University of Baghdad
College of Medicine
2022-2023

Title: Gluteal Region

Grade: One

Module: HSF-I

Speaker: Prof. Dr. Malak A. Taha

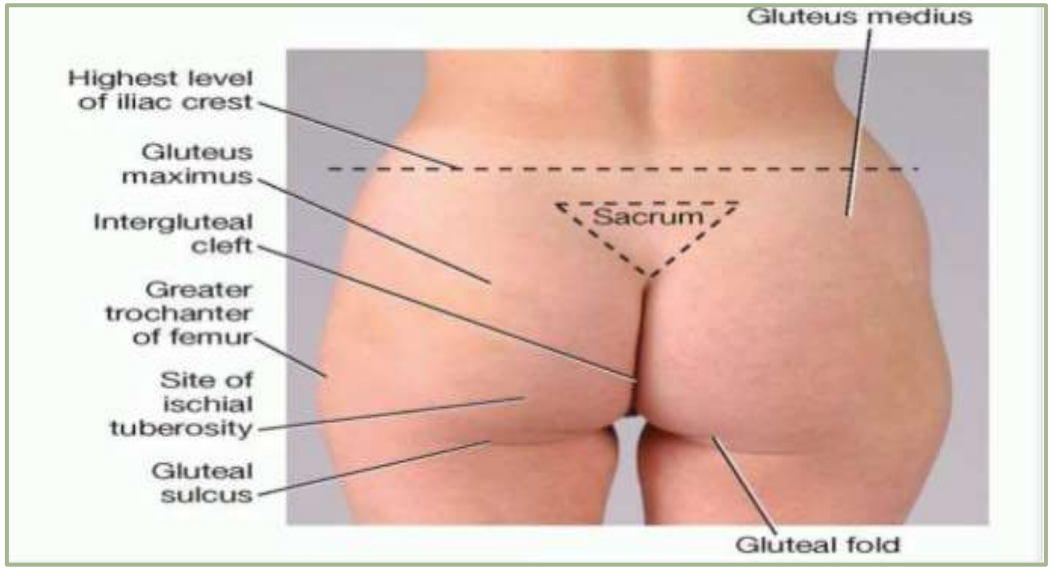
Date:

Objectives

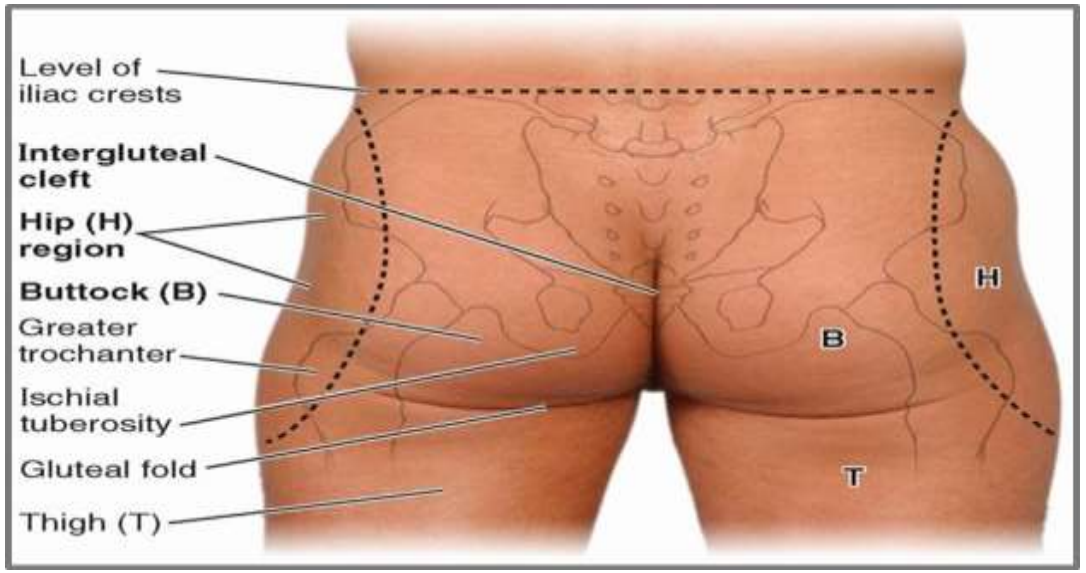
- **Describe** the gluteal region
- **List** its muscles, vessels & nerves
- **Specify** the site of injection
- **Demonstrate** some important pathologies affecting the structures in this region

Gluteal Region: Buttocks and Hip Region

- ❑ The demarcation of the trunk and lower limb
- ✓ Anteriorly, is abrupt at the inguinal ligament,
- ✓ Posteriorly the gluteal region is a large transitional zone between the trunk and limb.



- ❑ **The gluteal region**
- ✓ **Physically** part of the trunk,
- ✓ **functionally** part of the lower limb



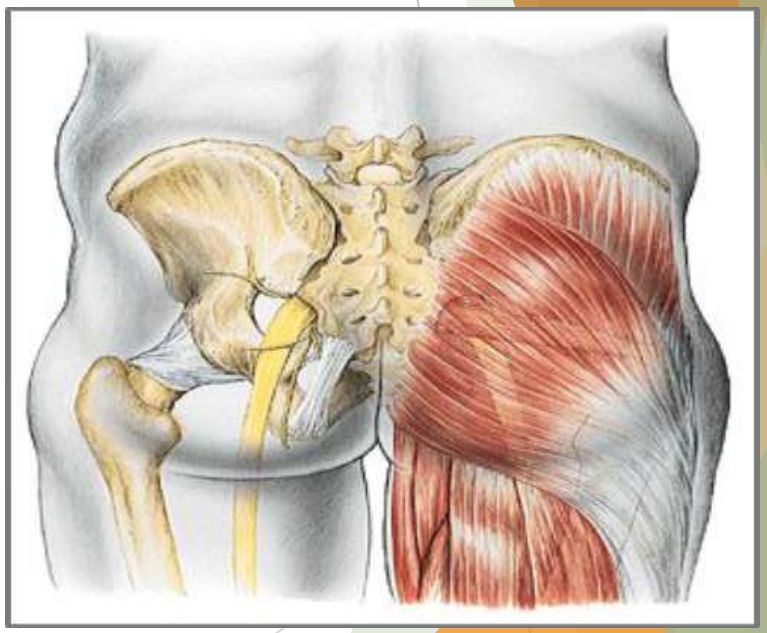
- The **intergluteal cleft (natal cleft)** is the groove that separates the buttocks from each other.

- The **gluteal fold**
  - ✓ demarcates the inferior boundary of the buttock and the superior boundary of the thigh.
  - ✓ is the transverse skin crease for the hip joint and is not caused by the lower border of the gluteus maximus, which crosses the line of the fold obliquely.

- The subcutaneous fat is well developed in this region

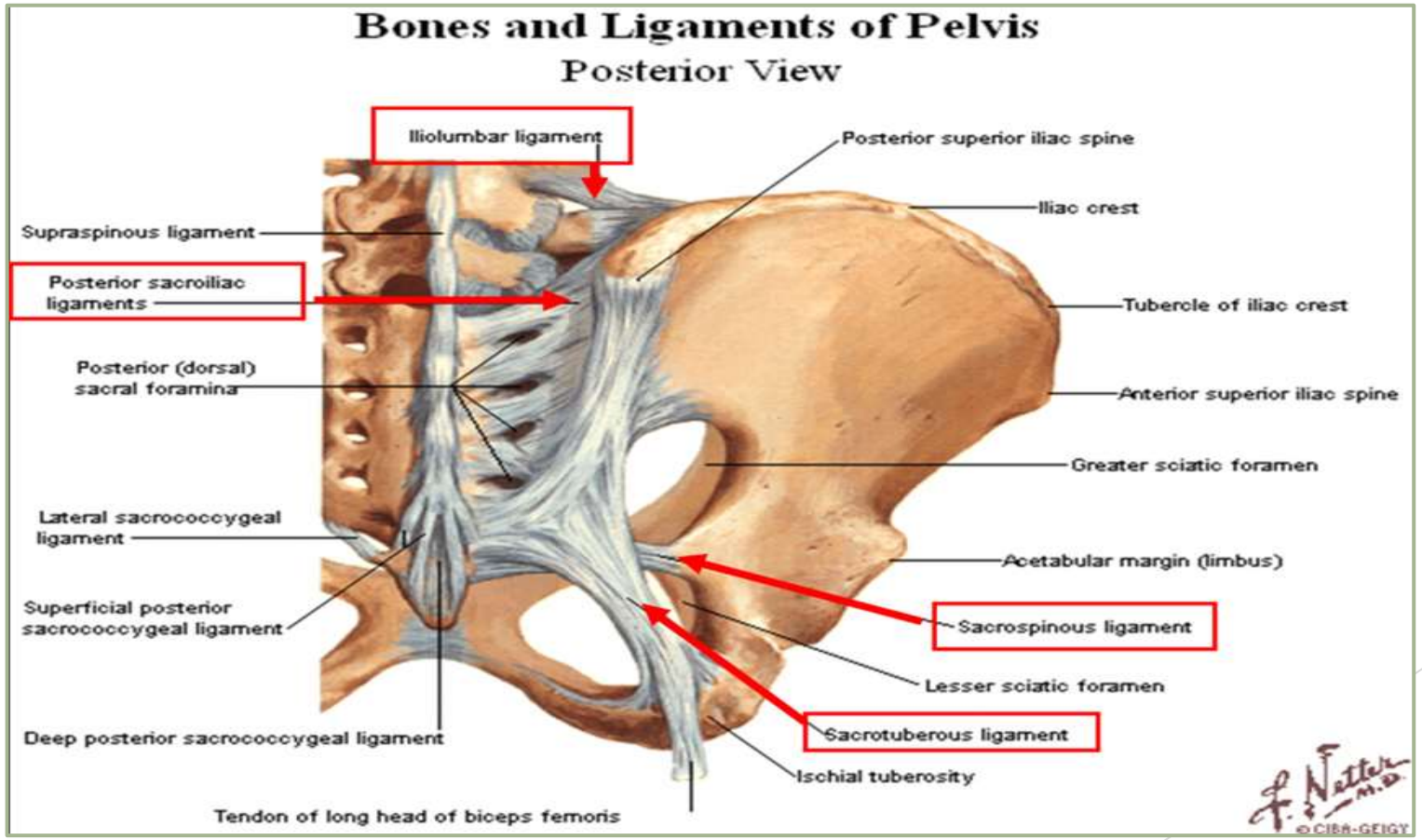
Gluteal Region

- **Boundaries**
  - ✓ Iliac crest above
  - ✓ Gluteal fold below
- The region **communicates** with the **pelvic cavity** and **perineum** through the **greater** and **lesser sciatic foramina**
- Inferiorly, it is continuous with the posterior thigh (hamstring comp).



GLUTEAL LIGAMENTS

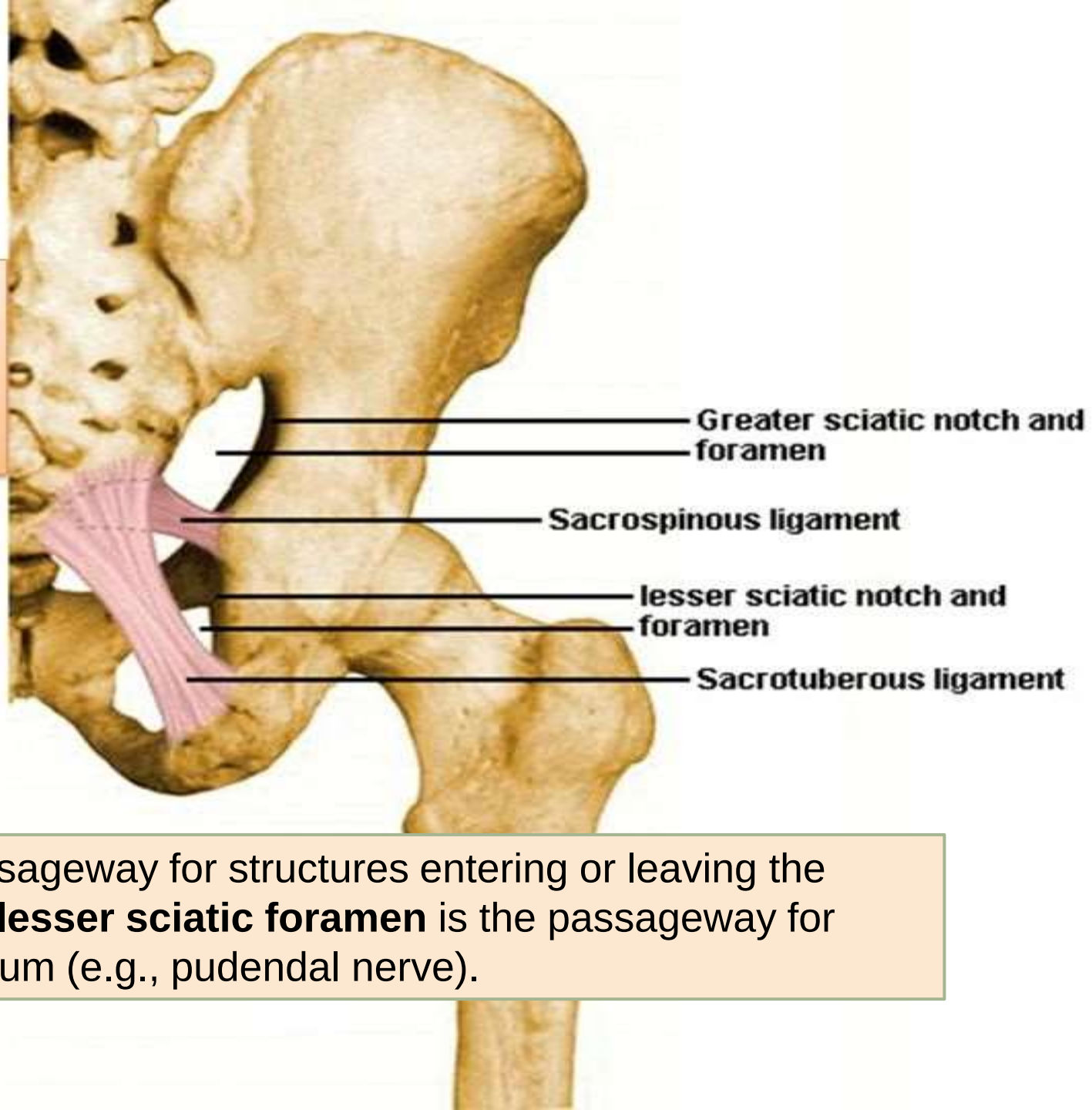
- The **posterior sacroiliac ligament** is continuous inferiorly with the **sacrotuberous ligament**.



ligaments in the gluteal region

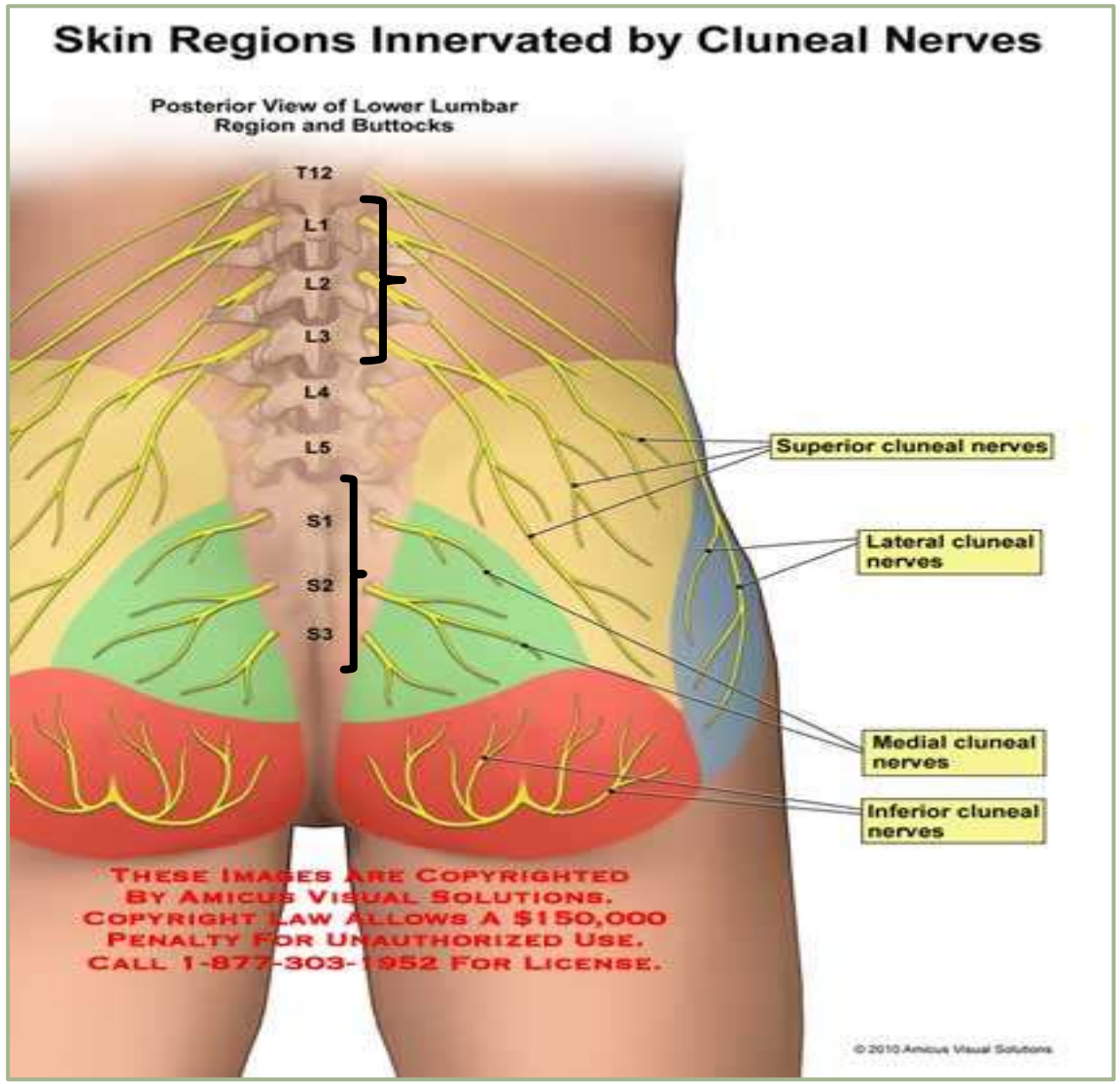
1- SACROTUBEROUS LIGAMENT

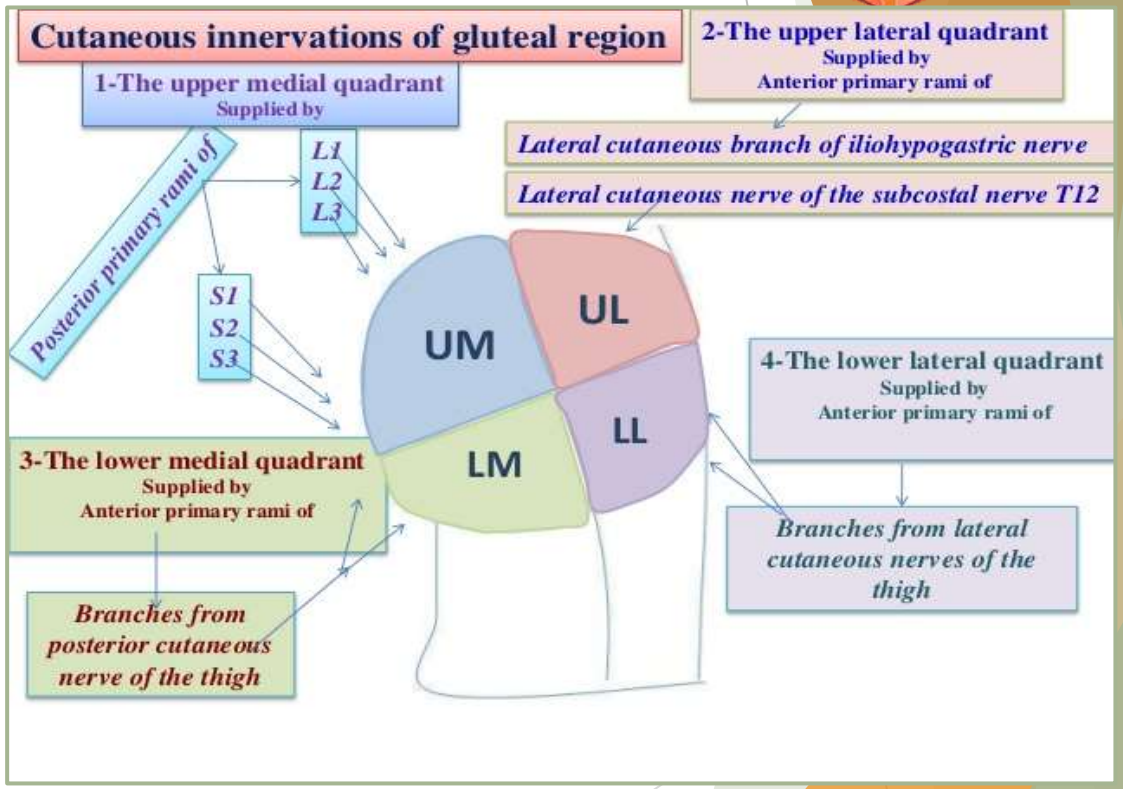
2- SACROSPINOUS LIGAMENT



- The **greater sciatic foramen** is the passageway for structures entering or leaving the pelvis (e.g., sciatic nerve), whereas the **lesser sciatic foramen** is the passageway for structures entering or leaving the perineum (e.g., pudendal nerve).

Cutaneous nerves





NERVES OF THE GLUTEAL REGION

Nerve	Origin	Course	Distribution
Superior Clunial nerve	posterior rami of **L1-L3**	cross iliac crest	Supply skin of superior & central parts of buttocks
Middle (Medial) Clunial nerve	posterior rami of **S1-S3** nerves	exit through posterior sacral foramina and enter gluteal region	Supply skin of medial buttocks and inter-gluteal cleft
Inferior Clunial nerve	posterior cutaneous nerve of Thigh **(S2&S3)**	curve around inferior border of gluteus maximus	Supplies skin of inferior buttocks (overlying the gluteal folds)
Lat. Cut. Br. Of Subcostal N.	Ant. Rami of **T12**	Descends over iliac crest	Supplies skin of hip region inferior to ant. Part of iliac crest and ant. To greater trochanter
Lat. Cut. Br. Of iliohypogastric N.	Ant. Rami of **L1**	Parallels iliac crest	Supplies the supralateral quadrant of buttocks
Lateral cutaneous N. of thigh	Ant. Rami of **L2**	Passes deep to inguinal ligament	Supplies skin of lower part of Lateral buttock

Muscles of Gluteal Region

The superficial layer

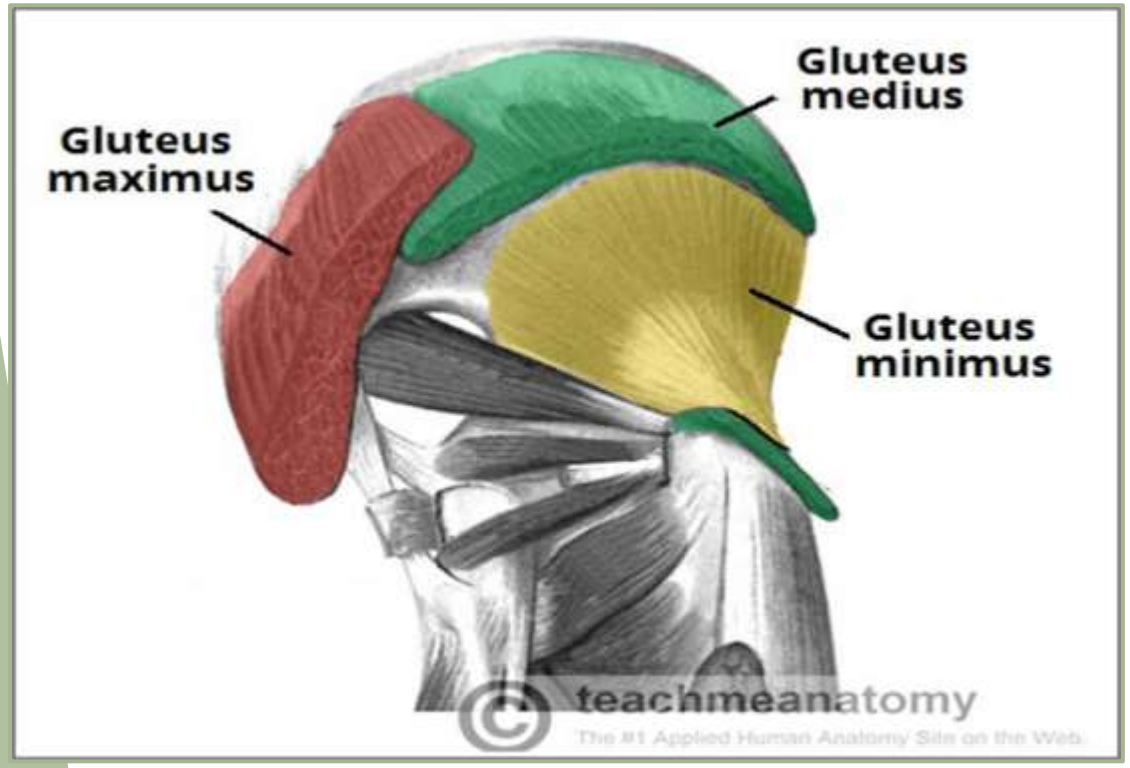
- consists of the three large overlapping glutei (maximus, medius, and minimus) and the tensor fasciae latae
- all have proximal attachments to external surface and margins of the ala of the ilium
- are mainly **extensors, abductors**, and **medial rotators of the thigh**.

The deep layer

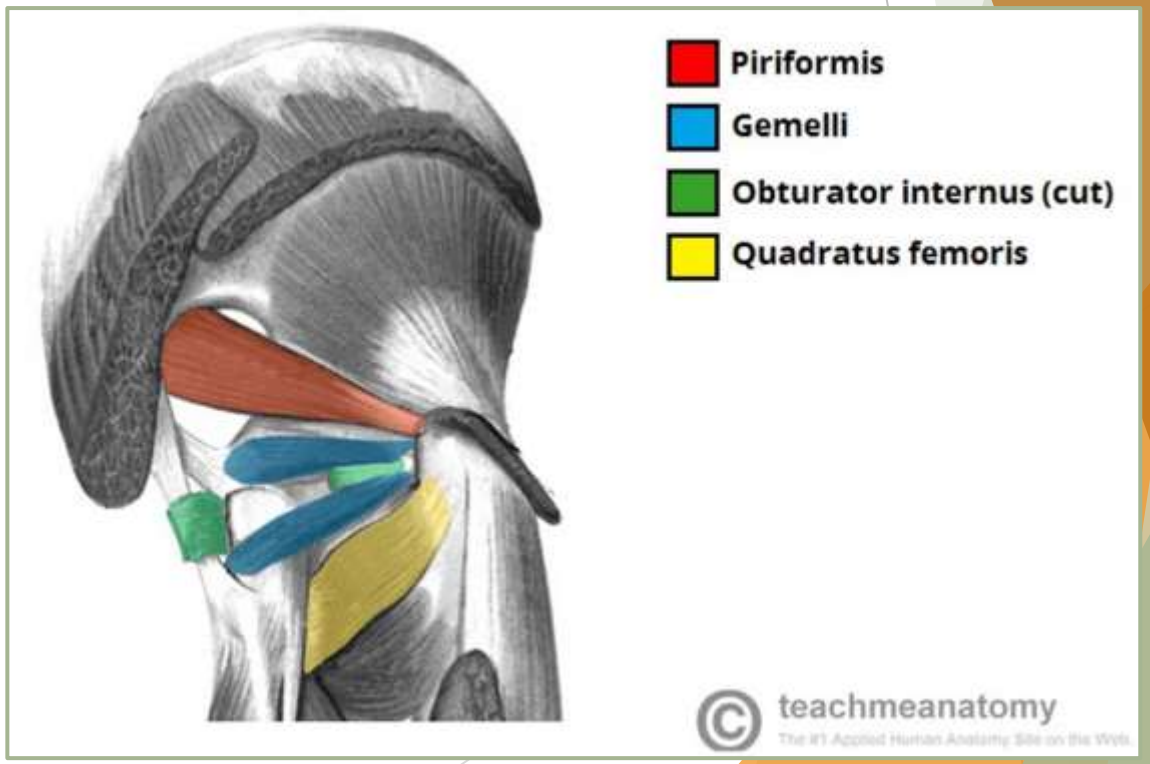
- consists of smaller muscles (**piriformis**, **obturator internus**, **superior and inferior gemelli**, and **quadratus femoris**)
- all have distal attachments on or adjacent to the intertrochanteric crest of the femur.
- are **lateral rotators** of the thigh, but they also **stabilize the hip joint,**

Muscles of Gluteal Region

Superficial layer



Deep layer



Muscle	Origin	Insertion	N Supply	Action
Gluteus Maximus	○ Ilium posterior to posterior gluteal line; ○ dorsal surface of sacrum and coccyx; ○ sacrotuberous ligament	○ Most fibers end in iliotibial tract, which inserts into lateral condyle of tibia; ○ some fibers insert on gluteal tuberosity	Inferior gluteal nerve (L5, S1, S2)	○ Extensor, abductor & lateral rotator of femur

Actions of the gluteus maximus

- It extends and laterally rotates the hip joint
- Through the iliotibial tract it helps maintain the knee joint in extension.
- It is most commonly used as an extensor of the trunk on the thigh
- The chief antigravity muscle of the hip.
- It is used in standing up from a sitting position, running & climbing up stairs.

Testing the gluteus maximus

- ✓ the person is prone with the lower limb straight.
- ✓ The person tightens the buttocks and extends the hip joint
- ✓ G Max. can be observed and palpated

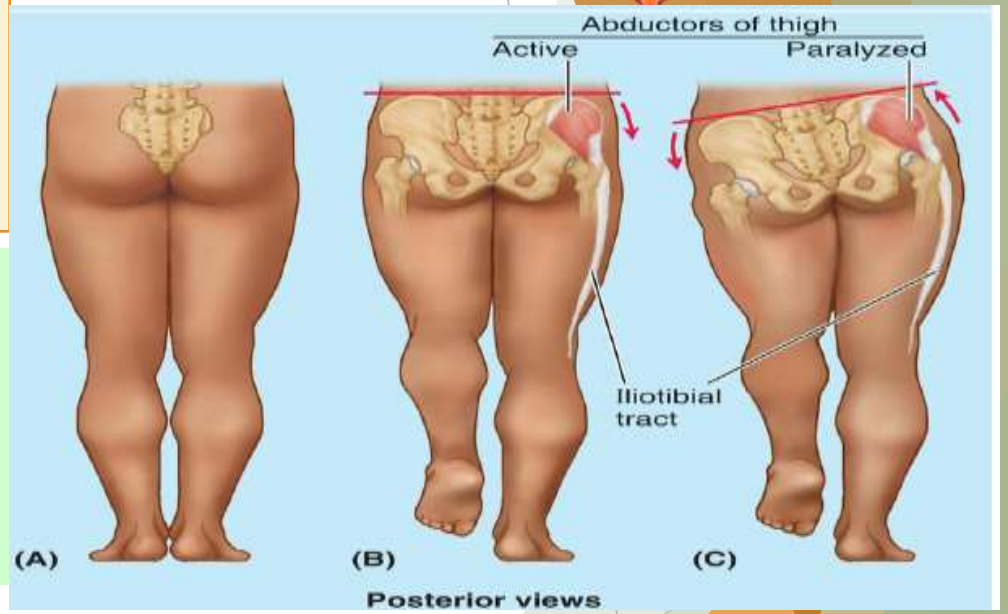
- ✓ The **gluteus maximus** contracts only **briefly** during the **earliest part** of the **stance phase** .
- ✓ On **climbing stairs** , the gluteus maximus **contract strongly**.

- **Paralysis of the gluteus maximus** does not seriously affect **walking on level ground.**

Muscles	Origin	Insertion	N Supply	Action
Gluteus medius	External surface of ilium between anterior and posterior gluteal lines	Lateral surface of greater trochanter of femur	Superior gluteal nerve (L4, L5, S1)	○ Abduct and medially rotate thigh; ○ keep pelvis level when ipsilateral limb is weight-bearing and advance opposite (unsupported) side during its swing phase
Gluteus minimus	External surface of ilium between anterior and inferior gluteal lines	Anterior surface of greater trochanter of femur		
Tensor of fascia lata	Anterior superior iliac spine; anterior part of iliac crest	Iliotibial tract, which attaches to lateral condyle of tibia		

Actions of the Glute Med & Min

- ✓ abduct the hip joint
- ✓ rotate the thigh medially by their anterior fibres called into play as the foot on one side is raised during walking and running
- ✓ they are assisted by tensor fasciae latae
- ✓ They are important in holding both hips at the same level & preventing drop of the lifted side during walking



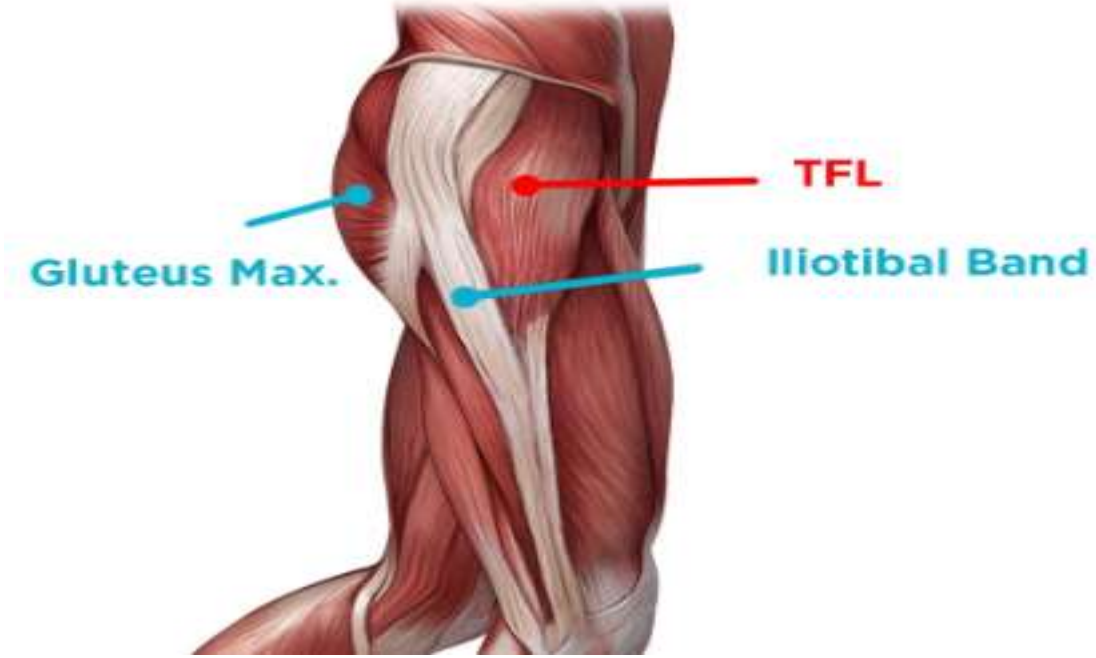
Testing the Glute Med & Min:

- ✓ the person is sidelying with the test limb uppermost and the lowermost limb flexed at the hip and knee for stability.
- ✓ The person abducts the thigh against resistance.
- ✓ The gluteus medius can be palpated

Trendelenburg test

- ✓ patient standing on one leg
- ✓ pelvis on the opposite side should rise slightly;
- ✓ if it falls due to loss of abductor power on the supporting side, the test is positive

Actions of tensor fasciae latae



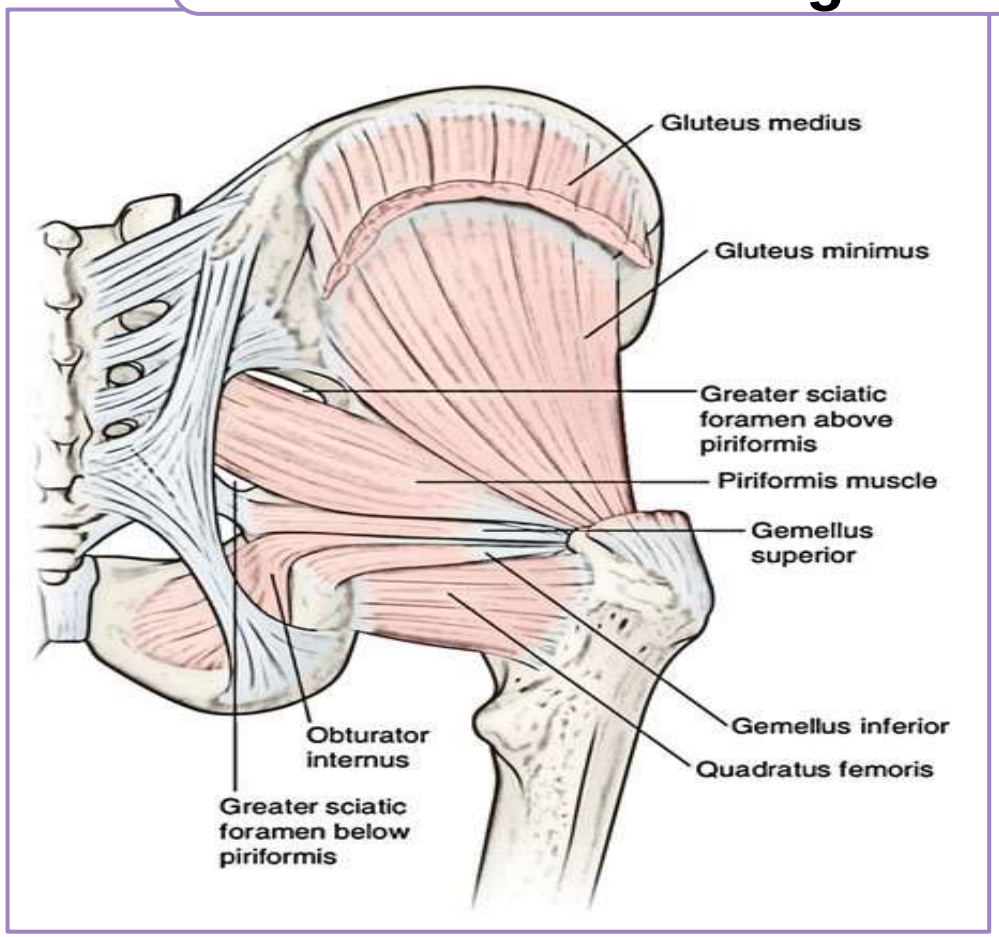
- is primarily a **flexor of the thigh**. It acts in concert with the iliopsoas and rectus femoris.
- It also works in conjunction with other **abductor/medial rotator muscles** (gluteus medius and minimus) as a synergist or fixator.
- It exerts traction on the iliotibial tract assists the gluteus maximus muscle in **maintaining the knee in the extended position**.

Muscles	Origin	Insertion	N Supply	Action
Piriformis	Anterior surface of sacrum; sacrotuberous ligament	Superior border of greater trochanter of femur	Branches of anterior rami of S1, S2	▪ Laterally rotate extended thigh ▪ abduct flexed thigh; ▪ steady femoral head in acetabulum
Obturator internus	Pelvic surface of obturator membrane and surrounding bones	Medial surface of greater trochanter (trochanteric fossa) of femur	Nerve to obturator internus (L5, S1,S2)	
Superior and inferior gemell	▪ Superior: ischial spine ▪ Inferior: ischial tuberosity	Medial surface of greater trochanter (trochanteric fossa) of femur	Superior gemellus: same nerve supply as obturator internus Inferior gemellus: same nerve supply as quadratus femoris	

Muscles	Origin	Insertion	N Supply	Action
Quadratus femoris	Lateral border of ischial tuberosity	Quadrate tubercle on intertrochanteric crest of femur and area inferior to it	Nerve to quadratus femoris (L4, L5, S1)	Laterally rotates thigh[c]; steadies femoral head in acetabulum

The **short rotators Test as a group by external rotation of the extended hip** and **abduction of the flexed hip against resistance**

Actions of Deep Muscles of Gluteal Region



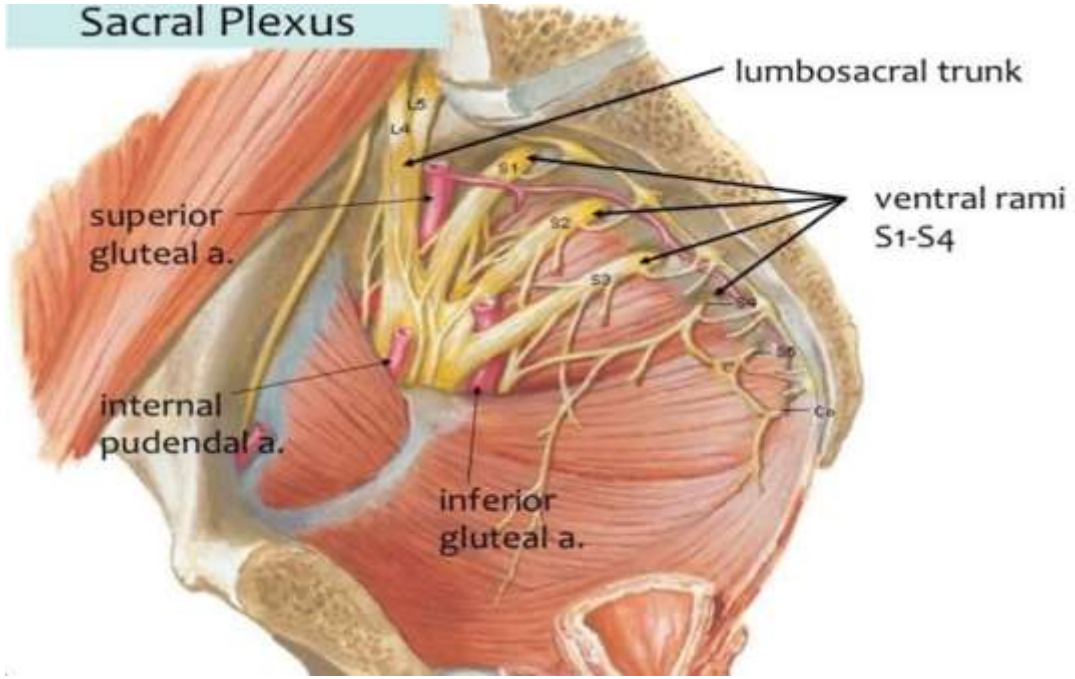
- ✓ lateral rotators of the extended thigh
- ✓ abductors of the flexed thigh
- ✓ Stabilize hip joint

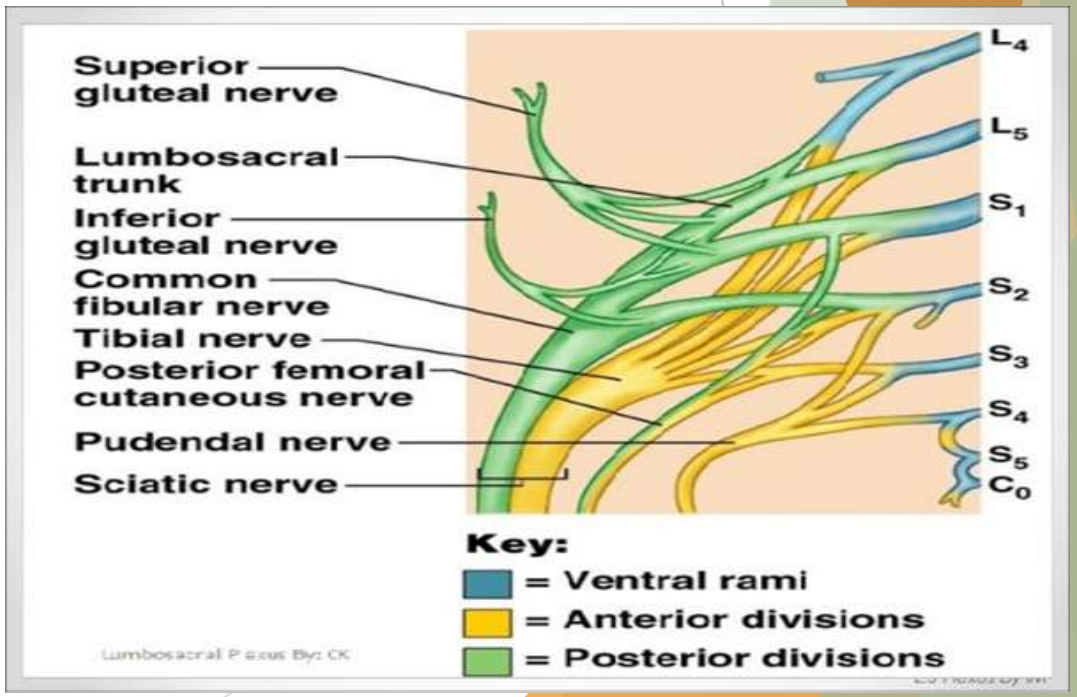
triceps coxae

The **short rotators Test as a group by external rotation of the extended hip** and **abduction of the flexed hip against resistance**

Sacral plexus

- ✓ A part of L4 joins the L5 anterior rami to form the lumbosacral trunk.
- ✓ Lumbosacral trunk descends to join the anterior rami of the upper four sacral nerves to form the sacral plexus
- ✓ located on the posterolateral wall of the lesser pelvis. rests upon piriformis and is covered anteriorly by the parietal pelvic fascia
- ✓ sacral nerves give off certain branches and then divide, as does the lumbosacral trunk, into anterior and posterior divisions which thereupon branch and reunite to form nerves for supply of flexor and extensor compartments of the lower limb.





Branches of sacral plexus	Ventral divisions	Dorsal divisions
Nerve to quadratus femoris and gemellus inferior	L4, 5, S1	
Nerve to obturator internus and gemellus superior	L5, S1, 2	
Nerve to piriformis		S(1), 2
Superior gluteal		L4, 5, S1
Inferior gluteal		L5, S1, 2
Posterior femoral cutaneous	S2, 3	S1, 2
Tibial (sciatic)	L4, 5, S1, 2, 3	
Common fibular (sciatic)		L4, 5, S1, 2
Perforating cutaneous		S2, 3
Pudendal	S2, 3, 4	
To levator ani, coccygeus and sphincter ani externus	S4	
Pelvic splanchnic	S2, 3, (4).	

Piriformis syndrome:

- Is a neuromuscular disorder that occurs when the sciatic nerve is compressed by the piriformis muscle
- Causes pain, tingling and numbness in the buttocks and along the path of the sciatic nerve descending down the lower thigh and into the leg
- The syndrome may be due to anatomical variations in the muscle-nerve relationship, or from overuse or strain.

Other structures in the G region

Structures passing through greater sciatic foramen

Above piriformis

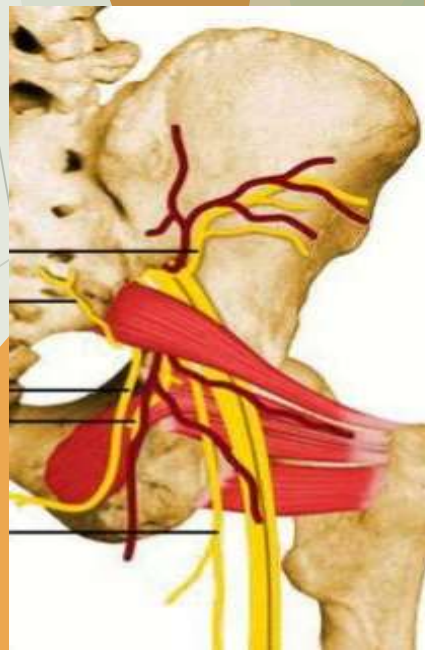
1- Superior G artery
2- Superior G nerve

Below piriformis

1- Inferior G artery
2- Inferior G nerve
3- Post. femoral cutaneous n.
4- Sciatic nerve
5- Nerve to QF
6- Nerve to OI
7- Pudendal n.
8- Internal pudendal vessels

Structures passing through lesser sciatic foramen

1- Pudendal n.
2- Int. pudendal vs.
3- Nerve to OI

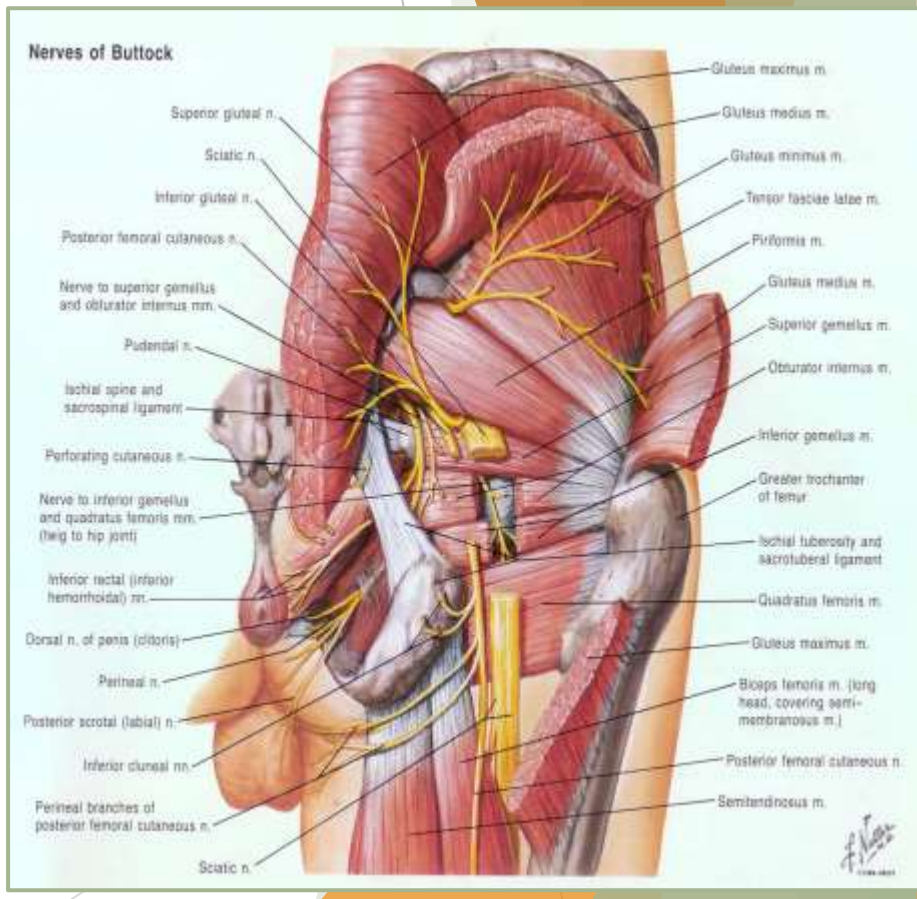


Superior gluteal nerve

- Arises from posterior divisions of anterior rami of L4-S1 of sacral plexus
- Leaves pelvis through greater sciatic foramen superior to piriformis; runs between gluteus medius and minimus and ends in tensor fasciae latae.
- Innervates gluteus medius, gluteus minimus, and tensor fasciae latae

Inferior gluteal nerve

- Arises from posterior divisions of anterior rami of L5-S2 of sacral plexus
- Leaves pelvis through greater sciatic foramen inferior to piriformis;
- Lies superficial to the sciatic nerve
- After a short course it divides into many branches which enter the deep surface of G maximus supplying it

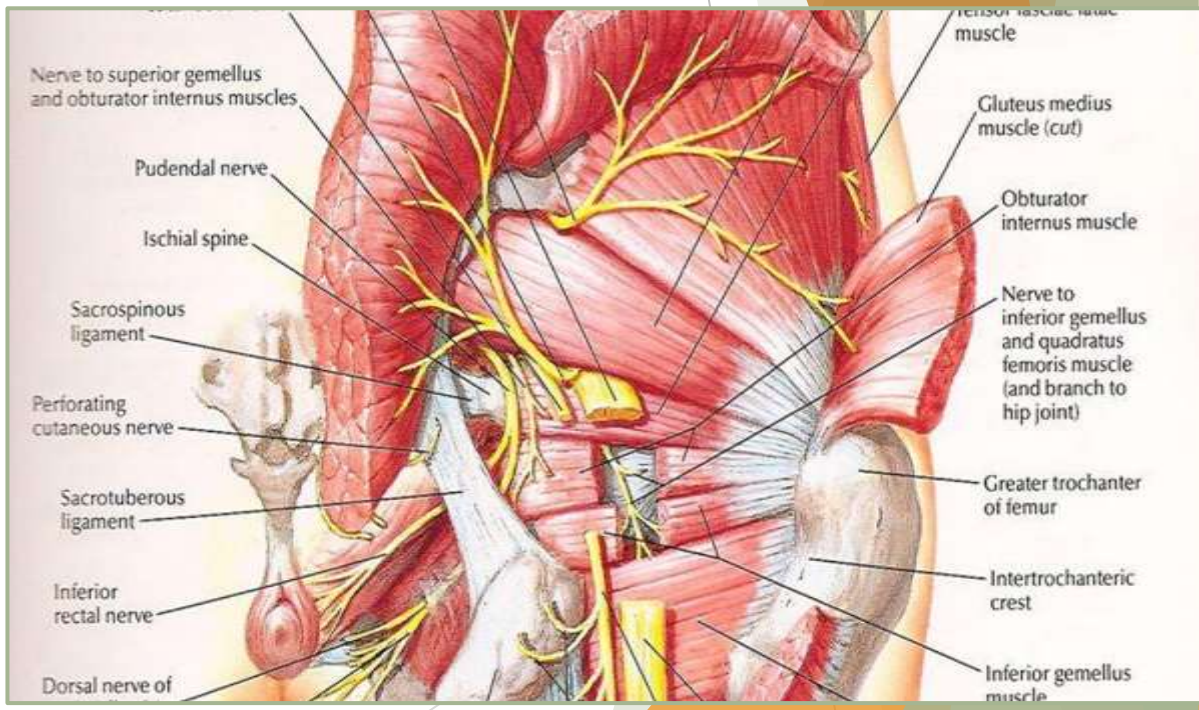


Nerve to obturator internus

- Arises from ant. Divisions of anterior rami of L5-S2 sacral plexus
- Enters gluteal region through greater sciatic foramen inferior to piriformis; descends posterior to ischial spine; lateral to the pudendal vessels enters lesser sciatic foramen;
- Supplies superior gemellus and obturator internus

Pudendal nerve

- Arises from anterior divisions of anterior rami of S2-S4 sacral plexus
- Enters gluteal region through greater sciatic foramen inferior to piriformis; descends posterior to sacrospinous ligament; enters perineum through lesser sciatic foramen
- Supplies most innervation to the perineum; supplies no structures in gluteal region



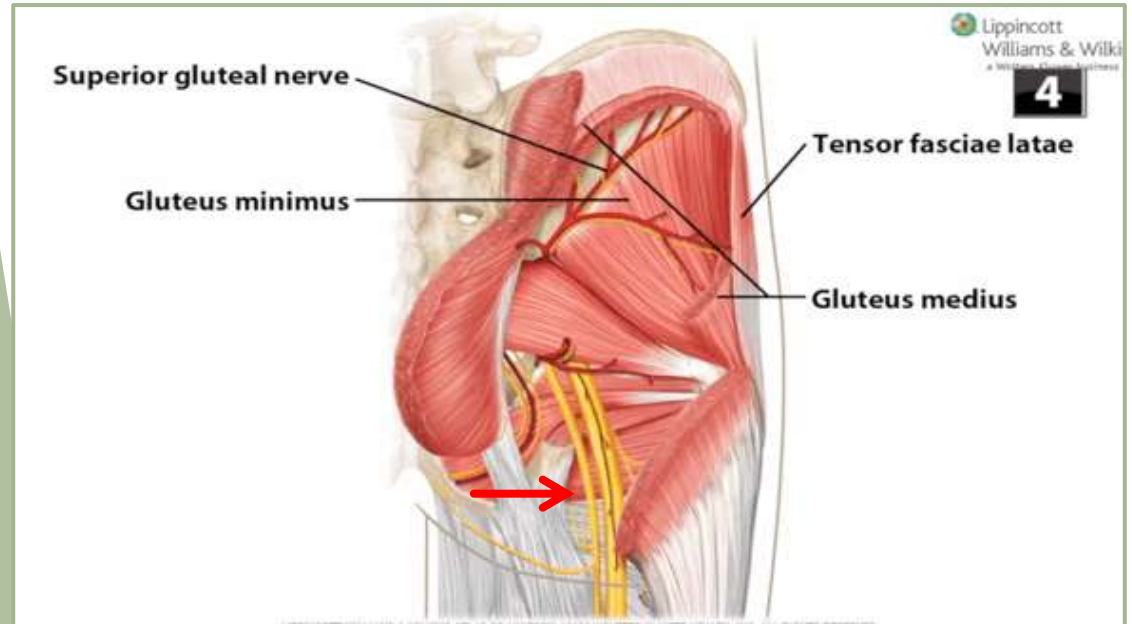
Nerve to quadratus femoris

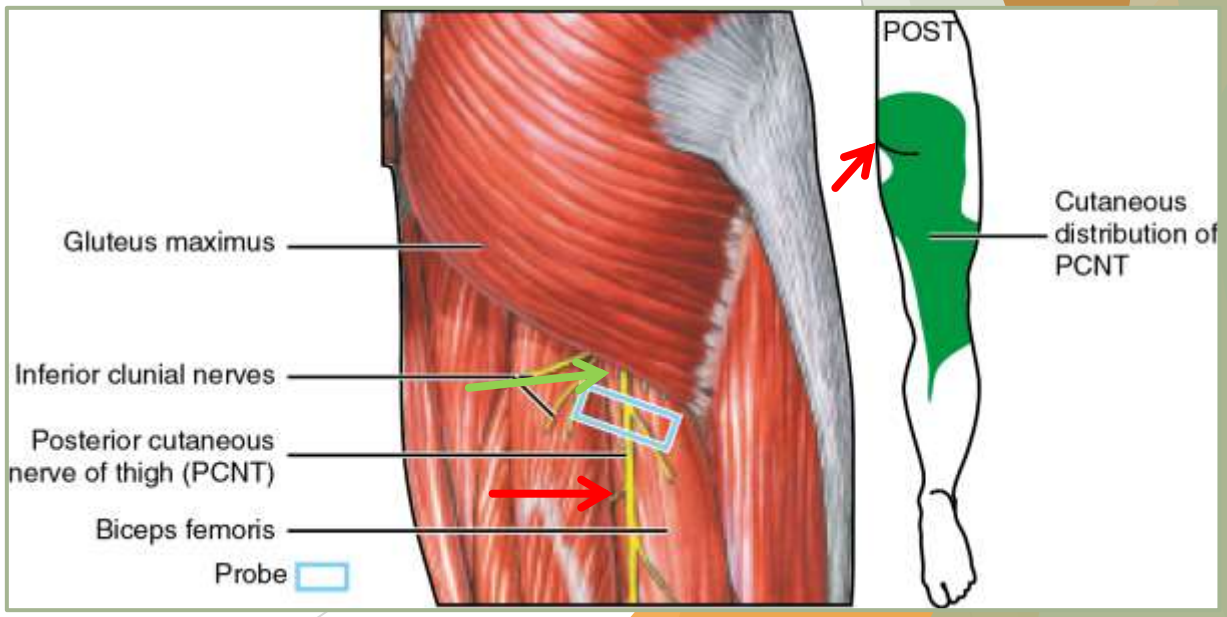
- Arises from **anterior divisions** of anterior rami of **L4,L5,S1** Sacral plexus
- Leaves pelvis through **greater sciatic foramen** deep to sciatic nerve
- Descends anterior to obturator internus & gemelli & Enters quadratus femoris at its anterior surface
- Innervates hip joint, inferior gemellus, and quadratus femoris

Posterior cutaneous nerve of the thigh

- Arises from anterior and posterior divisions of anterior rami of S1-S3of sacral plexus
- Leaves pelvis through greater sciatic foramen inferior to piriformis; runs deep to gluteus maximus; emerges from its inferior border; descends in posterior thigh deep to fascia lata; Superficial to the hamstrings, which separate it from the sciatic nerve,
- Supplies

✓ skin of buttock through **inferior clunial branches**
✓ skin over posterior aspect of thigh and calf;
✓ lateral perineum, upper medial thigh via **perineal branch**





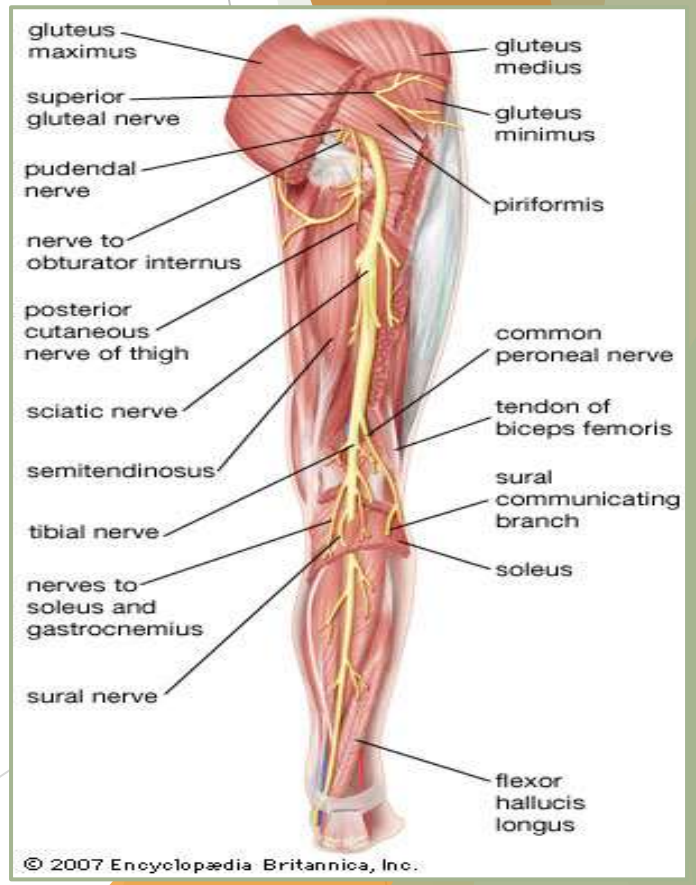
Sciatic nerve

- anterior and posterior divisions of anterior rami of L4-S3 Sacral plexus
- is the most **lateral structure** emerging through the greater sciatic foramen inferior to the piriformis.
- enters gluteal region; under cover of the gluteus maximus, midway between the greater trochanter and ischial tuberosity.
- rests on the ischium and then passes posterior to the obturator internus, quadratus femoris, and adductor magnus muscles.
- descends in the posterior thigh deep to biceps femoris; bifurcates into tibial and common fibular nerves at apex of popliteal fossa
- Supplies no muscles in gluteal region; supplies all muscles in posterior compartment of thigh

- **Components**:

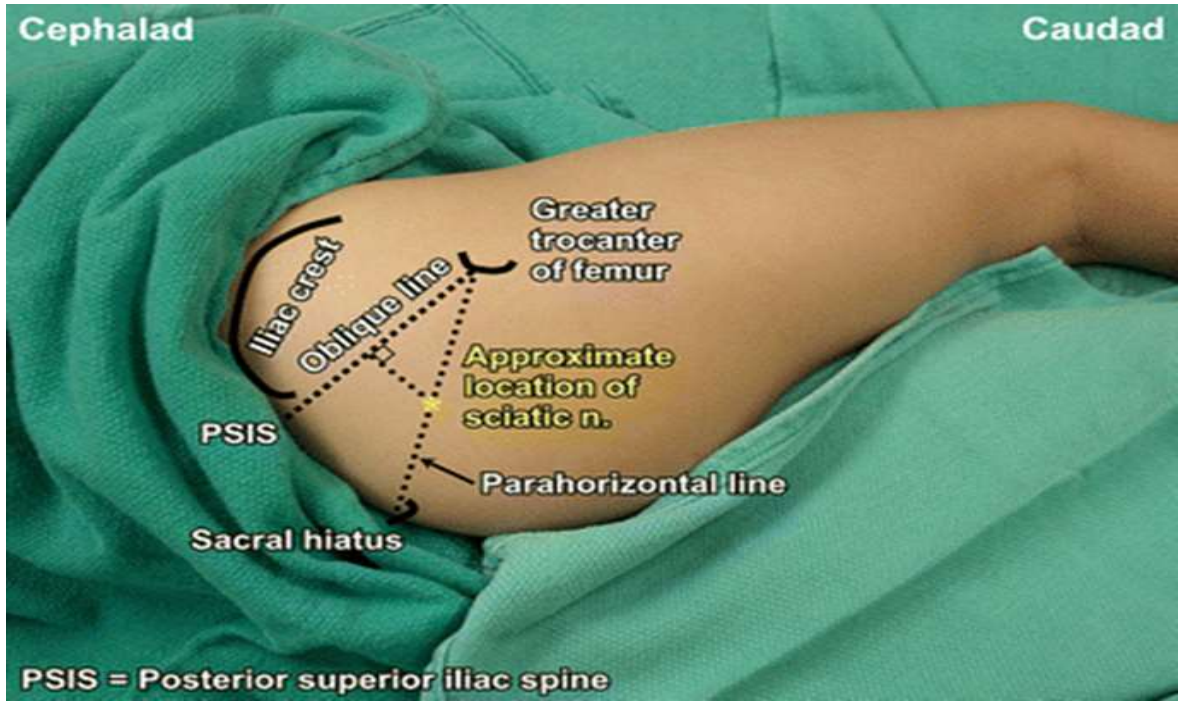
1-Tibial part (L4,5,S1,2,3 anterior)

2-Common peroneal part (L4,5,S1,2 posterior)

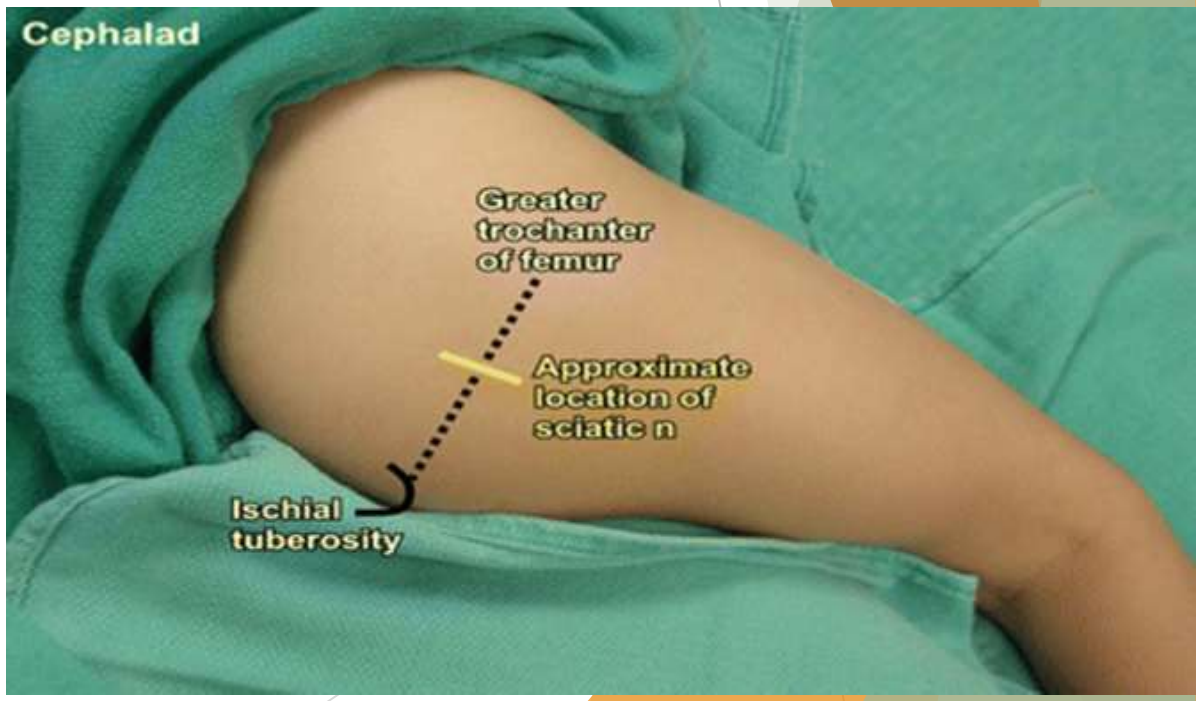


Anesthetic Block of Sciatic Nerve

surface marking for the **entry of the nerve** into the **gluteal region**



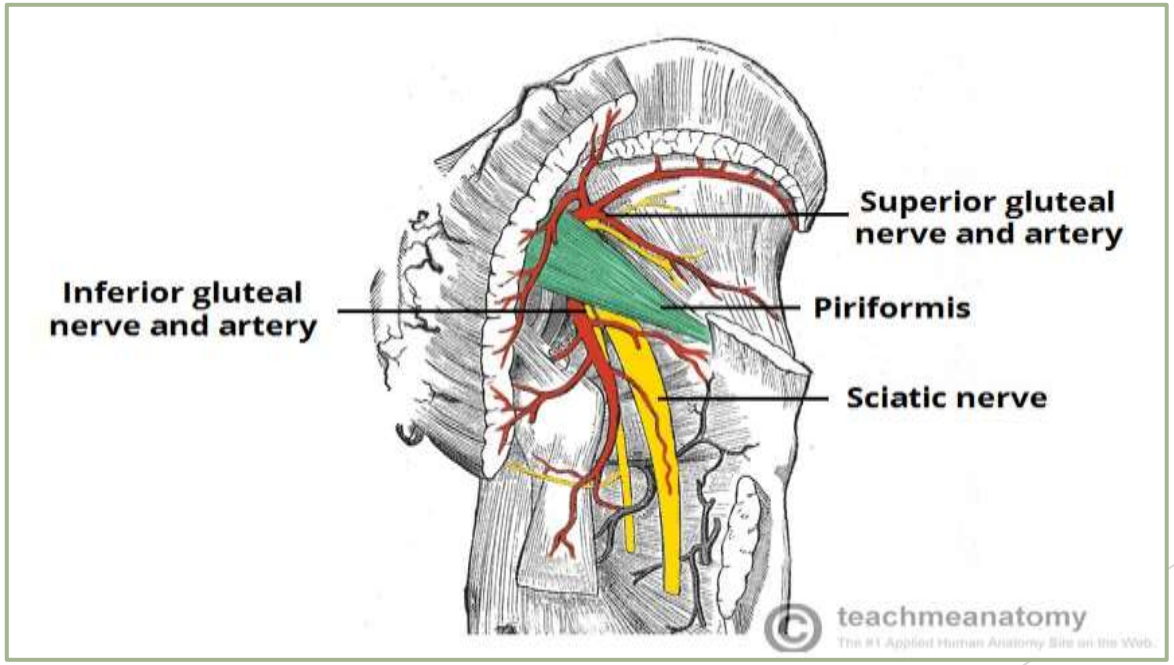
Surface marking for the **Subgluteal approach** targets the sciatic nerve at a more superficial location



Superior gluteal artery

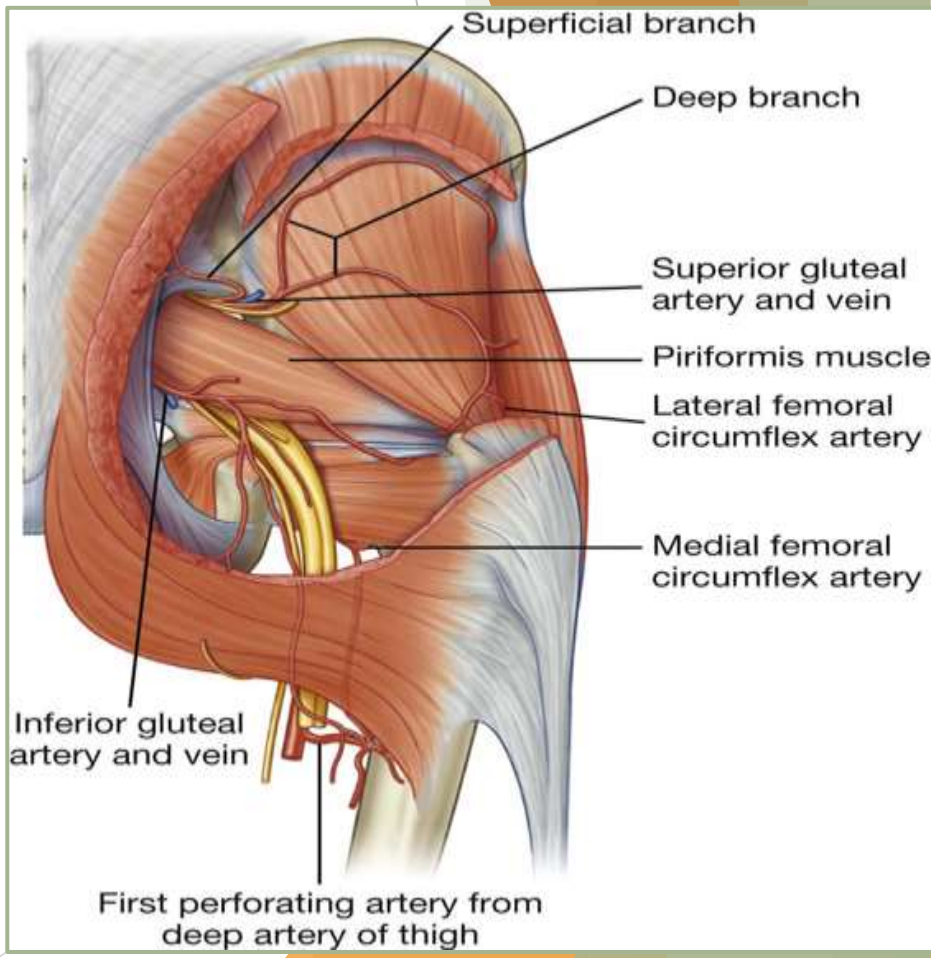
From the **posterior division** of the internal iliac a.

- ❑ enters gluteal region through greater sciatic foramen, superior to piriformis;
- ❑ divides into superficial and deep branches;
- ✓ **Superficial branch** supplying gluteus maximus
- ✓ **Deep branch**: runs between gluteus medius and minimus supplying both muscles & Tenser Fascia Lata



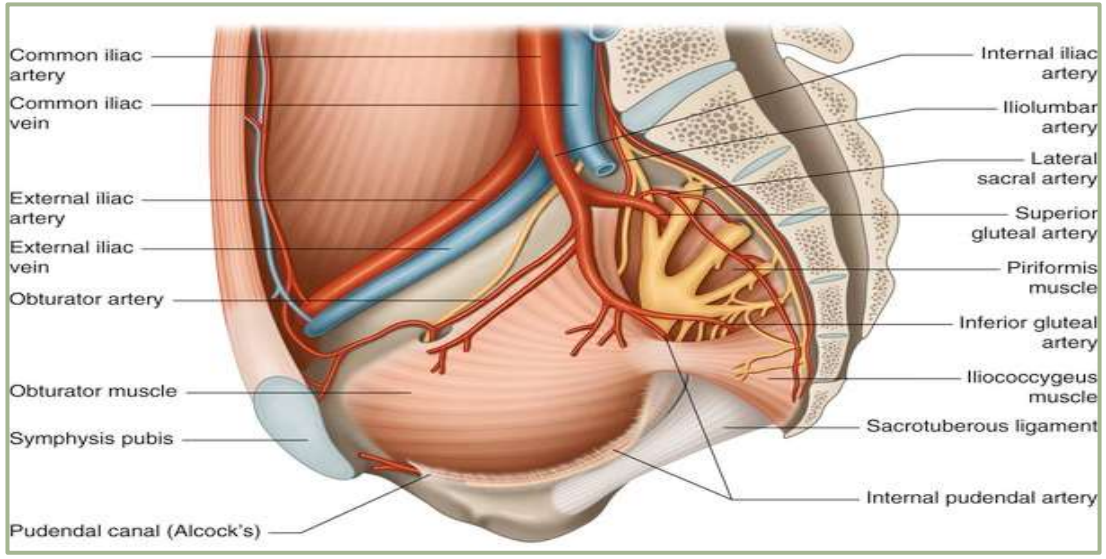
Inferior gluteal artery

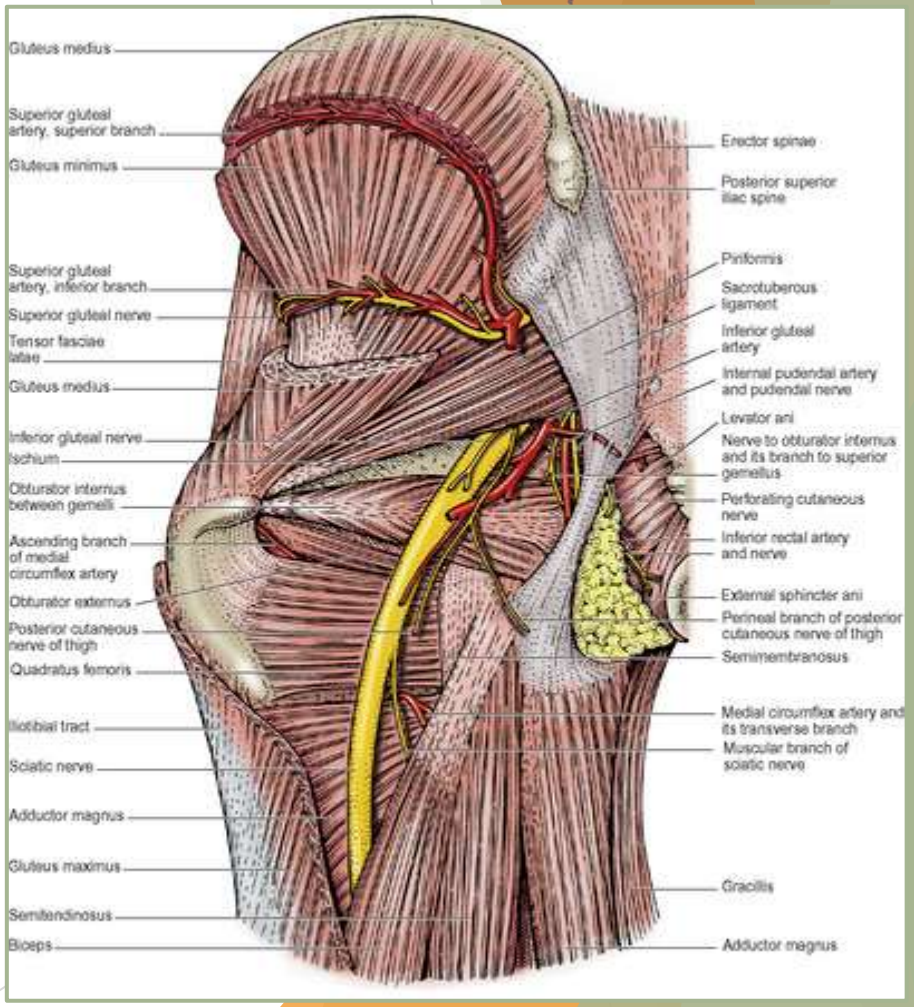
- The largest of the 2 terminal branches of the anterior division of the internal iliac a.
- Enters gluteal region through greater sciatic foramen, inferior to piriformis;
- Descends on medial side of sciatic nerve; **anastomoses** with **superior gluteal artery** and participates in **cruciate anastomosis of thigh**
- Supply Gluteus maximus, obturator internus, quadratus femoris, and superior parts of hamstrings



Internal pudendal artery

- Arises from the **anterior division** of internal iliac artery
- Enters gluteal region through greater sciatic foramen; descends posterior to ischial spine; (between the pudendal n. & n. to OI)
- enters perineum through lesser sciatic foramen
- Supply External genitalia and muscles in the perineal region; does not supply gluteal region





Intragluteal Injections

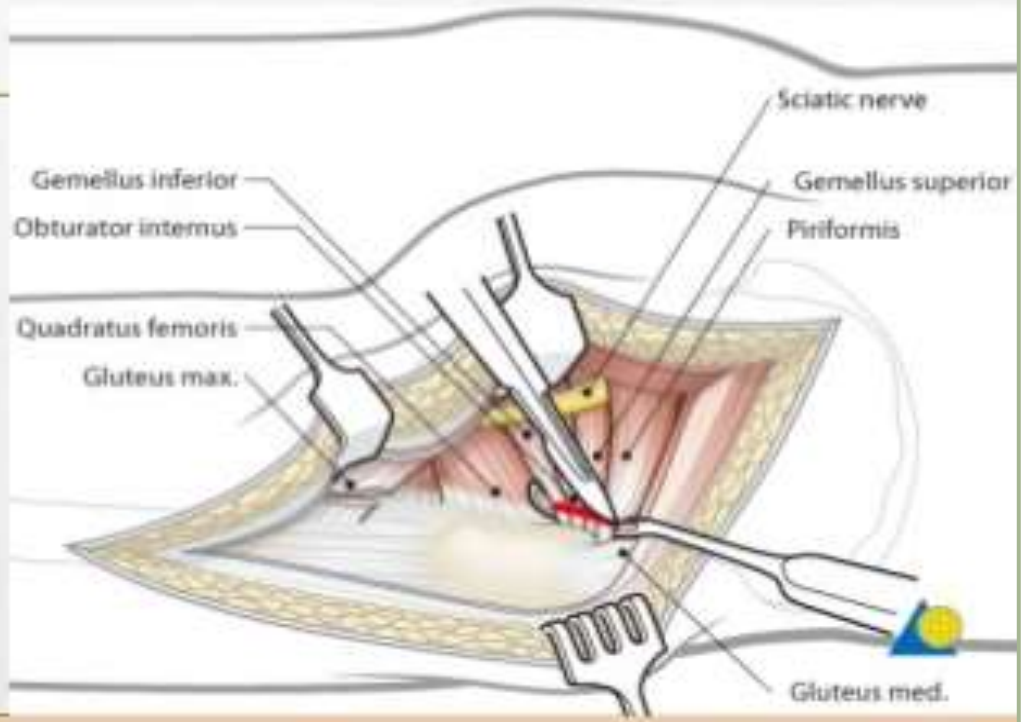
- Injections into the buttock are safe only in the
- ✓ **superolateral quadrant of the buttock** or
- ✓ superior to a line extending from the **PSIS** to the **superior border of the greater trochanter**

Complications of improper technique include

- ✓ nerve injury,
- ✓ Hematoma
- ✓ abscess formation.

Posterior approach to the Hip

Kocher-Langenbeck



The gluteal region is a common approach to the hip joint for ***arthroplasty*** and the lateral rotator muscles are used as landmarks and can be dissected off the femur and rolled medially over the sciatic nerve to protect it.

Butt enhancement (Gluteal augmentation)

Butt grafts

(Transfer fat from abdomen & flanks to the butt)

Butt implants

(By implanting silicon between fat & muscles)

Arterial anastomosis

❑ Anastomosis around the ASIS:

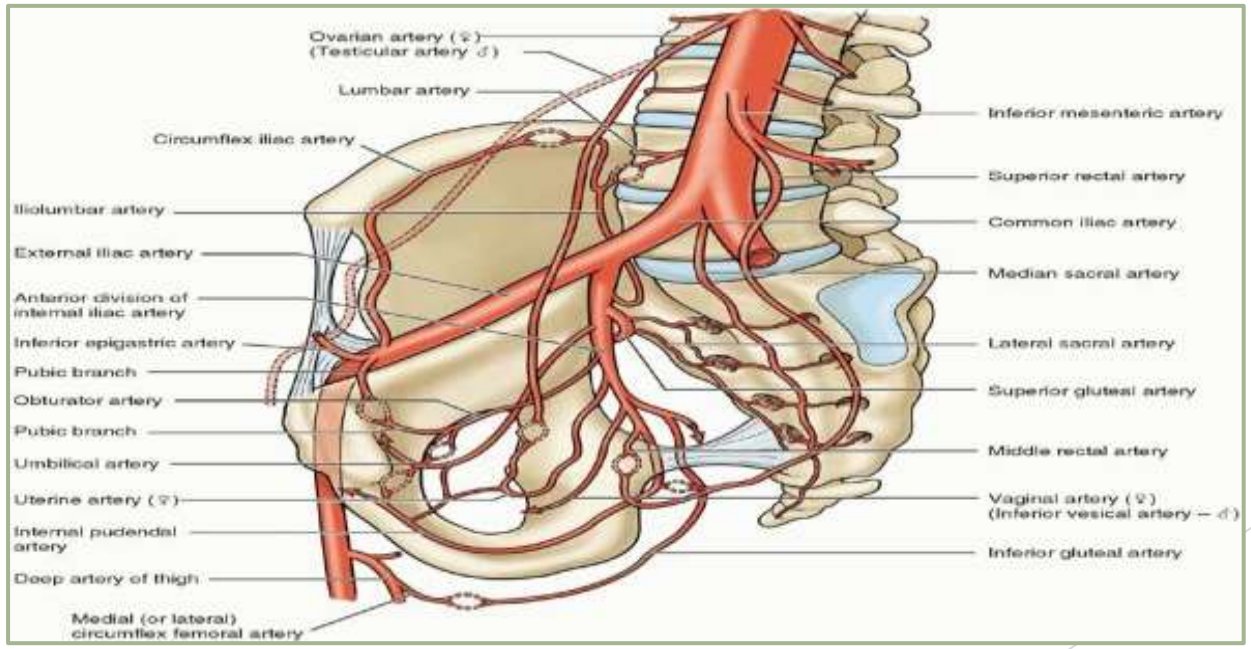
Connect the iliac arteries to the femoral & profunda arteries

1- Iliac branch of iliolumbar artery (internal internal iliac)

2- Deep circumflex iliac a. (external iliac)

3- Superficial circumflex iliac a. (femoral)

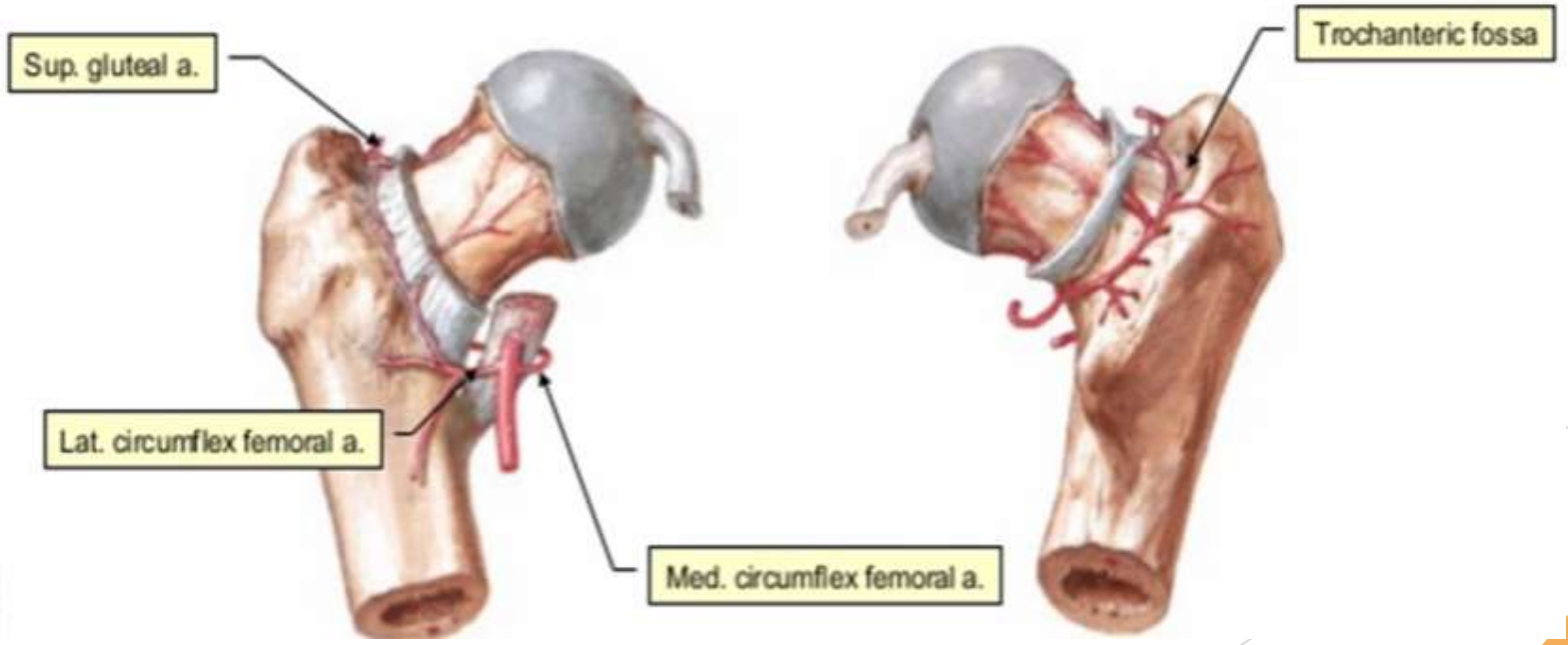
4- Ascending branch of LCF (profunda femoris)

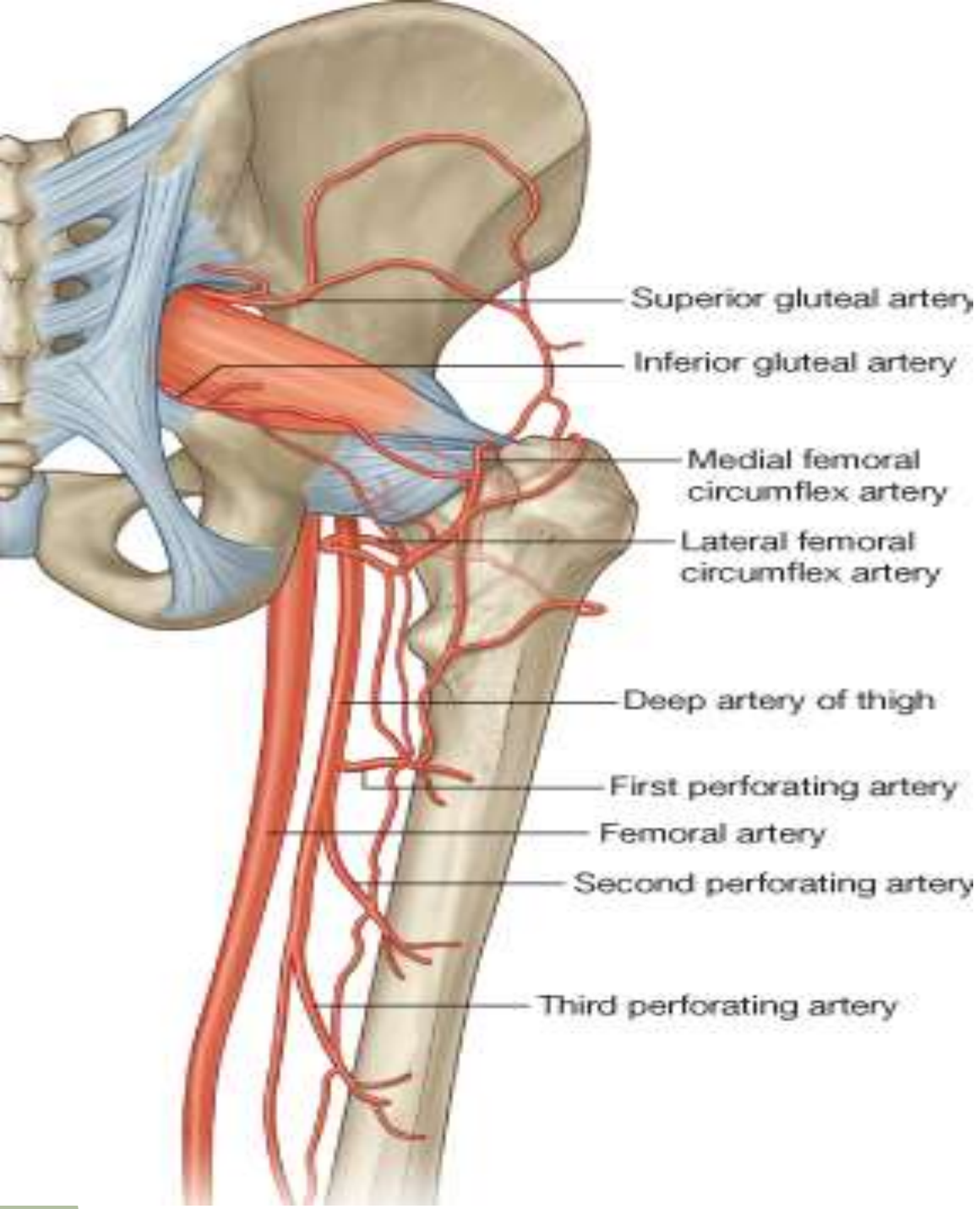


❑ Trochanteric Anastomosis

- Provides the main source of blood supply for the head of the femur
- Lies near the trochanteric fossa ,hence its name
- Formed by

✓ Descending branch of the superior gluteal artery
✓ Ascending branch of lateral circumflex femoral artery
✓ Ascending branch of medial circumflex femoral arteries
✓ Inferior gluteal artery usually participating by an anastomotic branch





❑ Cruciate anastomosis

- Connects the internal iliac a. to the profunda femoris
- Lies at the level of the middle of the lesser trochanter at the lower border of insertion of quadratus femoris
- Formed by:

1- Transverse branch of LCF

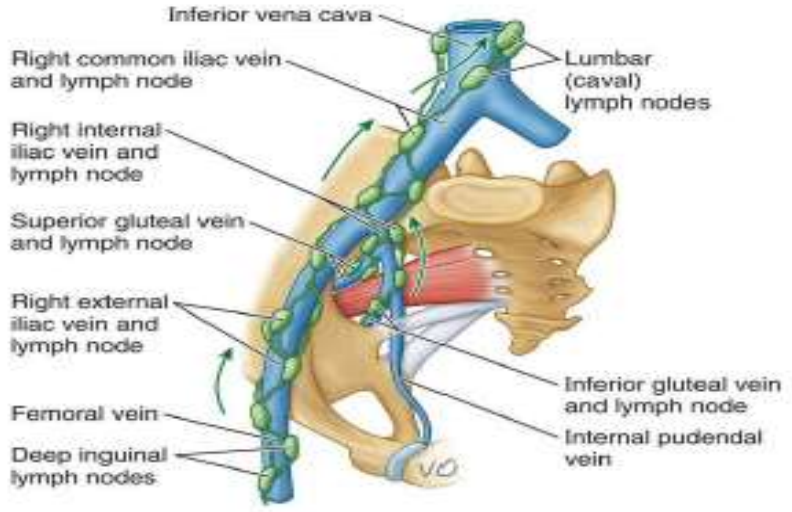
2- Transverse branch of MCF

3- Ascending branch of 1st perforating a.

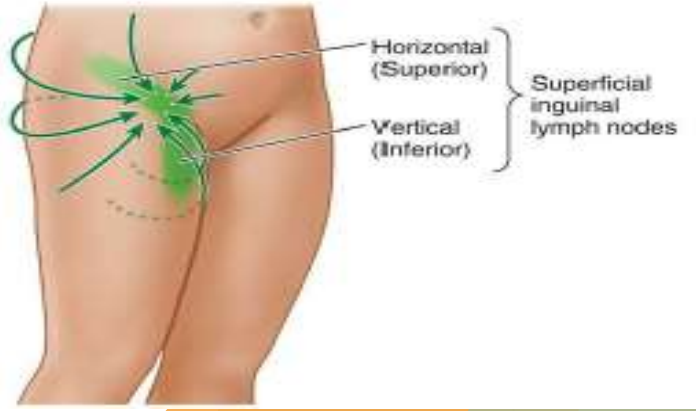
4-Descending branch of inferior gluteal a.

Lymphatic drainage of gluteal region

- **Lymph from the deep tissues of the buttocks** follows the gluteal vessels to the **superior** and **inferior gluteal lymph nodes**, and from them to the **internal and common iliac lymph nodes** and from them to the **lateral lumbar (aortic/caval) lymph nodes.**
- **Lymph from the superficial tissues of the gluteal region** enters the **superficial inguinal lymph nodes**, which also receive **lymph from the thigh.** All the superficial inguinal nodes send efferent lymphatic vessels to **the external iliac lymph nodes.**



(A) Deep lymphatic drainage from gluteal and thigh regions



Thank you