GLUTEAL REGION

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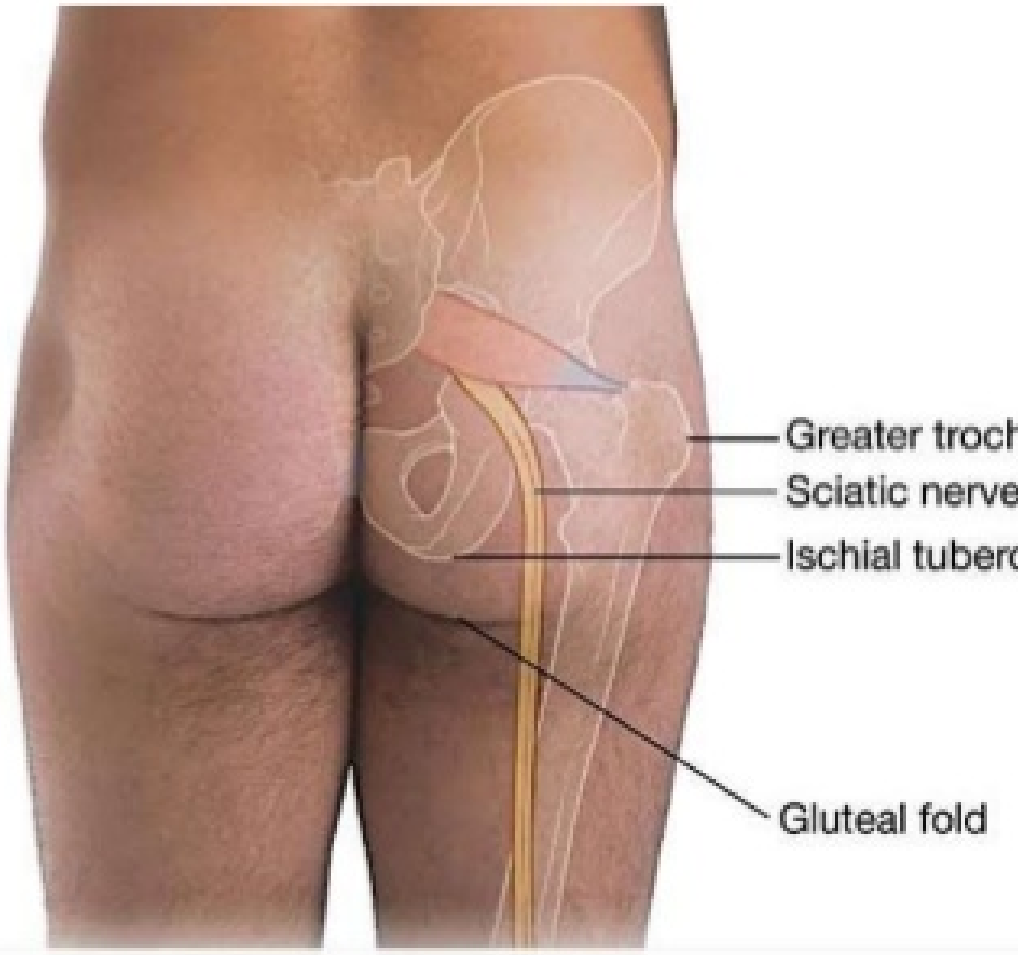
LECTURER ANATOMY KGMC

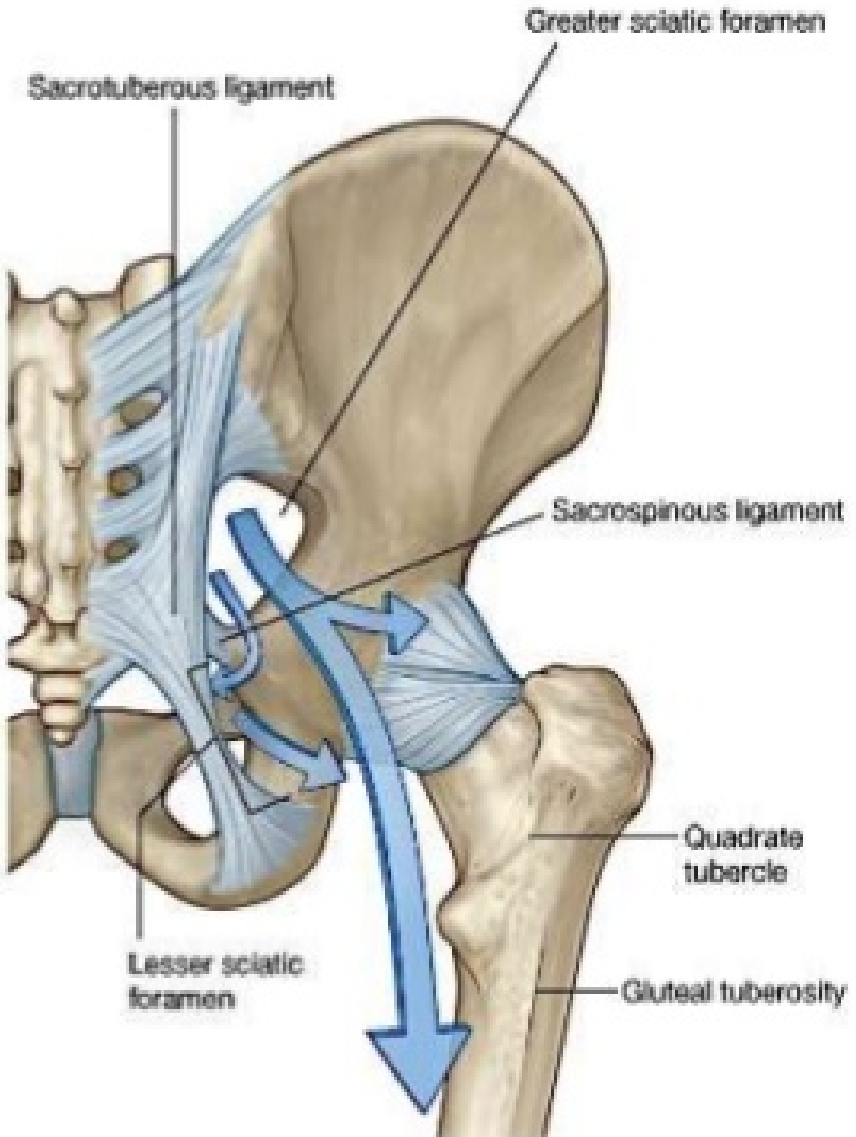
Gluteal region

- Transitional between trunk & lower extremity.
- Anatomically – trunk
- Functionally - lower extremity
- Includes rounded posterior buttocks & lateral hip



Boundaries

- **Superiorly**: iliac crest L4
- **Medially**: intergluteal cleft,
- **Laterally**: Greater trochanter
- **Inferiorly**: gluteal fold
- Gluteal muscles form prominent majority



MUSCLES

- **TWO LAYERS**

- SUPERFICIAL GLUTEAL MUSCLES
- Gluteus maximus
- Gluteus medius
- Gluteus minimus
- Tensor fasciae latae

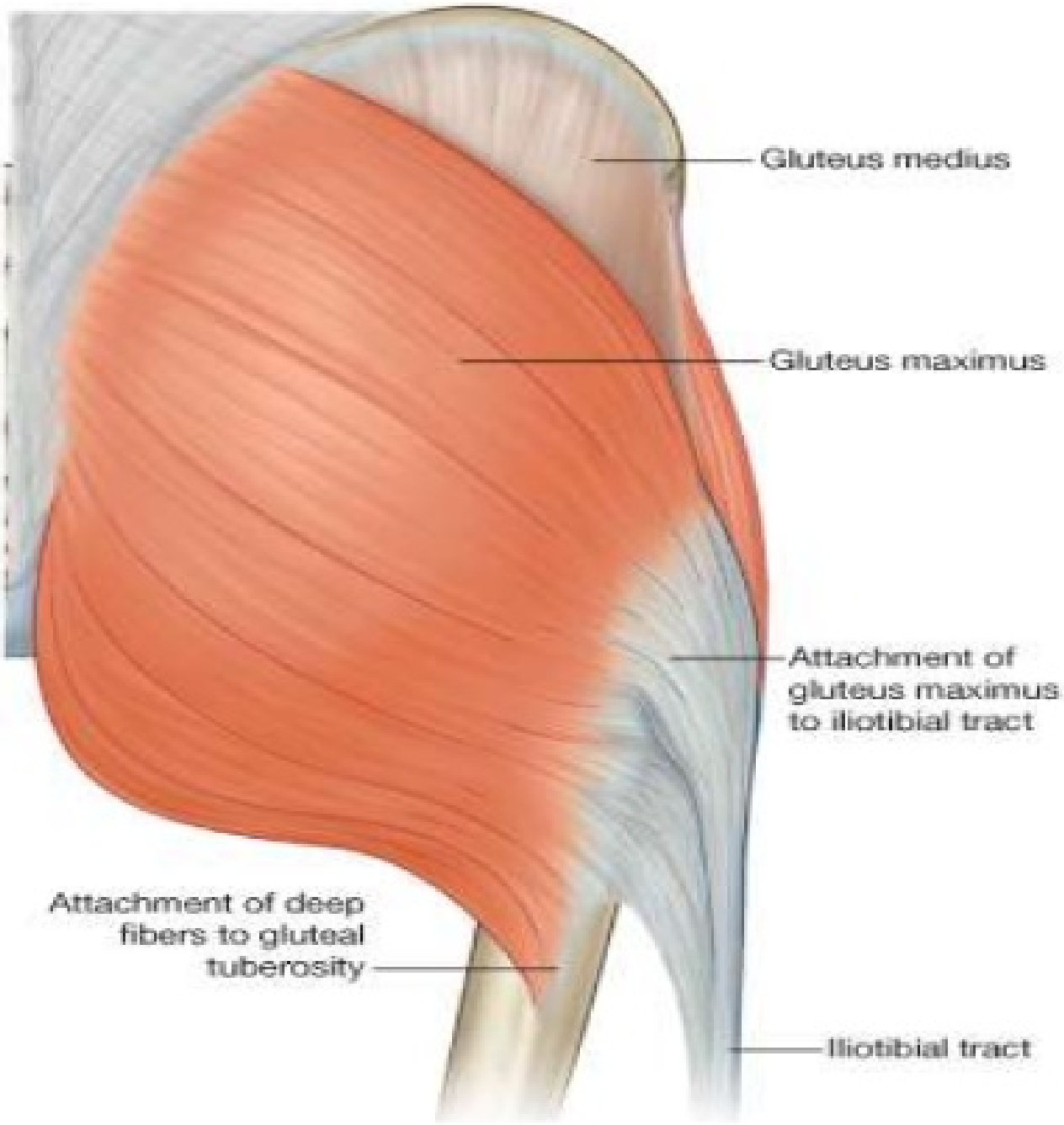
Deep gluteal muscle group

- Piriformis
- Gemellus superior
- Gemellus inferior
- Obturator internus
- Quadratus femoris

GLUTEUS MAXIMUS

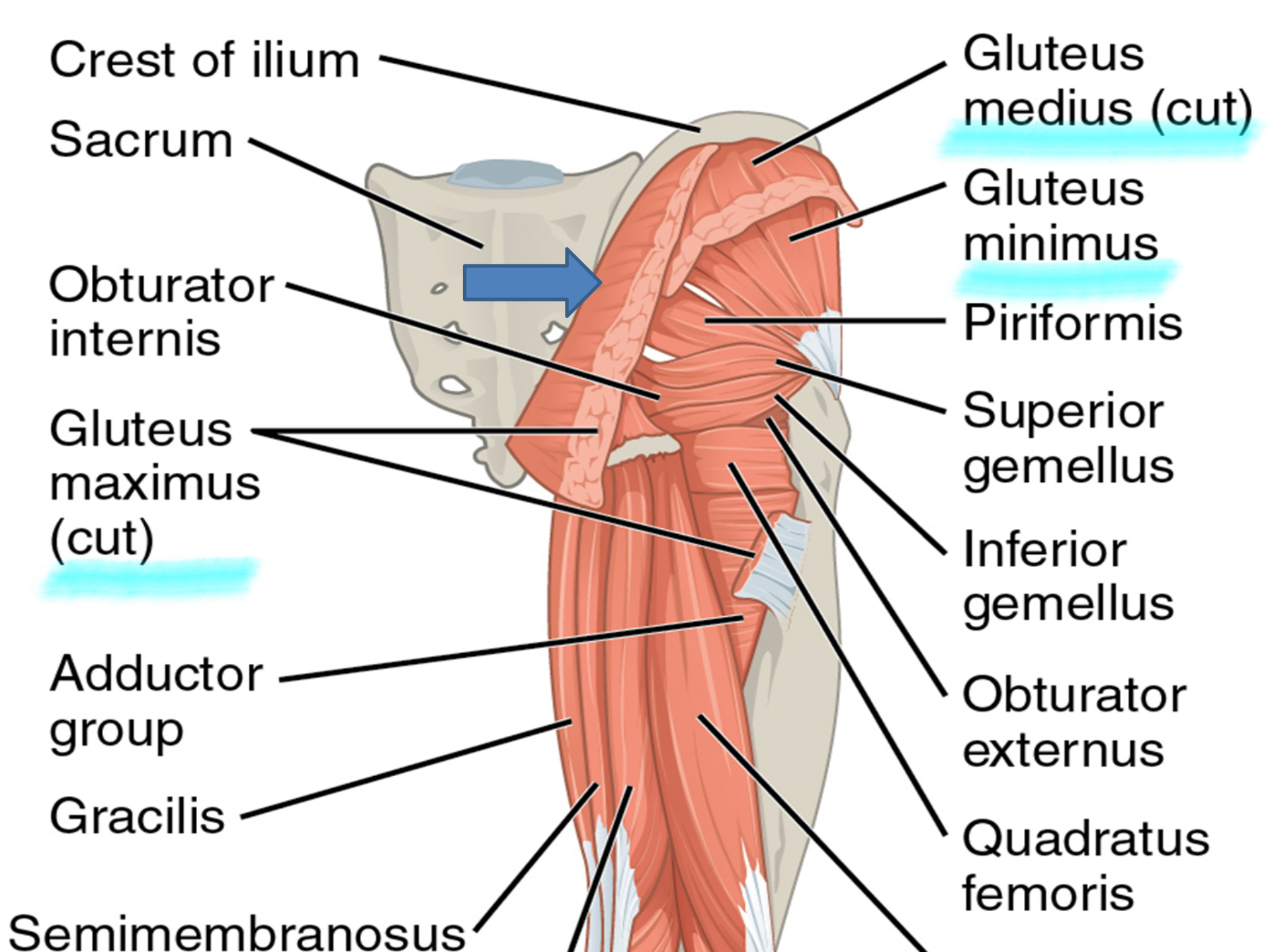
- As the largest muscle of the gluteal region, gluteus maximus is a powerful muscle involved in both primary hip movements and stabilisation of the hip joint.

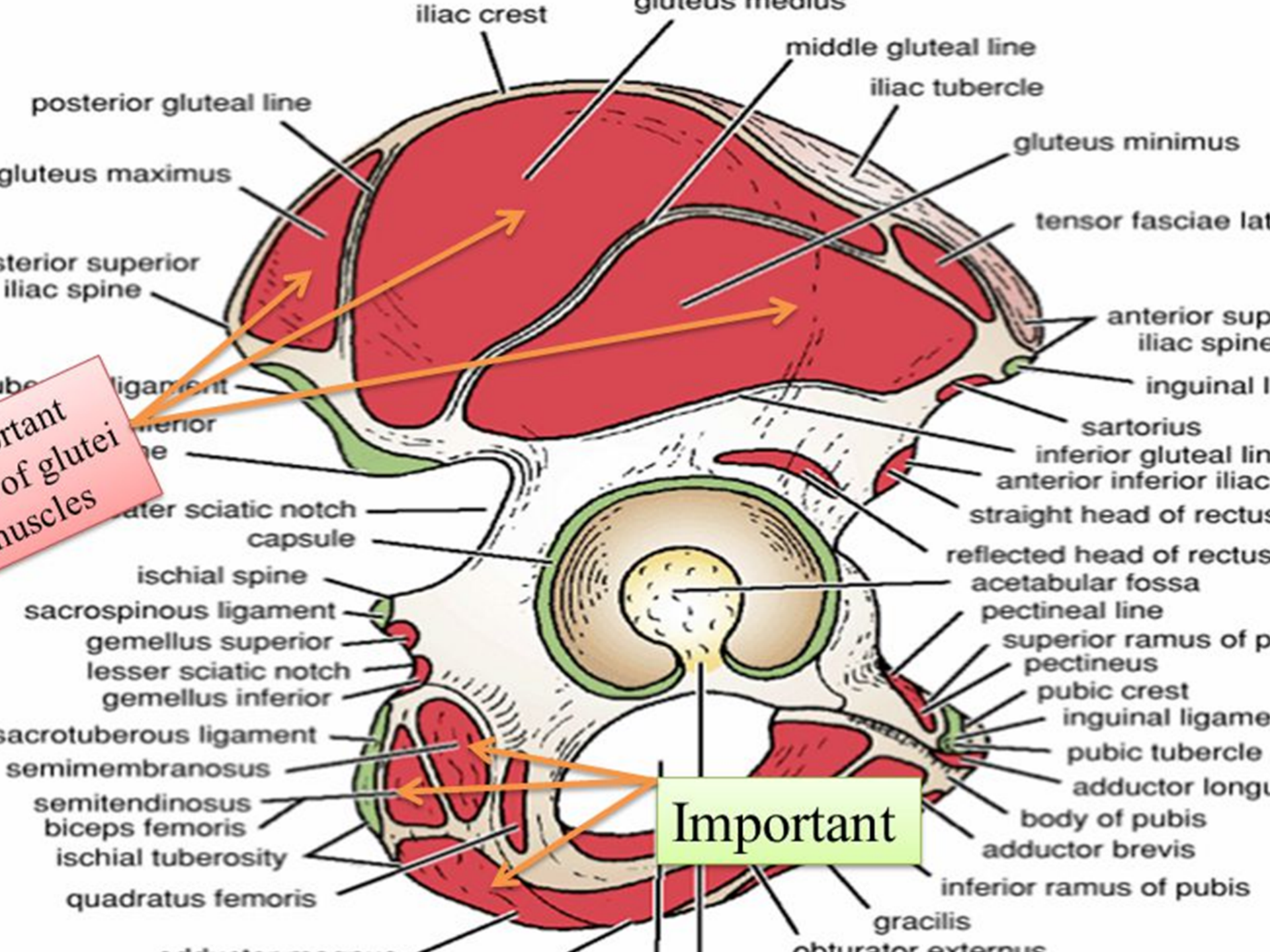
- Gluteus maximus lies superficial to the other gluteal muscles.


Gluteus medius
Gluteus maximus
Attachment of gluteus maximus to iliotibial tract
Attachment of deep fibers to gluteal tuberosity
Iliotibial tract

GLUTEUS MAXIMUS

- Origin: dorsal aspects of the ilium, sacrum and coccyx
- Insertion: iliotibial band and gluteal tuberosity of the dorsal (posterior surface of the shaft of femur)
- Innervation: inferior gluteal nerve (L5, S1, S2)
- Function: extension of the hip, assists in external rotation, abduction (superior fibres) and adduction (inferior fibres)

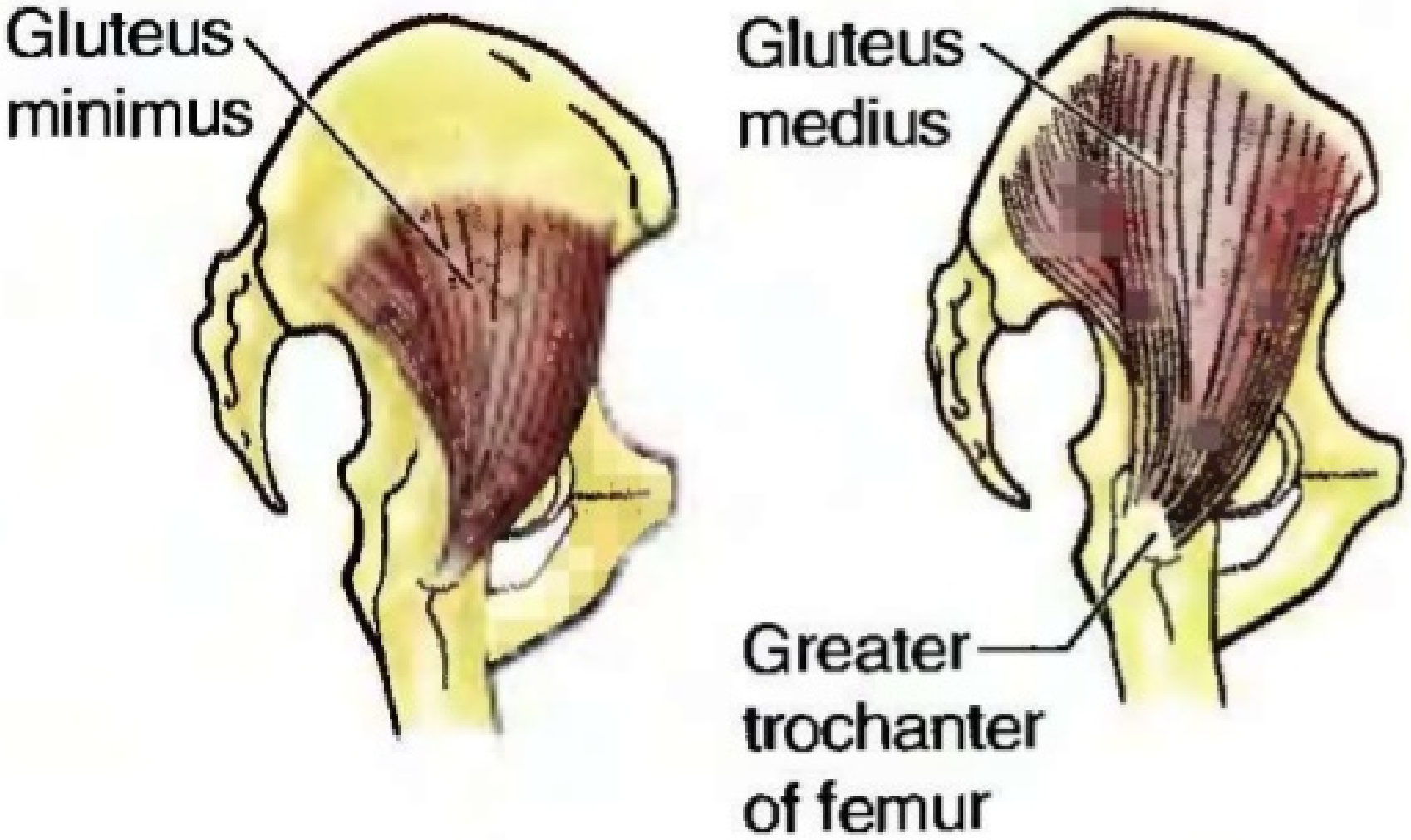

Crest of ilium
Sacrum
Obturator internis
Gluteus maximus (cut)
Adductor group
Gracilis
Semimembranosus
Gluteus medius (cut)
Gluteus minimus
Piriformis
Superior gemellus
Inferior gemellus
Obturator externus
Quadratus femoris

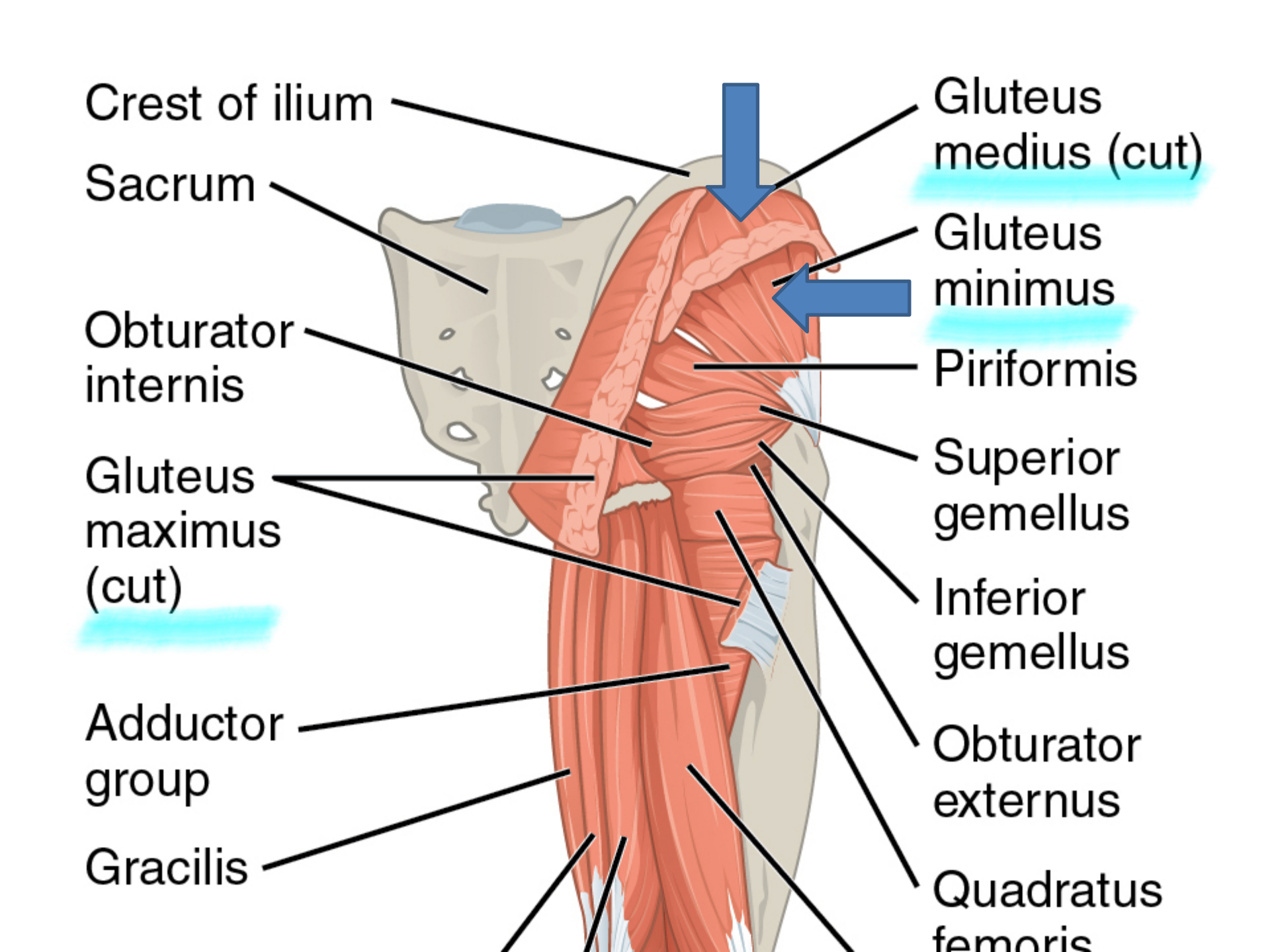

iliac crest
gluteus medius
middle gluteal line
iliac tubercle
posterior gluteal line
gluteus minimus
gluteus maximus
tensor fasciae lat
sterior superior
iliac spine
anterior sup
iliac spine
inguinal l
sartorius
inferior gluteal lin
anterior inferior iliac
straight head of rectus
reflected head of rectus
ater sciatic notch
capsule
ischial spine
acetabular fossa
sacrospinous ligament
pectineal line
gemellus superior
superior ramus of p
lesser sciatic notch
pectineus
gemellus inferior
pubic crest
sacrotuberous ligament
inguinal ligame
semimembranosus
pubic tubercle
semitendinosus
adductor longu
biceps femoris
body of pubis
ischial tuberosity
adductor brevis
quadratus femoris
inferior ramus of pubis
gracilis
Important
rtant
of glutei
nuscles

Gluteus medius and minimus

- Gluteus medius and minimus are extremely important abductors of the hip, and their dysfunction can lead to significant difficulty in walking (ataxia).

- Function: abduction of the hip joint
- Origin: gluteal fossa of the ilium
- Insertion: lateral aspect of the greater trochanter of the femur
- Innervation: superior gluteal nerve (L4, L5, S1)


Gluteus minimus
Gluteus medius
Greater trochanter of femur


Crest of ilium
Sacrum
Obturator internis
Gluteus maximus (cut)
Adductor group
Gracilis
Gluteus medius (cut)
Gluteus minimus
Piriformis
Superior gemellus
Inferior gemellus
Obturator externus
Quadratus femoris

Actions of the G. medius & minimus

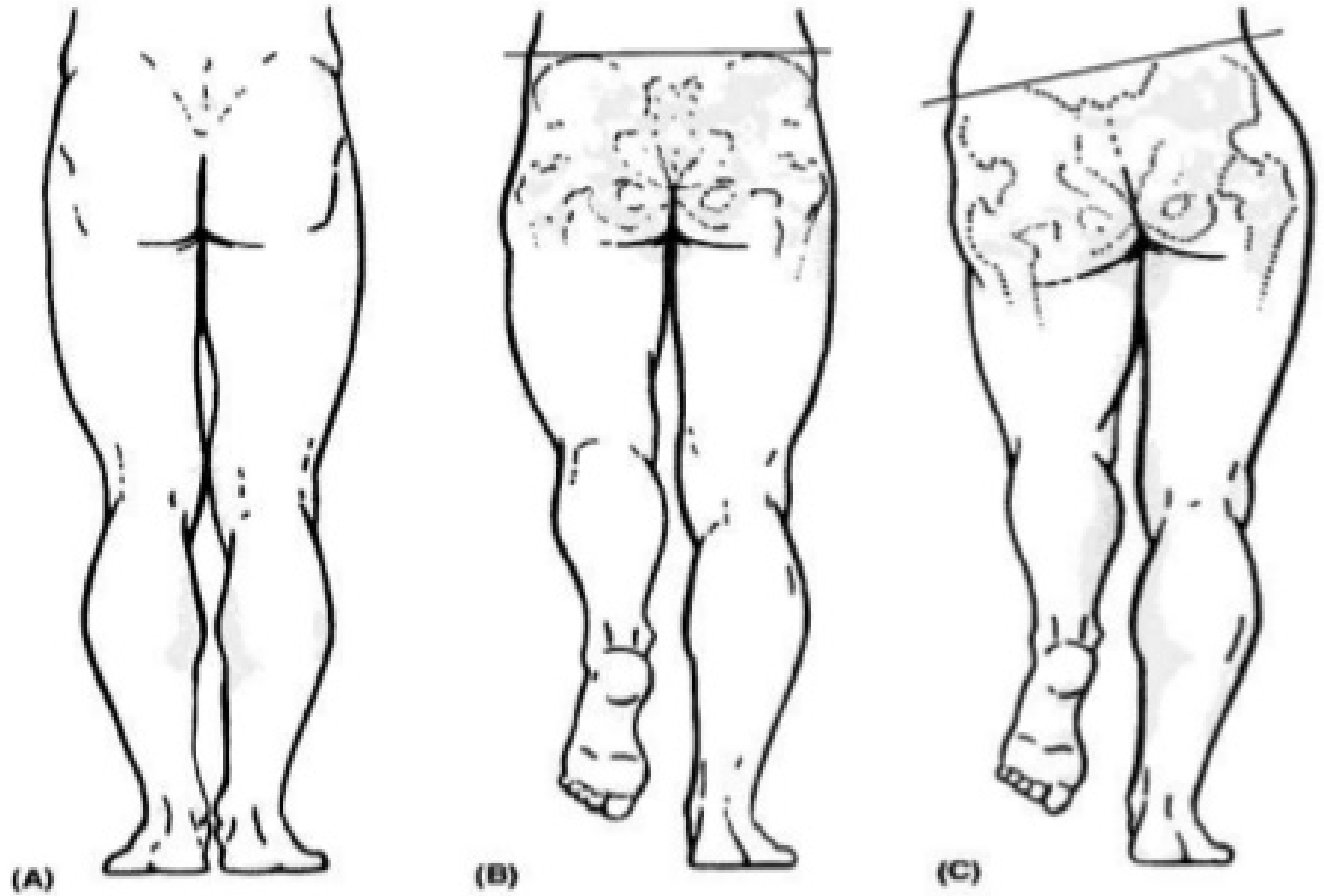


Figure 5.25. Action of abductors of the thigh (gluteus medius and minimus) when walking. Posterior views. **A.** When the weight is on both feet, the pelvis is evenly supported and does not sag. **B.** When the weight is borne by one foot, the muscles on the same side hold the pelvis so that the pelvis will not sag on the side of the raised limb. **C.** When the gluteus medius and minimus are inactive owing to injury of the superior gluteal nerve, the supporting and steadying action of these muscles is lost and the pelvis falls on the side of the raised limb (positive Trendelenburg sign).

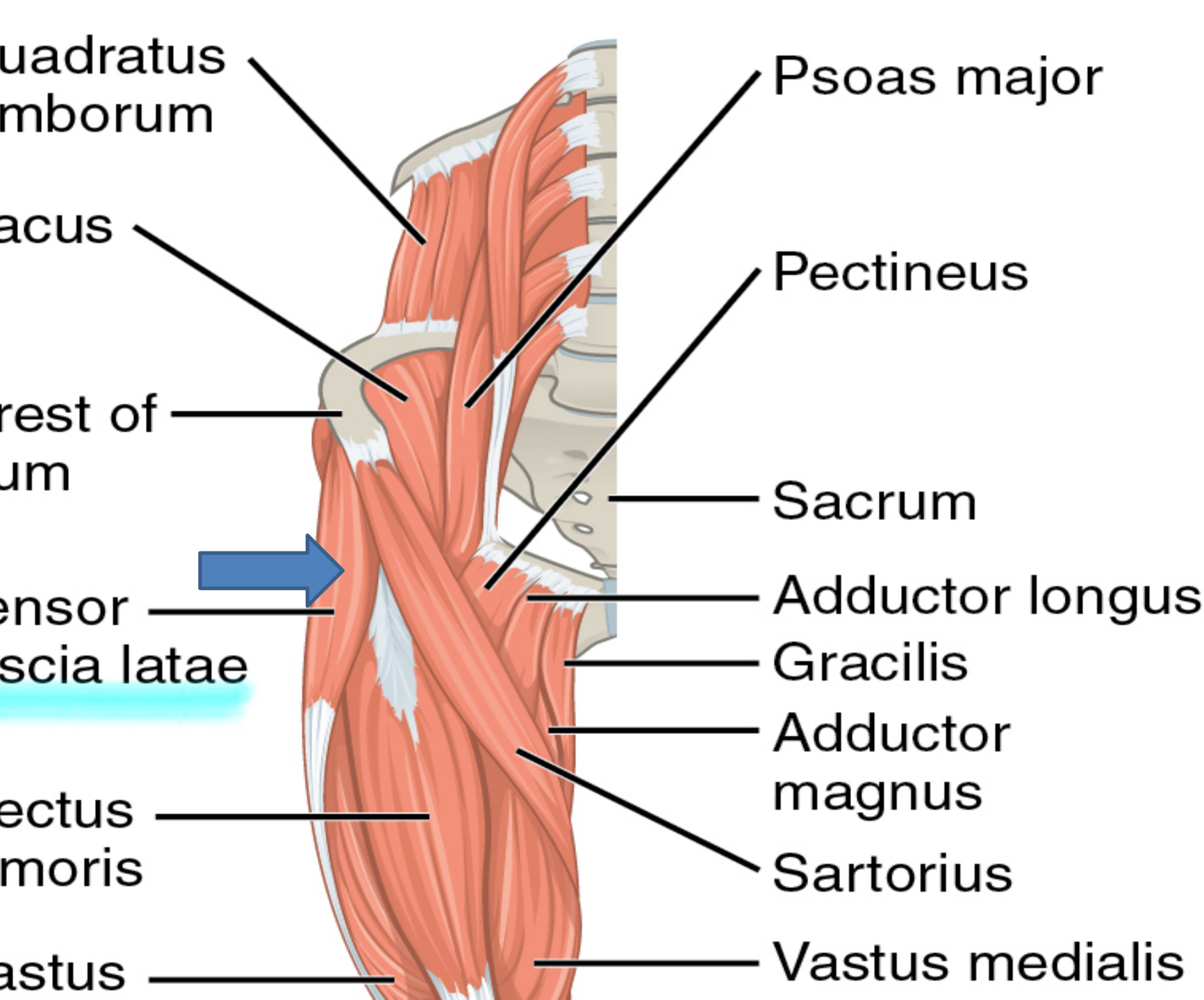
Tensor fasciae latae

- Tensor fascia latae is the most anterior of the superficial gluteal muscles.

- Function: flexion, medial rotation and abduction of the hip, stabilisation of the knee via the iliotibial band
- Origin: iliac crest between the anterior superior iliac spine and iliac crest tuberculum
- Insertion: anterior aspect of the iliotibial tract
- Innervation: superior gluteal nerve (L4, L5, S1)

ILIOTIBIAL TRACT

- The iliotibial band is a piece of connective tissue.
- It runs from the hip to the shinbone on the outside of the leg.
- This piece of fascia plays a significant role in helping the knee flex and extend.


uadratus
mborum
acus
rest of
um
ensor
scia latae
ectus
moris
astus
Psoas major
Pectineus
Sacrum
Adductor longus
Gracilis
Adductor
magnus
Sartorius
Vastus medialis

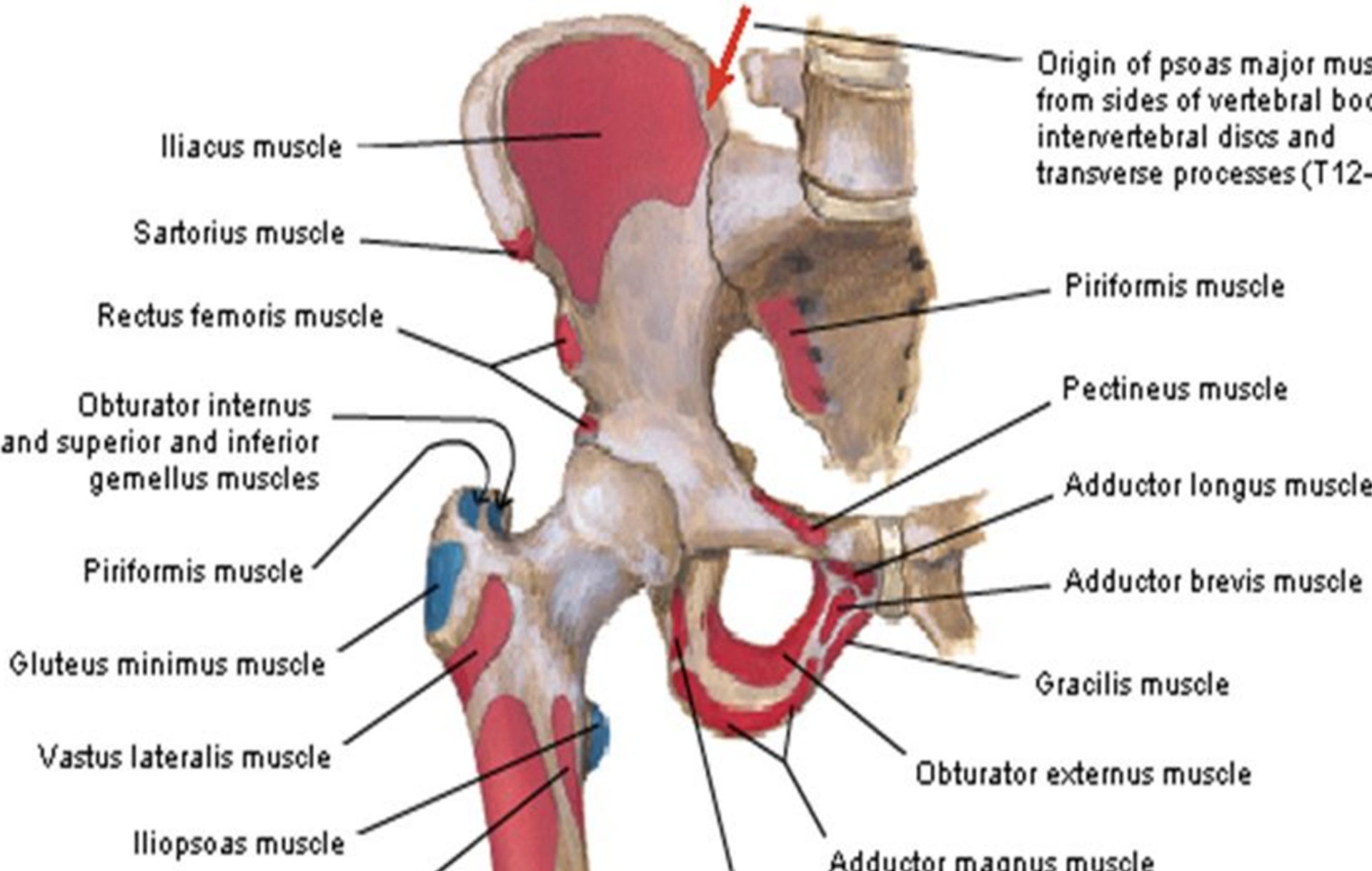
PIRIFORMIS

- Piriformis is the most superior muscle of the deep gluteal group. It is named after its pear-like shape (yes, the fruit!).

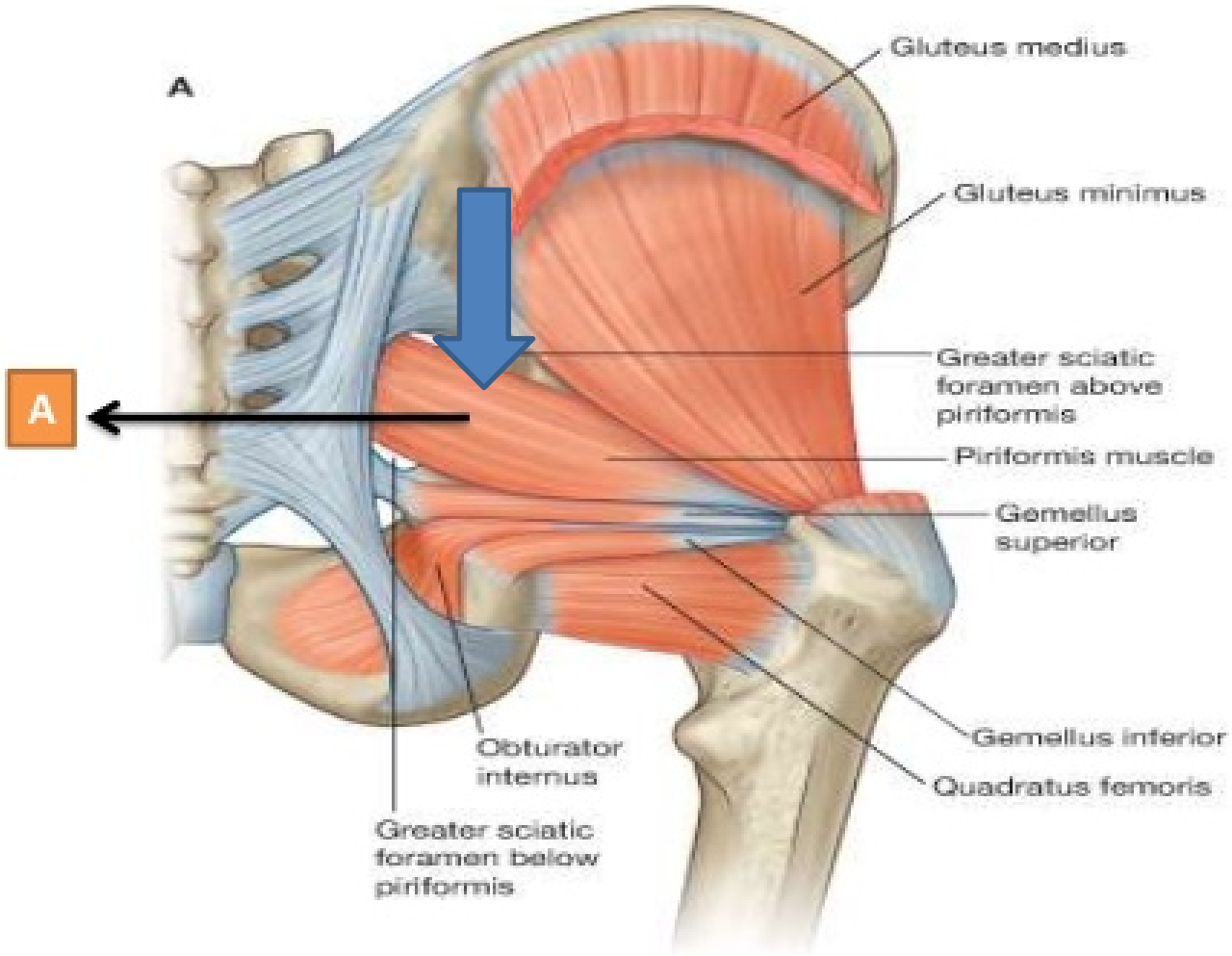
- Function: external rotation and abduction of the hip
- Origin: anterolateral aspect of the sacrum
- Insertion: superior aspect of the greater trochanter of the femur
- Innervation: nerve to piriformis (S1, S2)

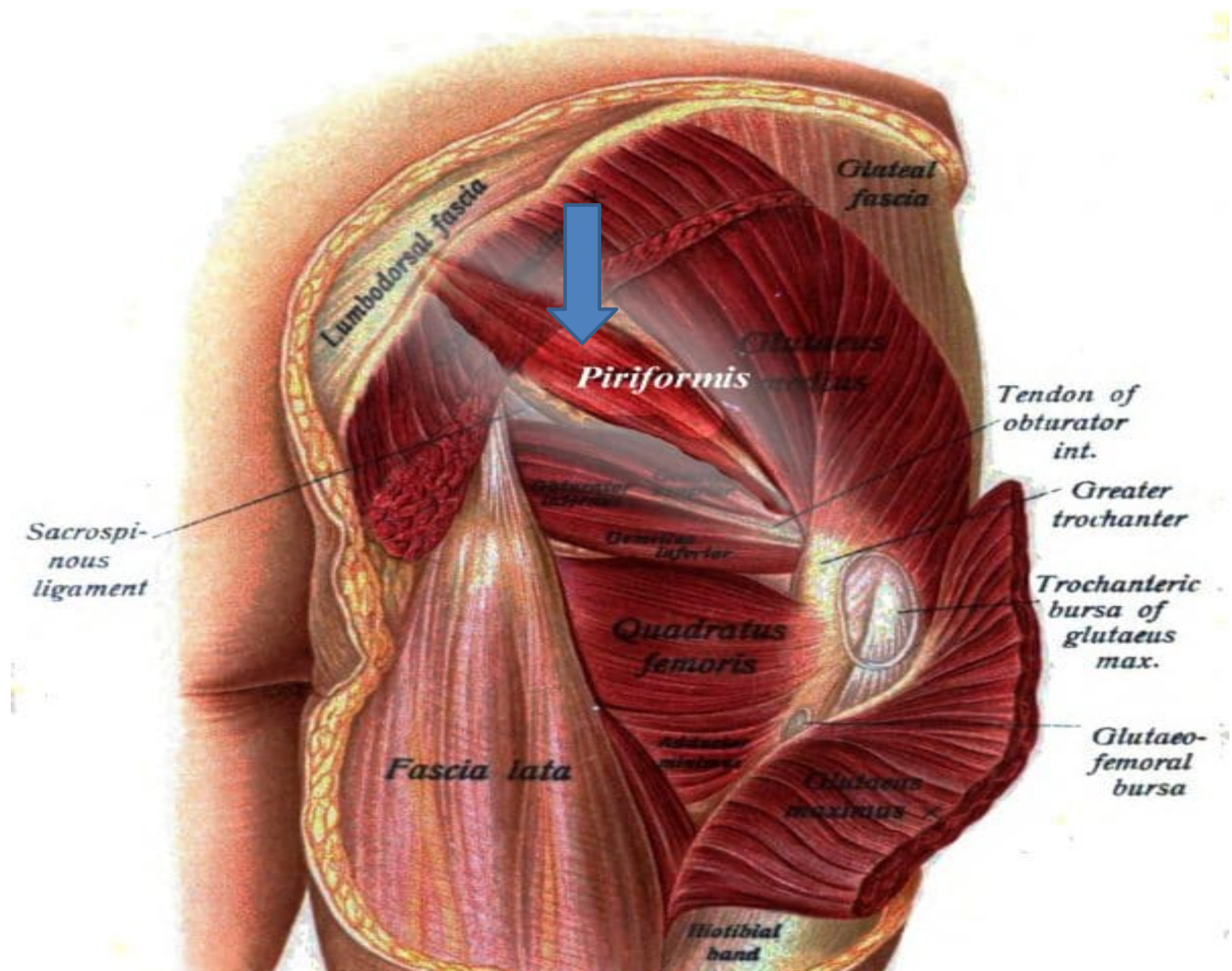
HIP & THIGH MUSCLES ATTACHMENT

(ANTERIOR VIEW)



Piriformis (A)

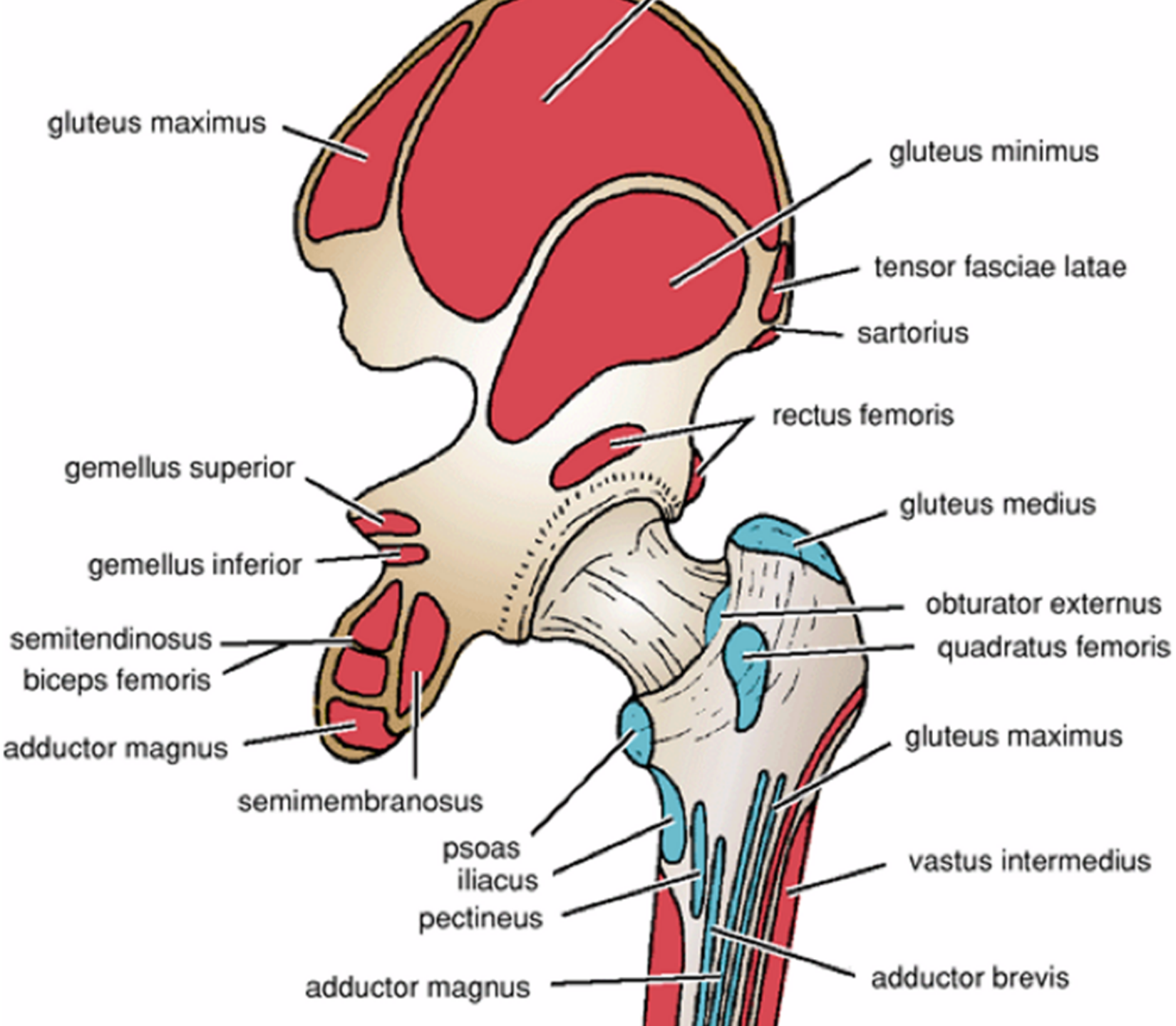



Glateal fascia
Lumbodorsal fascia
Piriformis
Tendon of obturator int.
Greater trochanter
Sacrospi-nous ligament
Trochanteric bursa of glutaeus max.
Quadratus femoris
Glutaeo-femoral bursa
Fascia lata
Iliotibial band

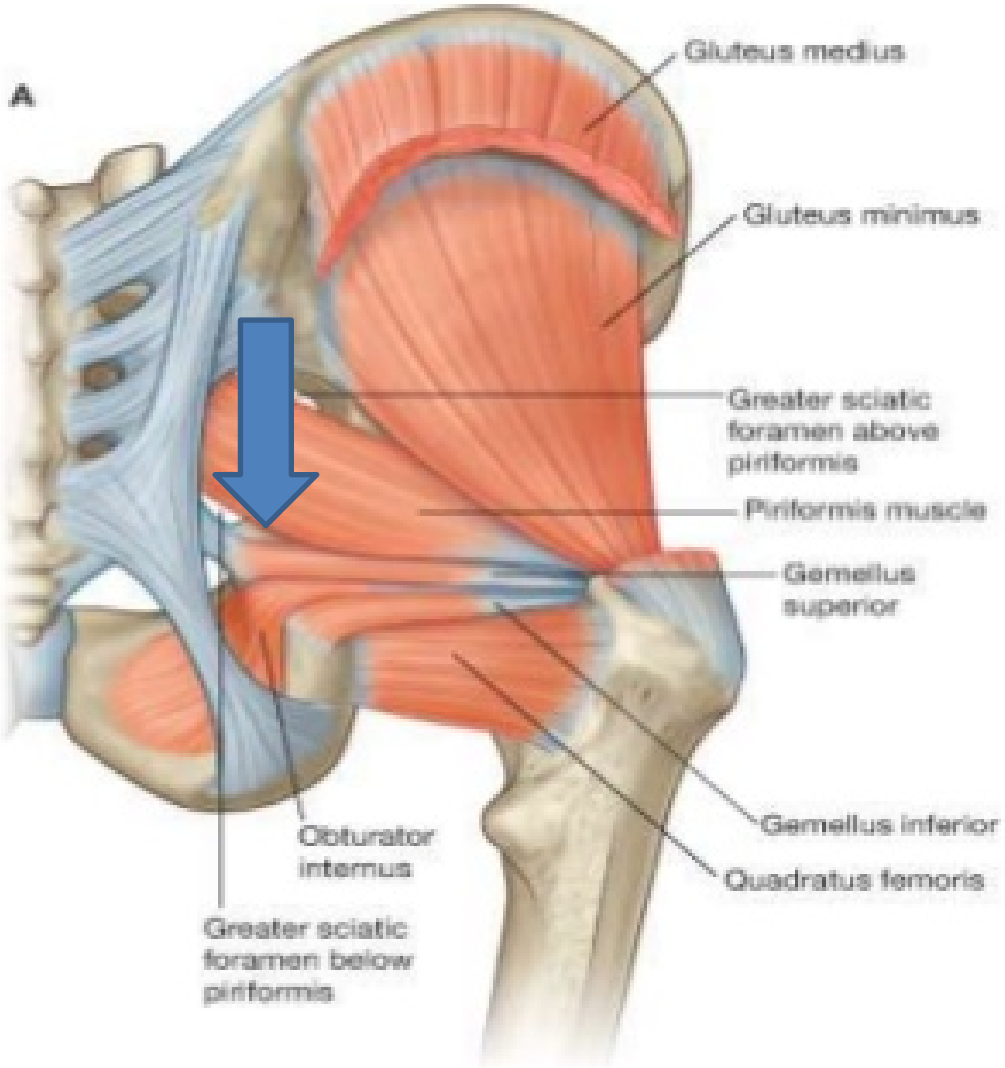
GEMELLUS SUPERIOR

- There are two gemelli (singular: gemellus) muscles. The superior muscle lies superior to the obturator internus, and the inferior muscle lies inferior to the obturator internus. They are fan-shaped muscles converging towards their insertion on the femur.

- Function: external rotation and abduction of the hip
- Origin: gluteal surface of the ischial spine
- Insertion: greater trochanter of the femur
- Innervation: nerve to obturator internus (L5, S1, S2)


gluteus maximus
gluteus minimus
tensor fasciae latae
sartorius
rectus femoris
gemellus superior
gluteus medius
gemellus inferior
obturator externus
semitendinosus
biceps femoris
quadratus femoris
adductor magnus
gluteus maximus
semimembranosus
psoas
iliacus
vastus intermedius
pectineus
adductor magnus
adductor brevis

Superior & inferior Gamelli (C)

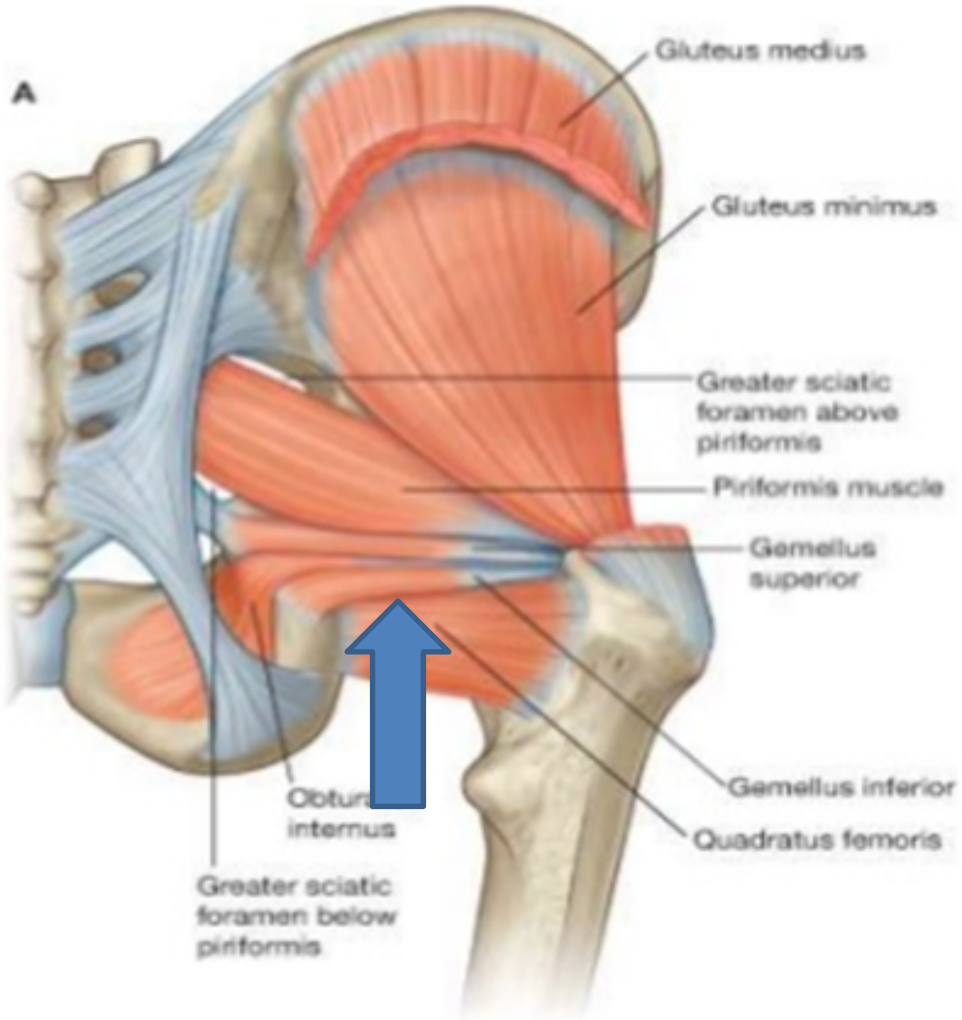


GEMELLUS INFERIOR

- The second of the gemelli muscles lies below the obturator internus tendon.

- Function: external rotation and abduction of the hip
- Origin: gluteal surface of the ischial tuberosity
- Insertion: greater trochanter of the femur
- Innervation: nerve to quadratus femoris (L4, L5, S1)

Superior & inferior Gamelli (C)

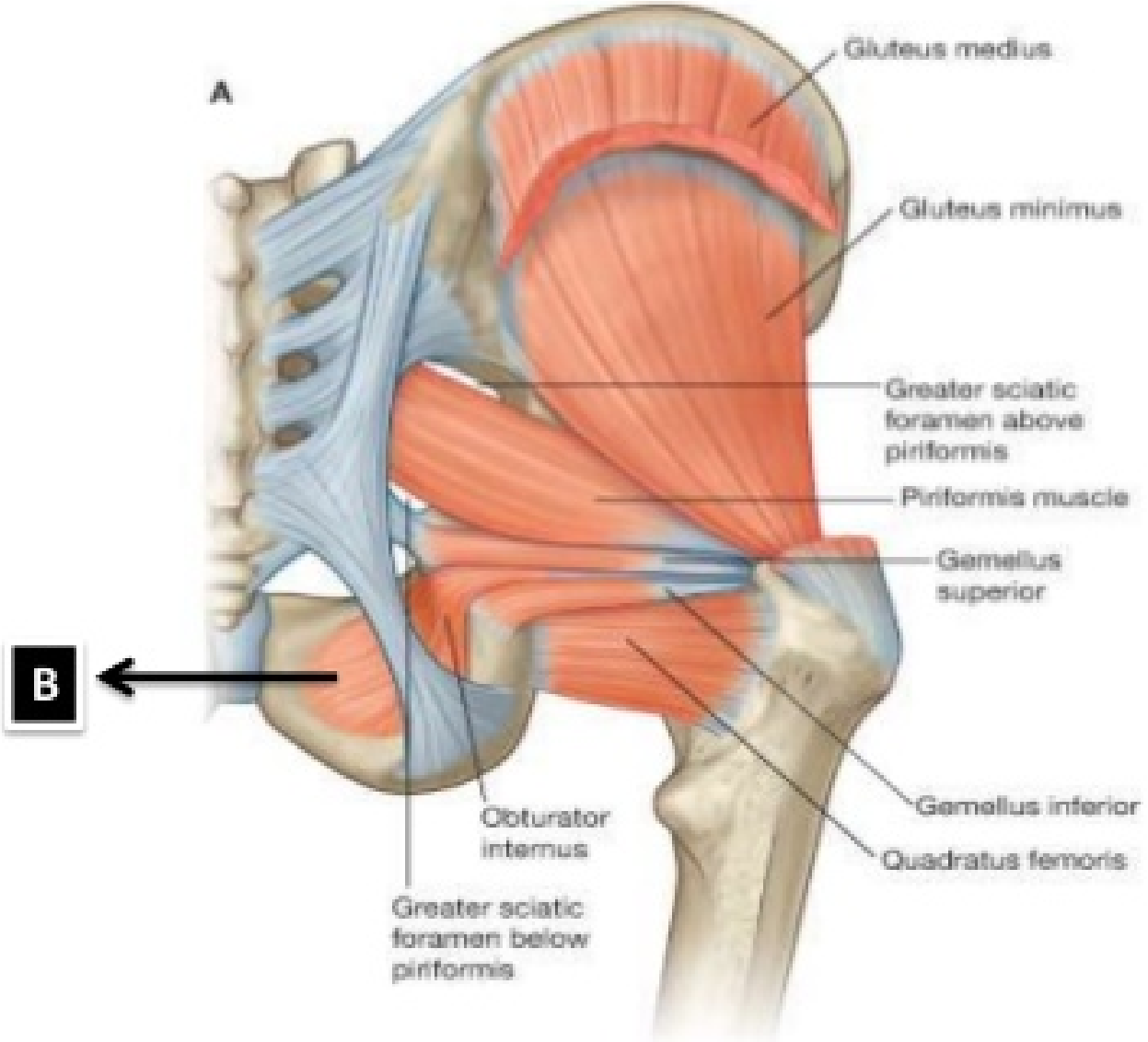


OBTURATOR INTERNUS

- Obturator internus originates on the internal surface of the pelvis. Obturator externus originates on the external surface of the pelvis. Both attach to the femur to contribute to femoral rotation.

- Function: external rotation and slight abduction of the hip
- Origin: internal surface of the obturator membrane and adjacent pubic, ischial and iliac surfaces
- Insertion: greater trochanter of femur
- Innervation: nerve to obturator internus (L5, S1, S2)

Obturator internus (B)

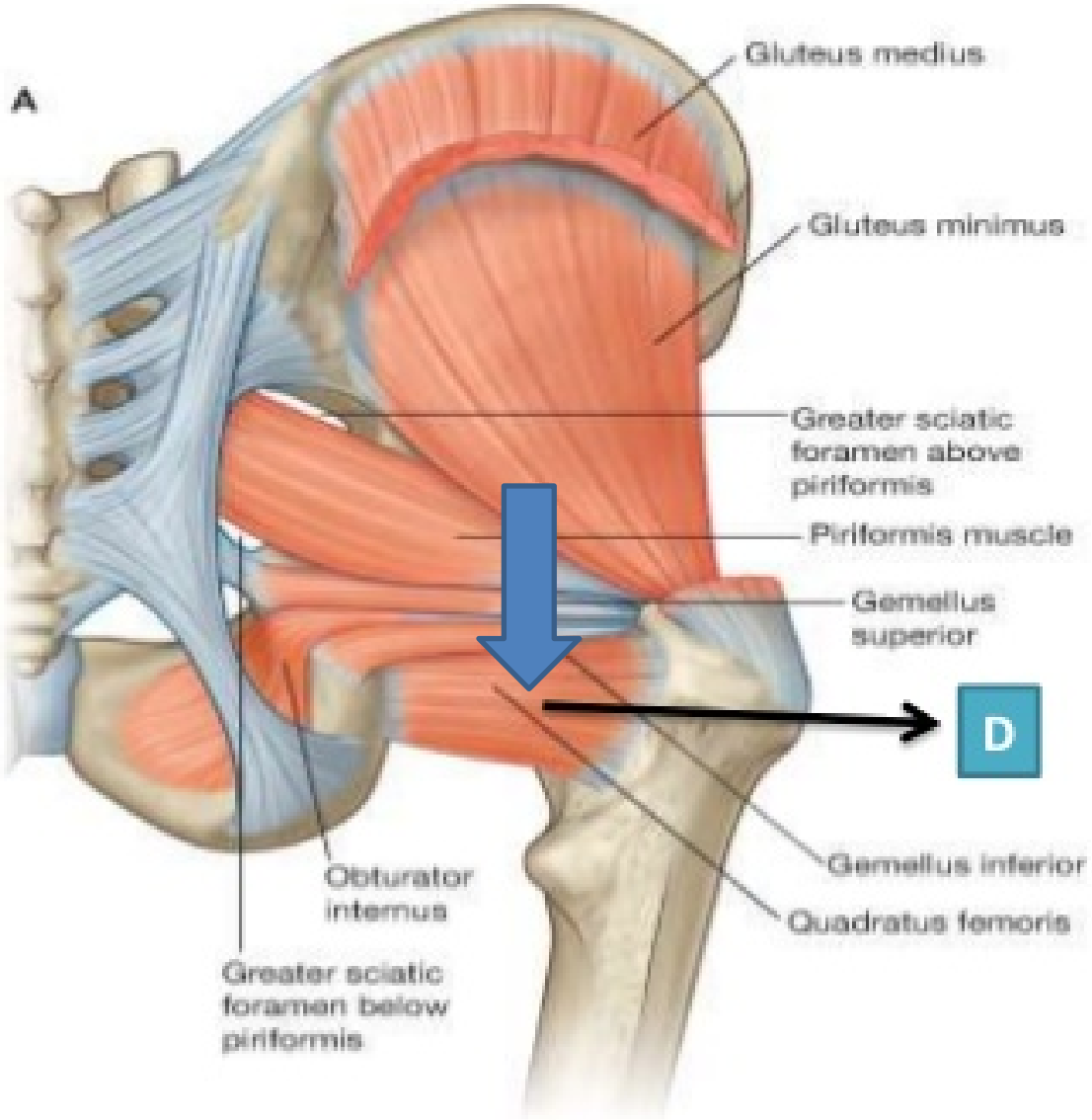


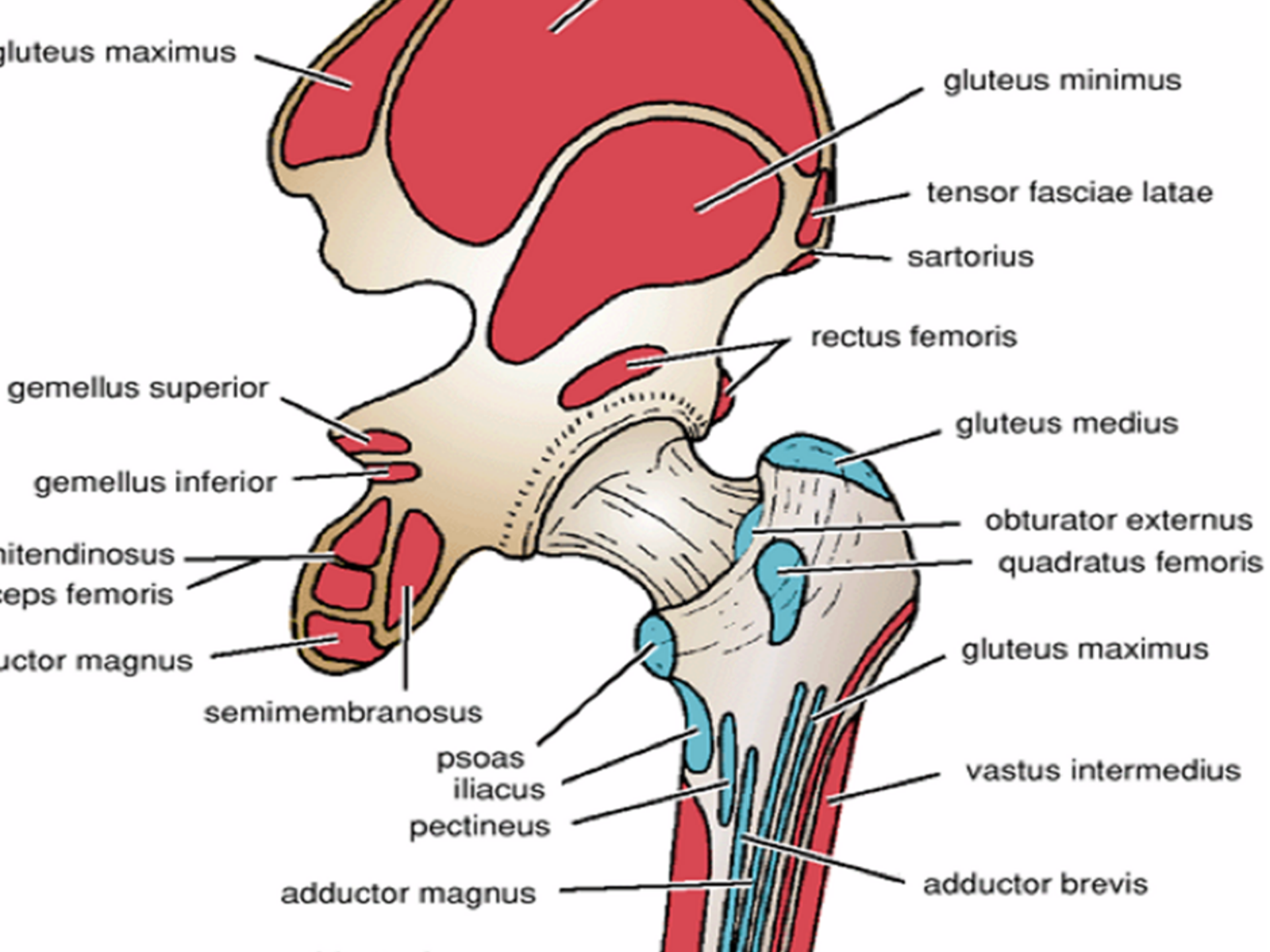
QUADRICEPS FEMORIS

- The last of the deep gluteal muscles, quadratus femoris is named after its flat, quadrilateral shape.

- Function: external rotation of the hip
- Origin: lateral aspect of the ischium
- Insertion: intertrochanteric crest of the femur
- Innervation: nerve to quadratus femoris (L4, L5, S1)

Quadratus femoris (D)




gluteus maximus
gluteus minimus
tensor fasciae latae
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itendinosus
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pectineus
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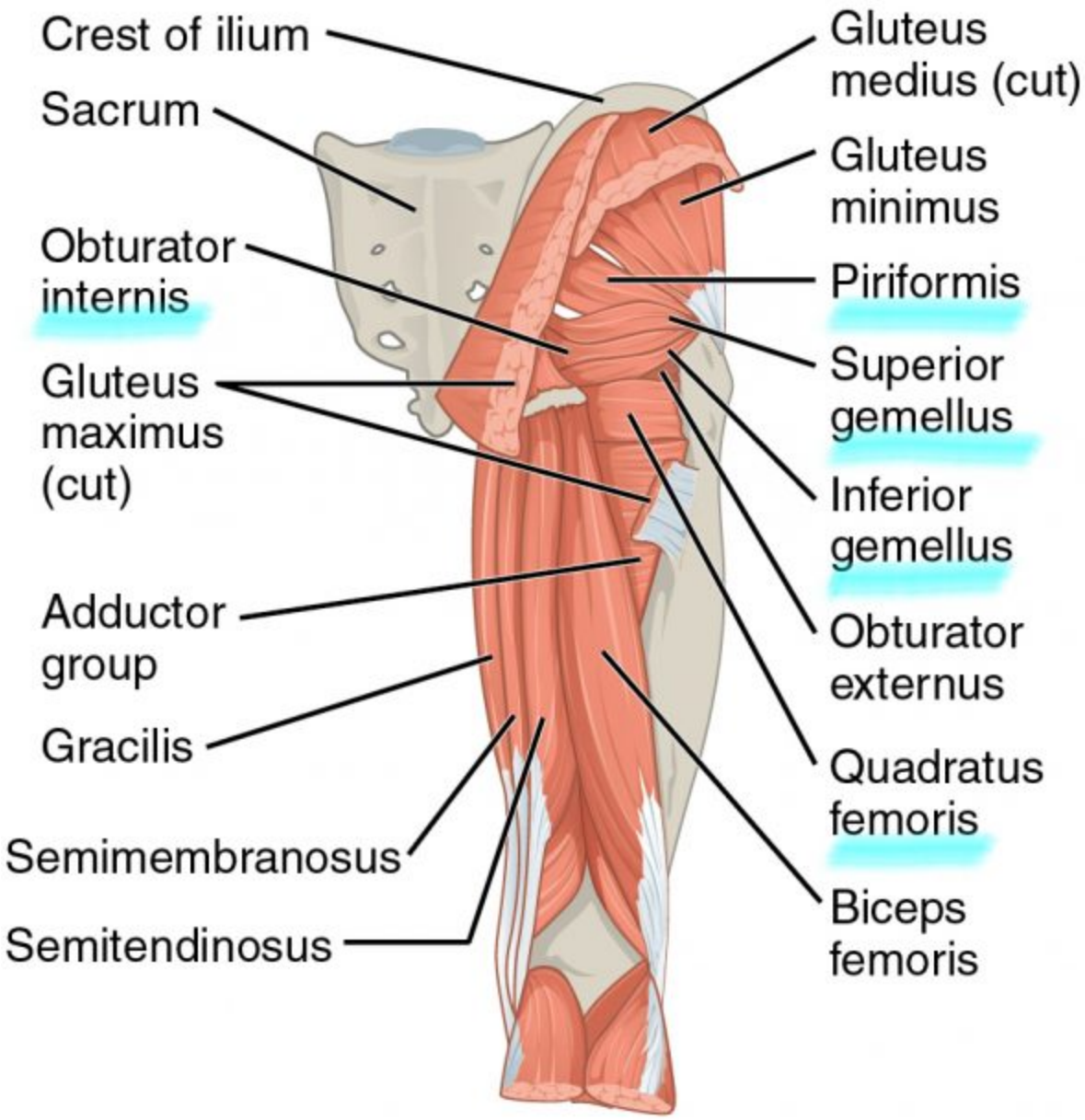
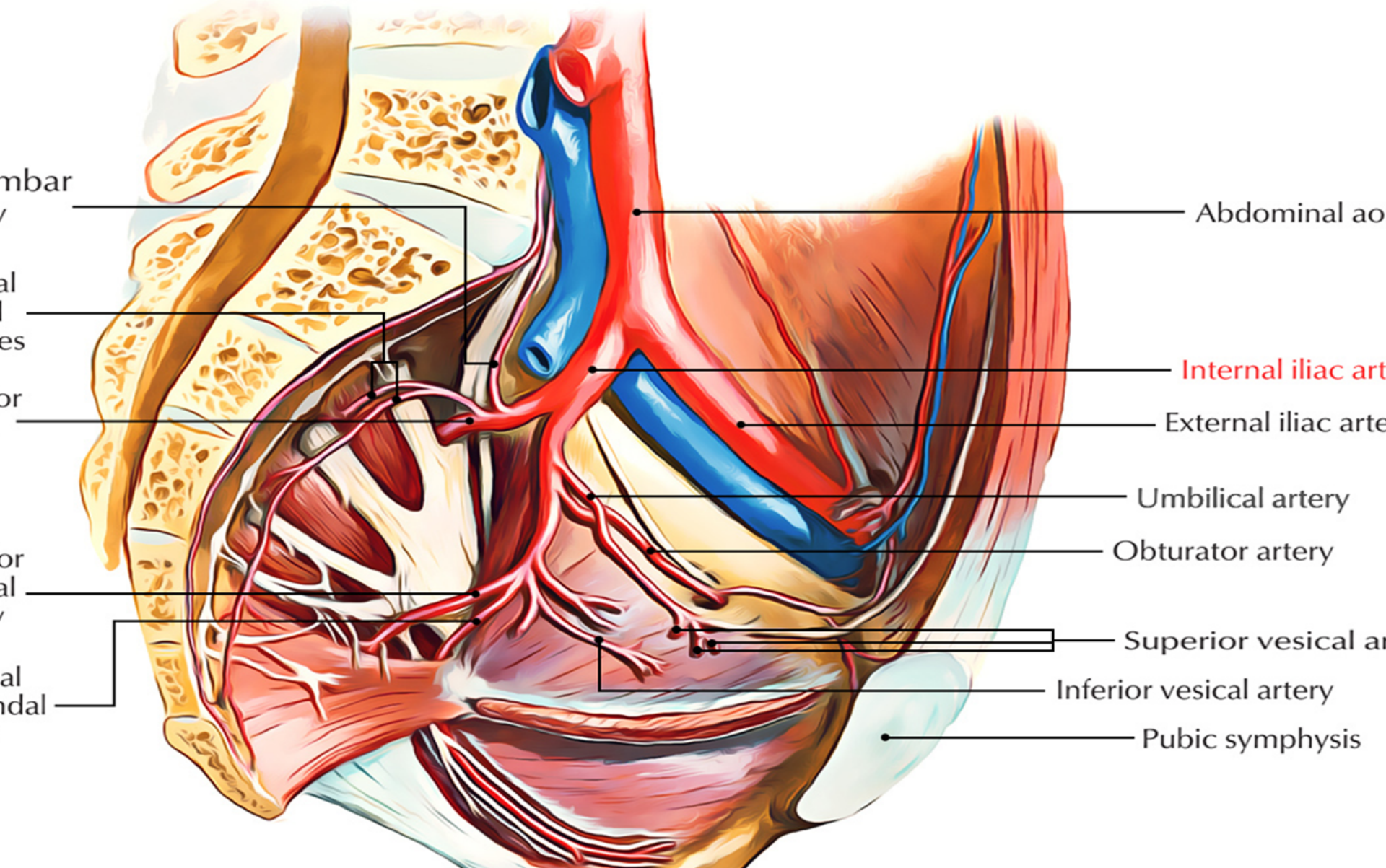
adductor brevis



Pelvic and thigh muscles of right leg (posterior view)

BLOOD SUPPLY



Arteries of Gluteal Region

Superior gluteal-from internal iliac posterior division above piriformis

Inferior gluteal-from internal iliac anterior division-below piriformis

Trochanteric anastomosis- main supply to head of femur. Retinac
nutrient arteries pass along neck of femur to head.

Formation

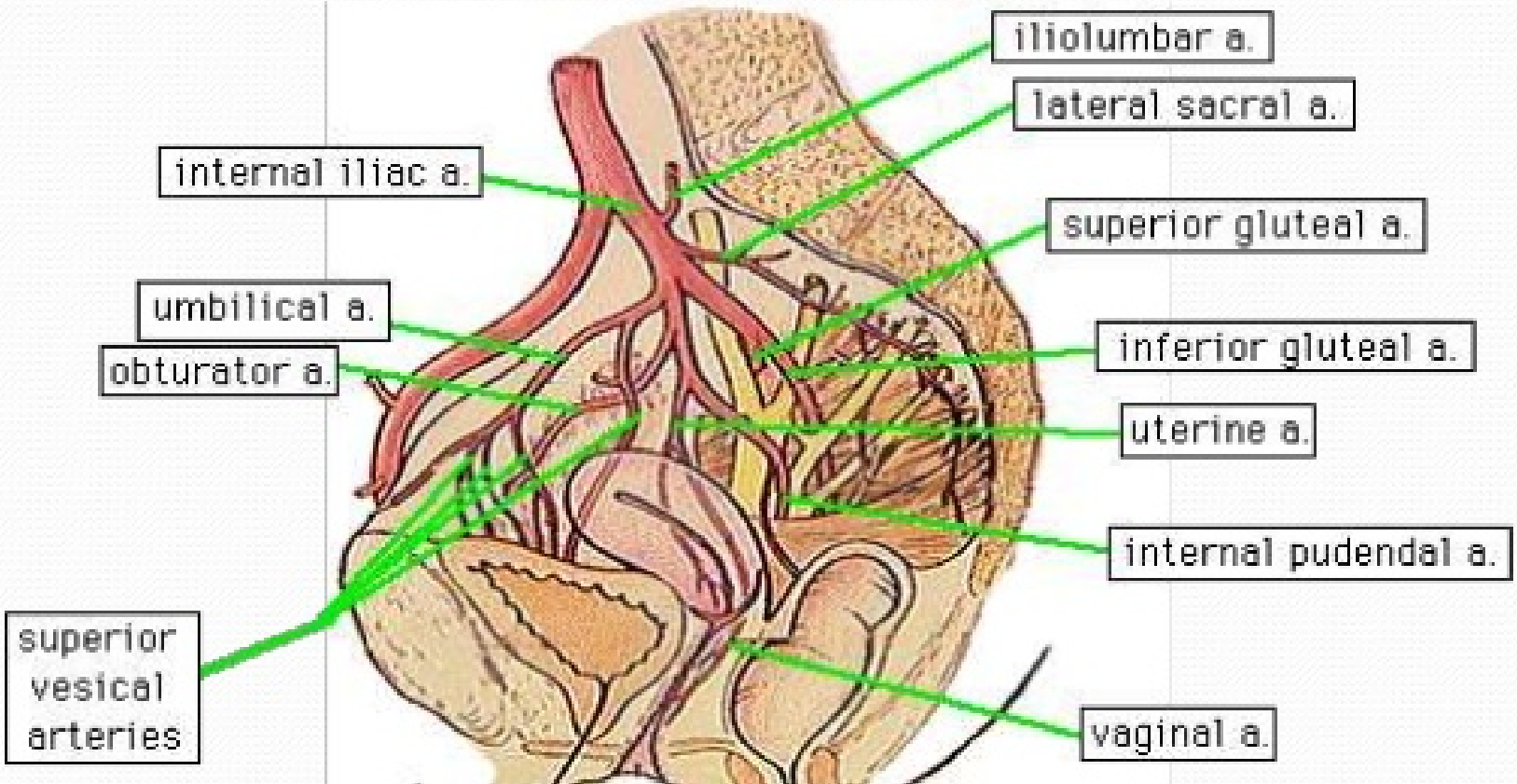
1. **Superior gluteal A**
2. **Inferior gluteal A**
3. **Medial Circumflex A**
4. **Lateral circumflex A**

Cruciate anastomosis

1. **Inferior gluteal**
2. **MCF and LCF**
3. **1st perforating branch of PFA**

Superior gluteal artery

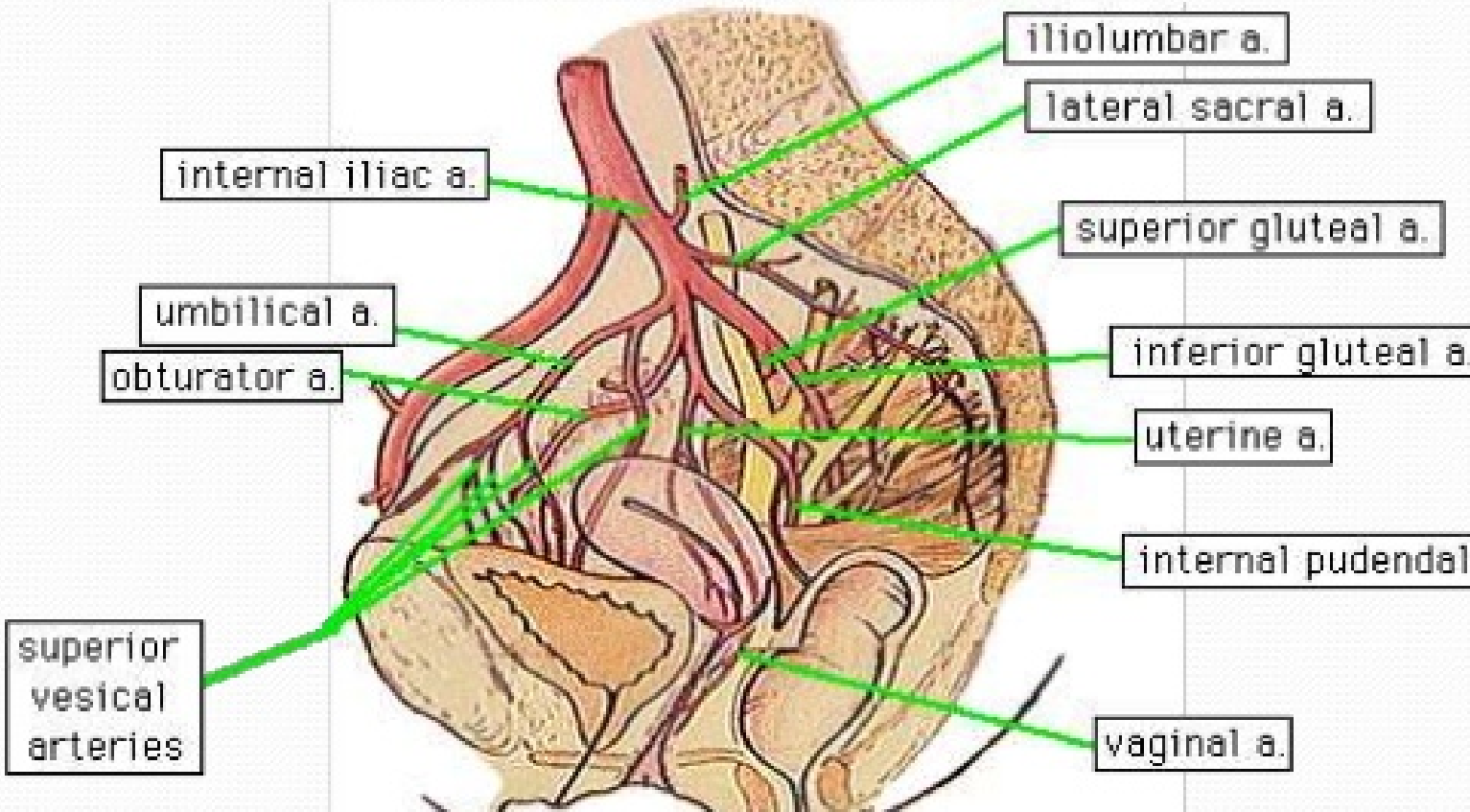
- *Branch from posterior division of the internal iliac artery*
- Leaves the pelvis by passing through the ***greater sciatic foramen above the piriformis muscle***

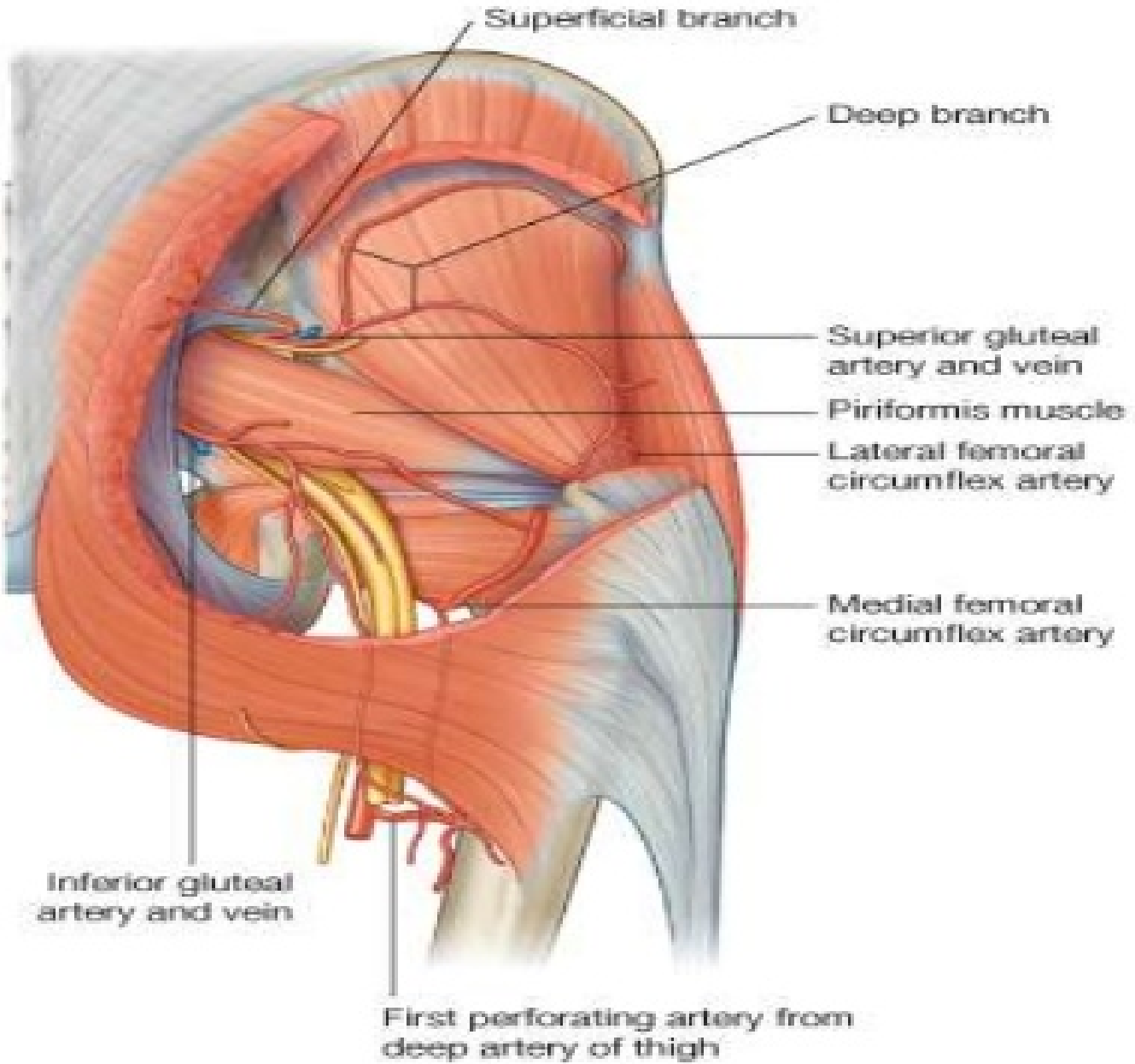


NFERIOR GLUTEAL ARTERY

Arises from anterior division of Internal iliac artery.

Leaves the pelvis by passing through ***the greater sciatic foramen below the piriformis muscle***

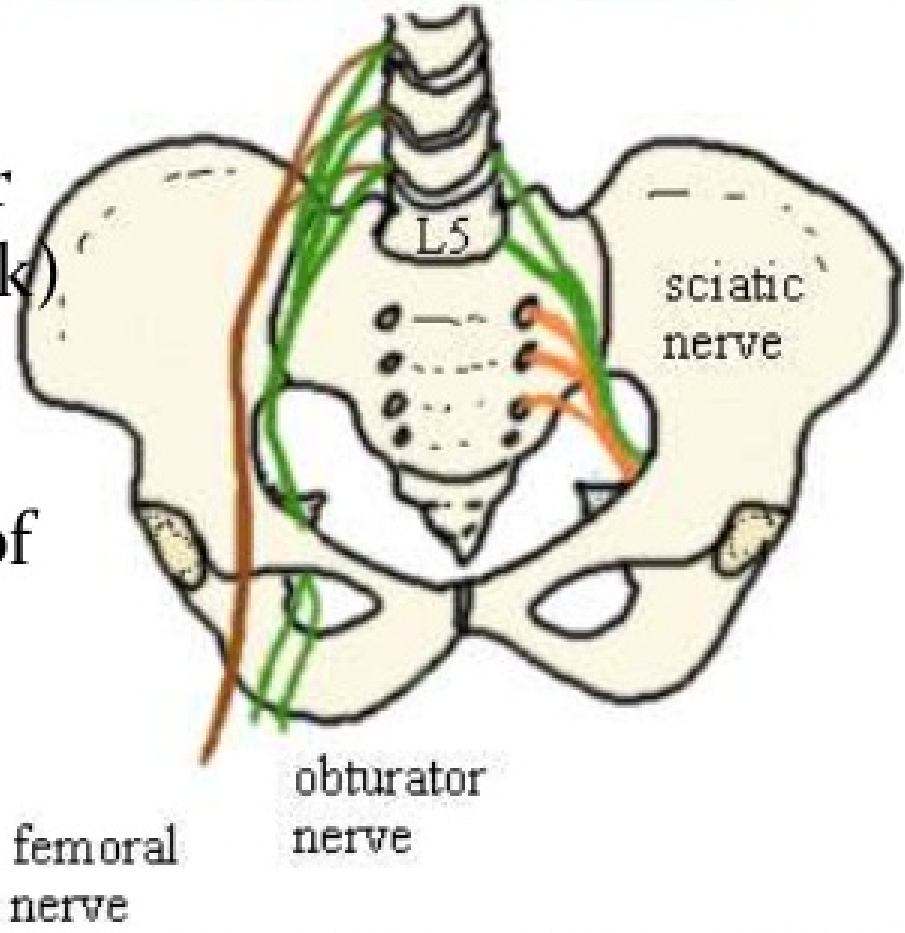



Superficial branch
Deep branch
Superior gluteal artery and vein
Piriformis muscle
Lateral femoral circumflex artery
Medial femoral circumflex artery
Inferior gluteal artery and vein
First perforating artery from deep artery of thigh

Sacral plexus

Formed by the 4th & 5th lumbar ventral rami (lumbosacral trunk) and S_{1234}

- Forms on the ventral surface of the piriformis muscle



- The sacral plexus supplies innervation to the pelvic muscles, gluteal muscles, and perineal muscles. It also forms the sciatic nerve.

Sciatic nerve

(L4, L5, SI, S2, S3)

- Is the largest branch of the sacral plexus and the largest nerve in body

- Consists of two separate nerves, the common peroneal nerve and the tibial nerve
- Leaves the pelvis through the greater sciatic foramen below the piriformis muscle

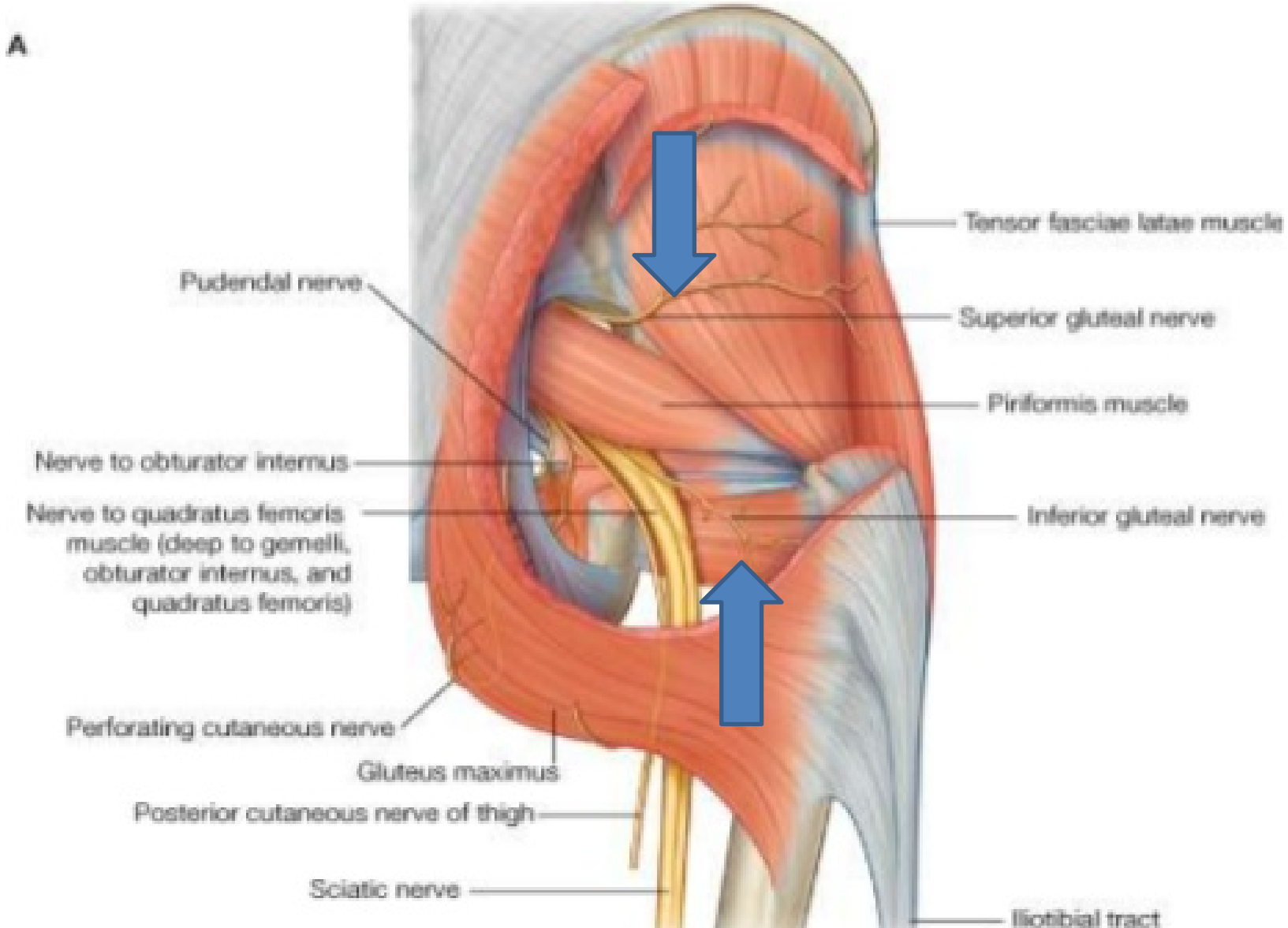
Superior gluteal nerve

(L4, L5, S1)

- Leaves the pelvis through
the greater sciatic foramen above
the piriformis muscle with the superior gluteal artery and vein

- In the gluteal region supplies the gluteus medius, the gluteus minimus, the tensor fasciae latae, and the hip joint

DIAGRAM OF GLUTEAL NERVE



Inferior gluteal nerve

(L_5, S_1, S_2)

- Leaves the pelvis through the greater sciatic foramen below the piriformis muscle with the inferior gluteal artery and vein

- In the gluteal region supplies the gluteus maximus muscle

Posterior femorai cutaneous nerv

(SI, S2, S3)

- Leaves the pelvis through the greater sciatic foram inferior to the piriformis

- In the gluteal region descends on the posterior surface of the sciatic nerve

- Supplies the skin of the buttocks, posterior thigh, popliteal fossa, and external genitalia

Nerve to the obturator internus

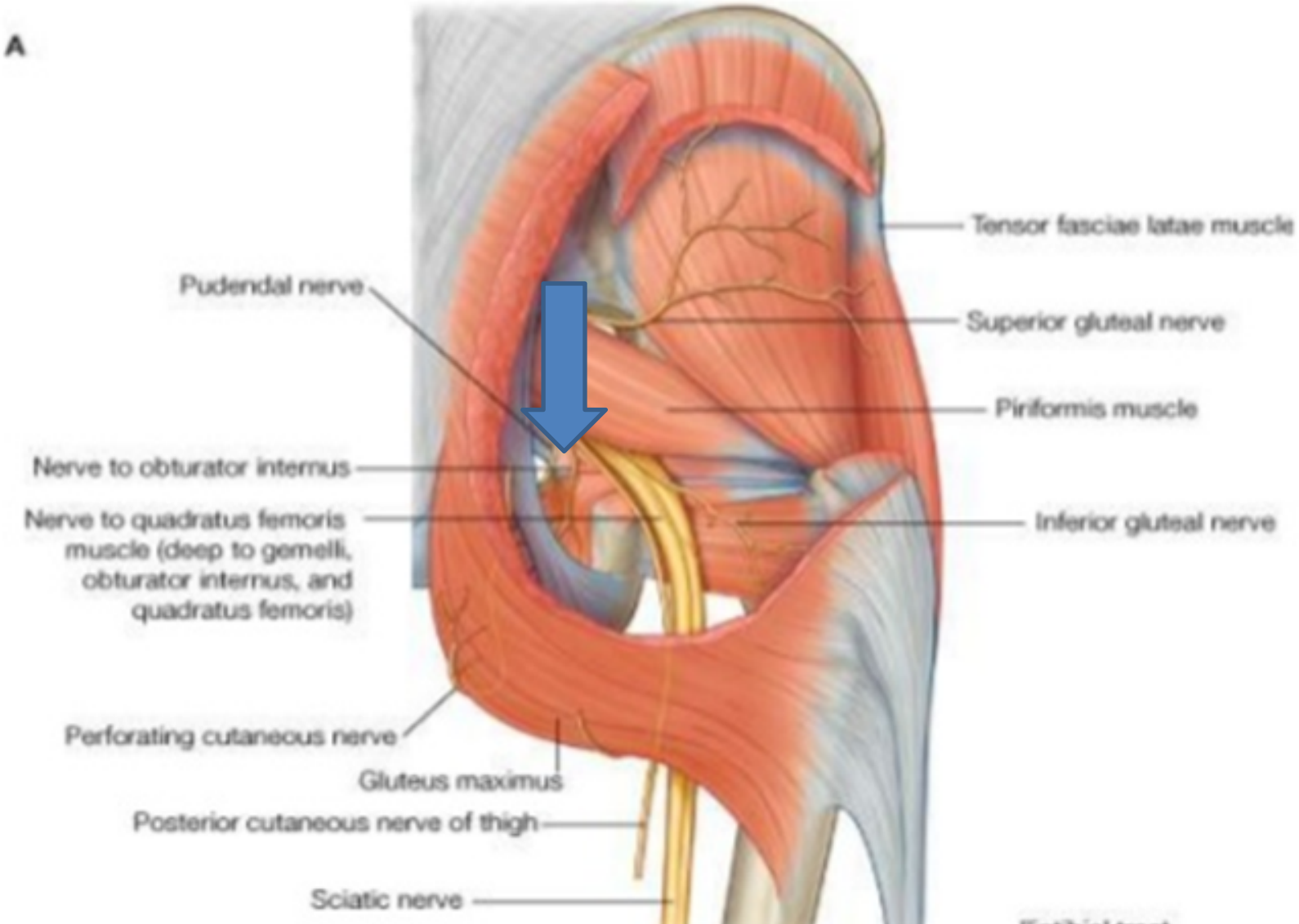
(L5, S1, S2)

Leaves the pelvis through the greater sciatic foramen below the piriformis muscle

In the gluteal region descends on the superior gemellus muscle to pass below the ischial spine and enter the lesser sciatic foramen

Supplies the superior gemellus and obturator internus muscles

DIAGRAM OF GLUTEAL NERVE



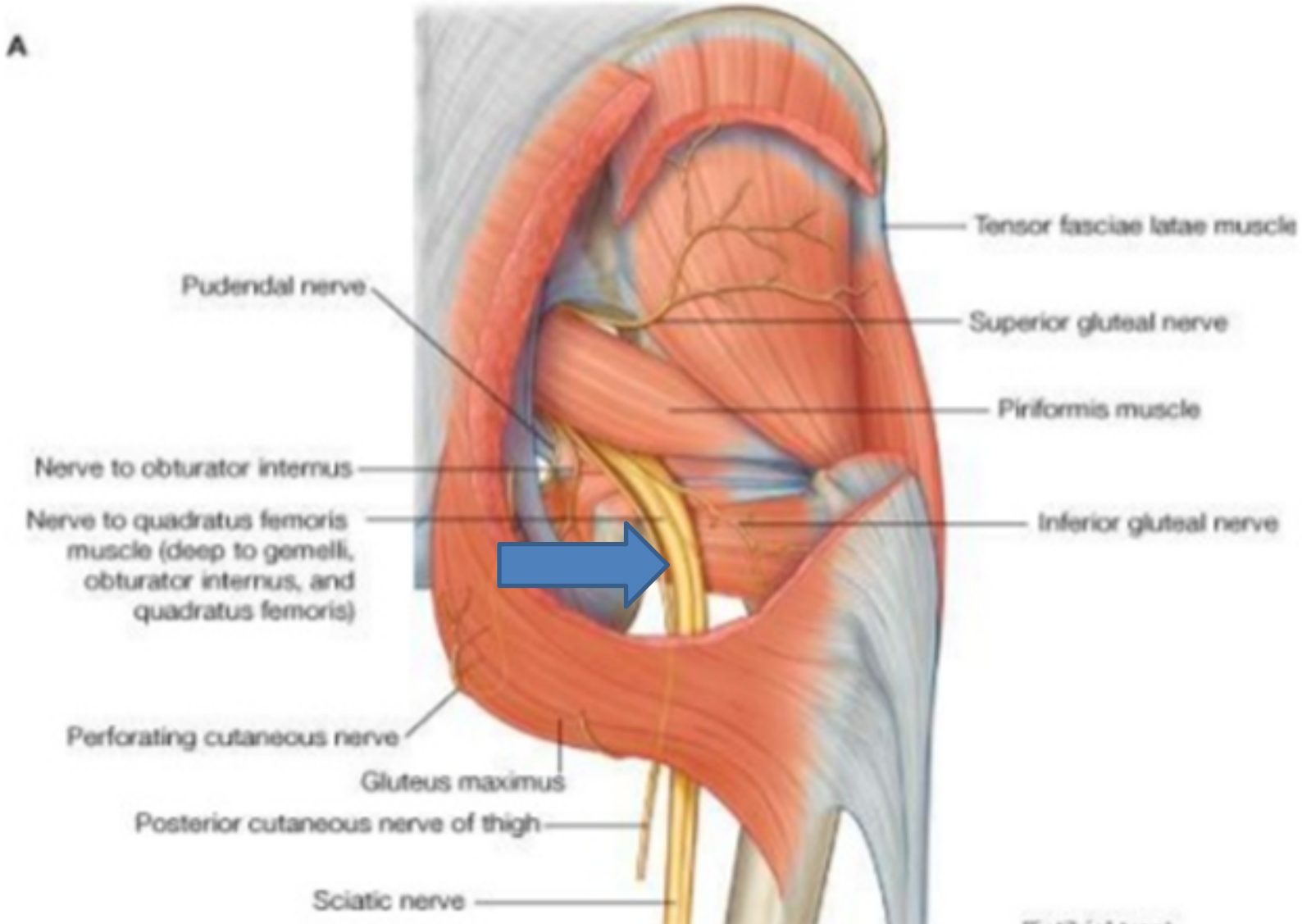
Nerve to the quadratus femoris (L_4, L_5, SI)

- Leaves the pelvis through the greater sciatic foramen below the piriformis muscle and deep to the sciatic nerve

- In the gluteal region runs anterior to the superior and inferior gemellus and obturator internus muscles

- Supplies the inferior gemellus and quadratus femoris muscles

DIAGRAM OF GLUTEAL NERVE



Pudendal nerve

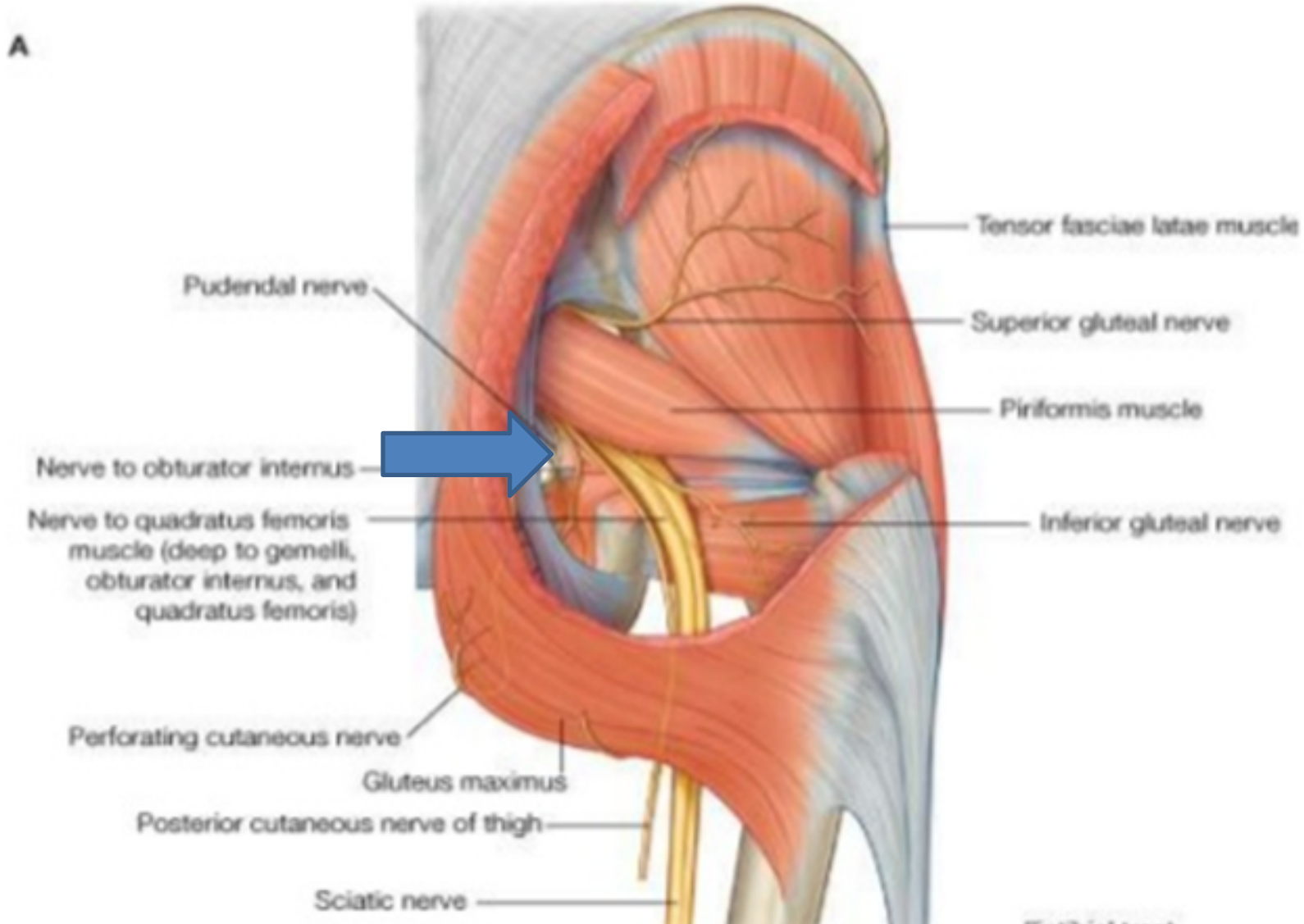
(S_2, S_3, S_4)

- Leaves the pelvis through the greater sciatic foramen inferior to the piriformis muscle along wi the internal pudendal artery and vein

- In the gluteal region descends posterior to the ischial spine and enters the lesser sciatic foramen

- Is distributed to the perineum and has no branch in the gluteal region

DIAGRAM OF GLUTEAL NERVE



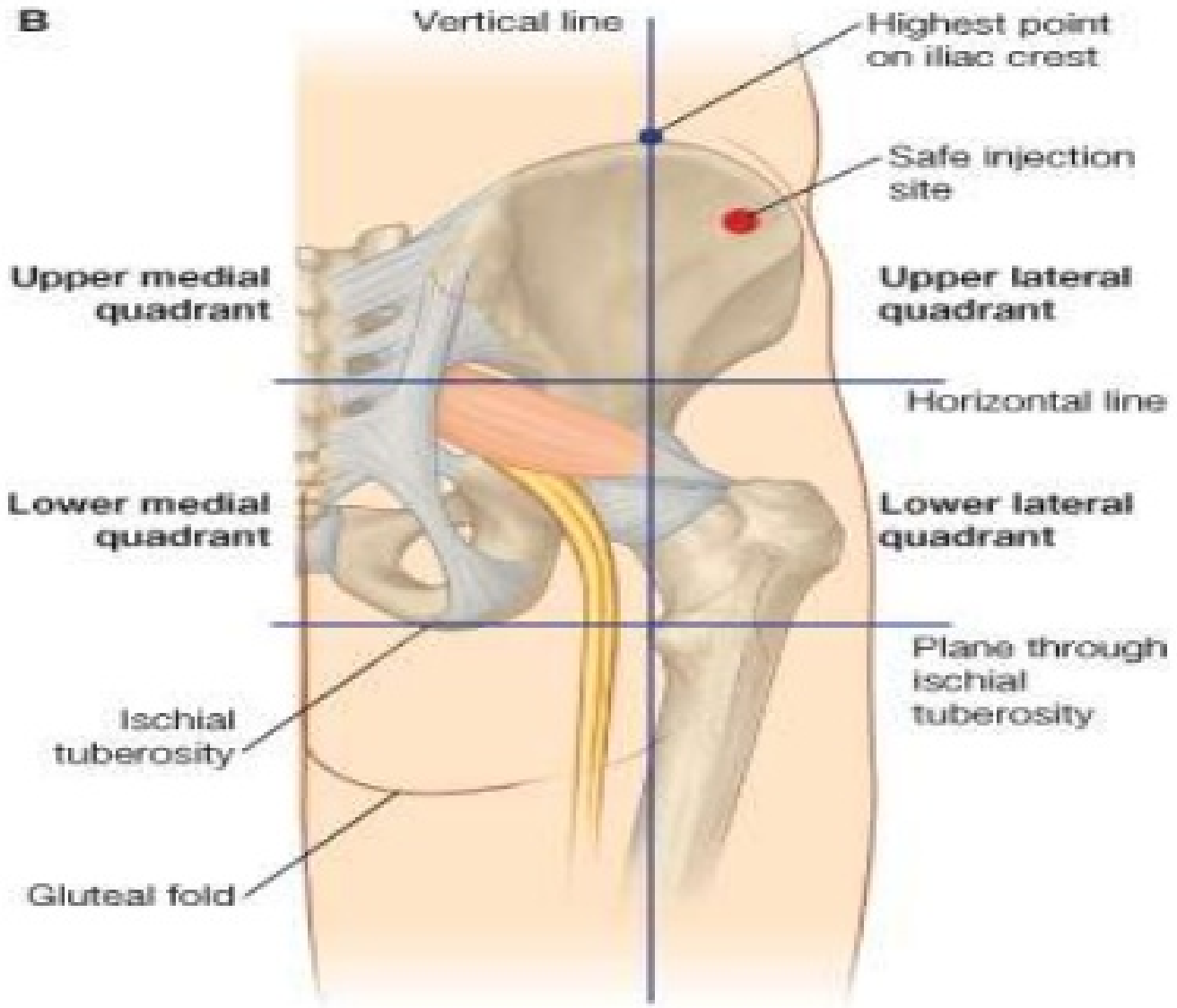
Movements of the hip muscles

- Muscles passing the hip anteriorly cause flexion at the hip
- Muscles passing the hip posteriorly cause extension at the hip (gluteus maximus)
- Muscles passing laterally cause abduction at the hip (gluteus medius and minimus)
- Small muscles that are lower on the femur are often more responsible for rotation (the deep gluteal muscles)

Intramuscular injections

- From time to time it is necessary to administer drugs intramuscularly: that is, by direct injection into muscles.
- This procedure must be carried out without injuring neurovascular structures.
- A typical site for an intramuscular injection is the gluteal region.
- The sciatic nerve passes through this region and needs to be avoided.
- The safest place to inject is the upper outer quadrant of either gluteal region.

QUADRANT FOR INTERMUSCULAR INJECTION



Clinical relevance – Trendelenburg's sign

- Patients with impaired hip abduction may present with an abnormal gait (ataxia). Impaired hip abduction is commonly due to damage to the superior gluteal nerve. This may occur secondary to pelvic fractures, space-occupying lesions and as a complication of hip surgery.

- In these patients, Trendelenburg's sign is said to be positive and may be demonstrated by asking the patient to stand on the affected leg only, when this is done the pelvis drops to the unaffected sign.