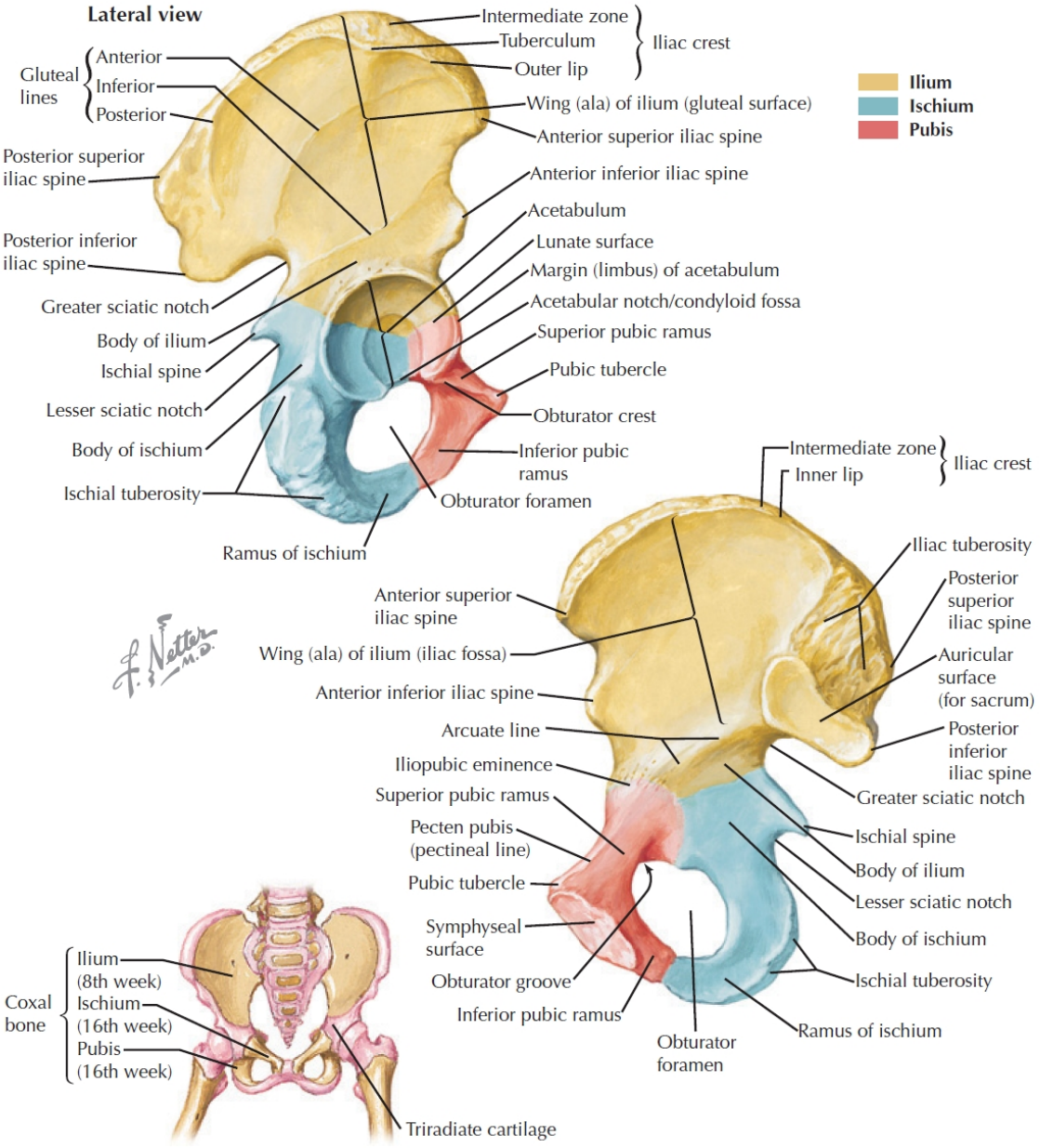
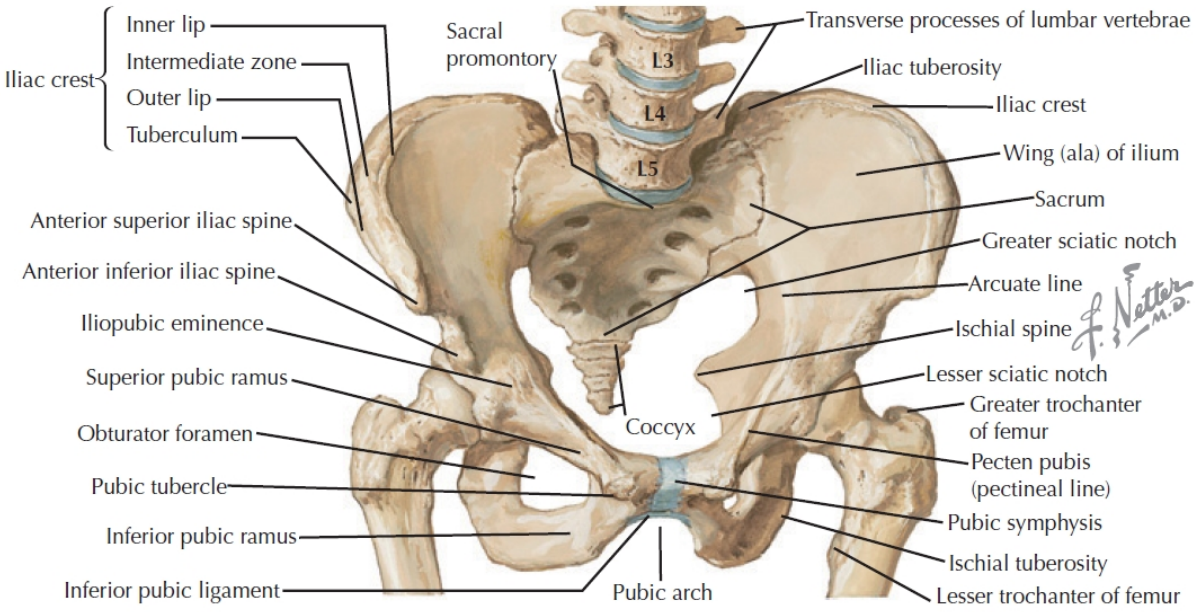
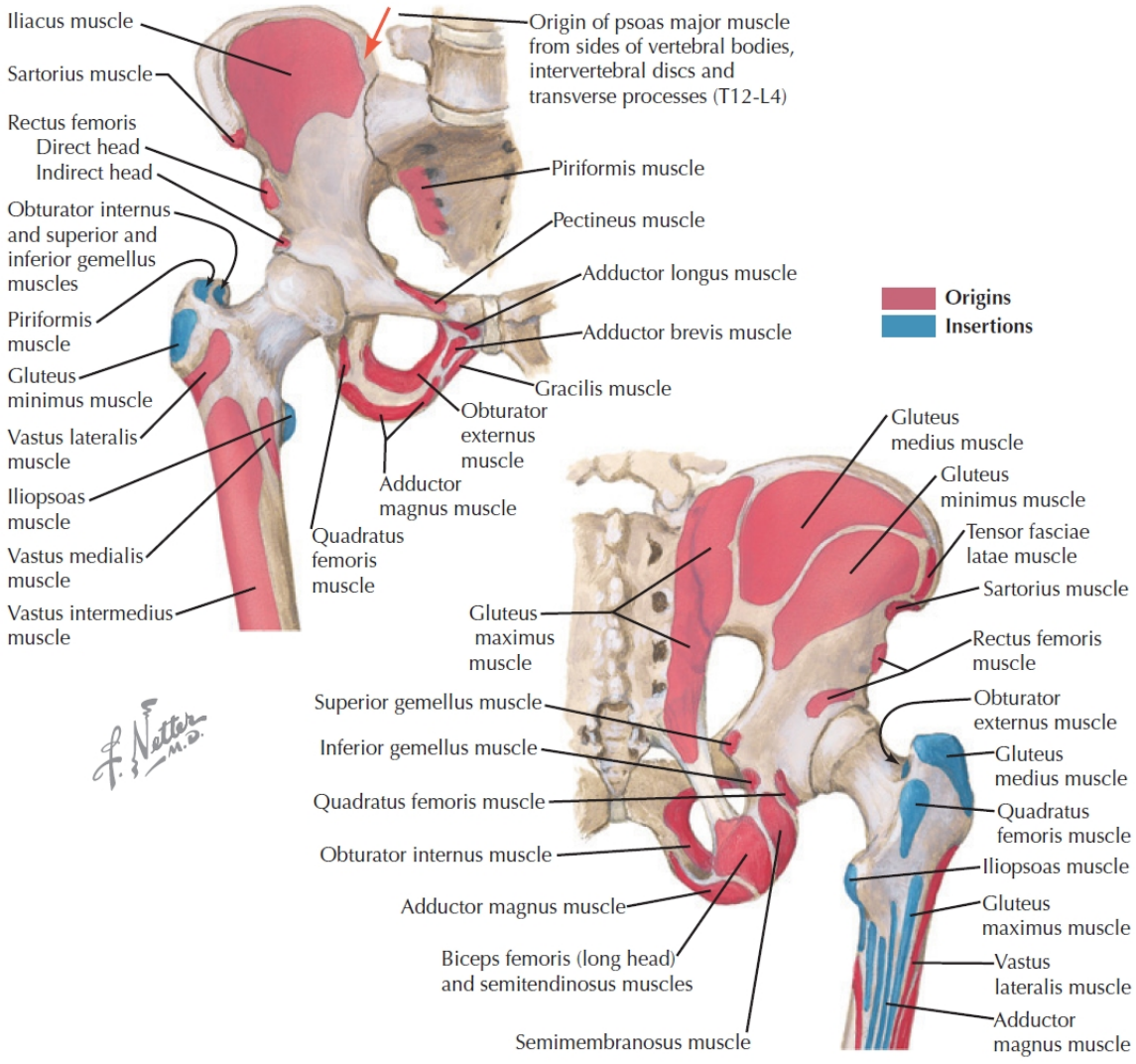
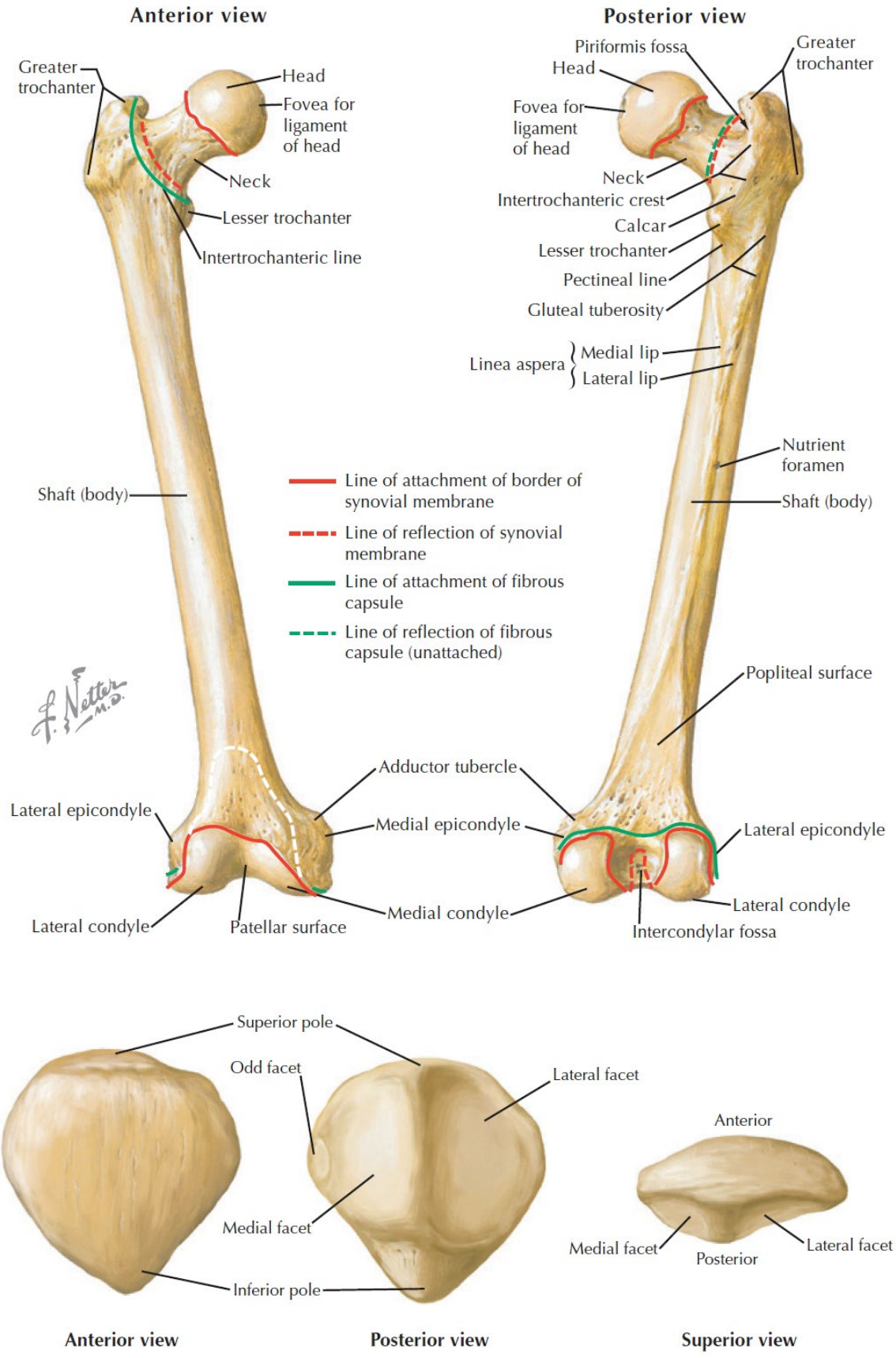
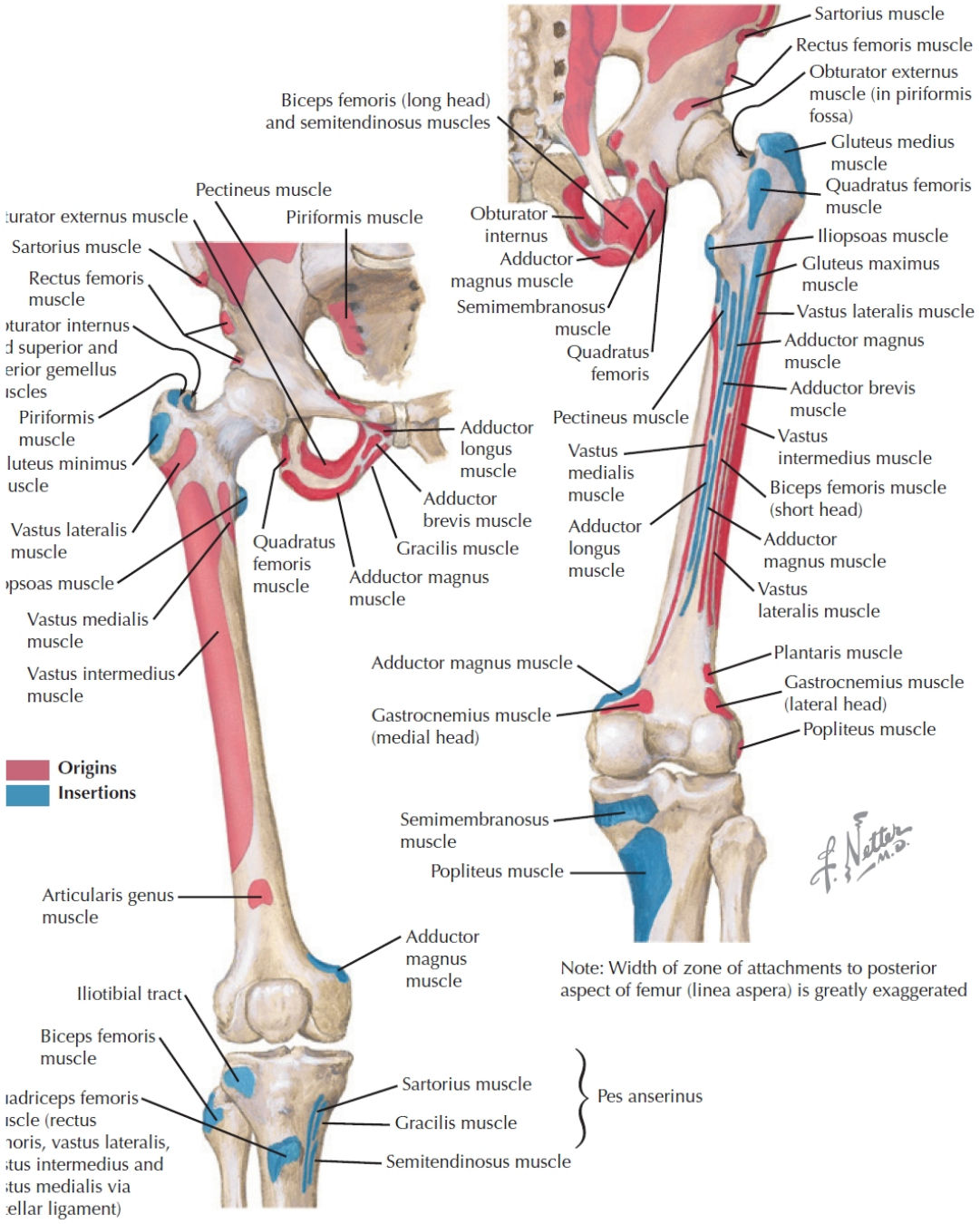
Bones of the Pelvis and Lower Limbs

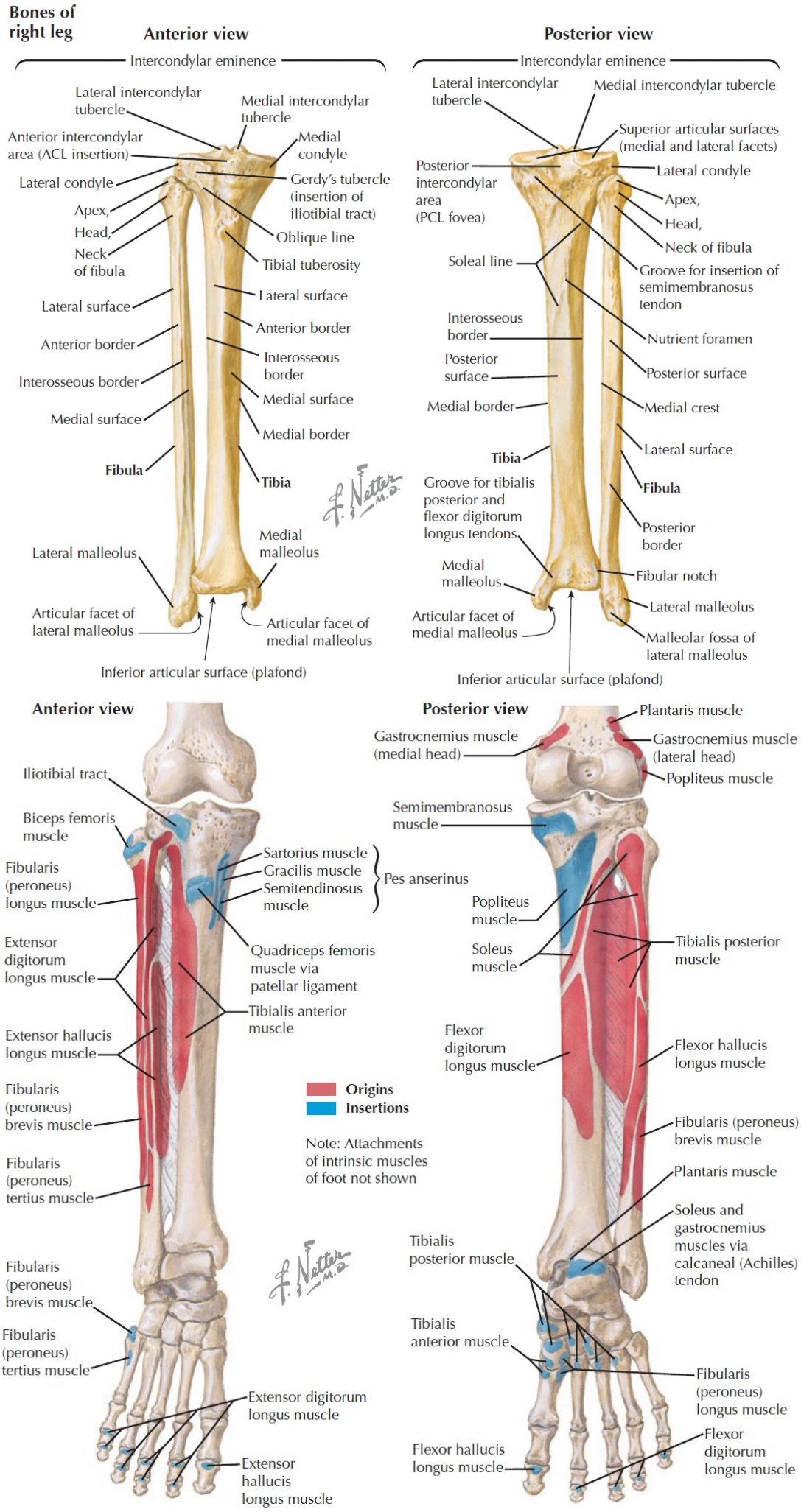


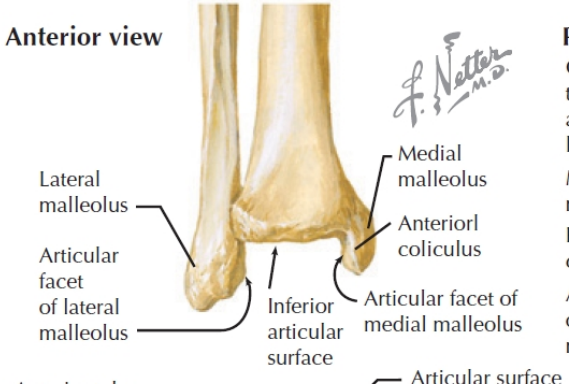

Iliac crest
Inner lip
Intermediate zone
Outer lip
Tuberculum
Sacral promontory
L3
L4
L5
Transverse processes of lumbar vertebrae
Iliac tuberosity
Iliac crest
Wing (ala) of ilium
Sacrum
Greater sciatic notch
Arcuate line
Ischial spine
Lesser sciatic notch
Greater trochanter of femur
Pecten pubis (pectineal line)
Pubic symphysis
Ischial tuberosity
Lesser trochanter of femur
Anterior superior iliac spine
Anterior inferior iliac spine
Iliopubic eminence
Superior pubic ramus
Obturator foramen
Pubic tubercle
Inferior pubic ramus
Inferior pubic ligament
Coccyx
Pubic arch

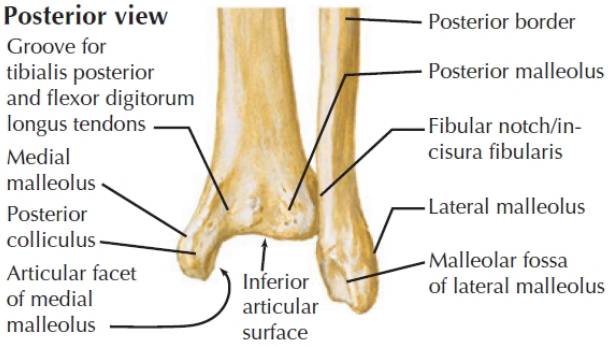

Iliacus muscle
Sartorius muscle
Rectus femoris
Direct head
Indirect head
Obturator internus and superior and inferior gemellus muscles
Piriformis muscle
Gluteus minimus muscle
Vastus lateralis muscle
Iliopsoas muscle
Vastus medialis muscle
Vastus intermedius muscle
Origin of psoas major muscle from sides of vertebral bodies, intervertebral discs and transverse processes (T12-L4)
Piriformis muscle
Pectineus muscle
Adductor longus muscle
Adductor brevis muscle
Gracilis muscle
Obturator externus muscle
Adductor magnus muscle
Quadratus femoris muscle
Origins
Insertions
Gluteus medius muscle
Gluteus minimus muscle
Tensor fasciae latae muscle
Sartorius muscle
Rectus femoris muscle
Obturator externus muscle
Gluteus medius muscle
Quadratus femoris muscle
Iliopsoas muscle
Gluteus maximus muscle
Vastus lateralis muscle
Adductor magnus muscle
Gluteus maximus muscle
Superior gemellus muscle
Inferior gemellus muscle
Quadratus femoris muscle
Obturator internus muscle
Adductor magnus muscle
Biceps femoris (long head) and semitendinosus muscles
Semimembranosus muscle

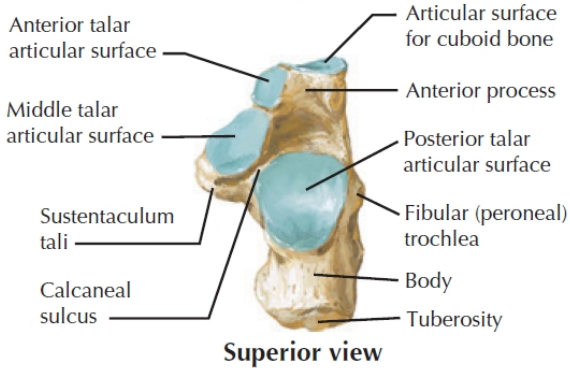

Anterior view
Posterior view
Greater trochanter
Head
Fovea for ligament of head
Neck
Lesser trochanter
Intertrochanteric line
Piriformis fossa
Head
Greater trochanter
Fovea for ligament of head
Neck
Intertrochanteric crest
Calcar
Lesser trochanter
Pectineal line
Gluteal tuberosity
Linea aspera
Medial lip
Lateral lip
Nutrient foramen
Shaft (body)
Shaft (body)
Line of attachment of border of synovial membrane
Line of reflection of synovial membrane
Line of attachment of fibrous capsule
Line of reflection of fibrous capsule (unattached)
Popliteal surface
Adductor tubercle
Lateral epicondyle
Medial epicondyle
Lateral epicondyle
Lateral condyle
Patellar surface
Medial condyle
Lateral condyle
Intercondylar fossa
Superior pole
Odd facet
Lateral facet
Medial facet
Inferior pole
Anterior
Medial facet
Posterior
Lateral facet
Anterior view
Posterior view
Superior view


Sartorius muscle
Rectus femoris muscle
Obturator externus muscle (in piriformis fossa)
Biceps femoris (long head) and semitendinosus muscles
Gluteus medius muscle
Quadratus femoris muscle
Pectineus muscle
Piriformis muscle
Obturator internus
Iliopsoas muscle
Adductor magnus muscle
Gluteus maximus muscle
Semimembranosus muscle
Vastus lateralis muscle
Quadratus femoris
Adductor magnus muscle
Adductor brevis muscle
Pectineus muscle
Vastus intermedius muscle
Adductor longus muscle
Vastus medialis muscle
Biceps femoris muscle (short head)
Adductor magnus muscle
Vastus lateralis muscle
Adductor magnus muscle
Plantaris muscle
Gastrocnemius muscle (lateral head)
Gastrocnemius muscle (medial head)
Popliteus muscle
Semimembranosus muscle
Popliteus muscle
Origins
Insertions
Articularis genus muscle
Adductor magnus muscle
Iliotibial tract
Biceps femoris muscle
Sartorius muscle
Gracilis muscle
Pes anserinus
Semitendinosus muscle
Note: Width of zone of attachments to posterior aspect of femur (linea aspera) is greatly exaggerated

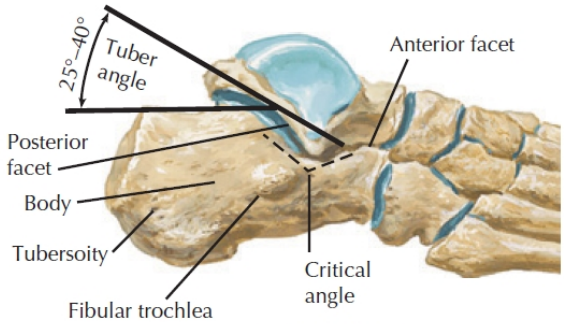

Bones of right leg
Anterior view
Intercondylar eminence
Lateral intercondylar tubercle
Medial intercondylar tubercle
Anterior intercondylar area (ACL insertion)
Medial condyle
Lateral condyle
Gerdy's tubercle (insertion of iliotibial tract)
Apex,
Head,
Neck of fibula
Oblique line
Tibial tuberosity
Lateral surface
Anterior border
Interosseous border
Medial surface
Medial border
Fibula
Tibia
Medial malleolus
Lateral malleolus
Articular facet of lateral malleolus
Articular facet of medial malleolus
Inferior articular surface (plafond)
Posterior view
Intercondylar eminence
Lateral intercondylar tubercle
Medial intercondylar tubercle
Superior articular surfaces (medial and lateral facets)
Posterior intercondylar area (PCL fovea)
Lateral condyle
Apex,
Head,
Neck of fibula
Soleal line
Groove for insertion of semimembranosus tendon
Interosseous border
Nutrient foramen
Posterior surface
Medial border
Medial crest
Lateral surface
Tibia
Fibula
Groove for tibialis posterior and flexor digitorum longus tendons
Posterior border
Medial malleolus
Fibular notch
Lateral malleolus
Articular facet of medial malleolus
Malleolar fossa of lateral malleolus
Inferior articular surface (plafond)
Anterior view
Iliotibial tract
Biceps femoris muscle
Fibularis (peroneus) longus muscle
Sartorius muscle
Gracilis muscle
Semitendinosus muscle
Pes anserinus
Extensor digitorum longus muscle
Quadriceps femoris muscle via patellar ligament
Tibialis anterior muscle
Extensor hallucis longus muscle
Fibularis (peroneus) brevis muscle
Fibularis (peroneus) tertius muscle
Origins
Insertions
Note: Attachments of intrinsic muscles of foot not shown
Extensor digitorum longus muscle
Extensor hallucis longus muscle
Posterior view
Plantaris muscle
Gastrocnemius muscle (medial head)
Gastrocnemius muscle (lateral head)
Popliteus muscle
Semimembranosus muscle
Popliteus muscle
Soleus muscle
Tibialis posterior muscle
Flexor digitorum longus muscle
Flexor hallucis longus muscle
Fibularis (peroneus) brevis muscle
Plantaris muscle
Soleus and gastrocnemius muscles via calcaneal (Achilles) tendon
Tibialis posterior muscle
Tibialis anterior muscle
Fibularis (peroneus) longus muscle
Flexor hallucis longus muscle
Flexor digitorum longus muscle



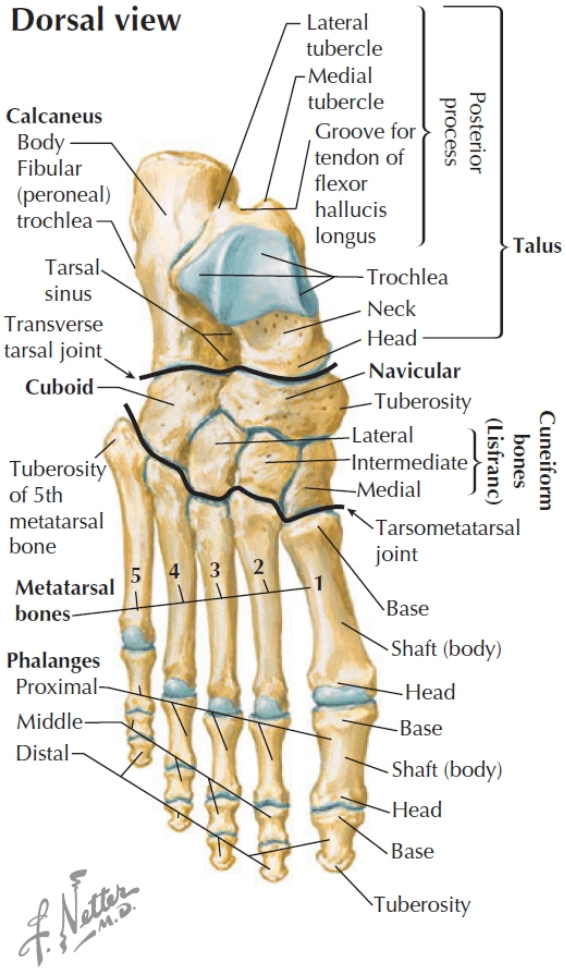


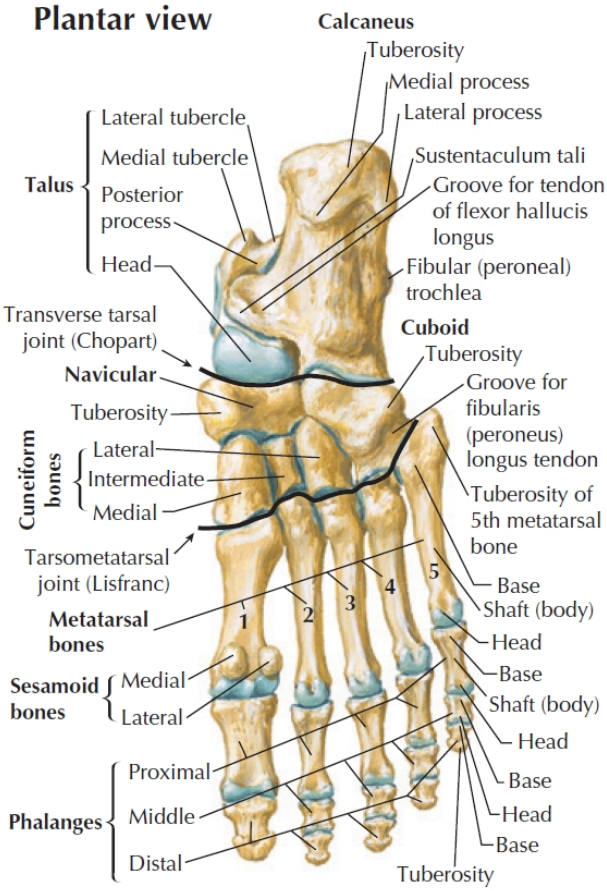


Superior view

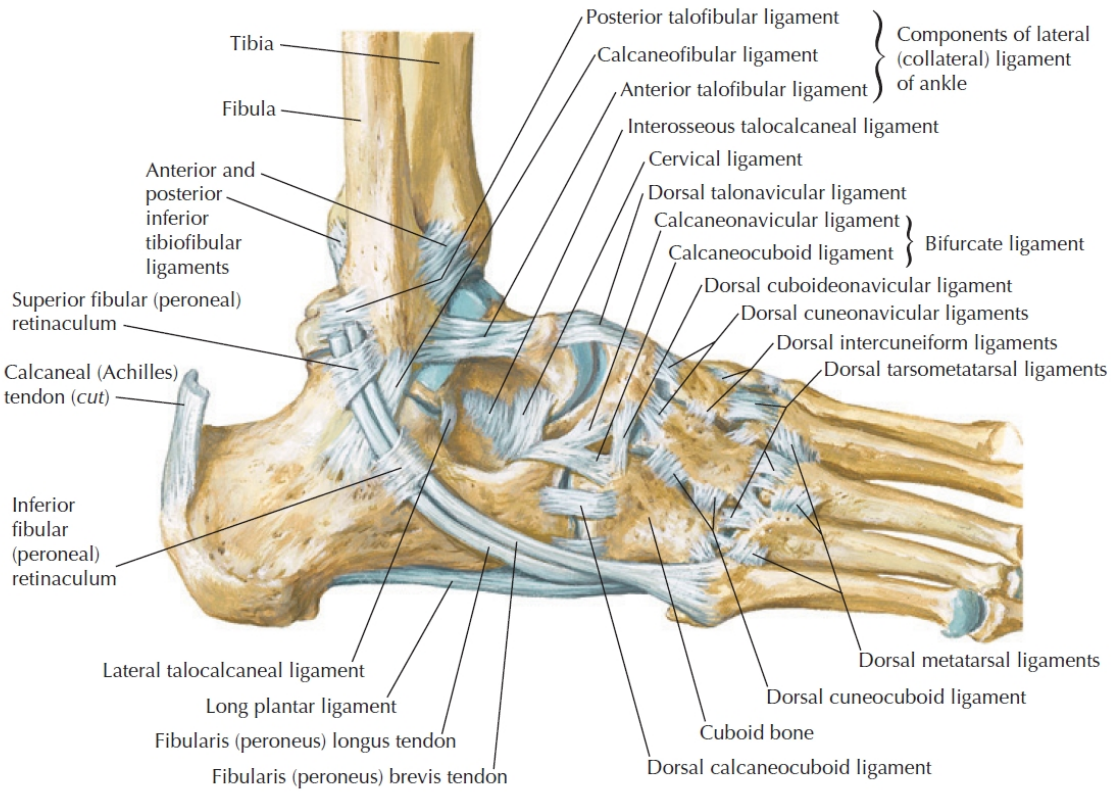


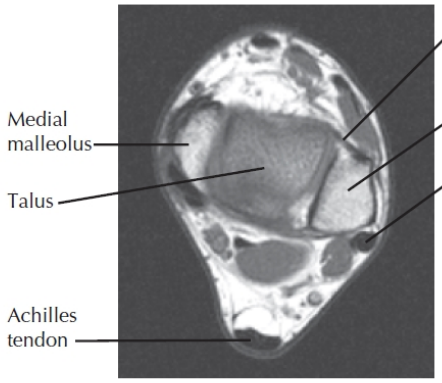
Lateral view





Right foot: lateral view





Ankle MRI, axial

Ankle MRI, coronal

Muscles of LL

Gluteal Region

Gluteal muscles

- Gluteus maximus: inserts to gluteal tuberosity of the femur and iliotibial tract
- Gluteus medius: attach to lateral greater trochanter
- Gluteus minimis: attach to anterior greater trochanter
- All extend and abduct the hip

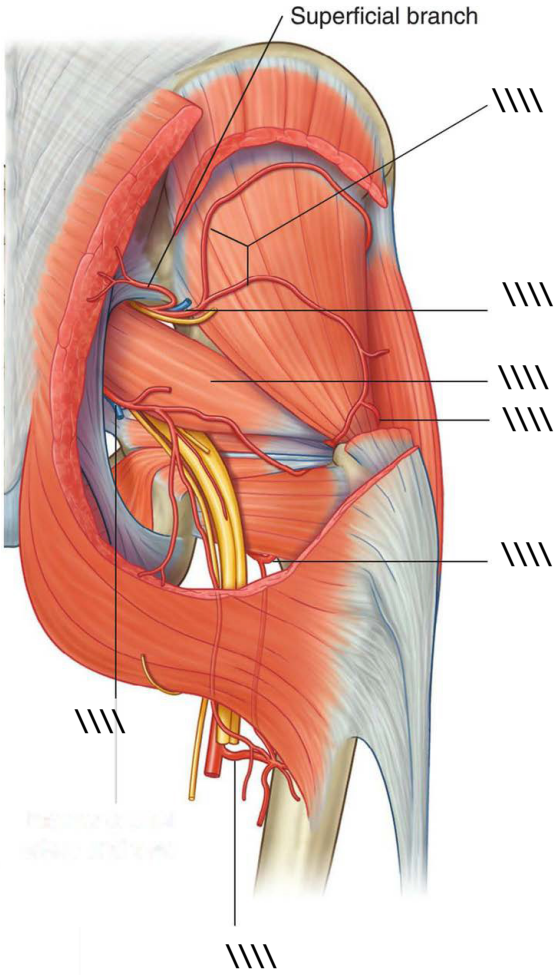
Deep lateral hip rotators

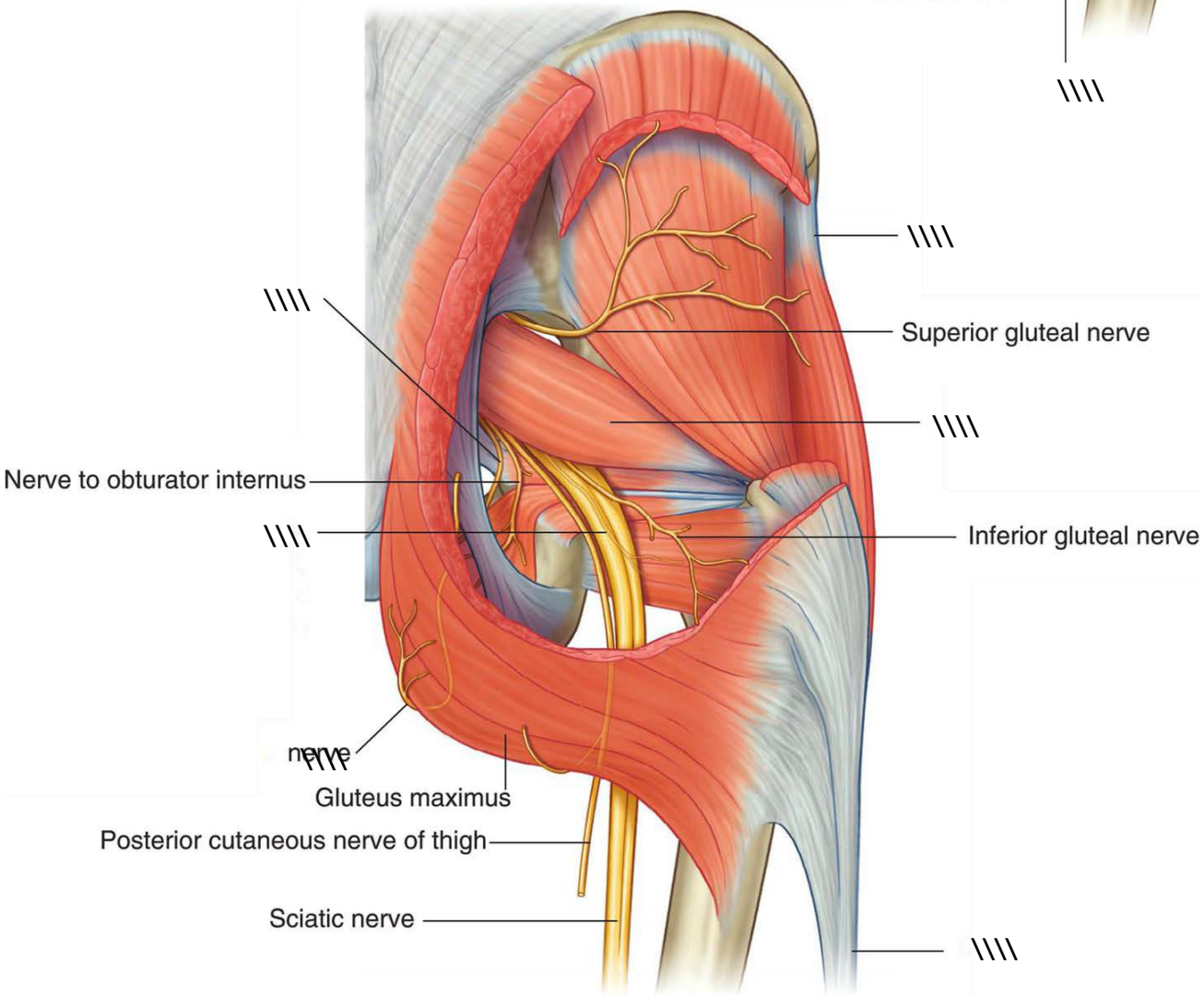
- Piriformis
- Gemelli
- Obturator internus
- Quadratus femoris

Nerves

Superior gluteal nerve (L5, S1)	• Gluteus medius • Gluteus minimis • Tensor fascia lata
Inferior gluteal nerve	Gluteus maximus

Damage to the superior gluteal nerve will result in the patient developing a Trendelenberg gait. Affected patients are unable to abduct the thigh at the hip joint. During the stance phase, the weakened abductor muscles allow the pelvis to tilt down on the opposite side. To compensate, the trunk lurches to the weakened side to attempt to maintain a level pelvis throughout the gait cycle. The pelvis sags on the opposite side of the lesioned superior gluteal nerve.



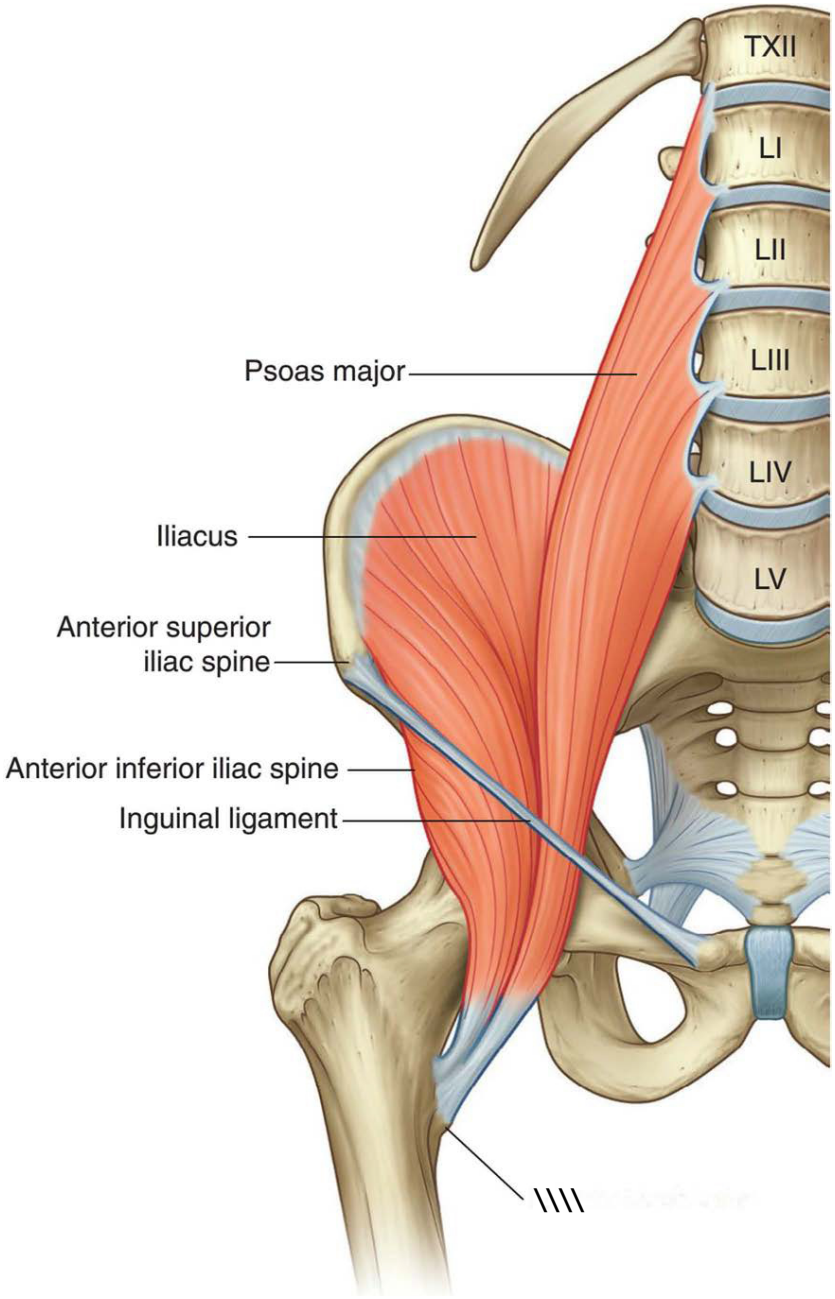


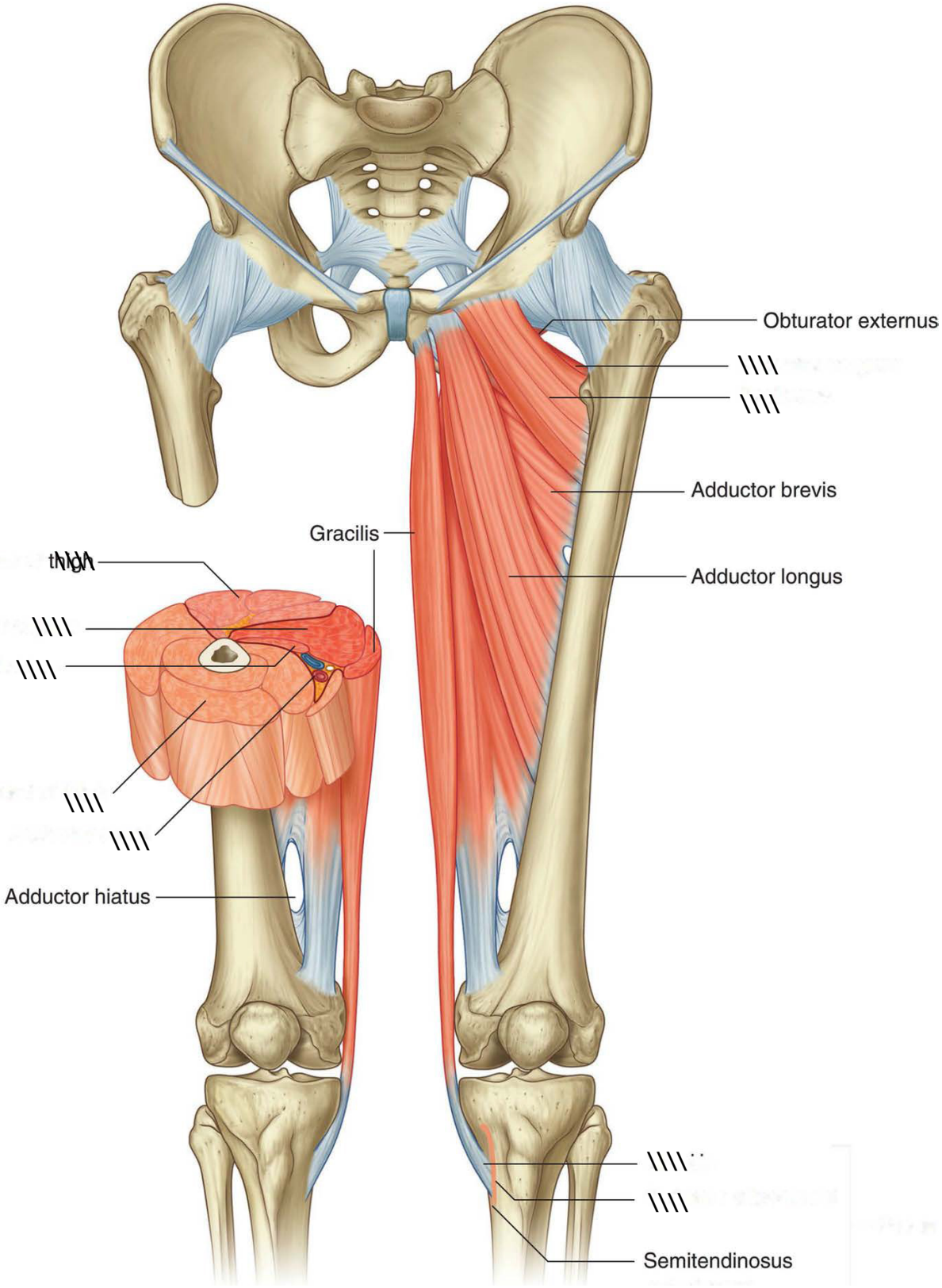
Muscles of The Pelvis and Hip

Muscle	Origin	Insertion	Nerve	Segment
Flexors				
Iliacus	Iliac fossa	Lesser trochanter	Femoral	L2-L4 (P)
Psoas	Transverse processes of L1-L5	Lesser trochanter	Femoral	L2-L4 (P)
Pectineus	Pectineal line of pubis	Pectineal line of femur	Femoral	L2-L4 (P)
Rectus femoris	*Straight head:* Anterior inferior iliac spine *Reflected head:* Acetabular rim	Patella and tibial tubercle	Femoral	L2-L4 (P)
Sartorius	Anterior superior iliac spine	Proximal medial tibia	Femoral	L2-L4 (P)
Adductors				
Adductor magnus	Inferior pubic ramus/ischial tuberosity	Linea aspera/adductor tubercle	Obturator (P) Sciatic (tibial)	L2-L4 (A)
Adductor brevis	Inferior pubic ramus	Linea aspera/pectineal line	Obturator (P)	L2-L4 (A)
Adductor longus	Anterior pubic ramus	Linea aspera	Obturator (A)	L2-L4 (A)
Gracilis	Inferior symphysis/pubic arch	Proximal medial tibia	Obturator (A)	L2-L4 (A)

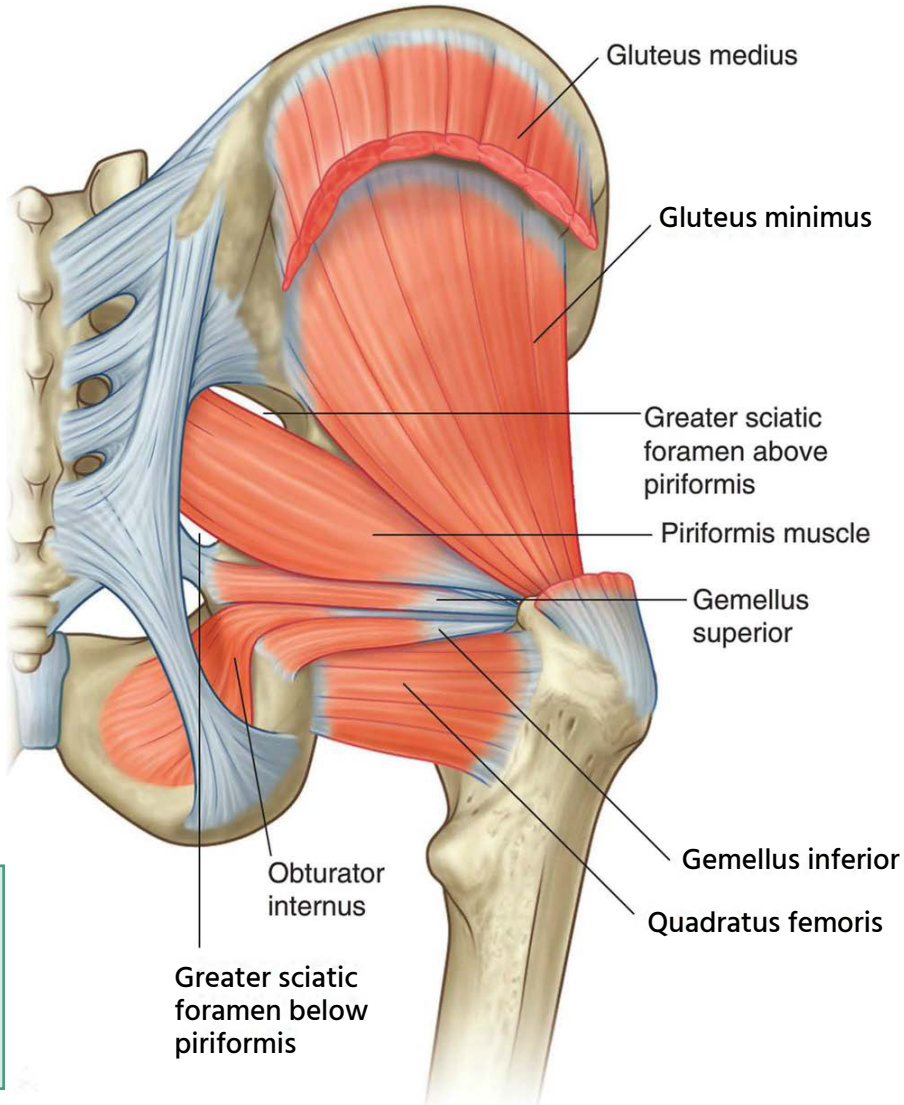
Pes anserinus: ***Goose's Foot***

Combination of sartorius, gracilis and semitendinous tendons inserting into the anteromedial proximal tibia.



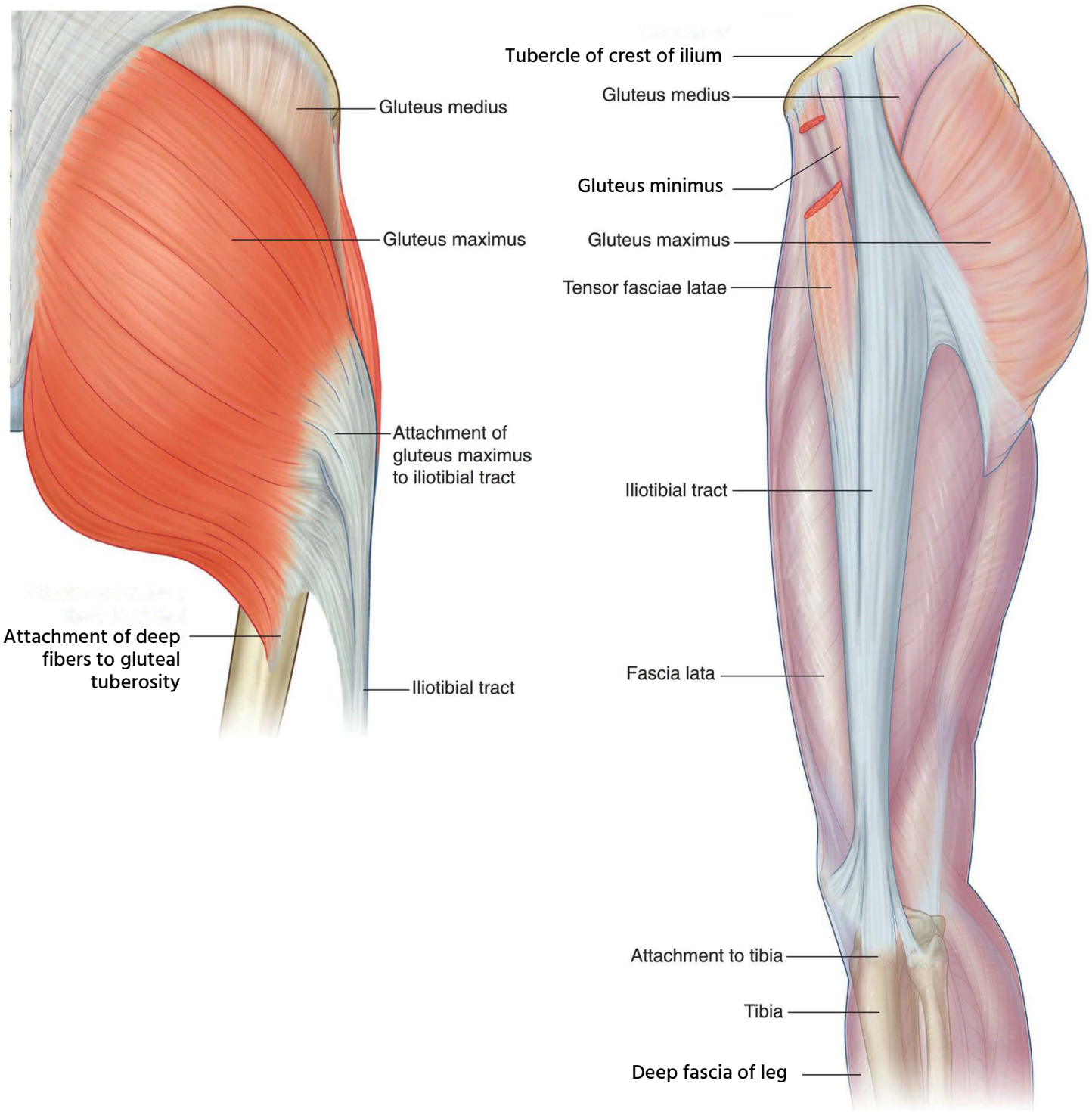

Obturator externus
Adductor brevis
Gracilis
Adductor longus
Adductor hiatus
Semitendinosus

Muscle	Origin	Insertion	Nerve	Segment
External Rotators				
Gluteus maximus	Ilium, posterior gluteal line	Iliotibial band/gluteal sling (femur)	Inferior gluteal	L5-S2 (P)
Piriformis	Anterior sacrum/sciatic notch	Proximal greater trochanter	Piriformis	S2 (P)
Obturator externus	Ischiopubic rami/obturator	Trochanteric fossa	Obturator	L2-L4 (A)
Obturator internus	Ischiopubic rami/obturator membrane	Medial greater trochanter	Obturator internus	L5-S2 (A)
Superior gemellus	Outer ischial spine	Medial greater trochanter	Obturator internus	L5-S2 (A)
Inferior gemellus	Ischial tuberosity	Medial greater trochanter	Quadratus femoris	L5-S1 (A)
Quadratus femoris	Ischial tuberosity	Quadrate line of femur	Quadratus femoris	L5-S1 (A)
Abductors				
Gluteus medius	Ilium between posterior and anterior gluteal lines	Greater trochanter	Superior gluteal	L4-S1 (P)
Gluteus minimus	Ilium between anterior and inferior gluteal lines	Anterior border of greater trochanter	Superior gluteal	L4-S1 (P)
Tensor fasciae latae (tensor fasciae femoris)	Anterior iliac crest	Iliotibial band	Superior gluteal	L4-S1 (P)
A, anterior; P, posterior.				



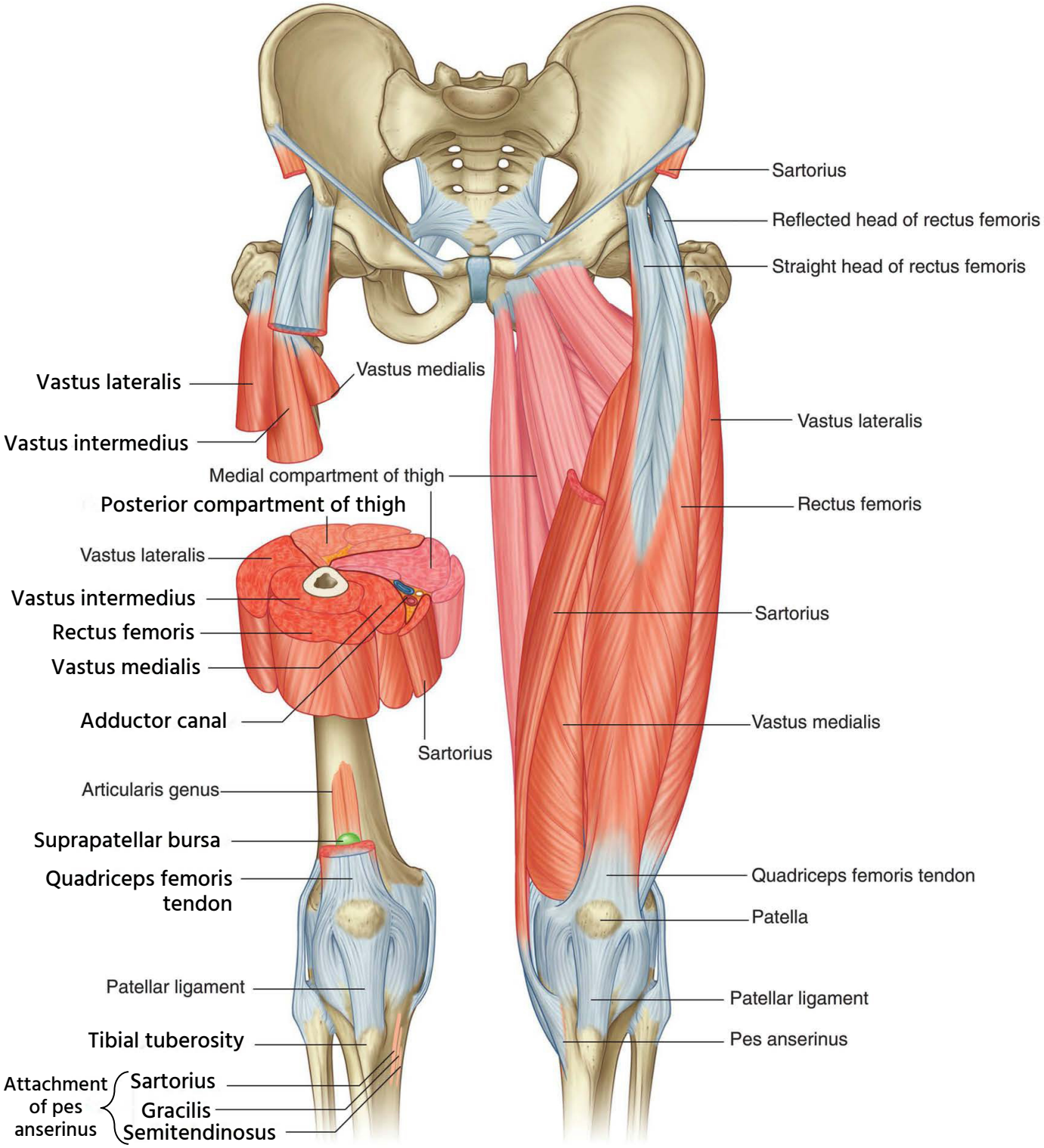
Mnemonic for muscle attachment on greater trochanter: ***POGO***:

- Piriformis
- Obturator internus
- Gemelli
- Obturator externus

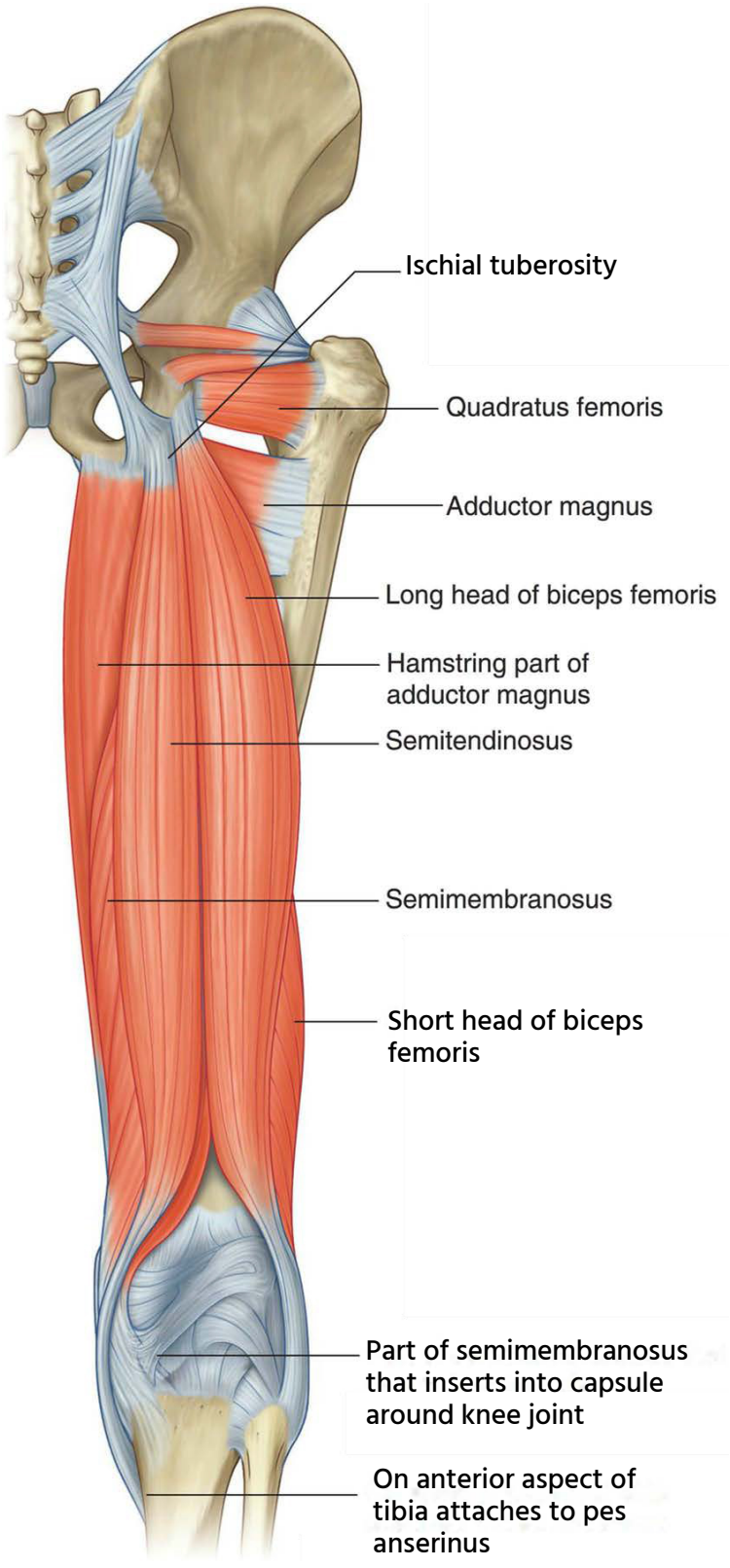

Gluteus medius
Gluteus maximus
Attachment of gluteus maximus to iliotibial tract
Attachment of deep fibers to gluteal tuberosity
Iliotibial tract
Tubercle of crest of ilium
Gluteus medius
Gluteus minimus
Gluteus maximus
Tensor fasciae latae
Iliotibial tract
Fascia lata
Attachment to tibia
Tibia
Deep fascia of leg

Muscles of The Thigh

Muscle	Origin	Insertion	Innervation
Muscles of the Anterior Thigh			
Vastus lateralis	Iliotibial line/greater trochanter/lateral linea aspera	Lateral patella	Femoral
Vastus medialis	Iliotibial line/medial linea aspera/supracondylar line	Medial patella	Femoral
Vastus intermedius	Proximal anterior femoral shaft	Patella	Femoral

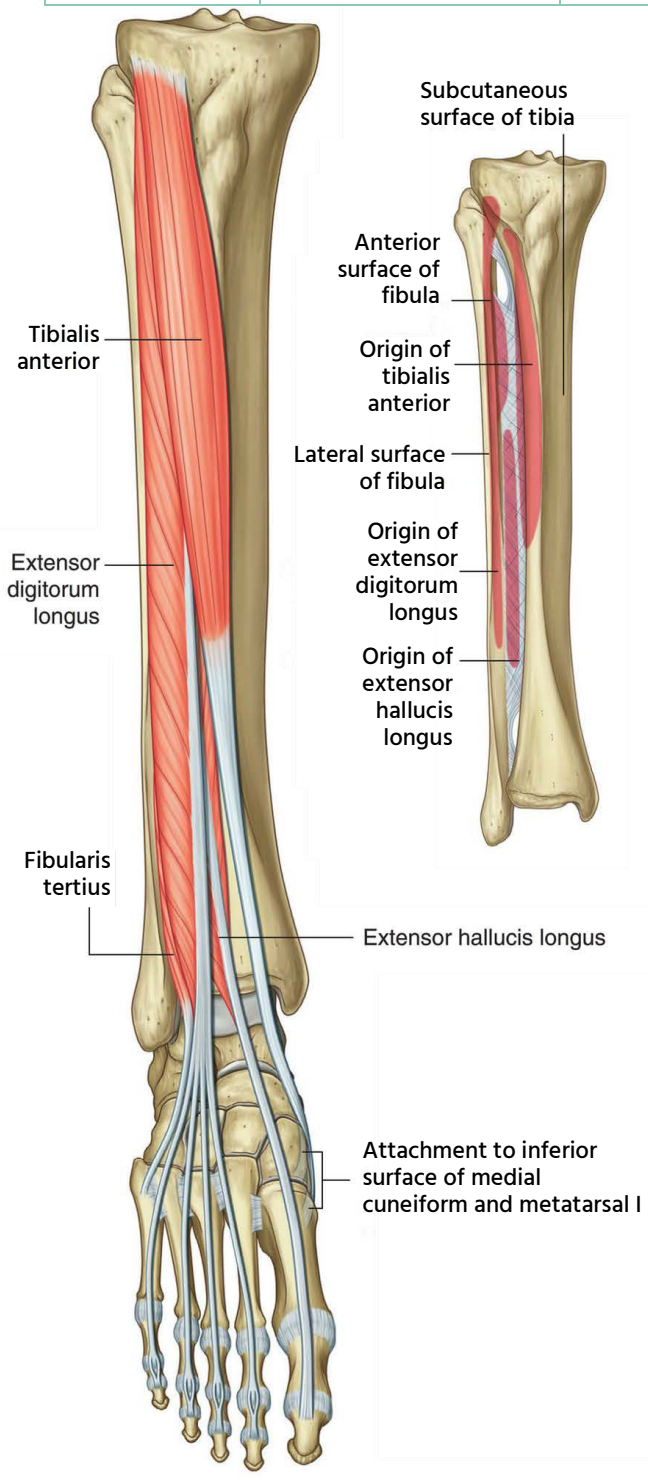


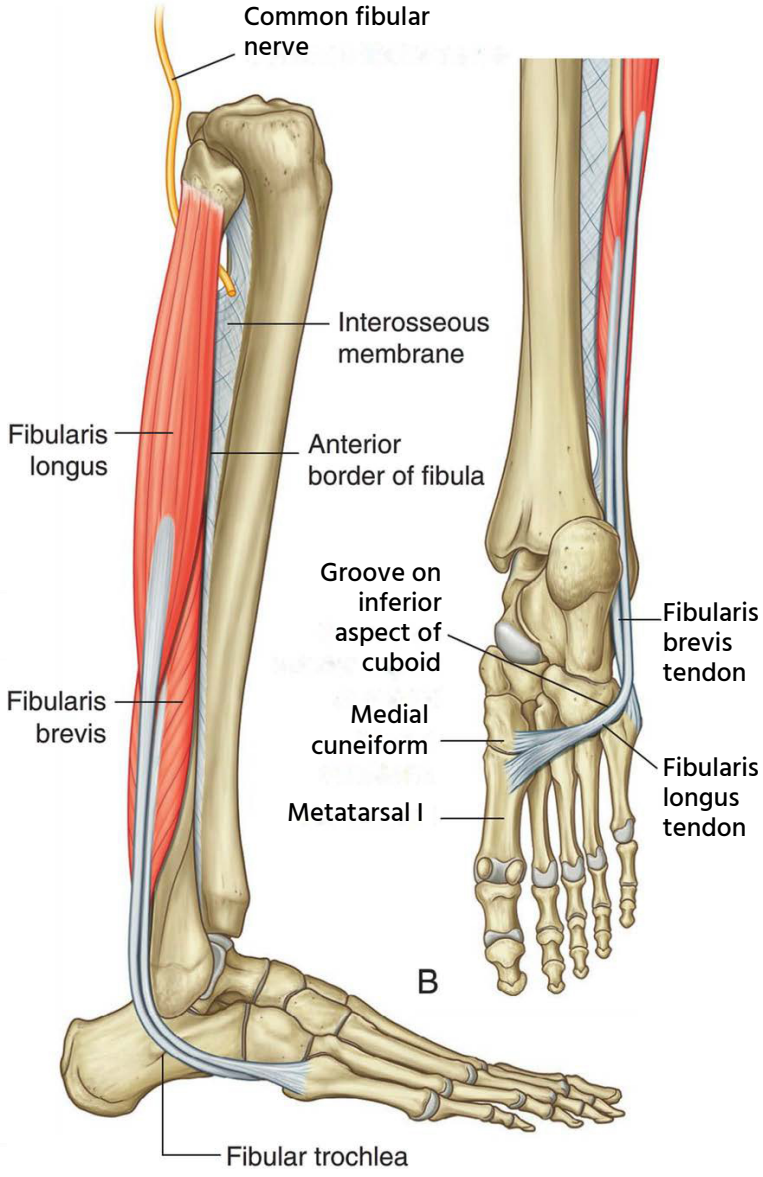
Muscle	Origin	Insertion	Innervation
Muscles of the Posterior Thigh			
Biceps femoris (long head)	Medial ischial tuberosity	Fibular head/lateral tibia	Tibial
Biceps (short head)	Lateral linea aspera/lateral intermuscular septum	Lateral tibial condyle	Peroneal
Semitendinosus	Distal medial ischial tuberosity	Anterior tibial crest	Tibial
Semimembranosus	Proximal lateral ischial tuberosity	Oblique popliteal ligament Posterior capsule Posterior/medial tibia Popliteus Medial meniscus	Tibial



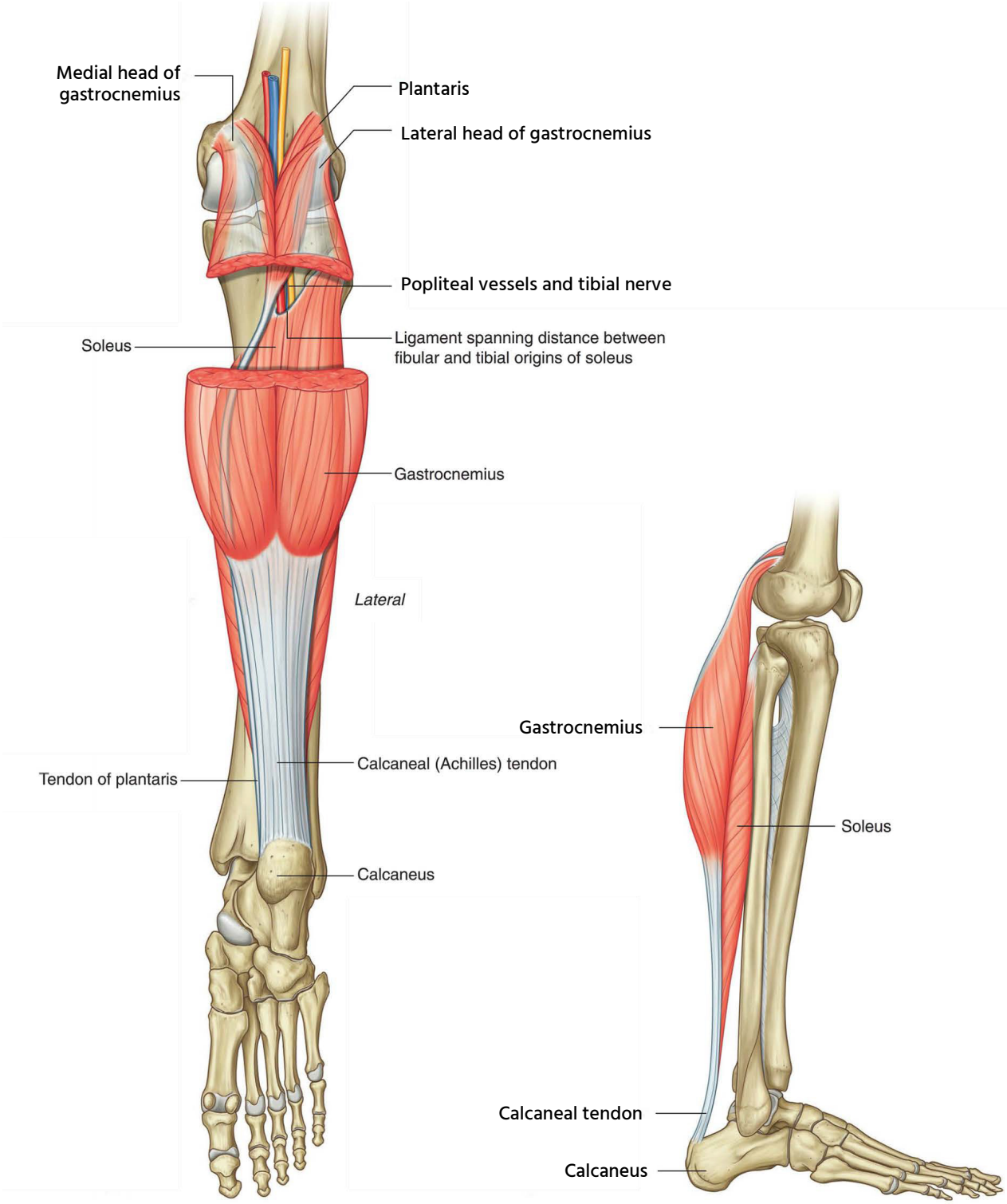
Muscles of The Leg

Muscle	Origin	Insertion	Action	Innervation
Anterior Compartment				
Tibialis anterior	Lateral tibia	Medial cuneiform, first metatarsal	Dorsiflexing, inverting foot	Deep peroneal (L4) nerve
Extensor hallucis longus	Mid-fibula	Great toe, distal phalanx	Dorsiflexing, extending toe	Deep peroneal (L5) nerve
Extensor digitorum longus	Tibial condyle/fibula	Toe, middle and distal phalanges	Dorsiflexing, extending toe	Deep peroneal (L5) nerve
Peroneus tertius	Fibula and extensor digitorum longus tendon	Fifth metatarsal	Everting, dorsiflexing, abducting foot	Deep peroneal (S1) nerve
Lateral Compartment				
Peroneus longus	Proximal fibula	Medial cuneiform, first metatarsal	Everting, plantar flexing, abducting foot	Superficial peroneal (S1) nerve
Peroneus brevis	Distal fibula	Tuberosity of fifth metatarsal	Everting foot	Superficial peroneal (S1) nerve

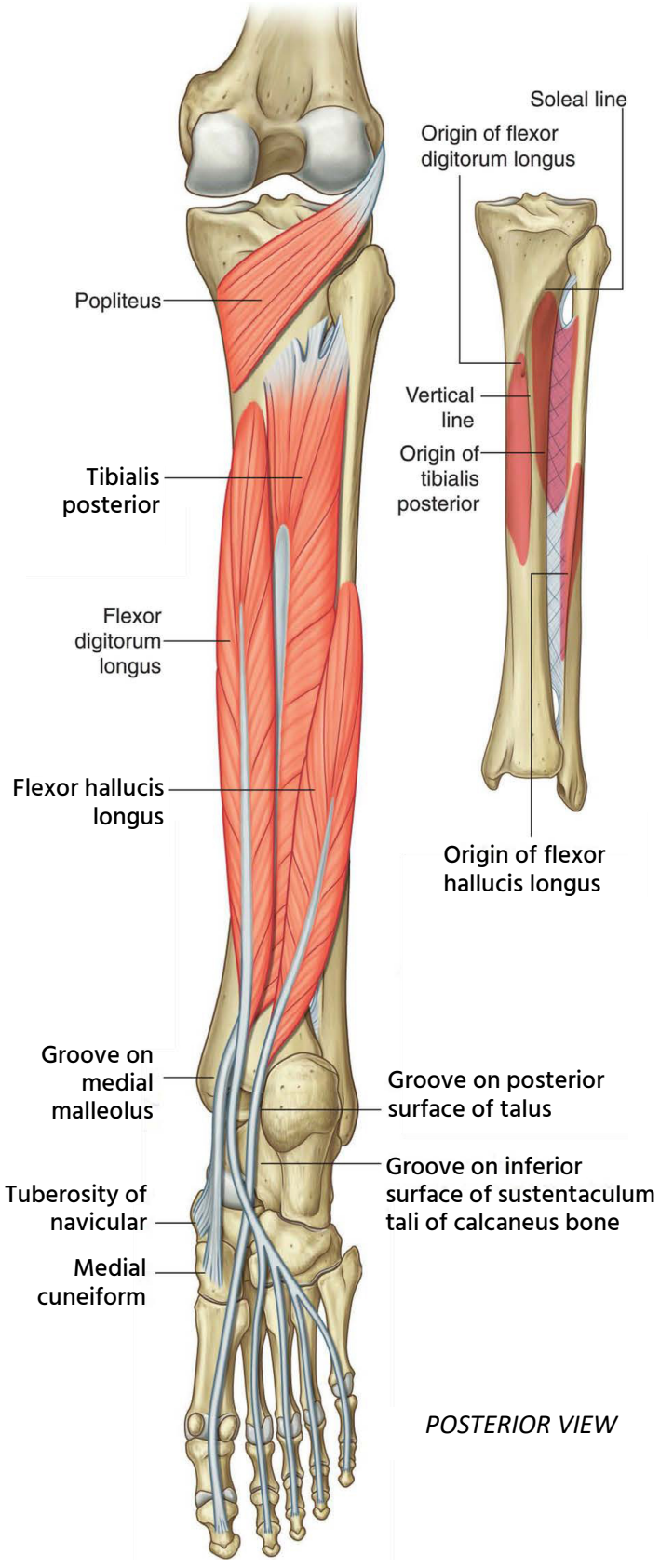


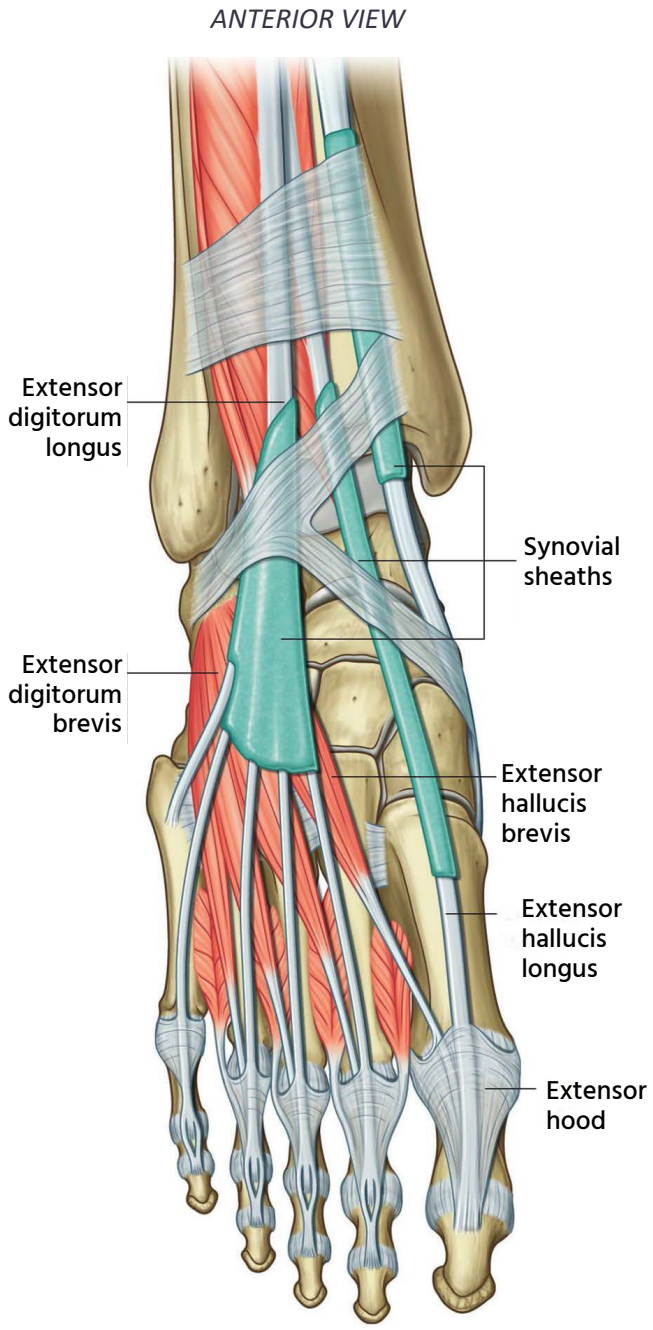


Muscle	Origin	Insertion	Action	Innervation
*Superficial Posterior Compartment **("GPS")***				
Gastrocnemius	Posterior medial and lateral femoral condyles	Calcaneus	Plantar flexing foot	Tibial (S1) nerve
Plantaris	Lateral femoral condyle	Calcaneus	Plantar flexing foot	Tibial (S1) nerve
Soleus	Fibula/tibia	Calcaneus	Plantar flexing foot	Tibial (S1) nerve



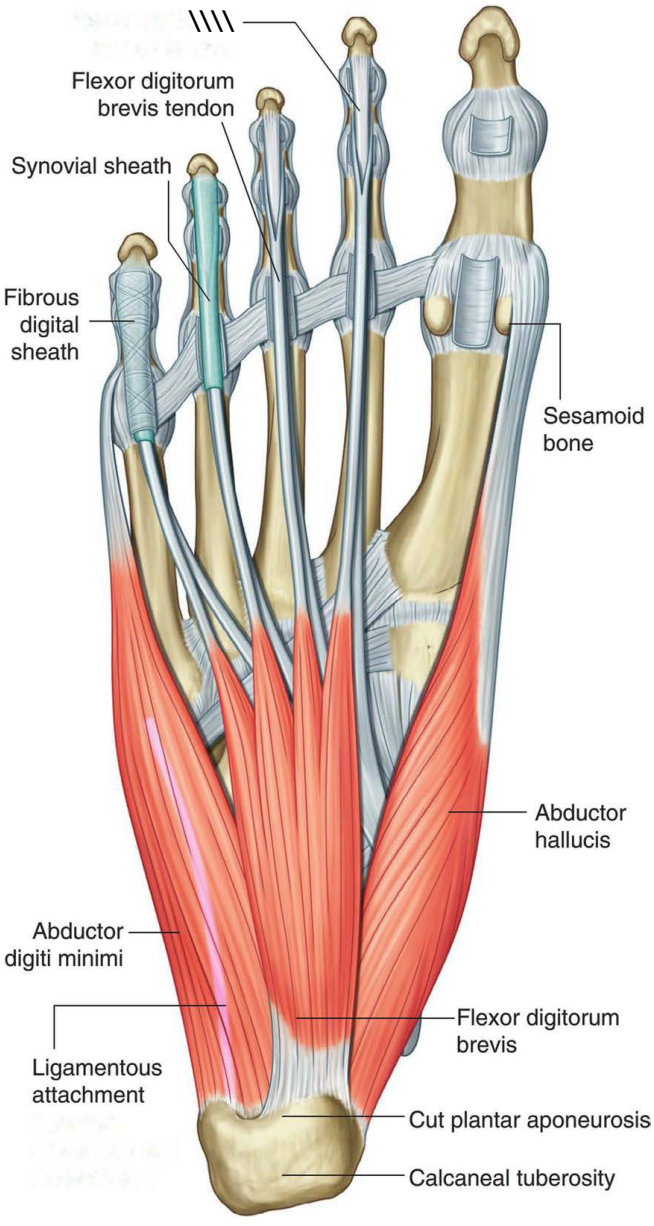
Muscle	Origin	Insertion	Action	Innervation
Deep Posterior Compartment ***("Pfft…")***				
Popliteus	Lateral femoral condyle, fibular head	Proximal tibia	Flexing, internally rotating knee	Tibial (L5, S1) nerve
Flexor hallucis longus	Fibula	Great toe, distal phalanx	Plantar flexing great toe	Tibial (S1) nerve
Flexor digitorum longus	Tibia	Second to fifth toes, distal phalanges	Plantar flexing toes, foot	Tibial (S1, S2) nerve
Tibialis posterior	Tibia, fibula, interosseous membrane	Navicular, medial cuneiform	Inverting/plantar flexing foot	Tibial (L4, L5) nerve

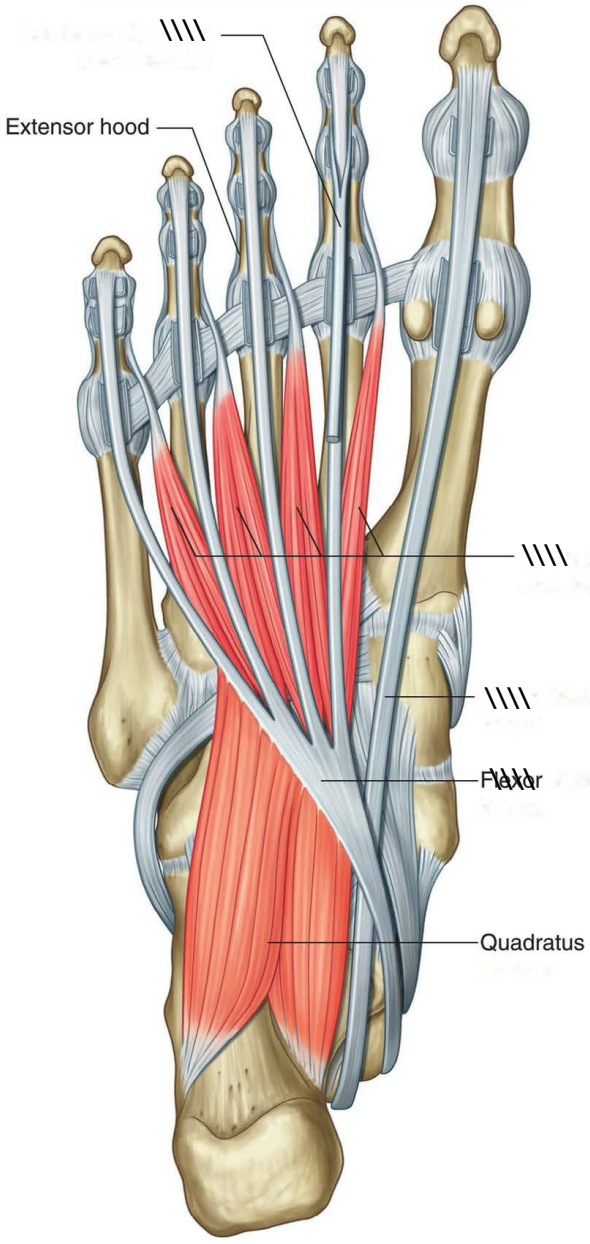




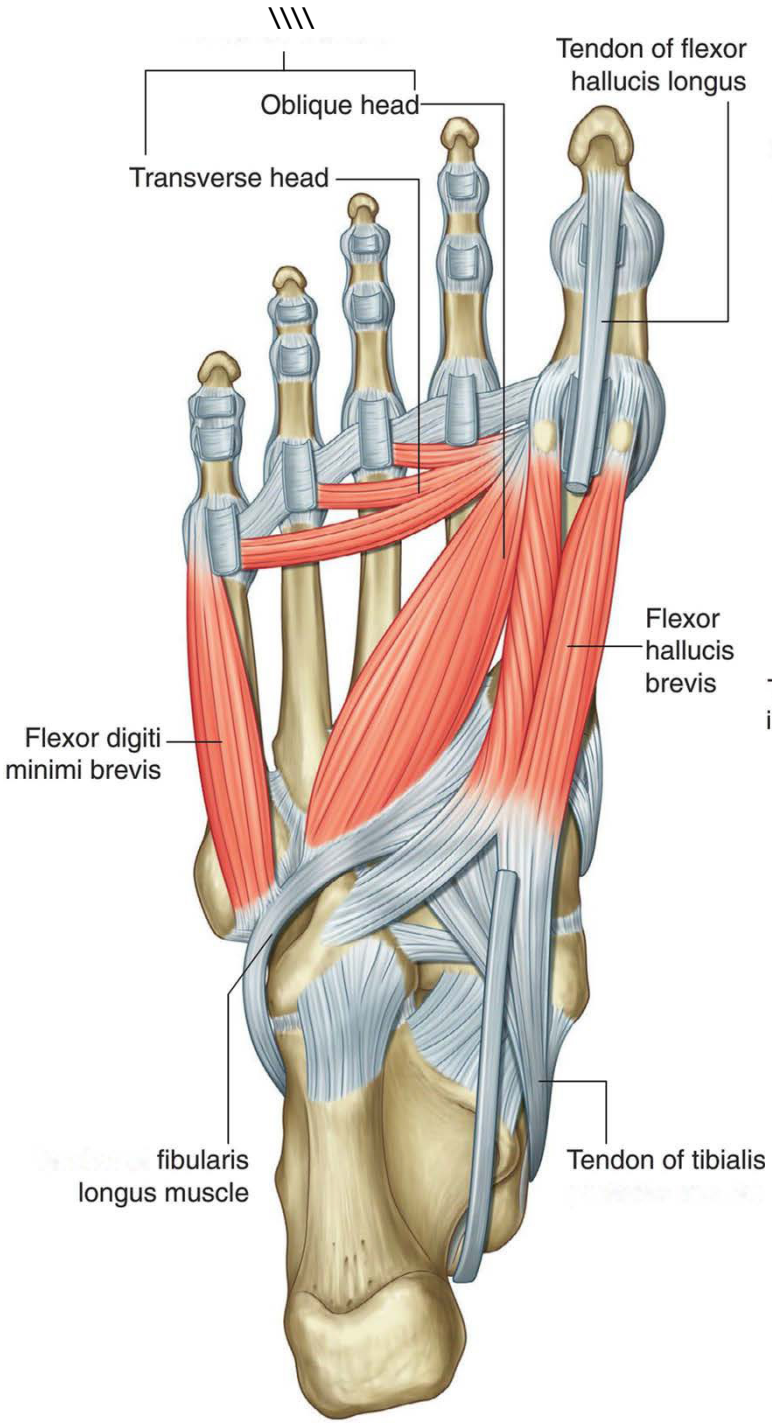
Muscles of The Ankle and Foot

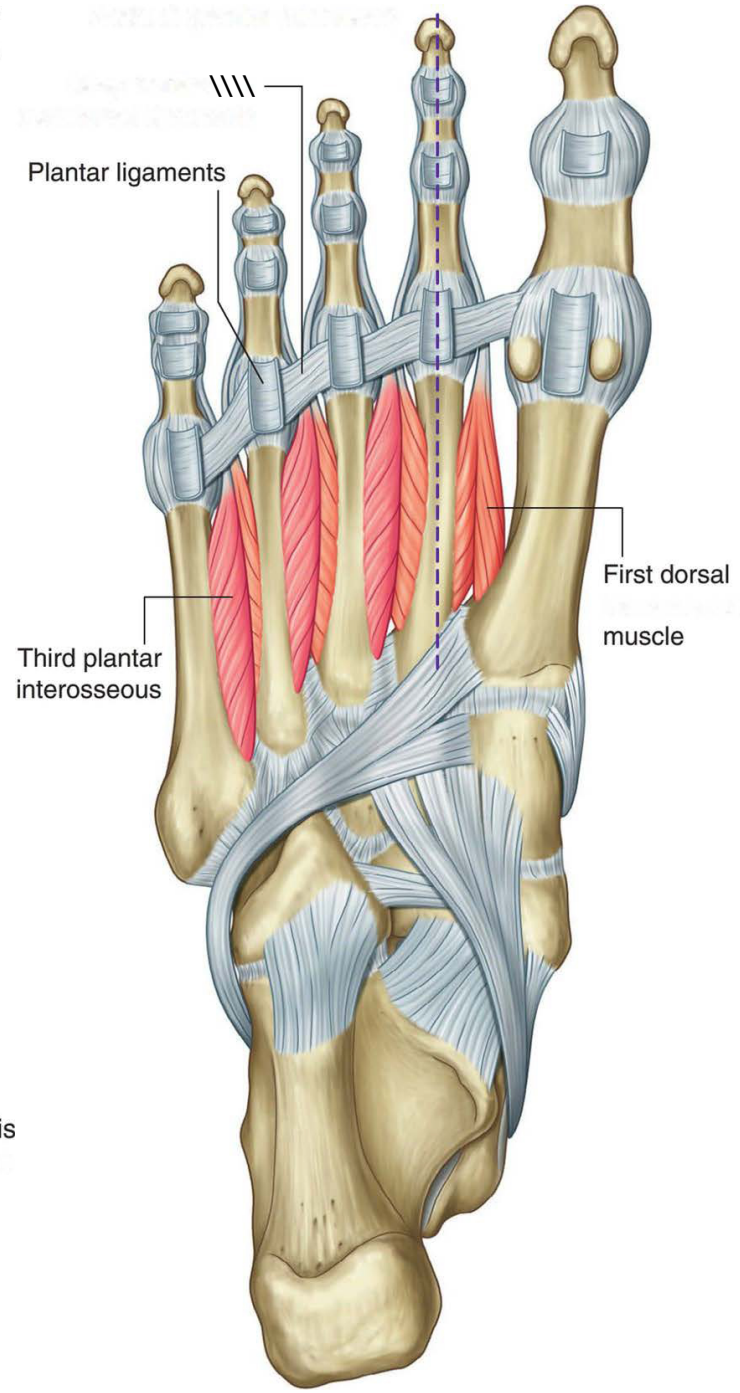
Muscle	Origin	Insertion	Action	Innervation
Dorsal Layer				
Extensor digitorum brevis	Superolateral calcaneus	Base of proximal phalanges	Extending	Deep peroneal nerve
First Plantar Layer				
Abductor hallucis	Calcaneal tuberosity	Base of great toe, proximal phalanx	Abducting great toe	Medial plantar nerve
Flexor digitorum brevis	Calcaneal tuberosity	Distal phalanges of second to fifth toes	Flexing toes	Medial plantar nerve
Abductor digiti minimi	Calcaneal tuberosity	Base of small toe	Abducting small toe	Lateral plantar nerve
Second Plantar Layer				
Quadratus plantae	Medial and lateral calcaneus	Flexor digitorum longus tendon	Helping flex distal phalanges	Lateral plantar nerve
Lumbrical muscles	Flexor digitorum longus tendon	Extensor digitorum longus tendon	Flexing metatarsophalangeal joint, extending interphalangeal joint	Medial and lateral plantar nerves
Flexor digitorum longus and flexor hallucis longus	Tibia/fibula	Distal phalanges of digits	Flexing toes, inverting foot	Tibial nerve





Muscle	Origin	Insertion	Action	Innervation
Third Plantar Layer				
Flexor hallucis brevis	Cuboid/lateral cuneiform	Proximal phalanx of great toe	Flexing great toe	Medial plantar nerve
Adductor hallucis	Oblique: second to fourth metatarsals	Proximal phalanx of great toe (lateral)	Adducting great toe	Lateral plantar nerve
Flexor digiti minimi brevis	Base of fifth metatarsal head	Proximal phalanx of small toe	Flexing small toe	Lateral plantar nerve
Fourth Plantar Layer				
Dorsal interosseous	Metatarsal	Dorsal extensors	Abducting	Lateral plantar nerve
Plantar interosseous (peroneus longus and tibialis posterior)	Third to fifth metatarsals	Proximal phalanges medially	Adducting toes	Lateral plantar nerve
	Fibula/tibia	Medial cuneiform/navicular	Everting/inverting foot	Superficial peroneal/tibial nerve
Note: For abduction and adduction in the foot, the second toe serves as the reference.				

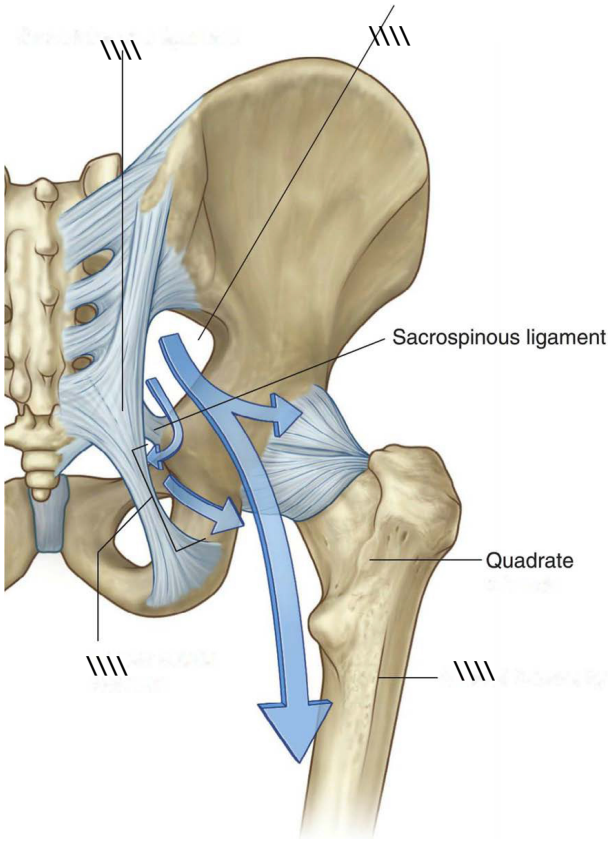




Greater Sciatic Foramen

Contents

Nerves	• Sciatic Nerve • Superior and Inferior Gluteal Nerves • Pudendal Nerve • Posterior Femoral Cutaneous Nerve • Nerve to Quadratus Femoris • Nerve to Obturator internus
Vessels	• Superior Gluteal Artery and vein • Inferior Gluteal Artery and vein • Internal Pudendal Artery and vein



Piriformis

Is a landmark for identifying structures passing out of the sciatic notch

- Above piriformis: Superior gluteal vessels and nerve
- Below piriformis: Inferior gluteal vessels, sciatic nerve (10% pass through it, <1% above it), posterior cutaneous nerve of the thigh

Greater sciatic foramen boundaries

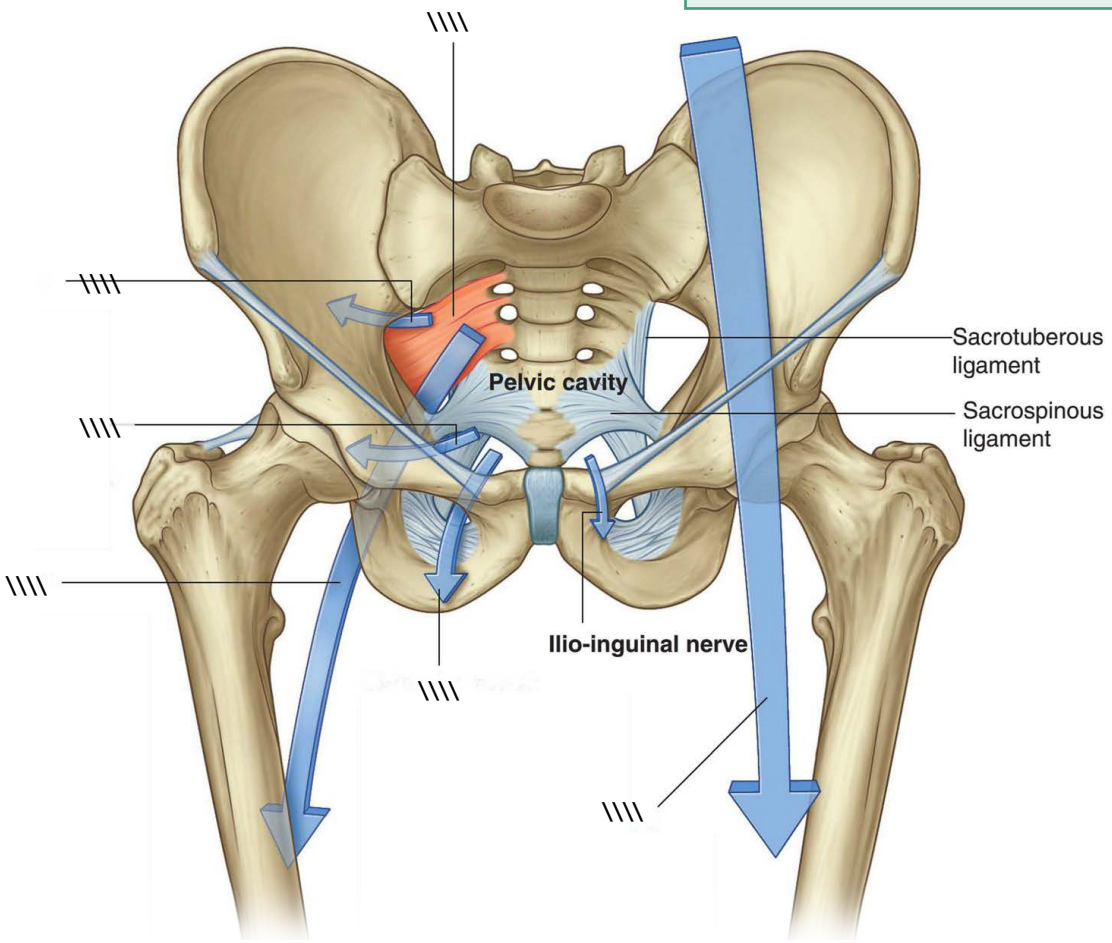
Anterolaterally	Greater sciatic notch of the ilium
Posteromedially	Sacrotuberous ligament
Inferior	Sacrospinous ligament and the ischial spine
Superior	Anterior sacroiliac ligament

Contents of the lesser sciatic foramen

- Tendon of the obturator internus
- Pudendal nerve
- Internal pudendal artery and vein
- Nerve to the obturator internus

Structures passing between both foramina
(Medial to lateral) ***PIN***

- Pudendal nerve
- Internal pudendal artery
- Nerve to obturator internus



Fascial Compartments of the Leg

Compartments of the thigh

Formed by septae passing from the femur to the fascia lata.

Compartment	Nerve	Muscles	Blood supply
Anterior compartment	Femoral	• Iliacus • Tensor fasciae latae • Sartorius • Quadriceps femoris	Femoral artery
Medial compartment	Obturator	• Adductor longus/magnus/brevis • Gracilis • Obturator externus	Profunda femoris artery and obturator artery
Posterior compartment (2 layers)	Sciatic	• Semimembranosus • Semitendinosus • Biceps femoris	Branches of Profunda femoris artery

Compartments of the lower leg

Separated by the interosseous membrane (anterior and posterior compartments), anterior fascial septum (separate anterior and lateral compartments) and posterior fascial septum (separate lateral and posterior compartments)

Compartment	Nerve	Muscles	Blood supply
Anterior compartment	Deep peroneal nerve	• Tibialis anterior • Extensor digitorum longus • Extensor hallucis longus • Peroneus tertius	Anterior tibial artery
Superficial Posterior compartment	Tibial	*"Pfft…"* • Popliteus • Flexor hallucis longus • Flexor digitalis longus • Tibialis posterior	Posterior tibial
Deep Posterior compartment		*"GPS"* • Gastrocnemius • Soleus • Plantaris	
Lateral compartment	Superficial peroneal	• Peroneus longus • Peroneus brevis	Peroneal artery

Deep and superficial compartments (separated by deep transverse fascia)

Arteries of LL

Anterior Tibial Artery

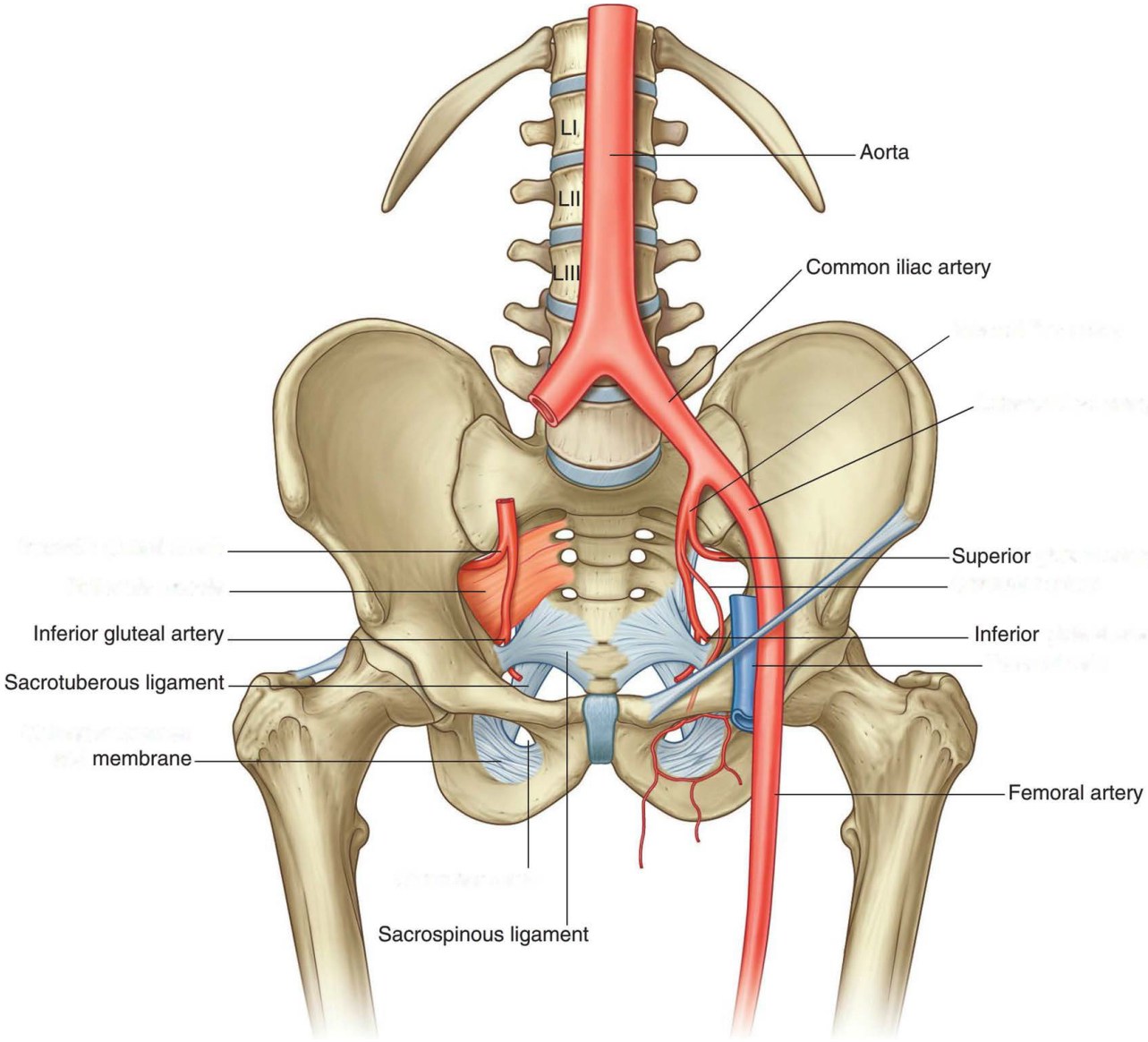
- Begins opposite the distal border of popliteus
- Terminates in front of the ankle, continuing as the dorsalis pedis artery
- As it descends it lies on the interosseous membrane, distal part of the tibia and front of the ankle joint
- Passes between the tendons of extensor digitorum and extensor hallucis longus distally
- It is related to the deep peroneal nerve, it lies anterior to the middle third of the vessel and lateral to it in the lower third

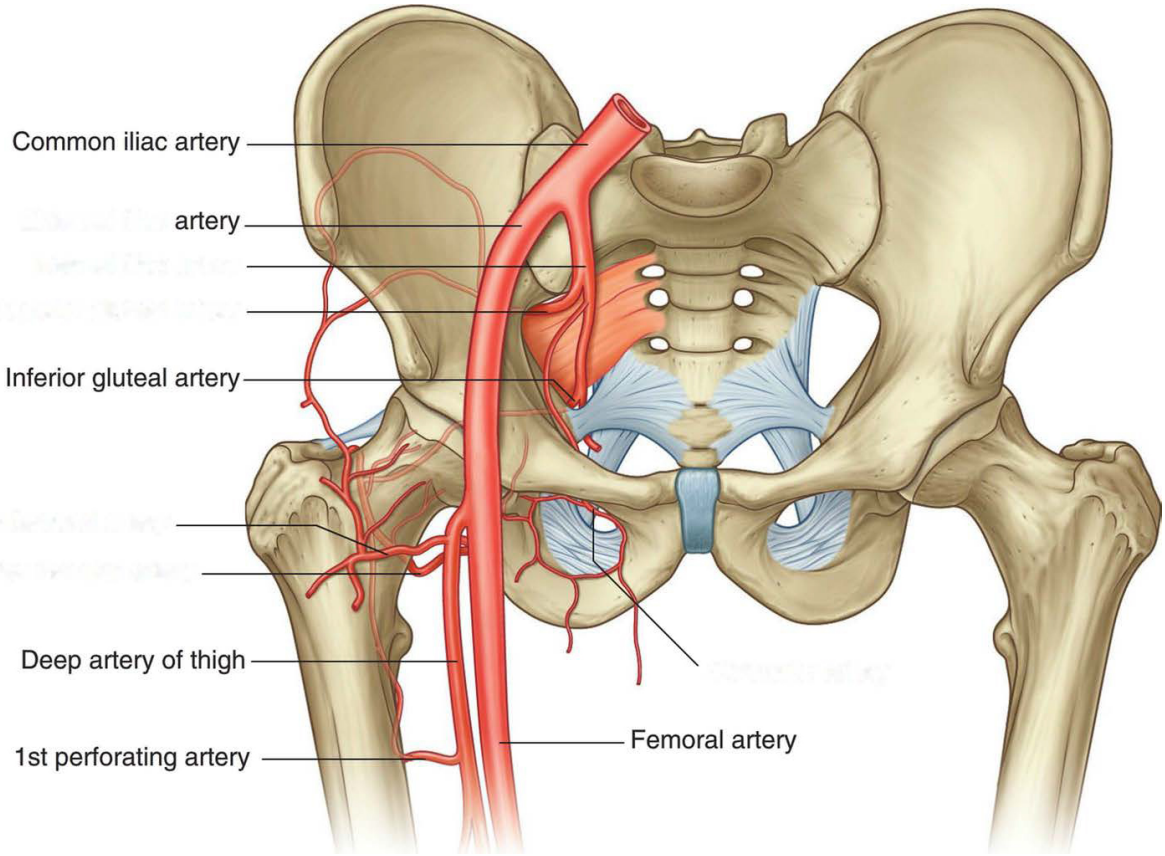
Posterior Tibial Artery

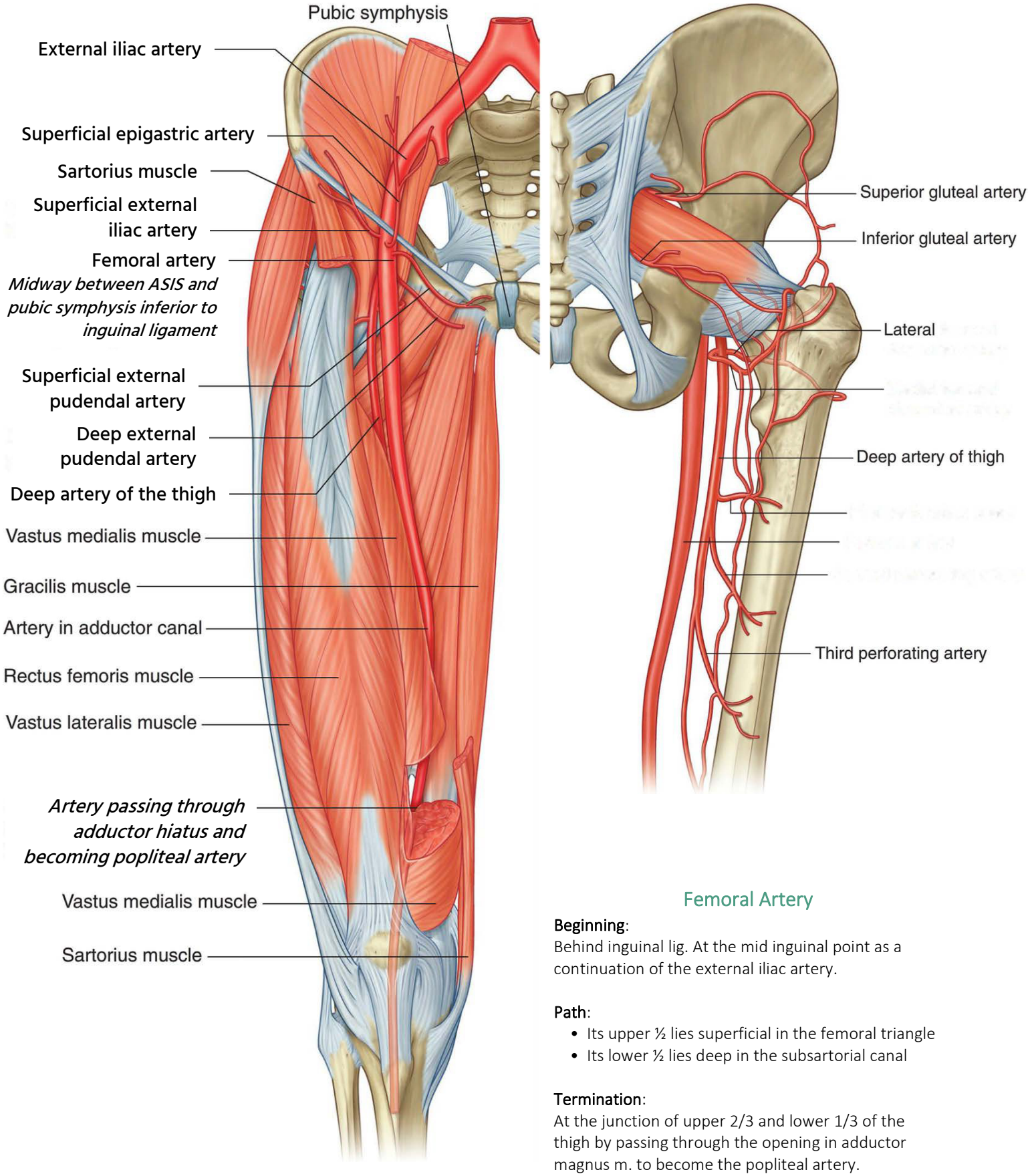
- Larger terminal branch of the popliteal artery
- Terminates by dividing into the medial and lateral plantar arteries
- Accompanied by two veins throughout its length
- Position of the artery corresponds to a line drawn from the lower angle of the popliteal fossa, at the level of the neck of the fibula, to a point midway between the medial malleolus and the most prominent part of the heel

Relations of the posterior tibial artery *(Proximal to distal)*

Anteriorly	Tibialis posterior Flexor digitorum longus Posterior surface of tibia and ankle joint
Posterior	Tibial nerve 2.5 cm distal to its origin Fascia overlying the deep muscular layer Proximal part covered by gastrocnemius and soleus Distal part covered by skin and fascia


LI
LII
LIII
Aorta
Common iliac artery
Superior
Inferior
Inferior gluteal artery
Sacrotuberous ligament
membrane
Femoral artery
Sacrospinous ligament


Common iliac artery
artery
Inferior gluteal artery
Deep artery of thigh
1st perforating artery
Femoral artery



Femoral Artery

Beginning:
Behind inguinal lig. At the mid inguinal point as a continuation of the external iliac artery.

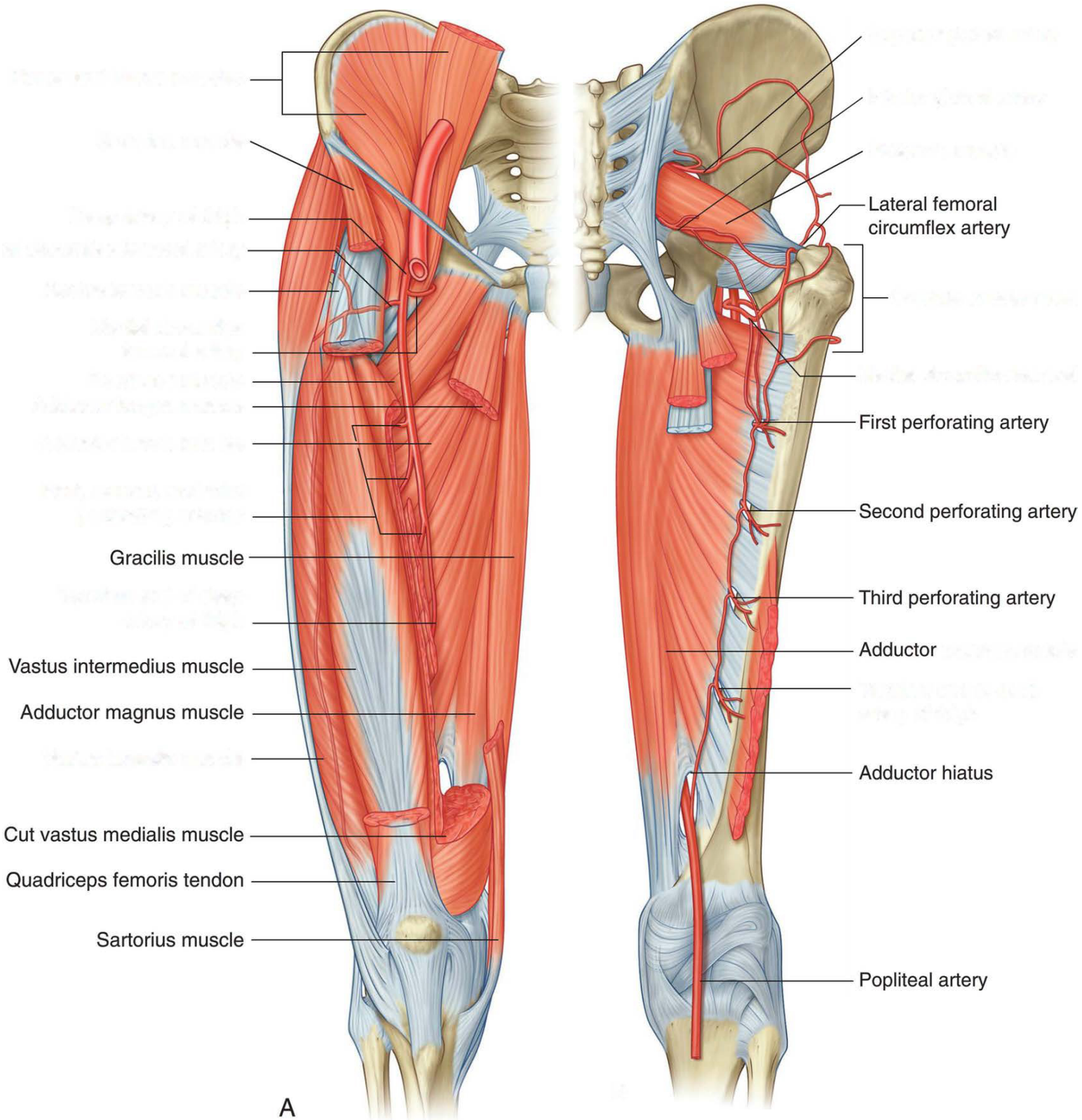
Path:

- Its upper ½ lies superficial in the femoral triangle
- Its lower ½ lies deep in the subsartorial canal

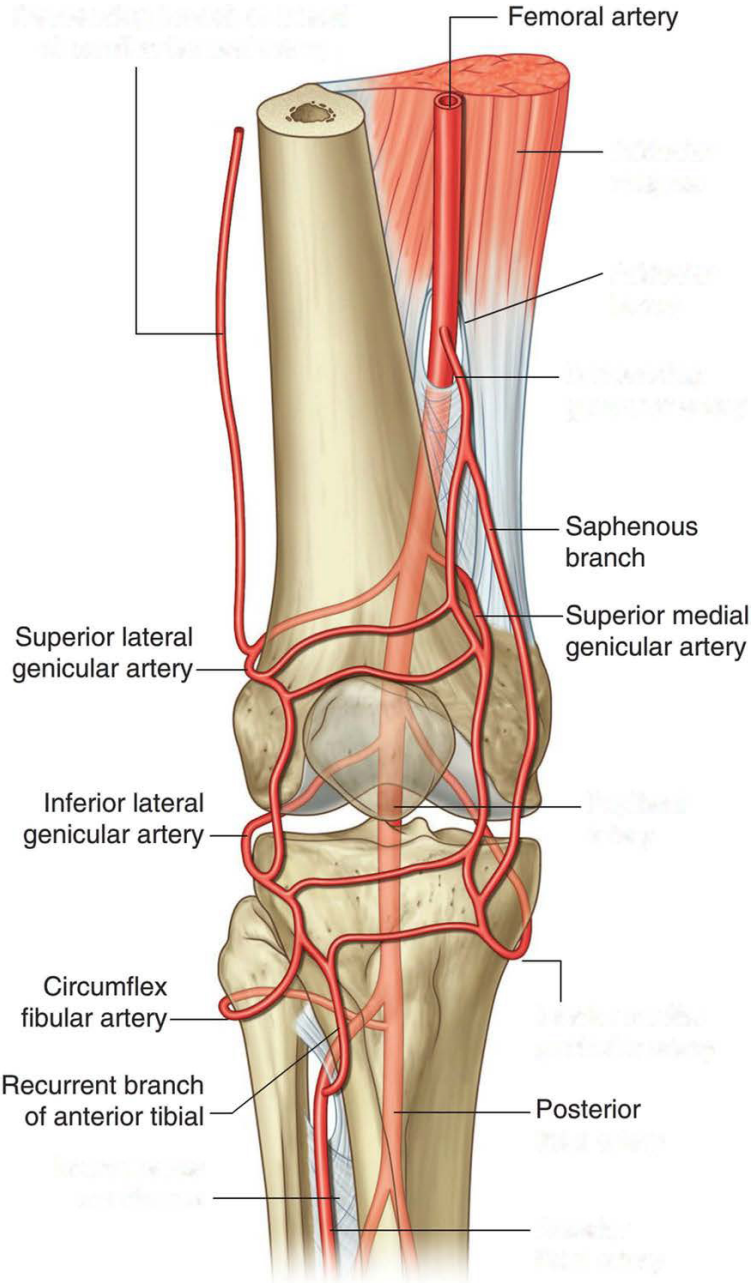
Termination:
At the junction of upper 2/3 and lower 1/3 of the thigh by passing through the opening in adductor magnus m. to become the popliteal artery.

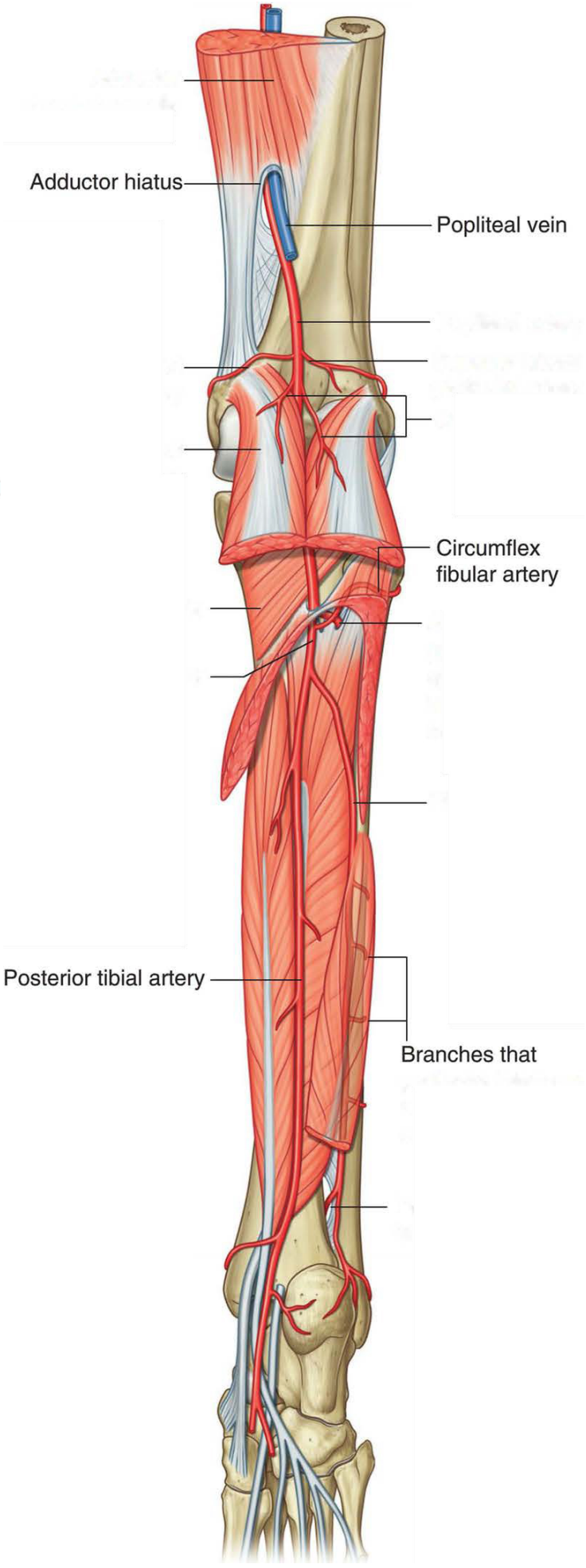
Branches:

Superficial branches	Deep branches
• Superficial epigastric artery • Superficial external pudendal artery • Superficial circumflex iliac artery	• Profunda femoris artery • Deep external pudendal artery • Descending genicular artery



Deep artery of thigh. A. Anterior view. B. Posterior view.


Femoral artery
Saphenous branch
Superior medial genicular artery
Superior lateral genicular artery
Inferior lateral genicular artery
Circumflex fibular artery
Recurrent branch of anterior tibial
Posterior


Adductor hiatus
Popliteal vein
Circumflex fibular artery
Posterior tibial artery
Branches that

Veins of LL

Saphenous Vein

Long saphenous vein

This vein may be harvested for bypass surgery, or removed as treatment for varicose veins with saphenofemoral junction incompetence.

- Originates at the 1st digit where the dorsal vein merges with the dorsal venous arch of the foot
- Passes anterior to the medial malleolus and runs up the medial side of the leg
- At the knee, it runs over the posterior border of the medial epicondyle of the femur bone
- Then passes laterally to lie on the anterior surface of the thigh before entering an opening in the fascia lata called the saphenous opening
- It joins with the femoral vein in the region of the femoral triangle at the saphenofemoral junction

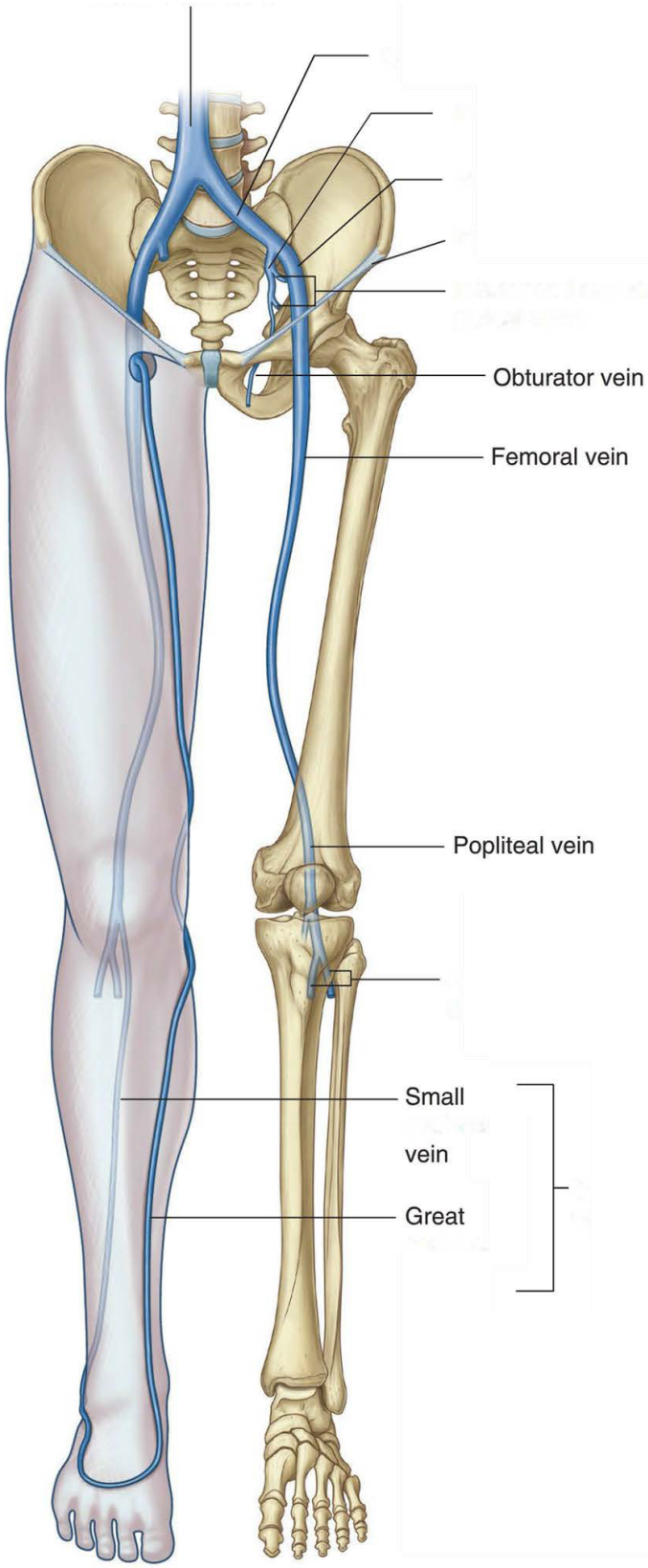
Tributaries

- Medial marginal
- Superficial epigastric
- Superficial iliac circumflex
- Superficial external pudendal veins

Short saphenous vein

- Originates at the 5th digit where the dorsal vein merges with the dorsal venous arch of the foot, which attaches to the great saphenous vein.
- It passes around the lateral aspect of the foot (inferior and posterior to the lateral malleolus) and runs along the posterior aspect of the leg (with the sural nerve)
- Passes between the heads of the gastrocnemius muscle, and drains into the popliteal vein, approximately at or above the level of the knee joint.

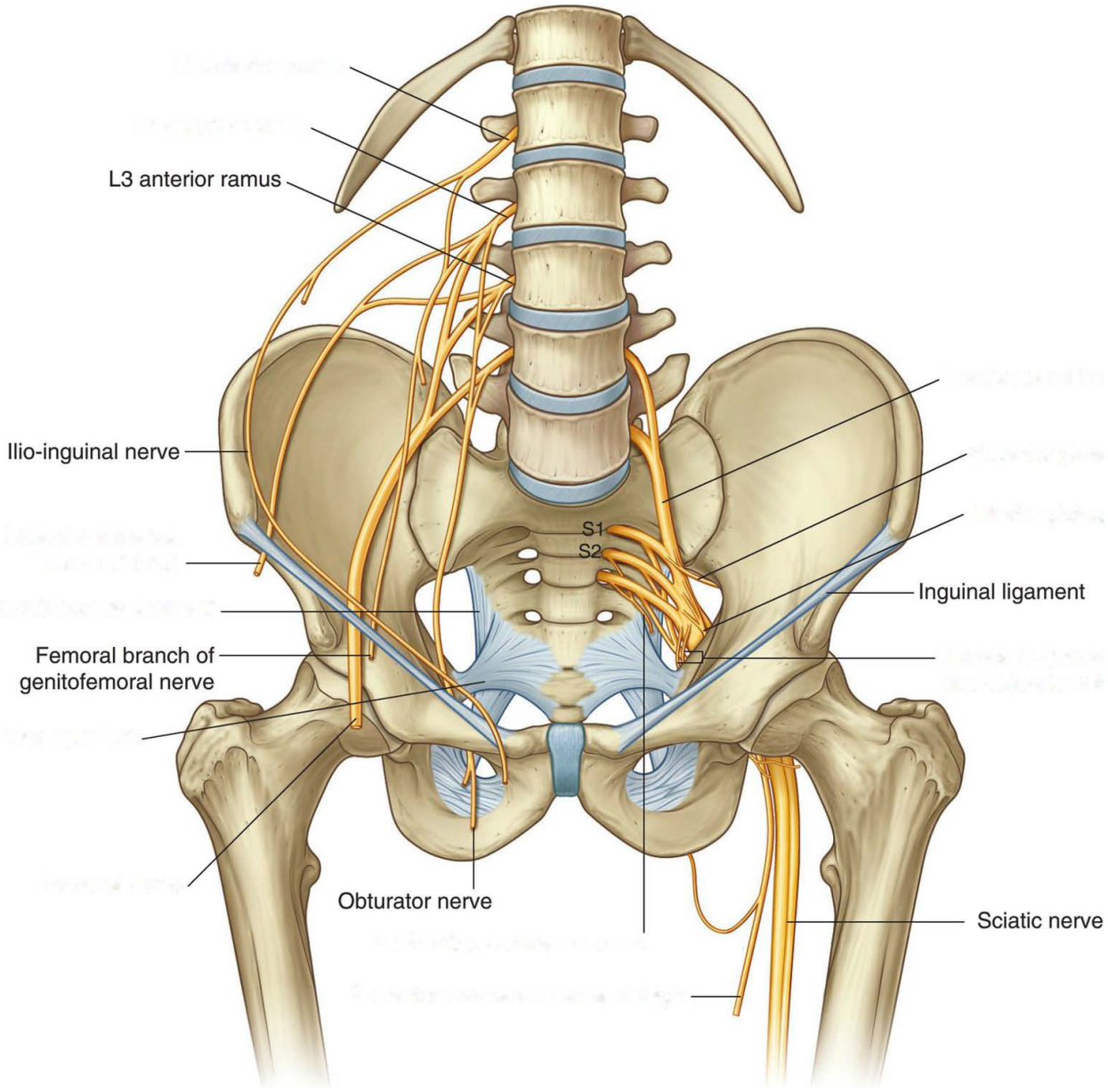
The sural nerve is related to the short saphenous vein. The saphenous nerve is related to the long saphenous vein below the knee and for this reason full length stripping of the vein is no longer advocated.



Nerves of LL

Lumbosacral Plexus Divisions and Innervations

Nerve	Level	Muscles Innervated
Anterior Division		
Tibia	L4-S3	Semimembranosus, semitendinosusbiceps brachii (long head), adductor magnus, superior gemellus, soleus, plantaris, popliteus, tibialis posterior, flexor digitorum longus, flexor hallucis longus
Quadratus femoris	L4-S1	Quadratus femoris, inferior gemellus
Obturator internus	L5-S2	Obturatorius internus, superior gemellus
Pudendal	S2-S4	Sensory: perineal Motor: bulbocavernosus, urethra, urogenital
Coccygeus	S4	Coccygeus
Levator ani	S3-S4	Levator ani
Posterior Division		
Peroneal	L4-S2	Biceps (short head), tibialis anterior, extensor digitorum longus, peroneus tertius, extensor hallucis longus Peroneus longus and brevis, extensor hallucis brevis, extensor digitorum brevis
Superior gluteal	L4-S1	Gluteus medius and minimus, tensor fascia lata
Inferior gluteal	L5-S2	Gluteus maximus
Piriformis	S2	Piriformis
Posterior femoral cutaneous	S1-S3	Sensory: posterior thigh



Important Neurologic Features of Lower Extremity

Joint	Function	Neurologic Level
Hip	Flexion	T12-L3
	Extension	S1
	Adduction	L2-L4
	Abduction	L5
Knee	Flexion	L5, S1
	Extension	L2-L4
Ankle	Dorsiflexion	L4, L5
	Plantar flexion	S1, S2
	Inversion	L4
	Eversion	S1

*Extensor hallucis longus is derived from **L5** and loss of EHL function is a useful test to determine whether this level is involved.*

Innervation of the Thigh

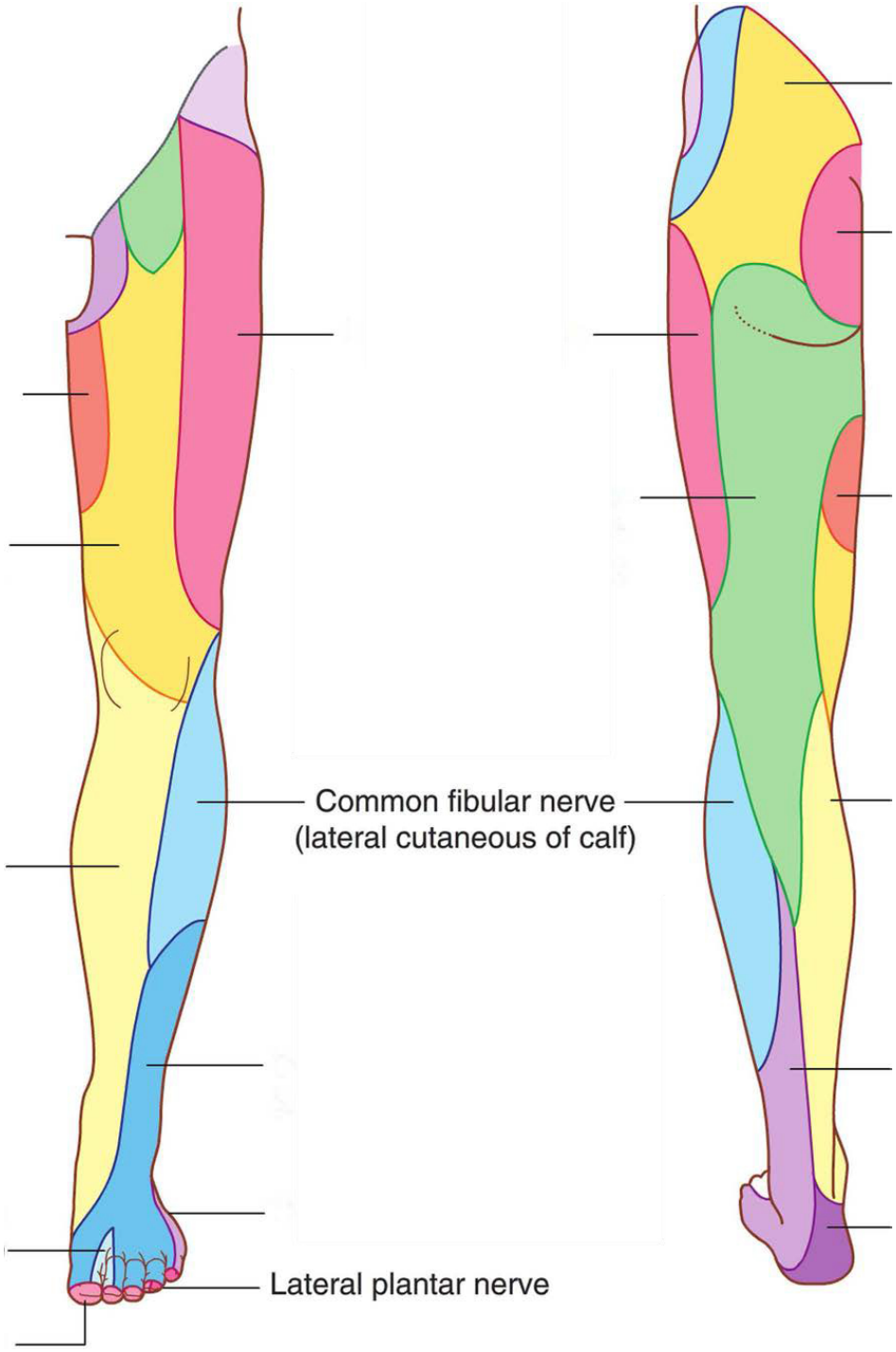
Nerve	Components	Muscles Innervated
Femoral	L2-L4	Iliacus, psoas major (lower part), sartorius, pectineus, quadriceps, articularis genus
Obturator	L2-L4	Obturator externus, hip adductors (brevis, longus, magnus), gracilis
Sciatic	L4-S3	Peroneal division: short head of biceps femoris Tibial division: hamstrings (semitendinosus, semimembranosus), part of adductor magnus, long head of biceps femoris

Innervation of Lower Extremity

Nerves	Muscles Innervated
Femoral	Iliacus, psoas, quadriceps femoris (rectus femoris, vastus lateralis, vastus intermedius, and vastus medialis)
Obturator	Adductor brevis, adductor longus, adductor magnus (along with tibial nerve), gracilis
Superior gluteal	Gluteus medius, gluteus minimus, tensor fascia lata
Inferior gluteal	Gluteus maximus
Sciatic	Semitendinosus, semimembranosus, biceps femoris (long head [tibial division] and short head [peroneal division]), adductor magnus (with obturator nerve)
Tibial	Gastrocnemius, soleus, tibialis posterior, flexor digitorum longus, flexor hallucis longus, medial and lateral plantar nerves
Deep peroneal	Tibialis anterior, extensor digitorum longus, extensor hallucis longus, peroneus tertius, extensor digitorum brevis
Superficial peroneal	Peroneus longus, peroneus brevis

Innervation of the Ankle and Foot

Nerves	Muscles Innervated
Medial plantar	Flexor hallucis brevis, abductor hallucis, flexor digitorum brevis, first lumbrical muscle
Lateral plantar	Pronator quadratus, abductor digiti minimi, flexor digiti minimi, adductor hallucis, interossei, second to fourth lumbrical muscles



Genitofemoral Nerve

Supplies

Small area of the upper medial thigh.

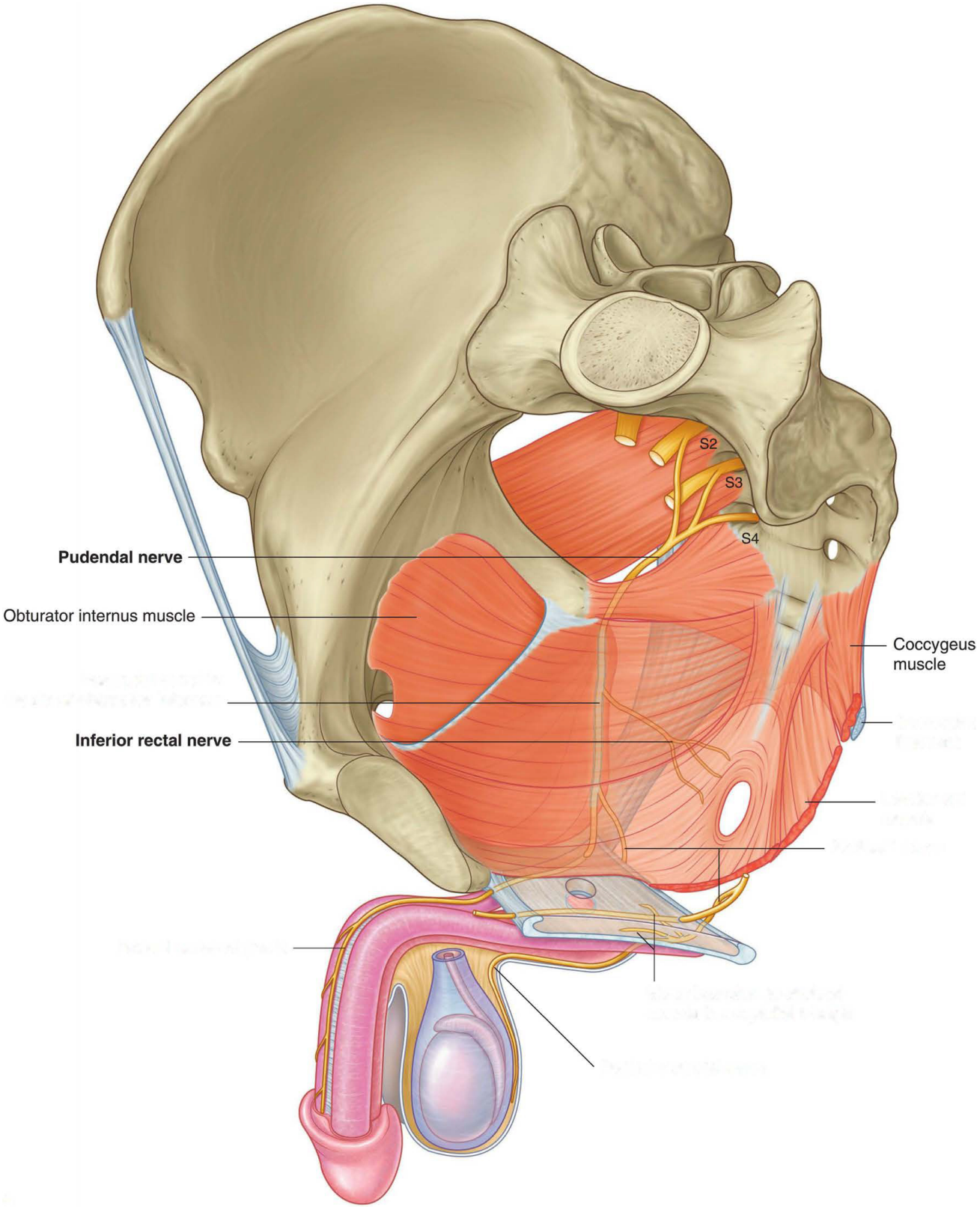
Path

- Arises from the first and second lumbar nerves.
- Passes obliquely through psoas major, and emerges from its medial border opposite the fibrocartilage between the third and fourth lumbar vertebrae.
- It then descends on the surface of psoas major, under cover of the peritoneum
- Divides into genital and femoral branches.
- The genital branch passes through the inguinal canal, within the spermatic cord, to supply the skin and fascia of the scrotum. The femoral branch enters the thigh posterior to the inguinal ligament, lateral to the femoral artery. It supplies an area of skin and fascia over the femoral triangle.
- It may be injured during abdominal or pelvic surgery, or during inguinal hernia repairs.

Pudendal Nerve

The pudendal nerve arises from nerve roots S2, S3 and S4 and exits the pelvis through the greater sciatic foramen. It re-enters the perineum through the lesser sciatic foramen. It travels inferior to give innervation to the anal sphincters and external urethral sphincter. It also provides cutaneous innervation to the region of perineum surrounding the anus and posterior vulva.

Traction and compression of the pudendal nerve by the foetus in late pregnancy may result in late onset pudendal neuropathy which may be part of the process involved in the development of faecal incontinence.



Femoral Nerve

Root values	L2, 3, 4
Innervates	• Pectineus • Sartorius • Quadriceps femoris • Vastus lateralis/medialis/intermedius
Branches	• Medial cutaneous nerve of thigh • Saphenous nerve • Intermediate cutaneous nerve of thigh

Path

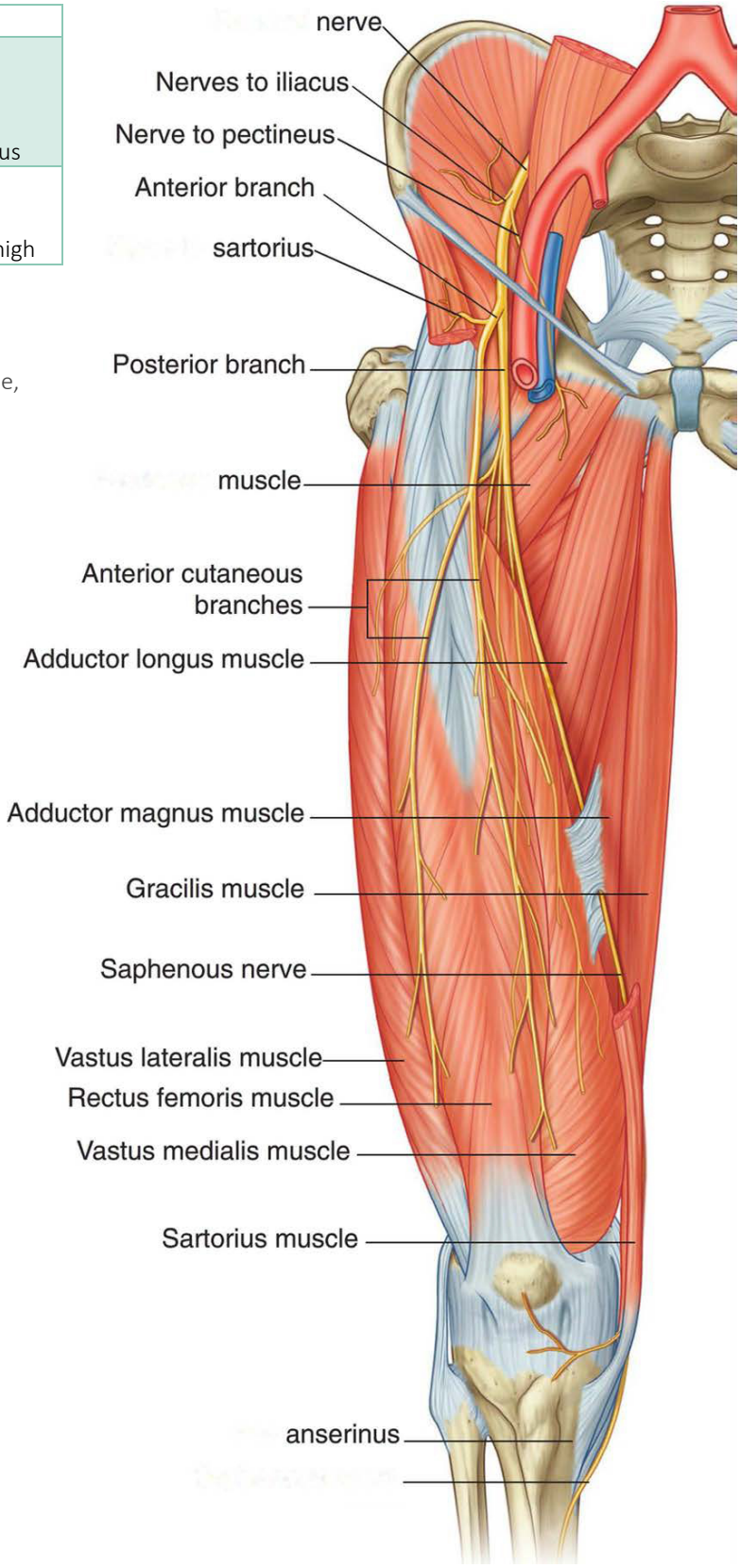
Penetrates psoas major and exits the pelvis by passing under the inguinal ligament to enter the femoral triangle, lateral to the femoral artery and vein.

Mnemonic for femoral nerve supply
(don't) ***M I S V Q Scan for PE***

M edial cutaneous nerve of the thigh
I ntermediate cutaneous nerve of the thigh
S aphenous nerve

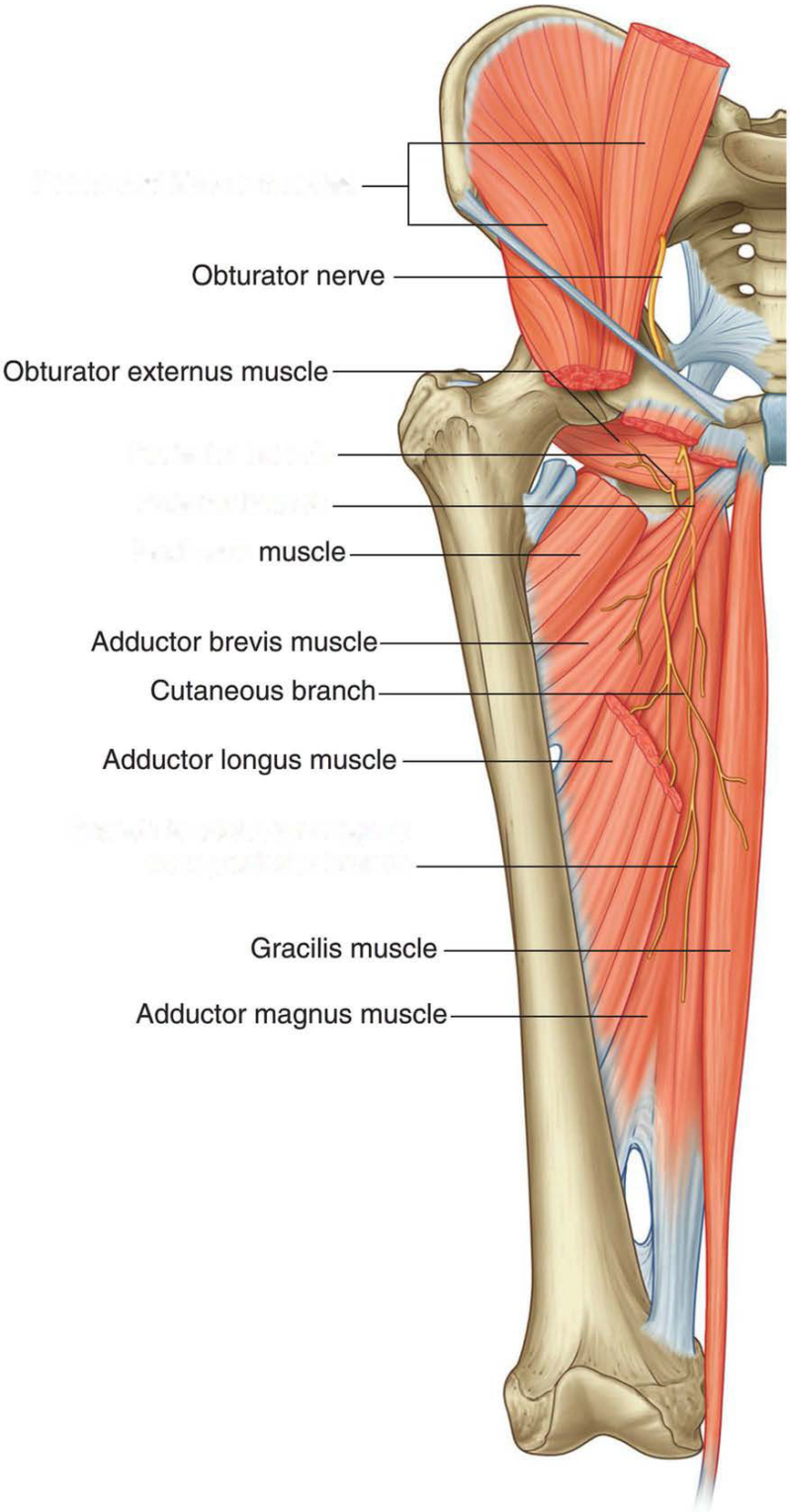
V astus
Q uadriceps femoris
S artorius

PE ctineus



Obturator Nerve

The obturator nerve arises from L2, L3 and L4 by branches from the ventral divisions of each of these nerve roots. L3 forms the main contribution and the second lumbar branch is occasionally absent. These branches unite in the substance of psoas major, descending vertically in its posterior part to emerge from its medial border at the lateral margin of the sacrum. It then crosses the sacroiliac joint to enter the lesser pelvis, it descends on obturator internus to enter the obturator groove. In the lesser pelvis the nerve lies lateral to the internal iliac vessels and ureter, and is joined by the obturator vessels lateral to the ovary or ductus deferens.



Supplies

- Medial compartment of thigh
- Muscles supplied: external obturator, adductor longus, adductor brevis, adductor magnus (not the lower part-sciatic nerve), gracilis
- The cutaneous branch is often absent. When present, it passes between gracilis and adductor longus near the middle part of the thigh, and supplies the skin and fascia of the distal two thirds of the medial aspect.

Obturator canal

- Connects the pelvis and thigh: contains the obturator artery, vein, nerve which divides into anterior and posterior branches.

Sciatic Nerve

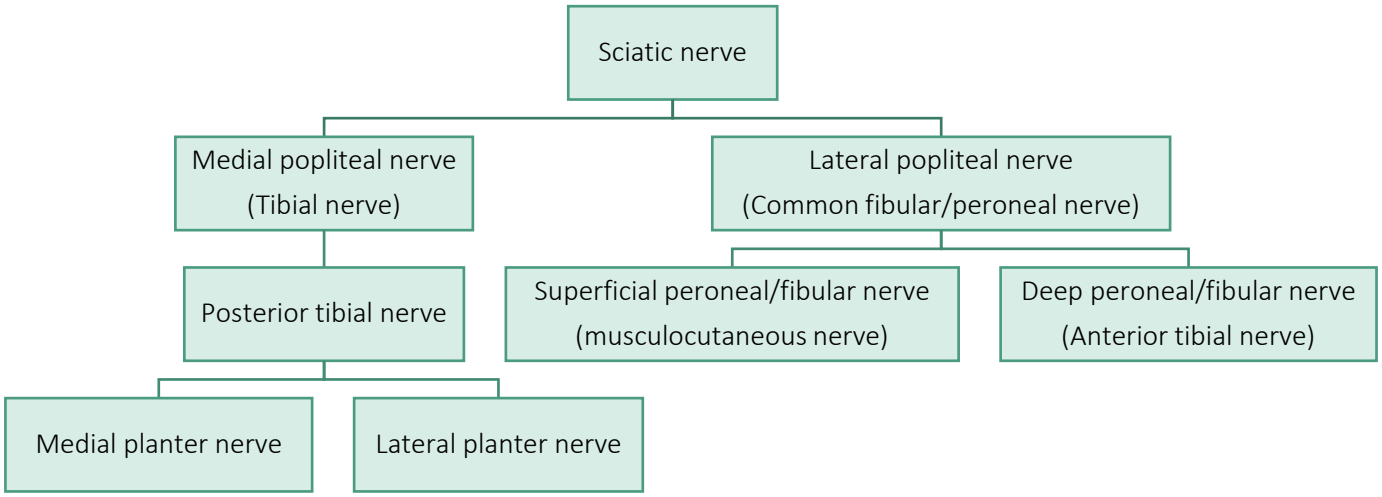
The sciatic nerve is formed from the sacral plexus and is the largest nerve in the body. It is the continuation of the main part of the plexus arising from ventral rami of L4 to S3. These rami converge at the inferior border of piriformis to form the nerve itself. It passes through the inferior part of the greater sciatic foramen and emerges beneath piriformis. Medially, lie the inferior gluteal nerve and vessels and the pudendal nerve and vessels. It runs inferolaterally under the cover of gluteus maximus midway between the greater trochanter and ischial tuberosity. It receives its blood supply from the inferior gluteal artery. The nerve provides cutaneous sensation to the skin of the foot and the leg. It also innervates the posterior thigh muscles and the lower leg and foot muscles. The nerve splits into the tibial and common peroneal nerves approximately half way down the posterior thigh. The tibial nerve supplies the flexor muscles and the common peroneal nerve supplies the extensor muscles and the abductor muscles.

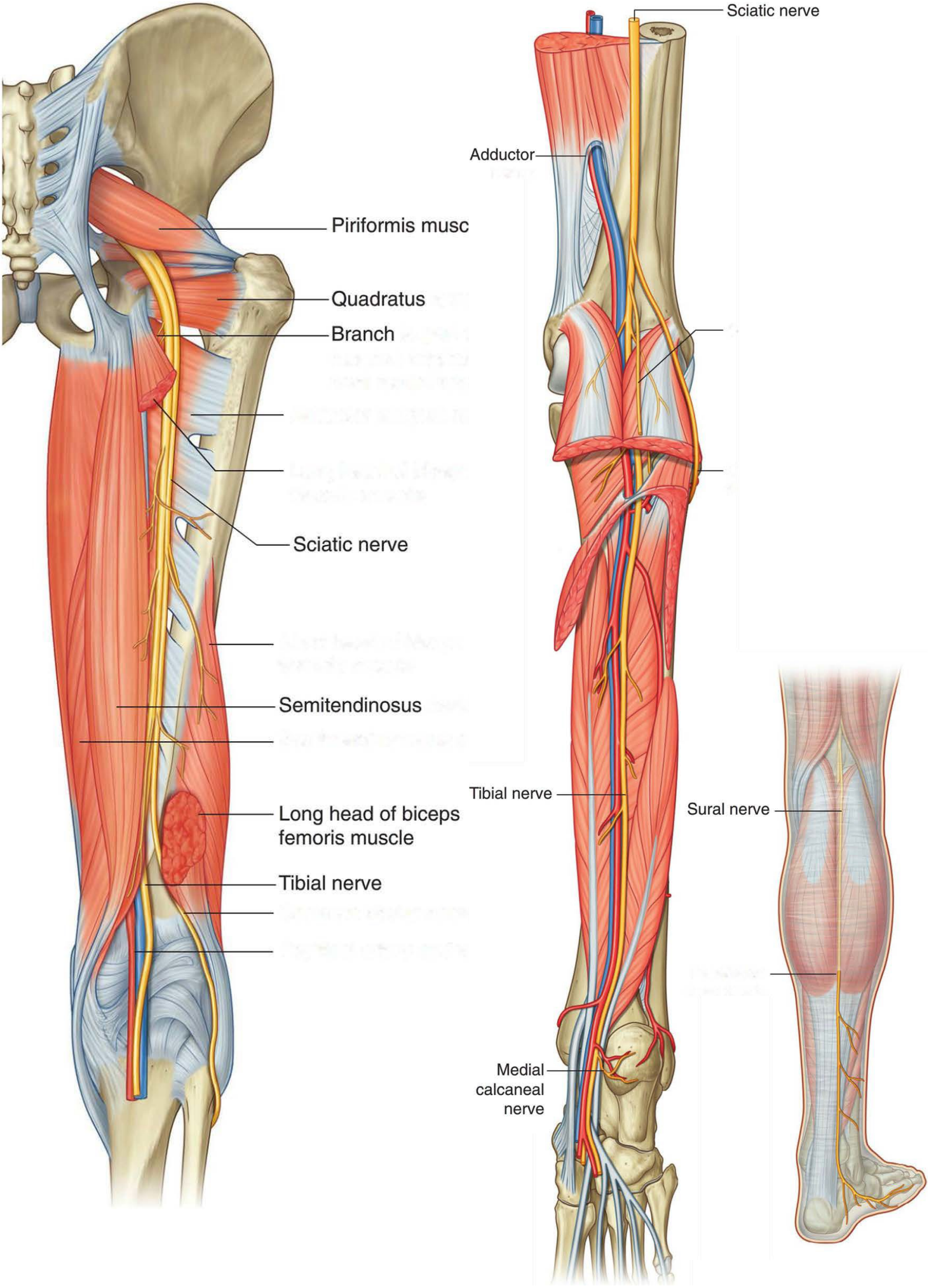
Major nerves of the LL (colors indicate regions of motor innervation)

Summary points

Origin	Spinal nerves L4 - S3
Articular Branches	Hip joint
Muscular branches in upper leg	• Semitendinosus • Semimembranosus • Biceps femoris • Part of adductor magnus
Cutaneous sensation	• Posterior aspect of thigh (via cutaneous nerves) • Gluteal region • Entire lower leg (except the medial aspect)
Terminates	At the upper part of the popliteal fossa by dividing into the tibial and peroneal nerves

- The nerve to the short head of the biceps femoris comes from the common peroneal part of the sciatic and the other muscular branches arise from the tibial portion.
- The tibial nerve goes on to innervate all muscles of the foot except the extensor digitorum brevis (which is innervated by the common peroneal nerve).




Piriformis musc
Quadratus
Branch
Sciatic nerve
Semitendinosus
Long head of biceps femoris muscle
Tibial nerve
Sciatic nerve
Adductor
Tibial nerve
Medial calcaneal nerve
Sural nerve

Common Peroneal (Common Fibular) (Lat. Popliteal) Nerve

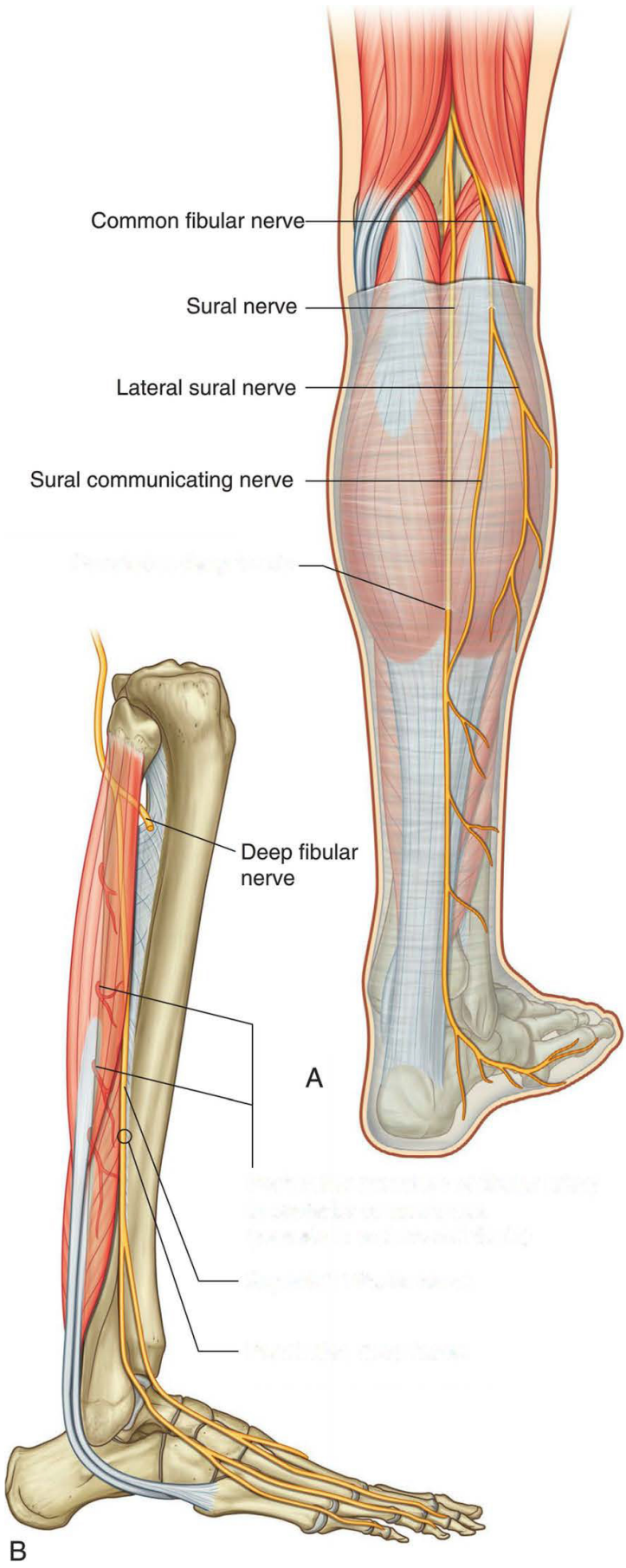
Derived from the dorsal divisions of the sacral plexus (L4, L5, S1 and S2).

This nerve supplies the skin and fascia of the anterolateral surface of the leg and the dorsum of the foot. It also innervates the muscles of the anterior and peroneal compartments of the leg, extensor digitorum brevis as well as the knee, ankle and foot joints.

It is laterally placed within the sciatic nerve. From the bifurcation of the sciatic nerve it passes inferolaterally in the lateral and proximal part of the popliteal fossa, under the cover of biceps femoris and its tendon. To reach the posterior aspect of the fibular head. It ends by dividing into the deep and superficial peroneal nerves at the point where it winds around the lateral surface of the neck of the fibula in the body of peroneus longus, approximately 2cm distal to the apex of the head of the fibula. It is palpable posterior to the head of the fibula.

Branches

In the thigh	Nerve to the short head of biceps Articular branch (knee)
In the popliteal fossa	Lateral cutaneous nerve of the calf
Neck of fibula	Superficial and deep peroneal nerves

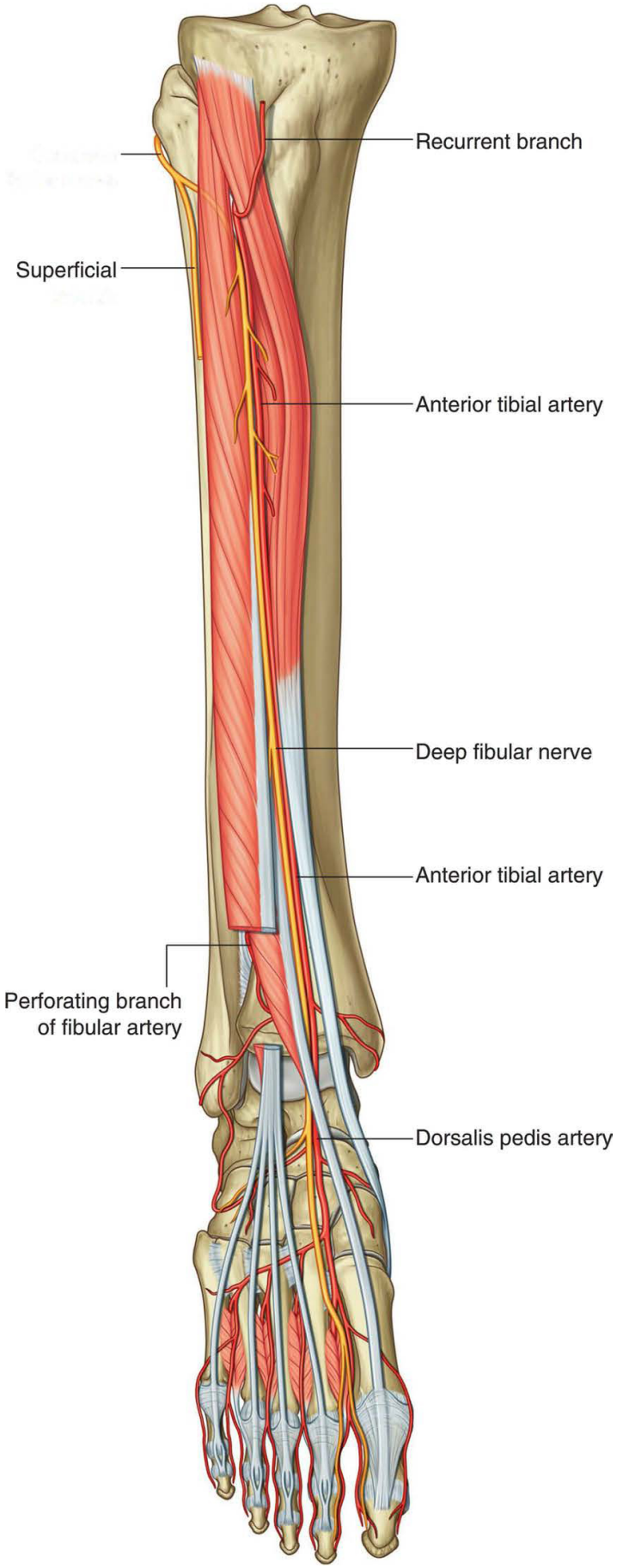


Deep Peroneal (Deep Fibular) (Ant. Tibial) Nerve

Origin	From the common peroneal nerve, at the lateral aspect of the fibula, deep to peroneus longus
Nerve root values	L4, L5, S1, S2
Course and relation	• Pierces the anterior intermuscular septum to enter the anterior compartment of the lower leg • Passes anteriorly down to the ankle joint, midway between the two malleoli
Terminates	In the dorsum of the foot
Muscles innervated	• Tibialis anterior • Extensor hallucis longus • Extensor digitorum longus • Peroneus tertius • Extensor digitorum brevis
Cutaneous innervation	Web space of the first and second toes
Actions	• Dorsiflexion of ankle joint • Extension of all toes (extensor hallucis longus and extensor digitorum longus) • Inversion of the foot

After its bifurcation past the ankle joint, the lateral branch of the deep peroneal nerve innervates the extensor digitorum brevis and the extensor hallucis brevis

The medial branch supplies the web space between the first and second digits.



Important Regions

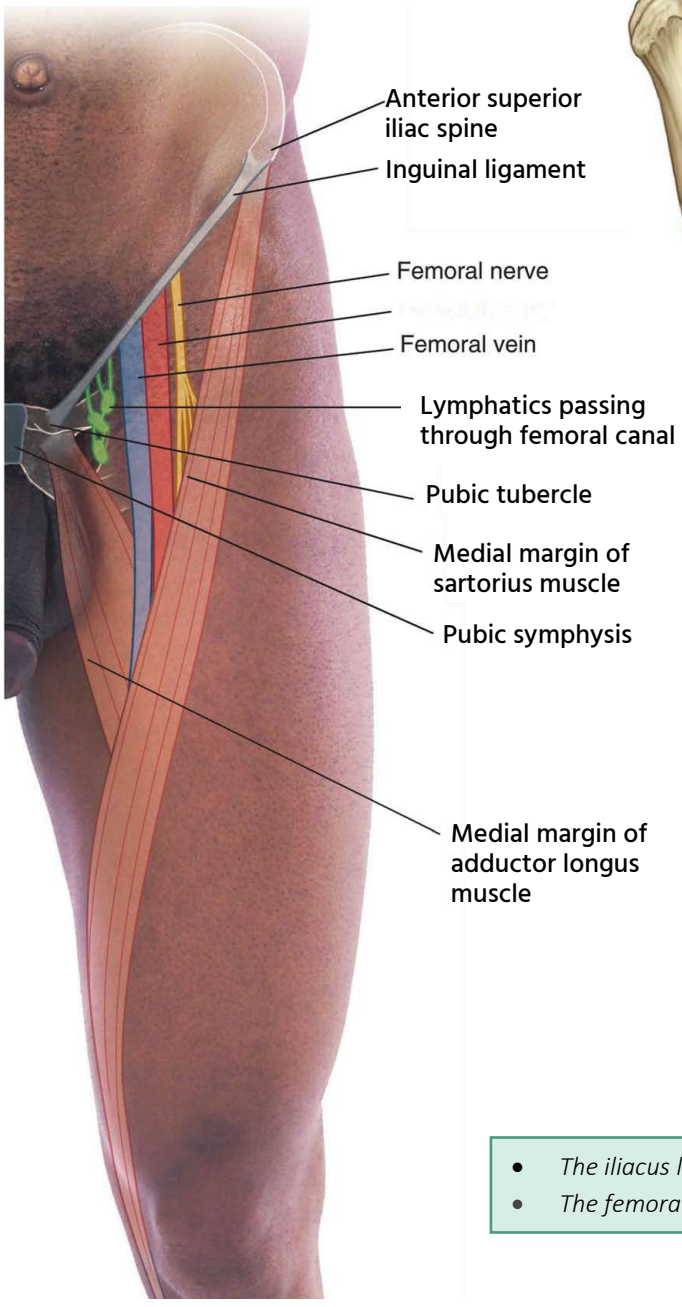
Femoral Triangle Anatomy

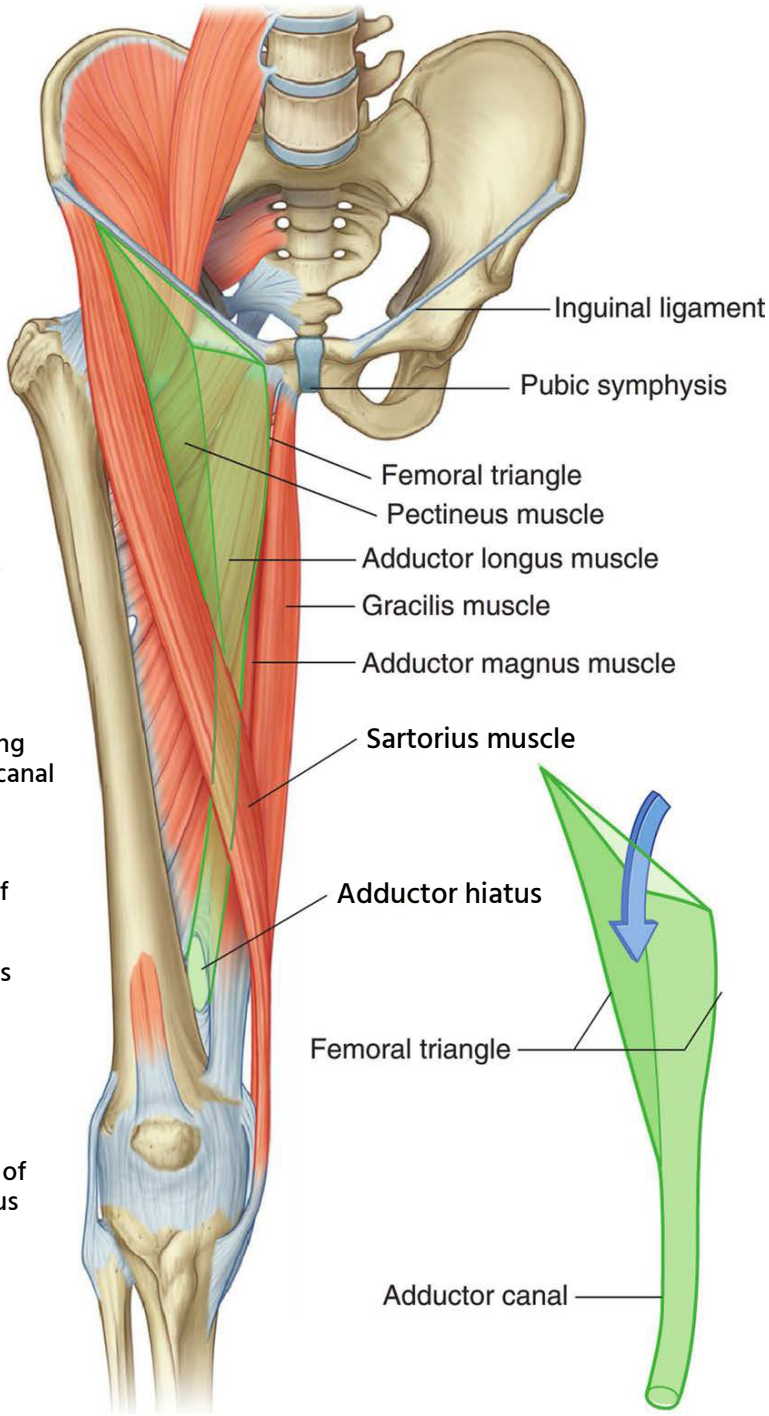
Boundaries

Superiorly	Inguinal ligament
Laterally	Sartorius
Medially	Adductor longus
Floor	Iliopsoas, adductor longus and pectineus
Roof	• Fascia lata and Superficial fascia • Superficial inguinal lymph nodes (palpable below the inguinal ligament) • Long saphenous vein

Contents

- Femoral vein (medial to lateral)
- Femoral artery-pulse palpated at the **mid inguinal point**
- Femoral nerve
- Deep and superficial inguinal lymph nodes
- Lateral cutaneous nerve
- Great saphenous vein
- Femoral branch of the genitofemoral nerve





- *The iliacus lies posterior to the femoral nerve in the femoral triangle.*
- *The femoral sheath lies anterior to both the iliacus and pectineus.*

Femoral Canal

The femoral canal lies at the medial aspect of the femoral sheath. The femoral sheath is a fascial tunnel containing both the femoral artery laterally and femoral vein medially. The canal lies medial to the vein.

Borders of the femoral canal

Laterally	Femoral vein
Medially	Lacunar ligament
Anteriorly	Inguinal ligament
Posteriorly	Pectineal ligament

Contents

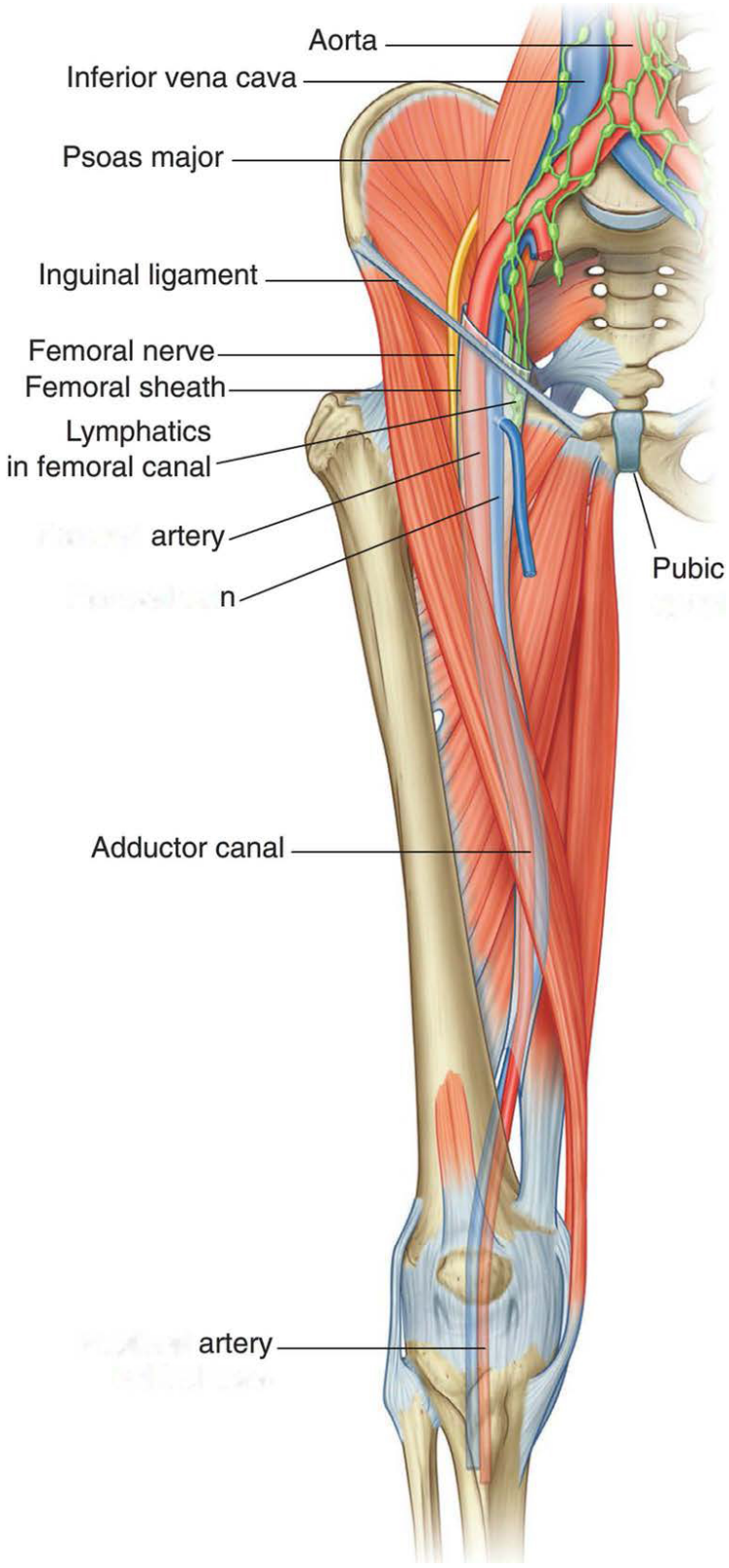
- Lymphatic vessels
- Cloquet's lymph node

Physiological significance

Allows the femoral vein to expand to allow for increased venous return to the lower limbs.

Pathological significance

As a potential space, it is the site of femoral hernias. The relatively tight neck places these at high risk of strangulation.



Adductor Canal

- Also called Hunter's or subsartorial canal
- Immediately distal to the apex of the femoral triangle, lying in the middle third of the thigh. Canal terminates at the adductor hiatus.

Borders	
Laterally	Vastus medialis muscle
Posteriorly	Adductor longus, adductor magnus
Roof	Sartorius

Contents
Saphenous nerve
Superficial femoral artery
Superficial femoral vein *(posterior to the artery in the upper part then posterolateral`)*

Popliteal Fossa

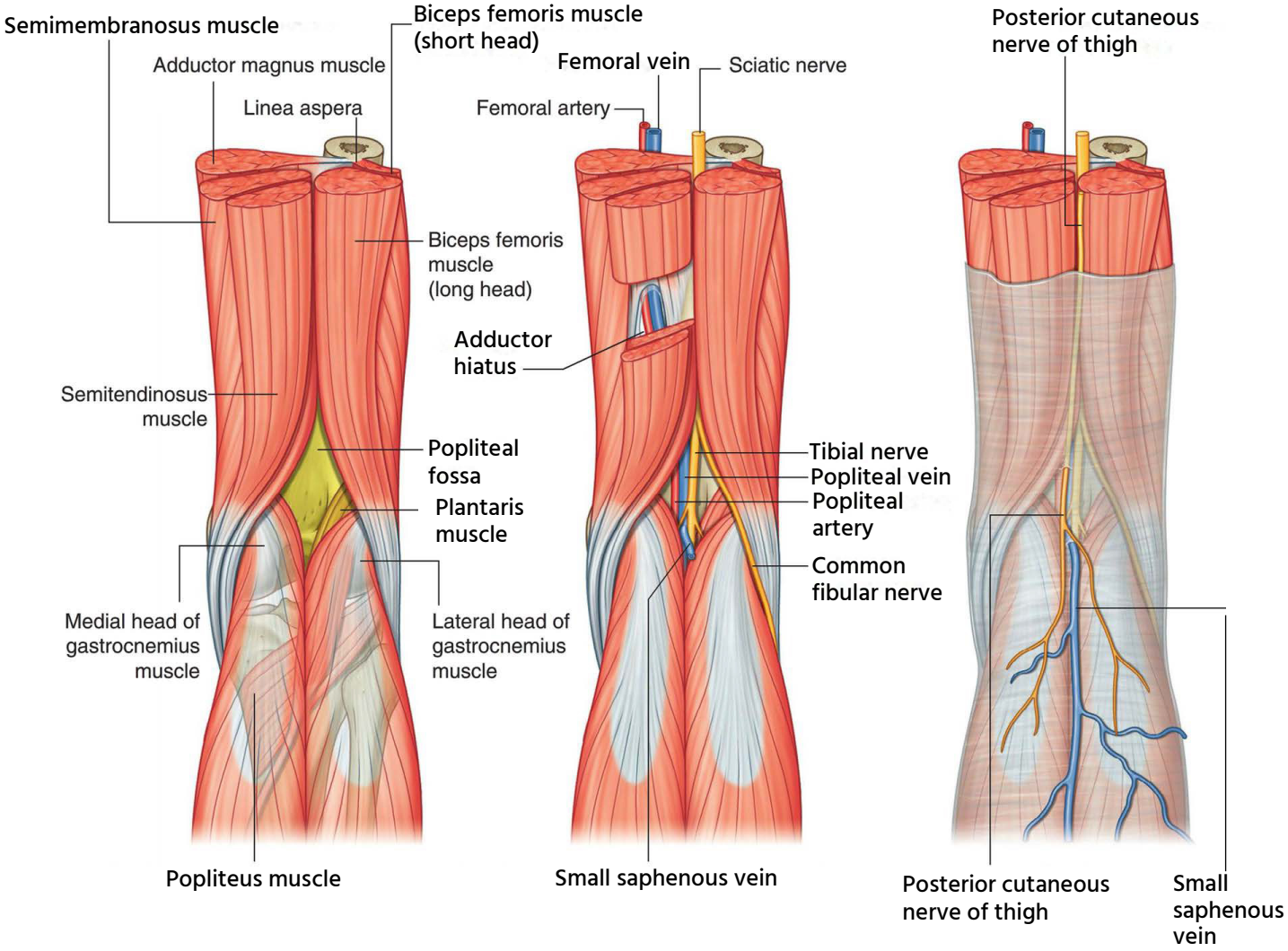
Boundaries of the popliteal fossa

Laterally	Biceps femoris above, lateral head of gastrocnemius and plantaris below
Medially	Semimembranosus and semitendinosus above, medial head of gastrocnemius below
Floor	Popliteal surface of the femur, posterior ligament of knee joint and popliteus muscle
Roof	Superficial and deep fascia

Contents

- Common peroneal nerve
- Tibial nerve
- Popliteal vein
- Popliteal artery
- Lymph nodes
- Small saphenous vein
- Posterior cutaneous nerve of the thigh
- Genicular branch of the obturator nerve

The tibial nerve lies superior to the vessels in the inferior aspect of the popliteal fossa. In the upper part of the fossa the tibial nerve lies lateral to the vessels, it then passes superficial to them to lie medially. The popliteal artery is the deepest structure in the popliteal fossa.



Pudendal (Alcock's) Canal

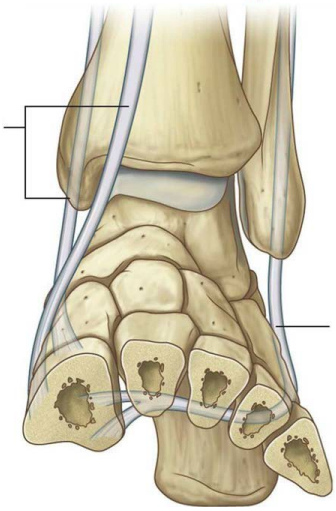
The pudendal canal is located along the lateral wall of the ischioanal fossa at the inferior margin of the **obturator internus muscle**. It extends from the lesser sciatic foramen to the posterior margin of the urogenital diaphragm. It conveys the internal pudendal vessels and nerve.

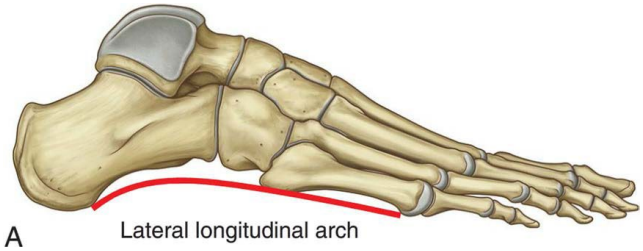
Foot - Anatomy

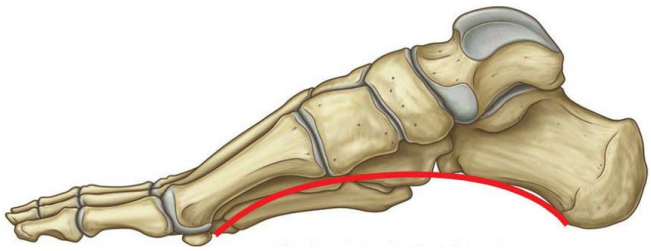
Arches of the foot

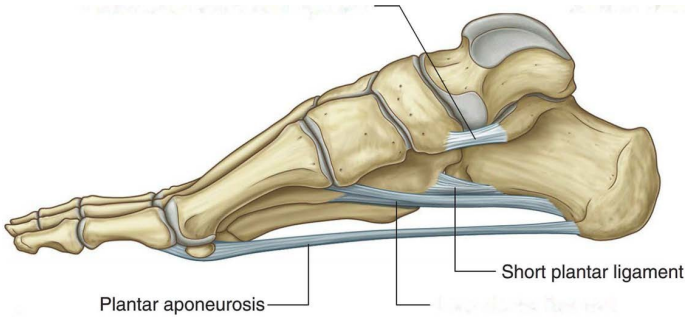
The foot is conventionally considered to have two arches.

- The longitudinal arch is higher on the medial than on the lateral side. The posterior part of the calcaneum forms a posterior pillar to support the arch. The lateral part of this structure passes via the cuboid bone and the lateral two metatarsal bones. The medial part of this structure is more important. The head of the talus marks the summit of this arch, located between the sustentaculum tali and the navicular bone. The anterior pillar of the medial arch is composed of the navicular bone, the three cuneiforms and the medial three metatarsal bones.
- The transverse arch is situated on the anterior part of the tarsus and the posterior part of the metatarsus. The cuneiforms and metatarsal bases narrow inferiorly, which contributes to the shape of the arch.







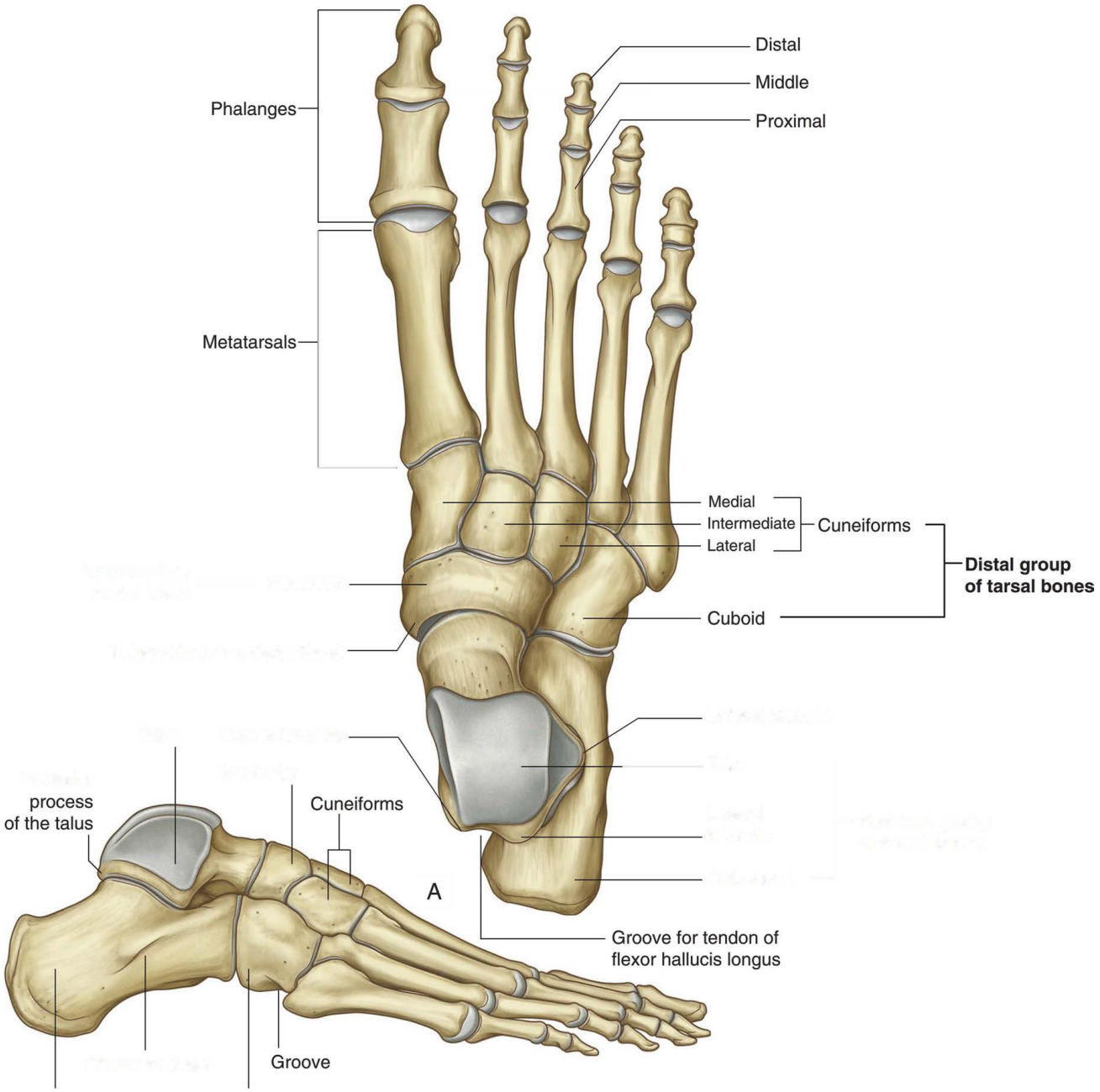


Arch	Medial longitudinal arch	Lateral longitudinal arch	Transverse arch
Construction	• Calcaneus, Talus, Navicular • 3 cuneiform • 3 medial metatarsals	• Calcaneus • Cuboid • 2 lateral metatarsal	• Cuboid, 3 cuneiform • Bases of metatarsals
Function	High arch concerned with the elastic propulsion of the foot during walking	Low arch concerned mainly with body weight transmission	Elastic propulsion of foot and body weight transmission
Factors maintaining	*Ligaments* • Interosseus ligaments • Plantar aponeurosis • Long planter ligament • Deltoid and spring ligaments *Muscles* • Tibialis anterior & posterior • Short muscles of the big toe • FHL	*Ligaments* • Interosseus ligaments • Plantar aponeurosis • Short planter ligament *Muscles* • 3 Peronei muscles • Short muscles of little toe	*Ligaments* • Interosseus ligaments *Muscles* • Peroneus longus • Transverse head of adductor hallucis

Intertarsal joints

Sub talar joint	Formed by the cylindrical facet on the lower surface of the body of the talus and the posterior facet on the upper surface of the calcaneus. The facet on the talus is concave anteroposteriorly, the other is convex. The synovial cavity of this joint does not communicate with any other joint.
Talocalcaneonavicular joint	The anterior part of the socket is formed by the concave articular surface of the navicular bone, posteriorly by the upper surface of the sustentaculum tali. The talus sits within this socket
Calcaneocuboid joint	Highest point in the lateral part of the longitudinal arch. The lower aspect of this joint is reinforced by the long plantar and plantar calcaneocuboid ligaments.
Transverse tarsal joint	The talocalcaneonavicular joint and the calcaneocuboid joint extend across the tarsus in an irregular transverse plane, between the talus and calcaneus behind and the navicular and cuboid bones in front. This plane is termed the transverse tarsal joint.
Cuneonavicular joint	Formed between the convex anterior surface of the navicular bone and the concave surface of the the posterior ends of the three cuneiforms.
Intercuneiform joints	Between the three cuneiform bones.
Cuneocuboid joint	Between the circular facets on the lateral cuneiform bone and the cuboid. This joint contributes to the tarsal part of the transverse arch.

A detailed knowledge of the joints is not required for MRCS Part A. However, the contribution they play to the overall structure of the foot should be appreciated



Nerves in the foot

Lateral plantar nerve

Passes anterolaterally towards the base of the 5th metatarsal between flexor digitorum brevis and flexor accessorius. On the medial aspect of the lateral plantar artery. At the base of the 5th metatarsal it splits into superficial and deep branches.

Medial plantar nerve

Passes forwards with the medial plantar artery under the cover of the flexor retinaculum to the interval between abductor hallucis and flexor digitorum brevis on the sole of the foot.

Plantar arteries

Arise under the cover of the flexor retinaculum, midway between the tip of the medial malleolus and the most prominent part of the medial side of the heel.

- Medial plantar artery. Passes forwards medial to medial plantar nerve in the space between abductor hallucis and flexor digitorum brevis.Ends by uniting with a branch of the 1st plantar metatarsal artery.
- Lateral plantar artery. Runs obliquely across the sole of the foot. It lies lateral to the lateral plantar nerve. At the base of the 5th metatarsal bone it arches medially across the foot on the metatarsals

Dorsalis pedis artery

This vessel is a direct continuation of the anterior tibial artery. It commences on the front of the ankle joint and runs to the proximal end of the first metatarsal space. Here is gives off the arcuate artery and continues forwards as the first dorsal metatarsal artery. It is accompanied by two veins throughout its length. It is crossed by the extensor hallucis brevis

Ligaments of the Intertarsal Joints

Ligament	Common Name	Origin	Insertion
Interosseous talocalcaneal	Cervical	Talus	Calcaneus
Calcaneocuboid/calcaneonavicular	Bifurcate	Calcaneus	Cuboid and navicular
Calcaneocuboid-metatarsal	Long plantar	Calcaneus	Cuboid and first to fifth metatarsals
Plantar calcaneocuboid	Short plantar	Calcaneus	Cuboid
Plantar calcaneonavicular	Spring	Sustentaculum tali	Navicular
Tarsometatarsal	Lisfranc	Medial cuneiform	Second metatarsal base

Foot Neuromuscular Interactions

Foot Function	Muscle	Innervation
Inversion	Tibialis anterior	Deep peroneal nerve (L4)
	Tibialis posterior	Tibial nerve (S1)
Dorsiflexion	Tibialis anterior, extensor digitorum longus, extensor hallucis longus	Deep peroneal nerve: tibialis anterior (L4), extensor digitorum longus, and extensor hallucis longus (L5)
Eversion	Peroneus longus and peroneus brevis	Superficial peroneal nerve (S1)
Plantar flexion	Gastrocnemius-soleus complex, flexor digitorum longus, flexor hallucis longus, tibialis posterior (also hindfoot inverter)	Tibial nerve (S1)

Joints of LL

Hip Joint

- Head of femur articulates with acetabulum of the pelvis
- Both covered by articular hyaline cartilage
- The acetabulum forms at the union of the ilium, pubis, and ischium
- The triradiate cartilage (Y-shaped growth plate) separates the pelvic bones
- The acetabulum holds the femoral head by the acetabular labrum
- Normal angle between femoral head and femoral shaft is 130°

Mnemonic lateral hip rotators:
P-GO-GO-Q (top to bottom)
- Piriformis
- Gemellus superior
- Obturator internus
- Gemellus inferior
- Obturator externus
- Quadratus femoris

Ligaments

- Transverse ligament: joints anterior and posterior ends of the articular cartilage
- Head of femur ligament (ligamentum teres): acetabular notch to the fovea. Contains arterial supply to head of femur in children.
-

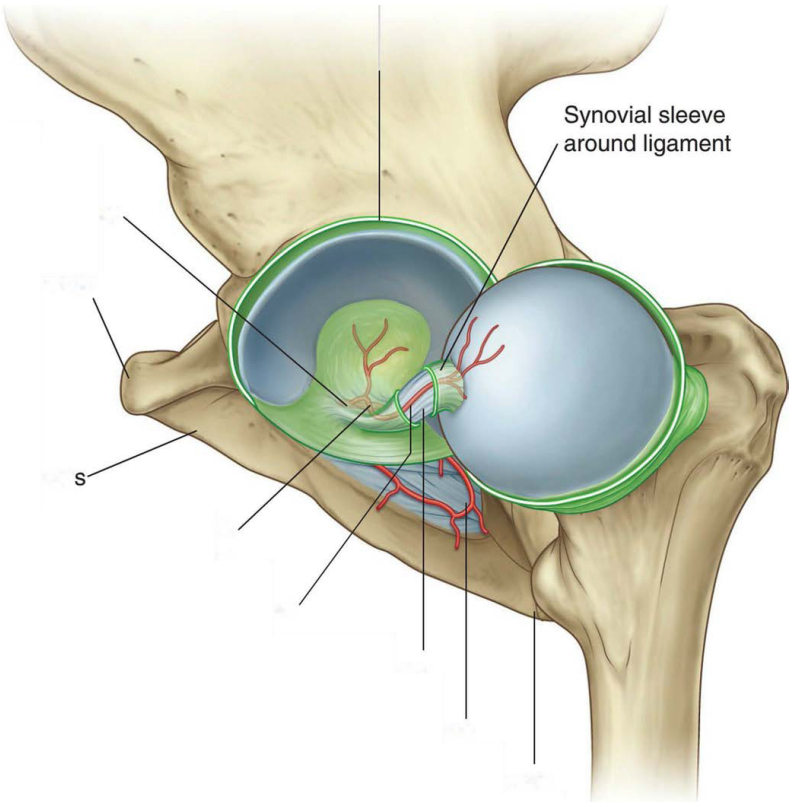
Extracapsular ligaments

- Iliofemoral ligament: inverted Y shape. Anterior iliac spine to the trochanteric line
- Pubofemoral ligament: acetabulum to lesser trochanter
- Ischiofemoral ligament: posterior support. Ischium to greater trochanter.

Blood supply

Medial circumflex femoral and lateral circumflex femoral arteries (Branches of profunda femoris). Also from the inferior gluteal artery. These form an anastomosis and travel to up the femoral neck to supply the head.

Nerve supply of lateral hip rotators
- Piriformis: ventral rami S1, S2
- Obturator internus: nerve to obturator internus
- Superior gemellus: nerve to obturator internus
- Inferior gemellus: nerve to quadratus femoris
- Quadrator femoris: nerve to quadrator femoris



Knee Joint

The knee joint is a synovial joint, the largest and most complicated. It consists of two condylar joints between the femur and tibia and a sellar joint between the patella and the femur. The tibiofemoral articular surfaces are incongruent, however, this is improved by the presence of the menisci. The degree of congruence is related to the anatomical position of the knee joint and is greatest in full extension.

Knee joint compartments

Tibiofemoral	• Comprised of the patella/femur joint, lateral and medial compartments (between femur condyles and tibia) • Synovial membrane and cruciate ligaments partially separate the medial and lateral compartments
Patellofemoral	• Ligamentum patellae • Actions: provides joint stability in full extension

Fibrous capsule

The capsule of the knee joint is a complex, composite structure with contributions from adjacent tendons.

Anterior fibres	The capsule does not pass proximal to the patella. It blends with the tendinous expansions of vastus medialis and lateralis
Posterior fibres	These fibres are vertical and run from the posterior surface of the femoral condyles to the posterior aspect of the tibial condyle
Medial fibres	Attach to the femoral and tibial condyles beyond their articular margins, blending with the tibial collateral ligament
Lateral fibres	Attach to the femur superior to popliteus, pass over its tendon to head of fibula and tibial condyle

Bursae

Anterior	• Subcutaneous prepatellar bursa; between patella and skin • Deep infrapatellar bursa; between tibia and patellar ligament • Subcutaneous infrapatellar bursa; between distal tibial tuberosity and skin
Laterally	• Bursa between lateral head of gastrocnemius and joint capsule • Bursa between fibular collateral ligament and tendon of biceps femoris • Bursa between fibular collateral ligament and tendon of popliteus
Medially	• Bursa between medial head of gastrocnemius and the fibrous capsule • Bursa between tibial collateral ligament and tendons of sartorius, gracilis and semitendinosus • Bursa between the tendon of semimembranosus and medial tibial condyle and medial head of gastrocnemius
Posterior	Highly variable and inconsistent

Ligaments

Medial collateral ligament	Medial epicondyle femur to medial tibial condyle: valgus stability
Lateral collateral ligament	Lateral epicondyle femur to fibula head: varus stability
Anterior cruciate ligament	Anterior tibia to lateral intercondylar notch femur: prevents tibia sliding anteriorly
Posterior cruciate ligament	Posterior tibia to medial intercondylar notch femur: prevents tibia sliding posteriorly
Patellar ligament	Central band of the tendon of quadriceps femoris, extends from patella to tibial tuberosity

Menisci

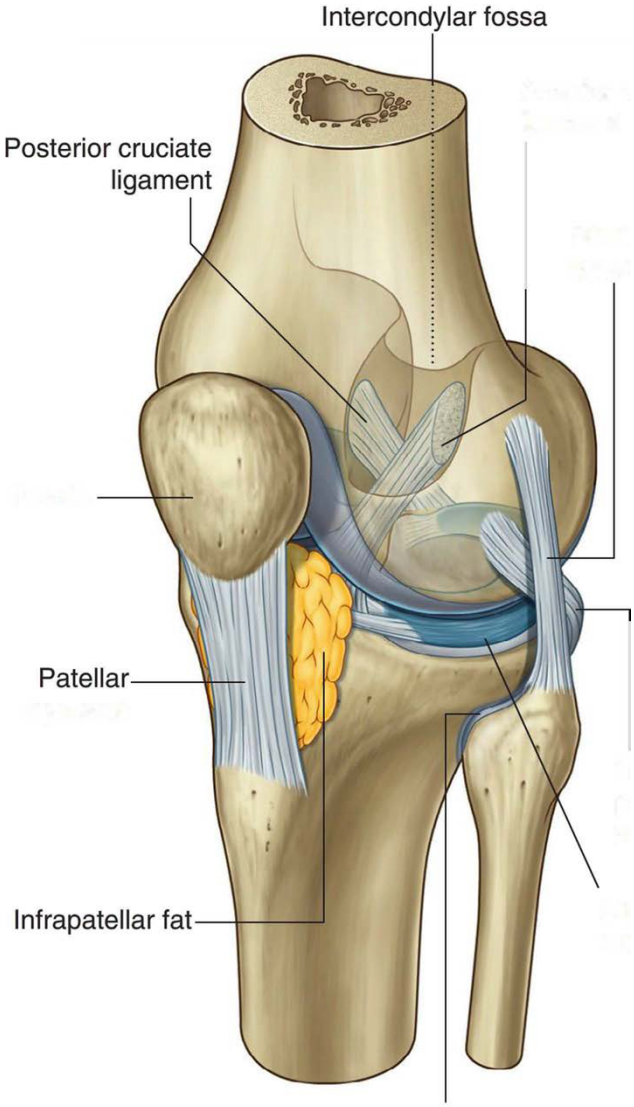
Medial and lateral menisci compensate for the incongruence of the femoral and tibial condyles.
Composed of fibrous tissue.
Medial meniscus is attached to the tibial collateral ligament.
Lateral meniscus is attached to the loose fibres at the lateral edge of the joint and is separate from the fibular collateral ligament. The lateral meniscus is crossed by the popliteus tendon.

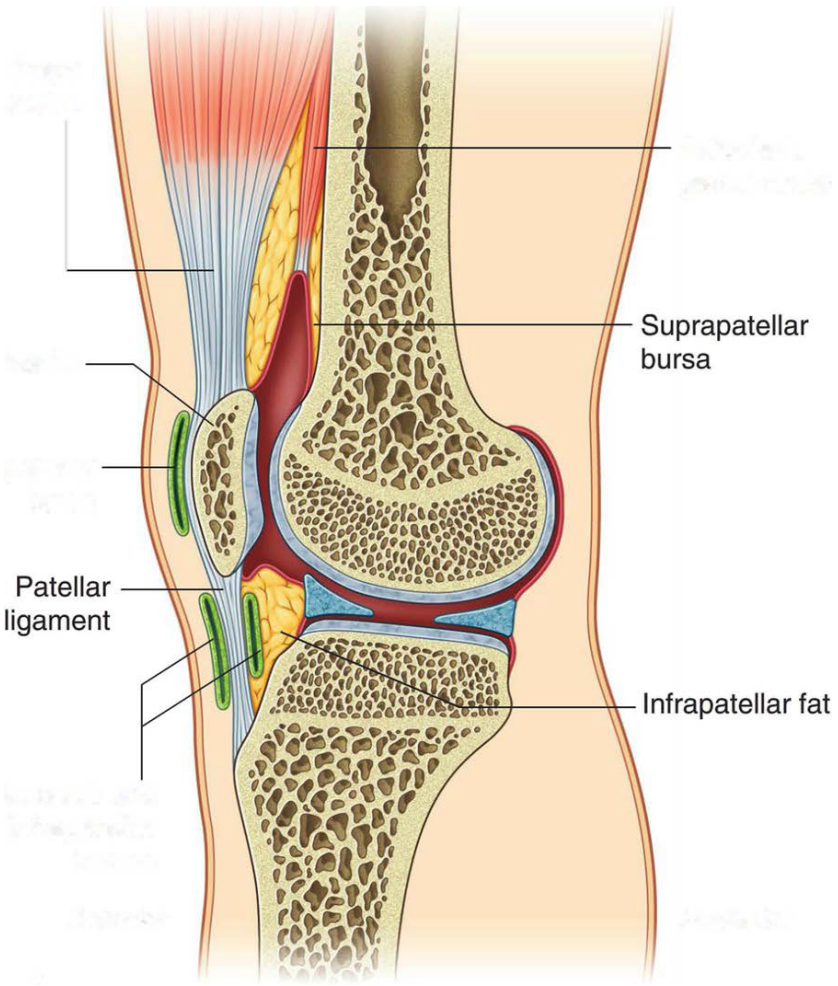
Nerve supply

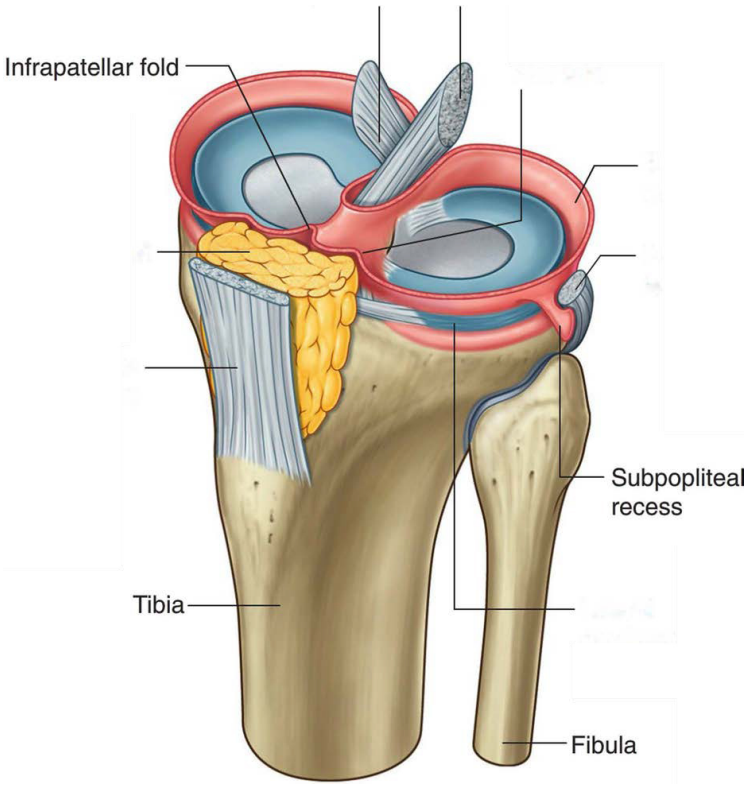
The knee joint is supplied by the femoral, tibial and common peroneal divisions of the sciatic and by a branch from the obturator nerve. Hip pathology pain may be referred to the knee.

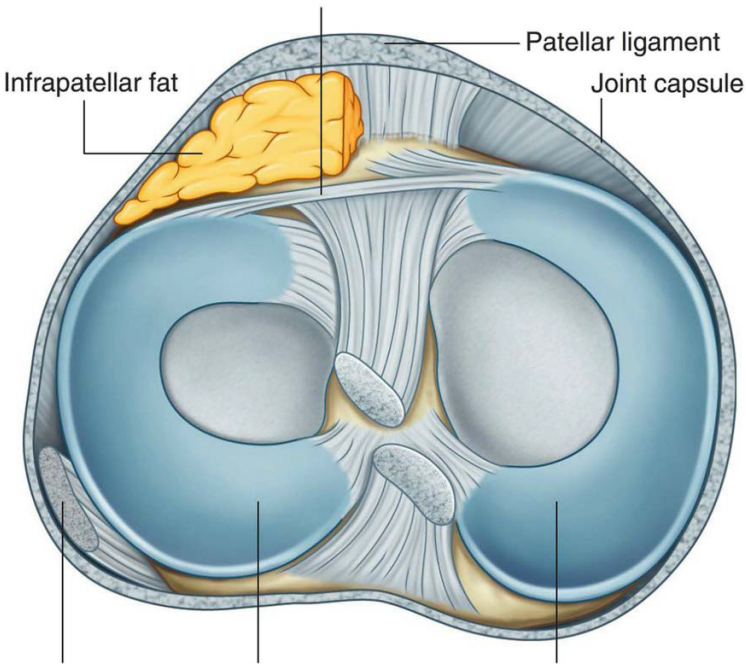
Blood supply

Genicular branches of the femoral artery, popliteal and anterior tibial arteries all supply the knee joint.


Intercondylar fossa
Posterior cruciate ligament
Patellar
Infrapatellar fat


Suprapatellar bursa
Patellar ligament
Infrapatellar fat

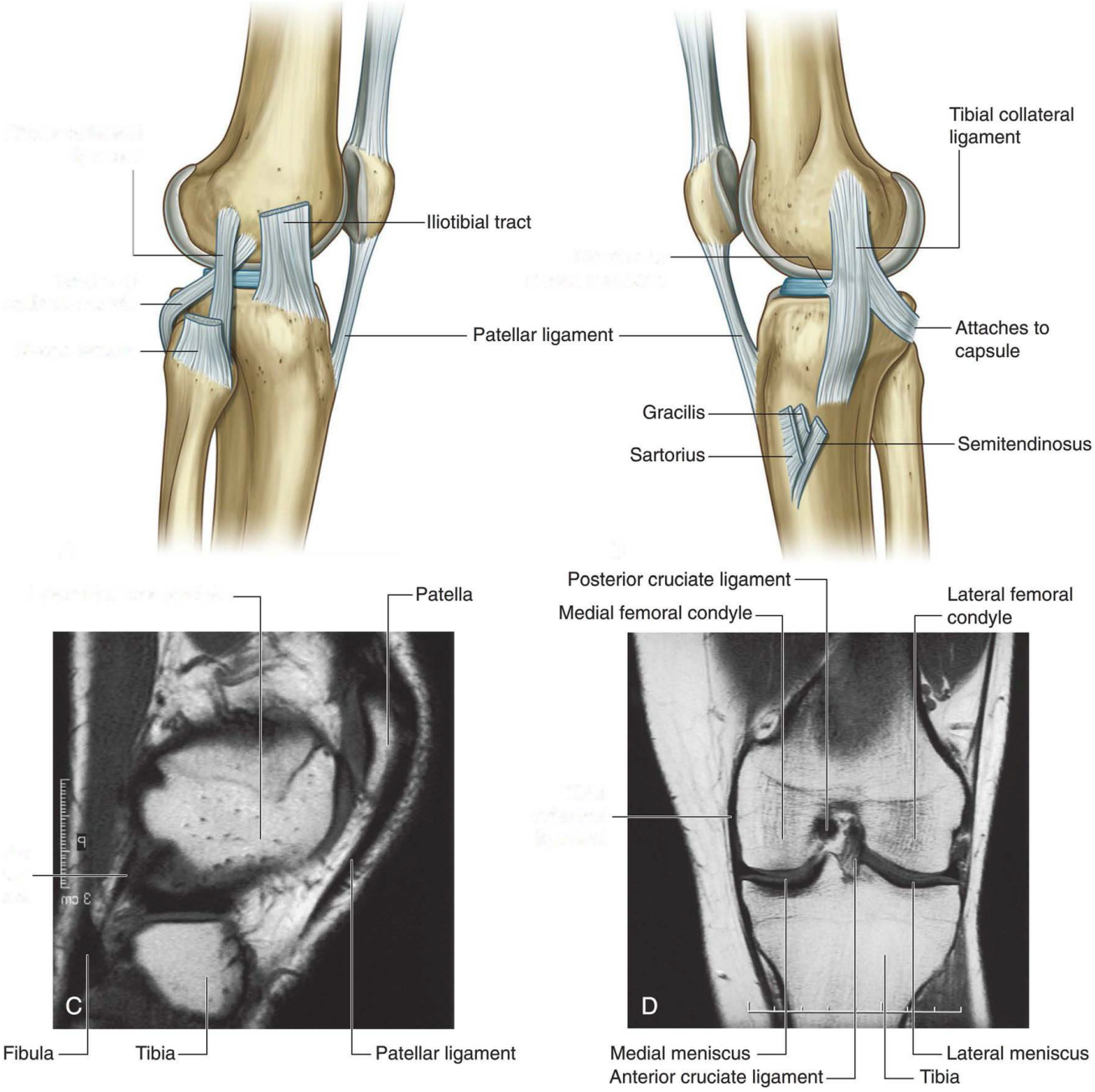

Infrapatellar fold
Subpopliteal recess
Tibia
Fibula

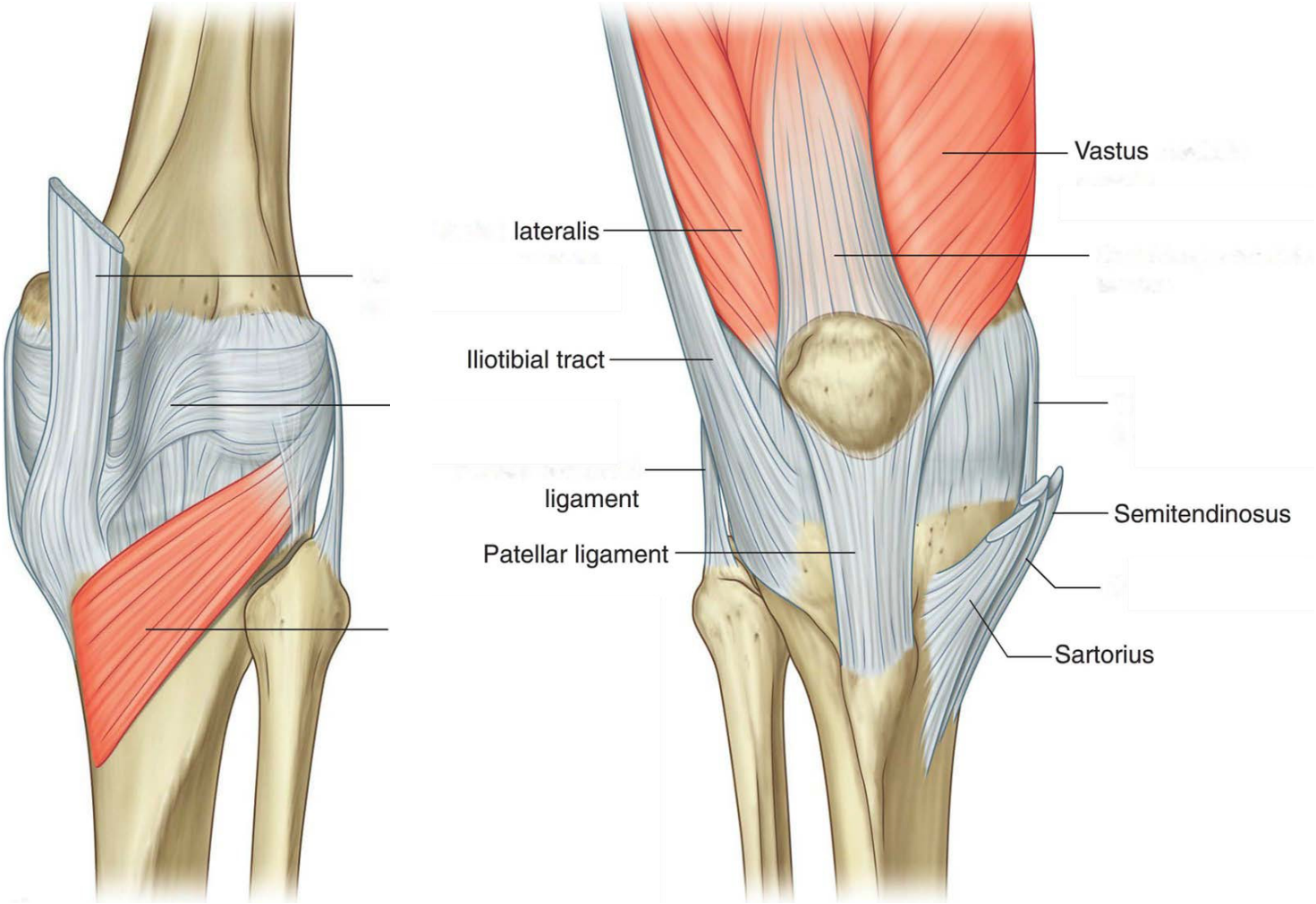

Patellar ligament
Infrapatellar fat
Joint capsule

Ligaments of the Knee

Ligament	Origin	Insertion	Function
Retinacular	Vastus medialis and vastus lateralis	Tibial condyles	Forms anterior capsule
Posterior fibers	Femoral condyles	Tibial condyles	Forms posterior capsule
Oblique popliteal	Semimembranosus tendon	Lateral femoral condyle/posterior capsule	Strengthens capsule
Deep MCL	Medial epicondyle	Medial meniscus	Holds medial meniscus to femur
Superficial MCL	Medial epicondyle	Medial condyle of tibia	Resists valgus force
Arcuate	Lateral femoral condyle, over popliteus	Posterior tibia/fibular head	Posterior support
Lateral collateral	Lateral epicondyle	Lateral fibular head	Resists varus force
Anterior cruciate	Anterior intercondylar tibia	Posteromedial lateral femoral condyle	Limits hyperextension/sliding
Posterior cruciate	Posterior sulcus of tibia	Anteromedial femoral condyle	Prevents hyperflexion/sliding
Coronary	Meniscus	Tibial periphery	Meniscal attachment
Wrisberg	Posterolateral meniscus	Medial femoral condyle (behind posterior cruciate ligament)	Stabilizes lateral meniscus
Humphrey	Posterolateral meniscus	Medial femoral condyle (in front)	Stabilizes lateral meniscus
Transverse meniscal	Anterolateral meniscus	Anteromedial meniscus	Stabilizes menisci

MCL, medial collateral ligament.




Vastus
lateralis
Iliotibial tract
ligament
Patellar ligament
Semitendinosus
Sartorius

Ankle Joint

The ankle joint is a synovial hinge joint composed of the tibia and fibula superiorly and the talus inferiorly.

Ankle Joint Ligaments

	Ligament	*Origin*	*Insertion*
Capsule		Tibia	Talus
Deltoid *(4 parts)*	*Anterior tibiotalar*	Anterior colliculus of medial malleolus	Anteromedial surface of talus
	Tibionavicular		Navicular tuberosity
	Tibiocalcaneal		Sustentaculum tali
	Posterior tibiotalar (deep)	Post. colliculus of medial malleolus	Medial talus & medial tubercle
LCL *(3 parts)*	*Anterior talofibular*	Lateral malleolus	Transversely to talus anteriorly
	Posterior talofibular	Lateral malleolus	Transversely to talus posteriorly
	Calcaneofibular	Lateral malleolus	Obliquely to calcaneus posteriorly

The calcaneofibular ligament is separate from the fibrous capsule of the joint. The two talofibular ligaments are fused with it.

The components of the syndesmosis are

- Antero-inferior tibiofibular ligament
- Postero-inferior tibiofibular ligament
- Inferior transverse tibiofibular ligament
- Interosseous ligament

Lateral collateral ligament (LCL)

- Anterior talofibular
- Posterior talofibular
- Calcaneofibular

Syndesmotic complex

- Anterior tibiofibular
- Posterior tibiofibular
- Inferior transverse tibiofibular *(deep fibers of posterior tibiofibular)*

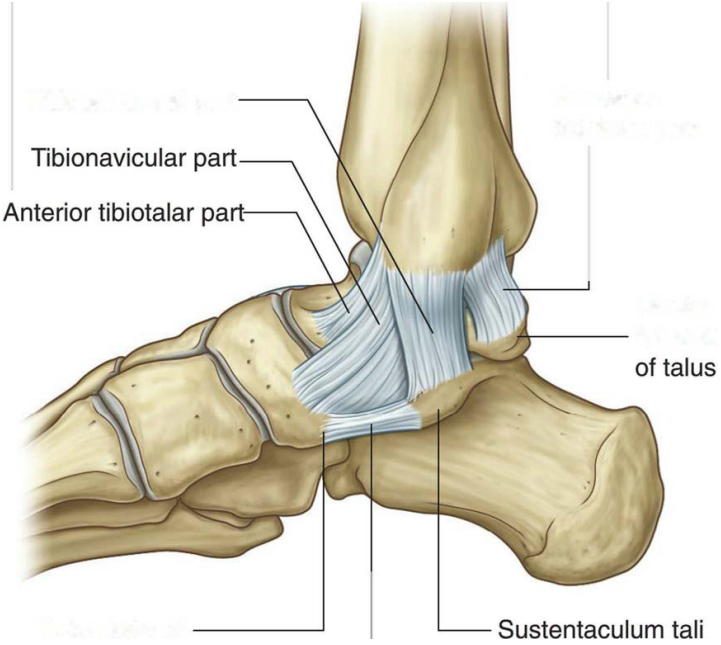
Movements at the ankle joint

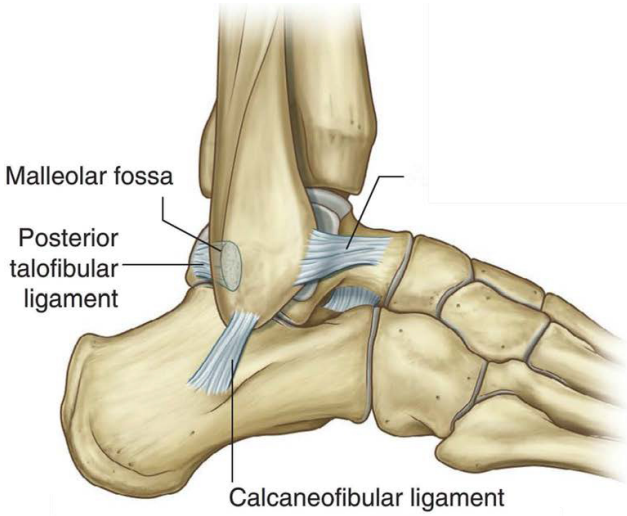
- Plantar flexion (55 degrees)
- Dorsiflexion (35 degrees)

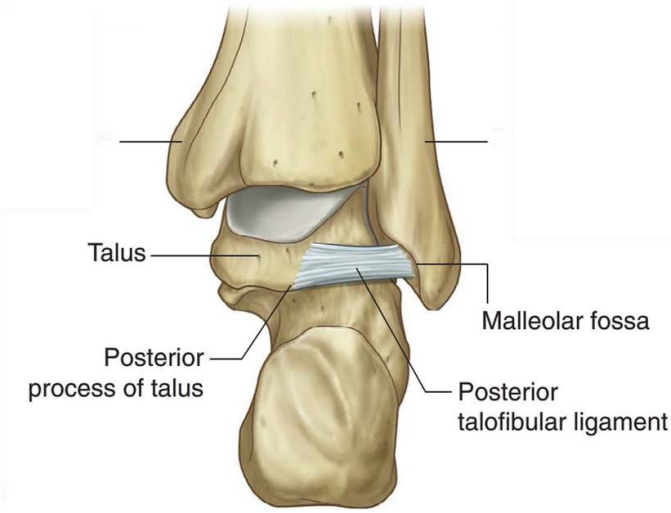
Inversion and eversion movements occur at the level of the sub talar joint

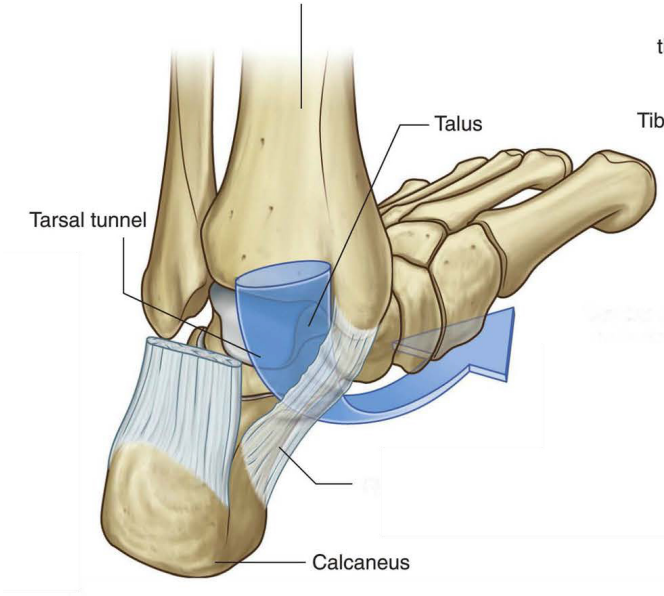
Nerve supply

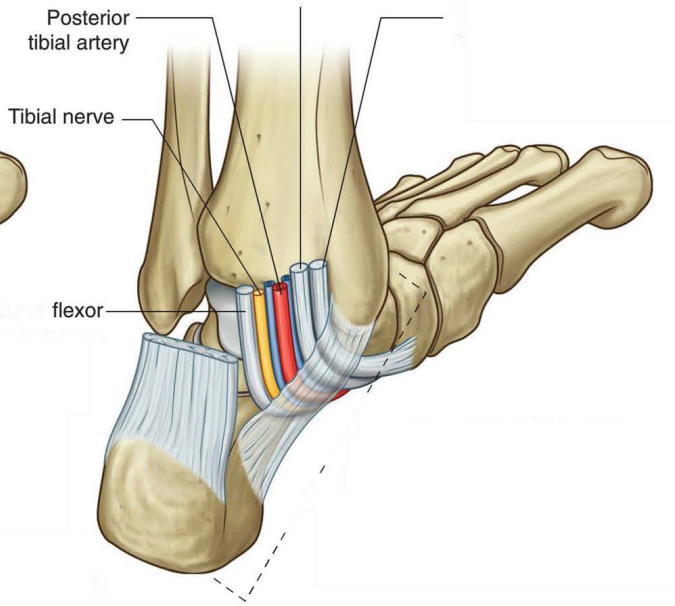
Branches of deep peroneal and tibial nerves.









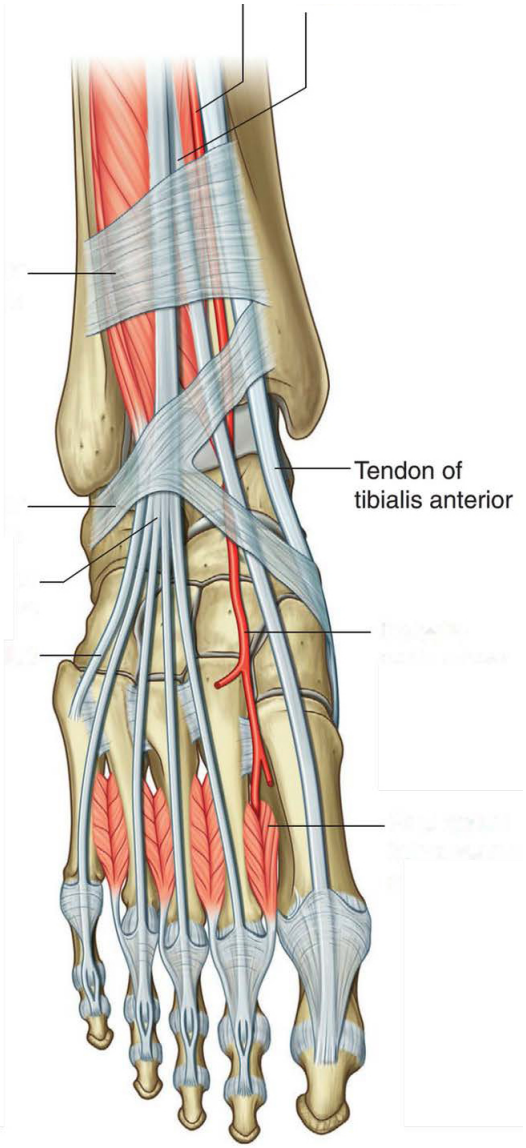


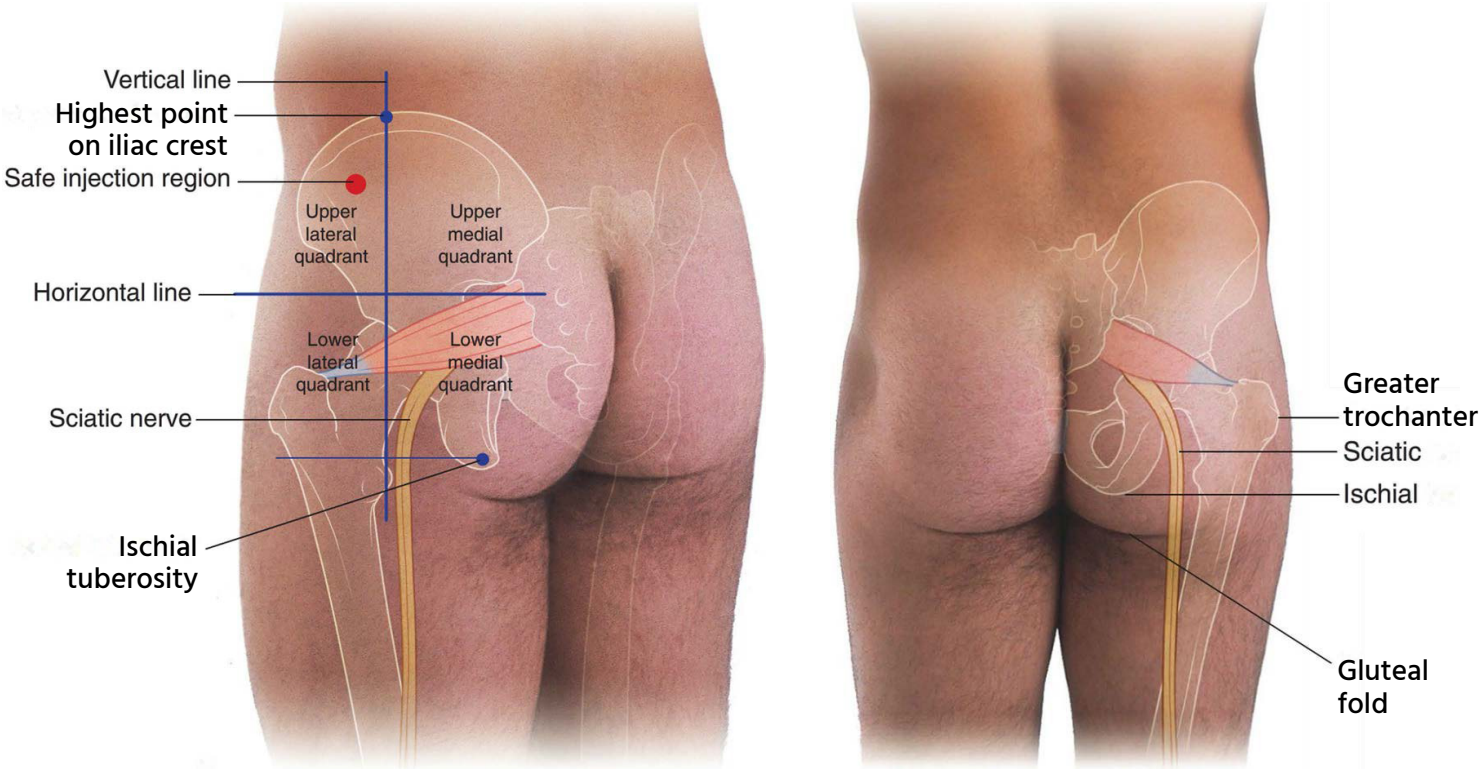
Structures posterior to the medial malleolus:
Deep to flexor retinaculum ***(Posteromedially)***
Tom Does Very Nice Hats

- Tibialis posterior tendon
- flexor Digitorum longus
- posterior tibial Vessels
- posterior tibial Nerve
- Hallucis longus

Structures deep to ext retinaculum ***(Anterior):***
Tom Has Very Nice Dogs & Pigs

- Tibialis anterior
- ext Hallucis longus
- anterior tibial Vessels
- anterior tibial Nerve
- extensor Digitorum longus
- Peroneus tertius




Vertical line
Highest point on iliac crest
Safe injection region
Upper lateral quadrant
Upper medial quadrant
Horizontal line
Lower lateral quadrant
Lower medial quadrant
Sciatic nerve
Ischial tuberosity
Greater trochanter
Sciatic
Ischial
Gluteal fold


Popliteal pulse