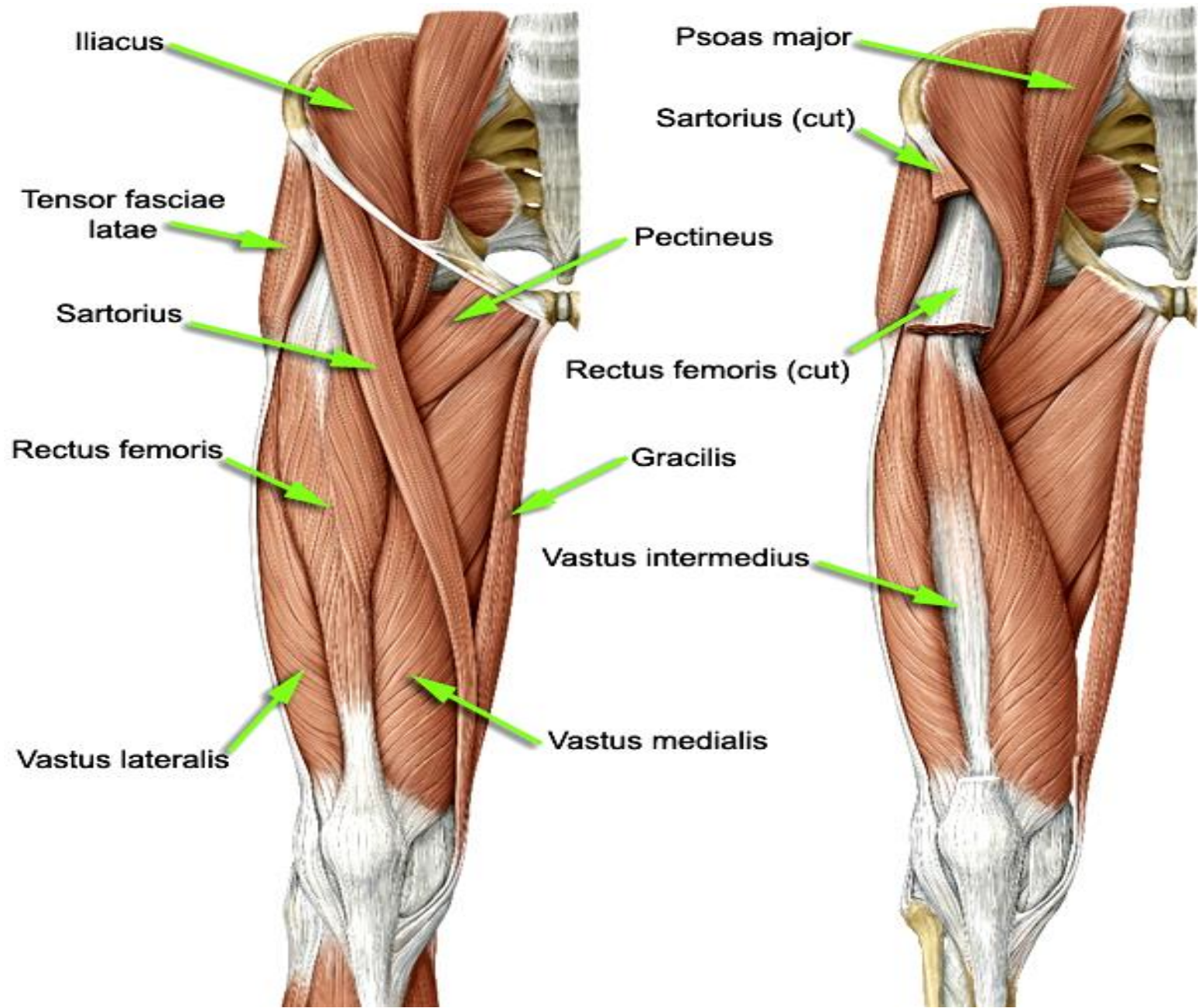


Muscles of lower limb

Muscles of front of the thigh

- All muscles are supplied by femoral nerve .

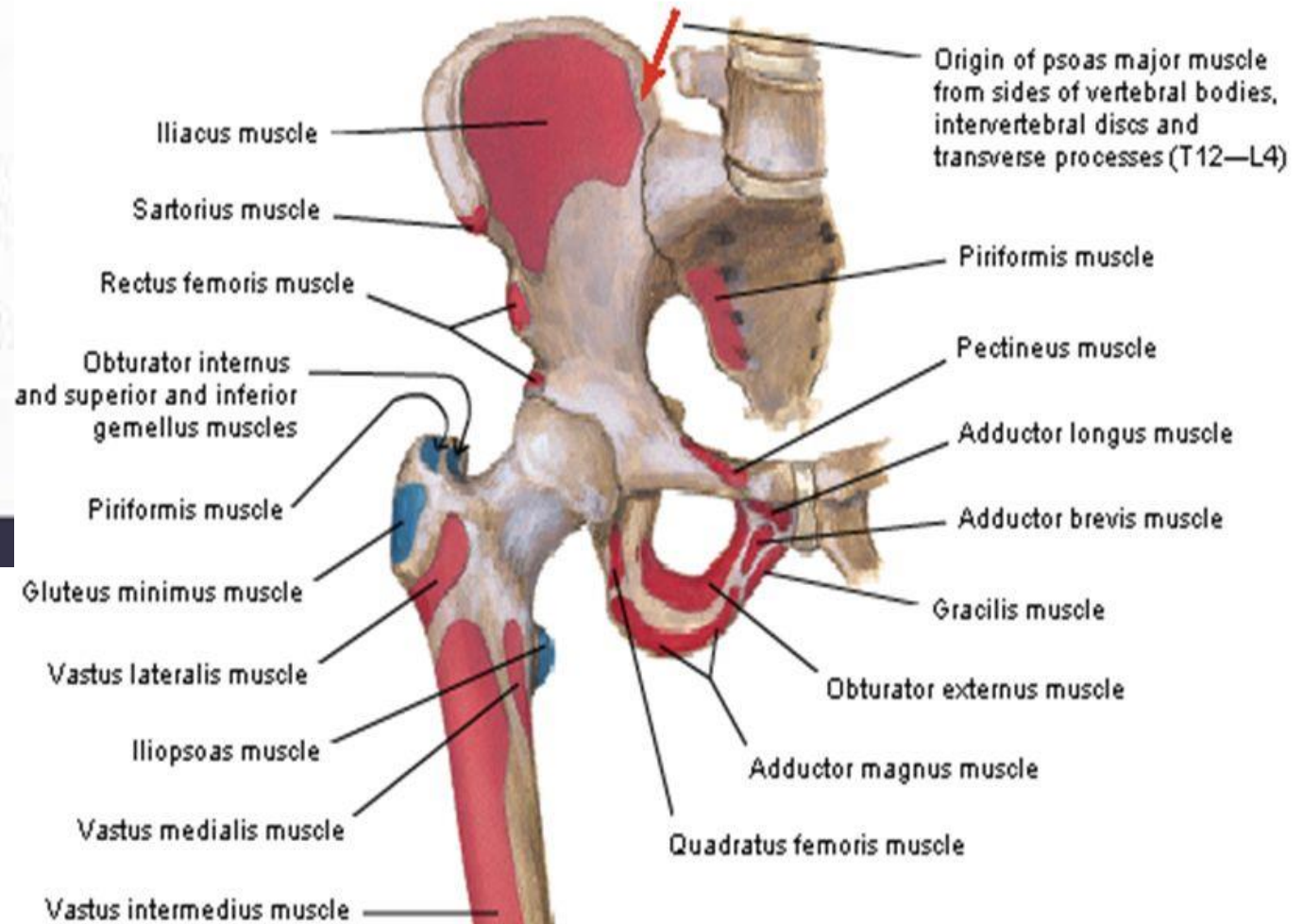
	Origin	Insertion	Main Action
1.Sartorius	<ul style="list-style-type: none"> • Anterior superior iliac spine (ASIS) 	<ul style="list-style-type: none"> • Upper part of medial surface of tibia (S.G.S) • It is the longest muscle in the body. 	<ul style="list-style-type: none"> • Flexion , abduction & lateral rotation of thigh at hip joint. • Flexion & medial rotation of leg at knee joint. i.e put LL in sartorius position)
2.Quadriceps femoris	<p>a)Rectus femoris:-by 2 heads</p> <ul style="list-style-type: none"> • Straight head : from A.I.I.S • Reflected head : above the acetabulum . <p>b)Vastus lateralis:Upper part of inter-trochanteric line, root of greater trochanter, lateral to gluteal tuberosity, upper 1/2 of lateral lip of linea aspera.</p> <p>c)Vastus medialis: lower part of inter-trochanteric line , spiral line, linea aspera, upper 1/2 of medial supracondylar ridge.</p> <p>d)Vastus intermedius : upper 2/3 of anterior & lateral surface of shaft of femur.</p>	<ul style="list-style-type: none"> • A common quadriceps tendon inserted into the base of patella then it extends as ligamentum patellae which is inserted into tibial tuberosity . • Some fibers from vastus medialis & lateralis form medial & lateral patellar retinacula respectively which are attached to sides of patella , in corresponding sides of the fibrous capsule of knee joint and anterior margins of tibial condyles. • Articularis genu : Deep fibers inserted into upper edge of synovial membrane of knee joint. 	<ul style="list-style-type: none"> • The only extensor of the knee . • Rectus femoris assists in flexion of the hip. • Articularis genu draws the synovial membrane of knee joint upwards during extension of the knee .

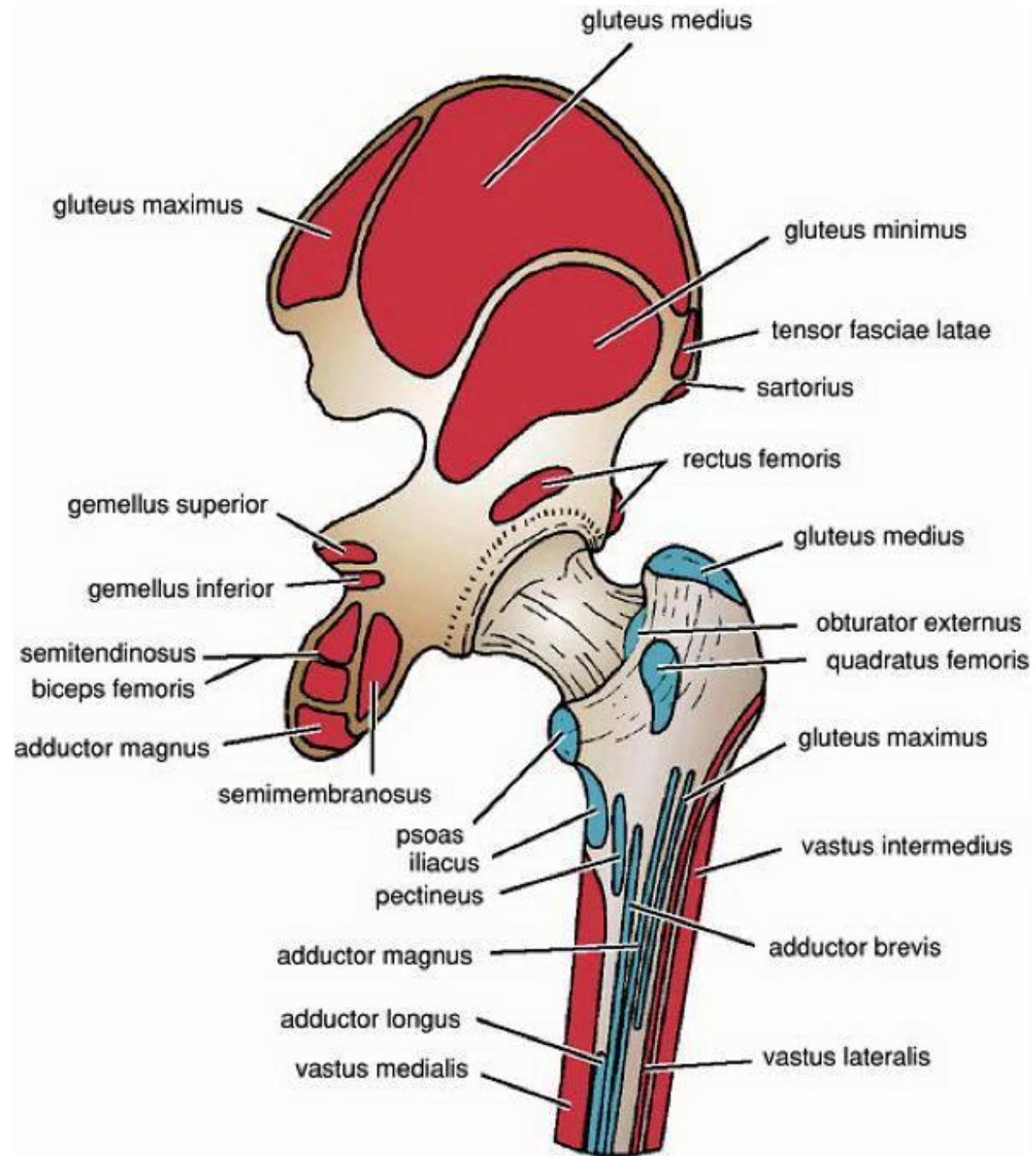


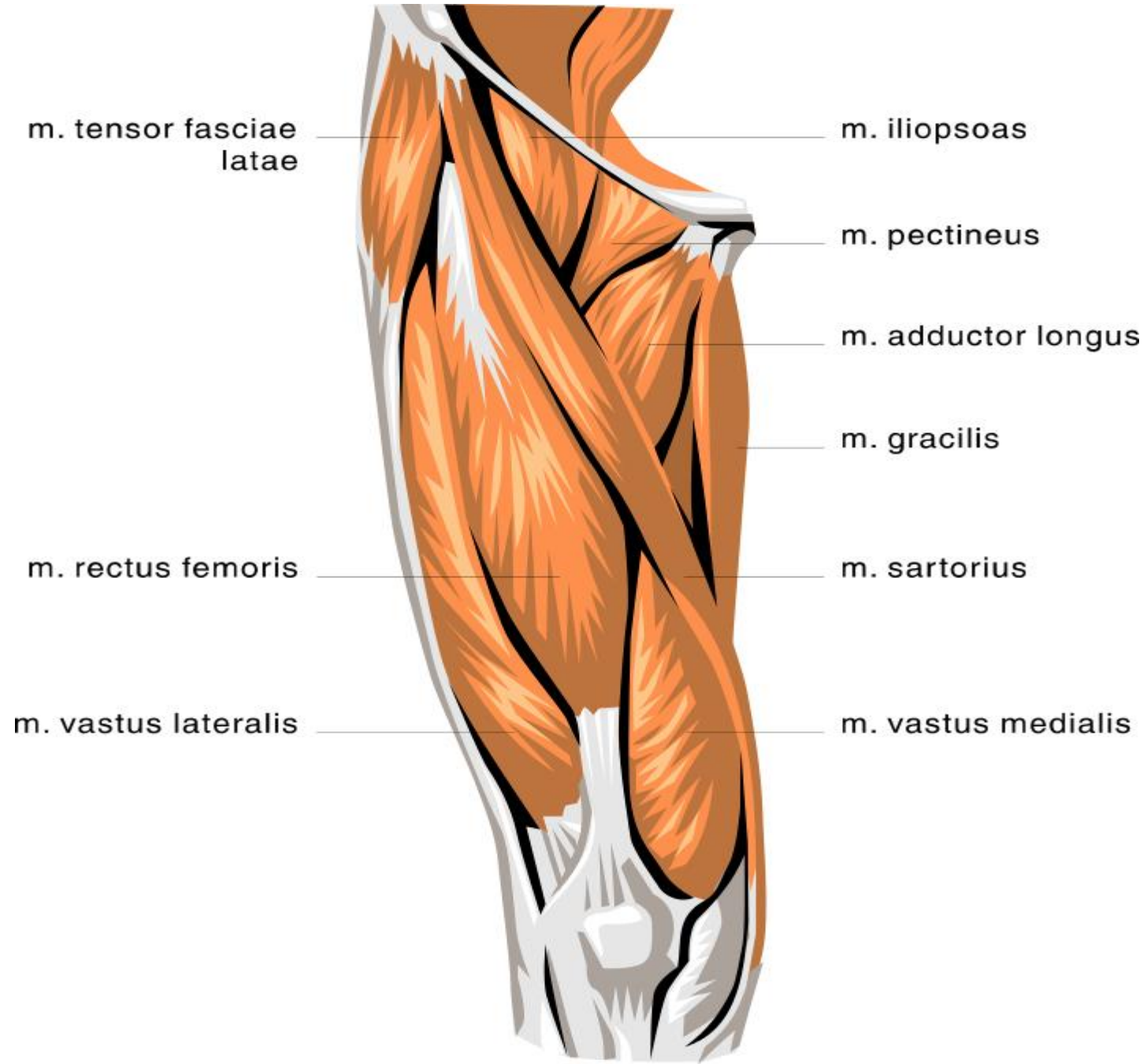


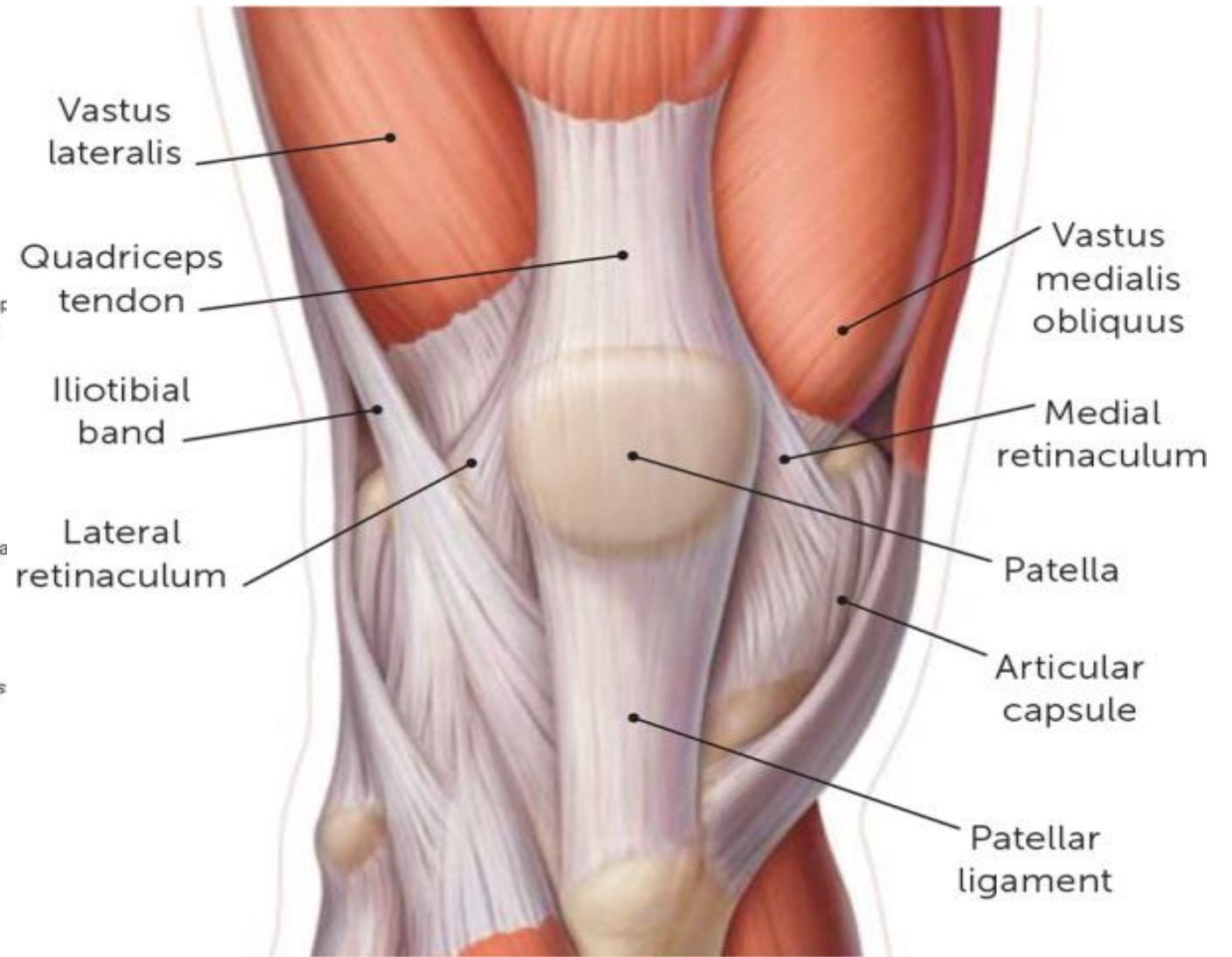
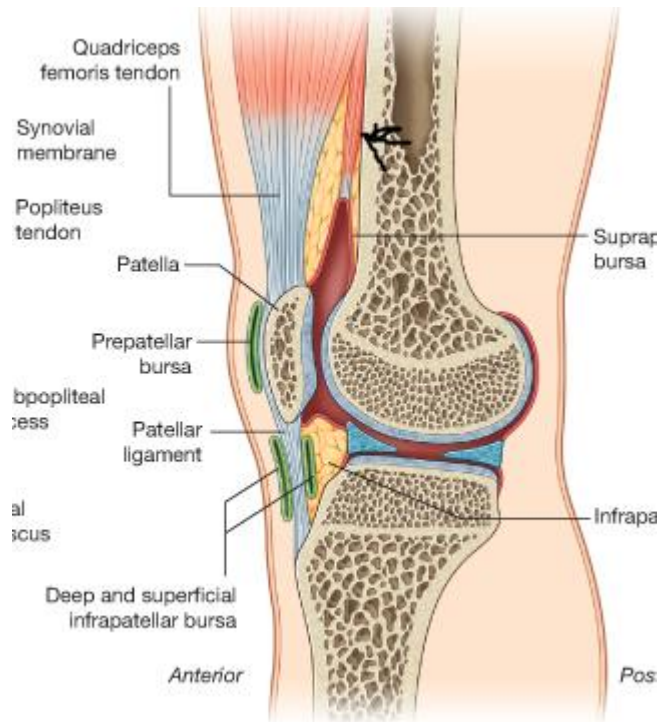
alamy stock photo

HIP & THIGH MUSCLES ATTACHMENT (ANTERIOR VIEW)





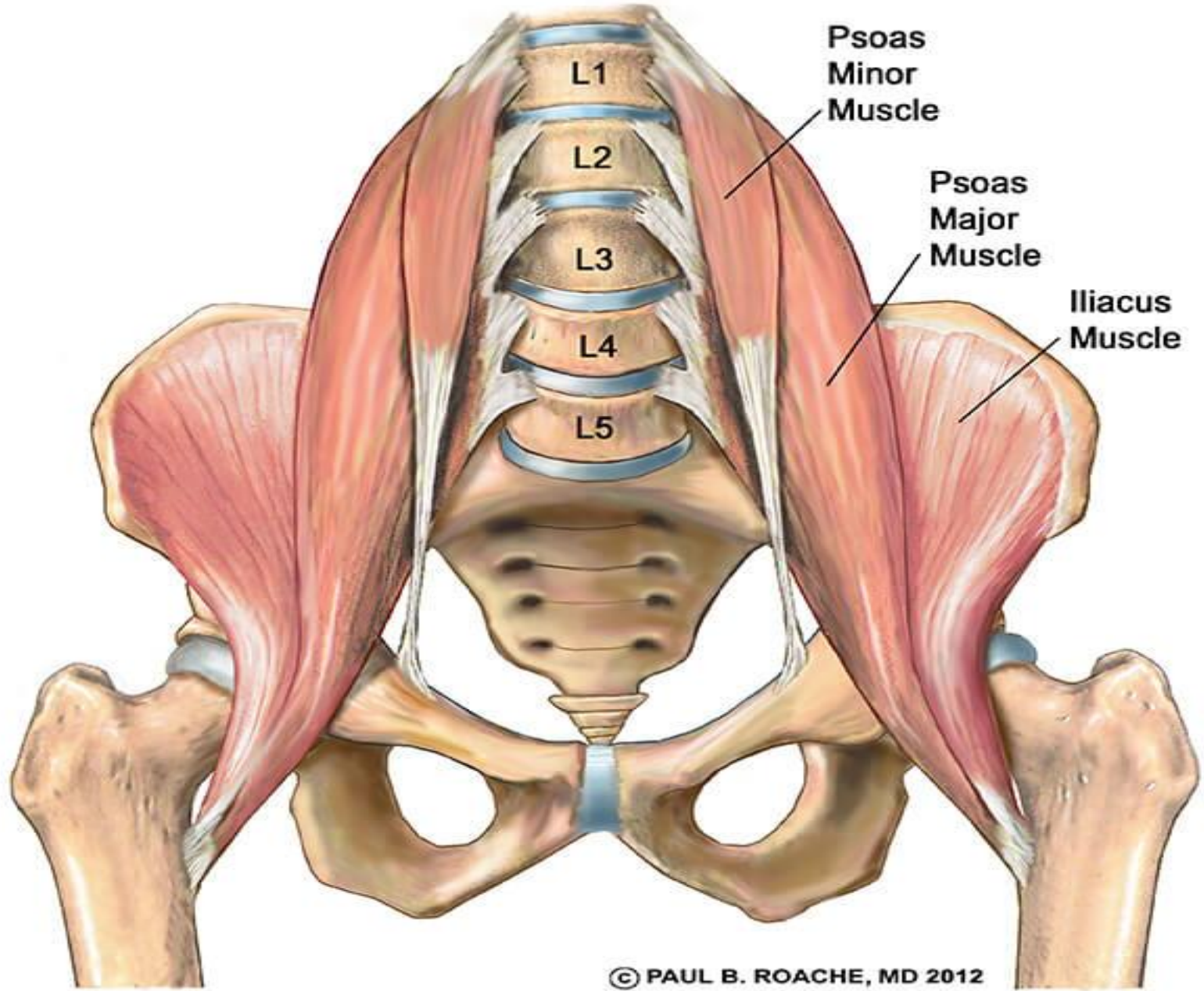




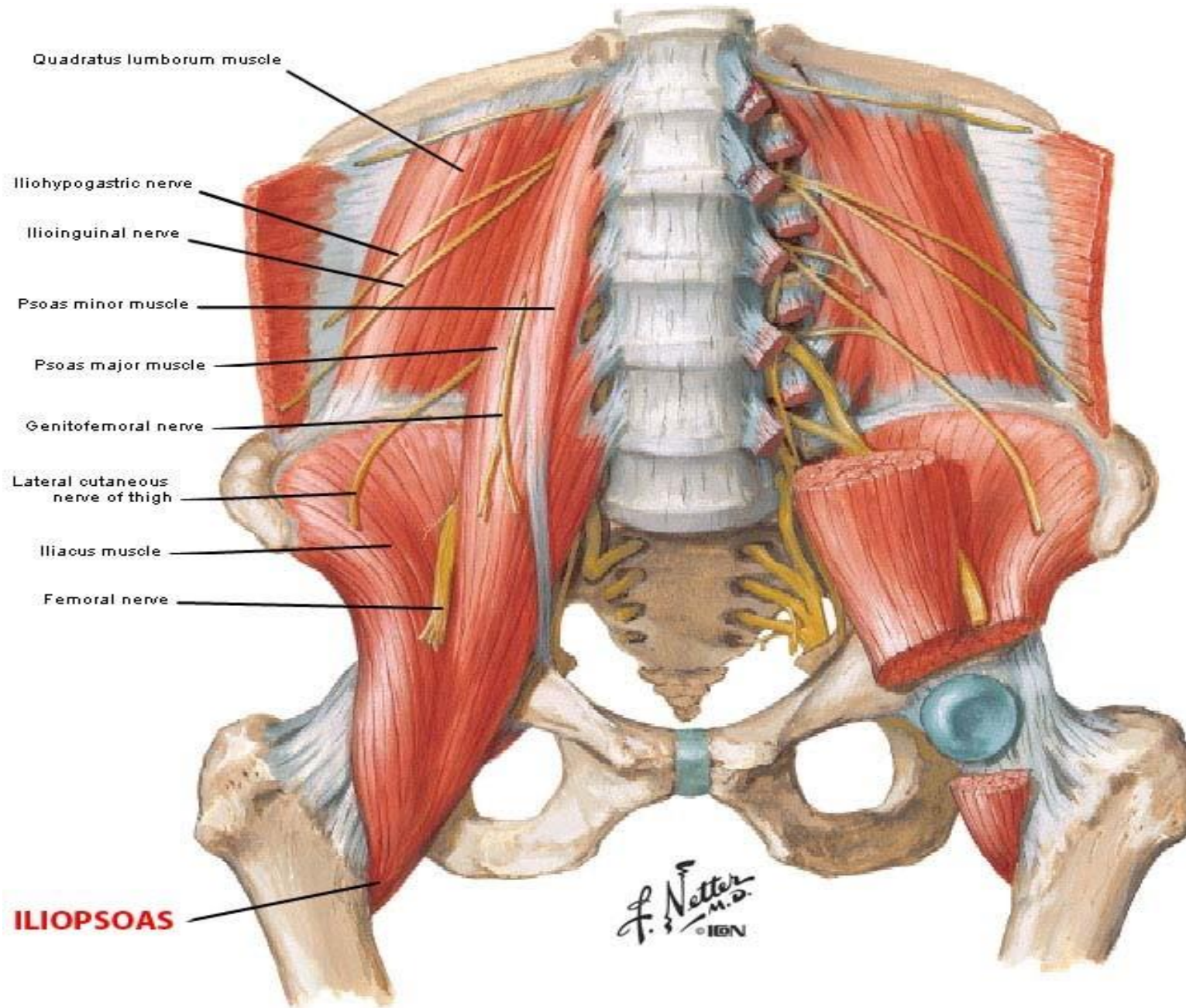
Muscles of the iliac region

★ Psoas major and iliacus are 2 muscles of the abdomen and fuse together deep to inguinal ligament to form iliopsoas muscle .

Muscle	Origin	Insertion	Nerve supply	Action
1- Psoas major :	<ul style="list-style-type: none"> Sides of body & intervertebral discs and front of transverse processes from T12 to L5 vertebrae. 	<ul style="list-style-type: none"> Both muscles form the iliopsoas tendon which is inserted into the lesser trochanter of femur. In addition 	<ul style="list-style-type: none"> From lumbar plexus (L 1,2 &3) 	<ol style="list-style-type: none"> Main flexor of the hip . Medial rotation of thigh. Contraction of both side produce flexion of vertebral column. Contraction of one side produce lateral flexion of vertebral column.
2-Iliacus :	<ul style="list-style-type: none"> Iliac fossa . 	<ul style="list-style-type: none"> insertion of iliacus extends for one inch below lesser trochanter 	<ul style="list-style-type: none"> Femoral nerve 	



© PAUL B. ROACHE, MD 2012



Muscles of medial aspect of the thigh (Adductors)

- All muscles are supplied by obturator nerve except the Pectineus (supplied by Femoral nerve & sometime take additional branch from obturator) & ischeal part of Adductor magnus (supplied by Sciatic nerve).
- Common origin : Front of body of pubic bone & inferior pubic ramus (except pectineus & adductor magnus).
- Common action : Adduction of the thigh at hip joint except ischeal part of Adductor magnus .

Muscle	Origin	Insertion	Main Action
1- Gracilis:	• Common origin.	• S.G.S behind the sartorius	• Common action. • Flexion & medial rotation of leg.
2- Pectineus	• Pectineal line & surface of superior pubic ramus.	• Upper 1/2 of pectineal line of femur	• Common action • Assist in flexion of hip joint .
3- Adductor Longus	• Body of pubic bone just below the pubic tubercle.	• Middle 1/3 of linea aspera	• Common action. • Its tendon is a landmark for pubic tubercle.
4- Adductor brevis	• Common origin.	• Lower 1/2 of pectineal line & upper part of linea aspera	• Common action
5- Adductor magnus	a) Pubic part: anterior surface of pubic arch. b) Ischeal part: lateral area of lower triangular part of ischeal tuberosity	a) pubic part: medial aspect of gluteal tuberosity of femur , linea aspera & medial supracondylar ridge. b) Ischeal part: adductor tubercle.	a) Pubic part: Common action b) Ischeal part: Extend the hip .

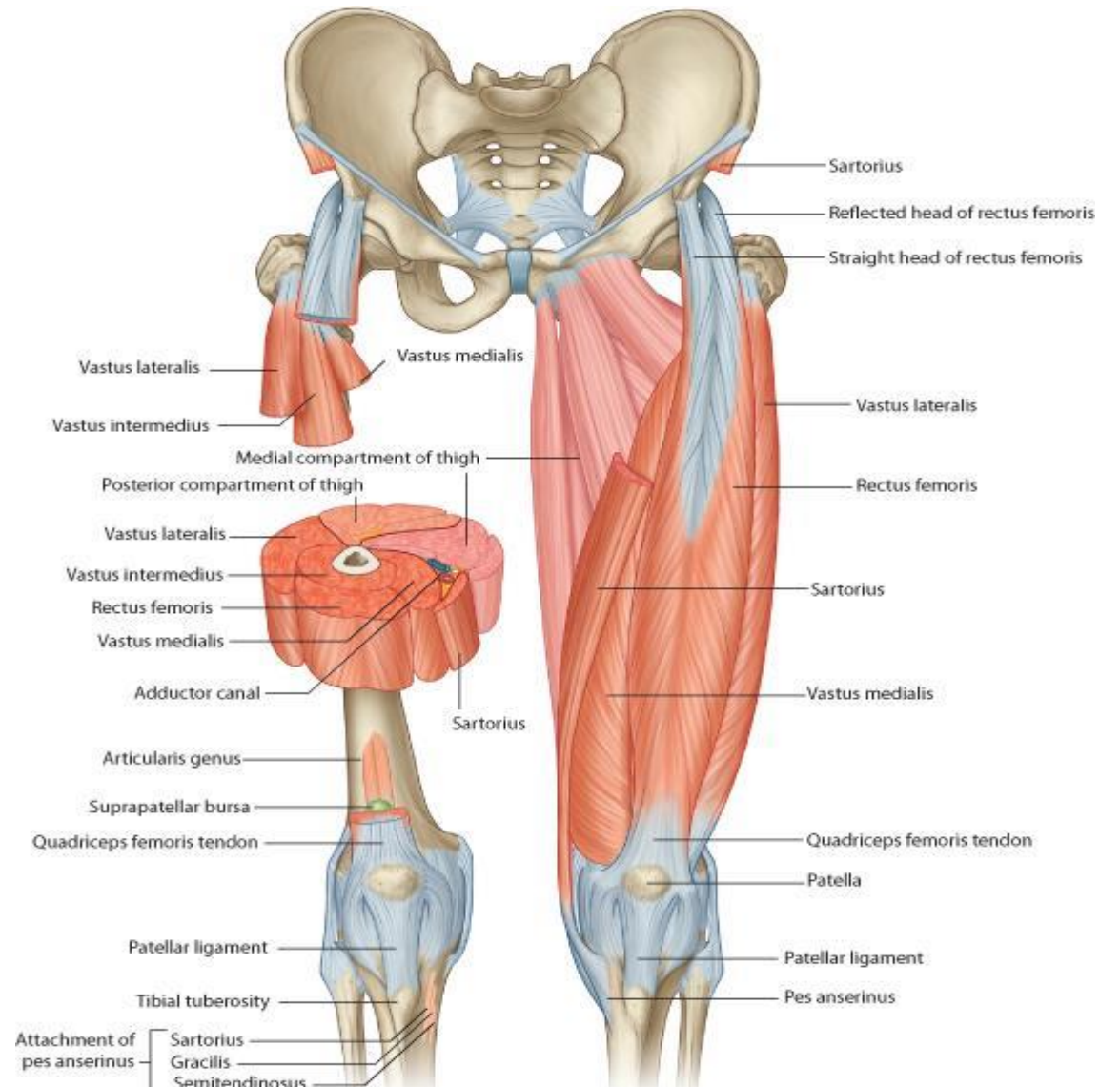
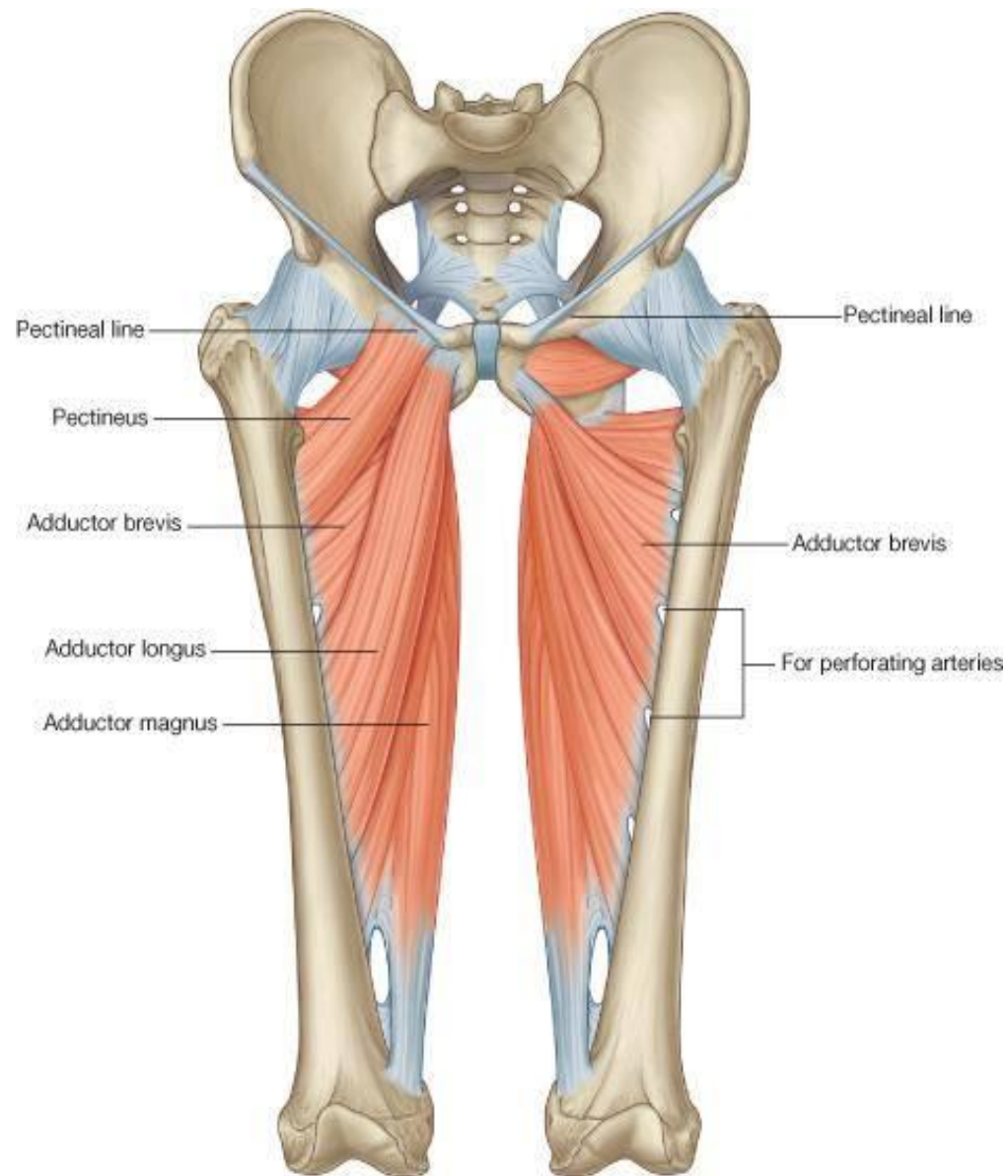
★ **Relations :**

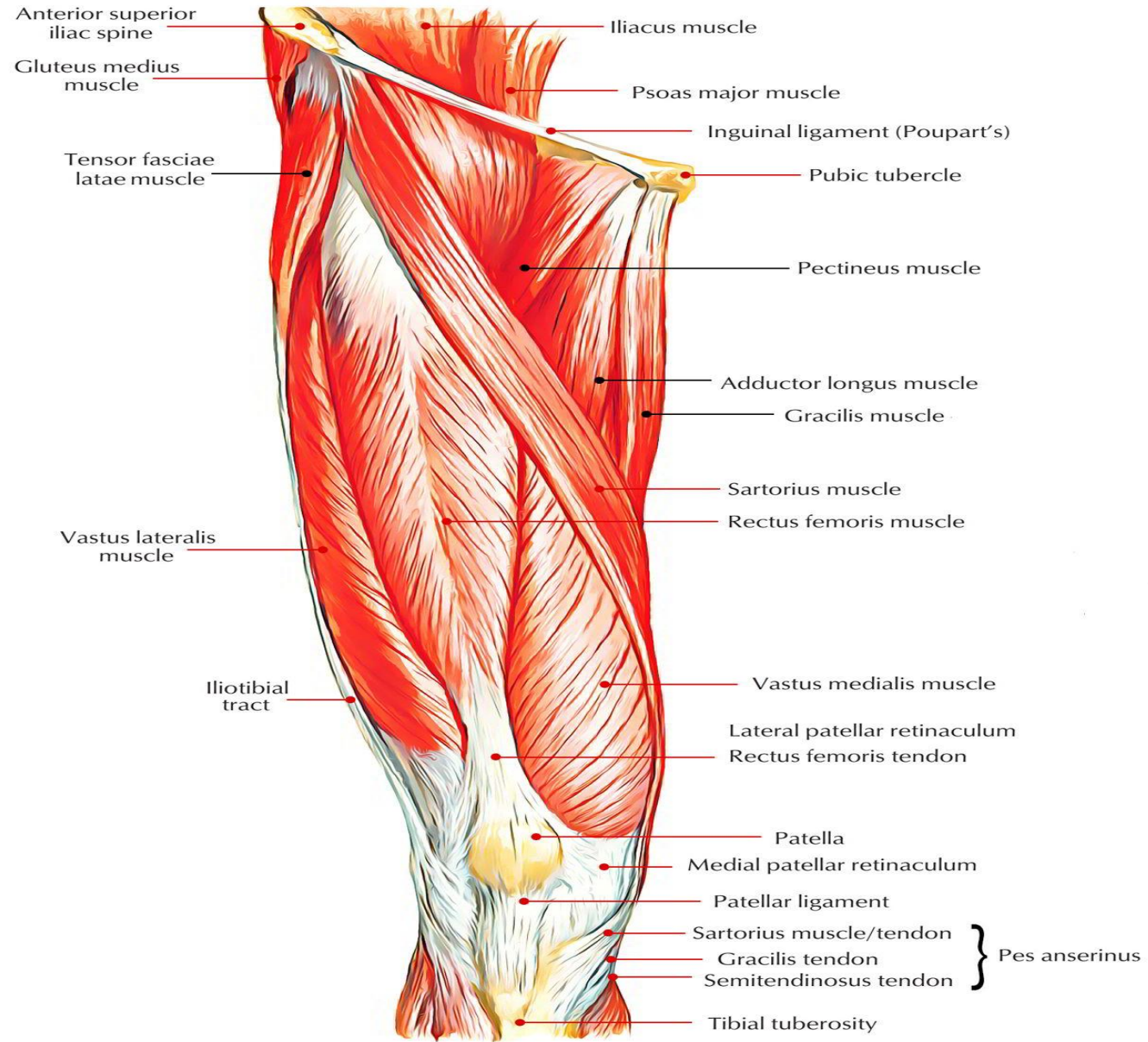
- **Anterior: femoral vessels & posterior division of obturator nerve.**
- **Posterior : sciatic nerve and anastomosis between perforating vessels.**
- **Adductor hiatus** lies between the 2 parts (end of femoral vessels).

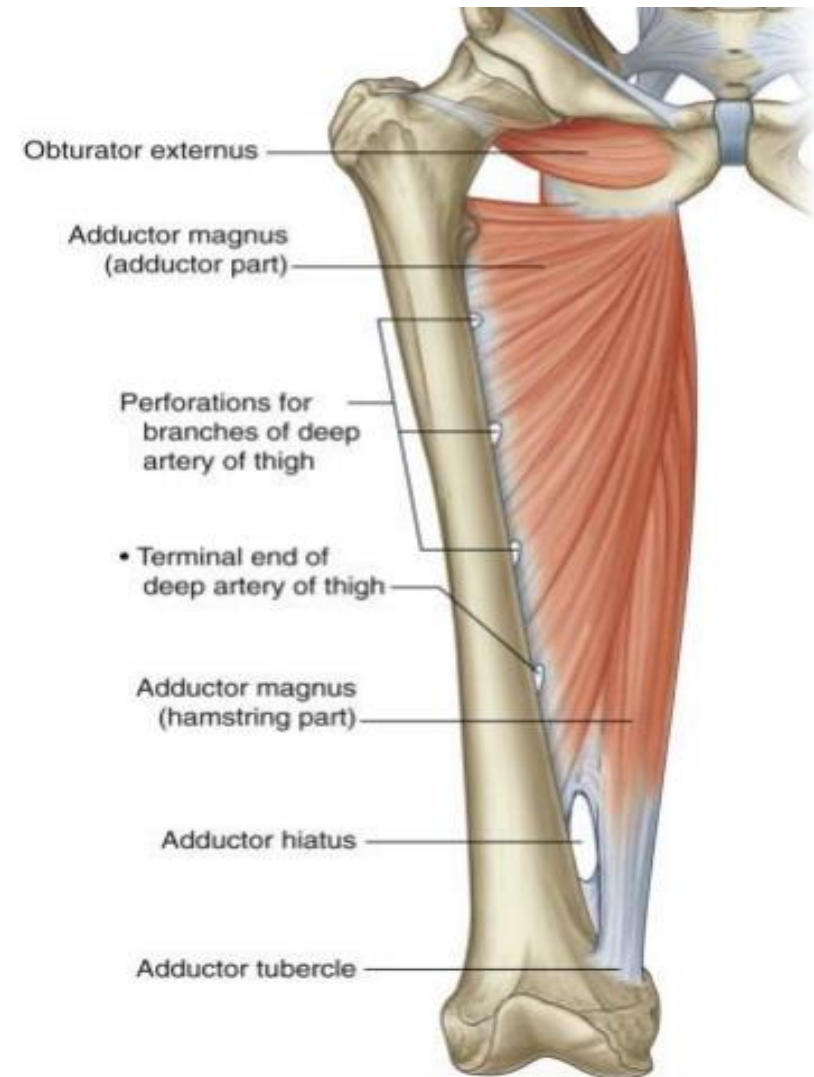
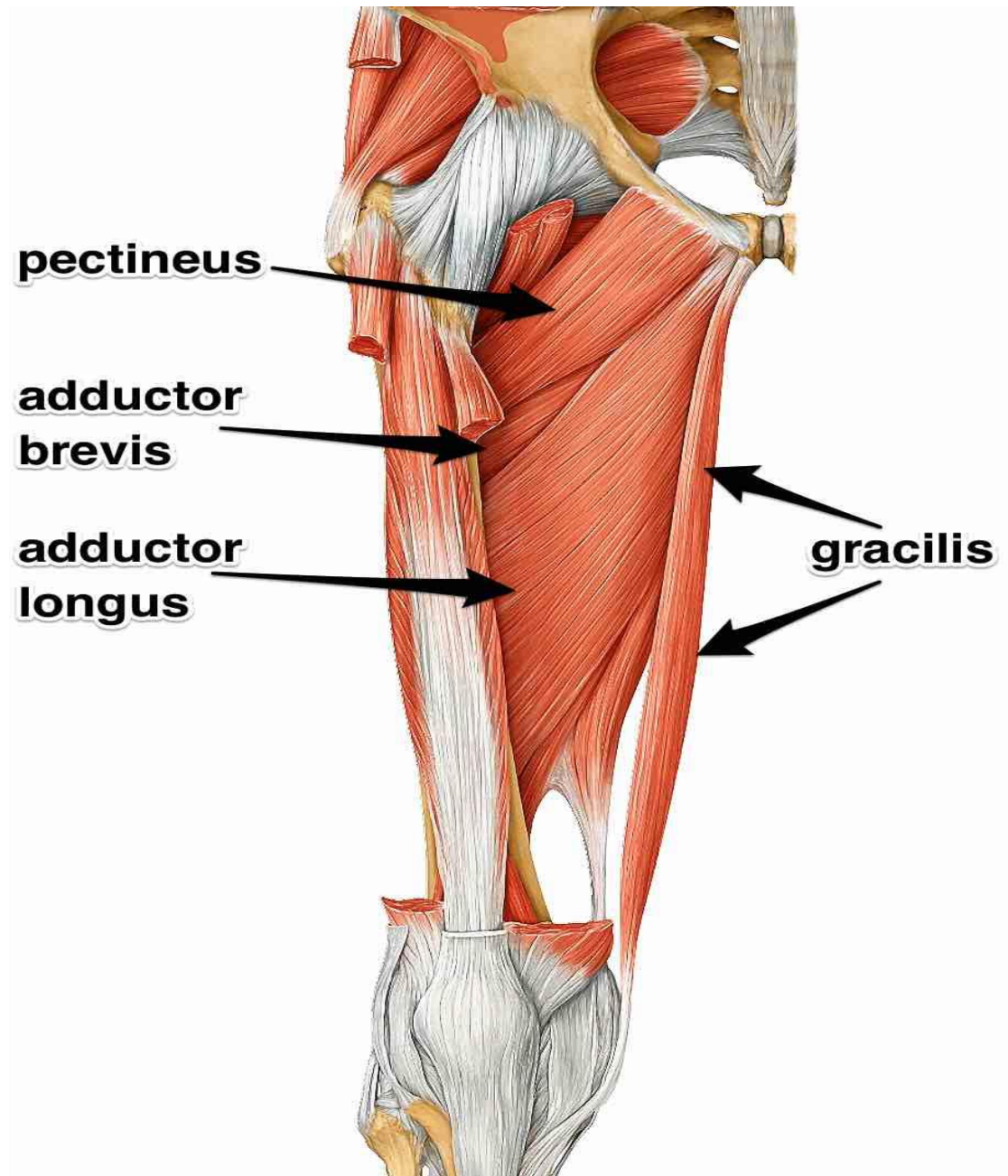
★ **Gracilis is most medial muscle in the thigh and form with shaft of femur a letter V in which other adductors are arranged in 3 layers:**

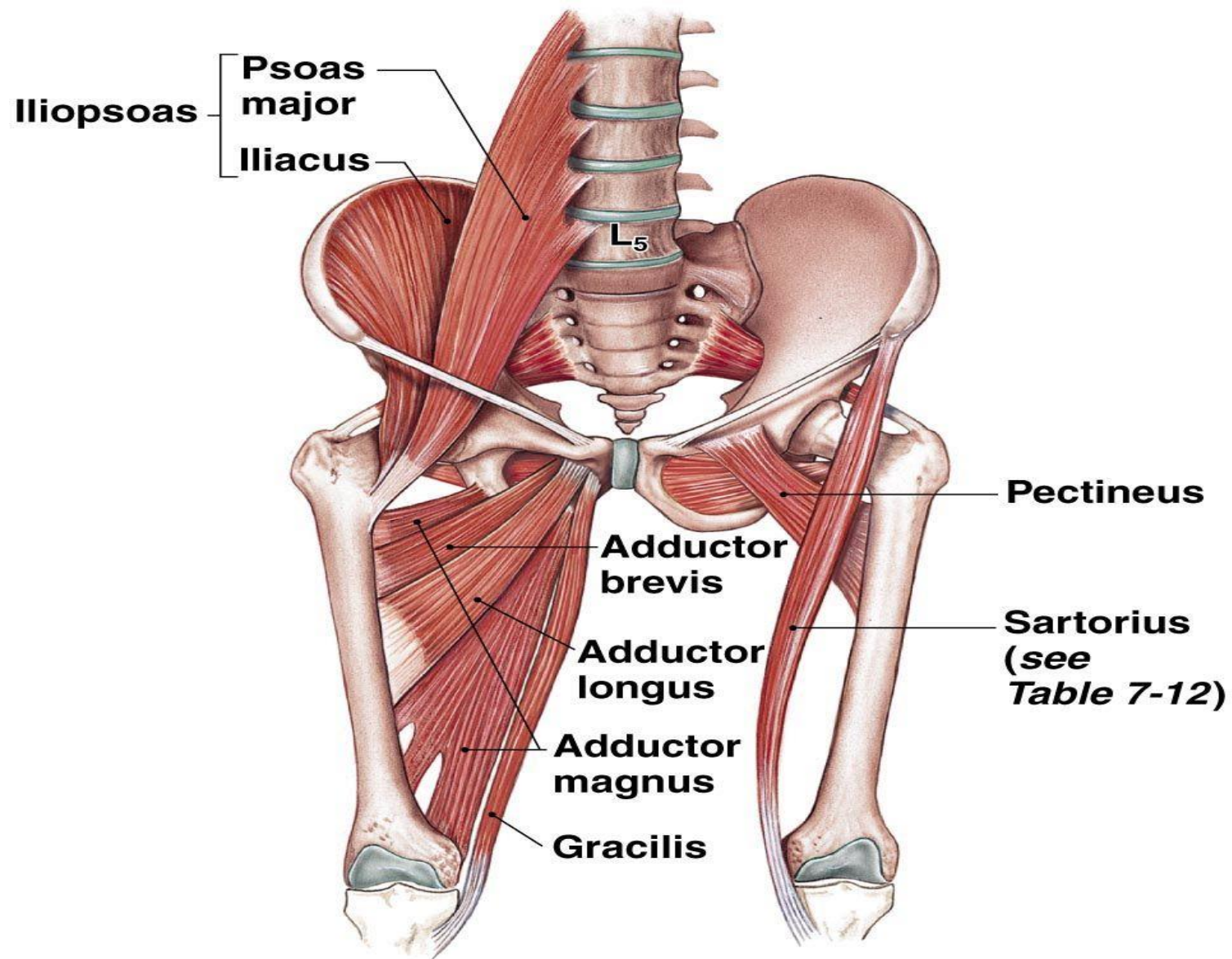
- **The first layer:** pectineus and adductor longus.
- **The second layer:** adductor brevis.
- **The third layer:** adductor magnus.

★ The anterior and posterior divisions of **obturator nerve pass** anterior and posterior to adductor brevis respectively.



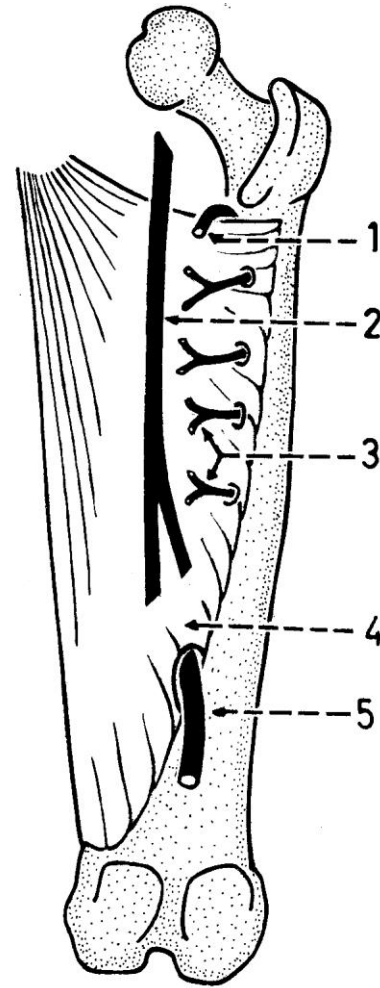
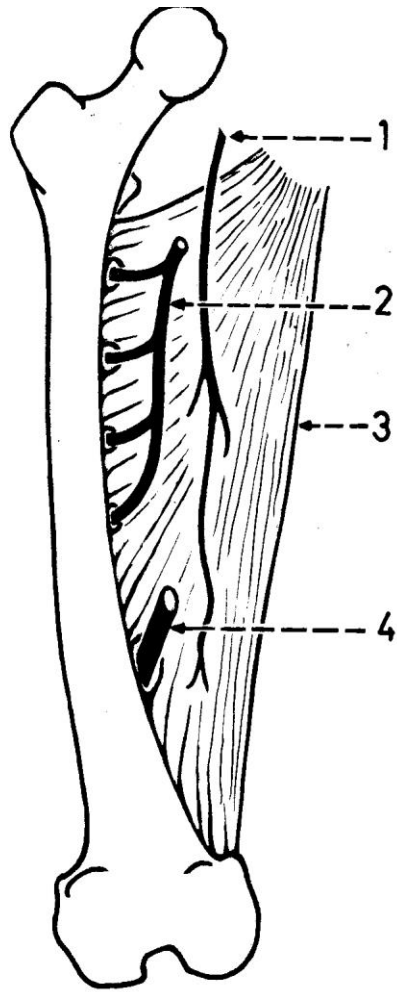




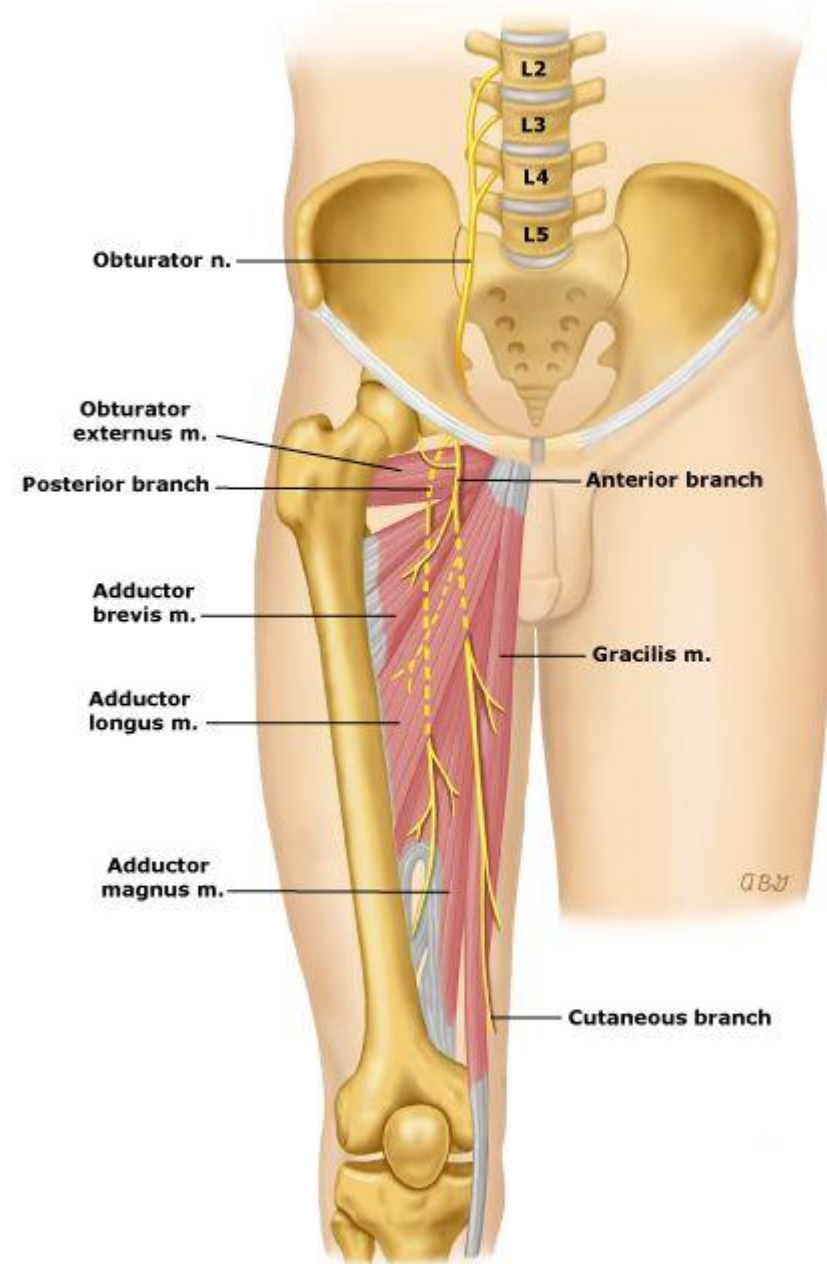


(c) The iliopsoas muscle and the adductor group

Copyright © 2010 Pearson Education, Inc.



Relations of adductor magnus



Muscles of Gluteal Region

	Origin	Insertion	Important features
1. Gluteus maximus.	<ul style="list-style-type: none"> • Gluteal surface of ilium behind posterior gluteal line. • Back of sacrum. • Back of Sacrotuberus ligament . 	<ul style="list-style-type: none"> • Deep 1/4: inserted into gluteal tuberosity of femur. • Superficial 3/4: is inserted into the posterior border of iliotibial tract. 	<ul style="list-style-type: none"> ❖ Powerful main extensor of flexed thigh as during rising from sitting position. ❖ Assist in lateral rotation thigh. ❖ It is a tensor of iliotibial tract (as action of tensor fascia lata) ❖ Structures deep to the gluteus maximus: <ol style="list-style-type: none"> 1. Bony prominences: greater trochanter and ischial tuberosity. 2. Ligaments: sacro-spinous and sacro-tuberous. 3. Muscles and tendons: gluteus medius, piriformis, tendon of obturator internus and the 2 gemelli, quadratus femoris, the origin of the hamstring and ischeal part of adductor magnus muscles (from ischial tuberosity). 4. Vessels: <ul style="list-style-type: none"> ▪ Above piriformis: superior gluteal vessels. ▪ Below piriformis: inferior gluteal and internal pudendal vessels. 5. Nerves <ul style="list-style-type: none"> ▪ Above piriformis: superior gluteal nerve. ▪ Below piriformis: sciatic nerve, inferior gluteal nerve, posterior cutaneous nerve of the thigh and nerve to quadratus femoris. 6. Two nerves pass from greater to lesser sciatic foramen: pudendal nerve and nerve to obturator internus . ❖ The great thickness of the gluteus maximus muscle makes it ideal for <i>intramuscular injections</i>. To avoid injury to the underlying sciatic nerve, the injection should be given in the <i>upper outer quadrant</i> of the buttock.

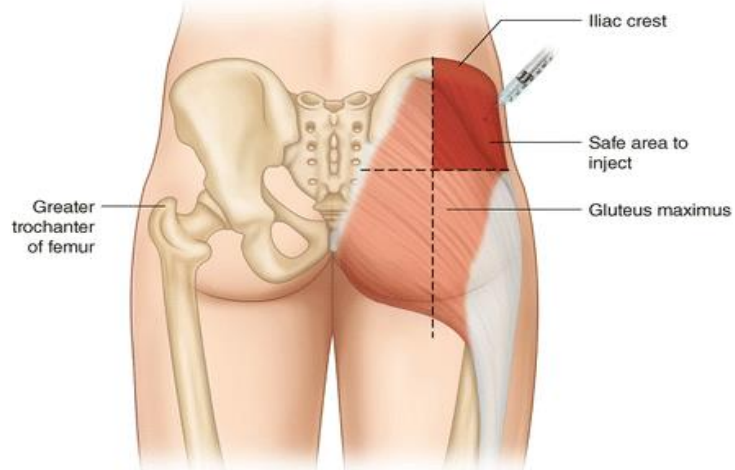
2. Gluteus medius	<ul style="list-style-type: none"> • Gluteal surface of ilium between posterior & middle gluteal lines . 	<ul style="list-style-type: none"> • Lateral surface greater trochanter. 	<ul style="list-style-type: none"> ❖ Whole gluteus medius & minimus muscles abduct the thigh . ❖ The anterior fibers rotate the thigh medially. ❖ Prevent falling down of the pelvis on the unsupported side during waking. Paralysis of these muscles leading to waddling gait. ❖ Gluteus minimus is deep to Gluteus medius and completely hidden by it.
3. Gluteus minimus.	<ul style="list-style-type: none"> • Gluteal surface of ilium between middle & inferior gluteal lines . 	<ul style="list-style-type: none"> • Anterior surface of the greater trochanter. 	<ul style="list-style-type: none"> ❖ Deep to gluteus minimus , there are capsule of hip joint and reflected head of rectus femoris .
4. Tensor fascia lata	<ul style="list-style-type: none"> • Anterior 5cm of outer lip of the iliac crest between the ASIS and tubercle of iliac crest . 	<ul style="list-style-type: none"> • Anterior border of the ilio-tibial tract 	<ul style="list-style-type: none"> • Tensor of fascia lata and ilio-tibial tract. • keeping the knee extended through its pull on the ilio-tibial tract. • Keep erect position as it steady the pelvis on the head of femur and steady femoral condyles on the tibia.

★ **Previous muscles are supplied by superior gluteal nerve except gluteus maximus which is supplied by inferior gluteal nerve.**

★ **Muscles of Gluteal Region include the previous 4 muscles + 6 lateral rotators of the thigh.**

★ **NB : The ilio-tibial tract:**

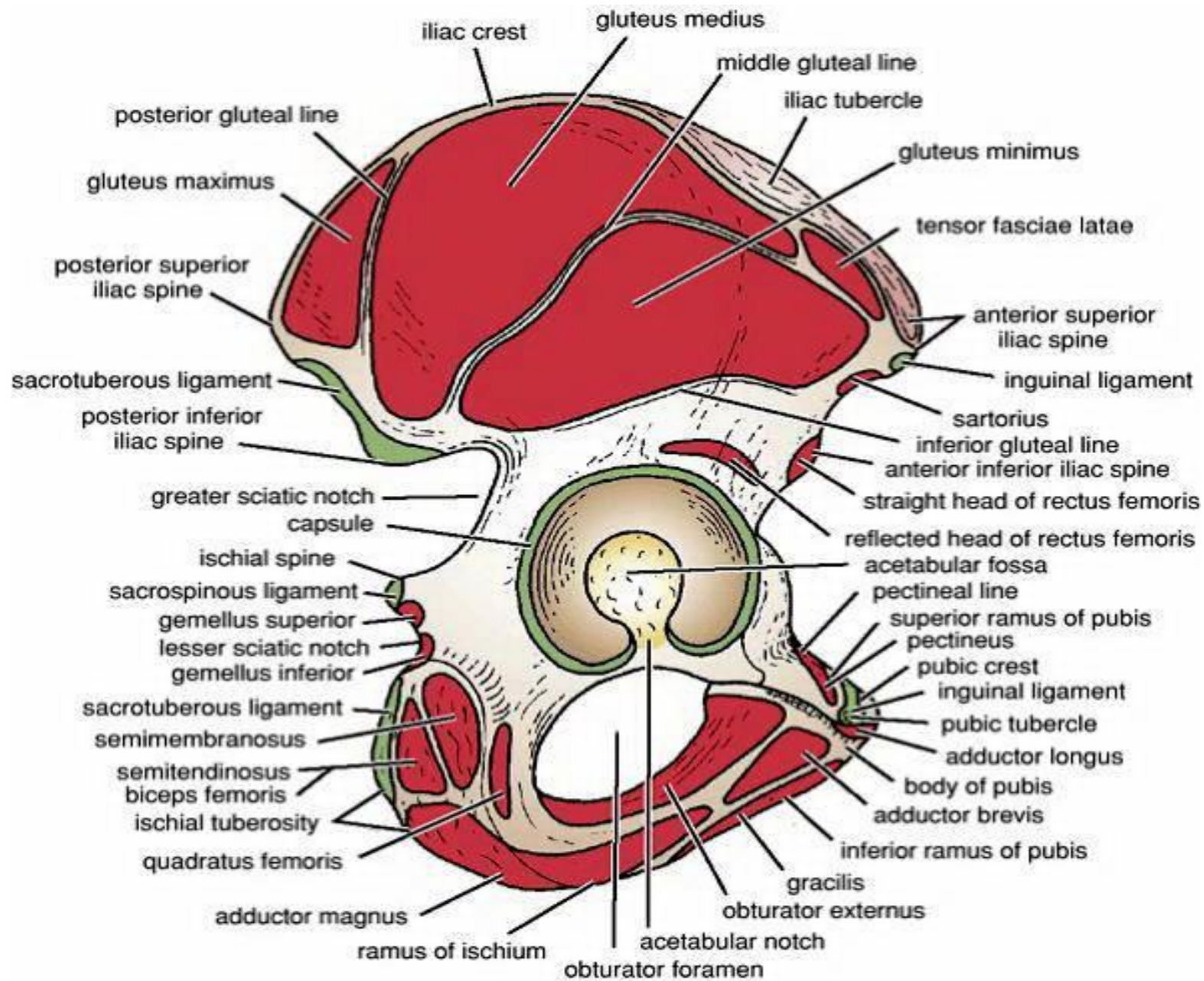
- * It is a **vertical thickening** of the fascia latae , on the **lateral aspect of the thigh** .
- * It **extends** from the iliac crest (**above**) to the lateral border of the patella, the lateral condyle of the tibia, the capsule of the knee joint and the head of fibula (**below**).
- * **It receives the insertion of 2 muscles:** Tensor fasciae latae(into its anterior border) & Superficial 3/4 of gluteus maximus (into its posterior border) .
- * **Functions of the ilio-tibial tract:**
 - 1- It **extends the insertion** of gluteus maximus and tensor fasciae latae downwards to reach the knee joint; thus inducing a **combined action** on both hip and knee joints.
 - 2- In the erect position, it helps to **steady** the pelvis and acts as a splint for the knee joint by fixing the tibial condyle below the femoral condyle during extension of the limb.

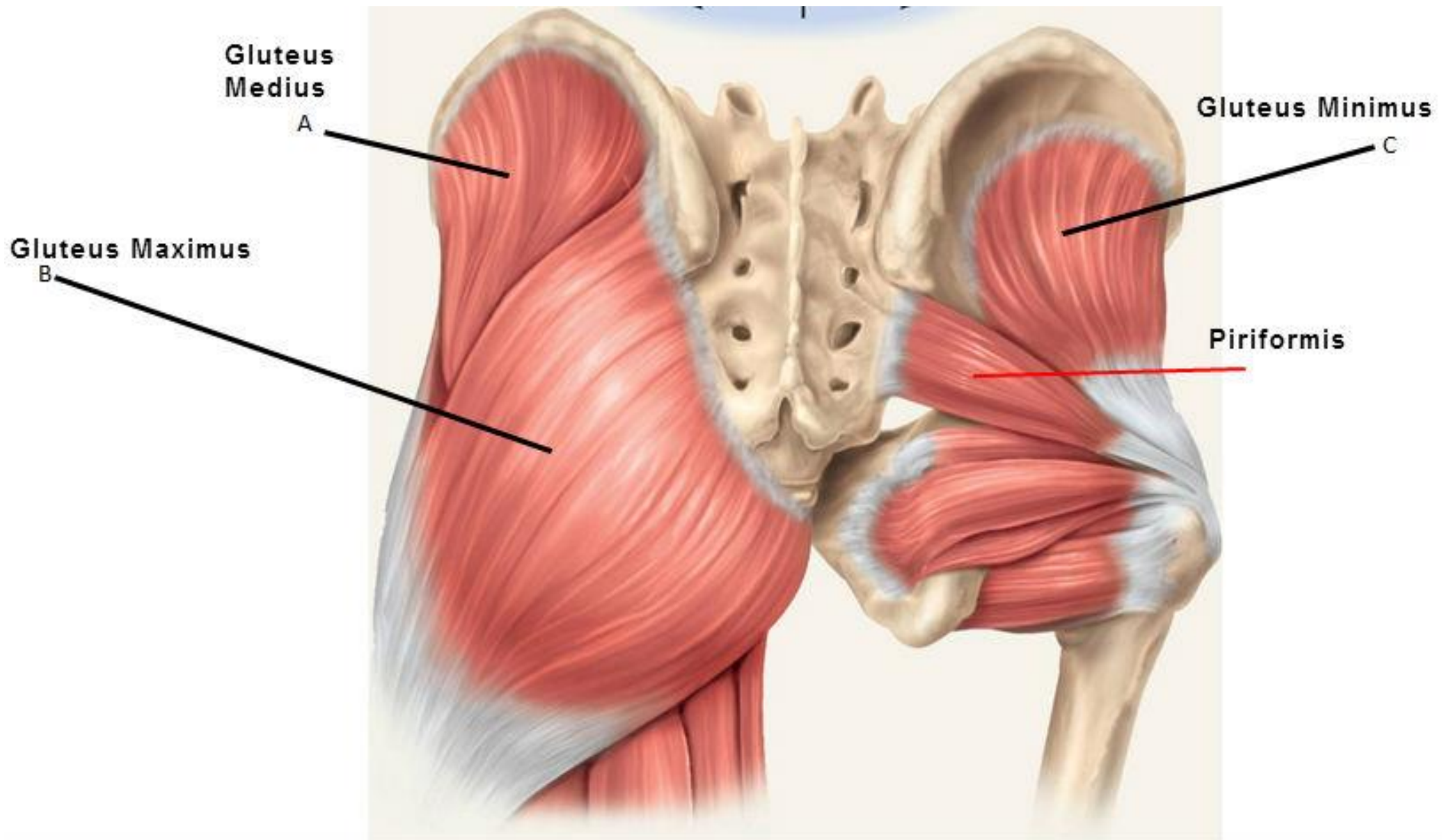


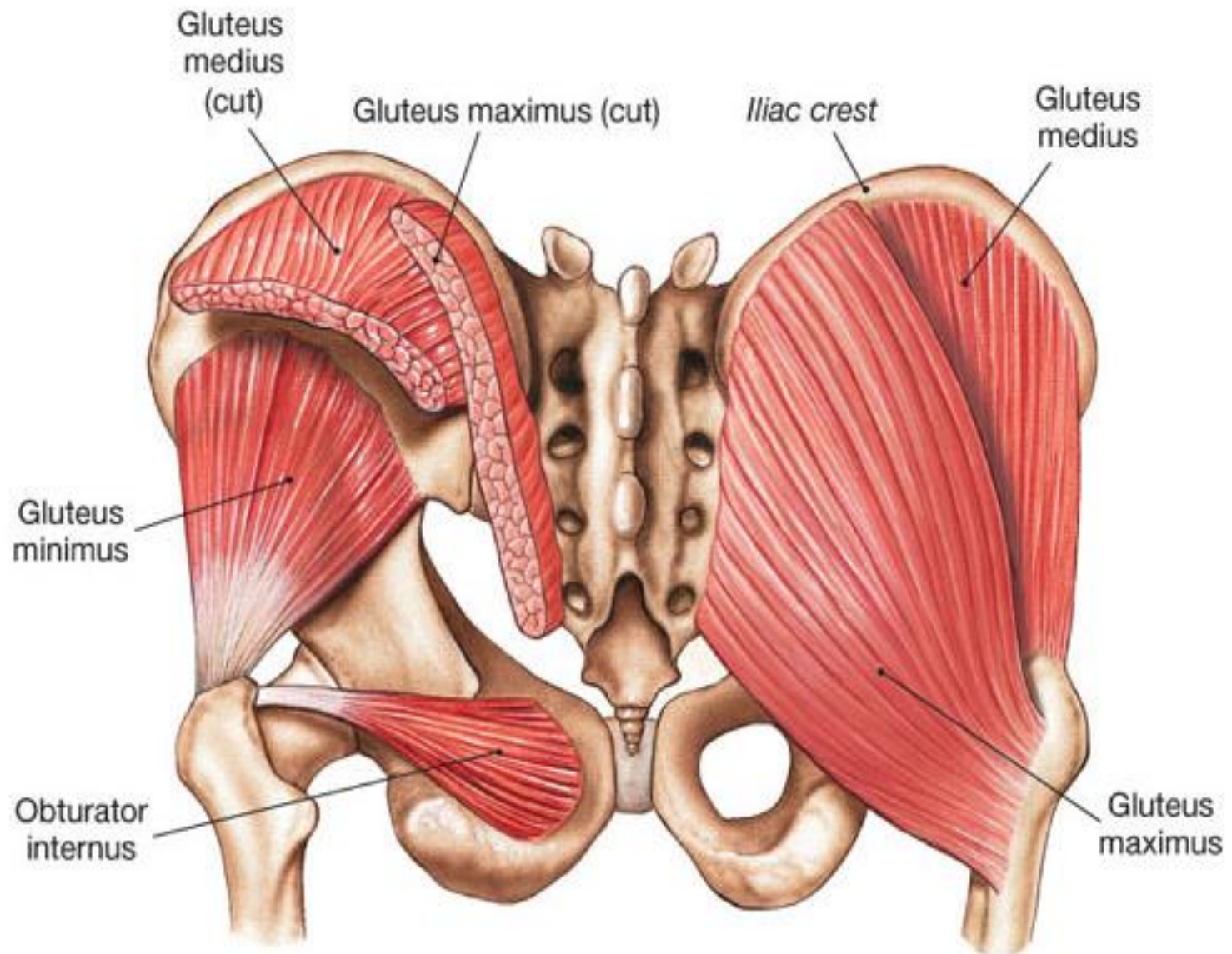
Site of IM injection

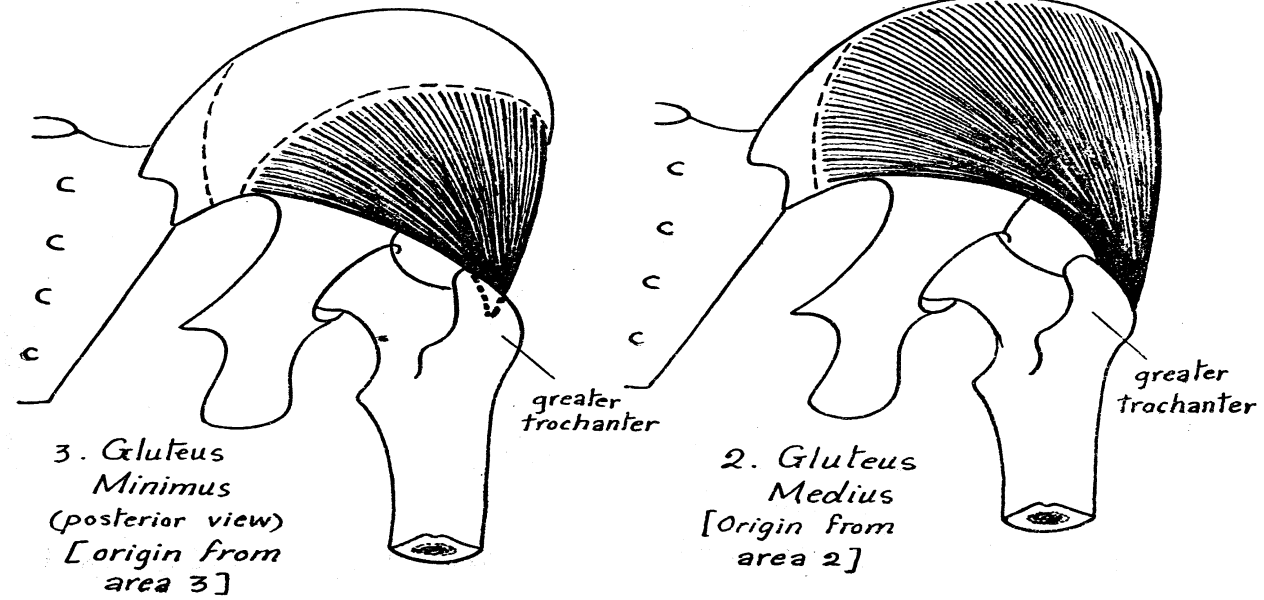
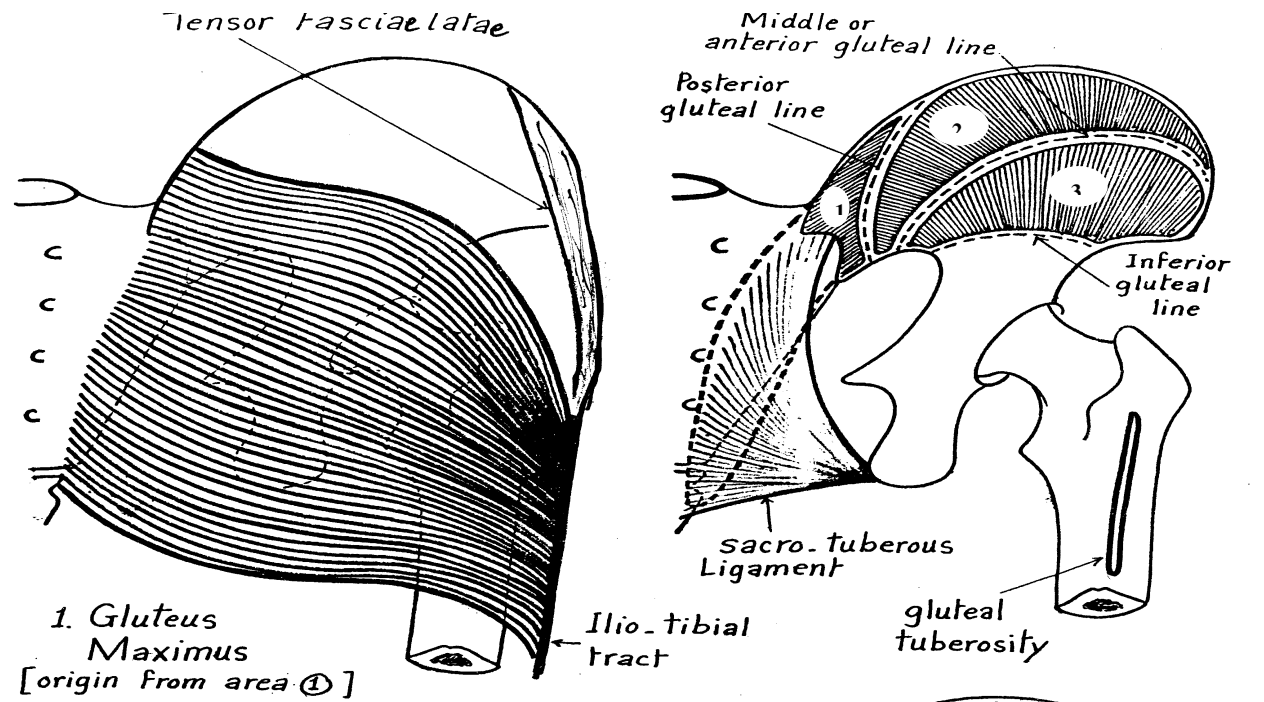


Waddling gait









Gluteus Medius
(under fascia)

**Gluteus
Maximus**

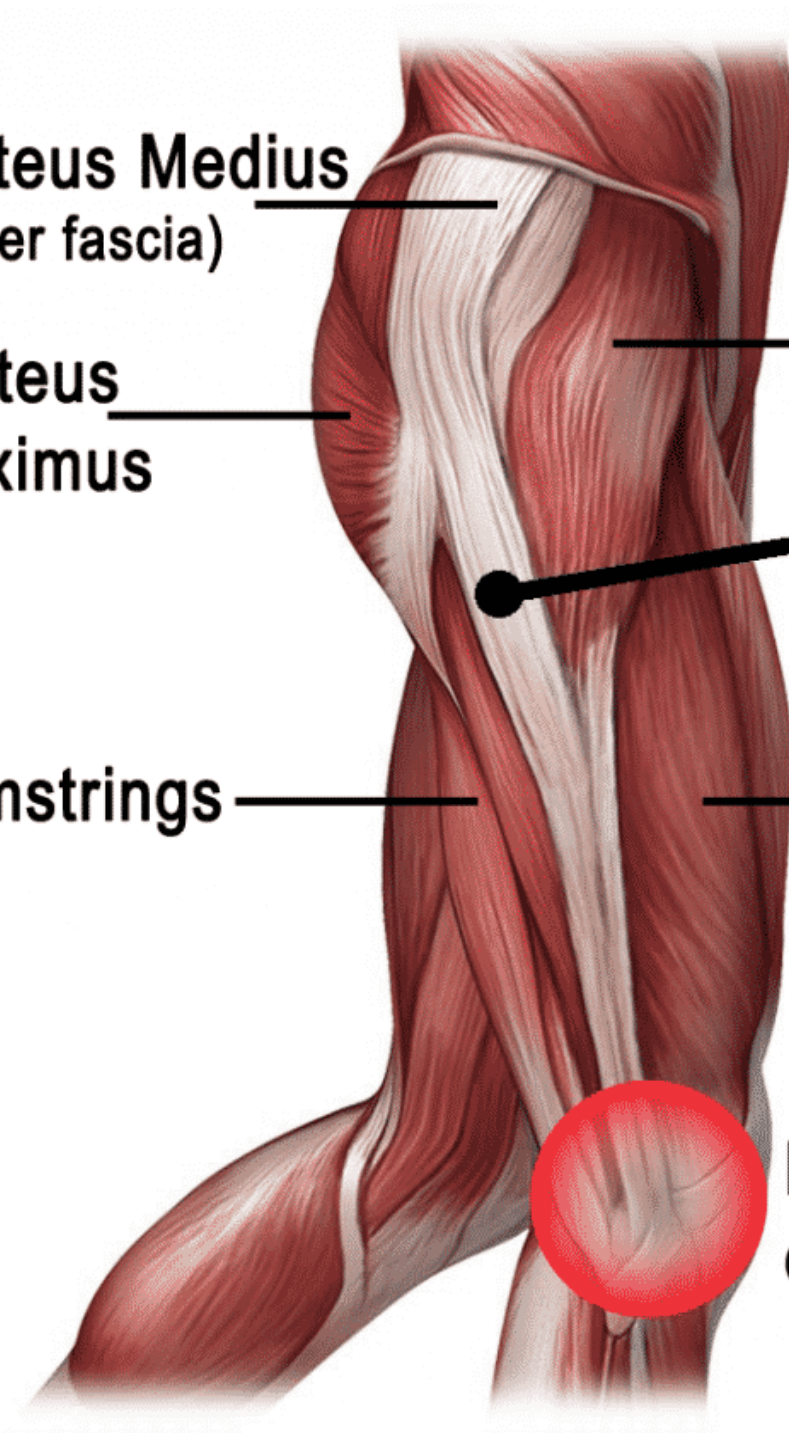
Hamstrings

Tensor Fasciae Latae

Iliotibial Band (ITB)

Quadriceps

**Localised pain
on outer knee**



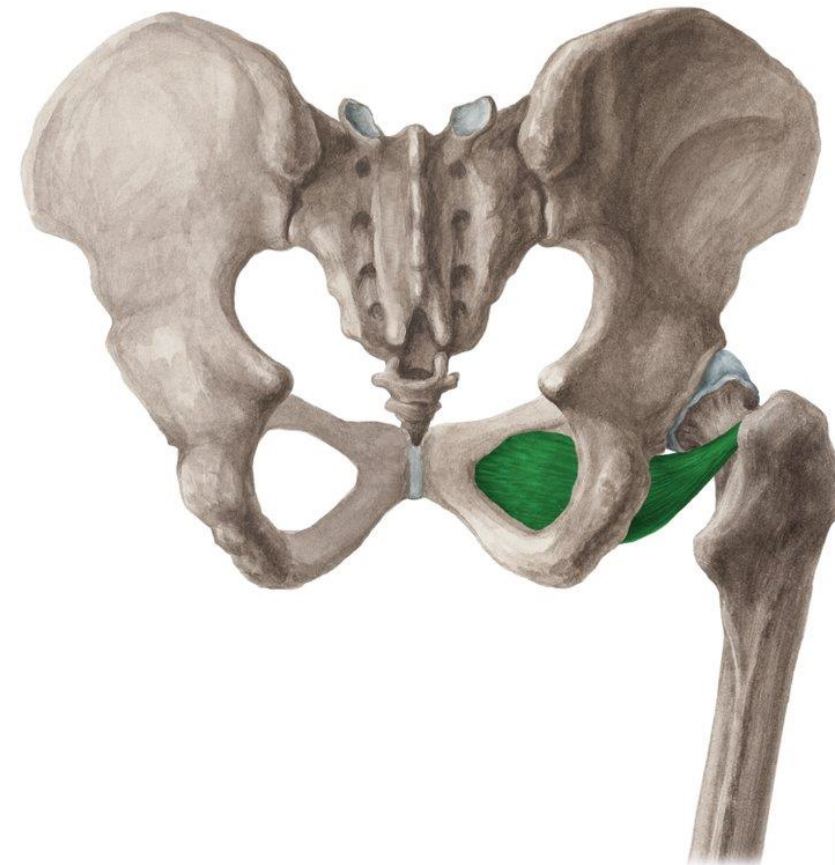
6 Lateral Rotators of the thigh

★ **Common insertion** :Region of greater trochanter (except quadratus femoris)

★ **Common action** : lateral rotation of the thigh at hip joint.

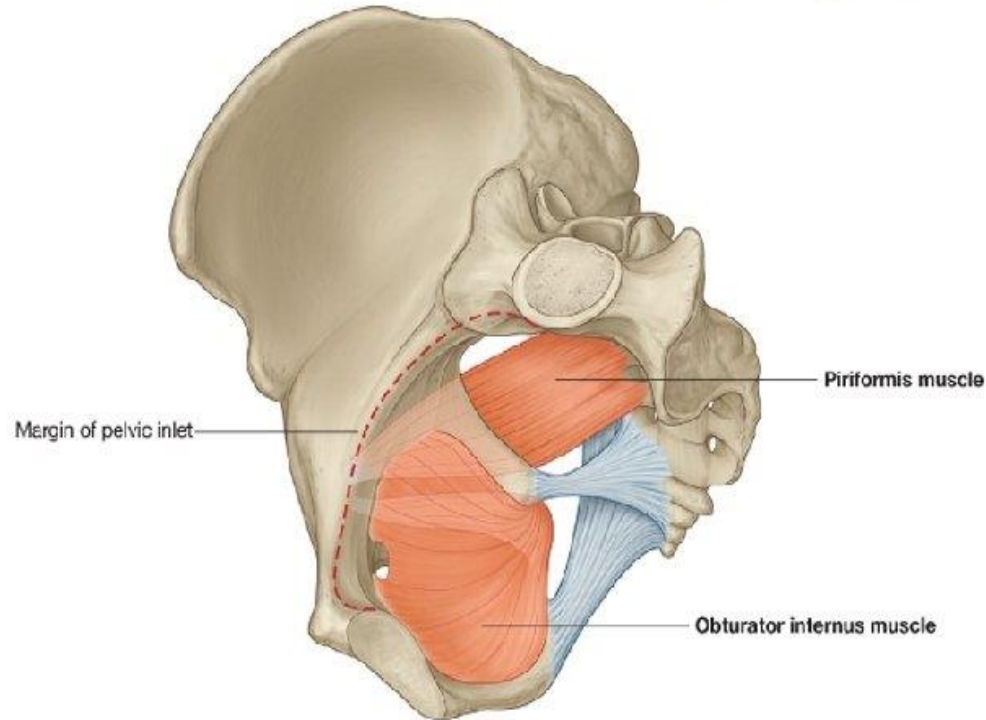
Muscle	Origin	Insertion	Nerve supply
1. Piriformis	<ul style="list-style-type: none"> • Front of the middle three pieces of sacrum. 	<ul style="list-style-type: none"> • It leaves the pelvis through the greater sciatic foramen to enter the gluteal region to be inserted into the top of the greater trochanter 	<ul style="list-style-type: none"> • Branches from sacral plexus
	<ul style="list-style-type: none"> • Relations : • Superior: Gluteus medius & minimus ,superior gluteal nerve & vessels • Inferior: <ul style="list-style-type: none"> ➤ Inferior gluteal nerve & vessels , sciatic nerve,posterior cutaneous nerve of the thigh. ➤ 3 structures pass from greater to lesser sciatic foramen: pudendal nerve , internal pudendal vessels and nerve to obturator internus + other lateral rotator muscles. ➤ Gluteus maximus is superficial while capsule of hip joint is deep to the muscle. 		
2. Obturator internus	<ul style="list-style-type: none"> • Pelvic surface of the obturator membrane. • Margins of the obturator foramen. • From an area extending between obturator foramen and greater sciatic notch. 	<ul style="list-style-type: none"> • Its tendon passes laterally through the lesser sciatic foramen across the back of hip joint to be joined by the 2 gemelli to form a common tendon inserted into the medial surface of the greater trochanter. 	<ul style="list-style-type: none"> • Nerve to obturator internus from the sacral plexus
3. 2 Gemelli	<ul style="list-style-type: none"> • Superior gemellus & Inferior gemellus originate from the upper & lower margins of the lesser sciatic notch respectively. 	<ul style="list-style-type: none"> • into the upper border of the tendon of obturator internus. 	

<p>4- Quadratus femoris</p>	<ul style="list-style-type: none"> • It is a quadrate muscle lies above the adductor magnus muscle . • It originates from the lateral margin of ischial tuberosity. 	<ul style="list-style-type: none"> • Quadrate tubercle on the intertrochanteric crest of femur . 	<ul style="list-style-type: none"> • Nerve to quadratus femoris (from the sacral plexus).
<p>5. Obturator externus</p>	<ul style="list-style-type: none"> • From outer surface of obturator membrane and from margins of obturator foramen. 	<ul style="list-style-type: none"> • The tendon passes below then behind the hip joint to become inserted into the floor of the trochanteric fossa. 	<ul style="list-style-type: none"> • Posterior division of obturator nerve.



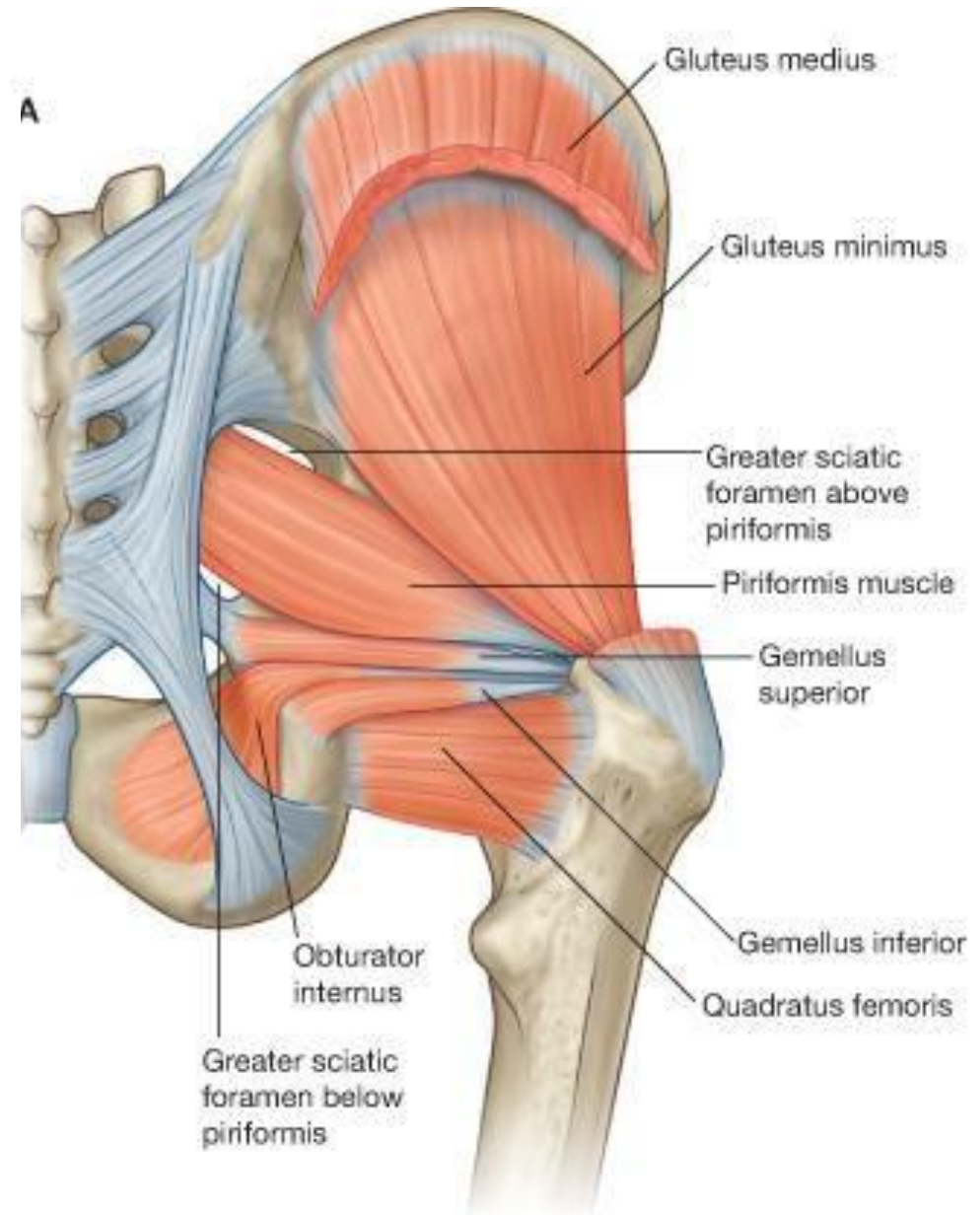
Piriformis & Obturator Internus (Origin)

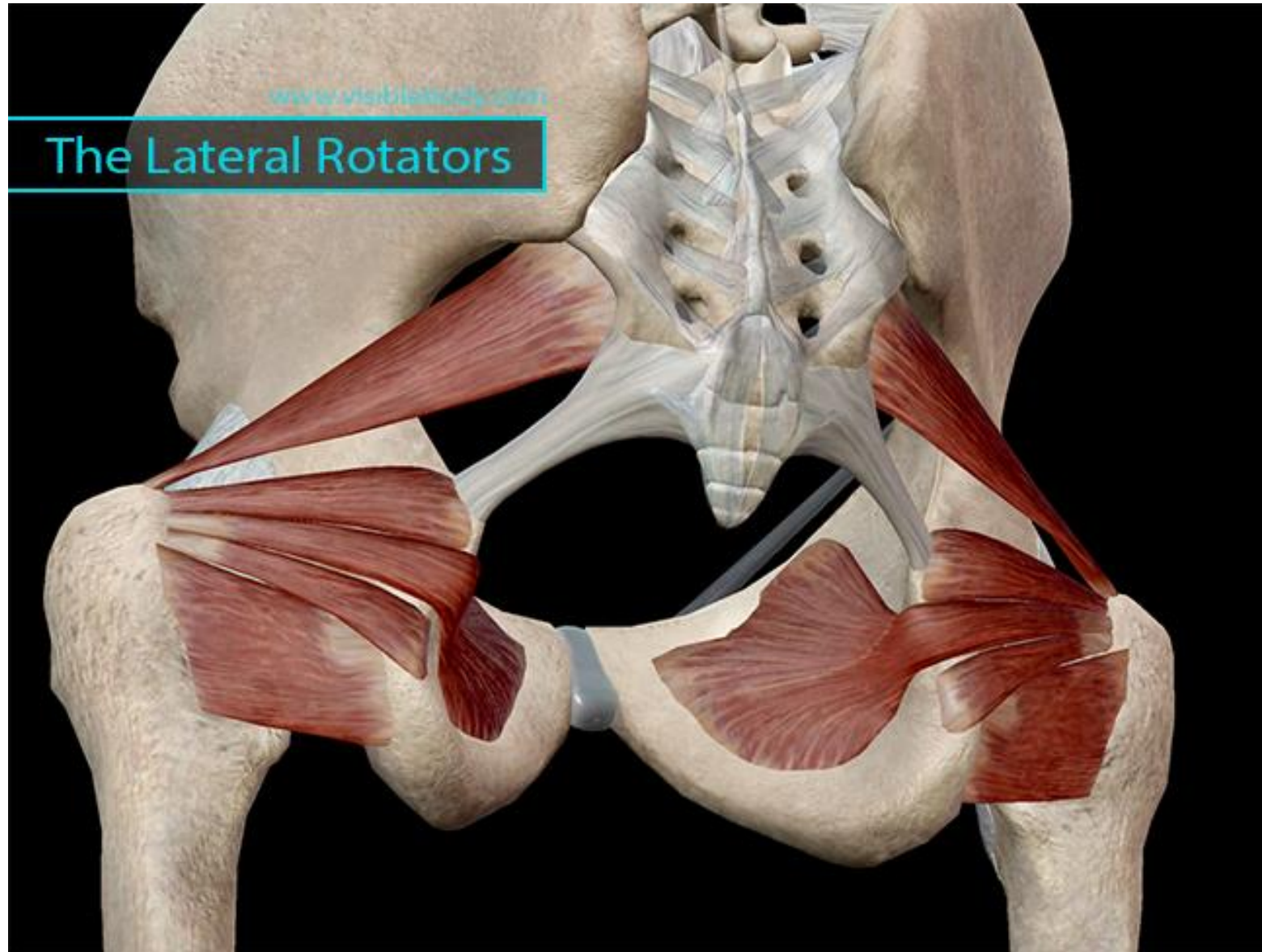
B

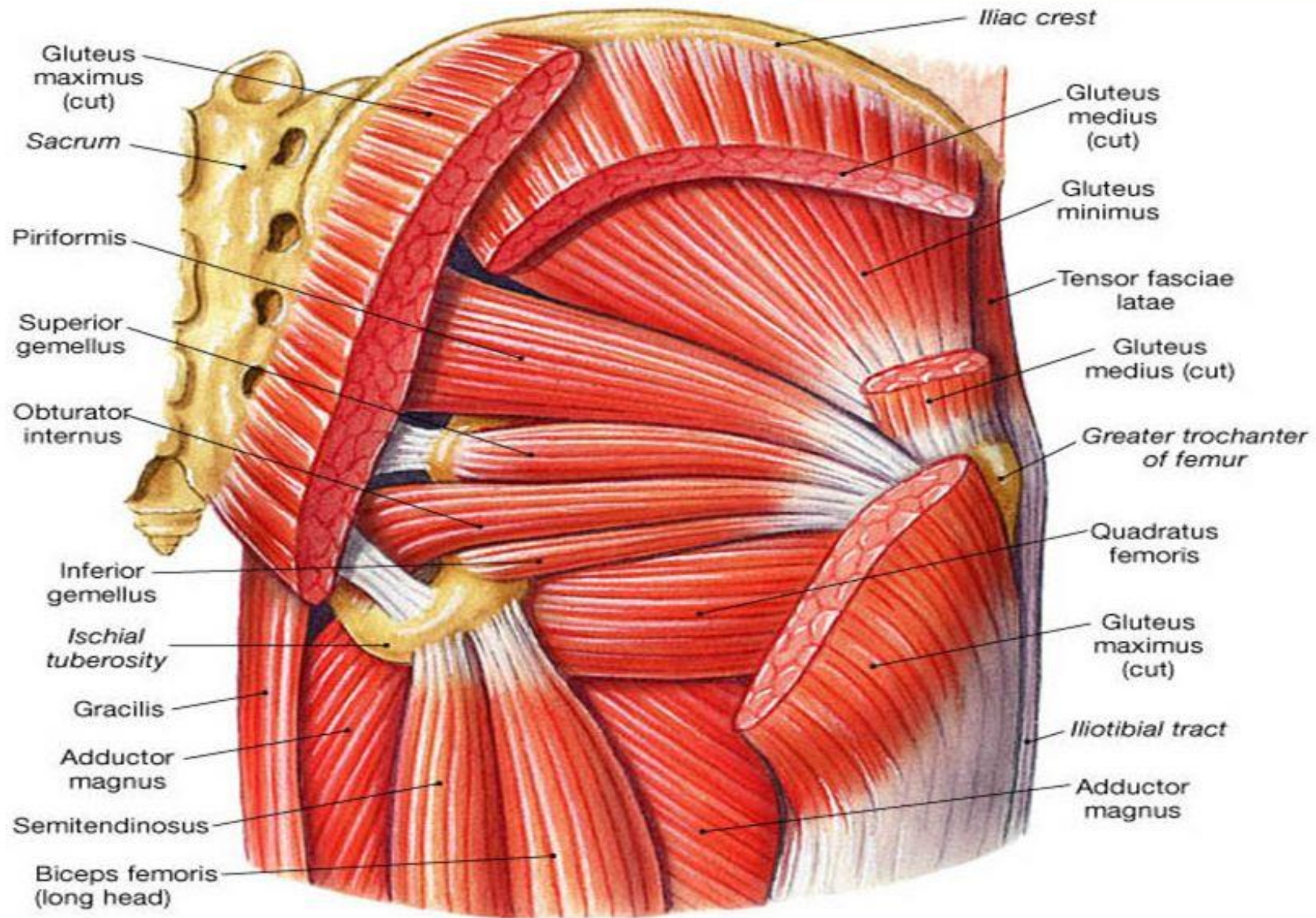


Drake: Gray's Anatomy for Students, 2nd Edition.
Copyright © 2009 by Churchill Livingstone, an Imprint of Elsevier, Inc. All rights reserved.

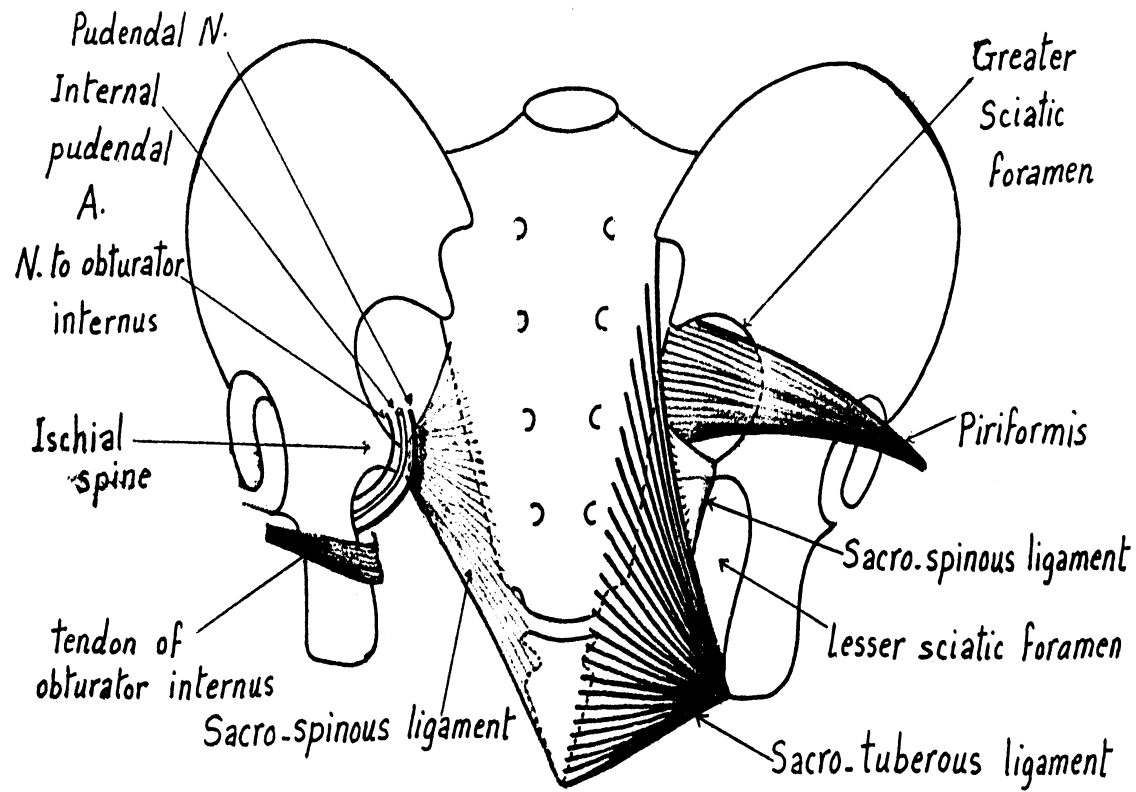
A



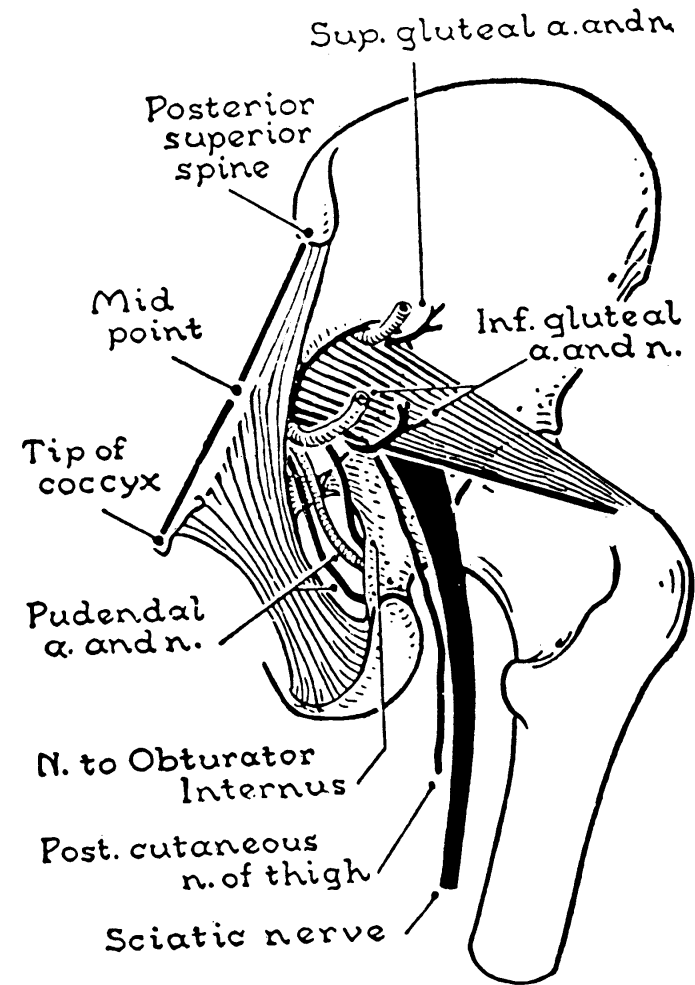




(a) Posterior view, deep muscles



Ligaments and foramina of gluteal region.

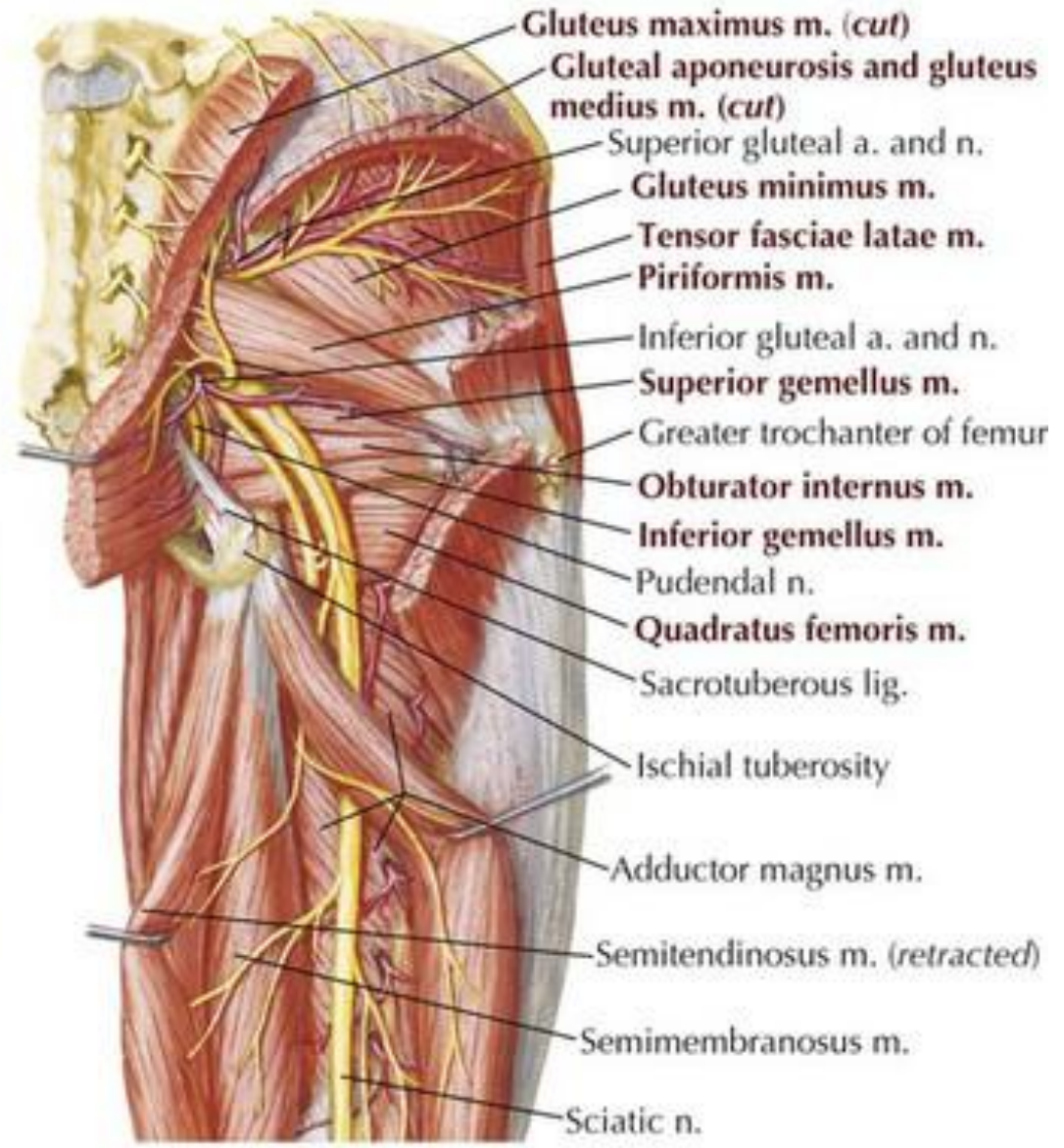


*Structures passing through the sciatic foramina
(deep to the gluteus maximus)*

Superficial dissection



Deep dissection

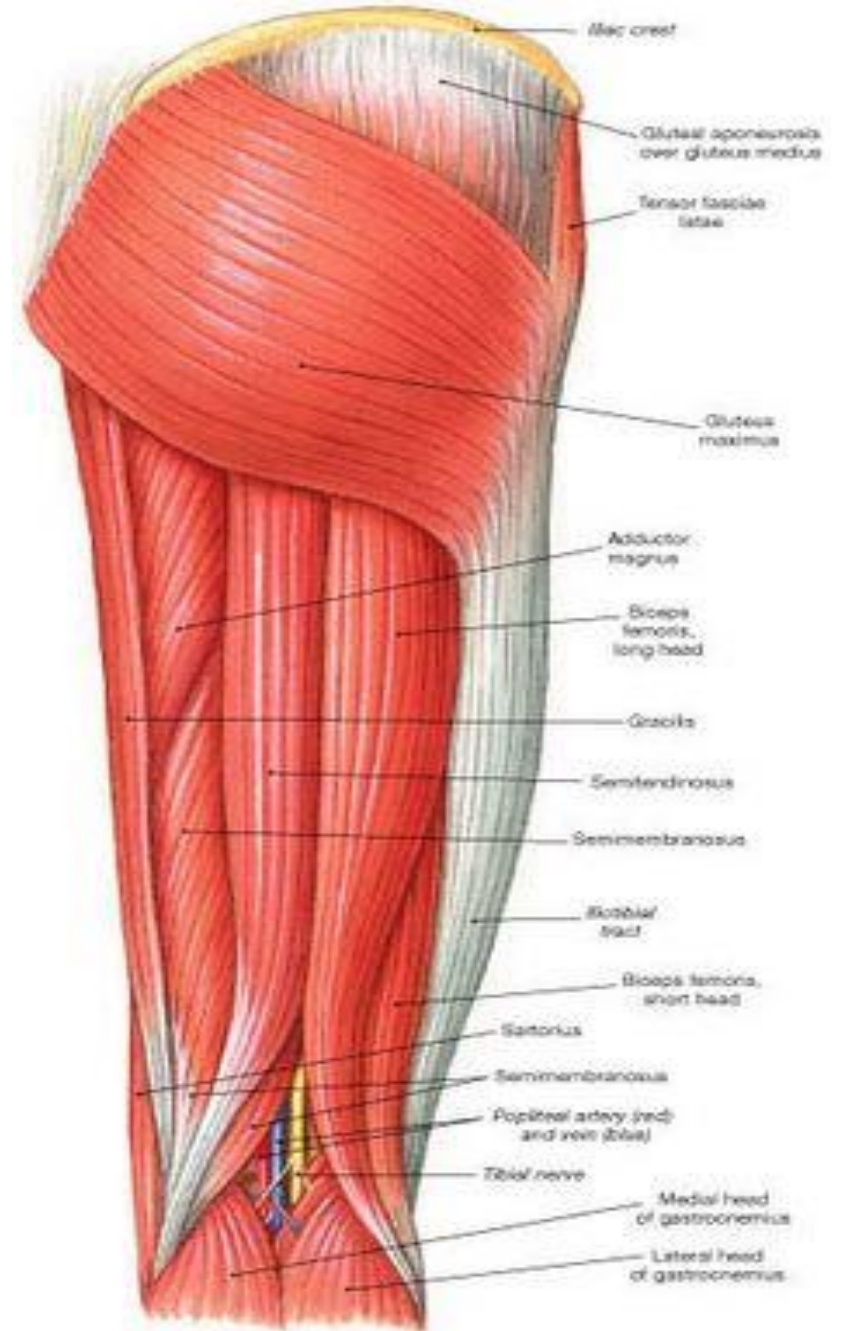
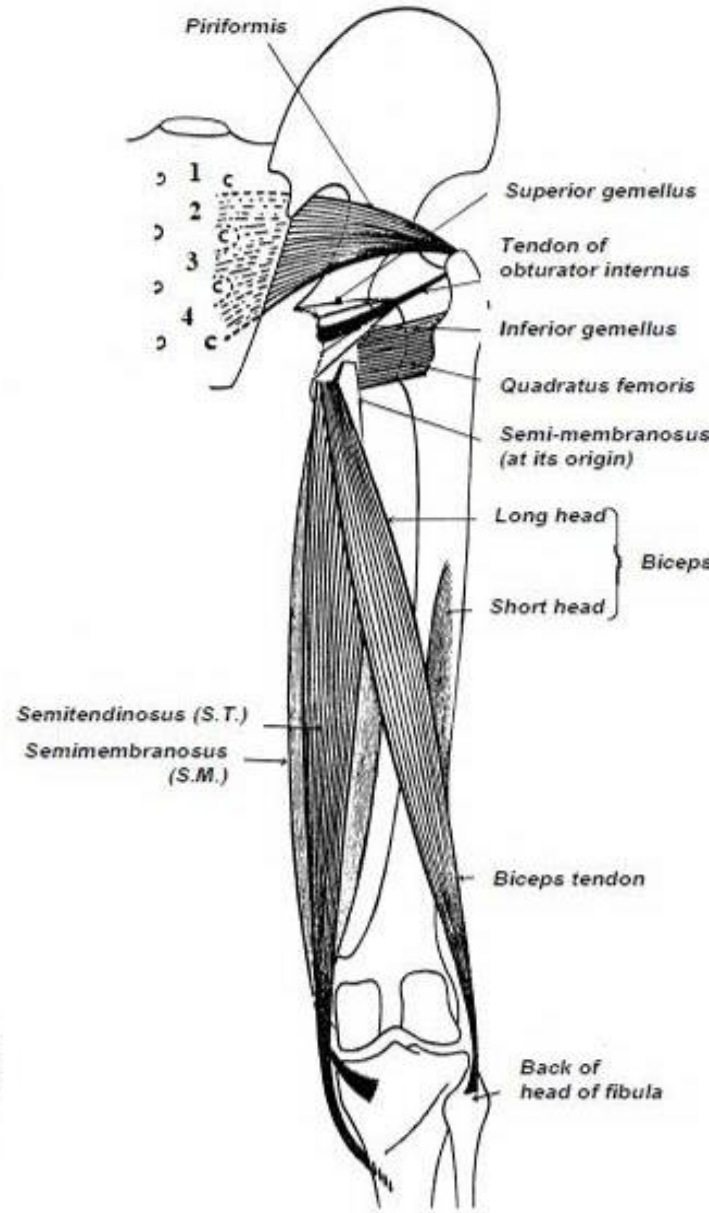
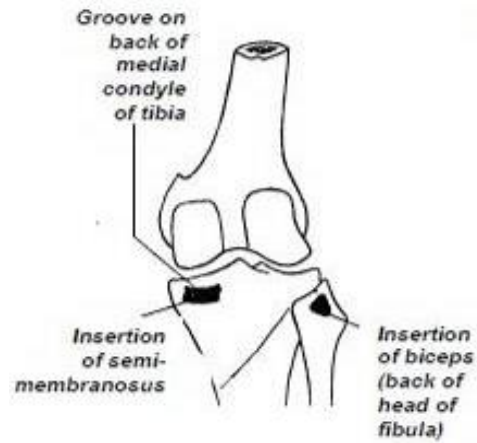
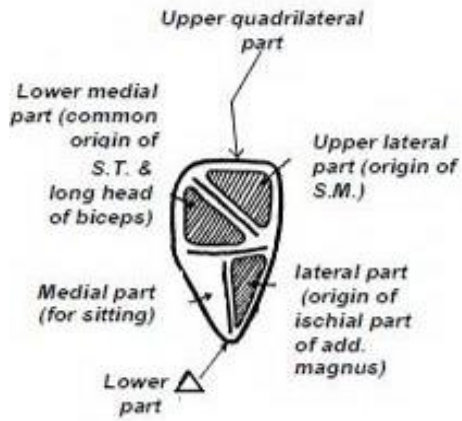


Muscles of Back of the thigh (Hamstrigs)

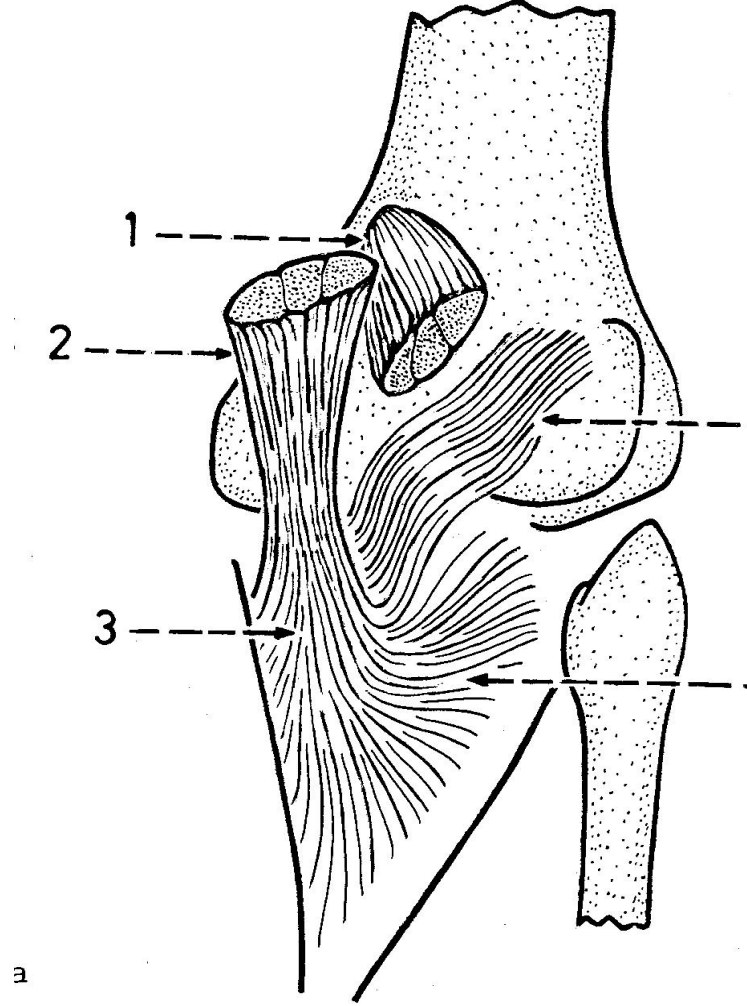
- **Common origin : Ischeal tuberosity except short head of biceps which originate from linea aspera .**
- **All these muscles are supplied by tibial part of sciatic nerve except short head of biceps which is supplied by common fibular part of sciatic nerve.**
- **Common action: Flexion of knee (main action) , medial rotation of knee (except biceps produce lateral rotation) & Extension of hip (as all muscles originate from ischeal ttuberosity) except short head of biceps.**
- **From lateral to medial they are:**

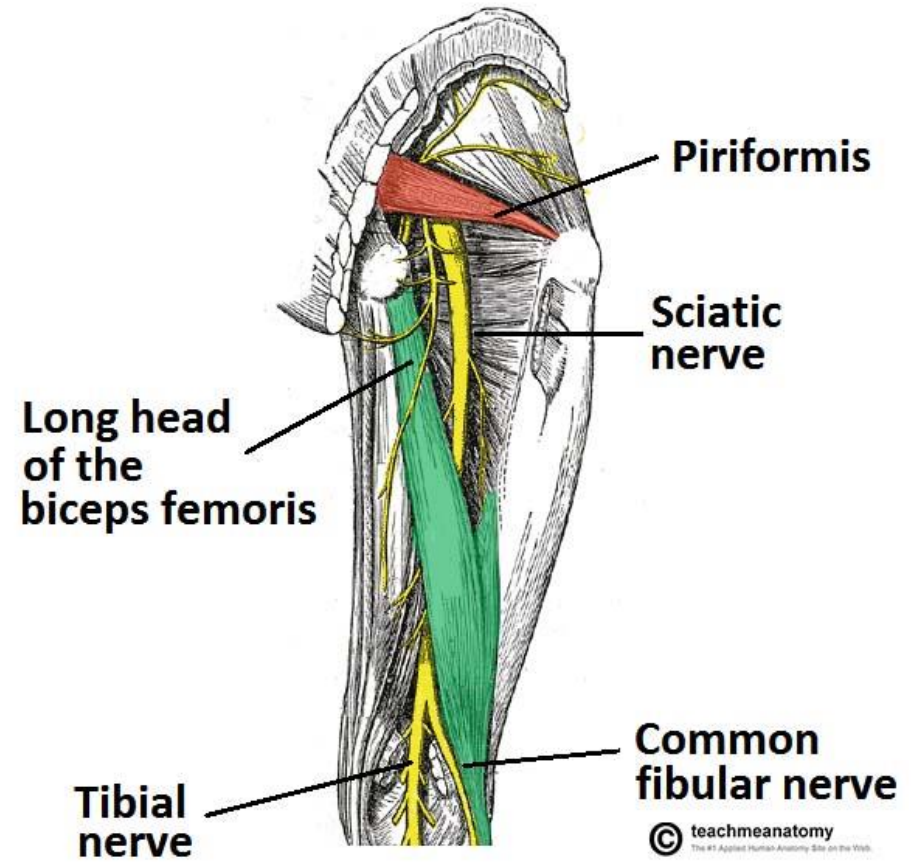
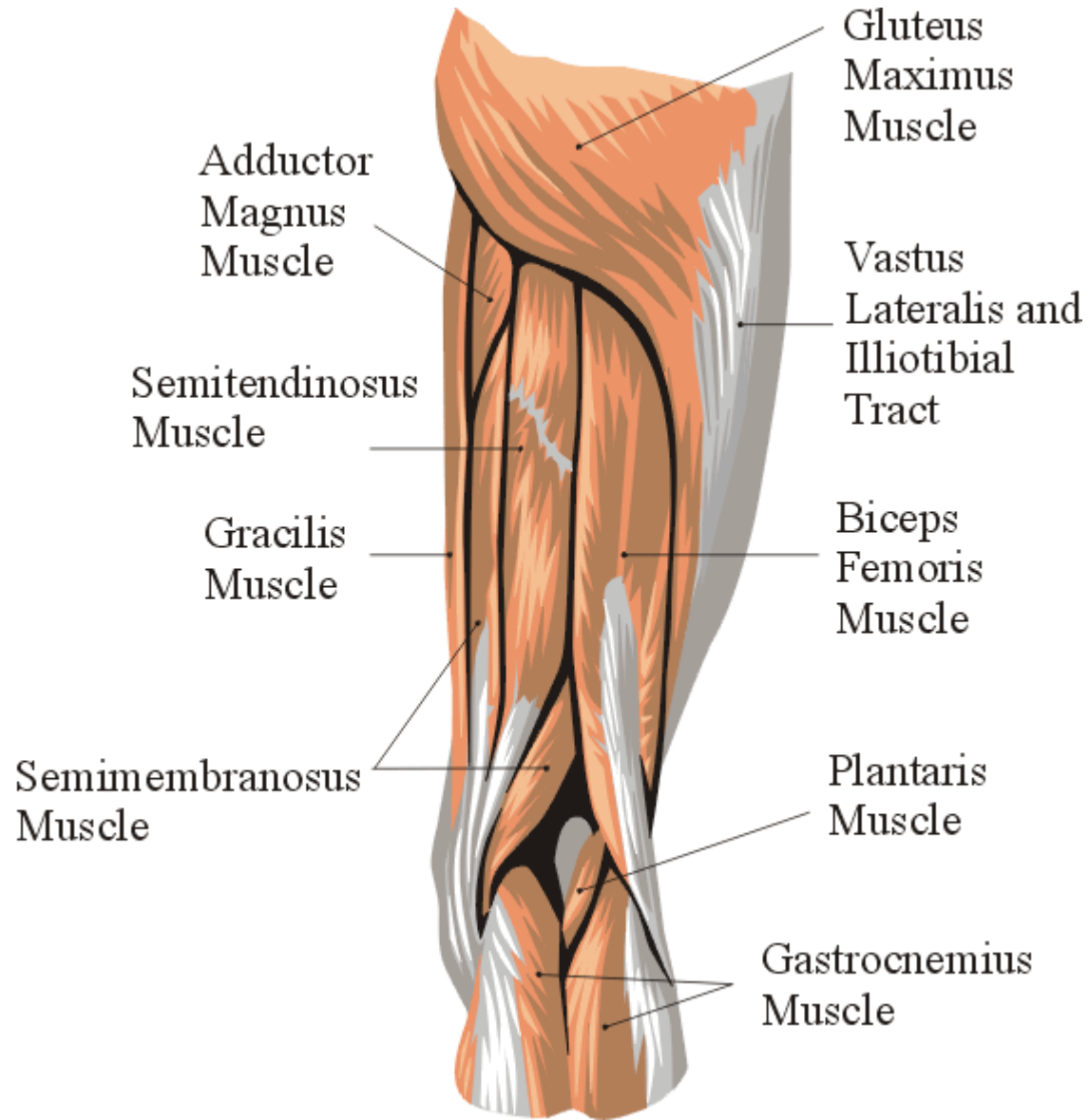
	Origin	Insertion	Main Action
1- Biceps femoris	<ul style="list-style-type: none"> a) Long head: arise in common with semitendinosus . b) Short head: lateral lip of linea aspera and the upper 1/2 of the lateral supracondylar line. 	<ul style="list-style-type: none"> • Head of fibula . • N.B: The long head covers the sciatic nerve and its tendon of insertion is related to common fibular nerve. 	<ul style="list-style-type: none"> • Common action • Lateral rotation of leg at the end of extension of the knee (Locking of knee joint).
3-Semi-tendinosus • It has long tendon	<ul style="list-style-type: none"> • With the long head of biceps from the lower medial part of the upper quadrangular part of ischeal tuberosity. 	<ul style="list-style-type: none"> • Upper part of medial surface of tibia (S.G.S. behind sartorius & gracilis). 	<ul style="list-style-type: none"> • Common action + • Medial rotation of the leg at beginning of flexion of knee(unlocking of knee joint).
3-Semi-membranosus	<ul style="list-style-type: none"> • Upper lateral part of the upper quadrangular part of ischeal tuberosity • Its upper part is membranous (hence the name) and form a groove for semi-tendinosus 	<ul style="list-style-type: none"> • Groove on back of medial condyle of tibia, back of capsule of knee joint & popliteal fascia 	<ul style="list-style-type: none"> • N.B: All muscles inserted in upper part of tibia (SGS, Semi-membranosus & Popliteus) flex & medial rotate the leg at knee joint.

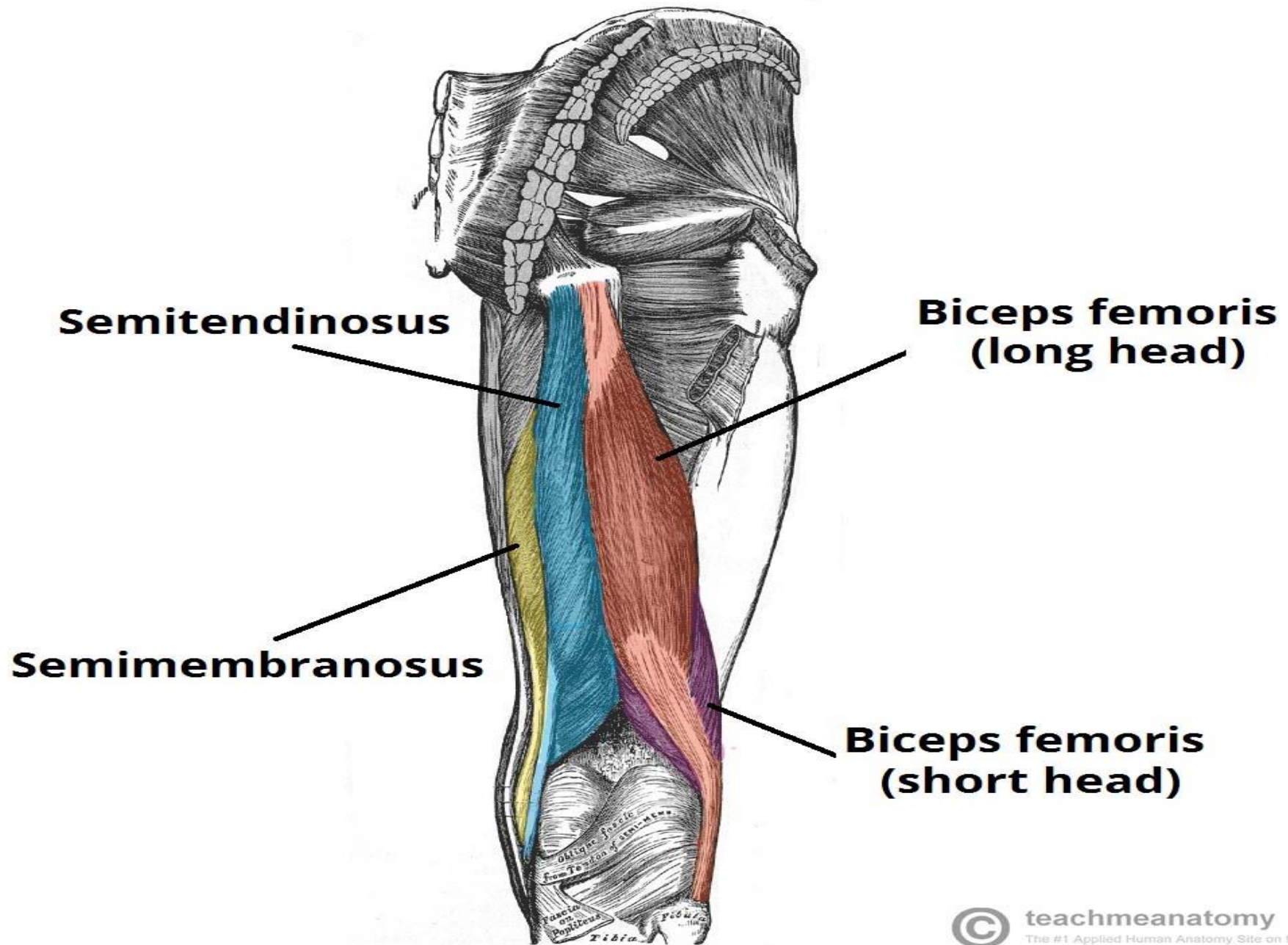
Ischial tuberosity



(a) Hip and thigh, posterior view







Semitendinosus

**Biceps femoris
(long head)**

Semimembranosus

**Biceps femoris
(short head)**

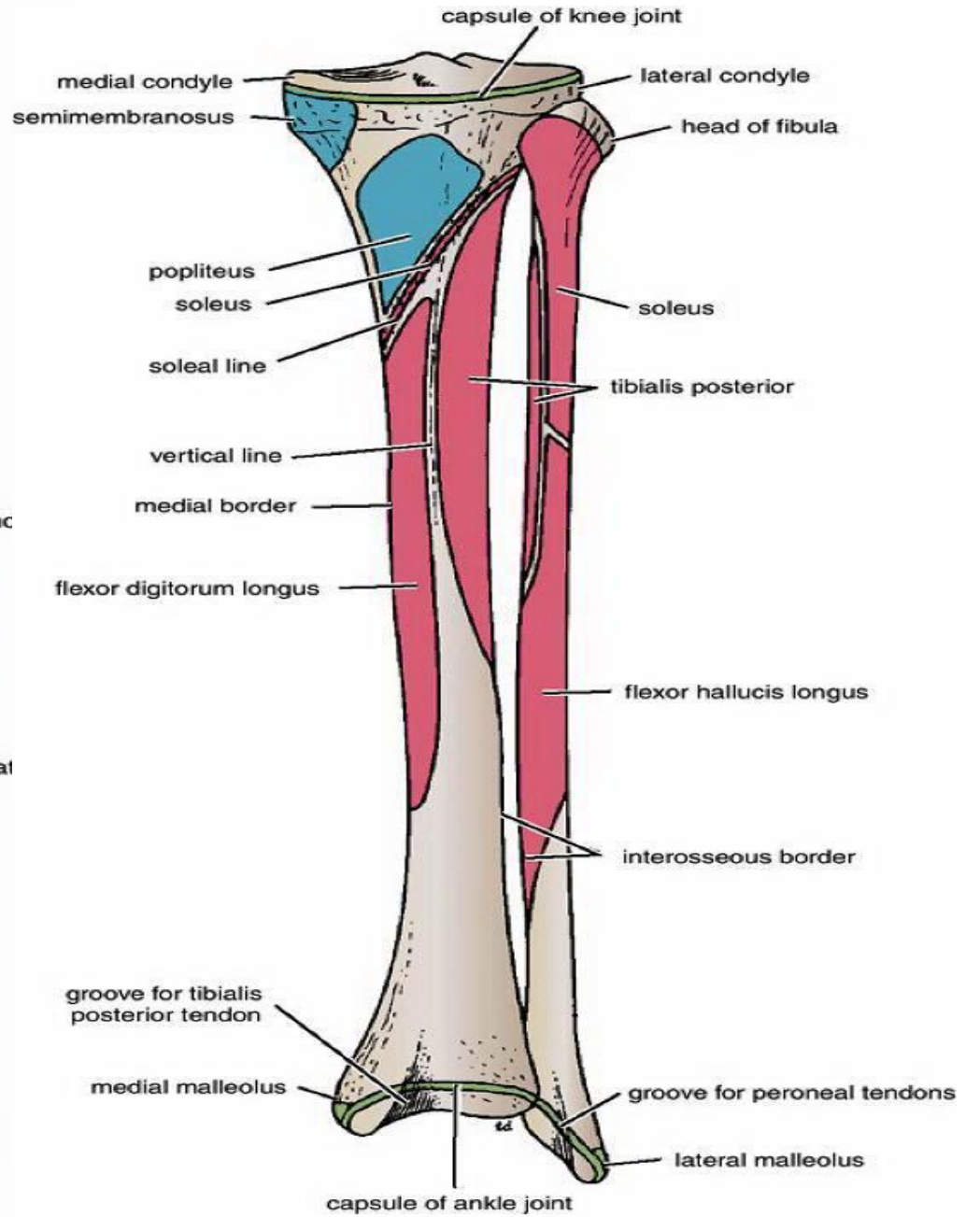
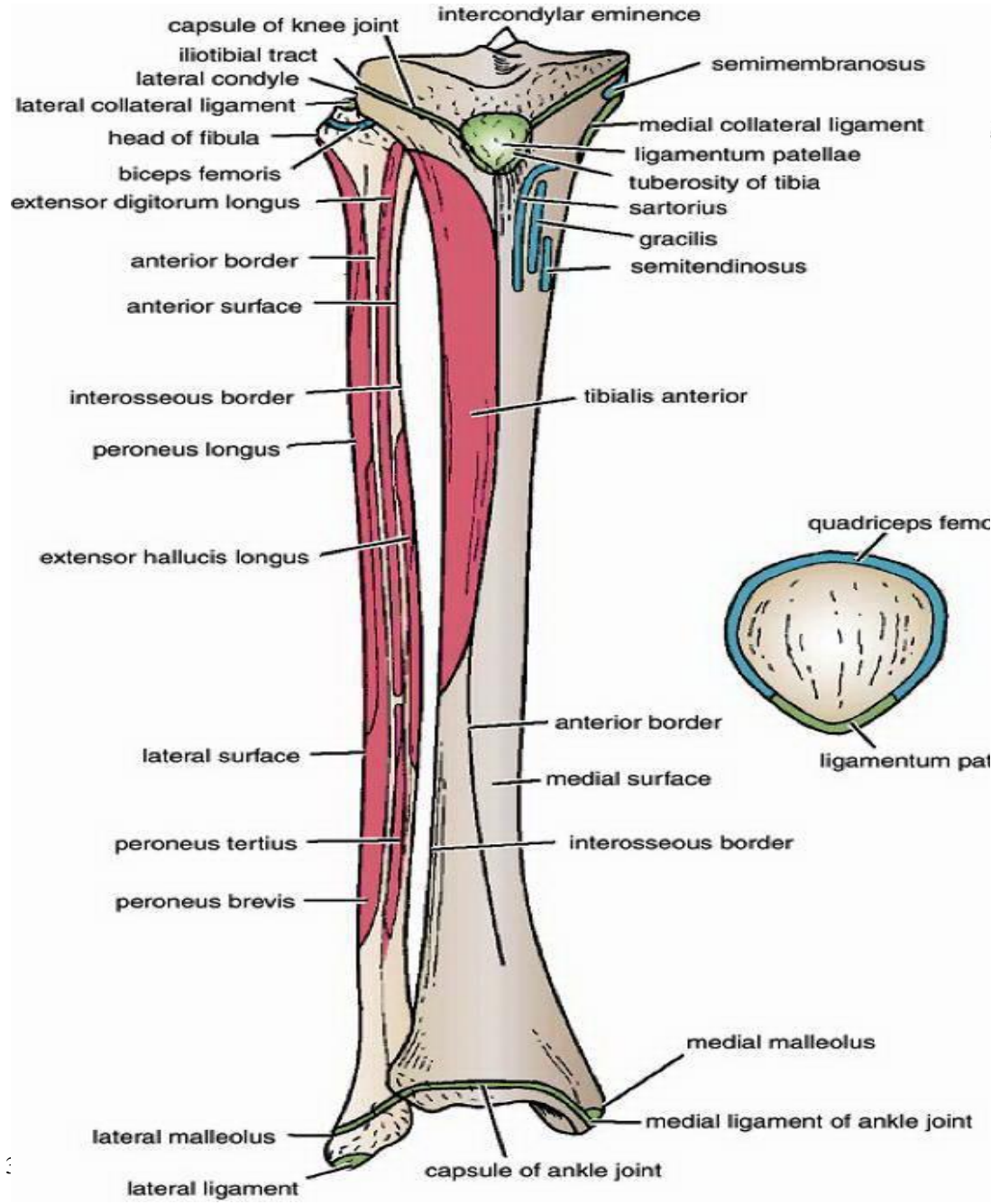
Muscles of Front of the Leg (Extensor or Dorsi flexors)

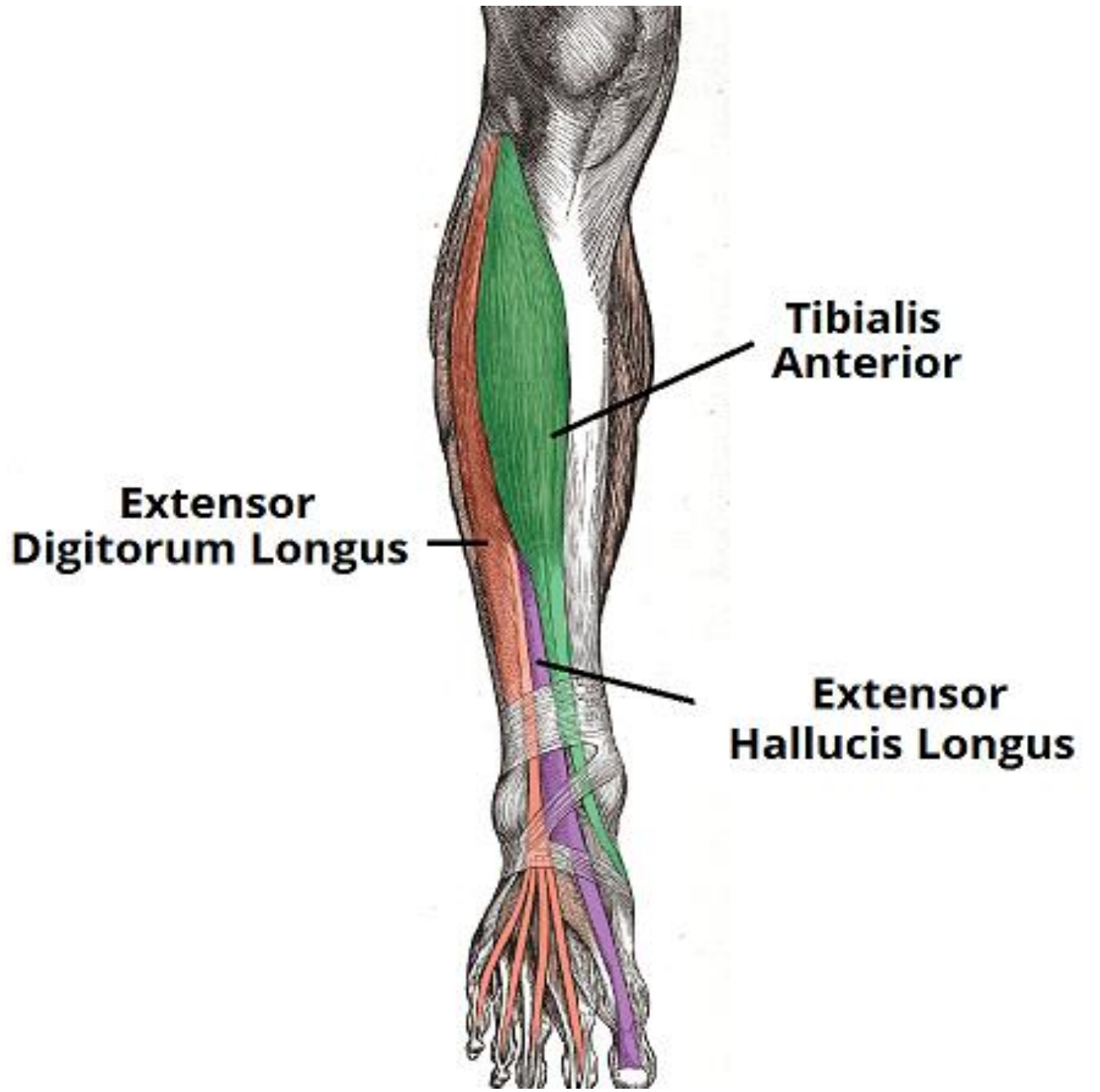
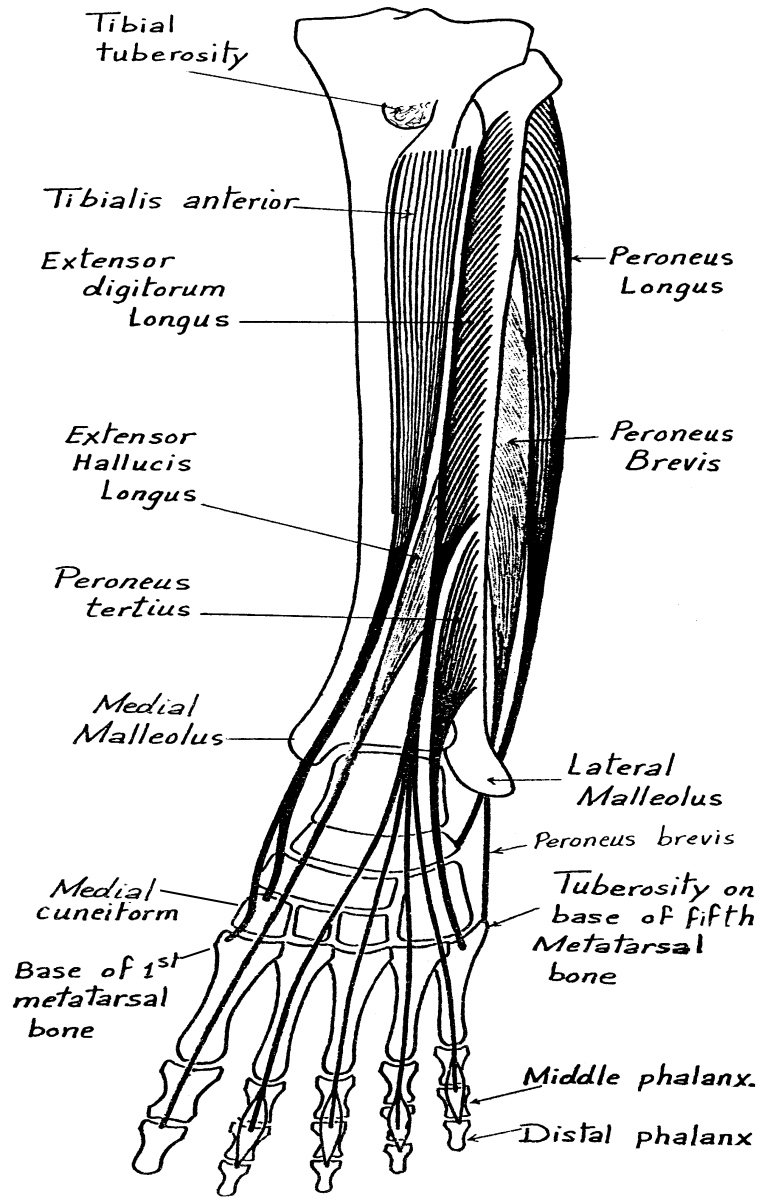
- These muscles pass in front of ankle from medial to lateral "Tom has very nice dog & pig"
- Common origin: Anterior Surface of fibula (except tibialis anterior) & interosseous membrane.
- All muscles are supplied by deep fibular nerve (In the past called deep peroneal or anterior tibial nerve).
- Common action: Extension "Dorsiflexion" of ankle joint.
- From medial to lateral they are:

Muscle	Origin	Insertion	Main Action
1-Tibialis anterior	• Upper 2/3 of lateral surface of tibia & interosseous membrane.	• Medial cuneiform bone & base of 1 st. metatarsal bone .	• Main extensor of ankle . • Invert the foot at subtalar joint.
2-Extensor hallucis longus	• Middle 2/4 of anterior surface of fibula & interosseous membrane.	• Dorsum of base of distal phalanx of big toe.	• Mainly extend all joints of the big toe. • Help in extension of ankle.
3-Extensor digitorum longus	• Upper ¾ of anterior surface of fibula & interosseous membrane.	• By 4 tendons into the extensor expansion of lateral 4 toes.	• Mainly extend all joints of lateral 4 toes • Help in extension of ankle.
4- Fibularis tertius (In the past called peroneus tertius)	• Lower 1/4 anterior surface of fibula & interosseous membrane.	• Dorsum of base of 5 th . metatarsal bone .	• Help extension of ankle . • Help eversion of foot.

★ **N.B:**

- Any tibialis produce inversion.
- Any fibularis (peroneus) produce eversion.
- Extensor expansion of lateral 4 toes cover dorsum of proximal phalanges then gets attached to the dorsum of base of middle and distal phalanges.





Muscles of Lateral Aspect of the Leg (Evertors)

- The muscles pass behind lateral malleolus.
- Common origin : lateral surface of fibula .
- All muscles are supplied by Superficial fibular nerve.
- Common action : Eversion (at subtalar joint) , help plantar flexion of foot (at ankle joint) & supports the lateral longitudinal arches of foot.

Muscle	Origin	Insertion	Action
1. Fibularis (peroneus) longus (superficial)	• Upper 2/3 of lateral surface of fibula.	• Its tendon pass from lateral to medial in the 4 th layer of sole of the foot to insert in lateral aspect of medial cunifrom bone & base of 1st metatarsal bone (as tibialis anterior).	<ul style="list-style-type: none"> • Common action. • Supports the lateral longitudinal & transverse arches of foot.
2. Fibularis (peroneus) brevis (deep)	• Lower 2/3 of lateral surface of fibula.	• Tuberosity of 5th metratarsal bone	• Common action.

Muscles of the Lateral Compartment

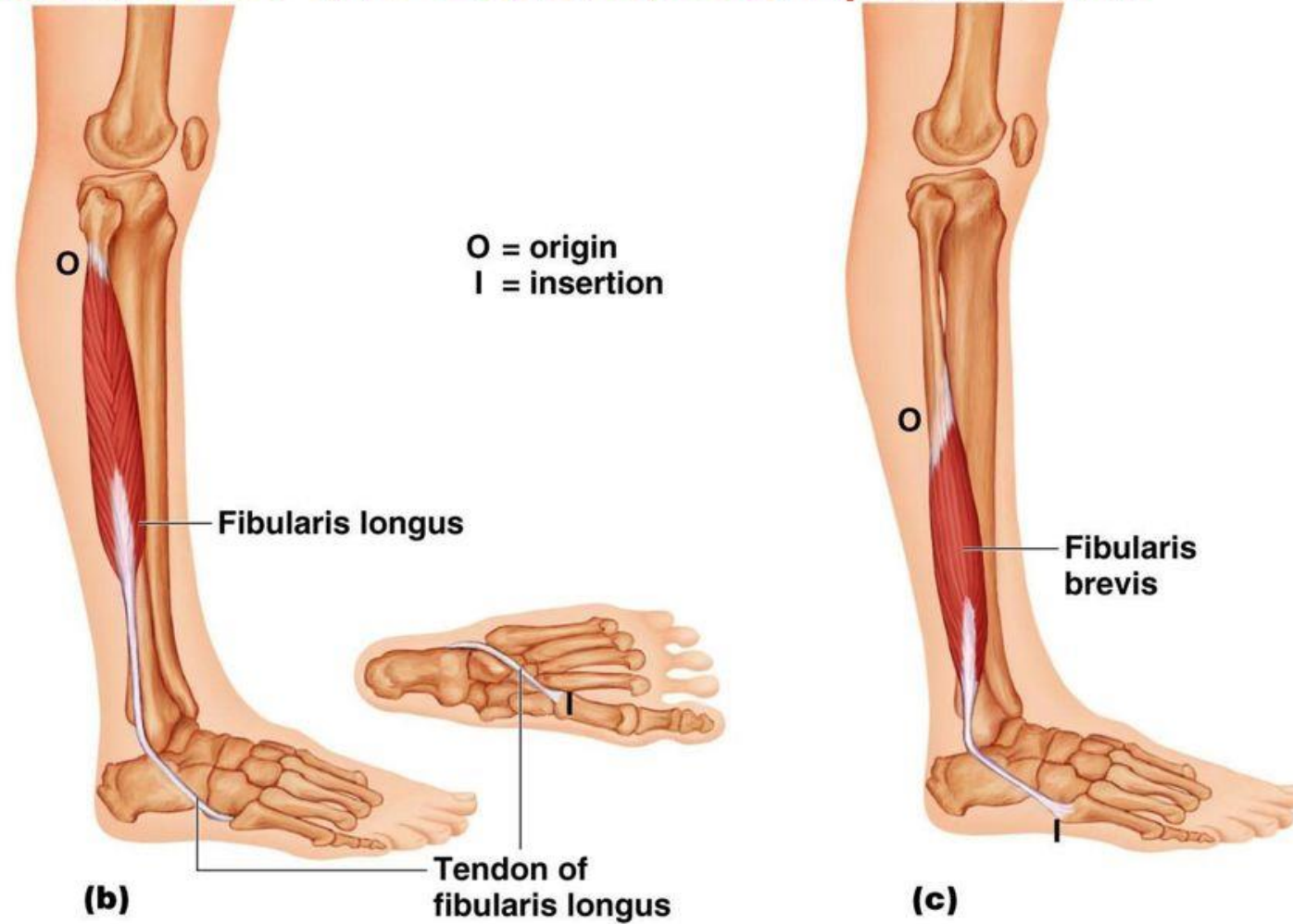


Figure 11.23b, c

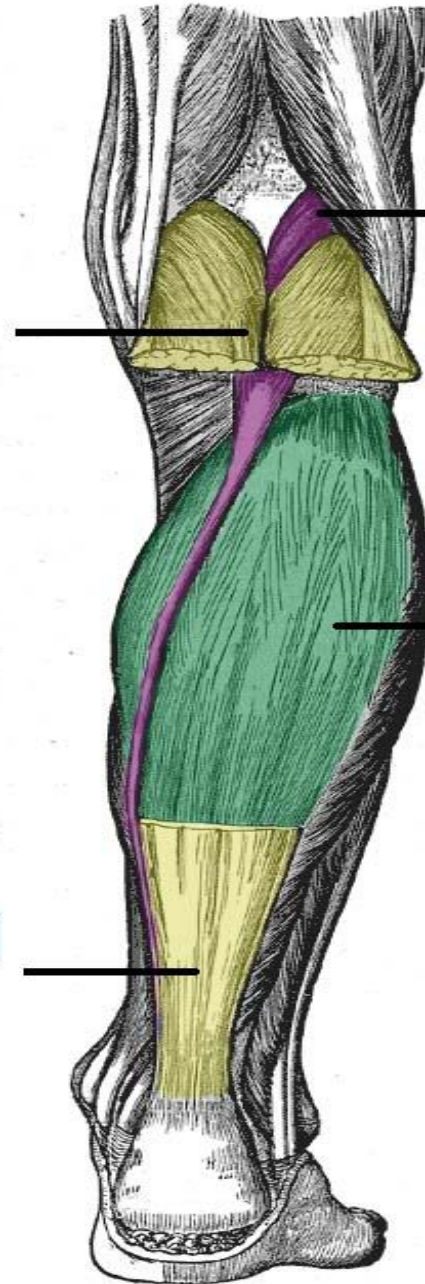
Muscles of Back of Leg

I) Superficial group

- All muscles pass behind the ankle.
- All muscles are supplied by branches of tibial nerve in the popliteal fossa except deep surface of soleus is supplied by a branch in the leg.
- Common action: Powerful plantar flexion of foot at ankle joint during walking , running or standing on the tip of toes & steady the leg on the foot during standing .

Muscle	Origin	Insertion	Action
1. Gastrocnemius	<ul style="list-style-type: none"> a- Lateral Head: lateral surface of lateral condyle of femur. b- Medial Head: Popliteal surface of femur above the medial Condyle. 	<ul style="list-style-type: none"> • By tendo-calcaneus (tendoachilis) into posterior surface of calcaneus. 	<ul style="list-style-type: none"> • Common action . • Help flexion of knee.
2. Soleus	<ul style="list-style-type: none"> • Posterior aspect of upper 1/3 of shaft & head of fibula, fibrotenuous arch between tibia & fibula, soleal line & middle 1/3 of medial border of tibia . 		<ul style="list-style-type: none"> • Common action
3- Plantaris	<ul style="list-style-type: none"> • Lower end of lateral supracondylar ridge . 		<ul style="list-style-type: none"> • Weak flexion of knee & ankle.

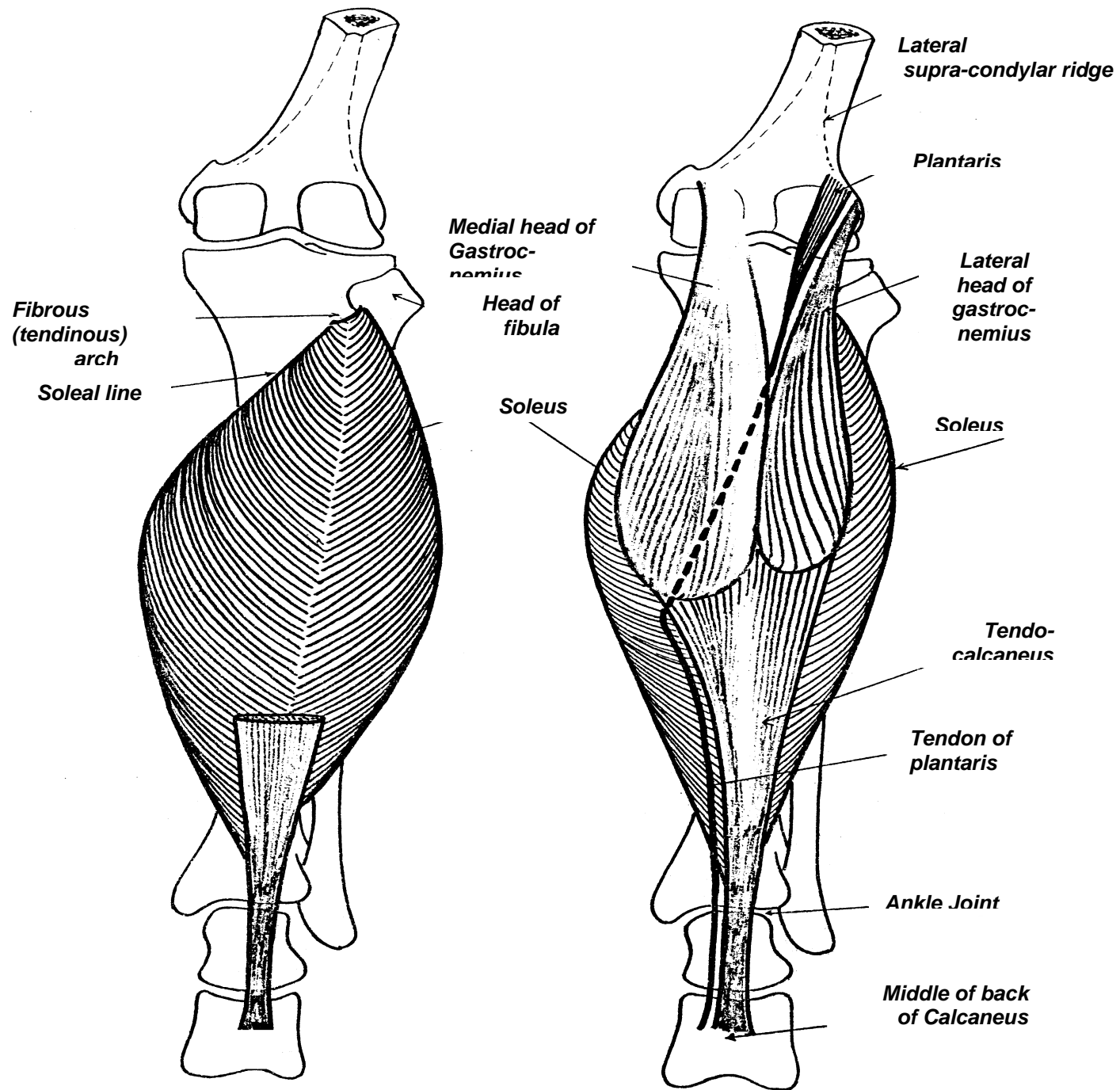
**Heads of the
gastrocnemius**



Plantaris

Soleus

**Calcaneal
tendon**



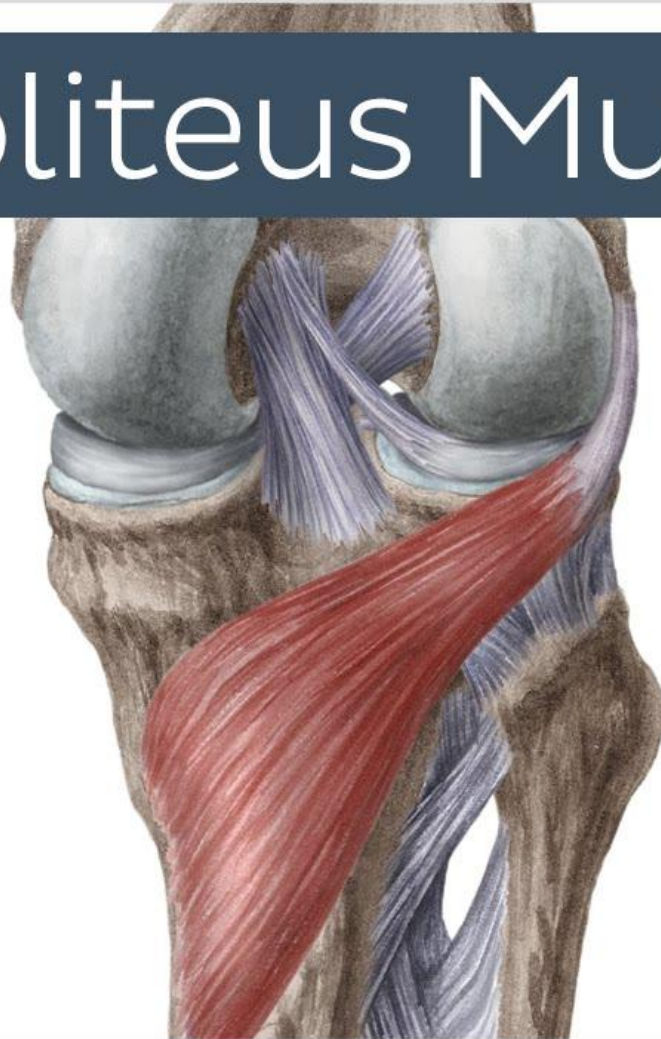
Muscles of the posterior compartment of the leg (superficial group)

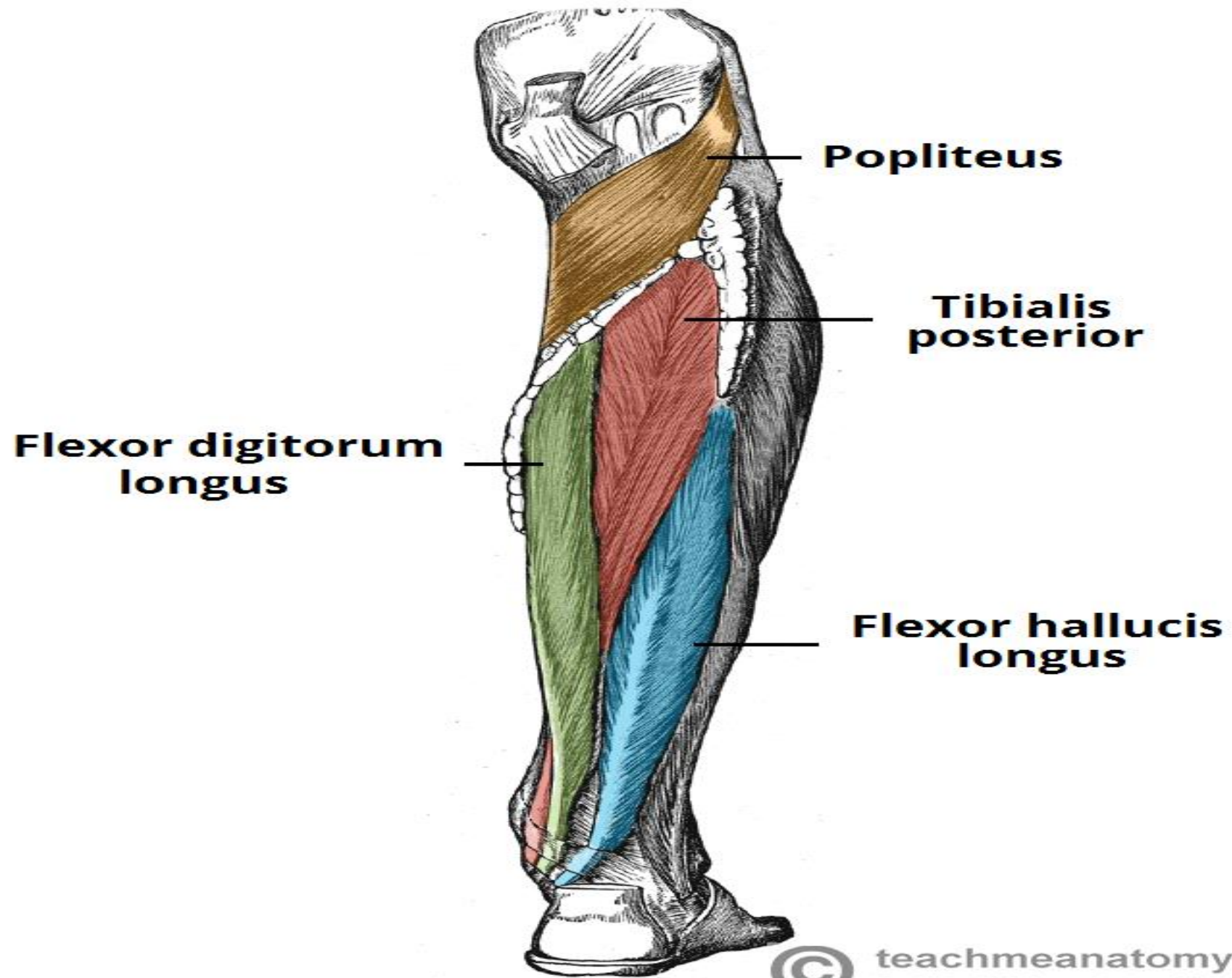
II) Deep Group

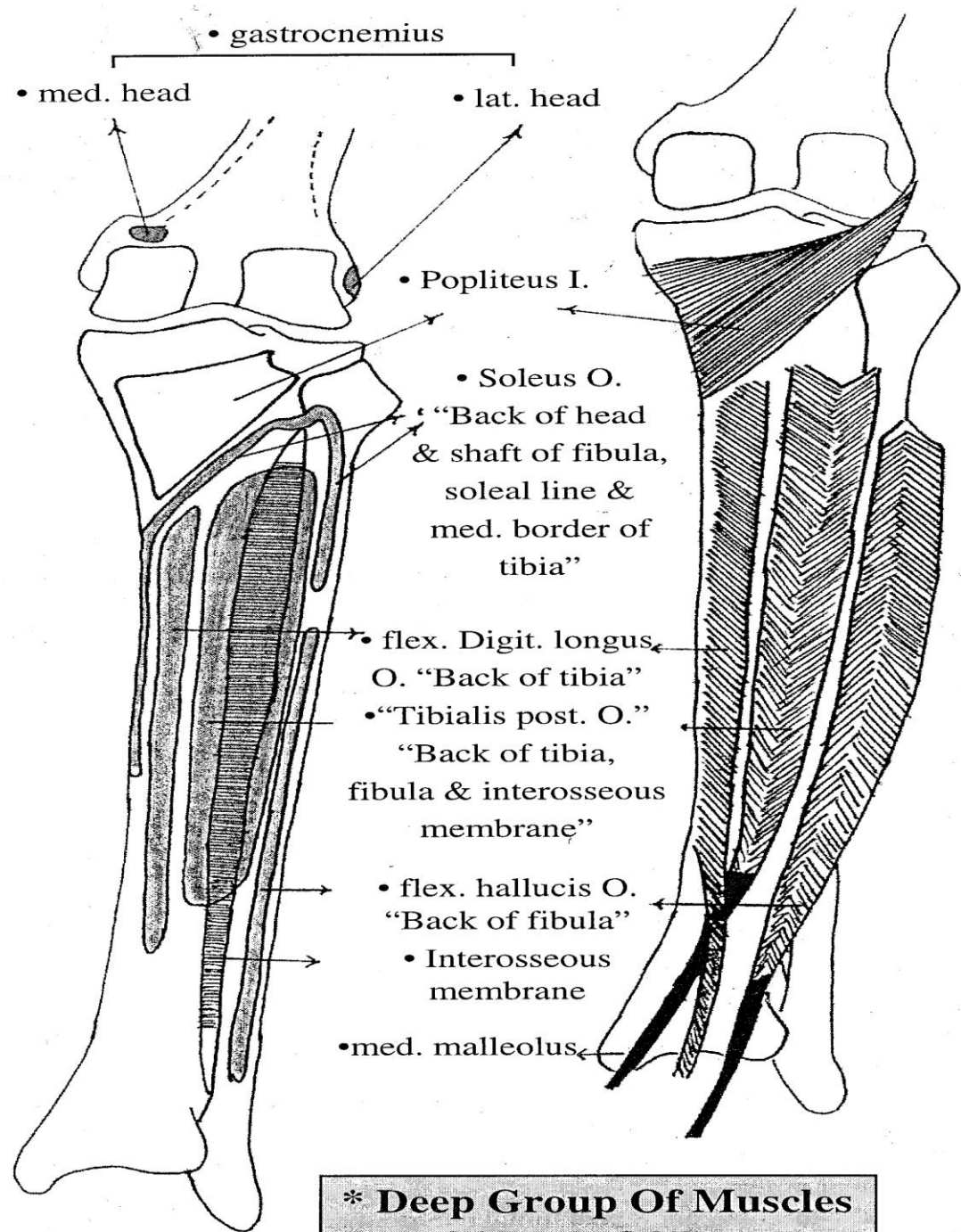
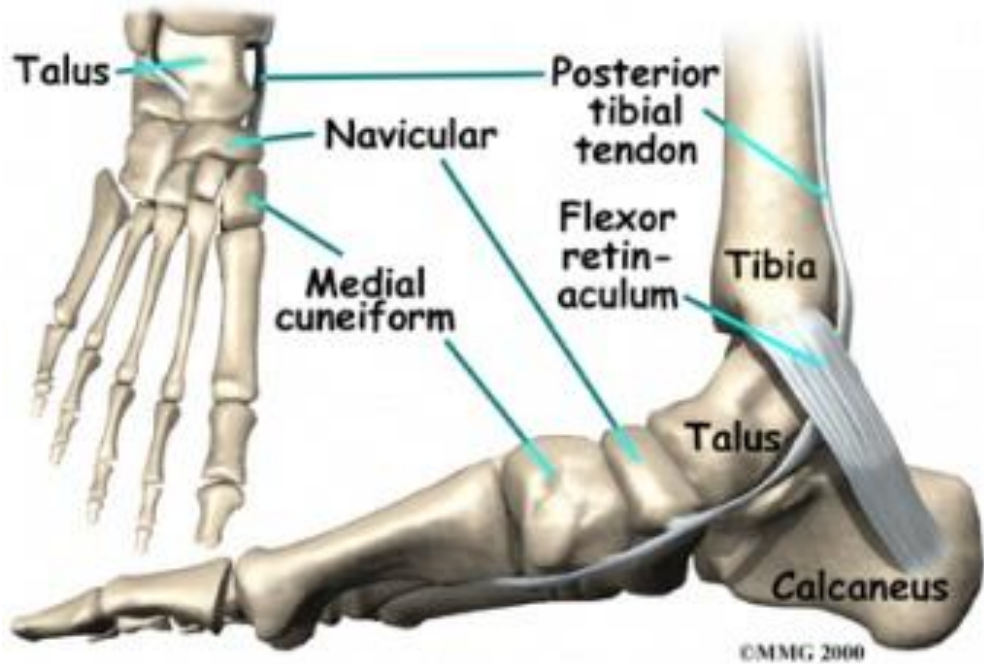
- All muscles pass behind medial malleolus (except popliteus). " Tom Dose Very Nice Hat "
- All muscles of back of the leg (superficial & deep groups) are supplied by tibial nerve .
- Common action: Plantar flexion of ankle and maintain longitudinal arches of foot (except popliteus) .

Muscle	Origin	Insertion	Main Action
1- Popliteus	<ul style="list-style-type: none"> • Groove on the lateral surface of lateral condyle of femur. 	<ul style="list-style-type: none"> • Posterior surface of tibia above soleal line. 	<ul style="list-style-type: none"> • Help flexion of knee . • Medial rotation of full extended knee at beginning of flexion (unlocking).
2- Flexor hallucis longus	<ul style="list-style-type: none"> • Lower 2/3 of posterior surface of fibula & back of interosseous membrane. 	<ul style="list-style-type: none"> • Plantar aspect of base of distal phalanx of big toe. 	<ul style="list-style-type: none"> • Flexes the ankle • Flexes all joints of big toe (main action). • Maintain medial longitudinal arch
3- Flexor digitorum longus	<ul style="list-style-type: none"> • Middle 1/3 of posterior surface of tibia below soleal line & medial to the vertical line. 	<ul style="list-style-type: none"> • By 4 tendons into the plantar aspect of base of distal phalanges of lateral 4 toes. 	<ul style="list-style-type: none"> • Flexes the ankle • Flexes all joints of lateral 4 toes (main action). • Maintain longitudinal arches.
4- Tibialis posterior	<ul style="list-style-type: none"> • Upper 2/3 of back of tibia below soleal line, lateral to the vertical line . • Upper 2/3 of back of fibula . • Back of interosseous membrane. 	<ul style="list-style-type: none"> • Main inserted into tuberosity of navicular bone in addition to plantar aspect of all tarsal bones except talus & bases of 2nd, 3rd, and 4th metatarsal bones. 	<ul style="list-style-type: none"> • Flexes the ankle . • Invert the foot. • Maintain medial longitudinal arch

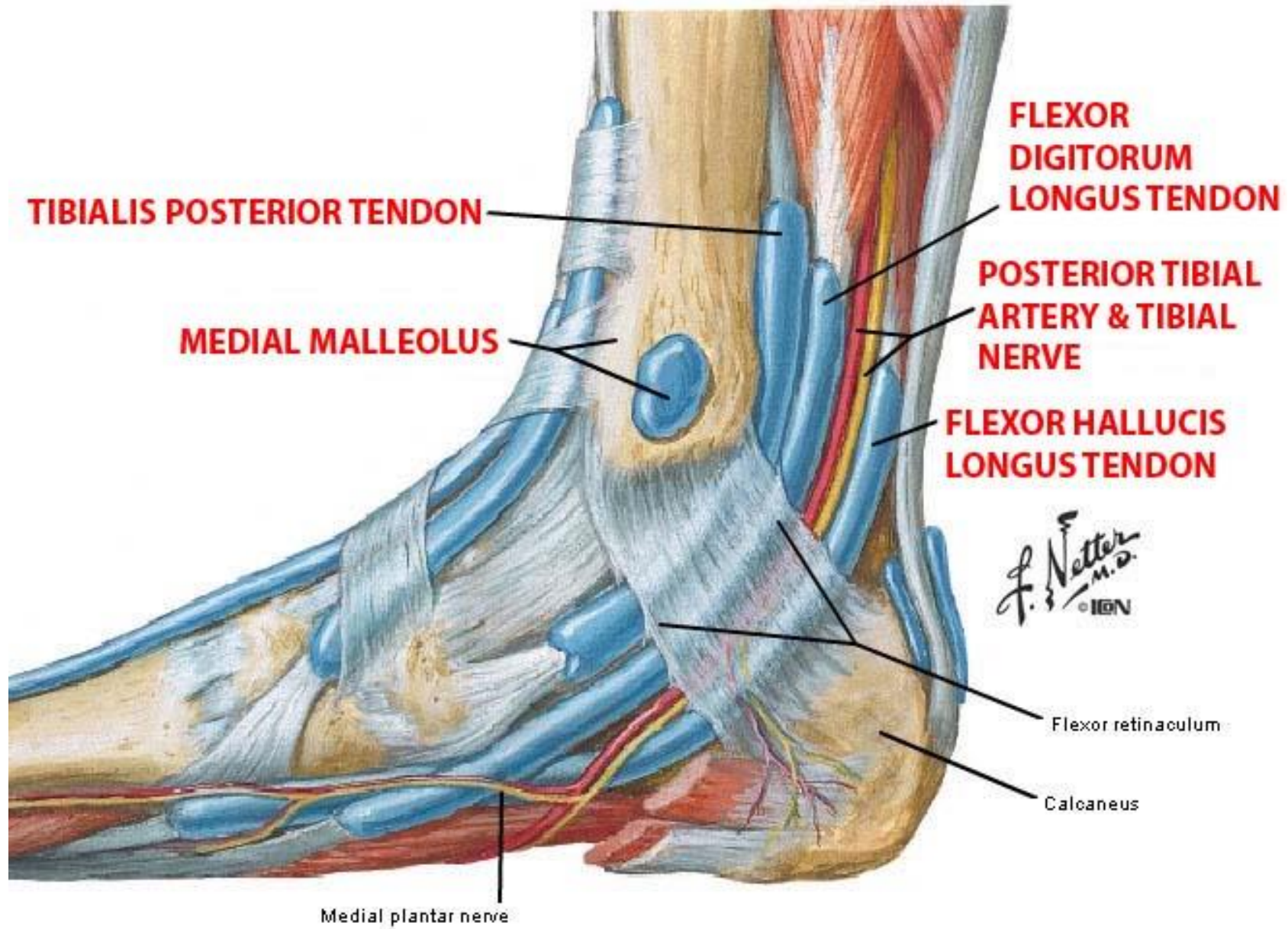
Popliteus Muscle







*** Deep Group Of Muscles Of Back Of Leg.**



Dorsum of the foot

★ Muscles :

1) **Tendons of muscles of anterior group of the leg** : Tibialis anterior , extensor hallucis longus , extensor digitorum longus

2) **Extensor digitorum brevis muscle** :

* **Origin:** Anterior part of upper surface of calcaneus .

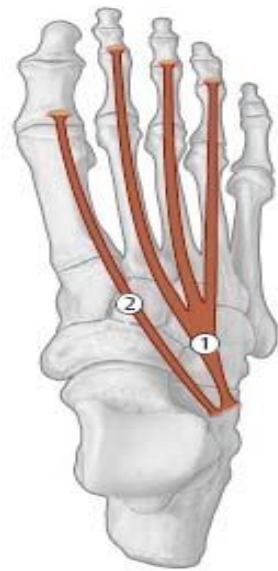
* **Insertion:** Extensor expansion of medial 4 toes. The part passing to big toe is called extensor hallucis brevis.

* **Nerve supply:** lateral terminal branch of deep fibular (peroneal) nerve .

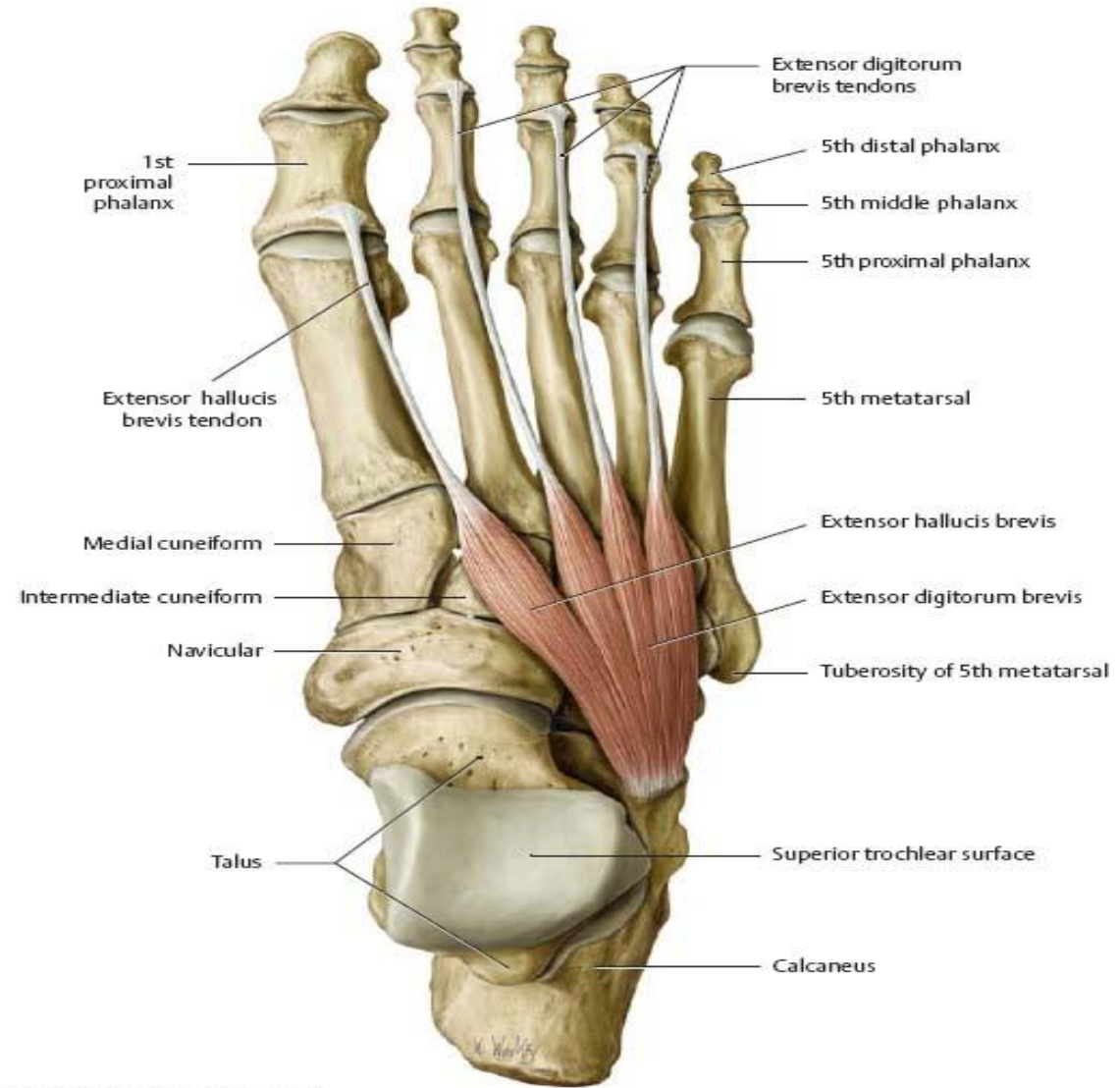
* **Action:** Help extension of medial 4 toes .

★ **Vessels : Dorsal venous arch and dorsalis pedis artery** .

★ **Nerves : Terminal branches of the following nerves** : deep fibular (peroneal) nerve , superficial fibular (peroneal) nerve , saphenous nerve and sural nerve .



A Schematic.



B Dorsal muscles of the foot.

Sole of the Foot

★ The deep fascia of the sole is thickened in its central part forming the **plantar aponeurosis** *which* is formed of 3 parts;

1. Central part (thick):

- It is triangular in shape, attached by its apex to the medial tubercle of calcaneus; its base splits into 5 slips (at the heads of metatarsals) which fuse with the fibrous flexor sheaths of toes.
- From its medial and lateral margin arise medial & lateral septa which extend deeply in the sole of the foot one on each side of flexor digitorum brevis .

2. Medial part (thin): it covers the abductor hallucis.

3. Lateral part (thin): it covers the abductor digiti minimi.

★ Function:

- It protects the nerves and vessels of the sole.
- It helps to maintain both the medial and lateral longitudinal arches.



Layer of the Sole of the Foot

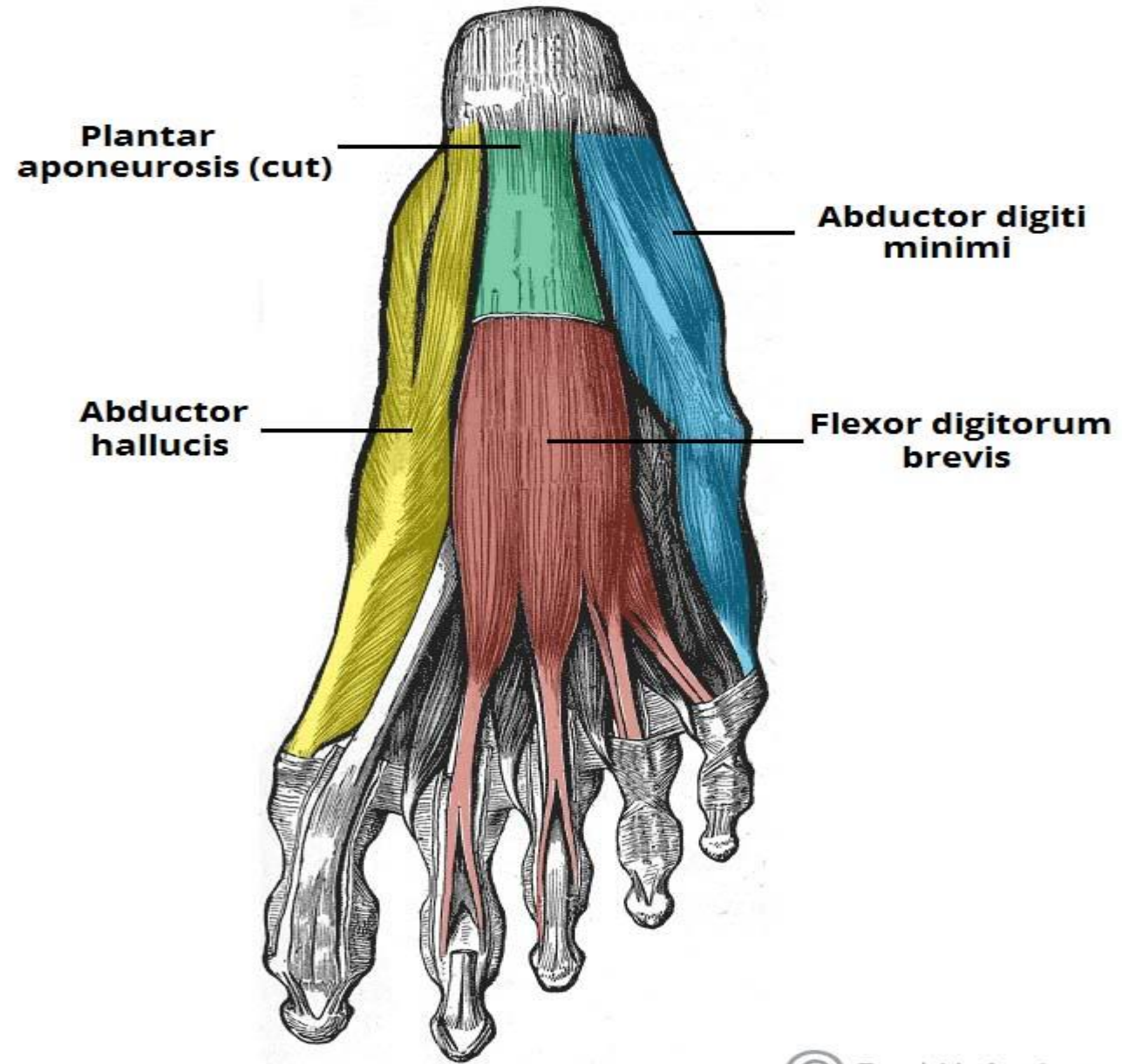
Layer	Muscle	Tendon
* 1st layer : (3 muscles)	<ul style="list-style-type: none"> • Abductor hallucis • Abductor digiti minimi • Flexor digitorum brevis . 	
* 2nd layer : (2 muscles & 2 tendons)	<ul style="list-style-type: none"> • Four lumbricals. • Flexor accessorius. 	<ul style="list-style-type: none"> • Flexor hallucis longus. • Flexor digitorum longus.
* 3rd layer : (3 muscles)	<ul style="list-style-type: none"> • Adductor hallucis. • Flexor hallucis brevis. • Flexor digiti minimi brevis 	
* 4th layer : (2 muscles & 2 tendons)	<ul style="list-style-type: none"> • 3 Plantar interossei • 4 dorsal interossei 	<ul style="list-style-type: none"> • Peroneus longus. • Tibialis posterior.

First Layer of the Sole of the Foot

★ **Common origin :** All arise from medial tubercle of calcaneus except abductor digiti minimi which arises from both medial and lateral tubercle of calcaneus.

★ **Nerve supply:** all muscles are supplied by medial plantar nerve except abductor digiti minimi which is supplied by lateral plantar nerve.

Muscle	Origin	Insertion	Action
1-Abductor hallucis. (medial)	<ul style="list-style-type: none"> • Medial tubercle of calcaneus. 	<ul style="list-style-type: none"> • Medial side of base of proximal phalanx of big toe. 	<ul style="list-style-type: none"> • Abduction of big toe away from the 2nd toe (axis for adduction and abduction).
2-Abductor digiti minimi (lateral)	<ul style="list-style-type: none"> • Medial and lateral tubercle of calcaneus 	<ul style="list-style-type: none"> • Lateral side of the base of proximal phalanx of little toe. 	<ul style="list-style-type: none"> • Abduction of little toe away from 2nd toe.
3-Flexor digitorum brevis (in between)	<ul style="list-style-type: none"> • Medial tubercle of calcaneus 	<ul style="list-style-type: none"> • By 4 tendons into the sides of middle phalanx of the lateral 4 toes. 	<ul style="list-style-type: none"> • Flexion of lateral 4 toes(at M/P and proximal I/P joints).



Second Layer of the Sole of the Foot

★ **Two tendons:**

1- Tendon of flexor digitorum longus:

- This tendon passes behind the medial malleolus then it enters 2nd layer of the sole of foot and crosses the tendon of flexor hallucis longus and divides into 4 tendons to insert into the bases of the distal phalanges of the lateral 4 toes.

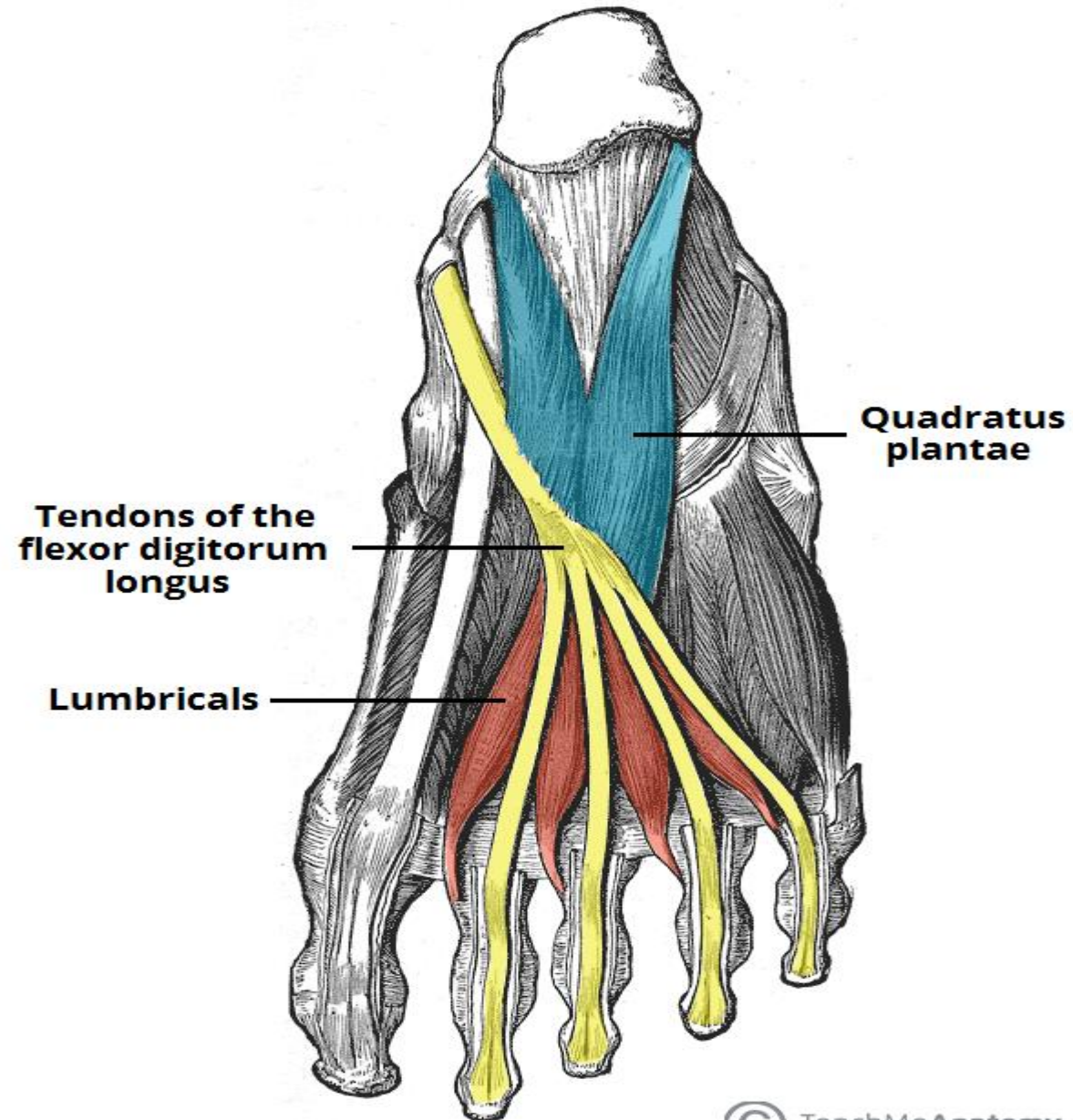
2- Tendon of flexor hallucis longus.:

- This tendon of the muscle lies in groove on the back of the lower end of tibia, pass in a groove on the back of talus then in a groove in the under surface of sustentaculum tali.
- Then it runs in the medial aspect of 2nd layer of the sole to insert into the base of the distal phalanx of the big toe.

★ **Two muscles :**

- All these muscles are supplied by **lateral plantar** nerve except medial lumbricle which is supplied by medial plantar .

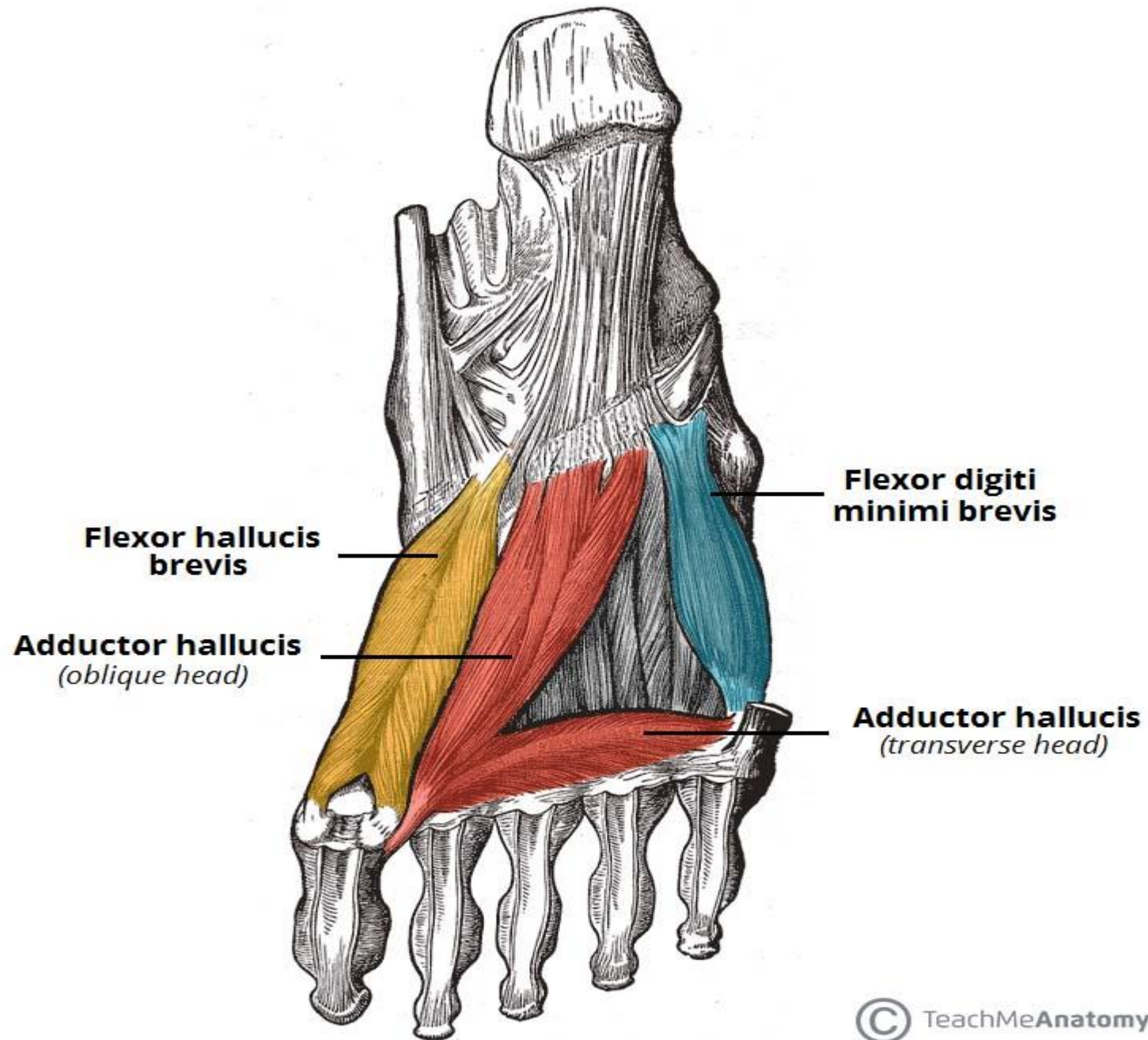
Muscle	Origin	Insertion	Action
1-Flexor digitorum accessorius	• From medial and lower surfaces of calcaneus.	• Into the tendon of flexor digitorum longus.	• It brings tendon of flexor digitorum longus in lines with the toes on which they act .
2- 4 lumbrical	• From adjacent sides of the 4 tendons of flexor digitorum longus.	• Into the extensor expansion of the lateral 4 toes.	• Flexion of metatarso-phalangeal joints and extension of interphalangeal joints of the lateral 4 toes.

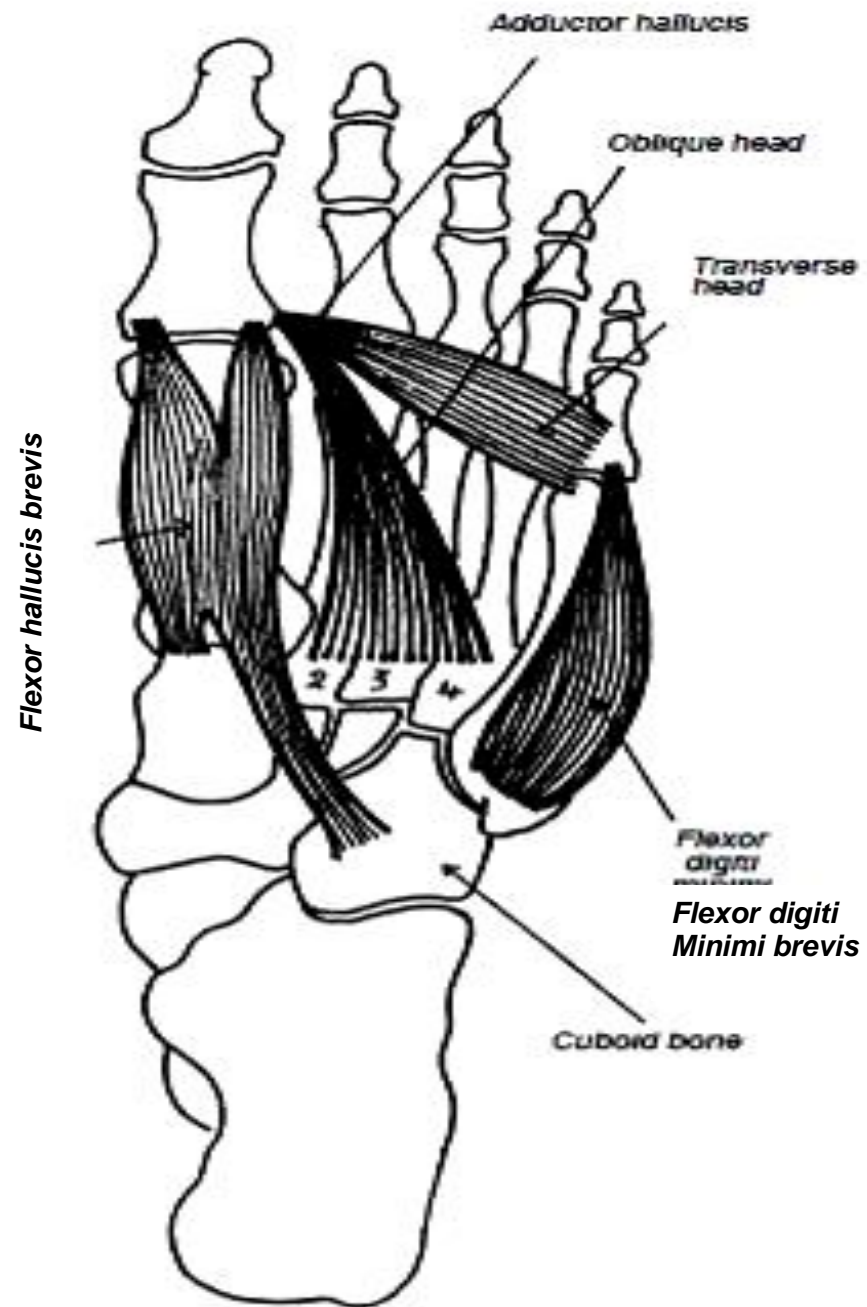


Third Layer of the Sole of the Foot

★ Common nerve supply : Lateral plantar nerve except adductor hallucis (supplied by medial plantar)

Muscle	Origin	Insertion	Action
1- Flexor hallucis brevis: (medially)	<ul style="list-style-type: none"> From cuboid 	<ul style="list-style-type: none"> By 2 small tendons, one on either side of the base of proximal phalanx of big toe. 	<ul style="list-style-type: none"> Flexes the metatarsophalangeal joint of the big toe.
2- Flexor digiti minimi brevis: (laterally)	<ul style="list-style-type: none"> From the base of 5th metatarsal bone 	<ul style="list-style-type: none"> In the lateral side of the base of proximal phalanx of little toe. 	<ul style="list-style-type: none"> Flexes the metatarsophalangeal joint of the little toe.
3- Adductor hallucis : (in between)	<ul style="list-style-type: none"> a-Oblique head: from the bases of the 2nd, 3rd and 4th metatarsal bones. b-Transverse head: from the capsule & ligaments of the lateral 4 M/P joints. 	<ul style="list-style-type: none"> Into the lateral side of the base of proximal phalanx of big toe. 	<ul style="list-style-type: none"> Adduction of big toe





Fourth Layer of the Sole of the Foot

★ 2 tendons:

- 1- **Peroneus longus:** This tendon crosses the 4th layer of sole of foot transversely ,from lateral to medial. to become inserted into the lateral aspect of the medial cuneiform bone and the base of the 1st metatarsal bone.
- 2- **Tibialis posterior:** This tendon of the muscle passes on the back of the medial malleolus then deep to the flexor retinaculum.on the deltoid ligament of ankle joint to enter the 4th layer of sole of foot where it lies below the spring ligament becomes inserted into the tuberosity of navicular bone (main insertion), into all tarsal bones (except the talus) and bases of 2nd , 3rd , and 4th metatarsal bones

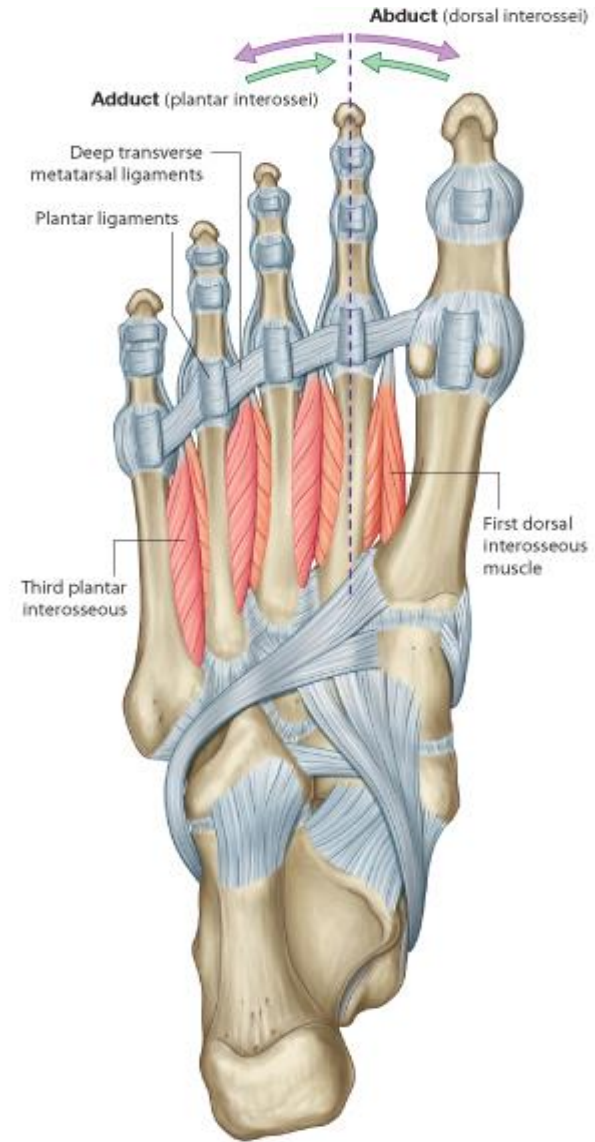
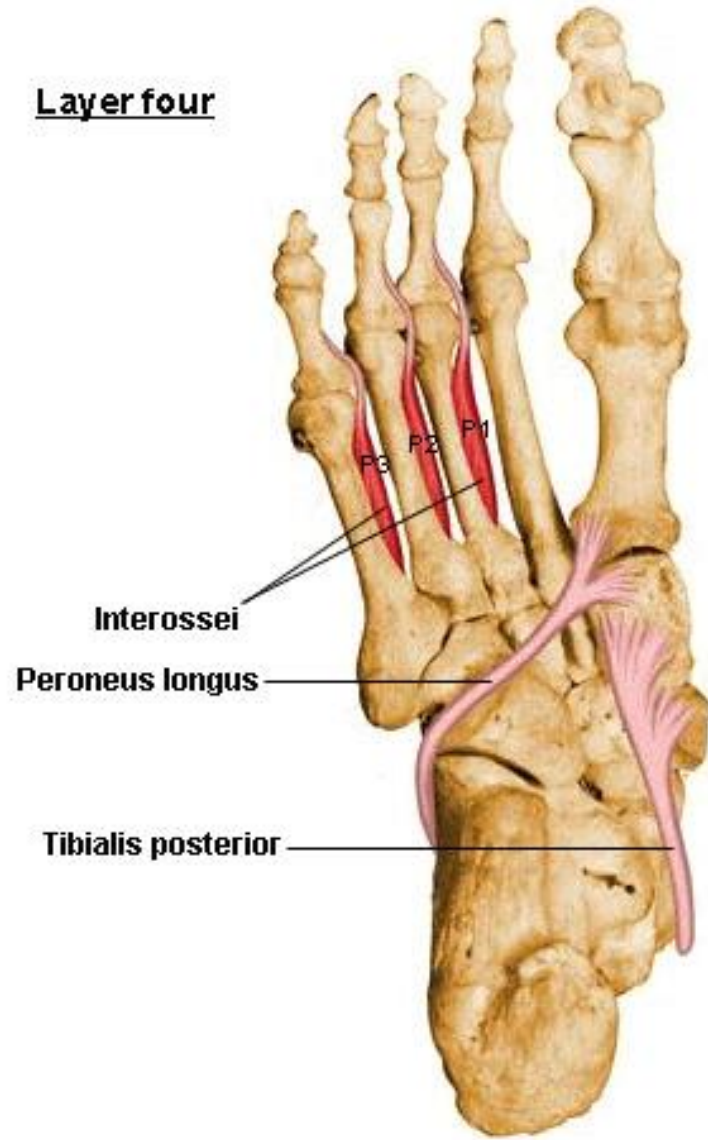
★ 2 Muscles :

- **Common nerve supply: All muscles are supplied by lateral plantar nerve .**
- **Common insertion: joins the extensor expansion on the dorsum of the proximal phalanx of the corresponding toe..**

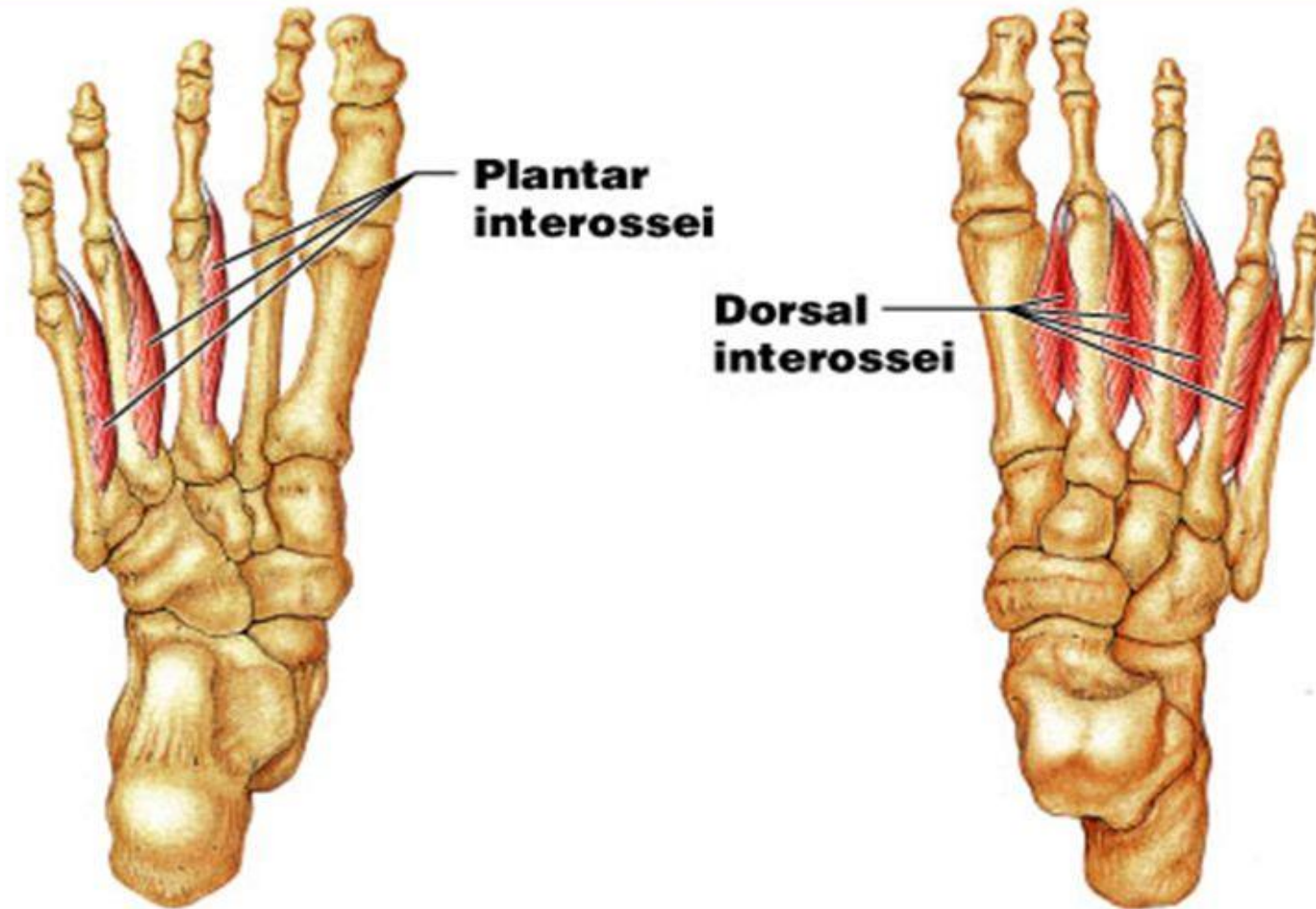
Muscle	Origin	Action
1) 3 Plantar interossei	• Shaft of the 3rd, 4th and 5th metatarsal bones.	• Adduct the lateral 3 toes towards middle line of the 2nd toe.
2)4 Dorsal interossei	• Adjacent sides of the metatarsal bones.	• abduct the 2nd, 3rd and 4th toes from middle line of the 2nd toe.

- No dorsal interosseus muscles for the big and little toes, as they have their own abductors..
- No plantar interosseus muscles for the big toe (as it has its own adductor) and the 2nd toe (as it is not adducted but it is only abducted on either sides).

Layer four



Plantar Muscles: Fourth Layer



**(e) Fourth layer:
plantar interossei**

**(f) Fourth layer:
dorsal interossei**