

# Muscles of Lower Limb.

## I. 3 Gluteal muscles.

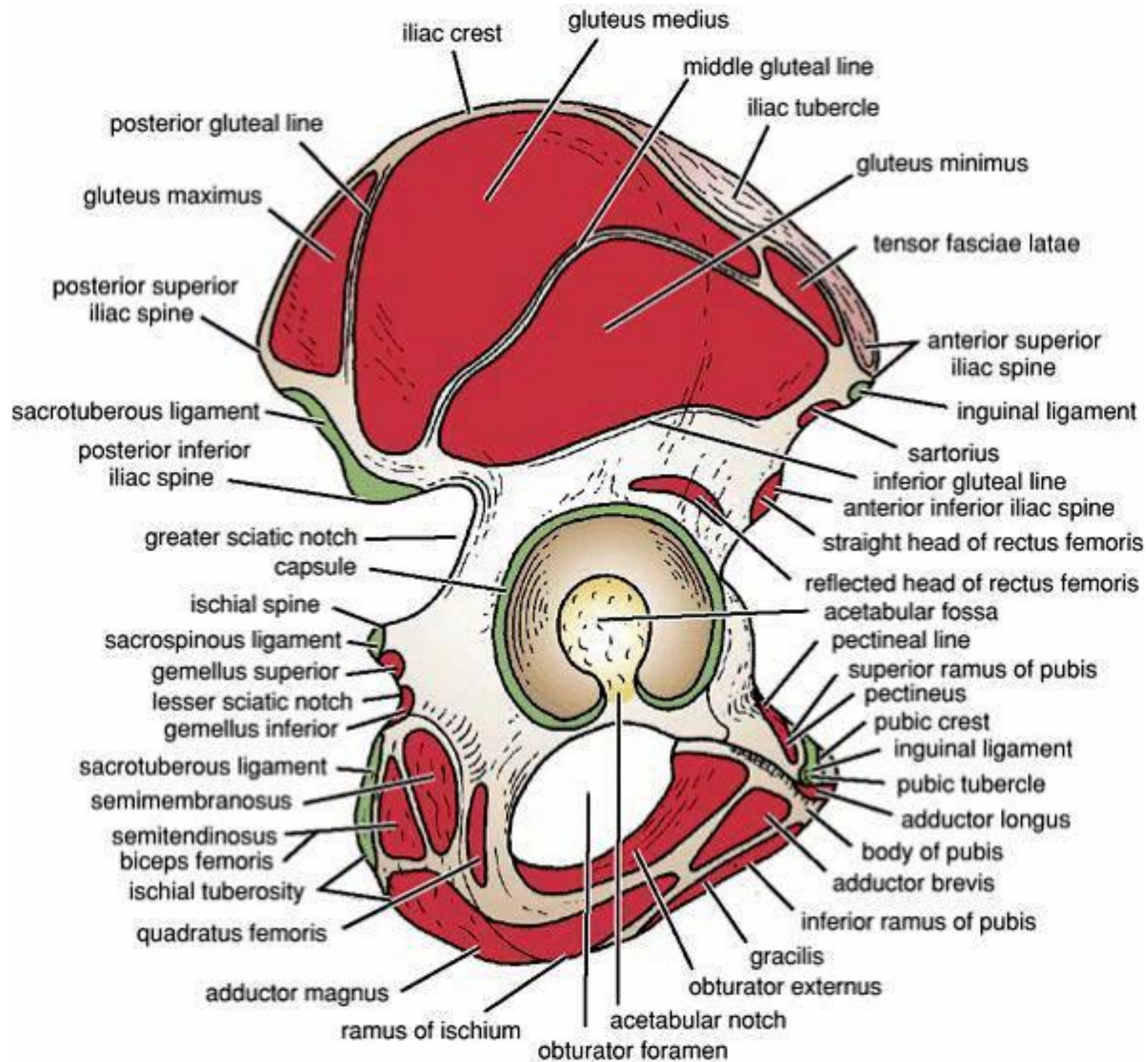
- All muscles are supplied by superior gluteal nerve except gluteus maximus which is supplied by inferior gluteal nerve .

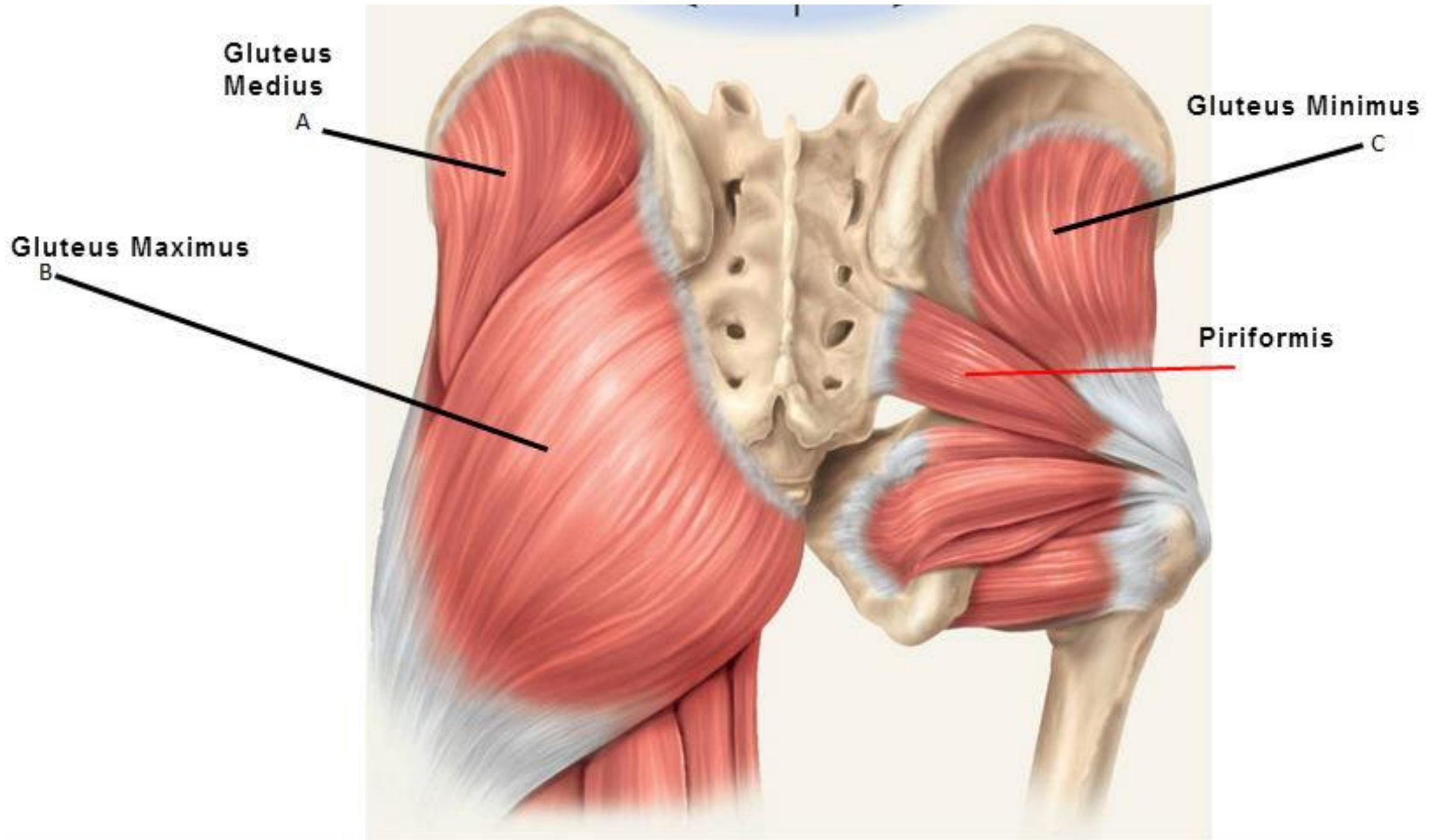
Muscle	Origin	Insertion	Important features
1. <b>Gluteus maximus</b>	<ul style="list-style-type: none"> <li>• Gluteal surface of ilium behind posterior gluteal line, back of sacrum &amp; sacrotuberus ligament .</li> </ul>	<ul style="list-style-type: none"> <li>• The deep <math>\frac{1}{4}</math> : inserted into gluteal tuberosity of femur .</li> <li>• The superficial <math>\frac{3}{4}</math> : is inserted into the posterior border of iliotibial tract</li> </ul>	<ul style="list-style-type: none"> <li>❖ It is the main extensor of hip &amp; assist in lateral rotation hip .</li> <li>❖ Structures deep to the gluteus maximus:               <ol style="list-style-type: none"> <li>1. Bony prominences: greater trochanter and ischial tuberosity.</li> <li>2. Ligaments: sacro-spinous and sacro-tuberous.</li> <li>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 ).</li> <li>4. Vessels:                   <ul style="list-style-type: none"> <li>▪ Above piriformis: superior gluteal vessels.</li> <li>▪ Below piriformis: inferior gluteal and internal pudendal vessels.</li> </ul> </li> <li>5. Nerves                   <ul style="list-style-type: none"> <li>▪ Above piriformis: superior gluteal nerve.</li> <li>▪ Below piriformis: sciatic nerve, inferior gluteal nerve, posterior cutaneous nerve of the thigh and nerve to quadratus femoris.</li> </ul> </li> <li>6. Two nerves pass from greater to lesser sciatic foramen: pudendal nerve and nerve to obturator internus .</li> </ol> </li> <li>* 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 well forward on the <i>upper outer quadrant</i> of the buttock.</li> </ul>

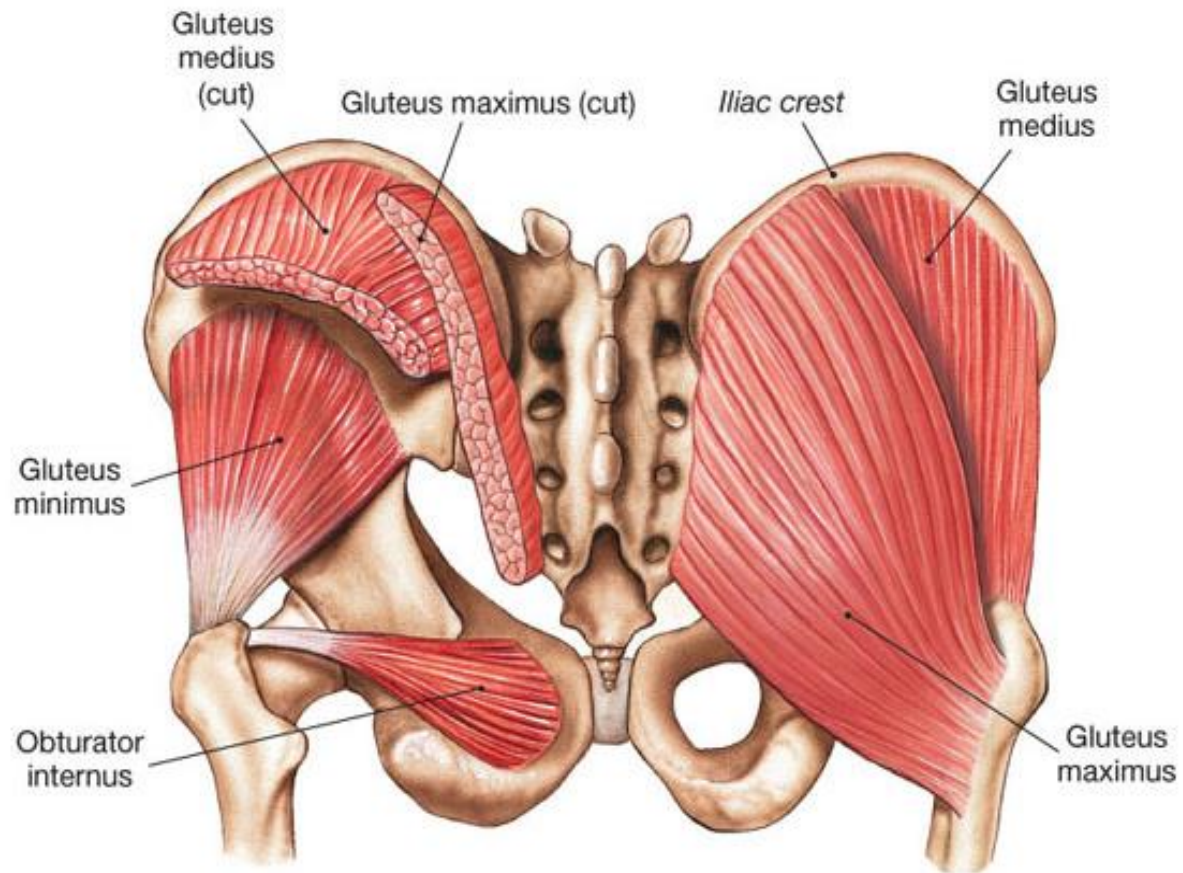
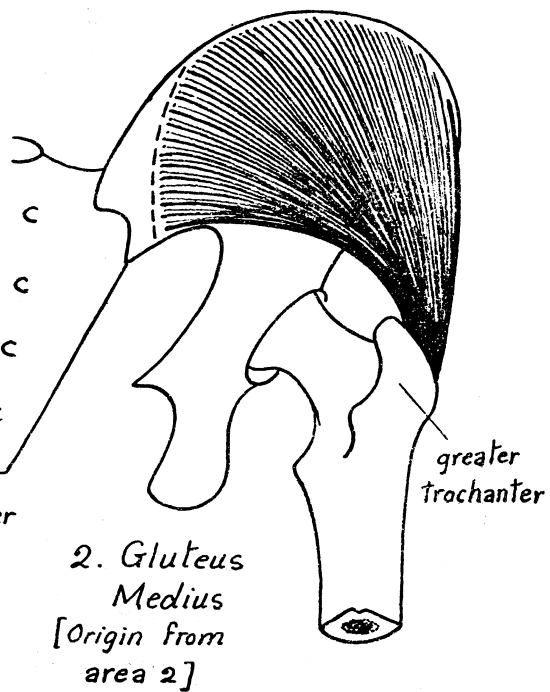
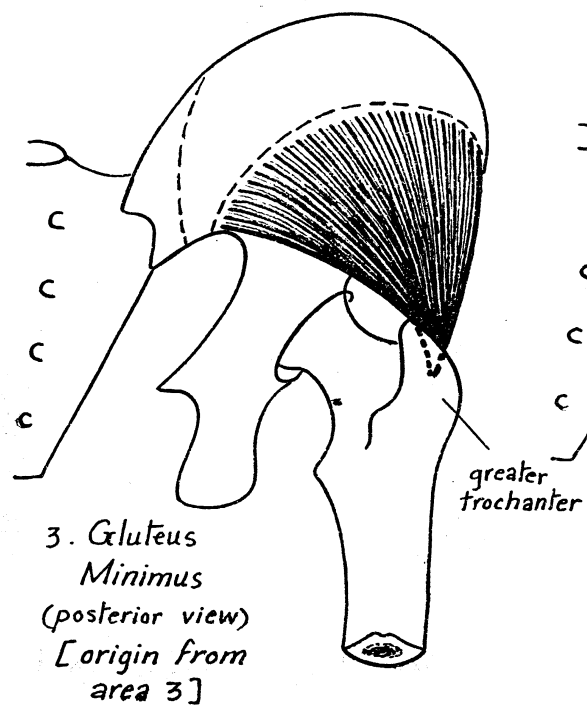
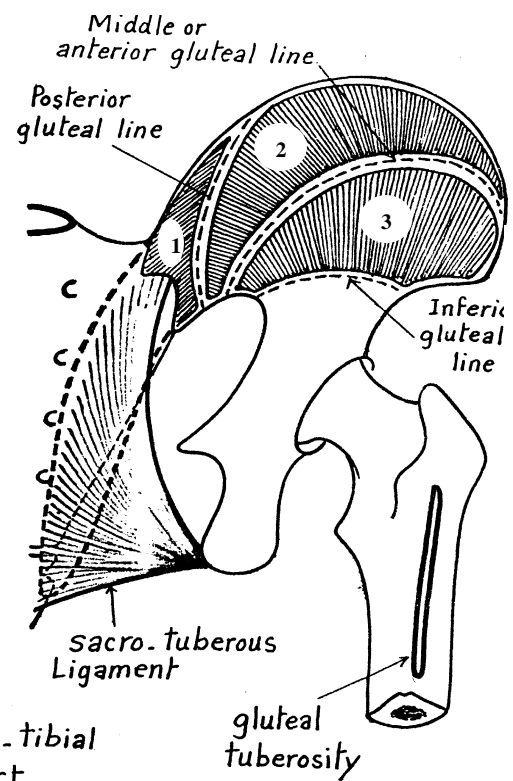
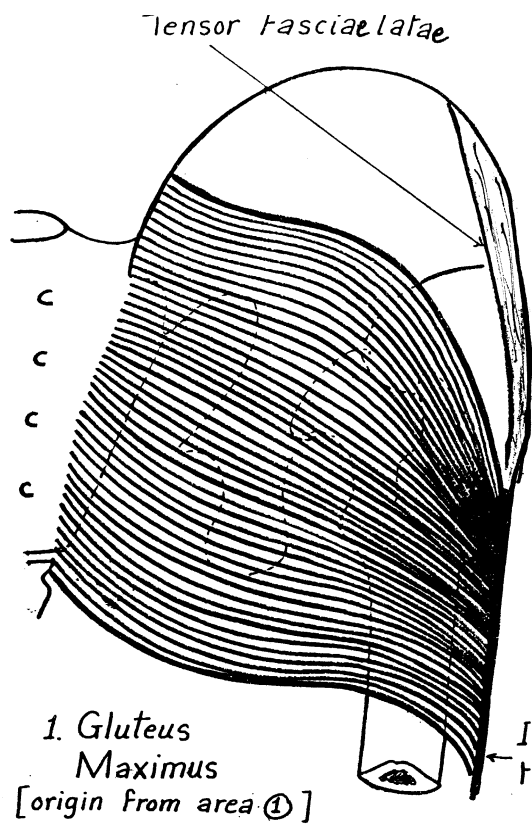
2. <b>Gluteus medius</b>	• Gluteal surface of ilium between posterior & middle gluteal lines .	• oblique ridge on the lateral surface greater trochanter.	a) Middle fibers abduct the thigh while the anterior fibers medial rotators . b) Prevent falling down of the pelvis on the unsupported side during waking. This the basis of Trendelenberg's test in examination of hip joint .
3. <b>Gluteus minimus.</b>	• Gluteal surface of ilium between middle & inferior gluteal lines .	• Anterior surface of the greater trochanter.	
4. <b>Tensor fascia lata</b>	• Outer lip of the iliac crest between the ASIS and tubercle of iliac crest .	• Anterior border of the ilio-tibial tract	<ul style="list-style-type: none"> <li>• Tightens the ilio-tibial tract.</li> <li>• keeping the knee extended through its insertion in the ilio-tibial tract.</li> <li>• Weak abductor and medial rotator of the thigh .</li> </ul>

★ **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.







**Gluteus Medius**  
(under fascia)

**Gluteus Maximus**

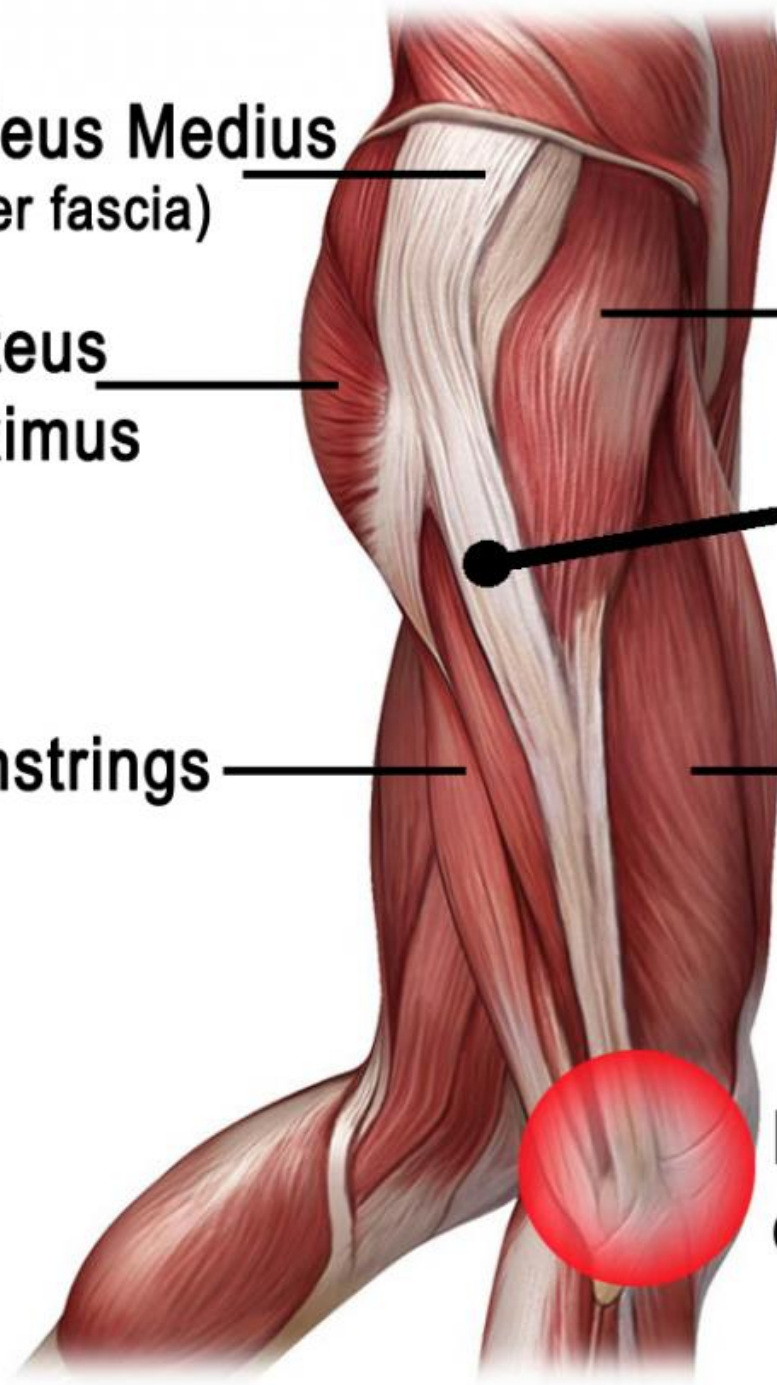
**Hamstrings**

**Tensor Fasciae Latae**

**Iliotibial Band (ITB)**

**Quadriceps**

**Localised pain on outer knee**

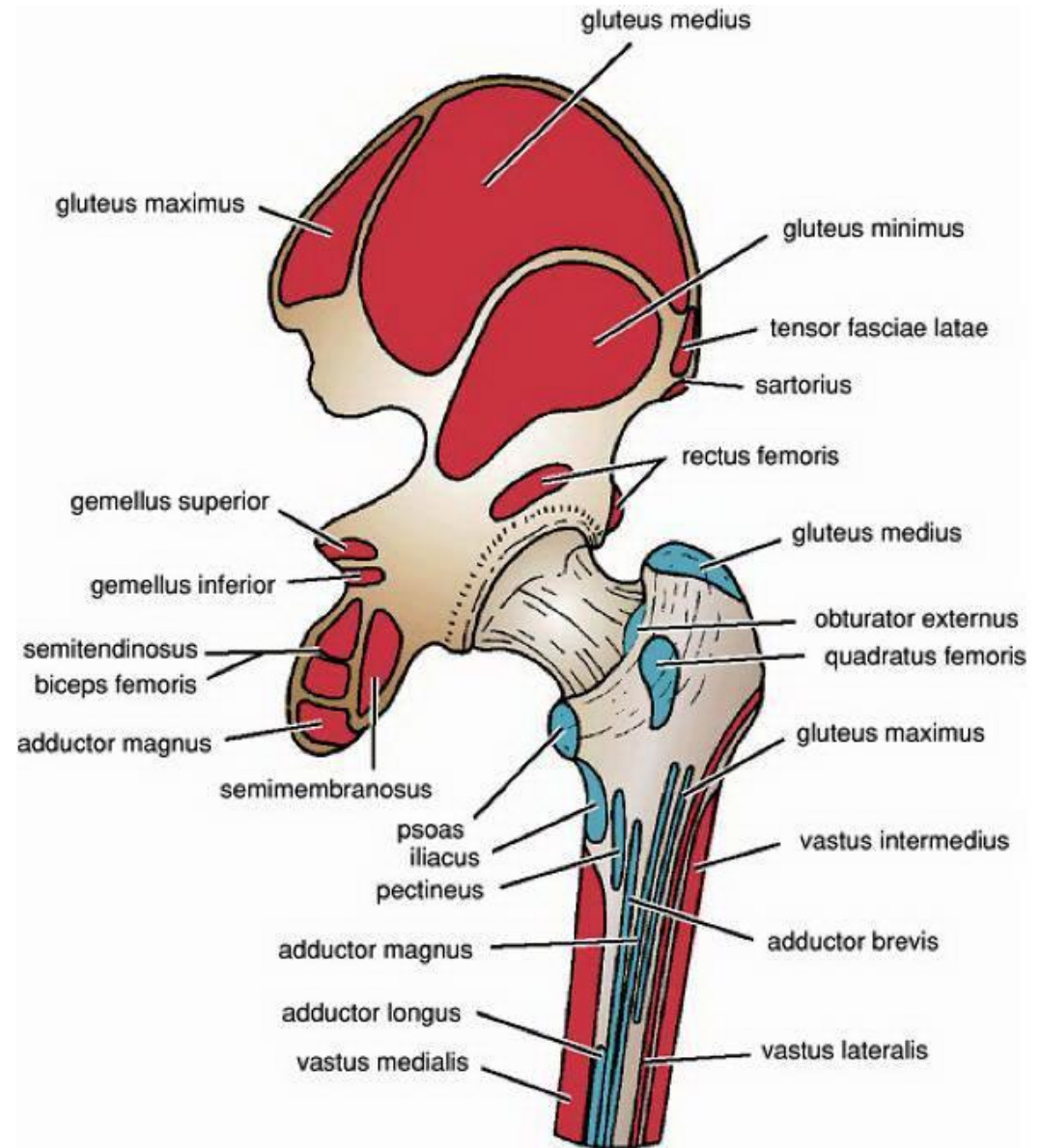
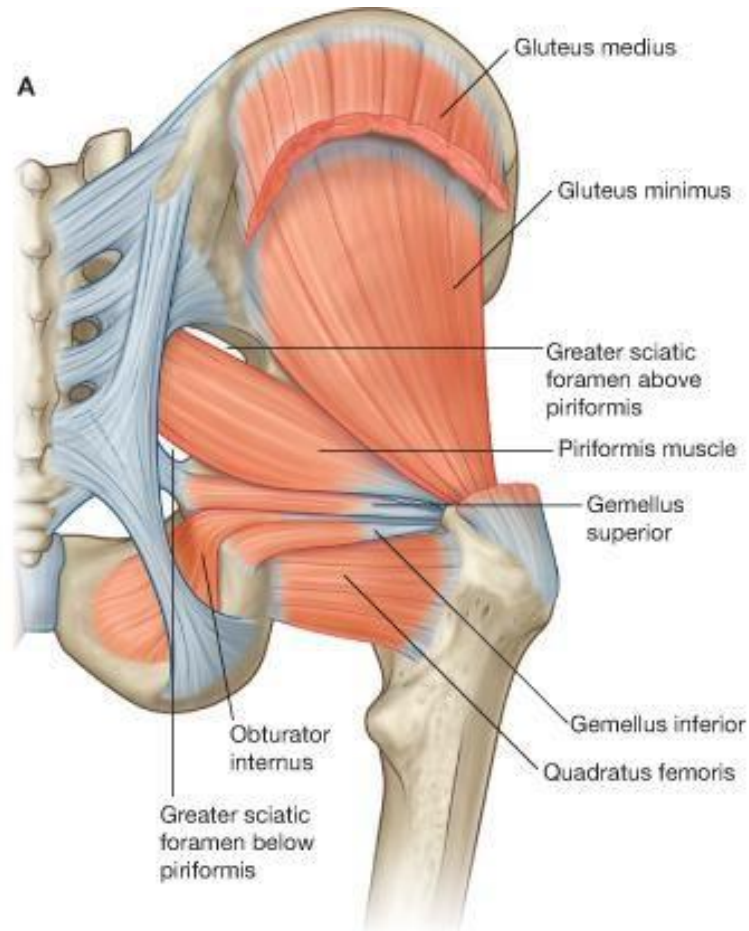


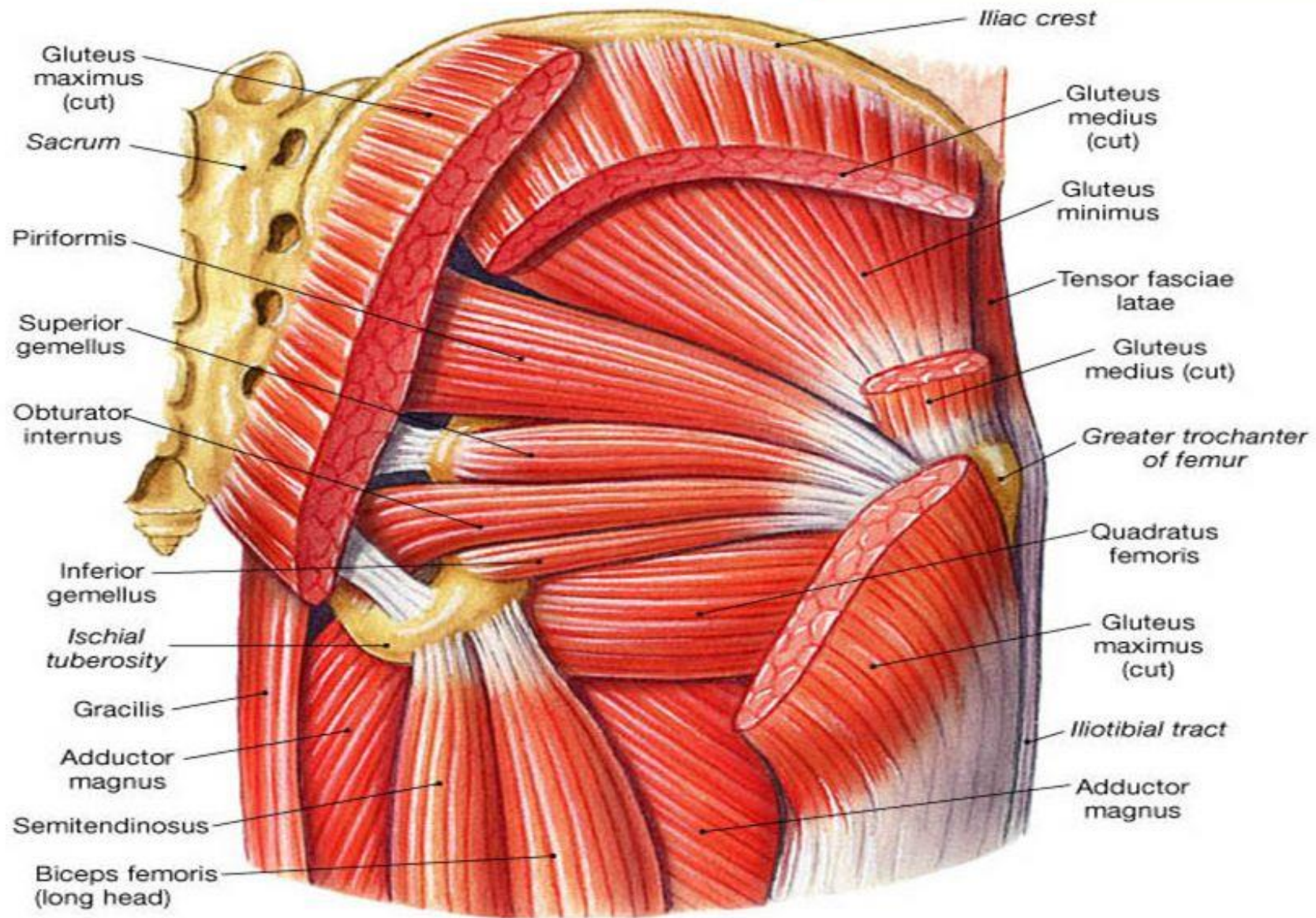
## II. 6 Lateral Rotators

\* 6 Lateral rotators include the following muscles:

1. Piriformis: Arises in the pelvis & passes in the greater sciatic foramen above the sciatic nerve.
2. Obturator internus: Arises from the lateral pelvic wall & passes in the lesser sciatic foramen.
3. Superior & inferior gemellus above & below tendon of Obturator internus .
4. Quadratus femoris.
5. Obturator externus.

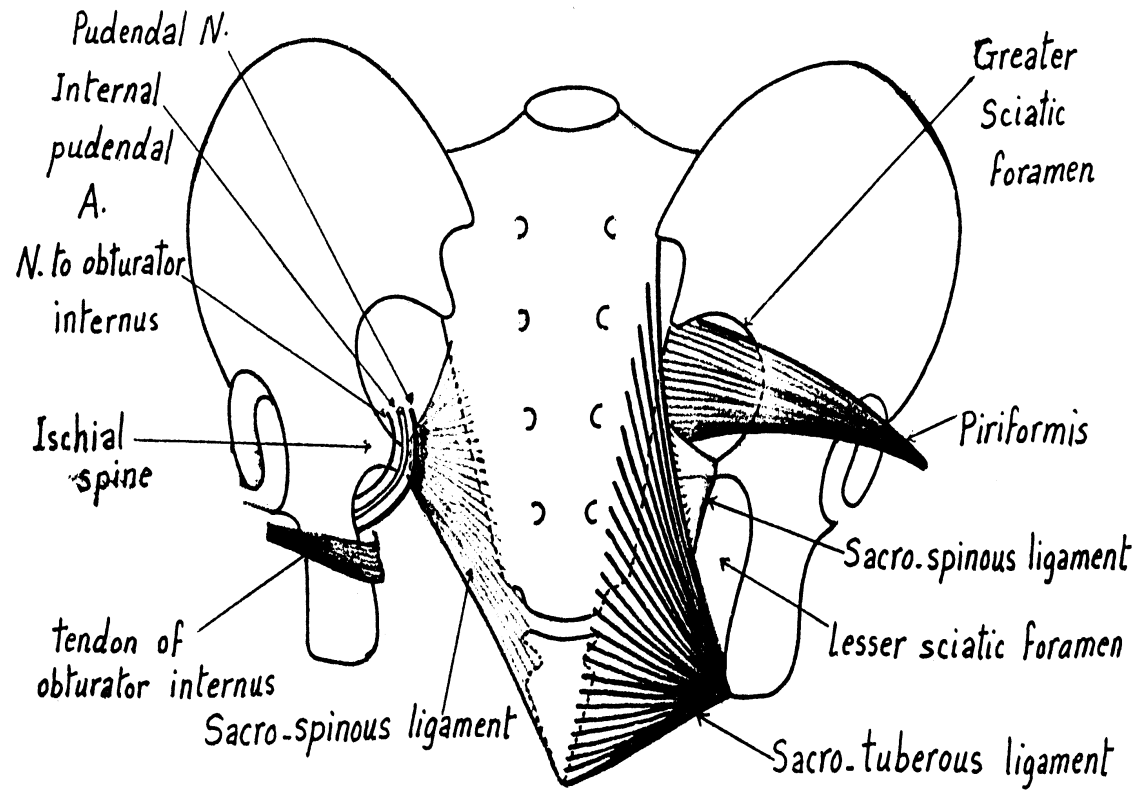
\* Common action : lateral rotation of the thigh .



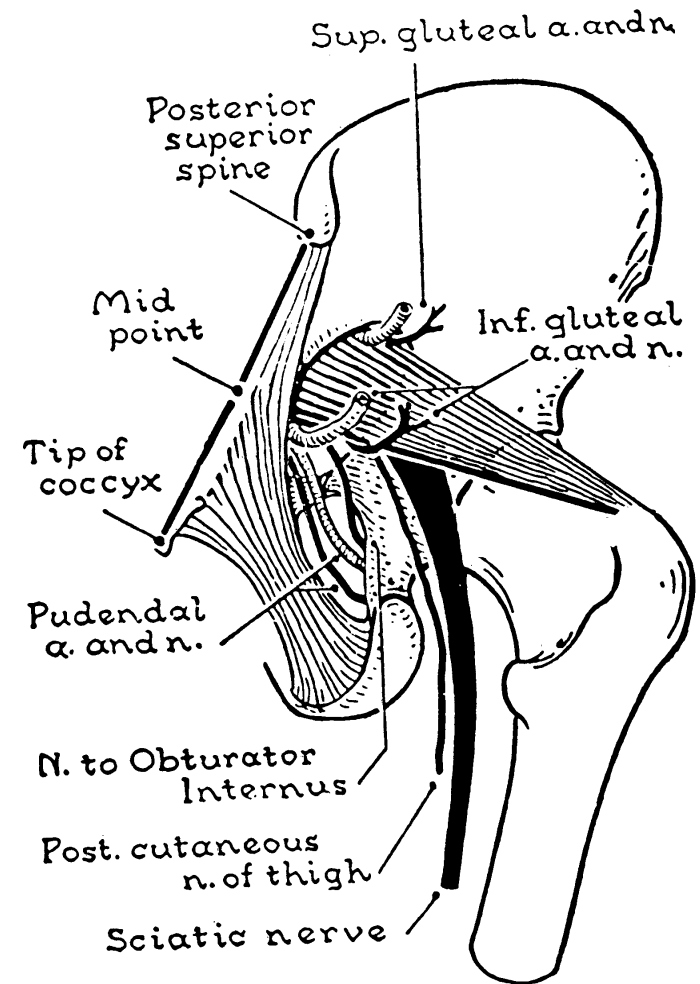


(a) Posterior view, deep muscles





*Ligaments and foramina of gluteal region.*

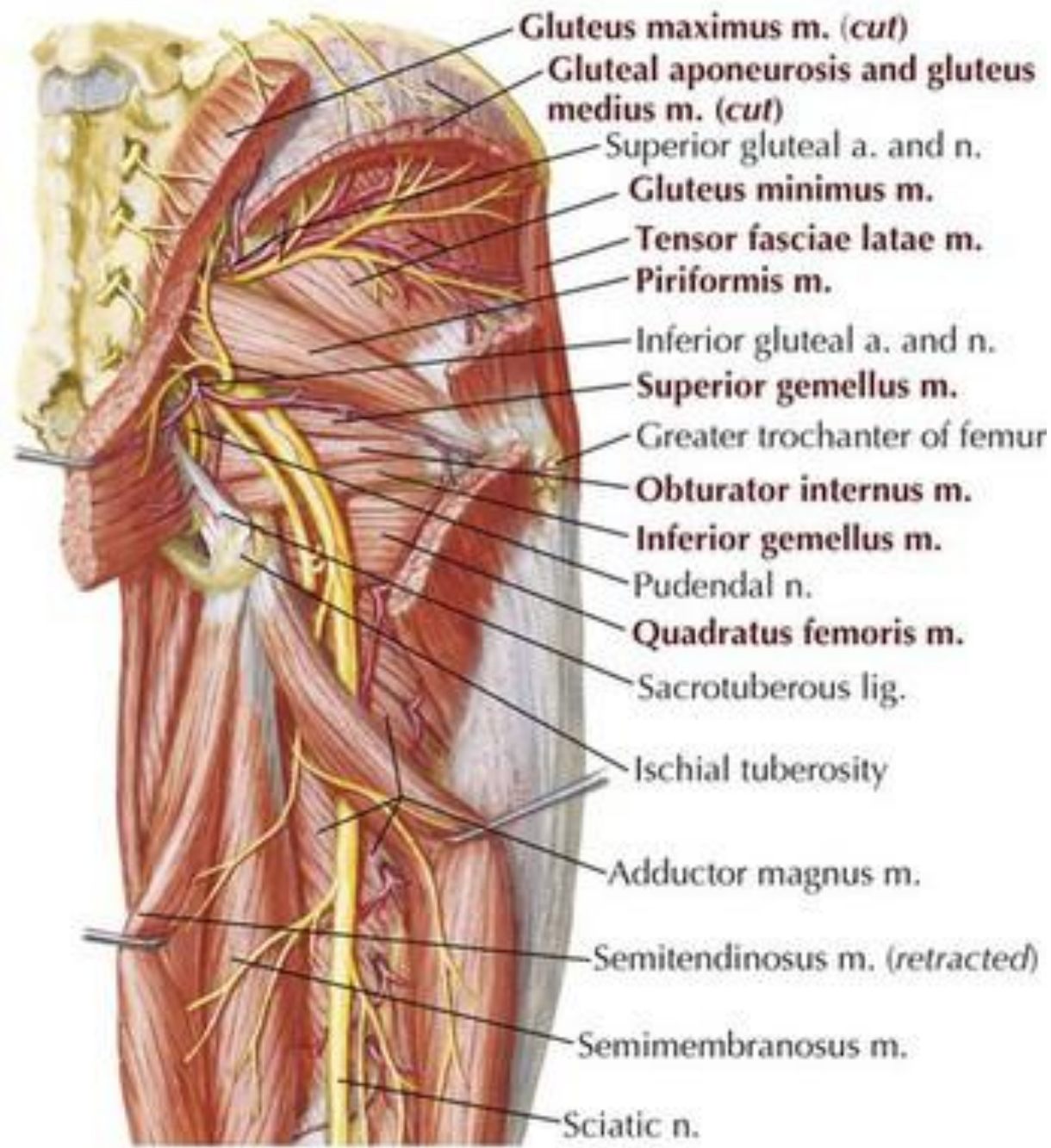


*Structures passing through the sciatic foramina  
(deep to the gluteus maximus)*

## Superficial dissection

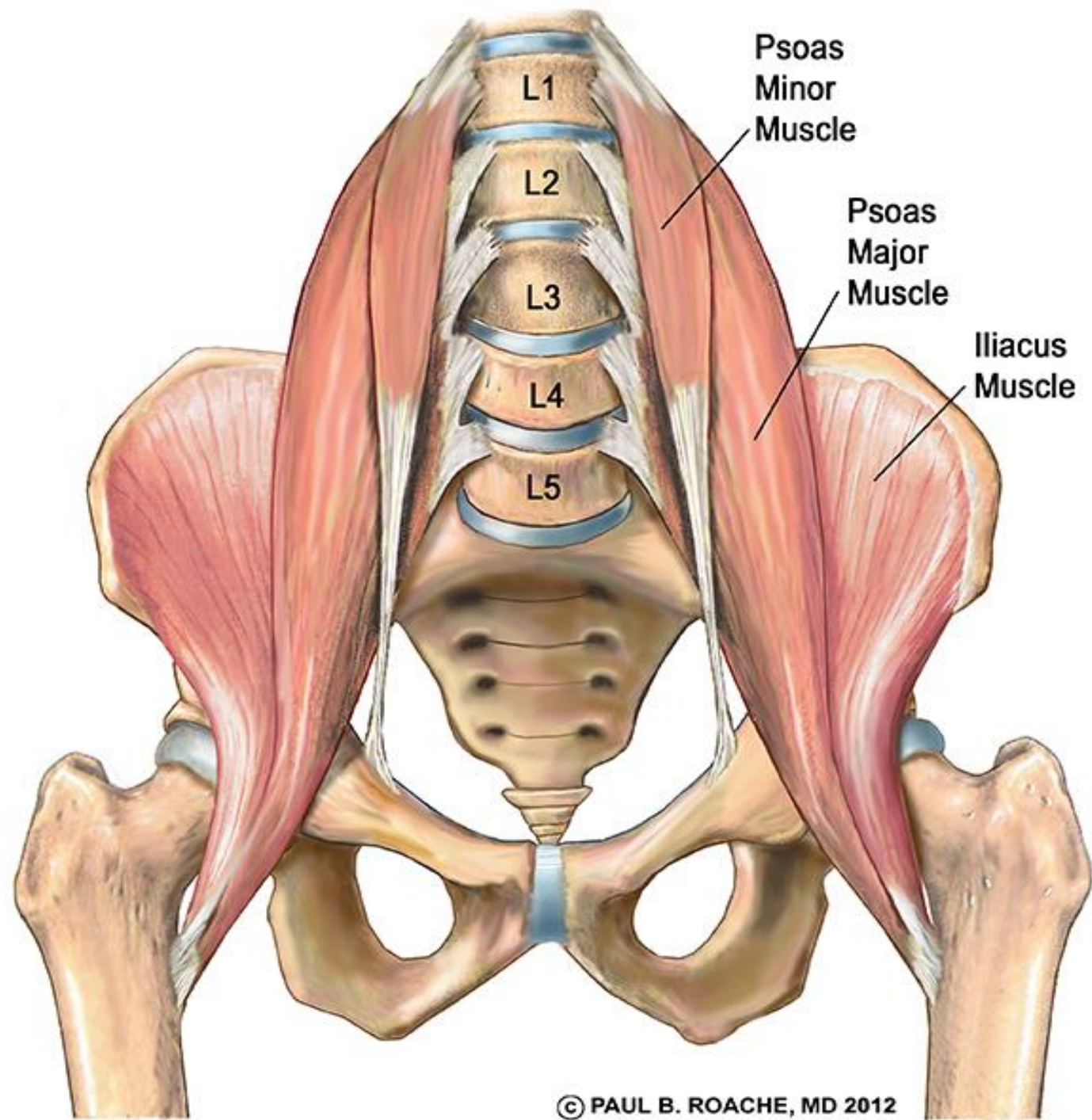


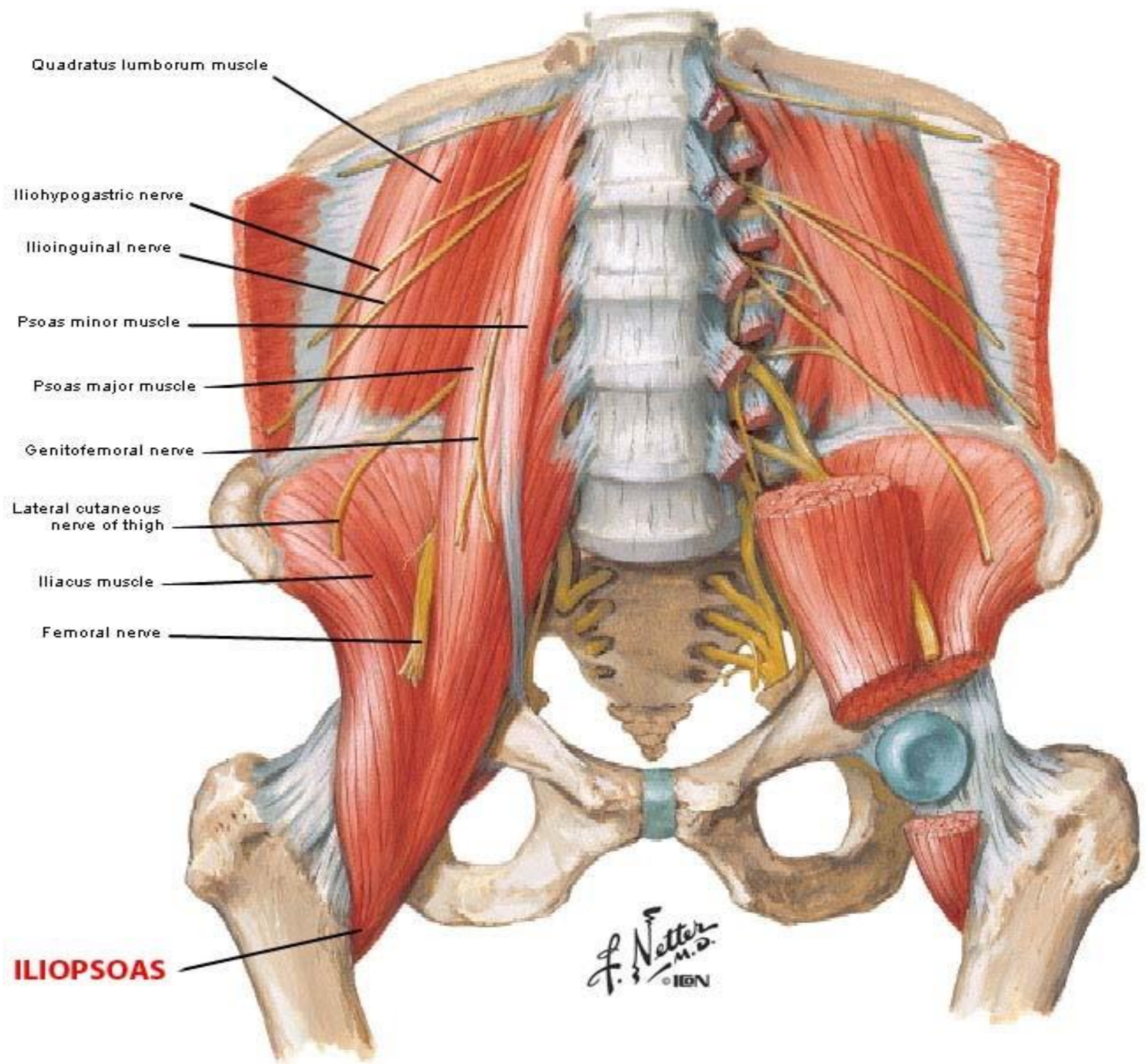
## Deep dissection



## Muscles of the iliac region

Muscle	Origin	Insertion	Nerve supply	Action
1- Psoas major :	<ul style="list-style-type: none"> <li>• Sides of body &amp; front of transverse processes of T12- L5 vertebrae</li> </ul>	<ul style="list-style-type: none"> <li>• Both muscles form the iliopsoas tendon which is inserted into the lesser trochanter of femur</li> </ul>	<ul style="list-style-type: none"> <li>• L 2,3&amp;4</li> </ul>	<ol style="list-style-type: none"> <li>1. Main flexor of the hip .</li> <li>2. Medial rotation of thigh.</li> <li>3. Contraction of both side produce flexion of vertebral column.</li> <li>4. Contraction of one side produce lateral flexion of vertebral column.</li> </ol>
2- Iliacus :	<ul style="list-style-type: none"> <li>• Iliac fossa .</li> </ul>		<ul style="list-style-type: none"> <li>• Femoral nerve</li> </ul>	





Quadratus lumborum muscle

Iliohypogastric nerve

Ilioinguinal nerve

Psoas minor muscle

Psoas major muscle

Genitofemoral nerve

Lateral cutaneous  
nerve of thigh

Iliacus muscle

Femoral nerve

**ILIOPSOAS**

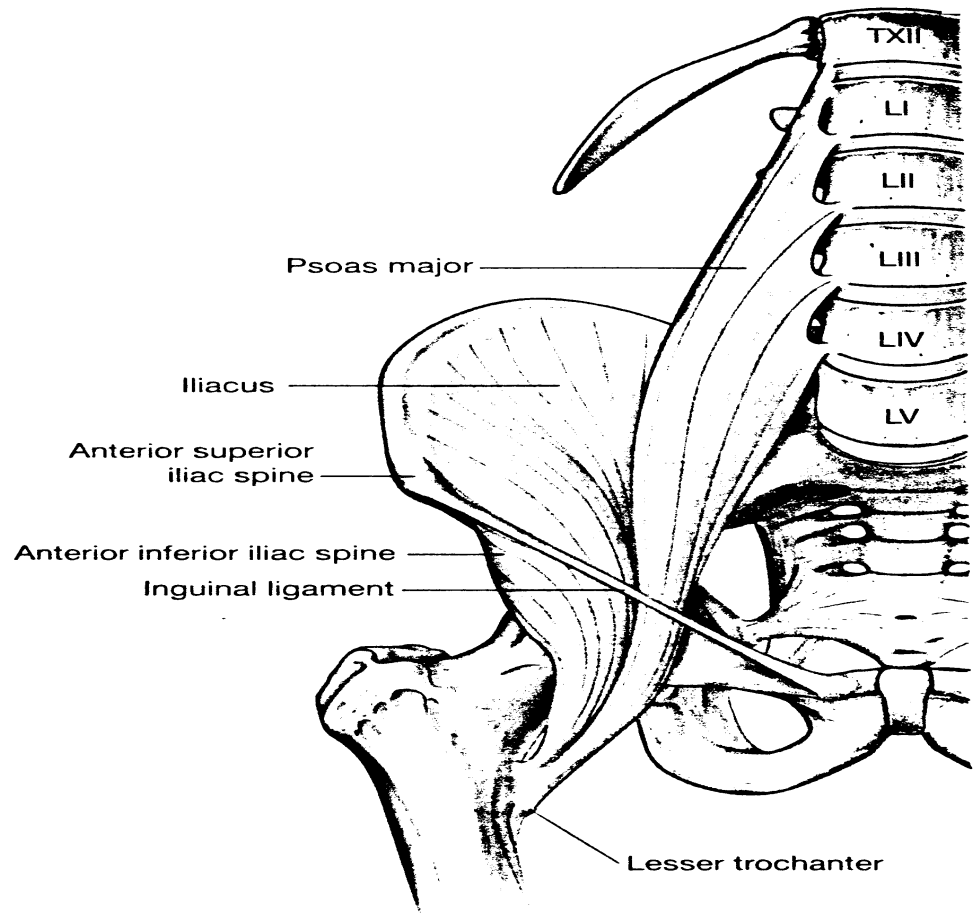
*F. Netter*  
M.D.  
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### III. Muscle of Thigh

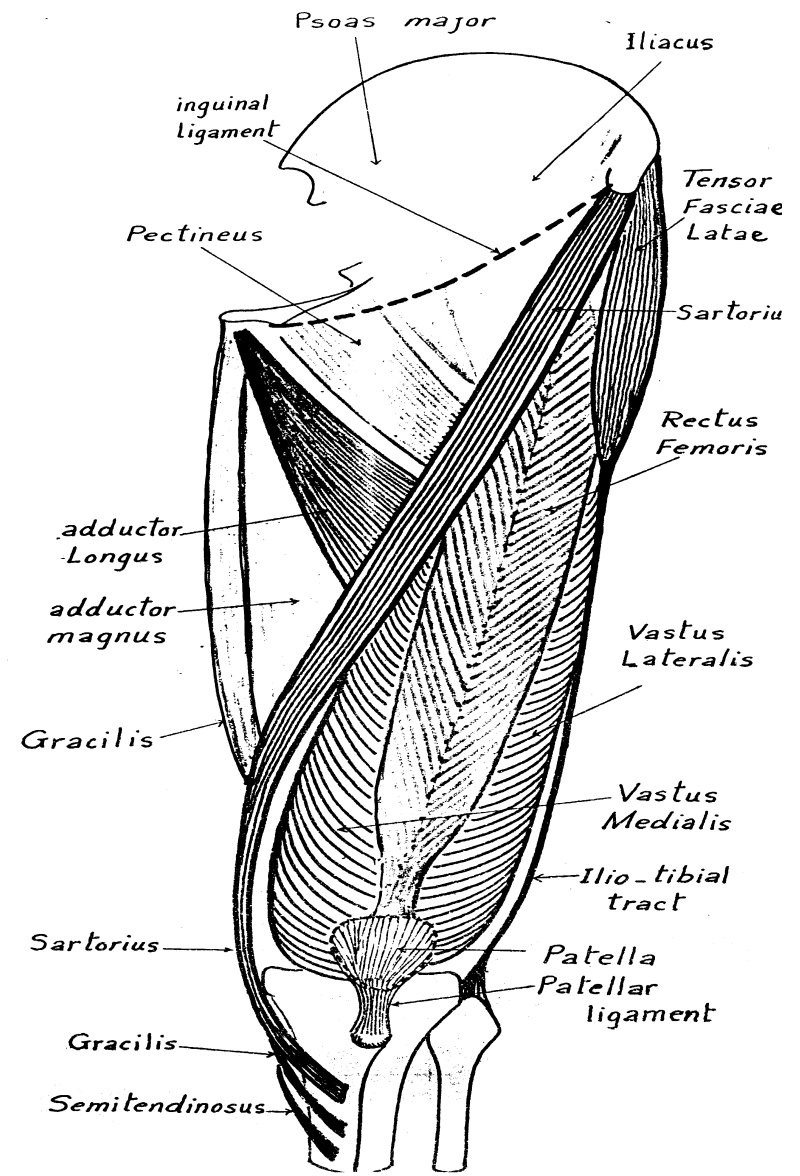
#### A. Muscles of front of the thigh (Extensors)

- All muscles are supplied by femoral nerve .

Muscle	Origin	Insertion	Main Action
<b>1.Sartorius</b> ( but LL in Sartorius position )	• A.S.I.S	<ul style="list-style-type: none"> <li>• Upper part of med. surface of tibia (S.G.S)</li> <li>• It is the <b>longest muscle</b> in the body .</li> </ul>	<ul style="list-style-type: none"> <li>• Flexion , abduction &amp; lateral rotation of hip .</li> <li>• Flexion &amp; medial rotation of knee.</li> </ul>
<b>2.Quadriceps femoris</b>	a)Rectus femoris:-by 2 heads <ul style="list-style-type: none"> <li>• Straight head : from A.I.I.S.</li> <li>• Reflected head : from above the acetabulum .</li> </ul> b)Vastus lateralis:Upper part of inter-trochanteric line, root of greater trochanter, lateral to gluteal tuberosity, upper ½ of lateral lip of linea aspera. c)Vastus medialis: lower part of inter-trochanteric line , spiral line, linea aspera, upper ½ of medial supracondylar ridge. d)Vastus intermedius :anterior & lateral surface of shaft of femur.	<ul style="list-style-type: none"> <li>• By a common quadriceps tendon into the patella then it extends as ligamentum patellae ( which is inserted into tibial tuberosity ) and medial &amp; lateral patellar retinacula ( which attached to medial &amp; lateral condyles of tibia.</li> </ul>	<ul style="list-style-type: none"> <li>• The only extensor of the knee .</li> <li>• In addition the rectus femoris flexes the hip.</li> </ul>

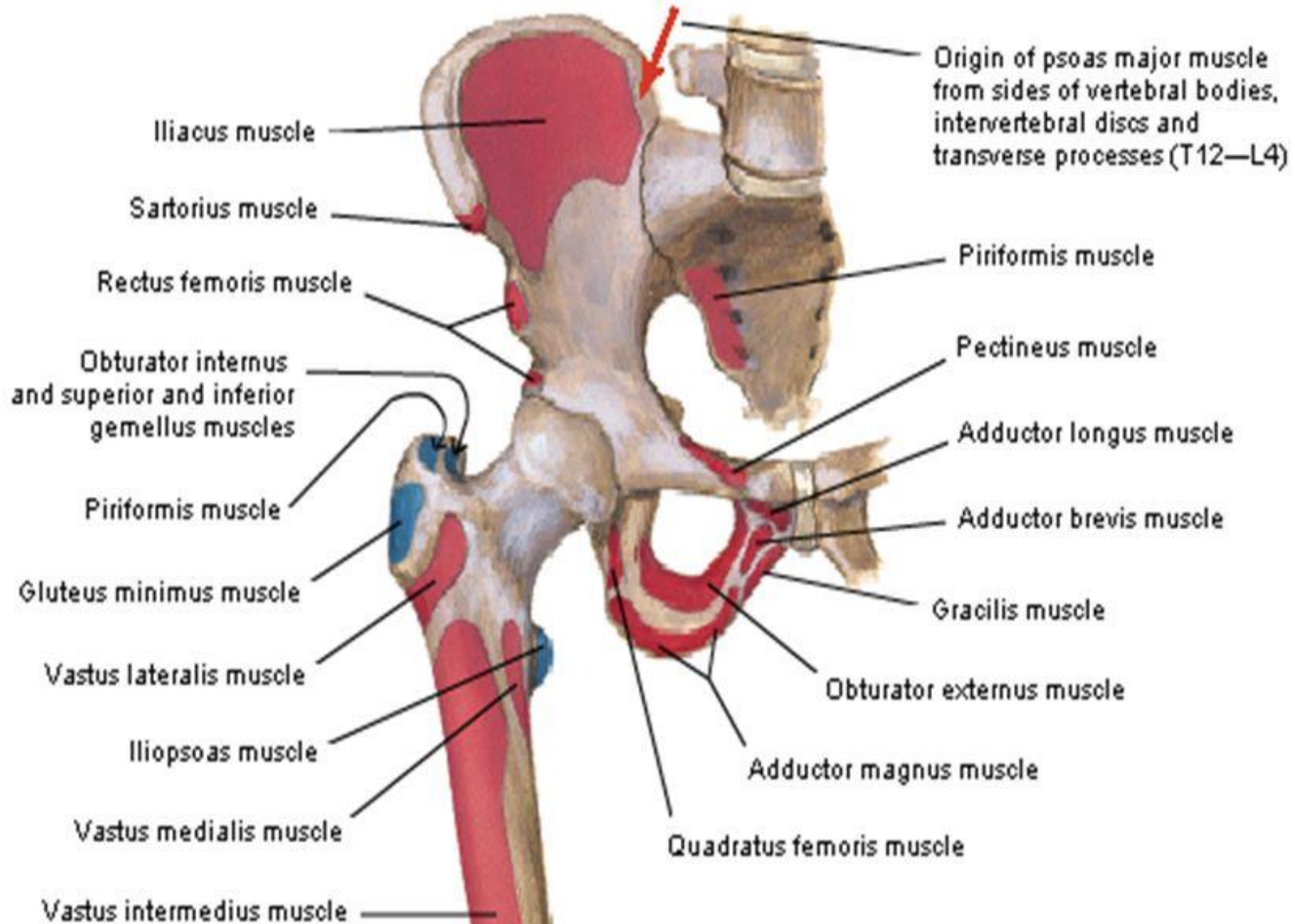


*Psoas major and iliacus muscles.*

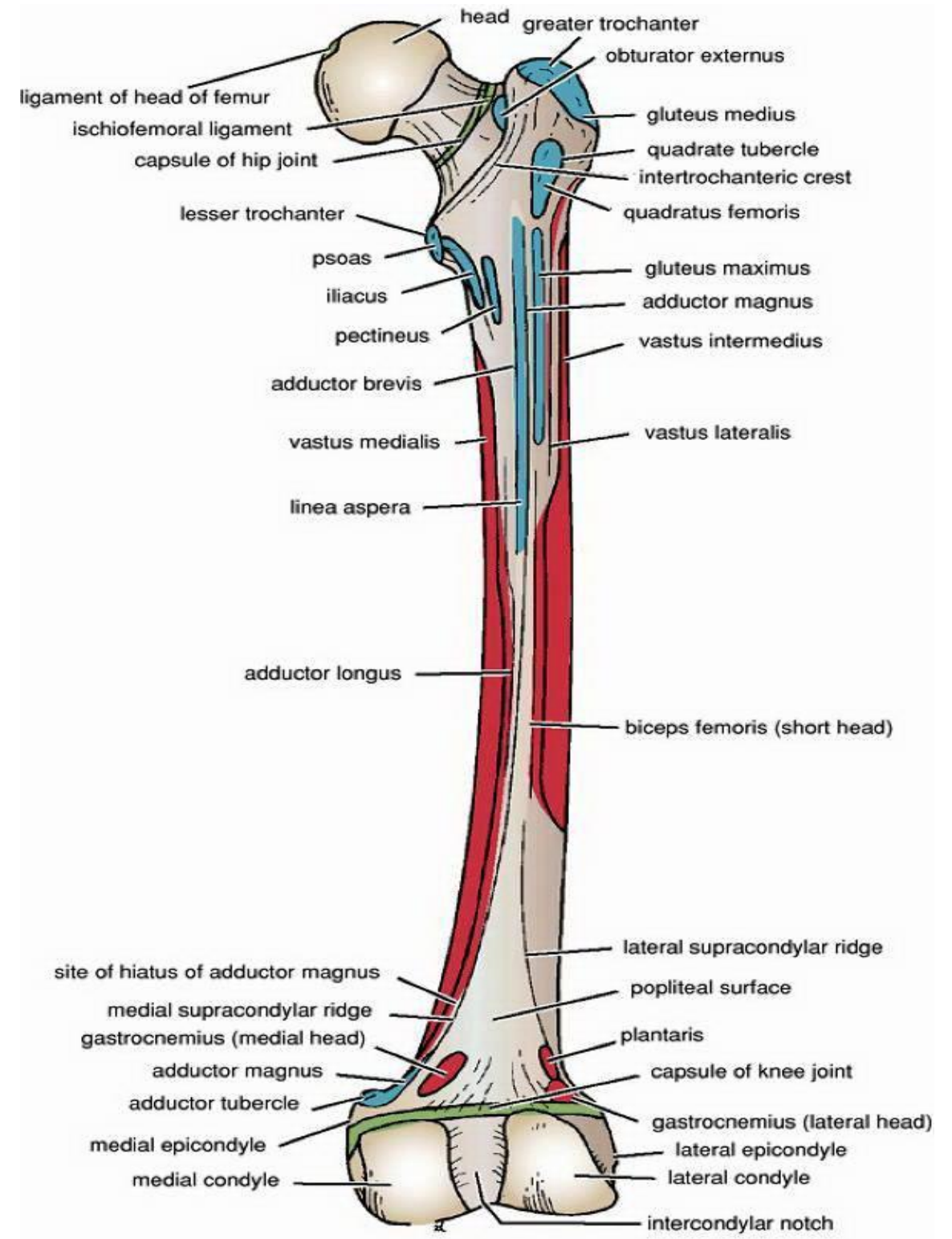
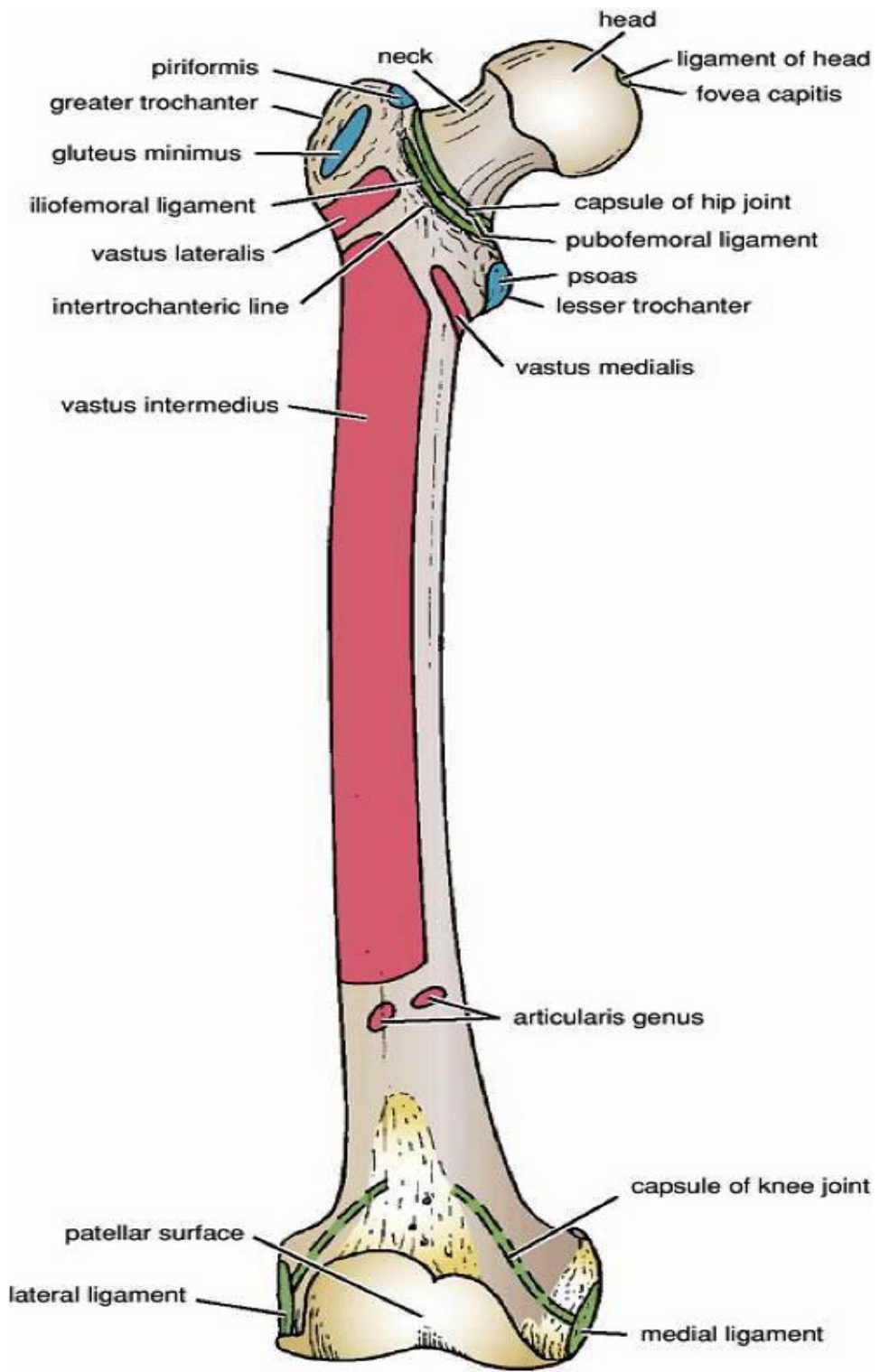




# HIP & THIGH MUSCLES ATTACHMENT (ANTERIOR VIEW)







m. tensor fasciae latae

m. iliopsoas

m. pectineus

m. adductor longus

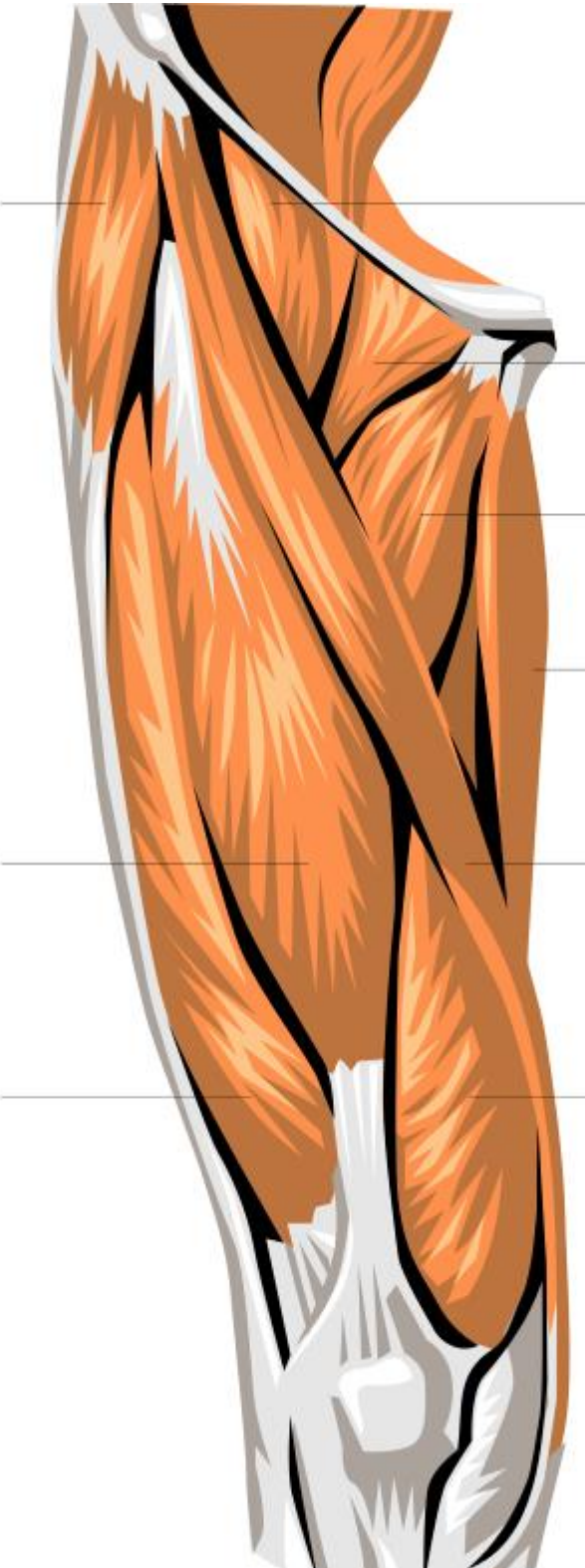
m. gracilis

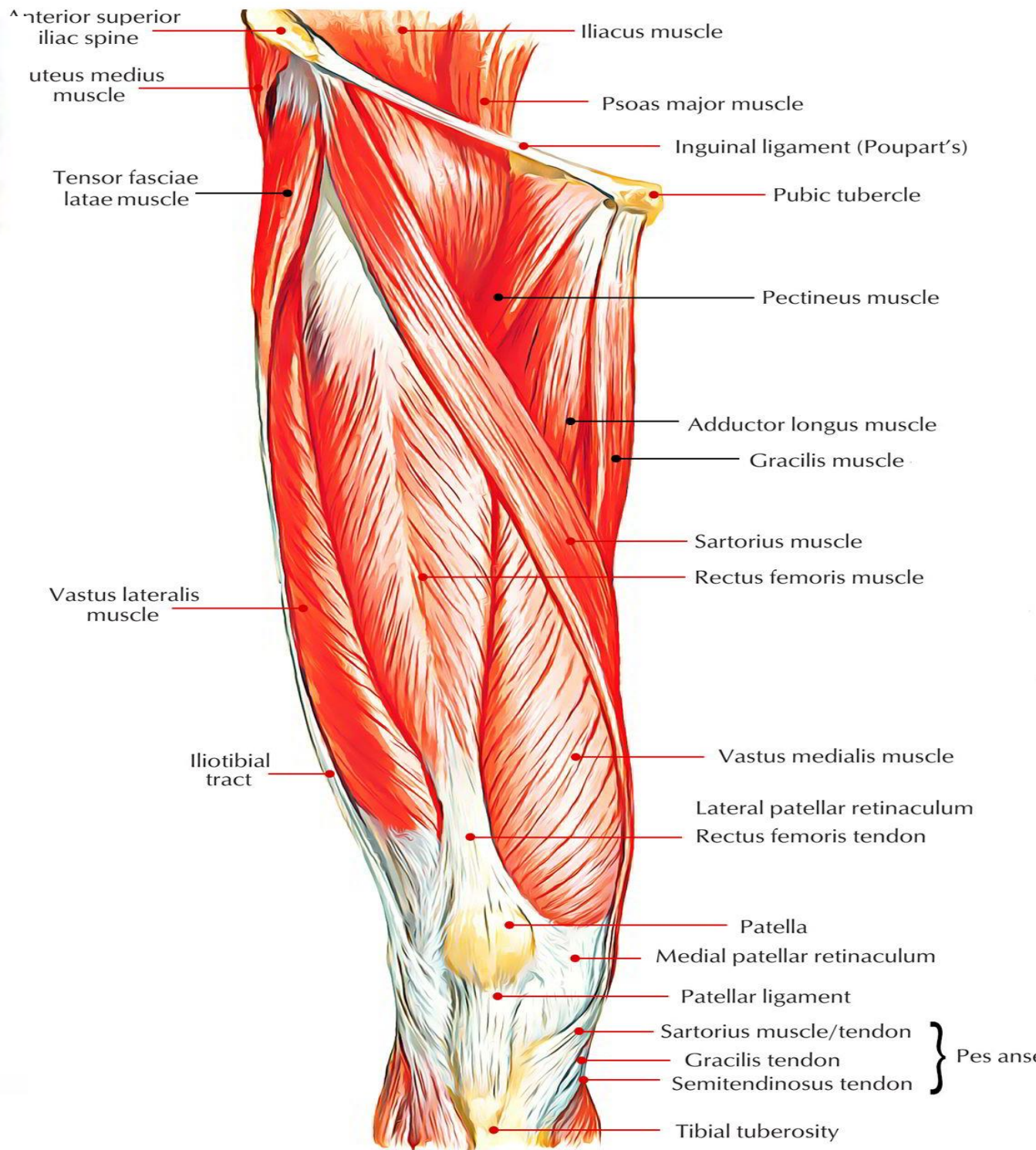
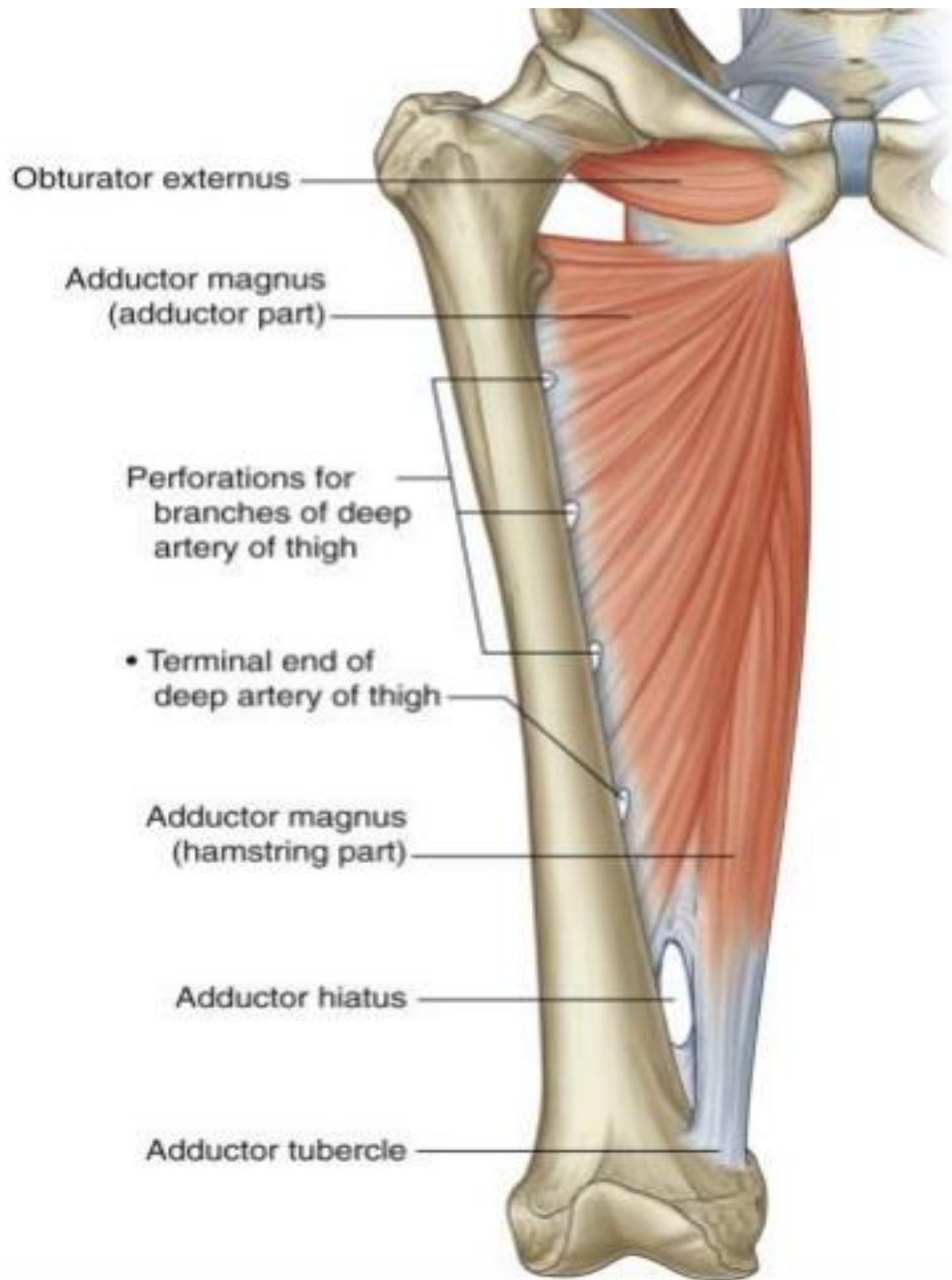
m. rectus femoris

m. sartorius

m. vastus lateralis

m. vastus medialis



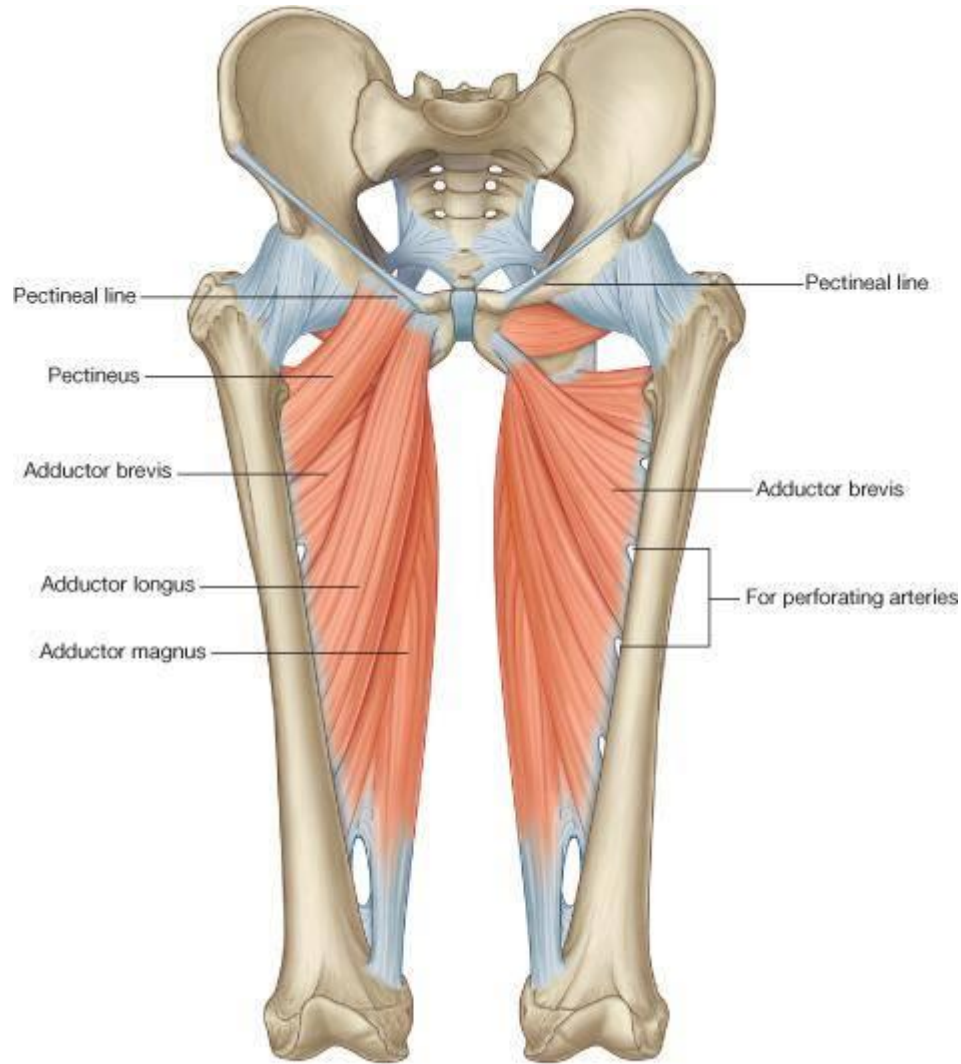


## B. Muscles of the Medial Aspect of thigh (Adductors)

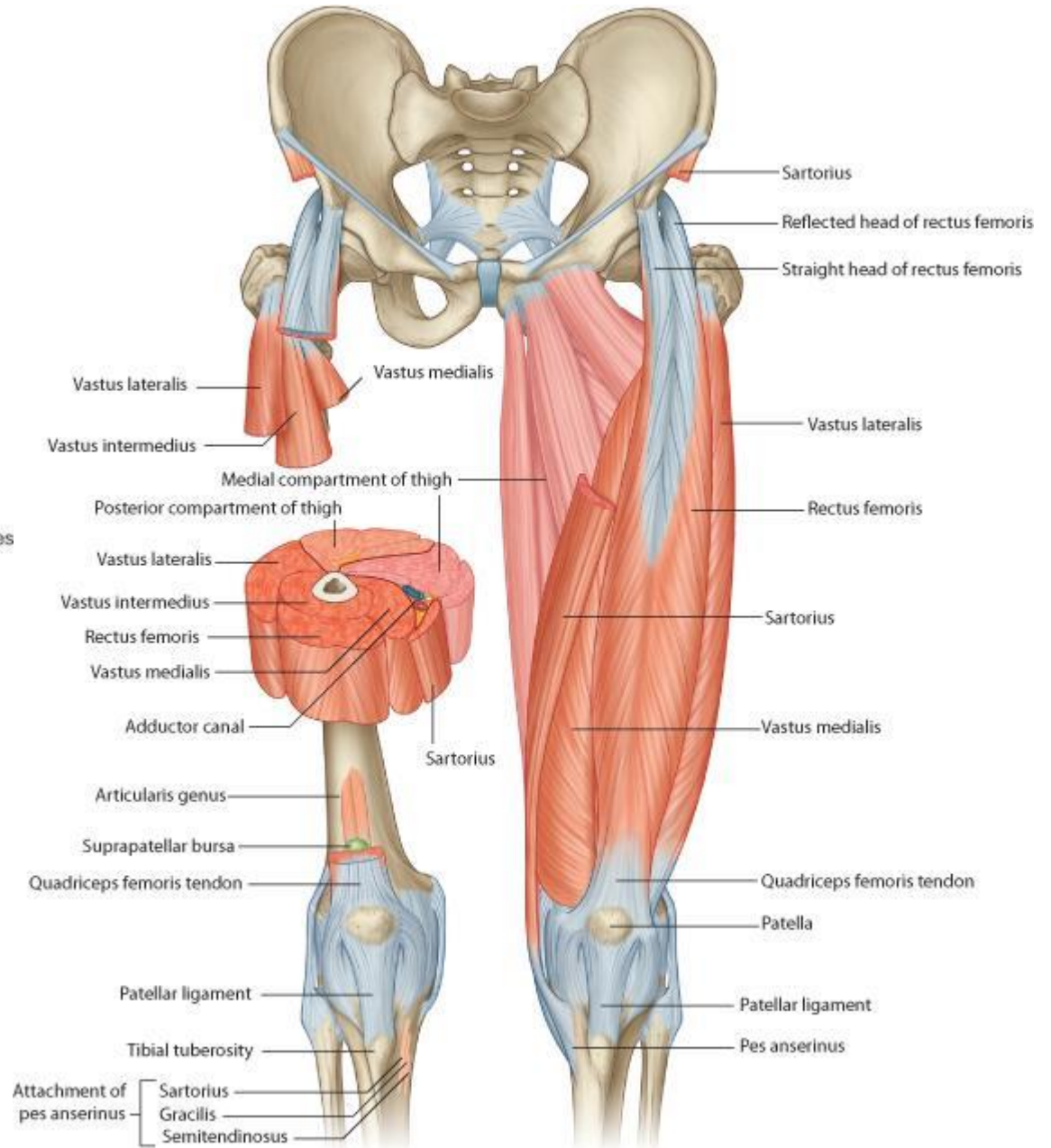
- All muscles are supplied by obturator nerve except the Pectineus ( supplied by Femoral nerve ) & ischeal part of Adductor magnus (supplied by Sciatic nerve ).
- Common origin : Body of pubic bone & inferior pubic ramus ( except pectineus & adductor magnus ).
- Common action : Adduction of hip joint .

Muscle	Origin	Insertion	Main Action
1- Gracilis	• Body of pubic bone & inferior pubic ramus	• S.G.S behind the sartorius	• Adduction of thigh . • Flexion & medial rotation of leg.
2- Pectineus	• Pectineal line & surface of superior pubic ramus.	• Pectineal line of femur	• Flexion & adduction of hip joint .
3- Adductor Longus	• Body of pubic bone just below the pubic tubercle.	• Linea aspera	• Adduction of thigh. • Its tendon is a landmark for pubic tubercle.
4- Adductor brevis	• Body of pubic bone & inferior pubic ramus.	• Linea aspera	• Adduction of thigh
5- Adductor magnus	a) Pubic part: conjoint ramus b) Ischeal part: from 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. *Adductor hiatus lies between the 2 parts ( end of femoral artery ).	a) Pubic part: adduction of thigh b) Ischeal part: Extend the hip .

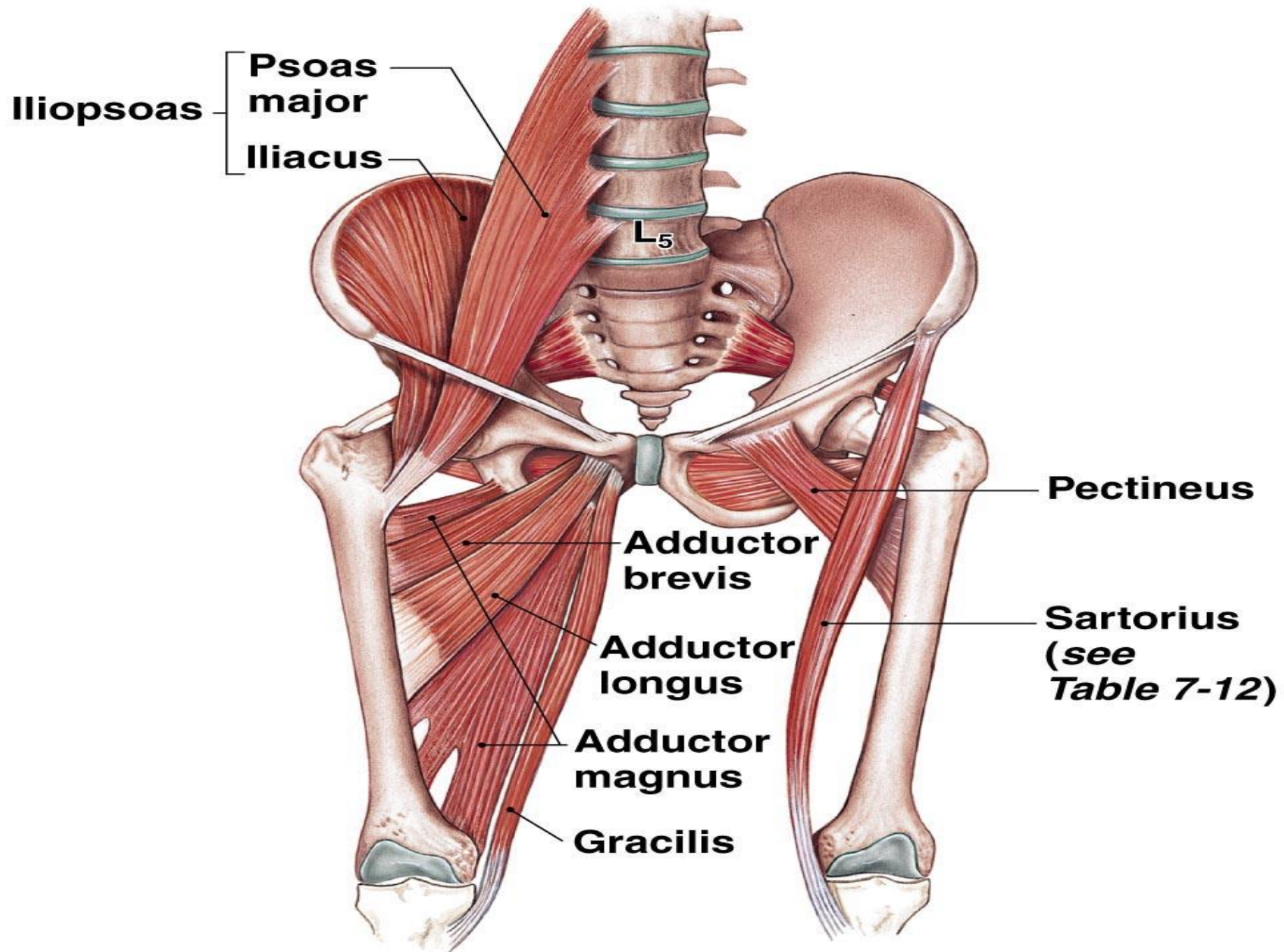
- ★ Gracilis form with shaft of femur a letter V in which other adductors are arranged in 3 layers:
- The first layer: pectineus and adductor longus.
  - The second layer: adductor brevis.
  - The third layer: adductor magnus.



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**(c) The iliopsoas muscle and the adductor group**

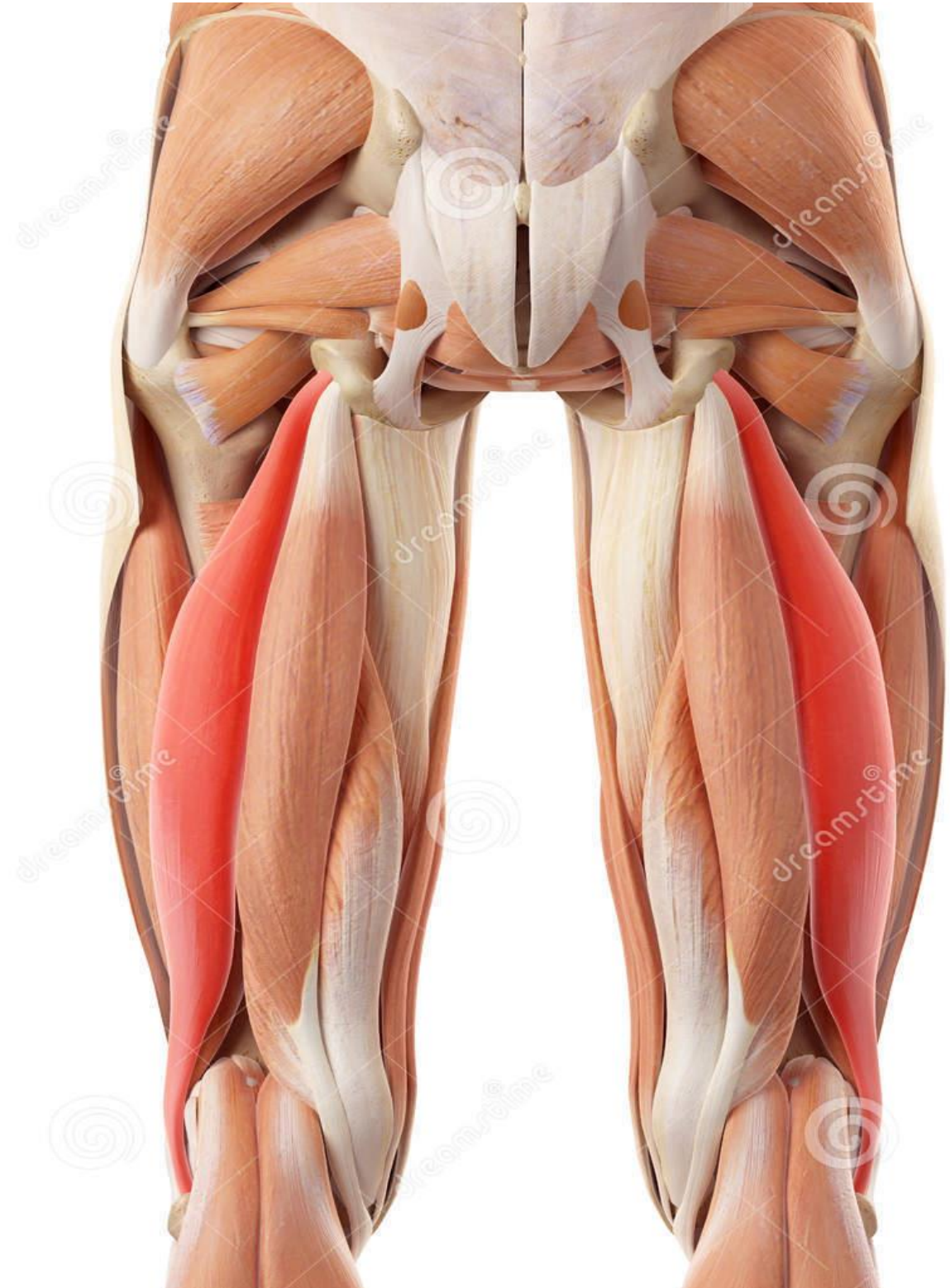
### C. Muscles of Back of Thigh (Flexors) ( Hamstring Muscles )

- **Common origin** : ischeal tuberosity except short head of biceps which originate from linea aspera .
- **All these muscles are supplied by sciatic nerve .**
- **Common action:** Extension of hip ( as all muscles originate from ischeal tuberosity ) and flexion of knee ( main action ) .
- **From lateral to medial they are:**

Muscle	Origin	Insertion	Main Action
<b>1- Biceps femoris</b>	a) Long head: as semitendinosus . b) Short head: Linea aspera	• Head of fibula .	• Common action + lateral rotation of leg (Locking of knee joint).
<b>2- Semitendinosus</b>	• With the long head of biceps from the lower medial part of the upper quadrangular part of ischeal tuberosity.	• S.G.S. behind sartorius & gracilis .	• Common action + medial rotation of the leg . (unlocking of knee joint).
<b>3-Semimembranosus</b>	• Upper lateral part of the upper quadrangular part of ischeal tuberosity	• Back of medial condyle of tibia, capsule of knee joint , popliteal fascia & soleal line .	• As no. 2.

**\*Important notes :**

- 1- All muscles originate from ischeal tuberosity extend the hip joint .**
- 2- Nearly all muscles originate from ischeal tuberosity are supplied by sciatic nerve .**
- 3- All muscles inserted in upper part of tibia ( SGS , Semimembranosus &Popliteus ) flex & medial rotate the leg (unlocking of knee joint).**



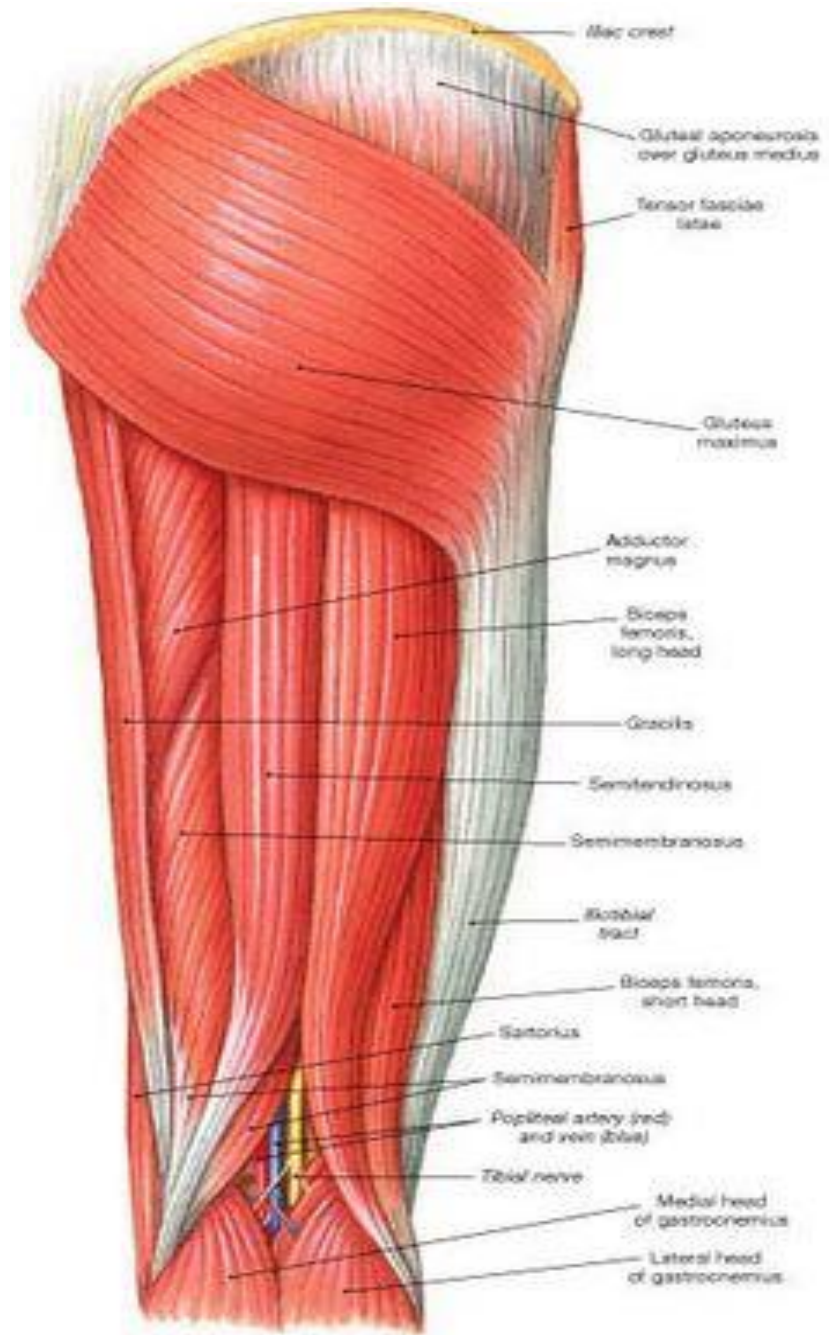
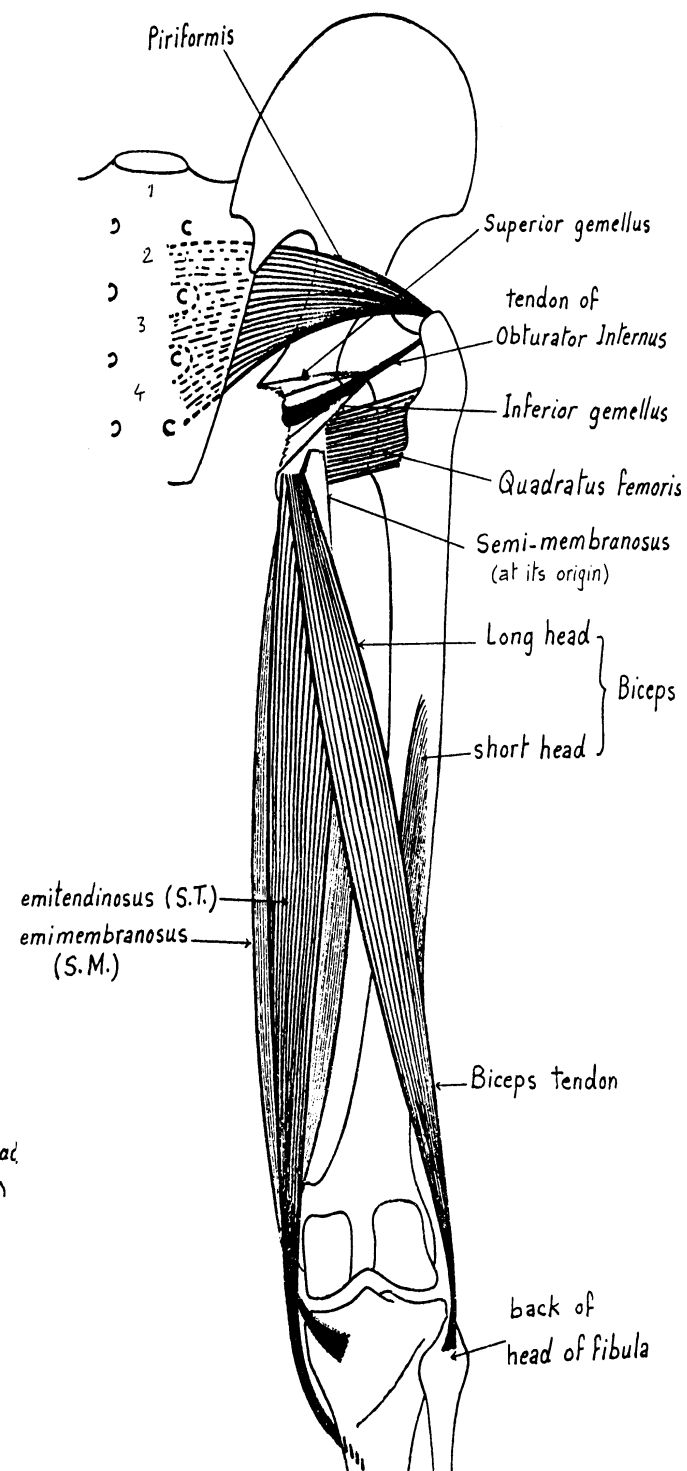
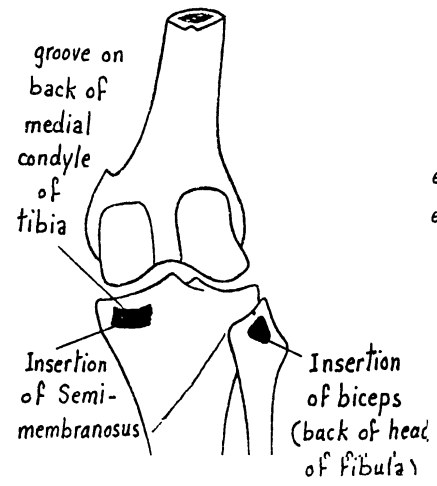
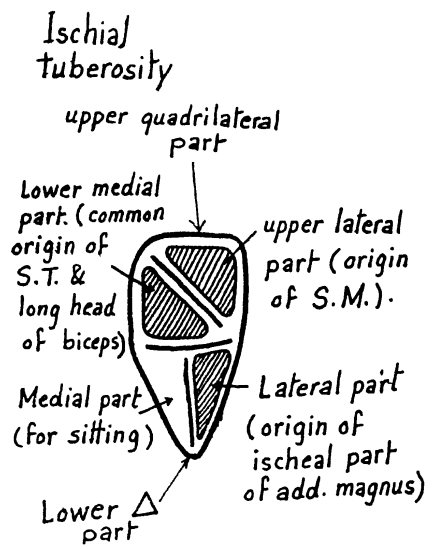
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(a) Hip and thigh, posterior view

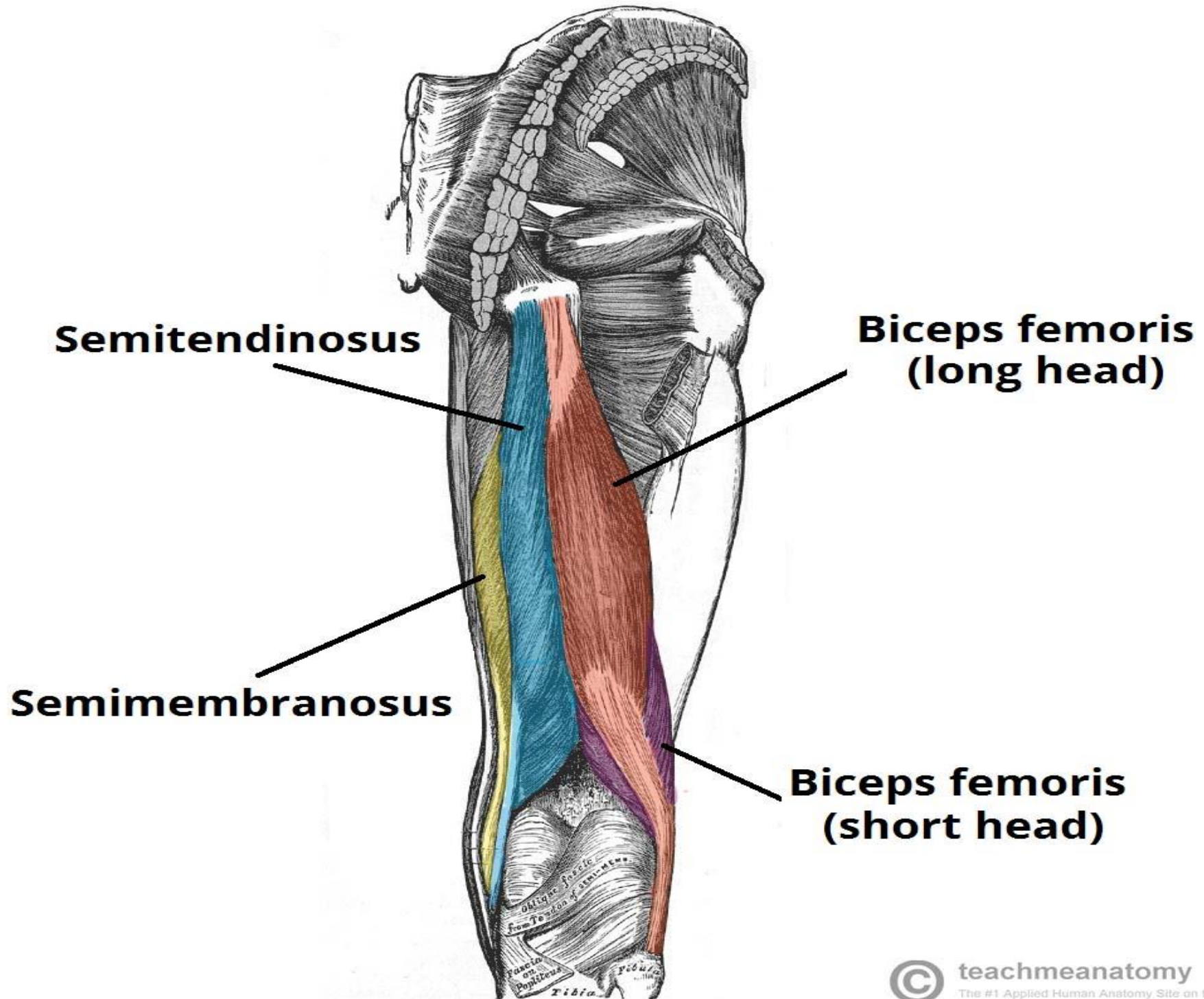
**MUSCOLI  
POSTERIORI  
DELLA COSCIA**

**BICIPITE FEMORALE**

**SEMITENDINOSO**

**SEMIMEMBRANOSO**





**Semitendinosus**

**Biceps femoris  
(long head)**

**Semimembranosus**

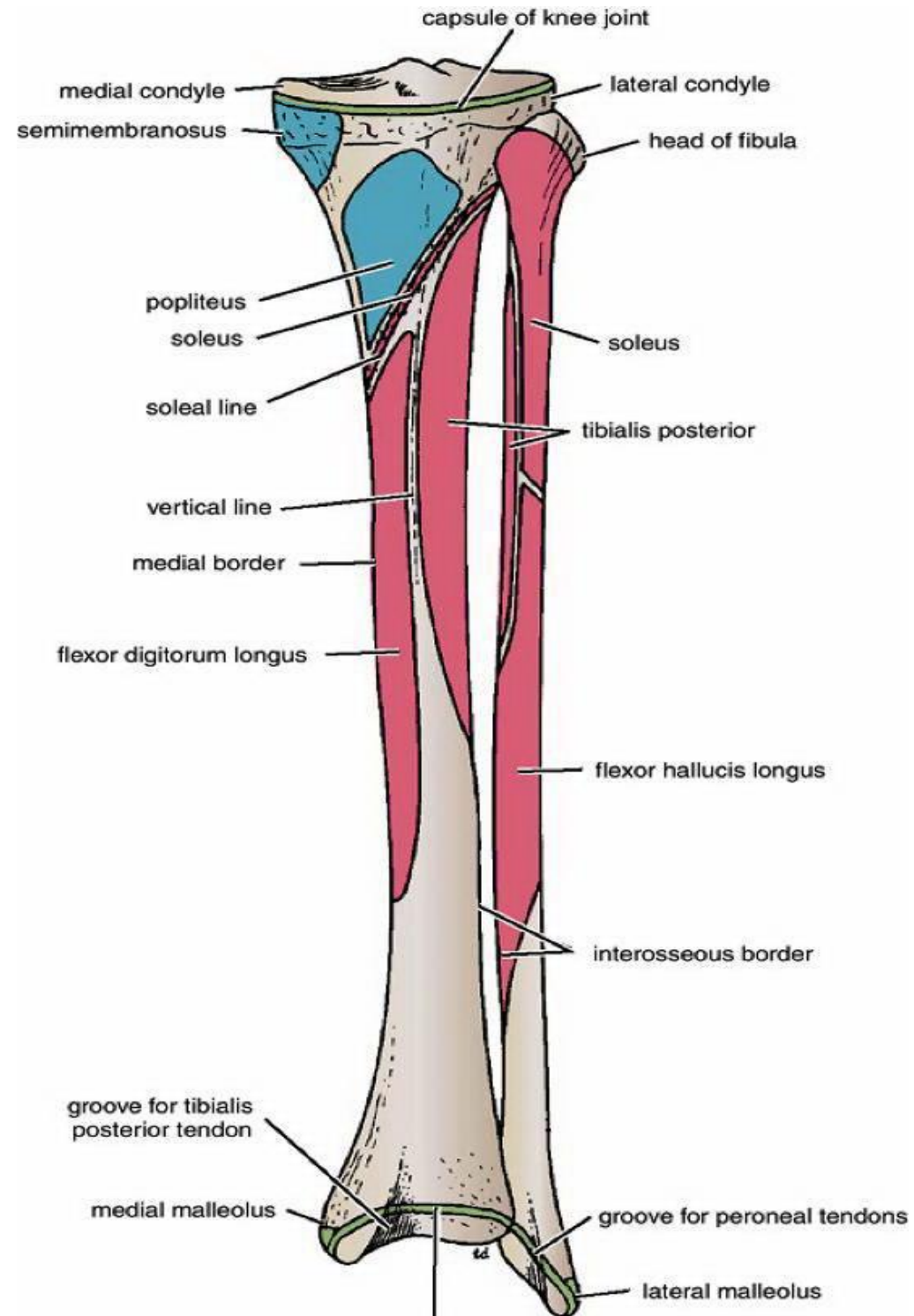
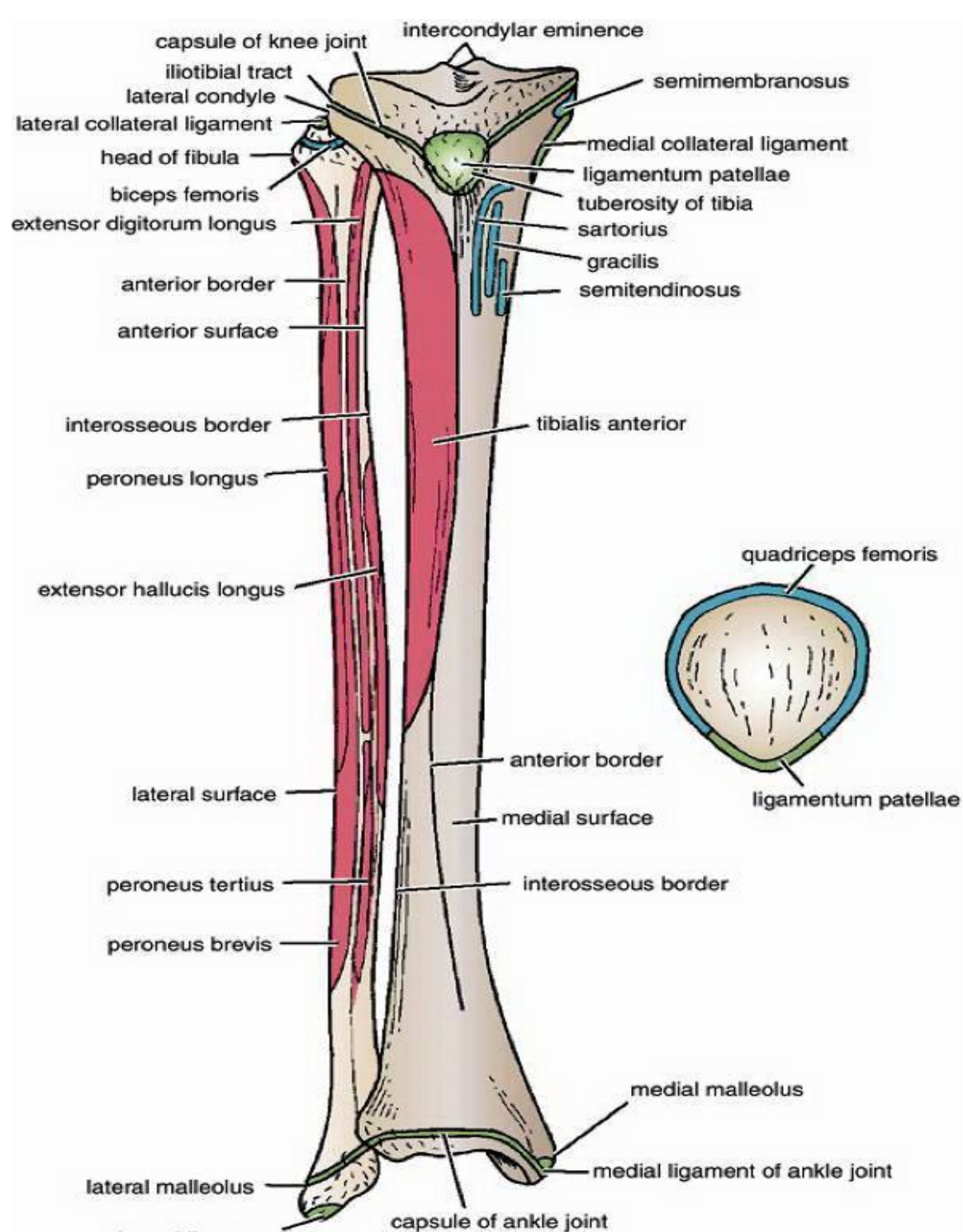
**Biceps femoris  
(short head)**

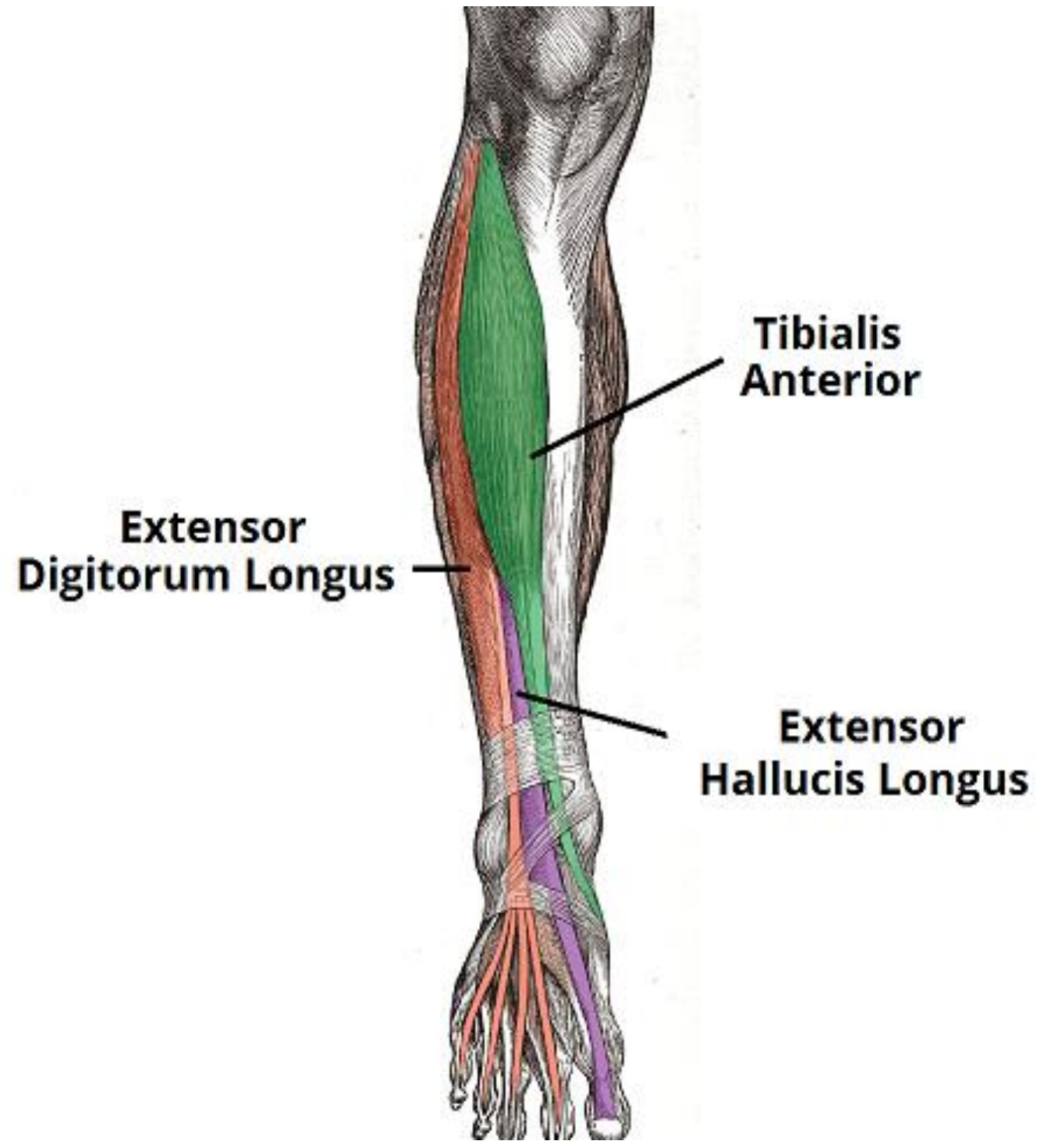
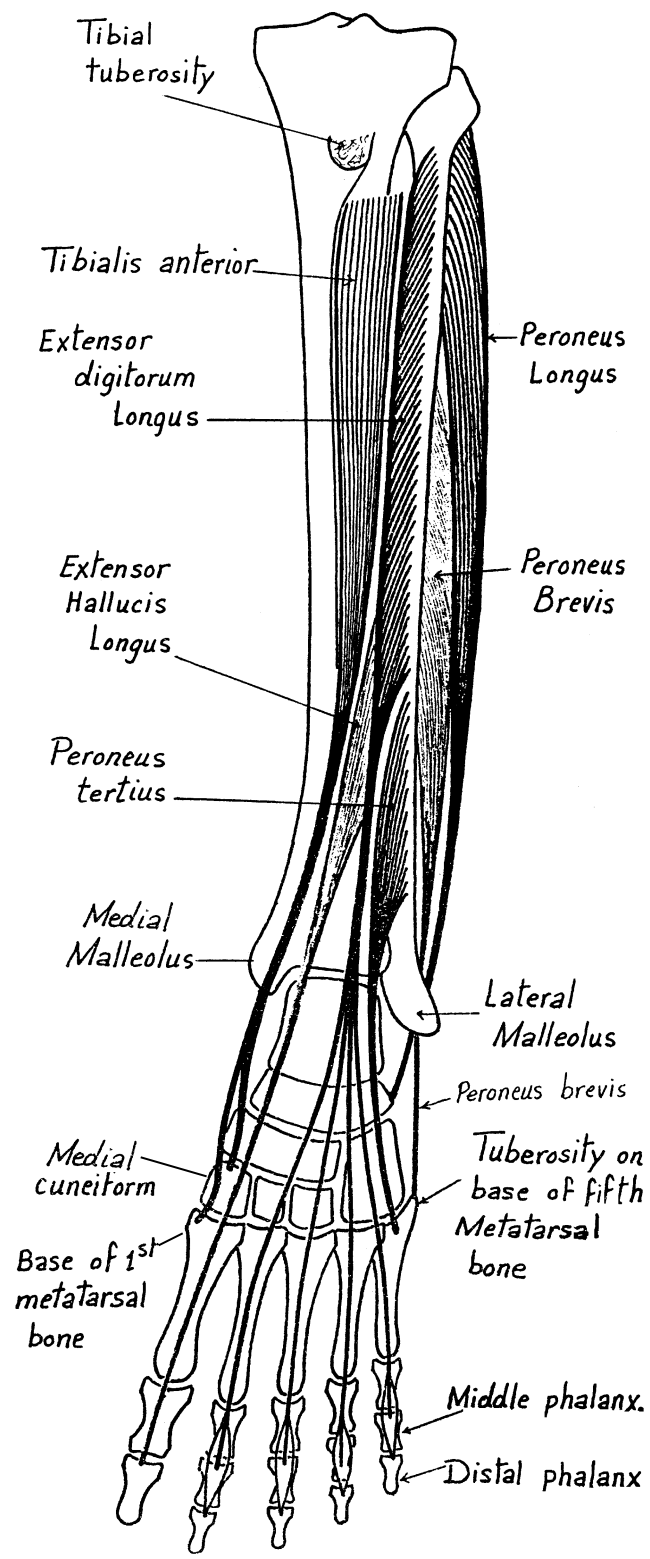
## IV. Muscles of Leg.

### A. Muscles of Front leg. (Extensors or Dorsiflexors)

- These muscles pass in front of ankle from medial to lateral "Tom has very nice dog & pig"
- Anterior Surface of fibula ( except tibialis anterior ) & interosseous membrane.
- All muscles are supplied by deep fibular nerve .
- Common action: Extension "Dorsiflexion" of ankle joint with the medial 2 muscles produce inversion & lateral 2 muscles produce eversion .
- From medial to lateral they are:

Muscle	Origin	Insertion	Main Action
1-Tibialis anterior	• Upper ½ of lateral surface of tibia & interosseous membrane.	• Medial cuneiform bone & base of 1st. metatarsal bone .	• Extend the ankle • Invert the foot.
2-Extensor hallucis longus	• Anterior Surface of fibula & interosseous membrane.	• Base of terminal phalanx of big toe.	• Extend the big toe & ankle • Invert the foot.
3-Extensor digitorum longus	• Anterior Surface of fibula & interosseous membrane.	• By 4 tendons into the extensor expansion of lateral 4 toes .	• Extend the ankle & lateral 4 toes • Evert the foot.
4- Fibularis tertius	• Anterior Surface of fibula & interosseous membrane.	• Base of 5 <sup>th</sup> . metatarsal bone .	• Extend the ankle . • Evert the foot.

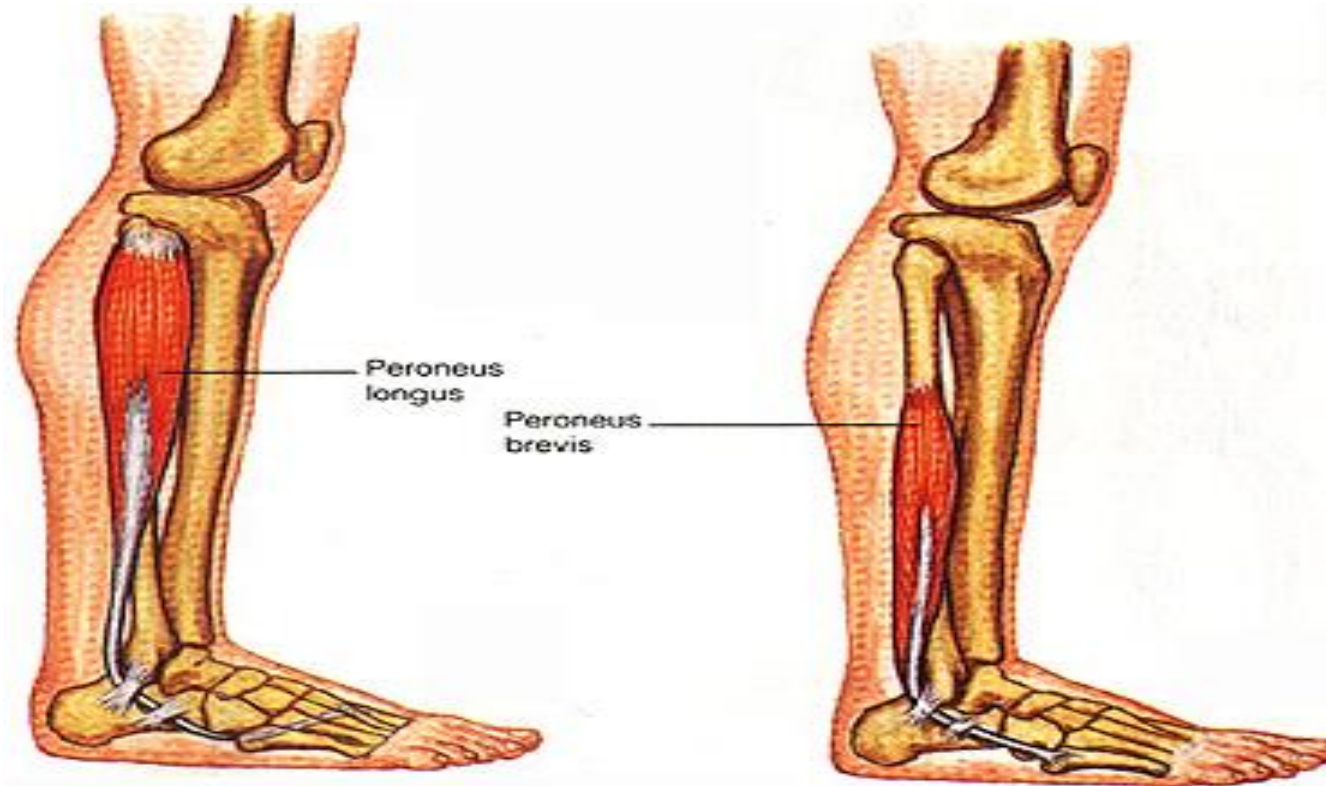




## B. Muscle of lateral Aspect of leg. (Evertors)

- The muscles pass behind lateral malleolus.
- Common origin : lateral surface of fibula .
- All muscles are supplied by Superficial fibular nerve.
- Common action : Eversion & maintain the transverse arch of foot.

Muscle	Origin	Insertion
1. Fibularis longus (superficial)	• Upper 2/3 of lateral surface of fibula.	• Its tendon pass from lateral to medial in the sole of the foot to insert in medial cunifrom bone & base of 1st metatarsal bone ( as tibialis anterior ).
2. Fibularis brevis (deep)	• Lower 2/3 of lateral surface of fibula.	• Tuberosity of 5th metatarsal bone



### C. Muscles of back of leg (flexors or plantar flexors )

#### a) Superficial group.

- All muscles pass behind the ankle.
- All muscles are supplied by Tibial nerve
- Common action: Plantar flexion of foot .

Muscle	Origin	Insertion	Action
1. Gastrocnemius	a- Lateral Head: lateral surface of lateral condyle of femur b- Medial Head: Popliteal surface of femur above the medial Condyle	• By tendo-calcaneus ( tendoachilis ) into posterior surface of calcaneus.	• Common action . • Help flexion of knee .
2. Soleus	• Posterior aspect of head & upper 1/3 of shaft of fibula, fibroteninous arch between tibia & fibula, soleal line & middle 1/3 of medial border of tibia .		• Common action
3- Plantaris	• Lower end of lateral supracondylar ridge .		• Common action

#### b) Deep Group.

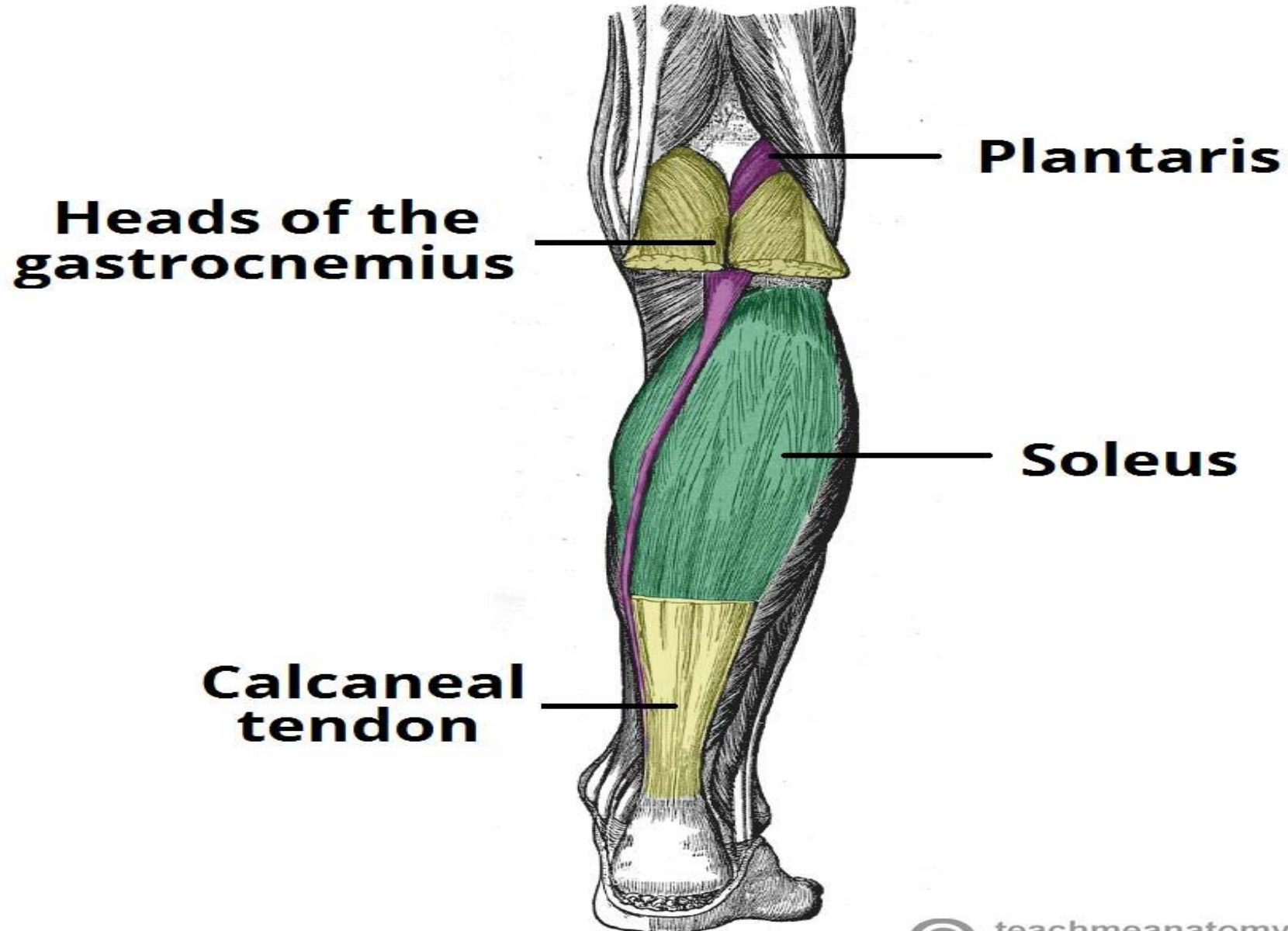
- All muscles pass behind medial malleolus (except popliteus). " Tom Dose Very Nice Hat "
- All muscles are Supplied by tibial nerve .
- Common action: Plantar flexion of ankle and maintain longitudinal arches of foot (except popliteus) .

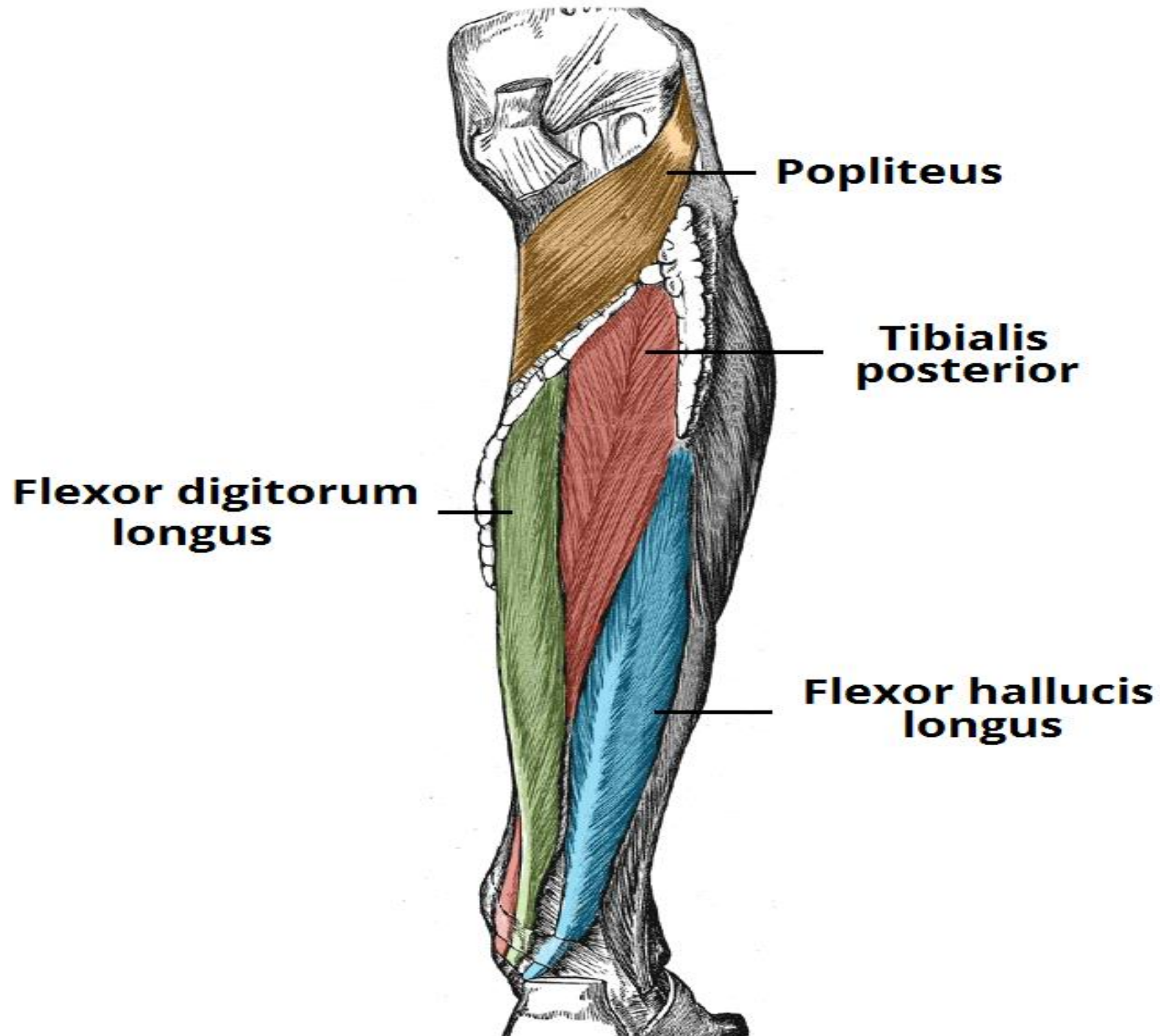
Muscle	Origin	Insertion	Main Action
1- Popliteus	• Groove on the lateral surface of lateral condyle of femur.	• Posterior surface of tibia above soleal line.	• Flexion & Medial rotation of knee at beginning of flexion (unlocking).
2- Flexor hallucis longus	• Posterior surface of fibula.	• Base of terminal phalanx of big toe.	• Flexes the ankle & big toe. • Invert the foot.
3- Flexor digitorum longus	• Back of tibia below soleal line.	• By 4 tendons into the base of terminal phalanx of lateral 4 toes.	• Flexes the ankle & lateral 4 toes.
4- Tibialis posterior	• Posterior surface of tibia & fibula & interosseous membrane.	• Tuberosity of navicular bone & all tarsal bones except talus.	• Flexes the ankle & invert the foot.

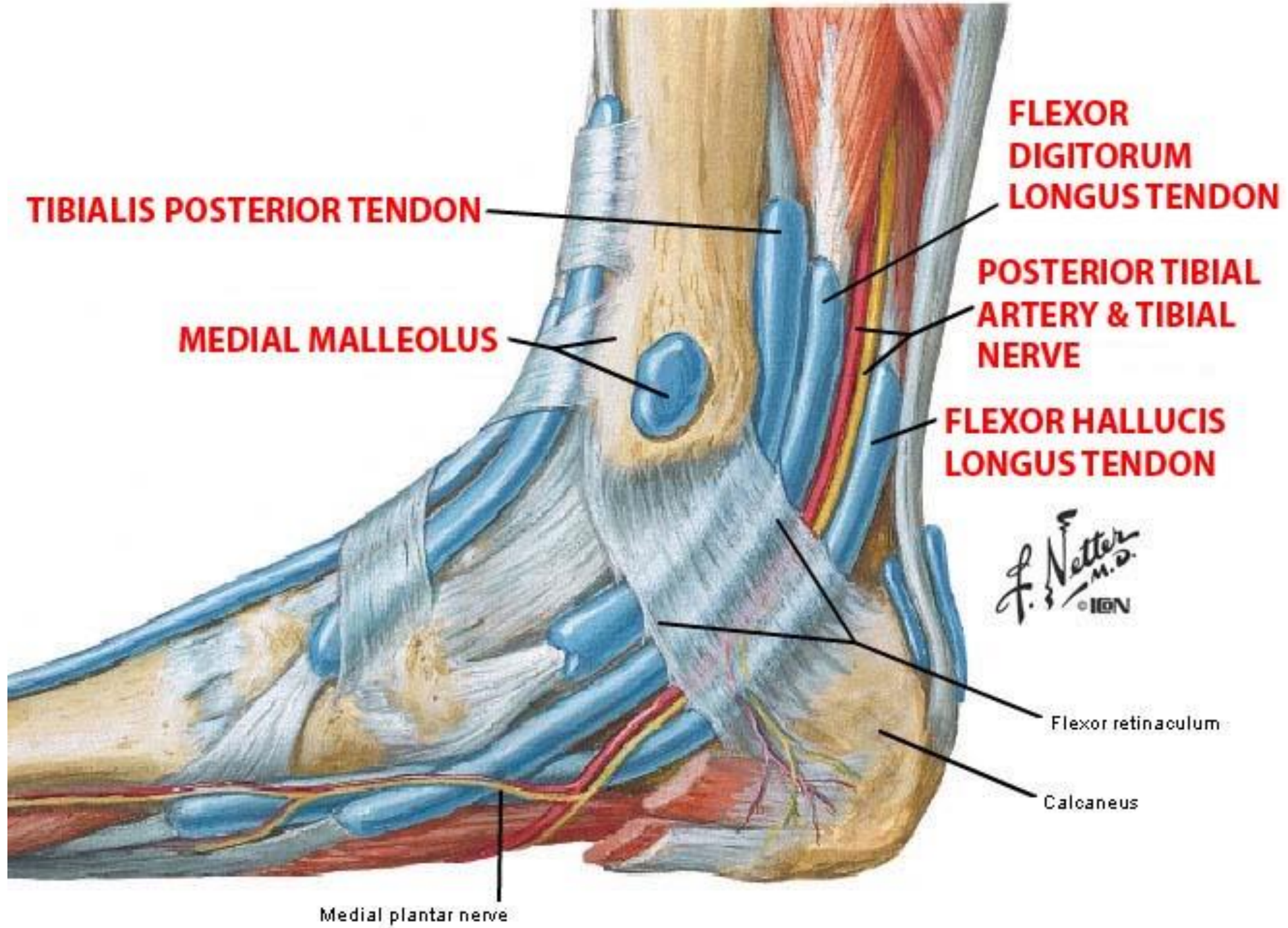


\* Important notes :

- 1- All muscles of back of the leg are supplied by tibial nerve .
- 2- Any tibialis muscle invert the foot .
- 3 Any fibularis muscle evert the foot .







## Layers of The Sole Of the Foot

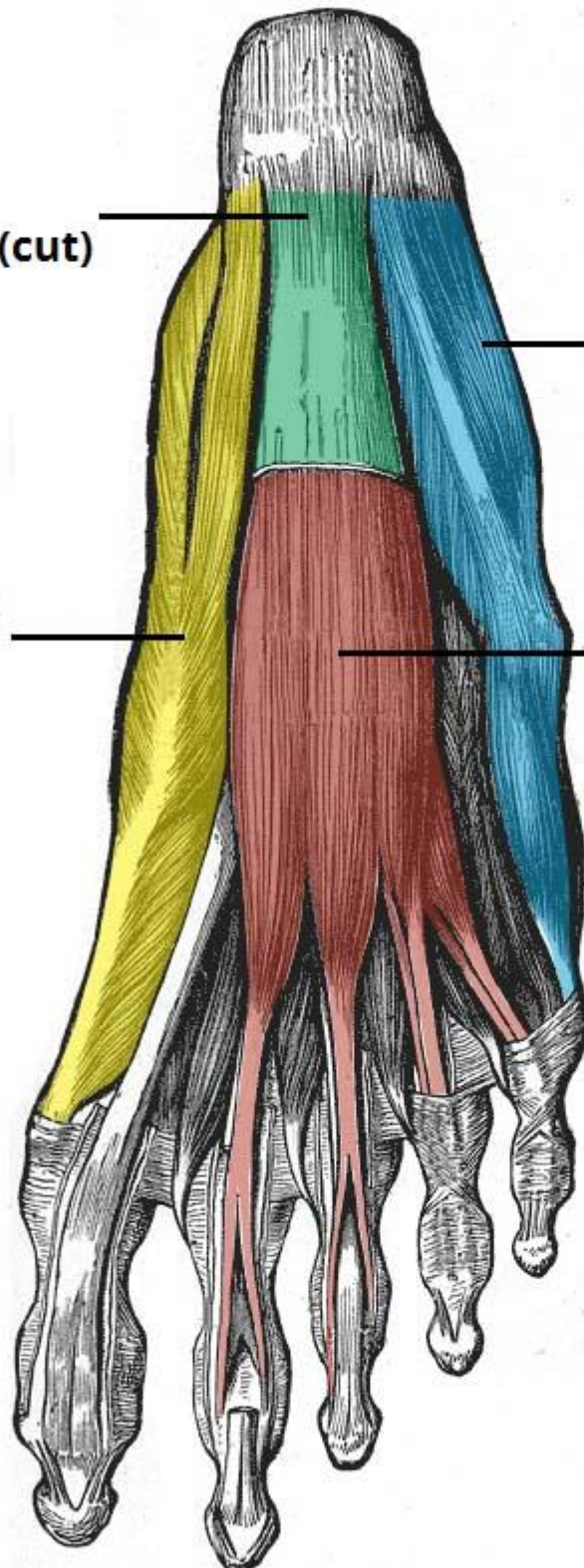
Layer	Muscle	Tendon
* <b>1<sup>st</sup> layer :</b> (3 muscles)	<ul style="list-style-type: none"> <li>• Abductor hallucis.</li> <li>• Abductor digiti minimi.</li> <li>• Flexor digitorum brevis.</li> </ul>	
* <b>2<sup>nd</sup> layer :</b> (2 muscles & 2 tendons)	<ul style="list-style-type: none"> <li>•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

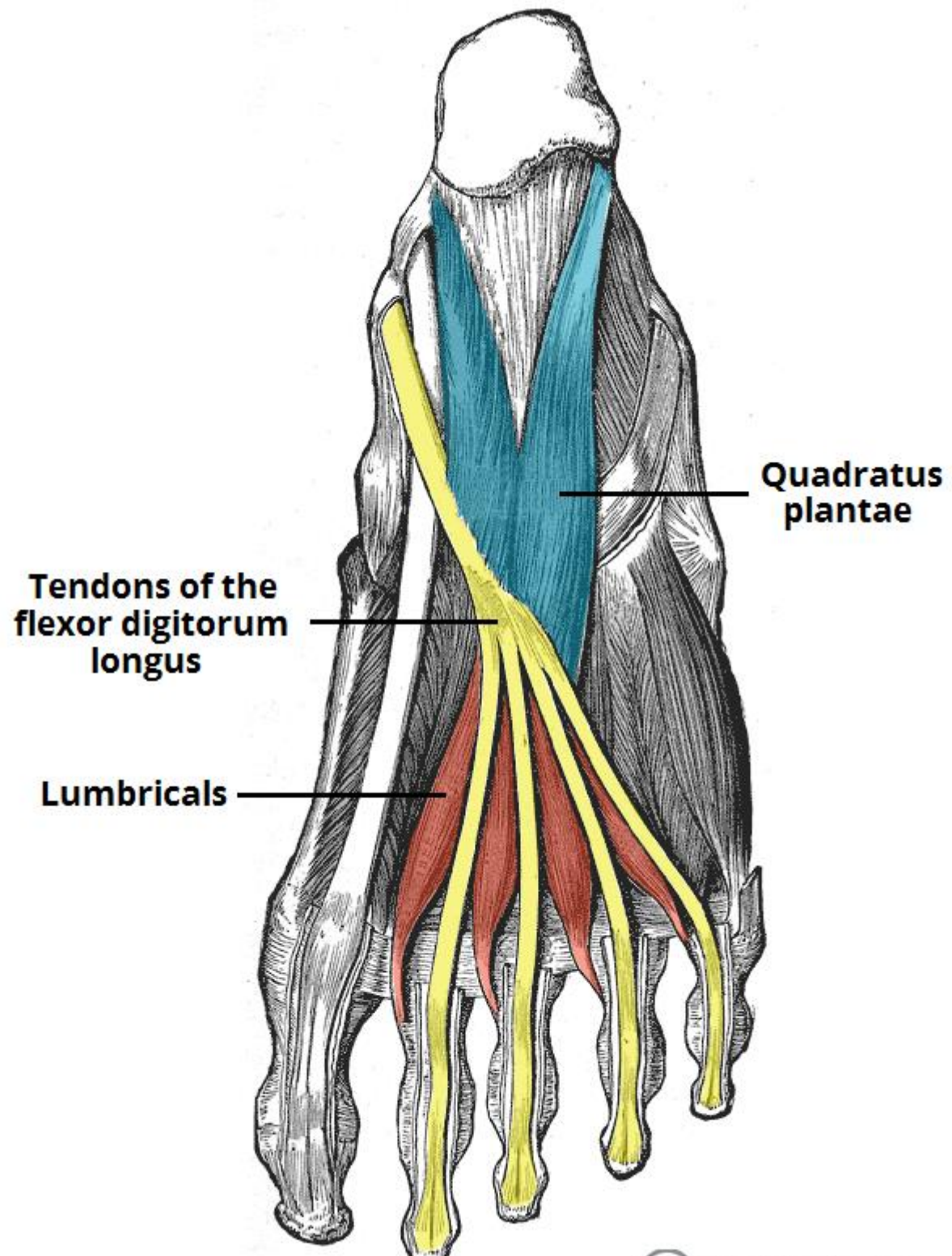
**Plantar  
aponeurosis (cut)**

**Abductor digiti  
minimi**

**Abductor  
hallucis**

**Flexor digitorum  
brevis**

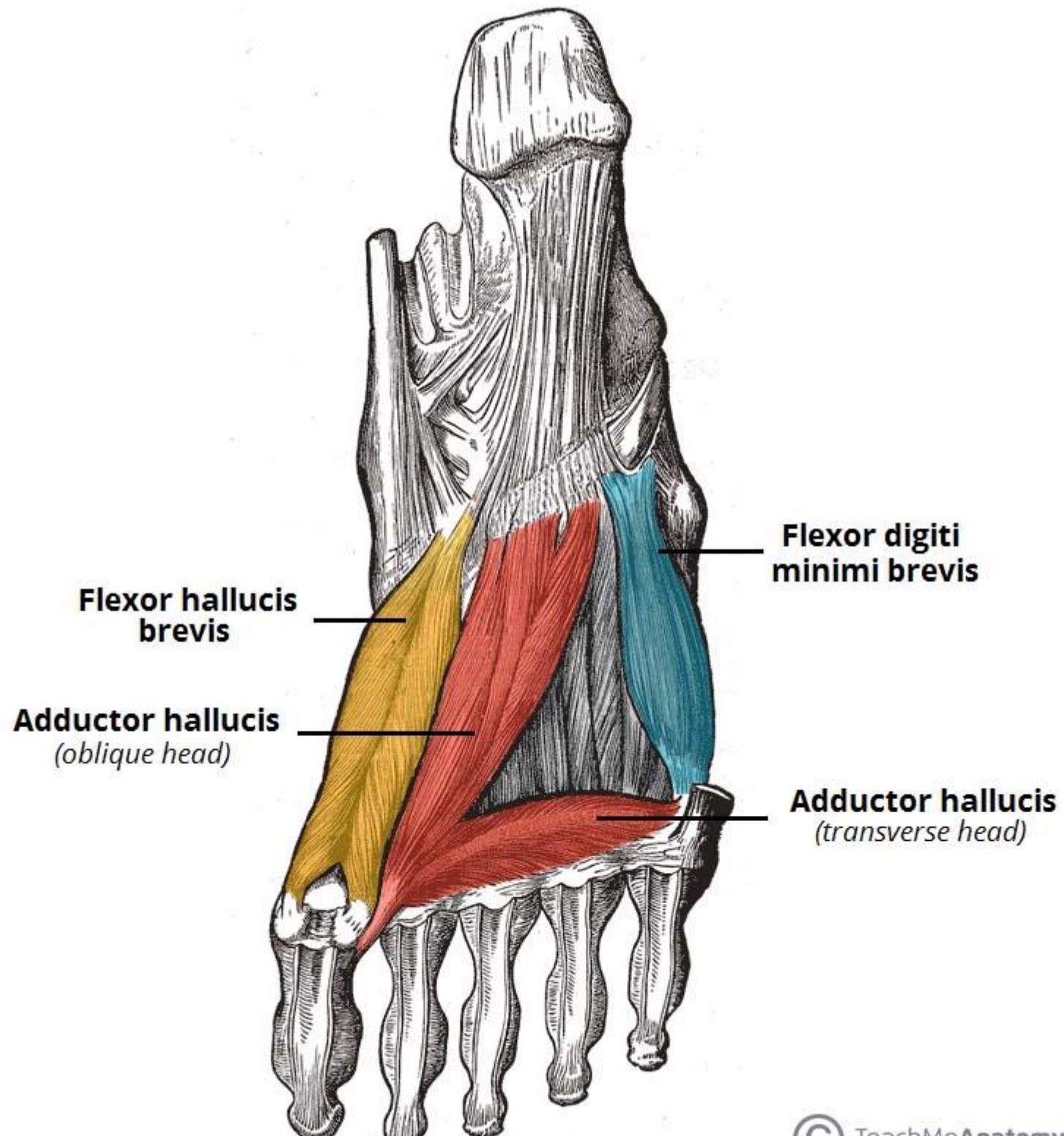




**Quadratus  
plantae**

**Tendons of the  
flexor digitorum  
longus**

**Lumbricals**





## Fourth Layer

1. Interossei,
2. Peroneus longus tendon,
3. Tibialis posterior tendon