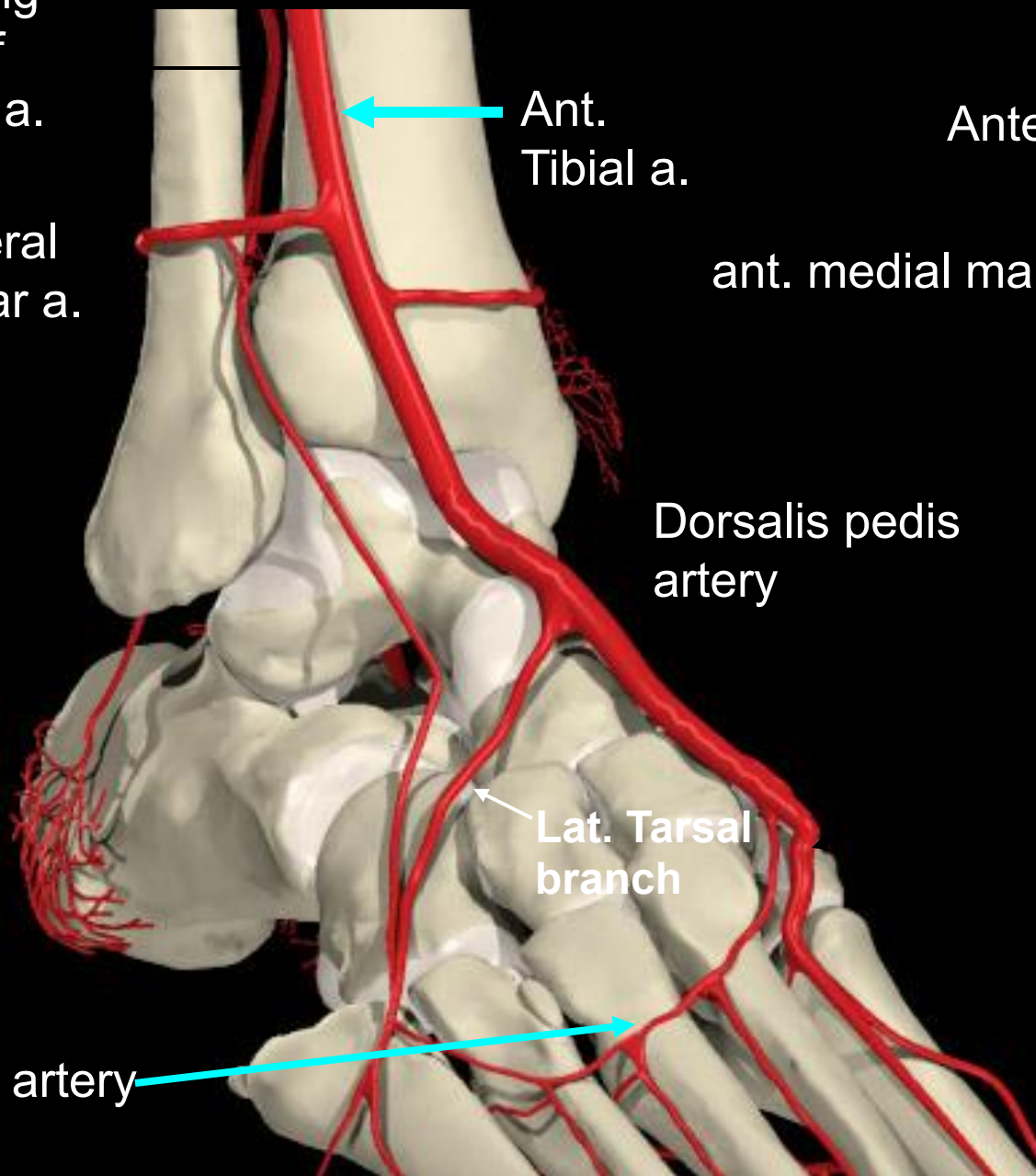
ant. medial malleolar a.

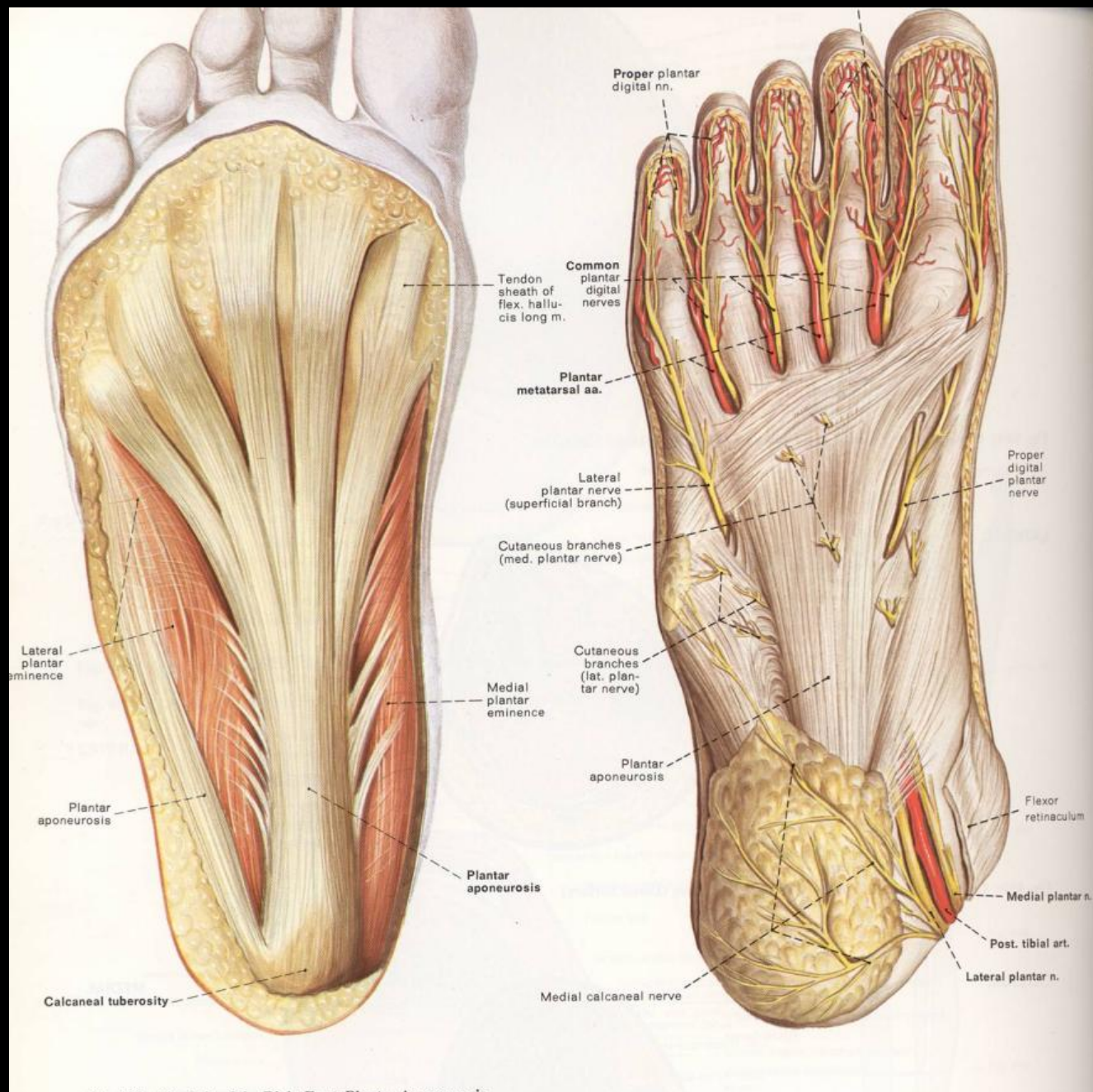
Dorsalis pedis
artery

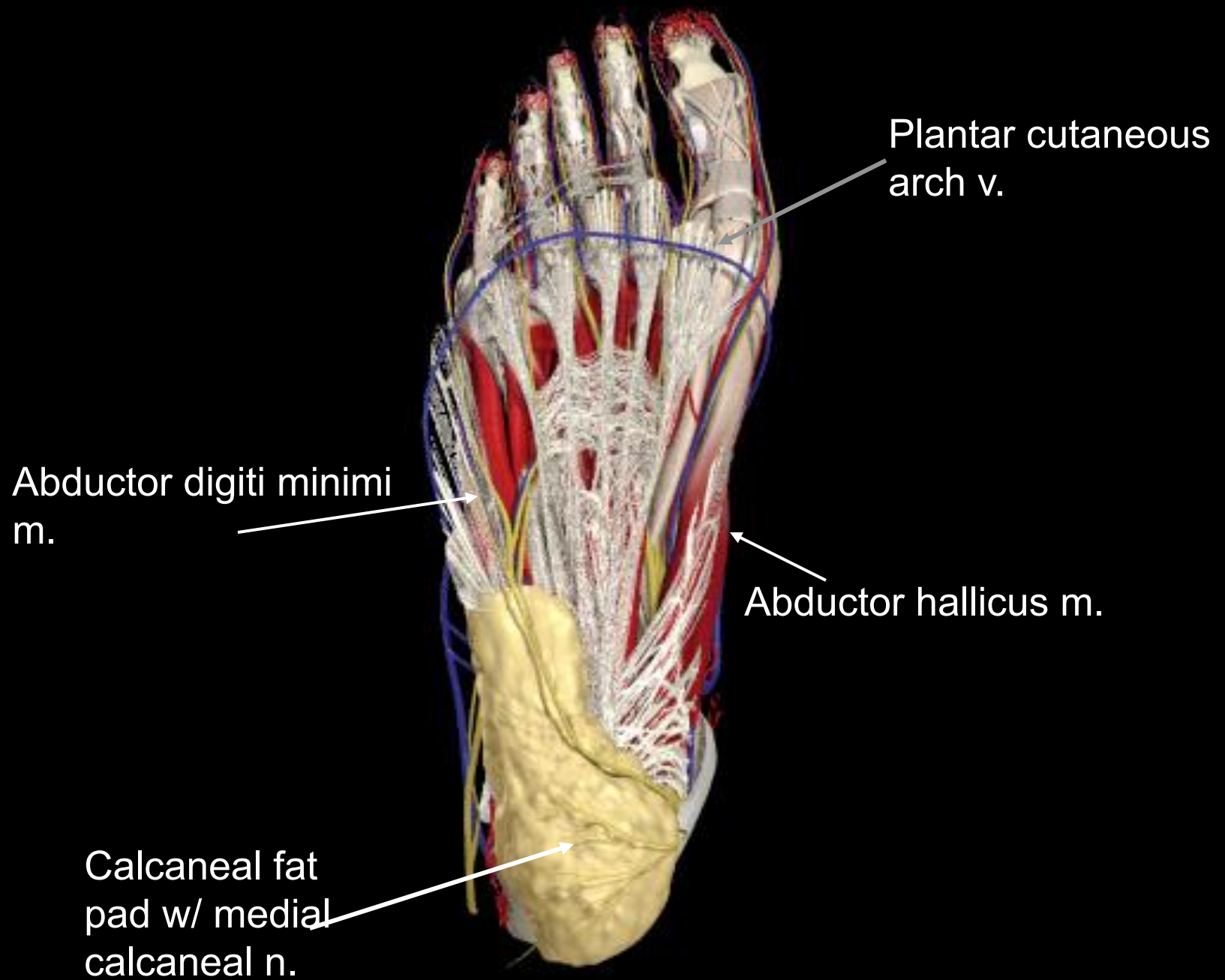
peroneal
a.

Lat. Tarsal
branch

Arcuate artery







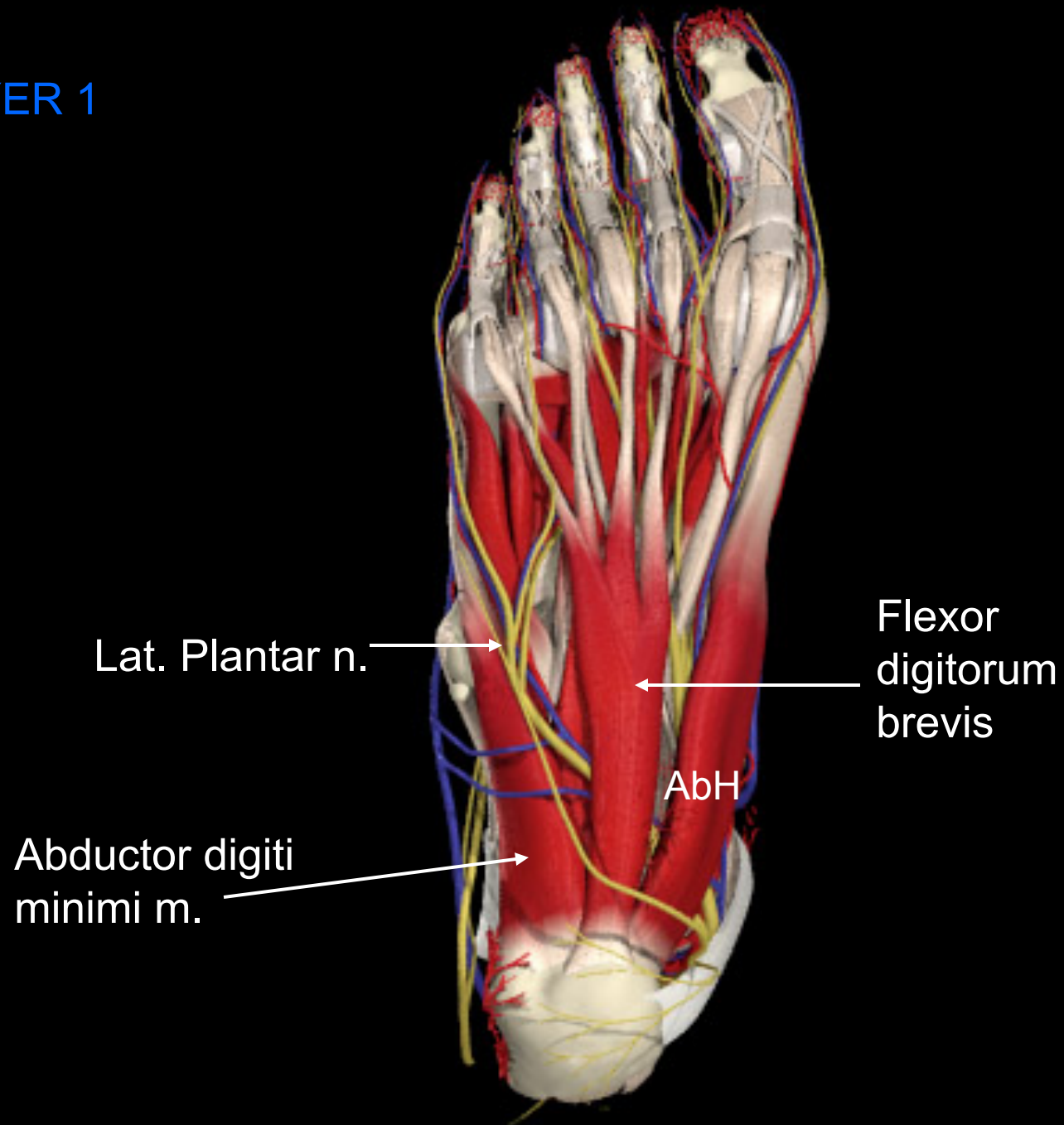


"hypothenar"

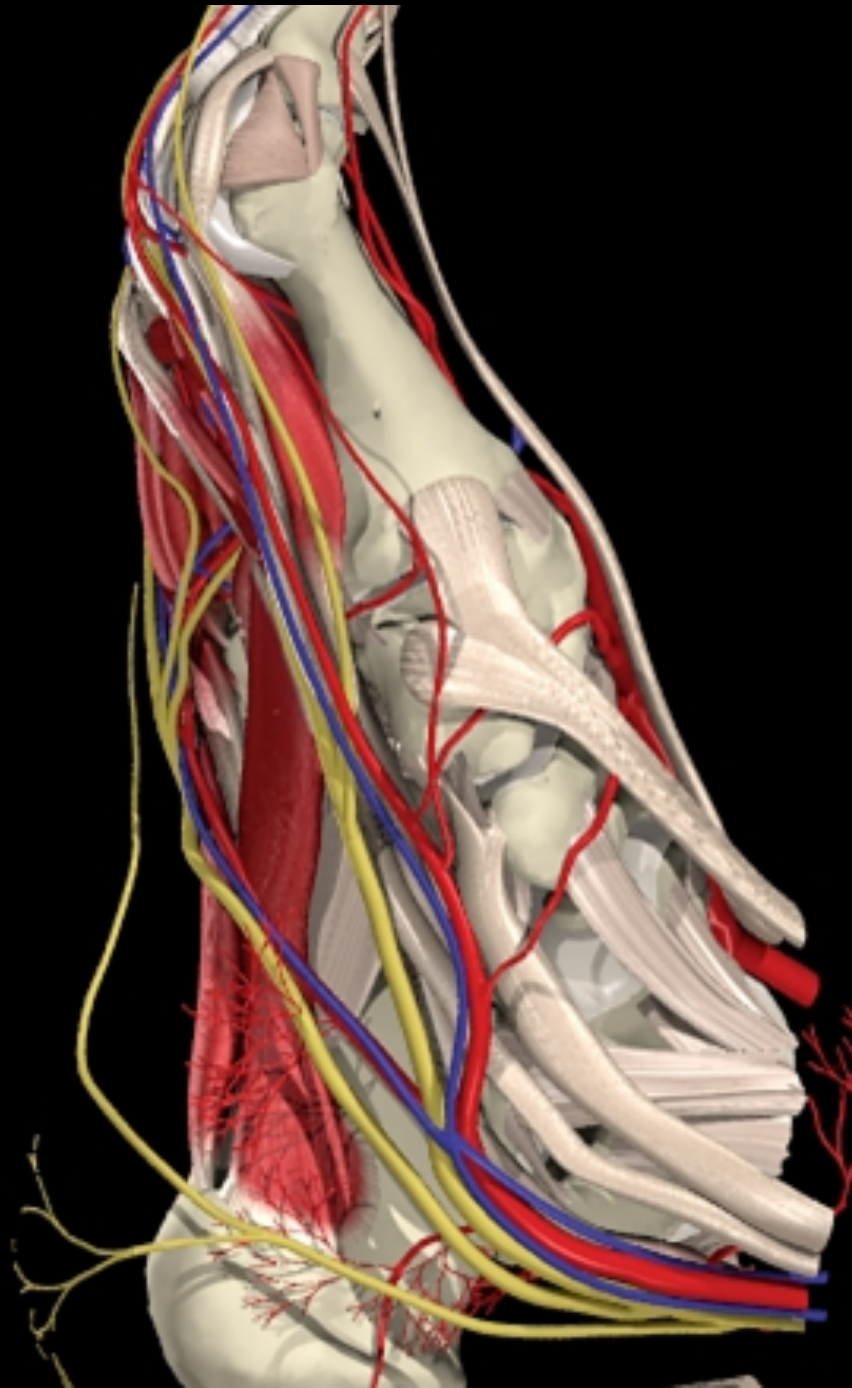
"thenar"

Flex. Digitorum brevis

LAYER 1



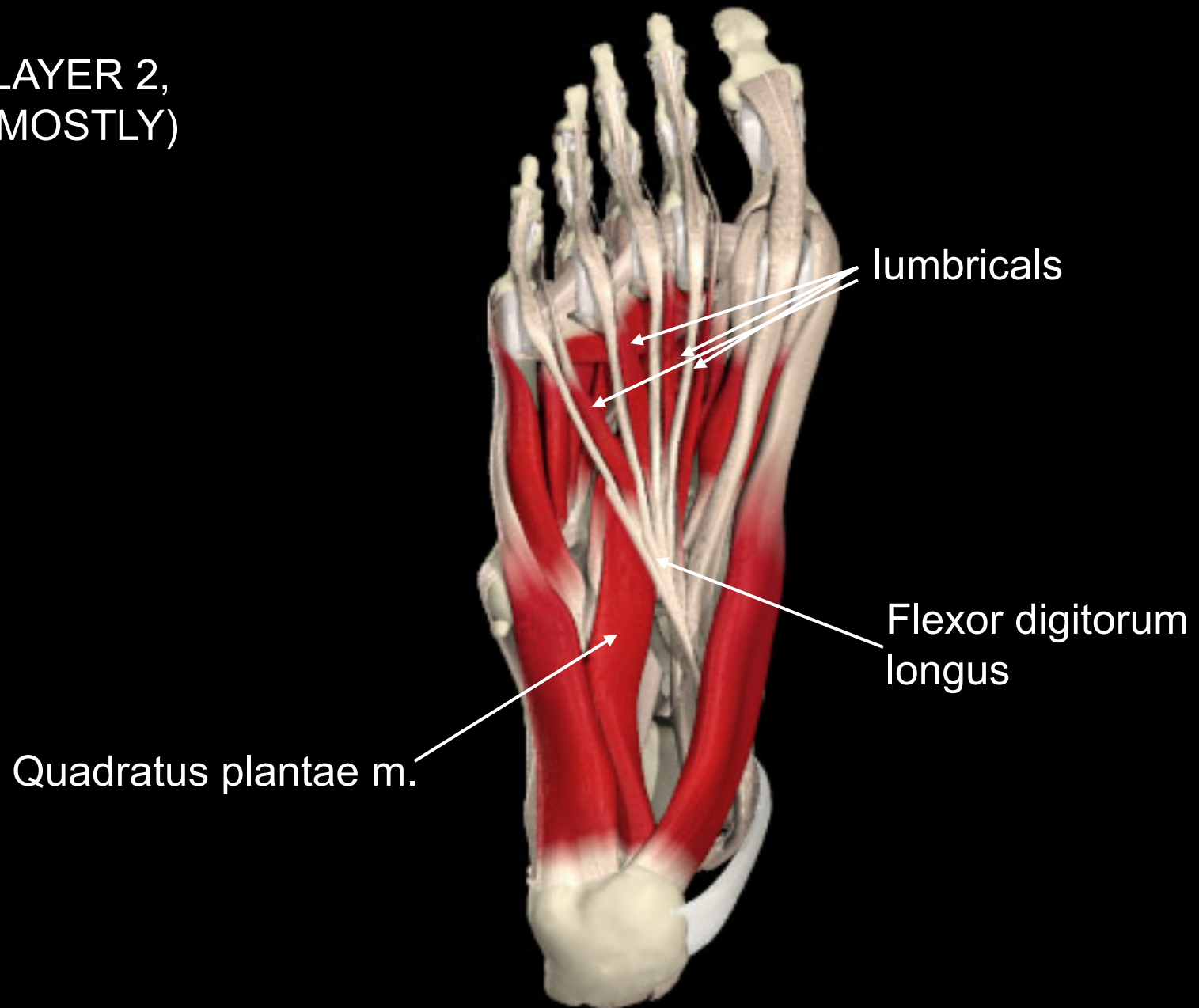
MOST
VASCULATURE
AND NERVES
BETWEEN
LAYERS 1 & 2







LAYER 2,
(MOSTLY)



LAYER 2 cont + 3

Flexor digiti minimi



Flexor hallucis
longus tendon

Flexor
hallucis
brevis

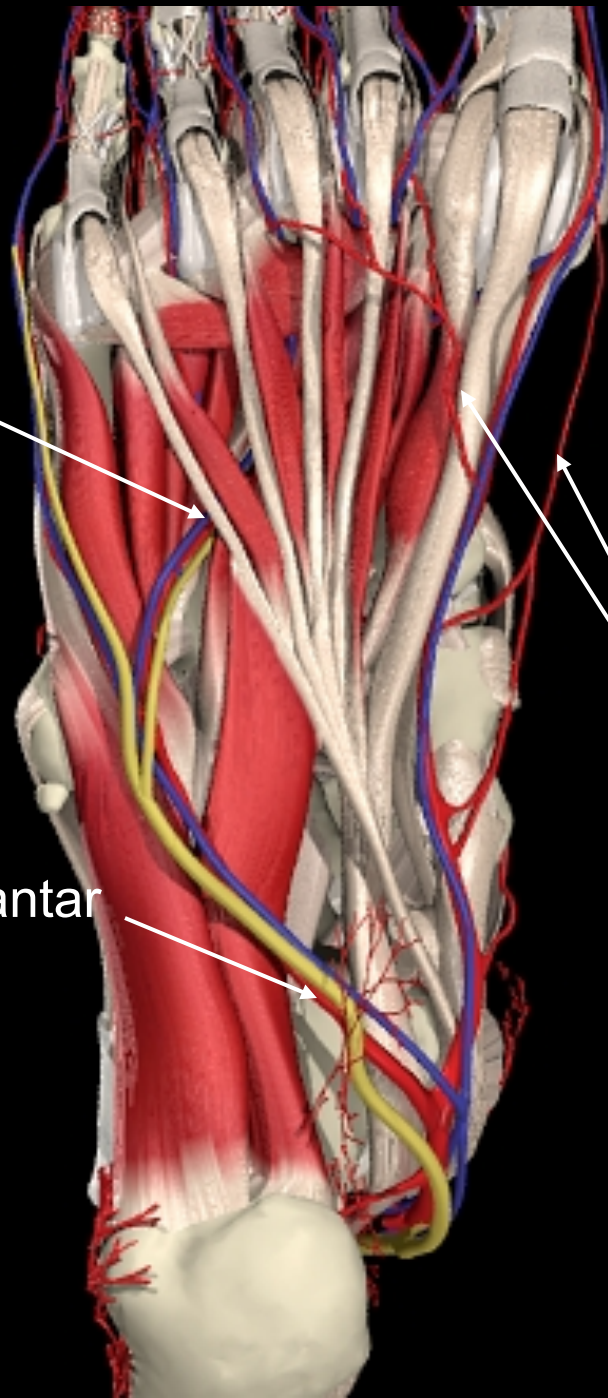


Deep
plantar arch

Lateral plantar
a.

*Muscles innervated
by medial plantar n.:*
Abductor hallucis
Flexor hallucis brevis
1st & 2nd lumbricals

Medial
plantar artery
& “arch”



LAYER 3

Adductor
hallucis

Transverse
head

Oblique head

Flexor hallucis
brevis

Flexor digiti
minimii



LAYER 4,
MOSTLY
PLANTAR
INTEROSSEI 3

Interosseous mm.
PAD
DAB

Axis 2nd digital
ray, not third

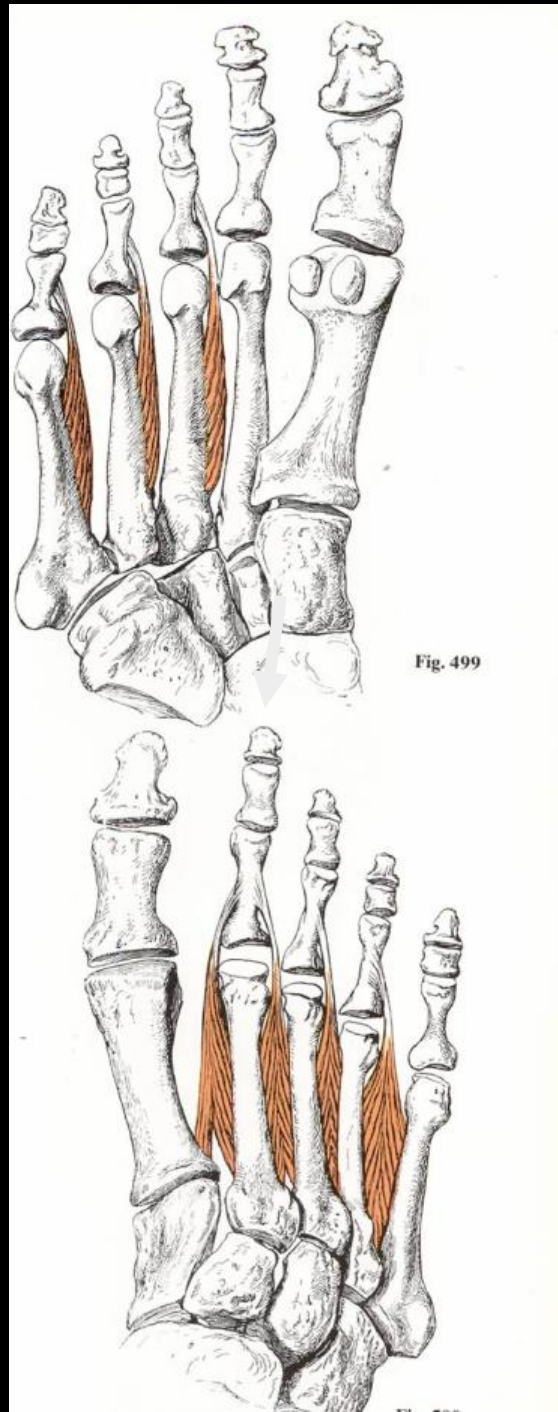


DORSAL
INTEROSSEI 4

Plantar
interossei

Axis of abduction/
adduction is digit 2

Dorsal
interossei





Lumbricals

Quadratus plantae

