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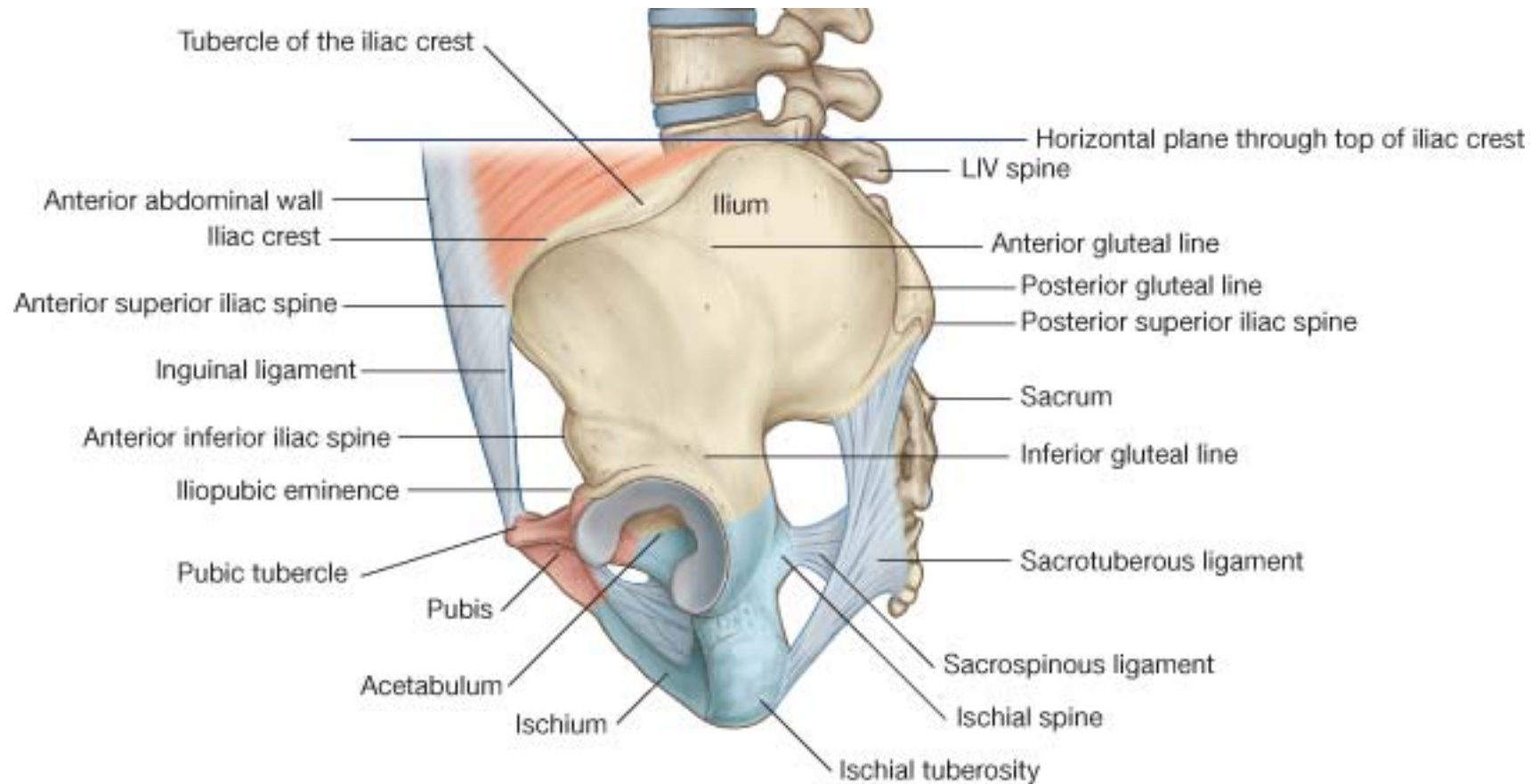
Lower Extremity

Introduction

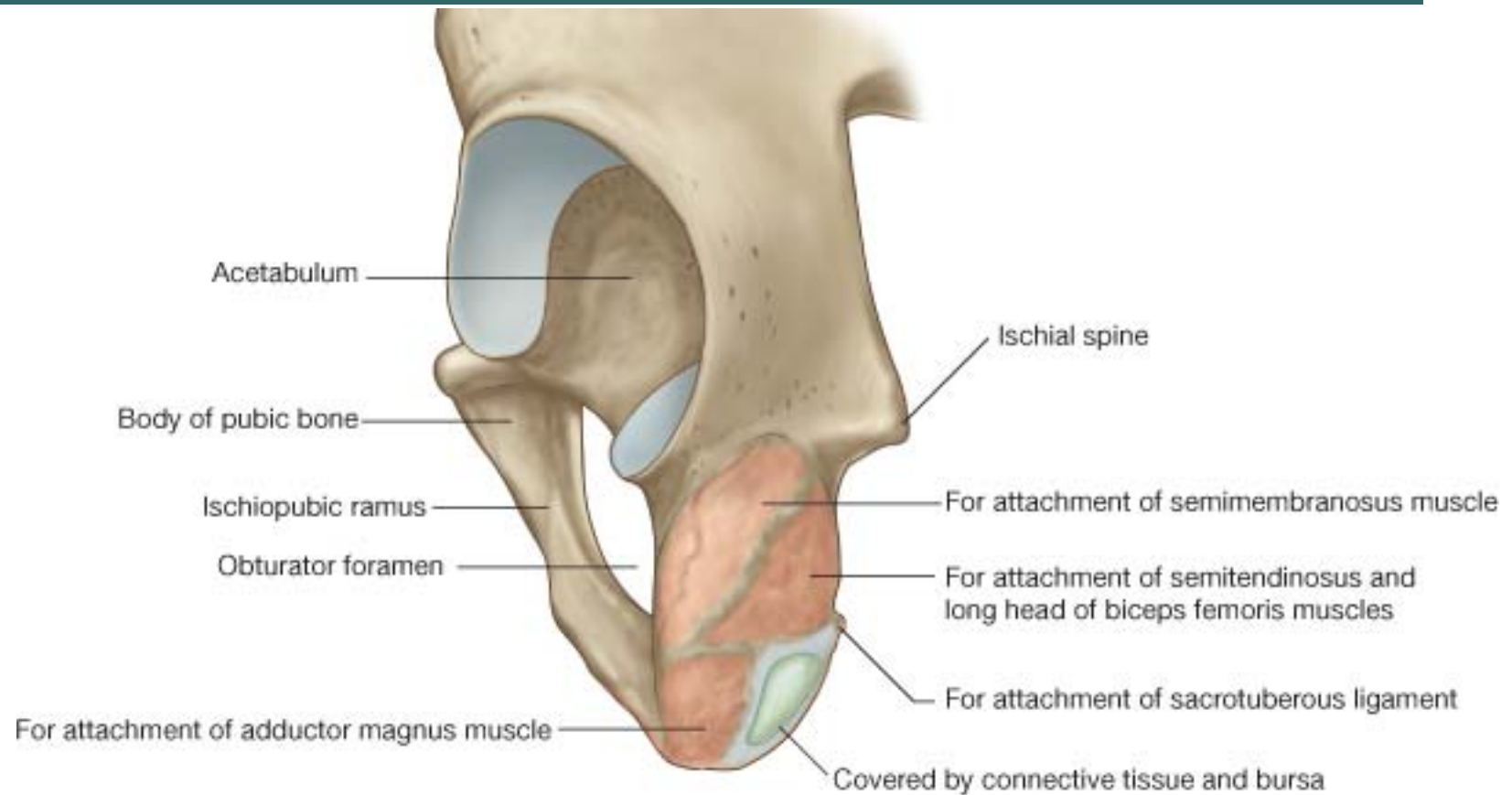
Hip Joint

- Head of the femur with acetabulum of innominate
- Ball in socket
- Better union than shoulder
- Acetabular labrum similar to glenoid labrum
- Acetabulum is not a complete circle, open inferiorly. This opening is closed by the **transverse** ligament
- Head of femur attached to inside of acetabulum by ligamentum teres AKA Head ligament

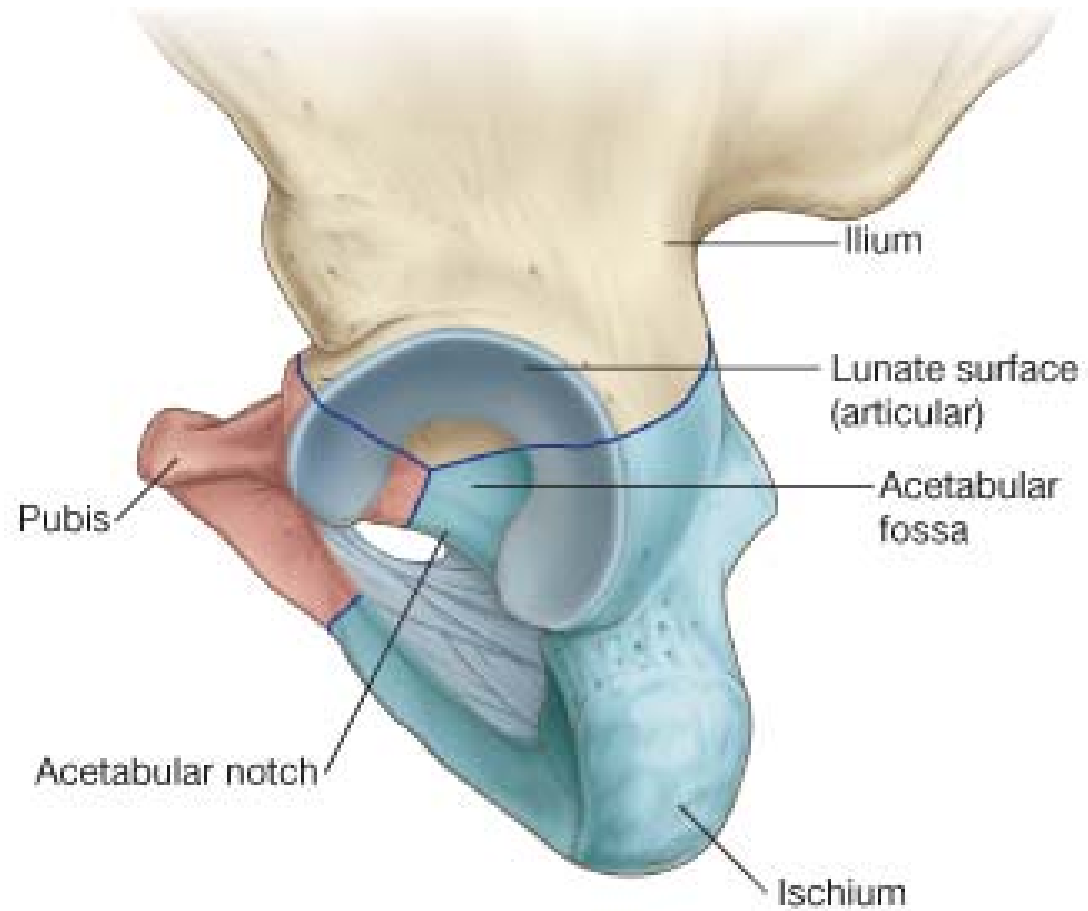
Acetabulum



Acetabulum

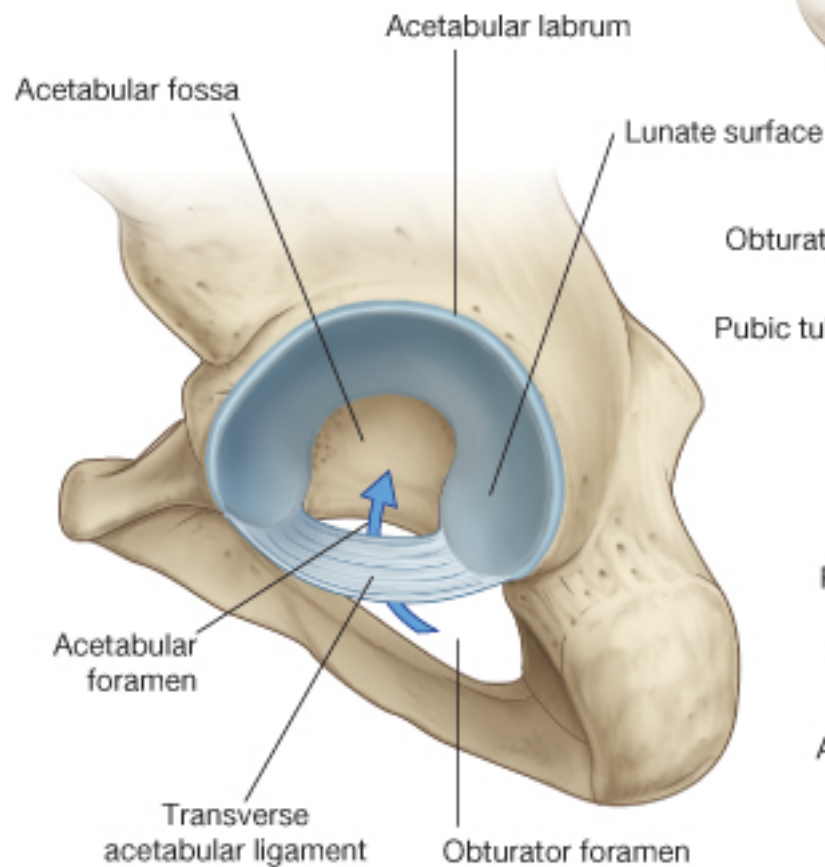


Acetabulum

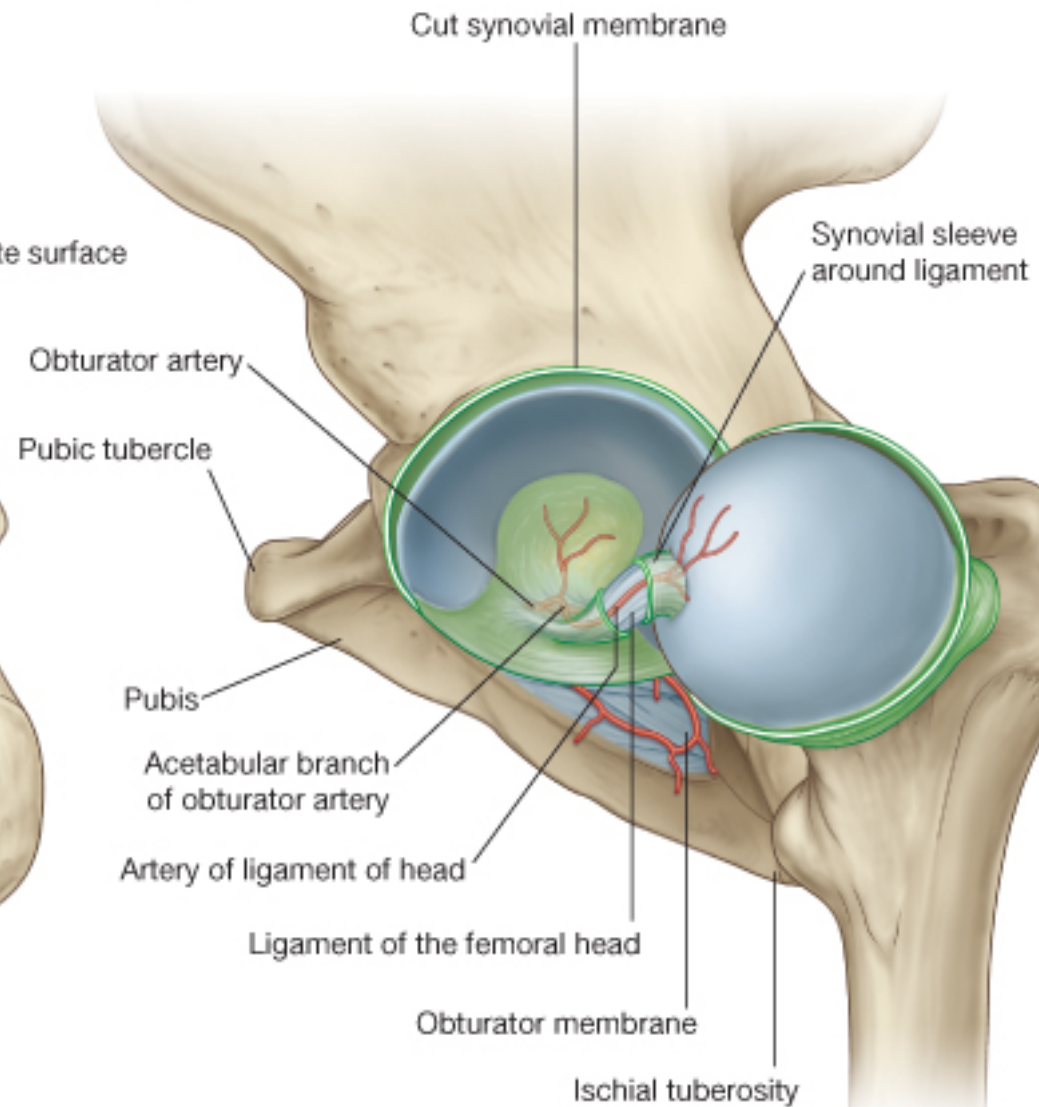


Transverse Ligament

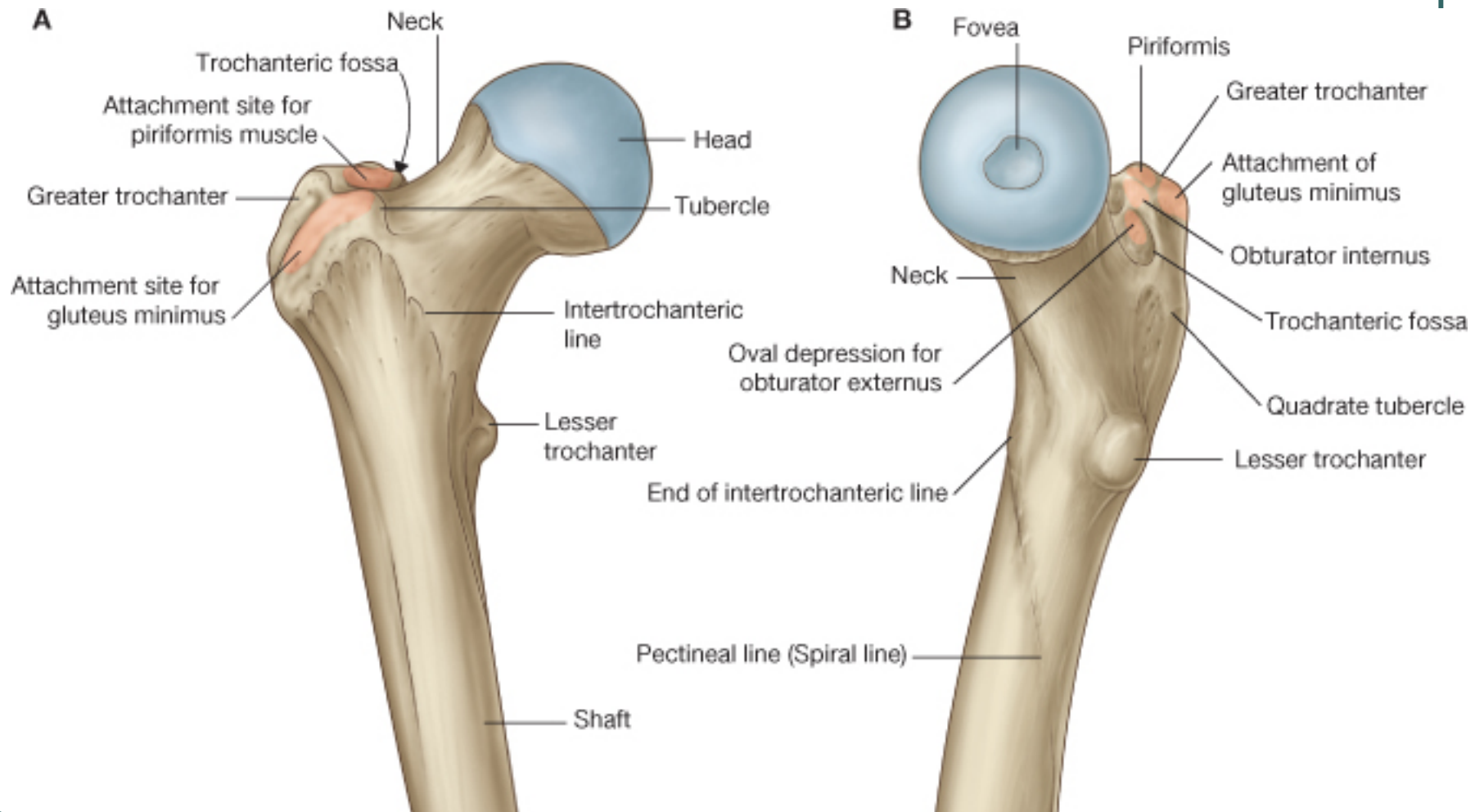
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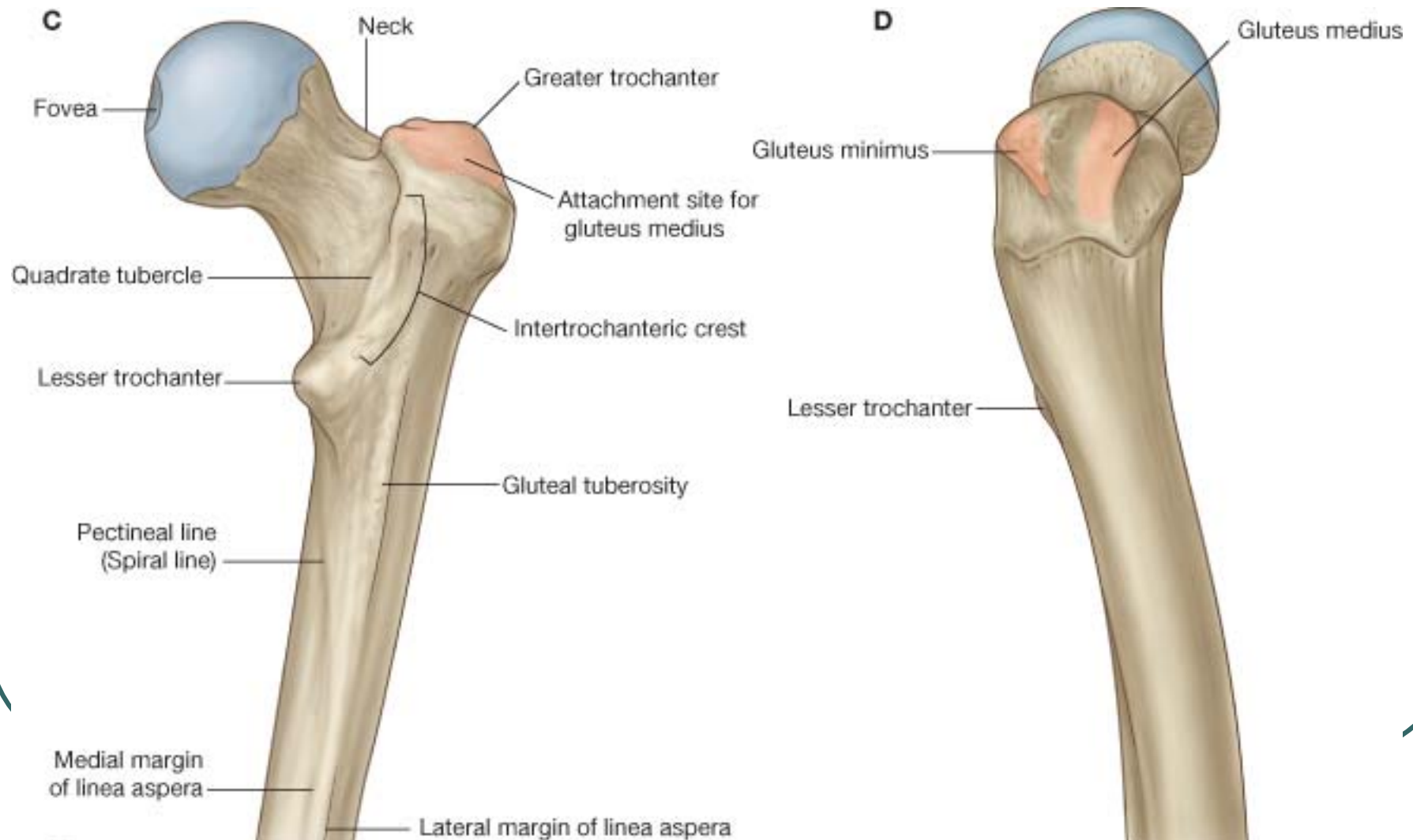
B



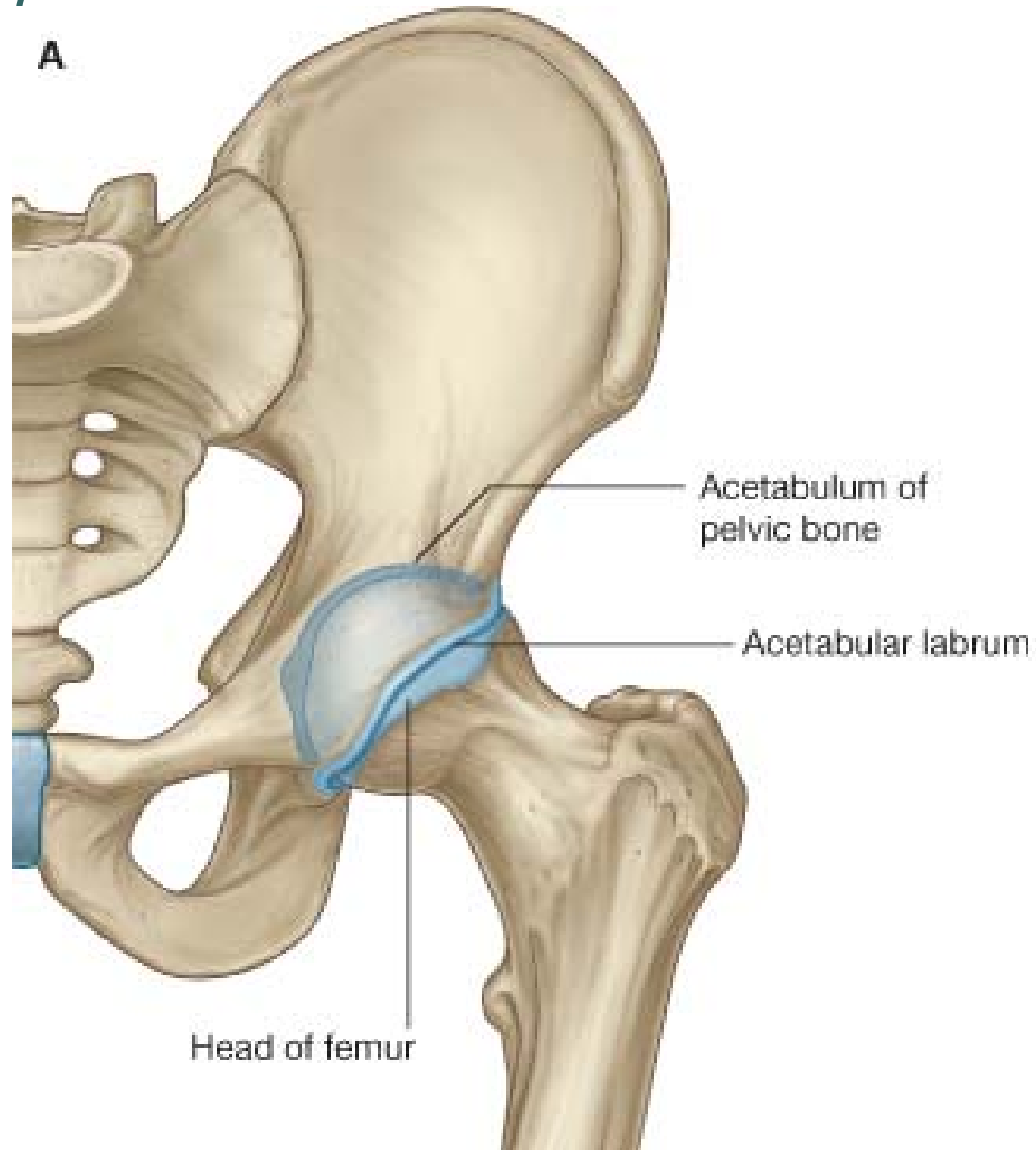
Femur - Anterior



Femur - Posterior



Hip Joint



I

Hip Joint

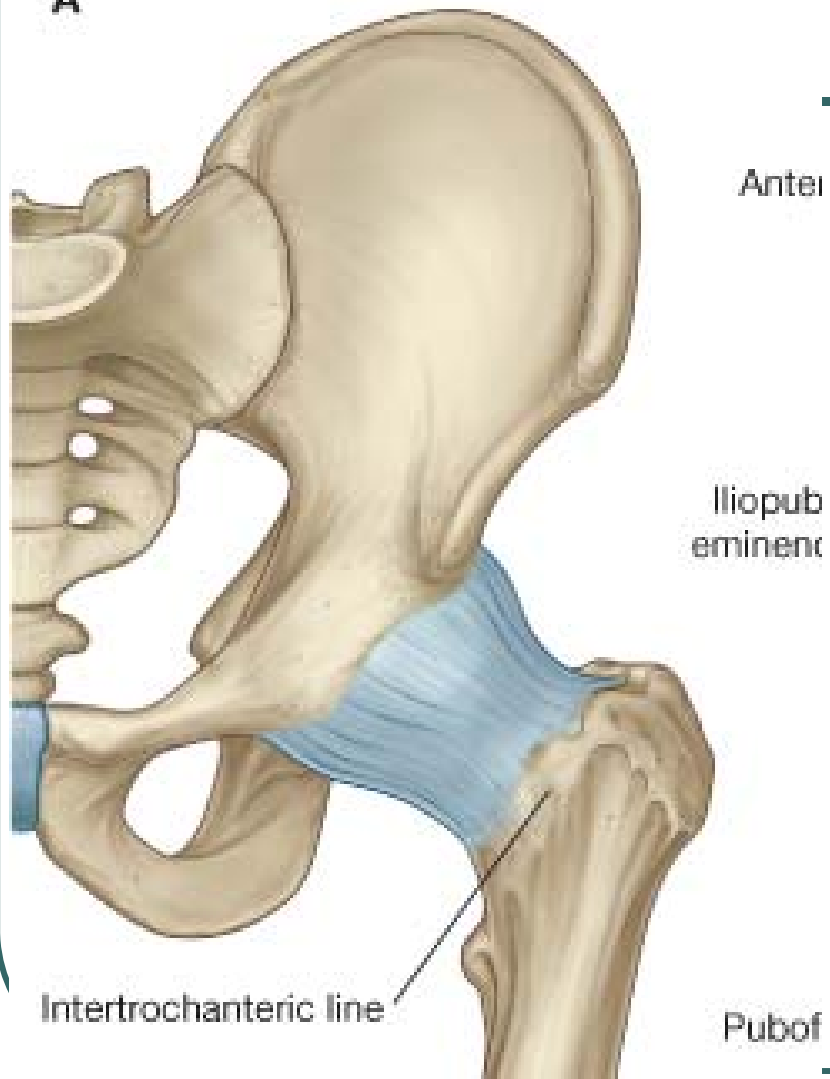


Hip

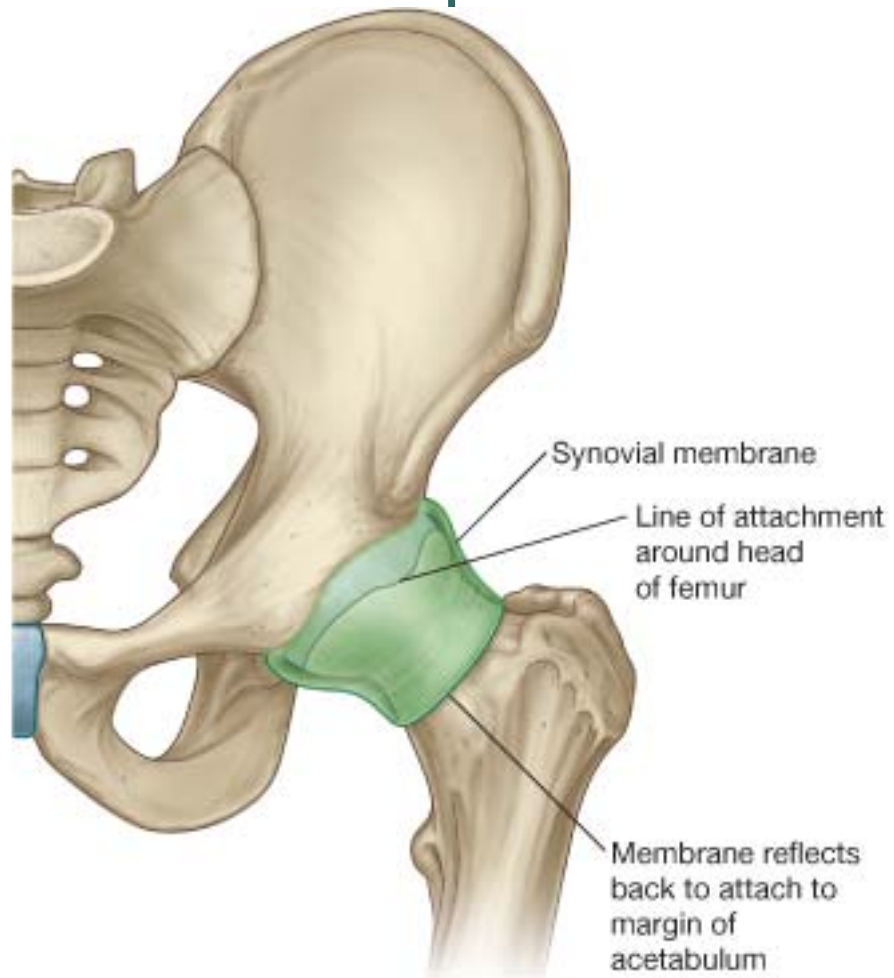
- Strong but loose joint capsule running from above the acetabulum and labrum down to the intertrochanteric line
- Suction exists in joint owing to atmospheric differences – this increases joint stability
- Approximately 70% of head of femur in contact with acetabulum at max contact

Anterior Capsule

A



Anterior Capsule



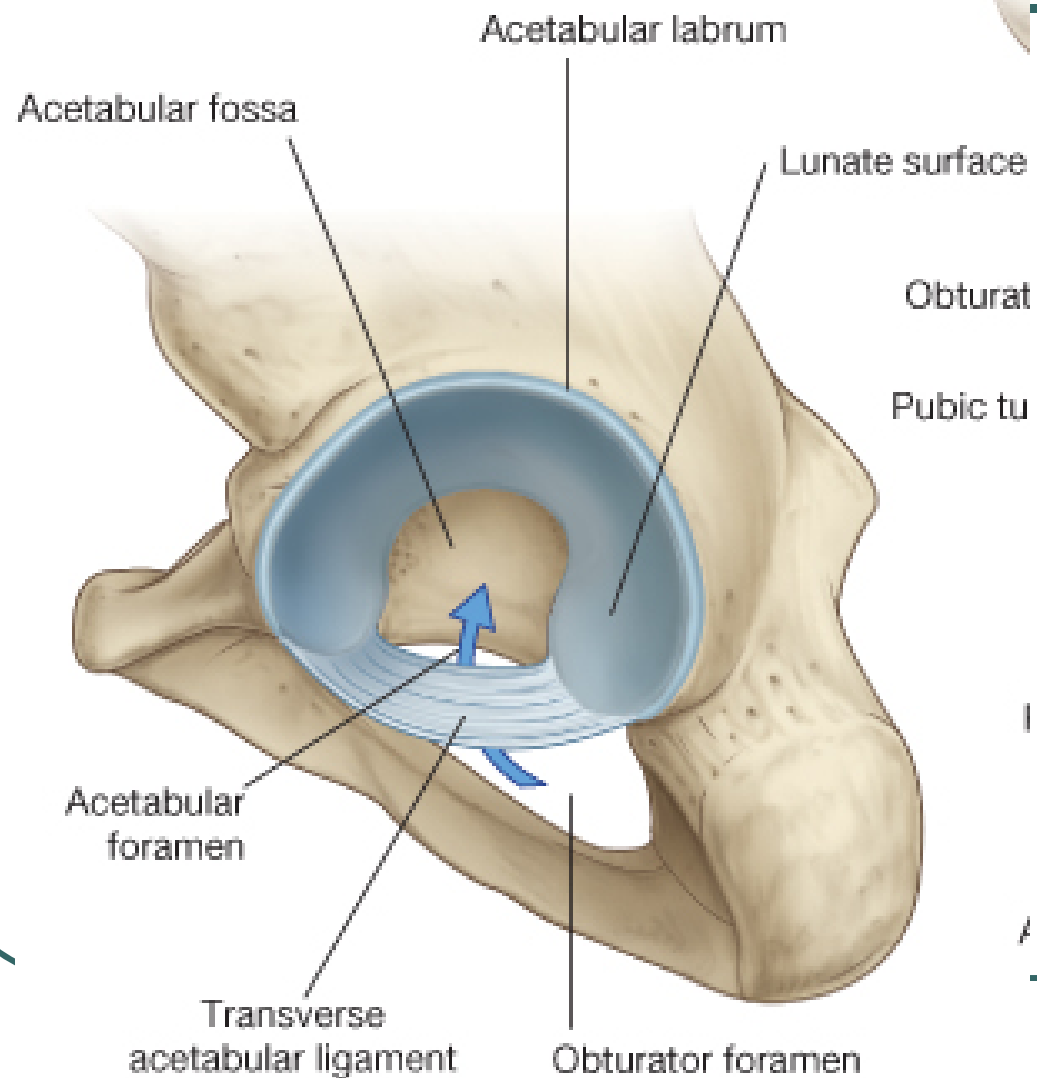
Posterior Capsule

c

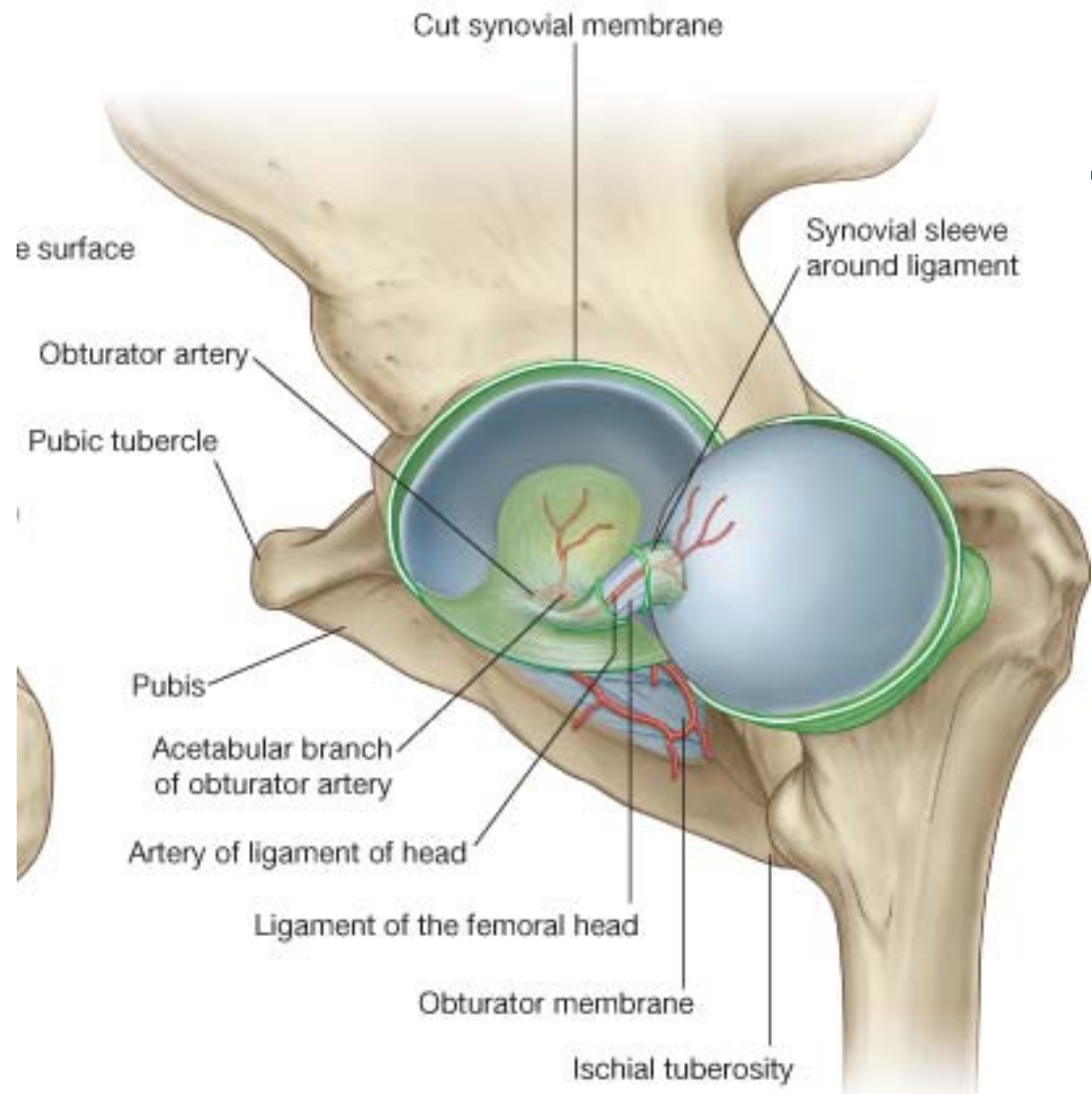
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Acetabular Labrum



Head Ligament



Hip

- Iliofemoral ligament – AKA the “Y” ligament or the “Y ligament of Bigelo”
- AIS inferiorly to the intertrochanteric line
- Triangular in shape
- Supports hip anteriorly, resists extension, internal rotation and some external rotation

"Y" Ligament

Anterior inferior iliac spine

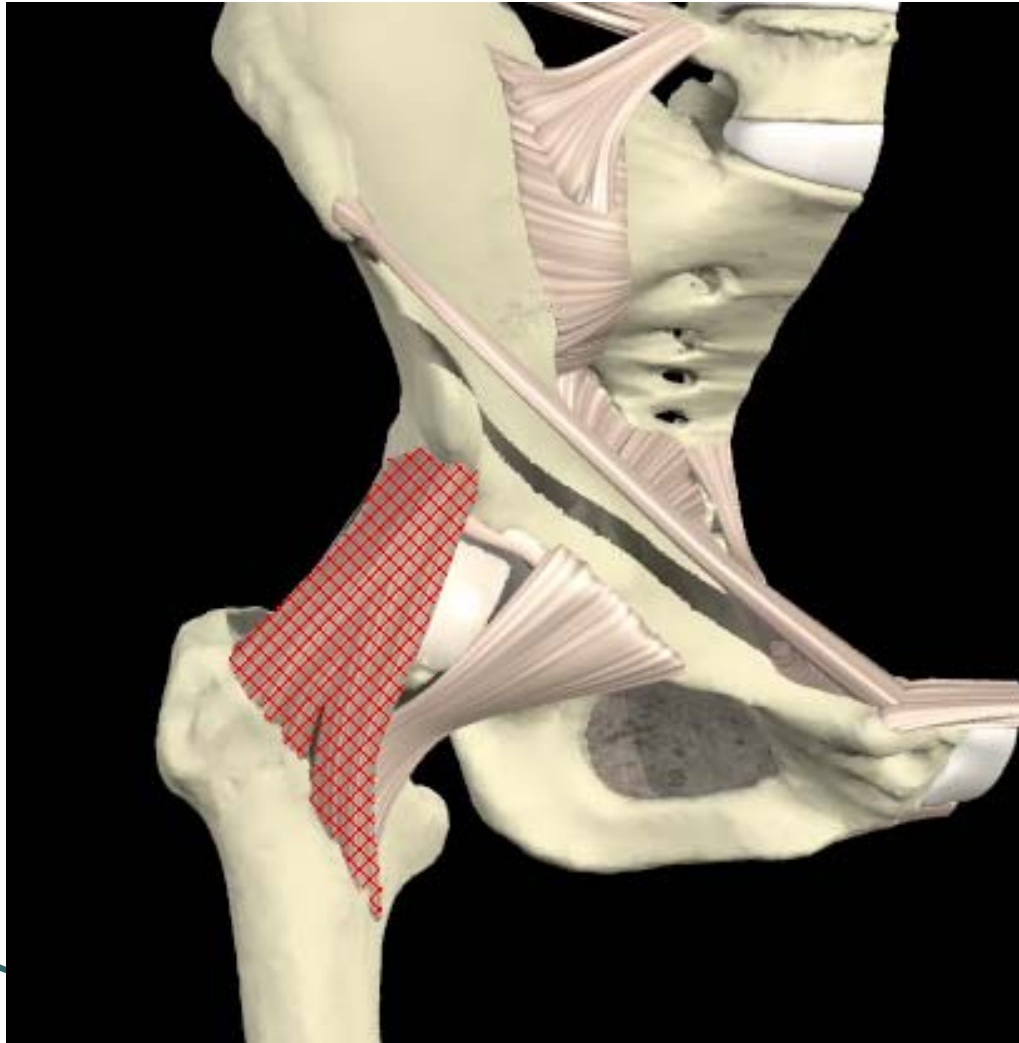
Iliopubic
eminence

Iliofemoral
ligament

Pubofemoral ligament



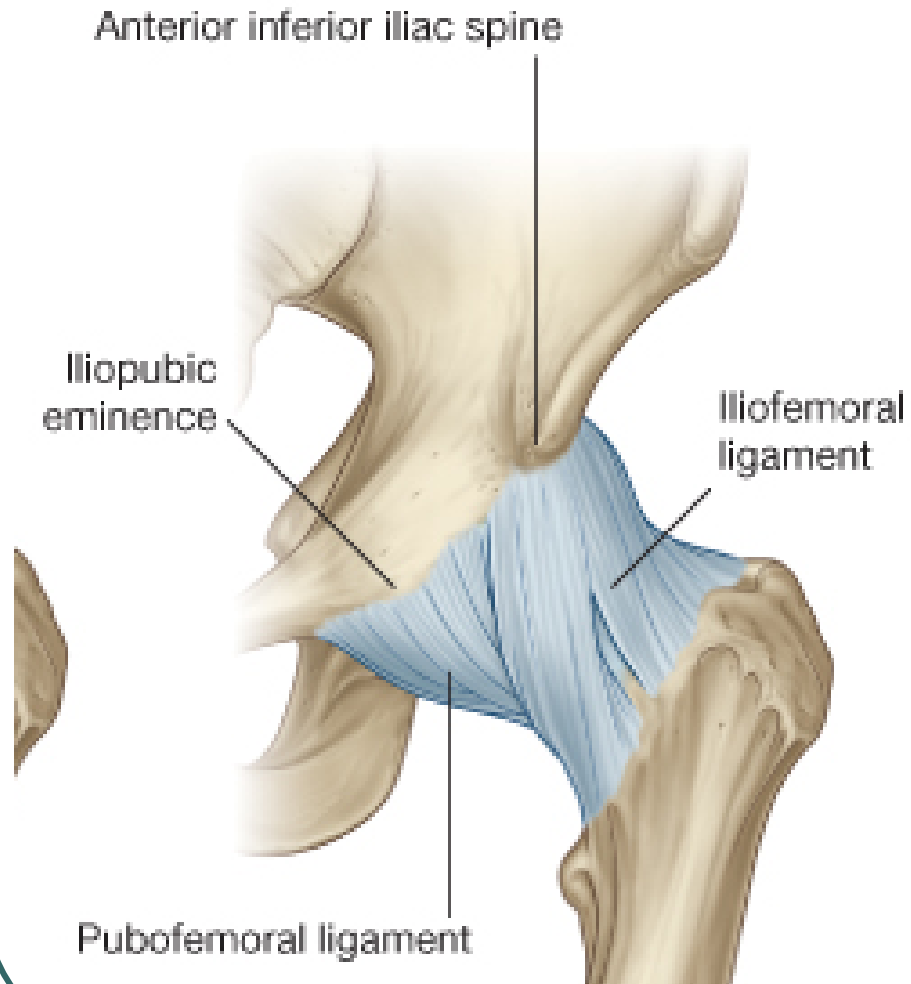
Hip Joint Ligaments - Y



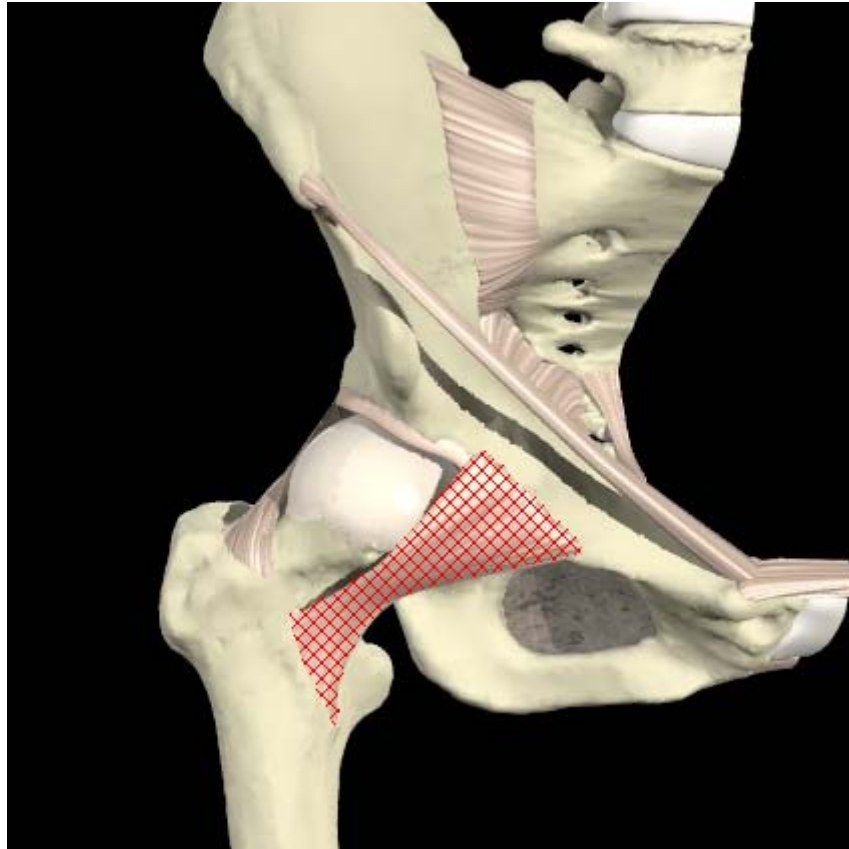
Hip

- Pubofemoral
- Runs from the superior pubic ramus and the acetabular rim, to just above lesser trochanter
- Resists ABD with some resistance to external rotation

Pubofemoral



Pubofemoral



Hip

- Ischiofemoral
- From the ischium to the posterior neck of the femur – is directed upwards and laterally
- Resists ADD and internal rotation
- ALL three loose during flexion, the freest motion

Ischiofemoral

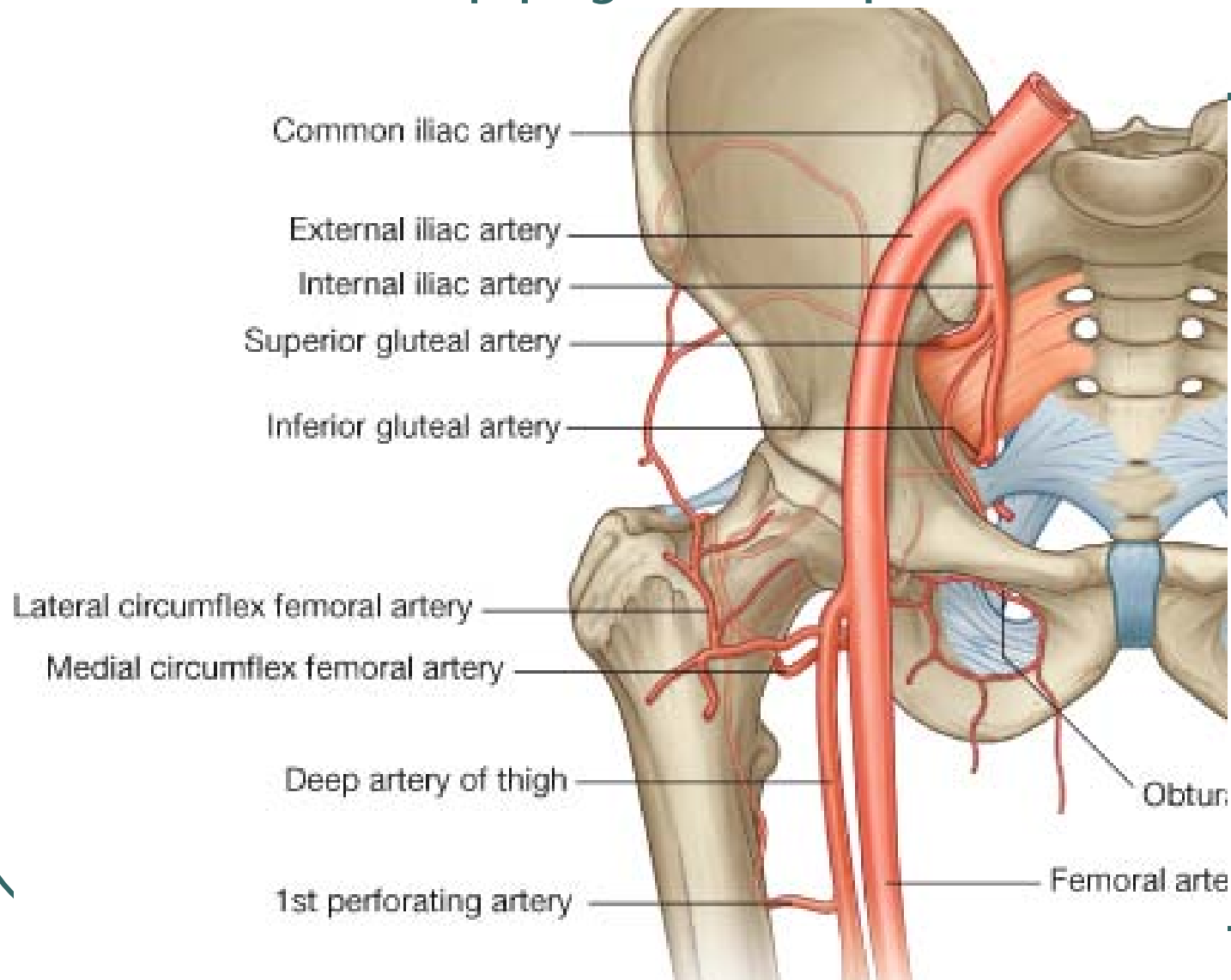


Ischiofemoral ligament

Hip

- Nerve Supply
 - Superior gluteal
 - Inferior gluteal and
 - Femoral
- Blood Supply
 - Medial circumflex artery
 - Lateral circumflex artery
- Bursae
 - Iliopectineal

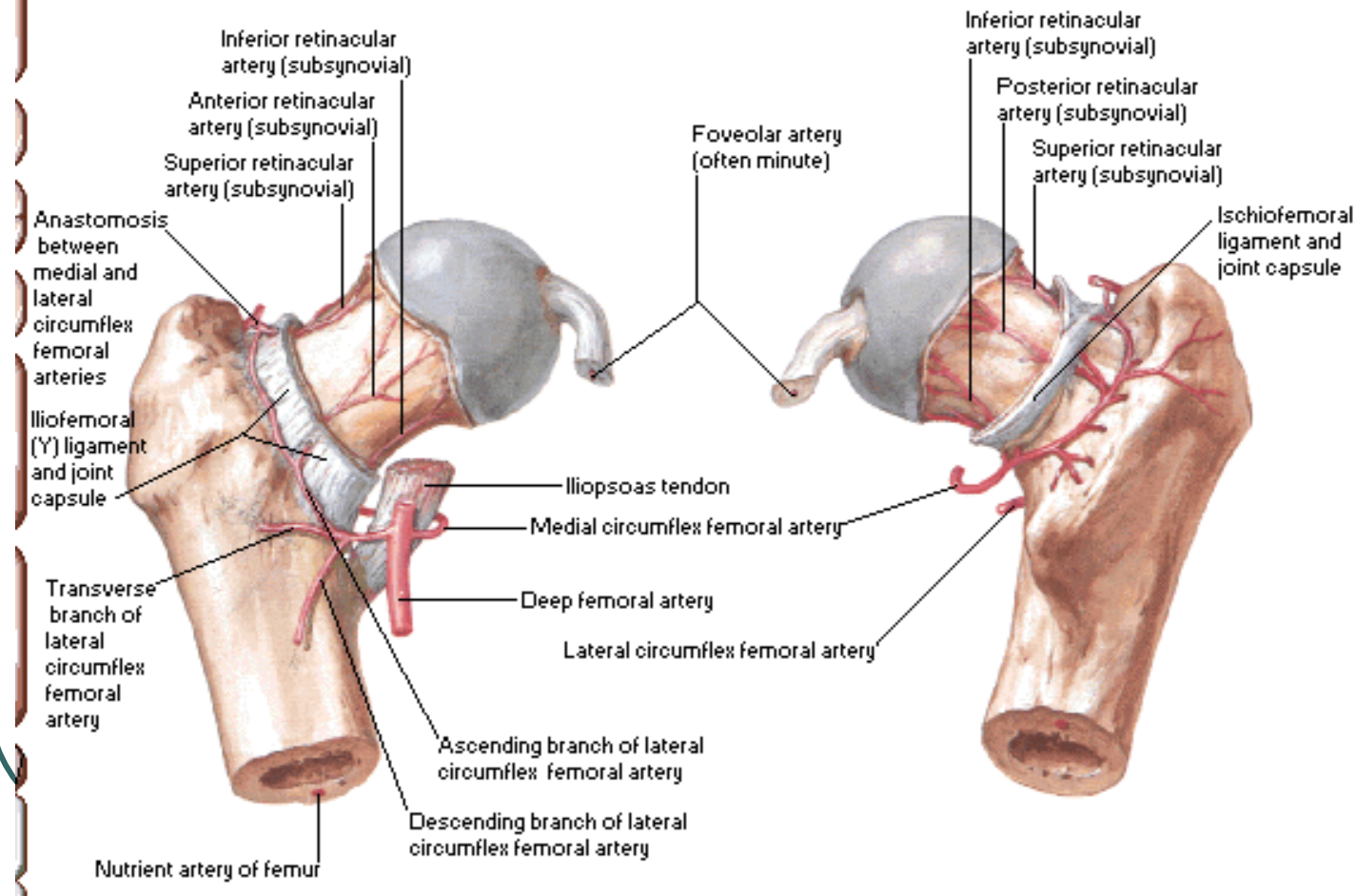
Blood Supply to Hip



Blood Supply

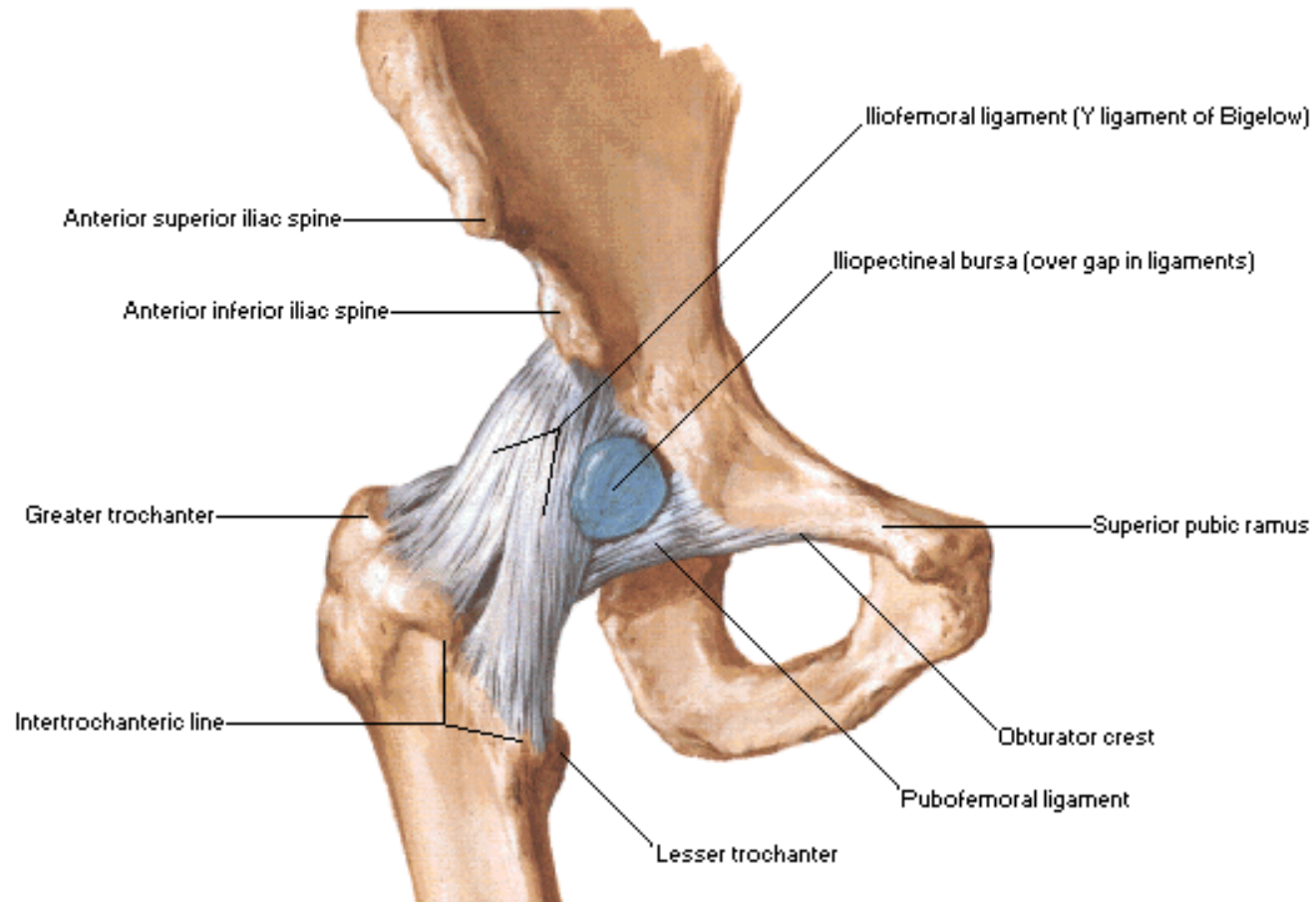
Arteries of Femoral Head and Neck

Anterior and Posterior Views



Iliopectineal Bursae

Hip Joint Anterior View



Hip Angles

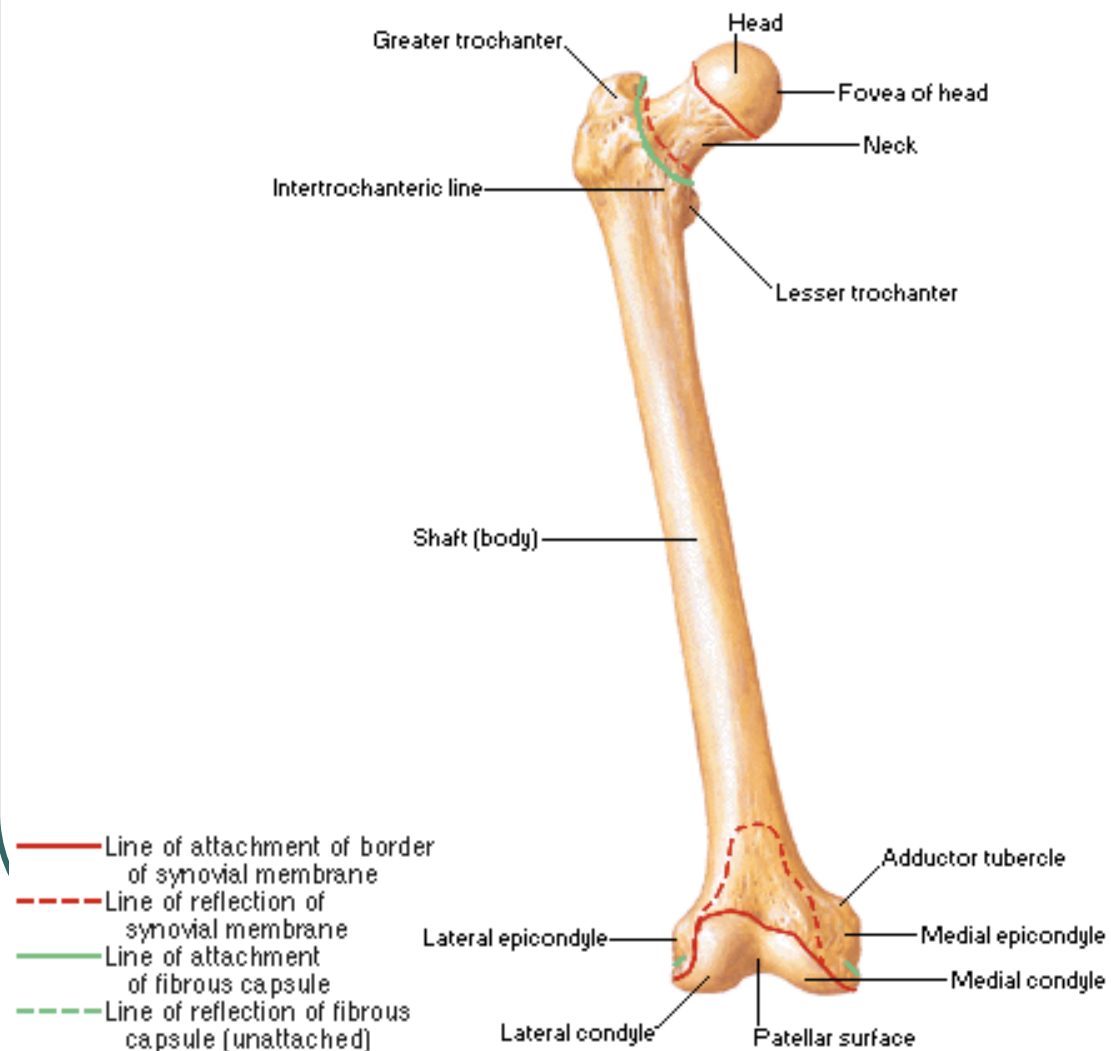
- Femur is held away from the hip joint and the pelvis via the femoral neck
- Forms an angle called the angle of inclination
 - In the frontal plane, angle = approximately 125 degrees; the range = from about 90 degrees to 135 degrees
- Determines
 - The effectiveness of hip ABD muscles
 - The length of the limb
 - The forces acting on the hip joint and femoral neck

Hip Angles

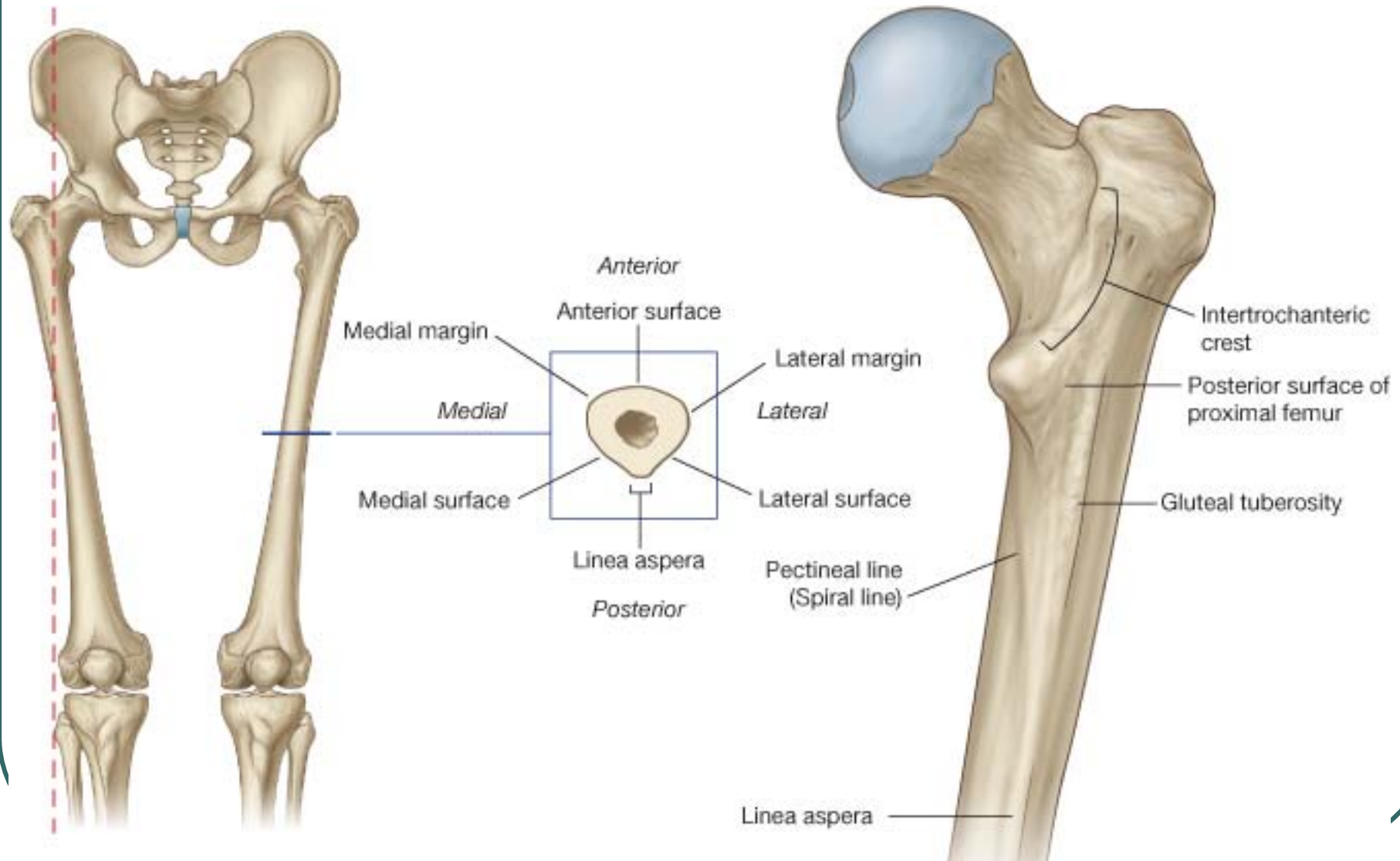
- If greater than 125 degrees called coxa valgus
 - Increase = lengthened limb length, increase load on femoral head, decrease stress on femoral neck, decrease effectiveness of hip ABD
- If less than 125 degrees, called coxa vara
 - Decrease = shortened limb, decrease load on femoral head, increase stress on femoral neck, increase effectiveness of hip ABD

Angle of Inclination

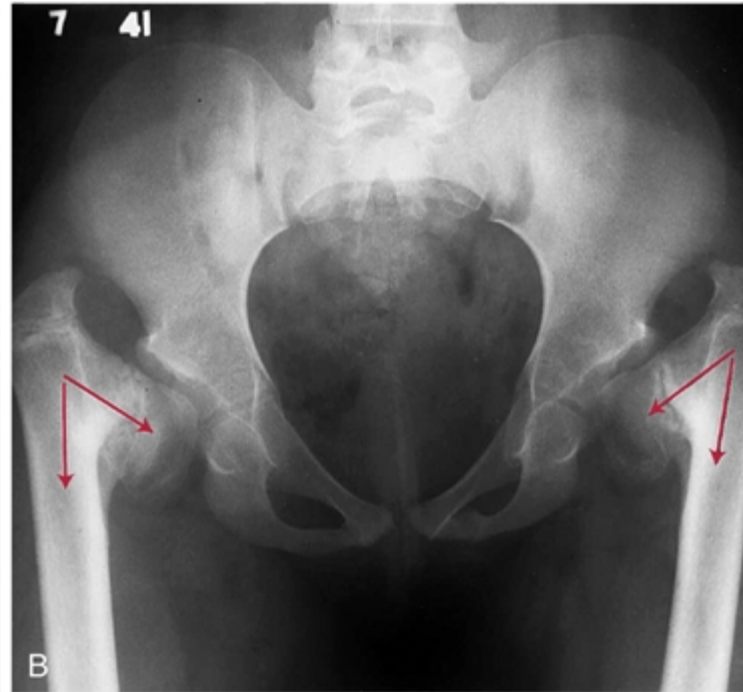
Femur Anterior View



Angle of Inclination



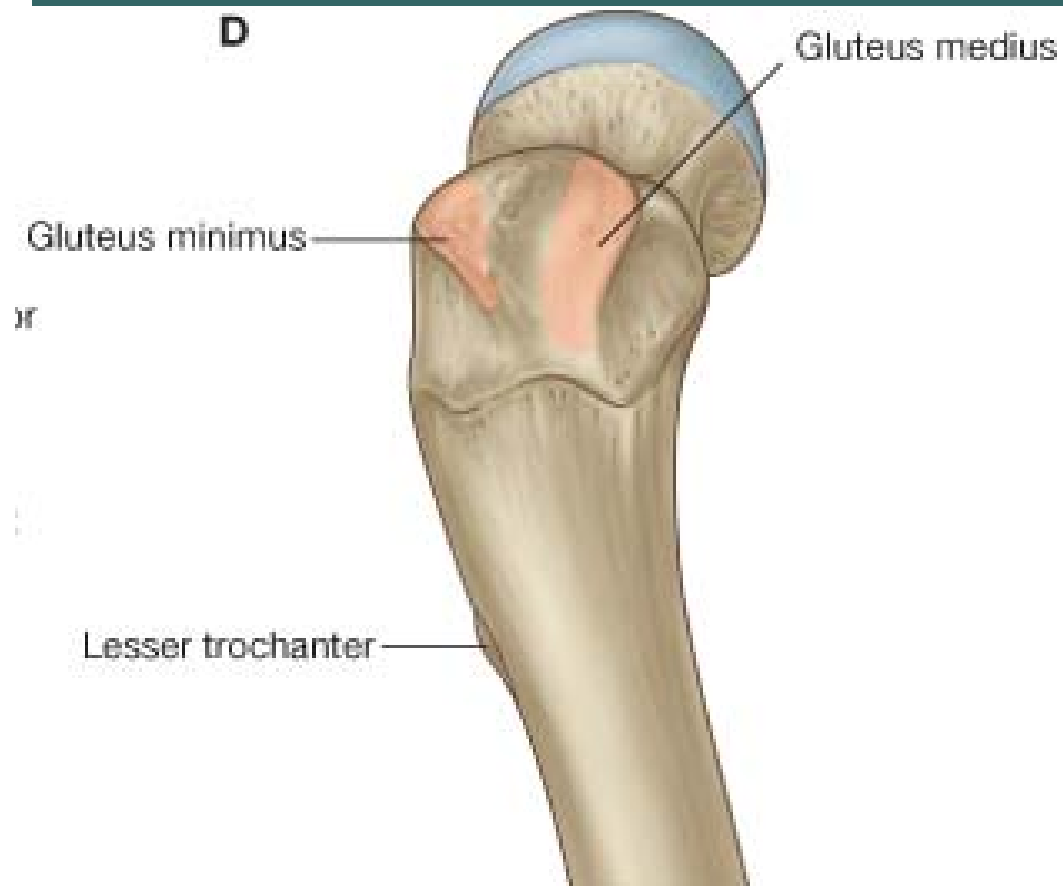
Coxa Valga (L) v. Coxa Vara



Hip Angles

- Angle of femoral neck in the transverse plane is termed anterversion
- Neck is rotated 12-14 degrees with respect to femur
- Increases the MA of the gluteus maximus – making it a more effective hip external rotator
 - Excessive (beyond 14 degrees) to the anterior side means that the head of femur is uncovered – tends to dislocate, unstable hip
 - Decrease (less than 12 degrees) is called Retroversion, angle reversed and moved posteriorly

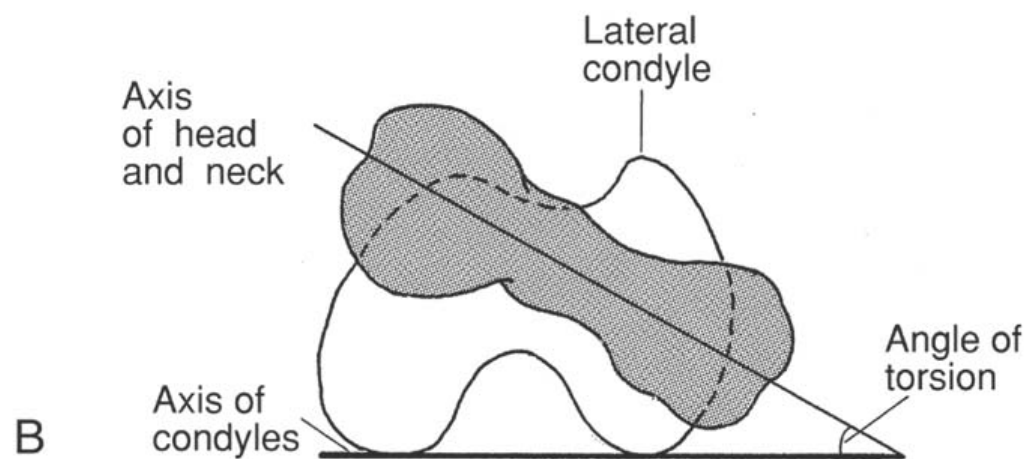
Anterversion



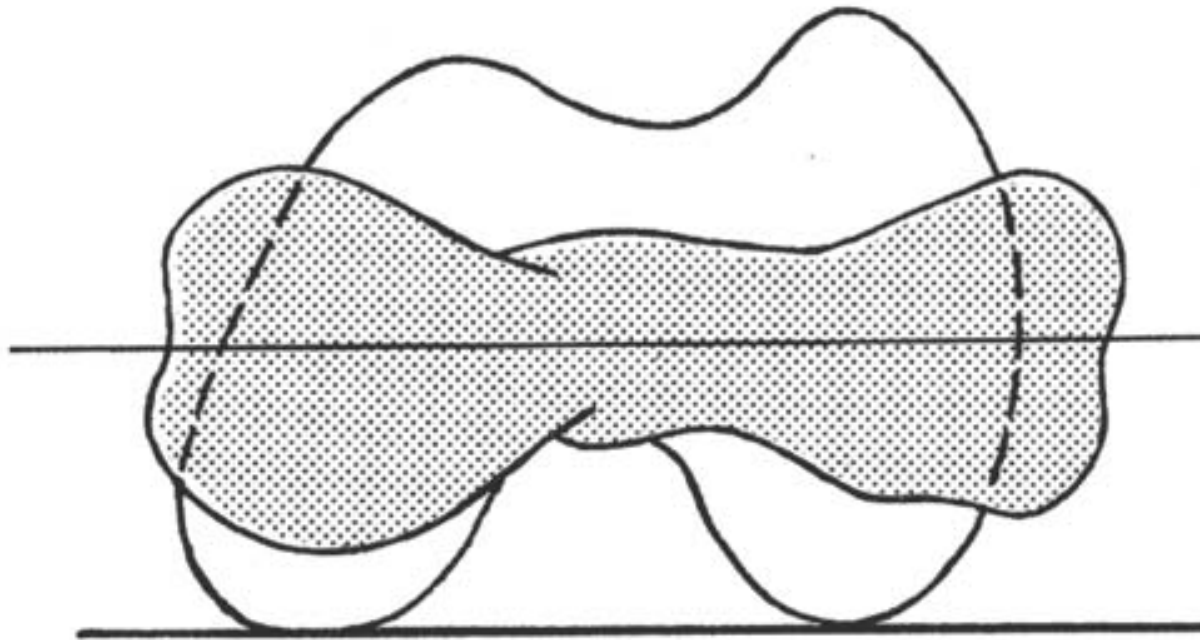
Anterversion - Normal



Anterversion - Excessive



Retroversion



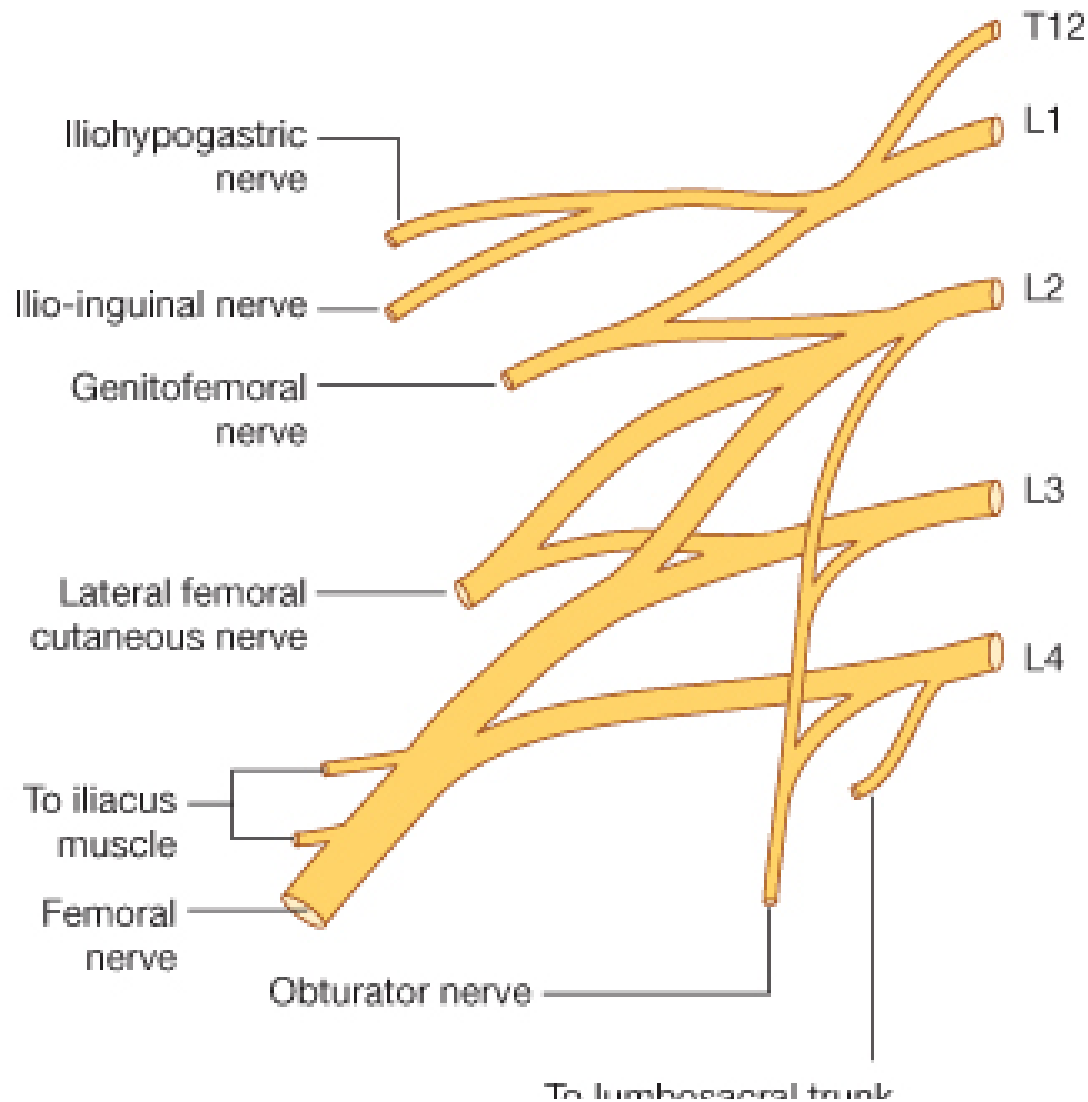
Hip ROM

- 70-140 degrees of flexion – 90 with knees extended, 125-140 with knees flexed
- 4-15 degrees of hyperextension (beyond anatomical position)
- Hyperextension is limited by anterior capsule, strong hip flexors, iliofemoral ligament
- ABD = about 30-50
- ADD = about 25 from anatomical position

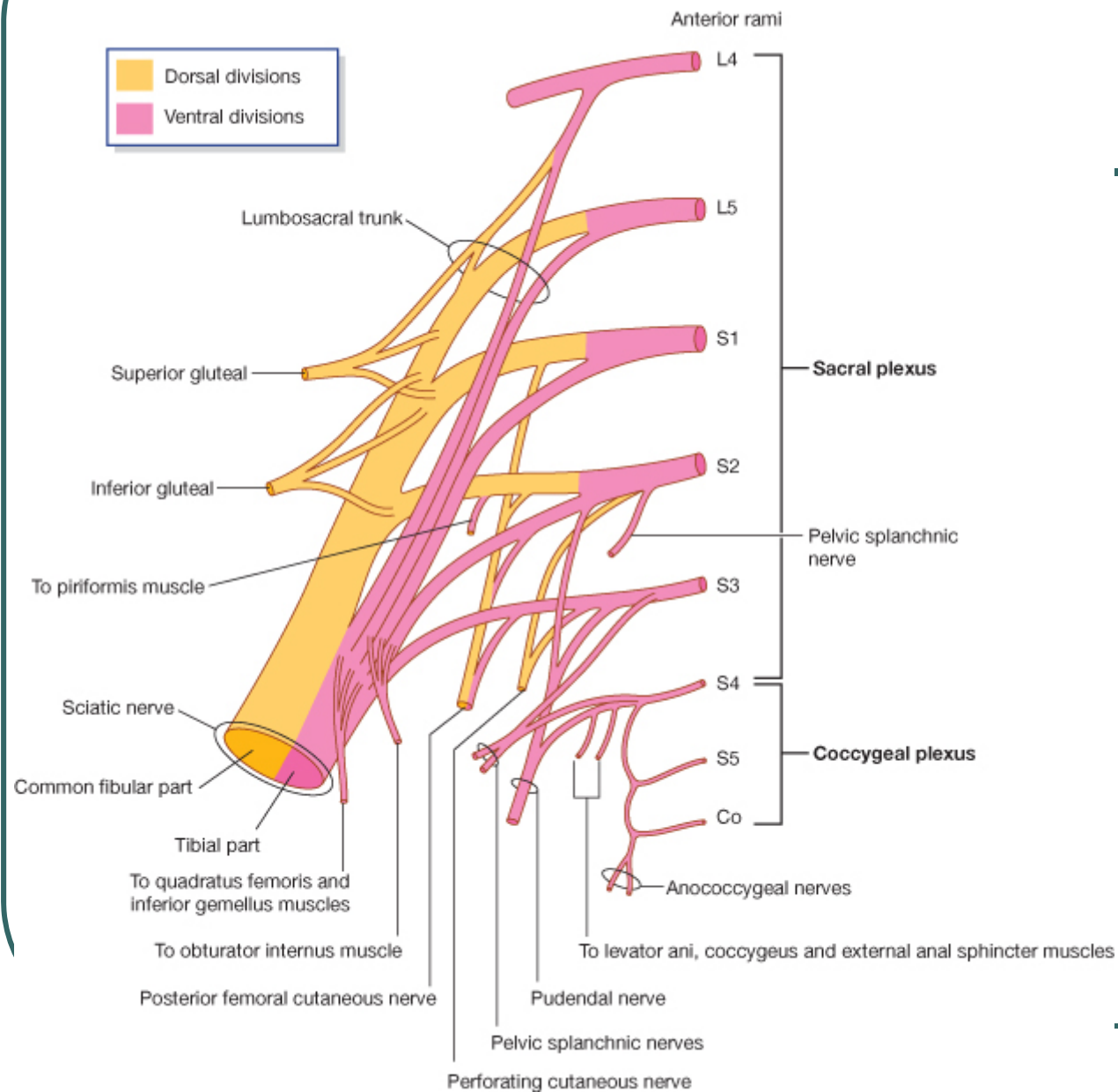
Lumbo-Sacral Plexus

- Two distinctly different plexi that are connected and serve the entire Hip and LE
- Lumbar from T12, L1, L2, L3, L4
- Sacral from L4, L5, S1, S2, S3, and S4
- Ventral rami, anterior and posterior divisions and terminal nerves

Lumbar Plexus Schematic



Sacral Plexus Schematic

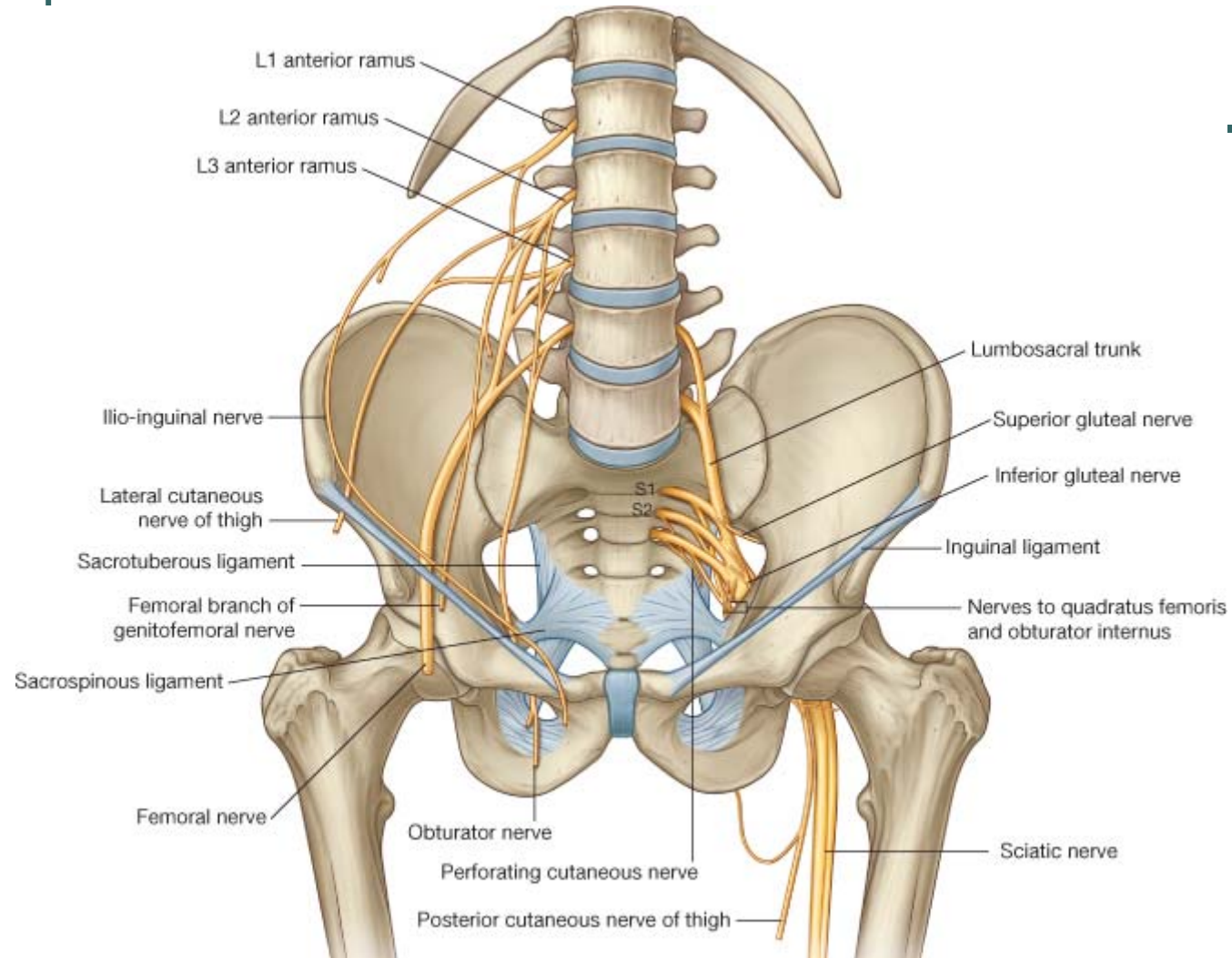


Lumbar Division

Ventral Rami from T12 to L5

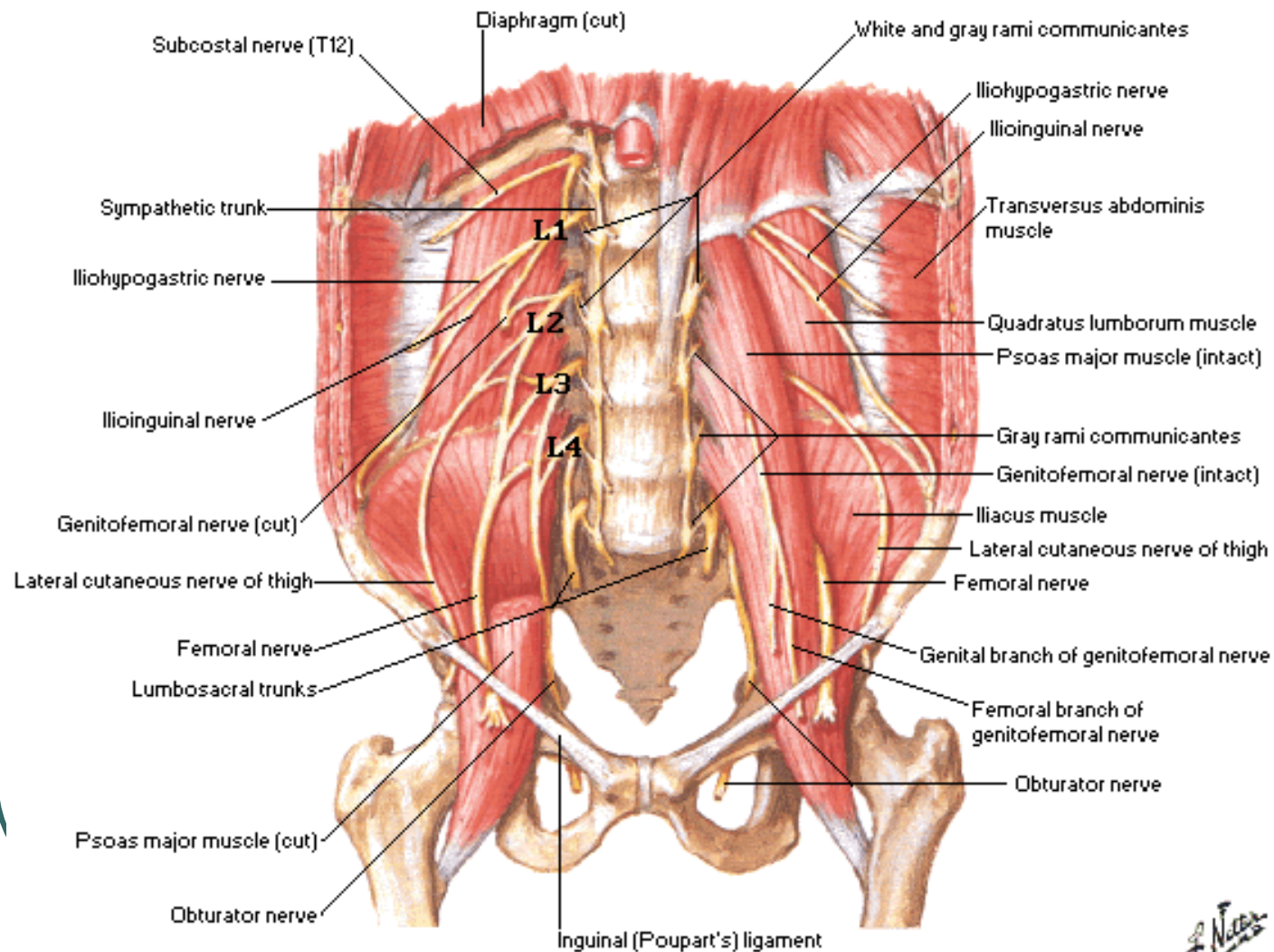
- Subcostal (T12)
- Iliohypogastric (T12,L1)
- Ilioinguinal (L1)
- Genitofemoral (L1, L2)
- Lateral Femoral Cutaneous (Post. Divisions L2,L3)
- Femoral (Posterior Division L2,L3,L4)
- Obturator (Anterior Division L2,L3,L4)
- Sacral Trunk (L4,L5)

Lumbar Division



Lumbar Plexus in Situ

Lumbar Plexus in Situ



F. Netter

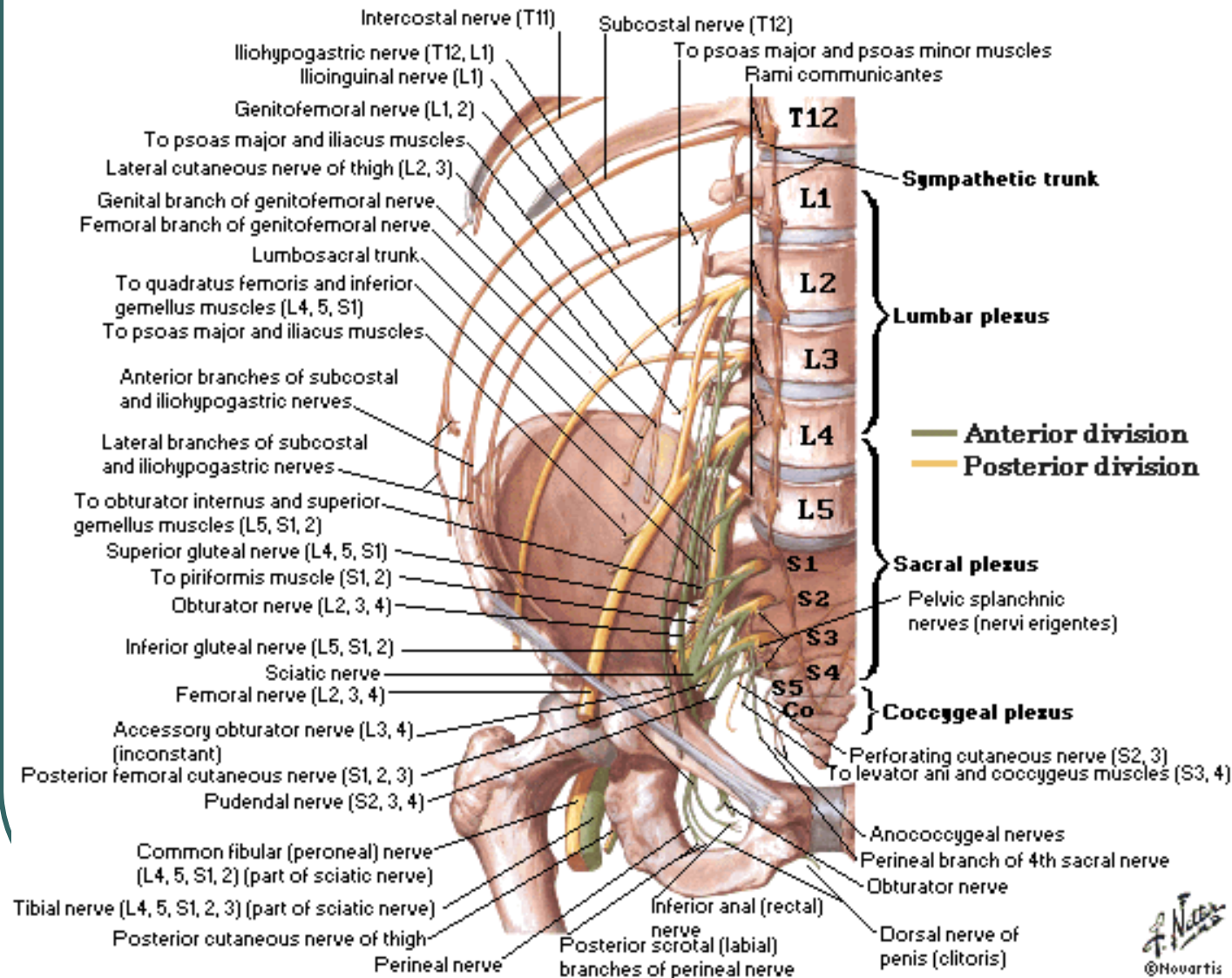
Sacral Division

Ventral Rami from L4 to S4

- **Posterior Division Nerves**
 - Superior Gluteal (L4,L5,S1)
 - Inferior Gluteal (L5,S1,S2)
 - Common Peroneal (L4,L5,S1,S2)
- **Anterior Division**
 - Tibial (L5,S1,S2,S3)
- **Both Divisions**
 - Posterior Femoral Cutaneous (S1.S2.S3)

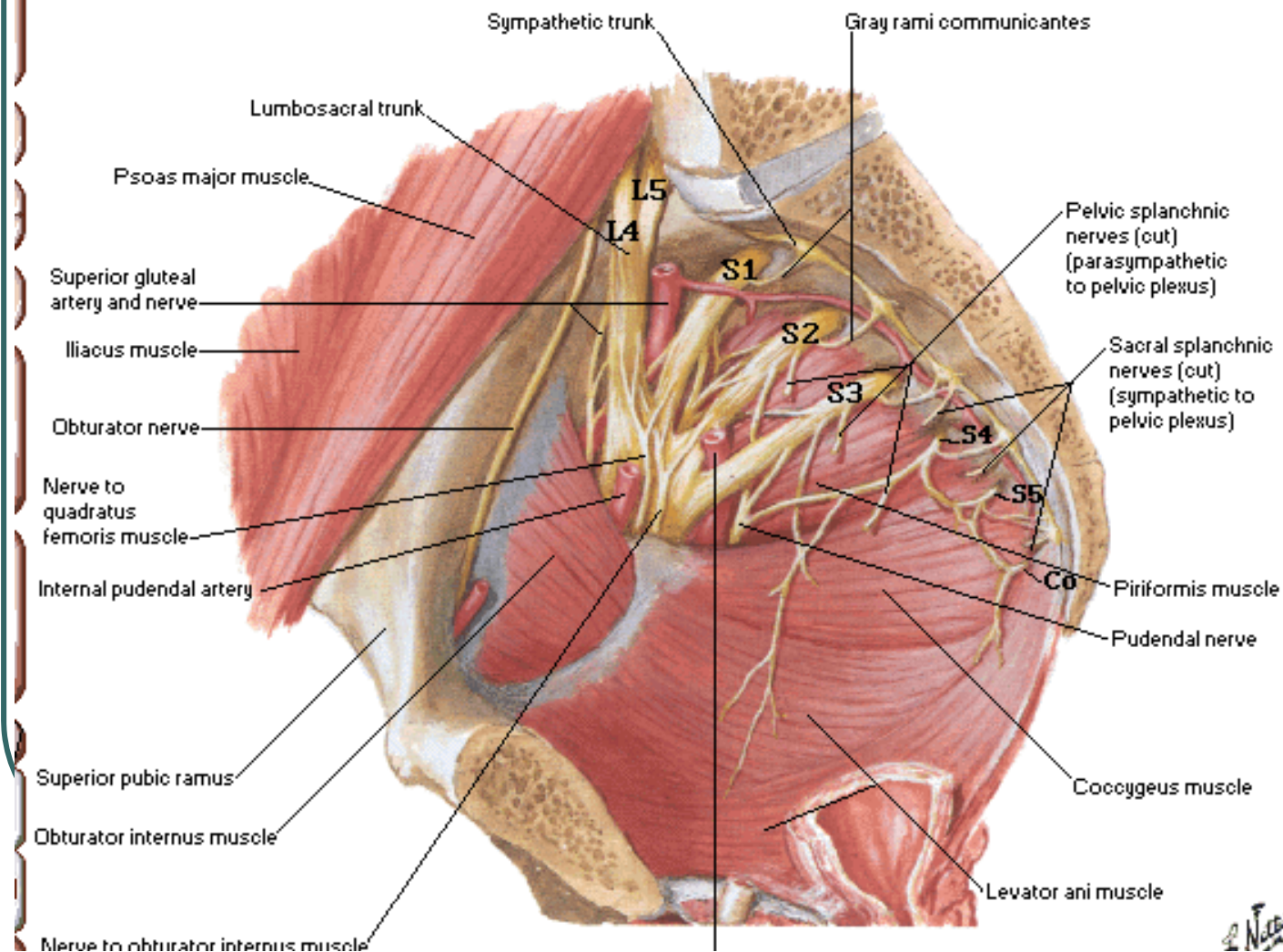
Both

Lumbosacral and Coccygeal Plexuses

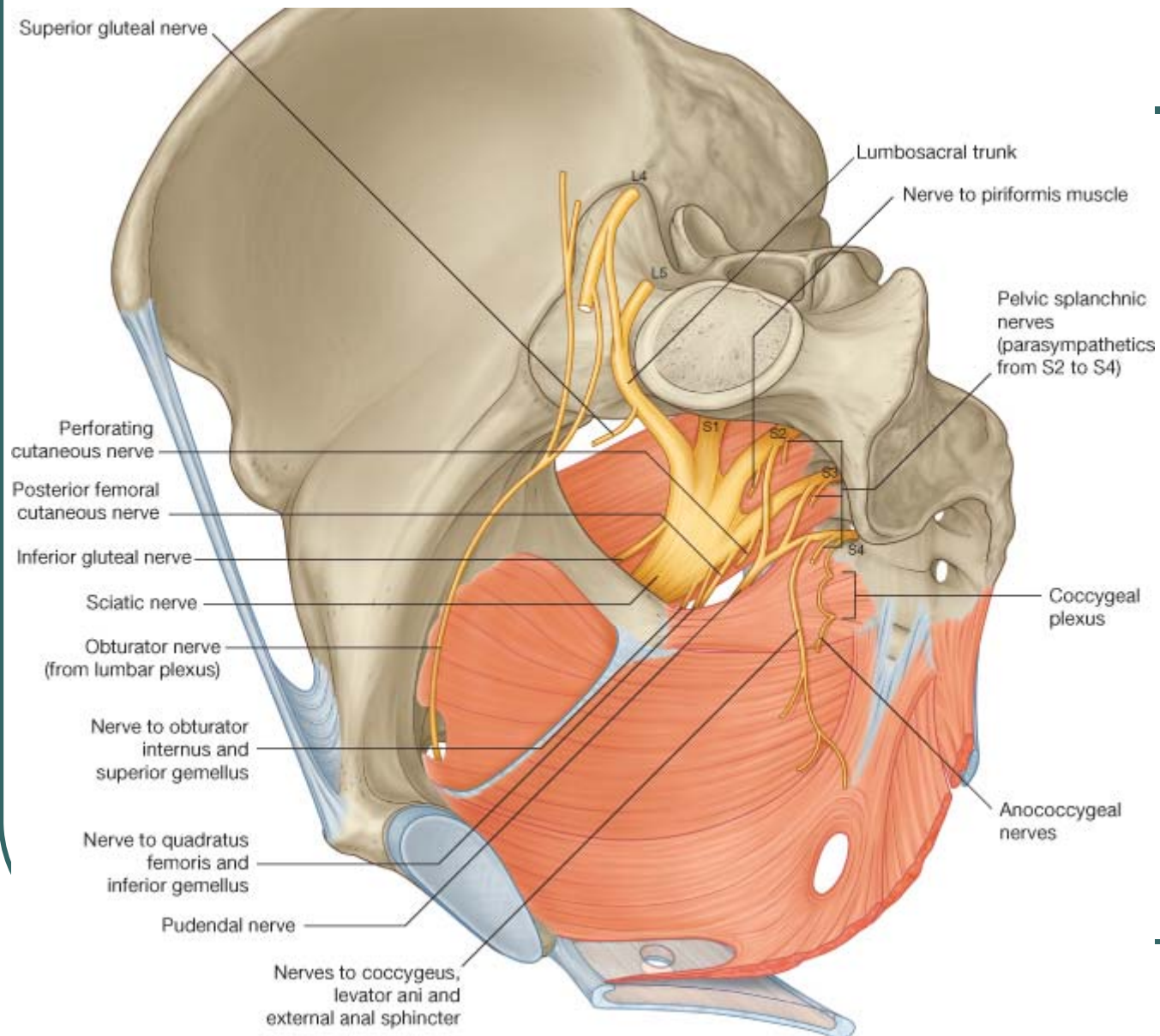


Sacral Plexus in Situ

Sacral and Coccygeal Plexuses in Situ



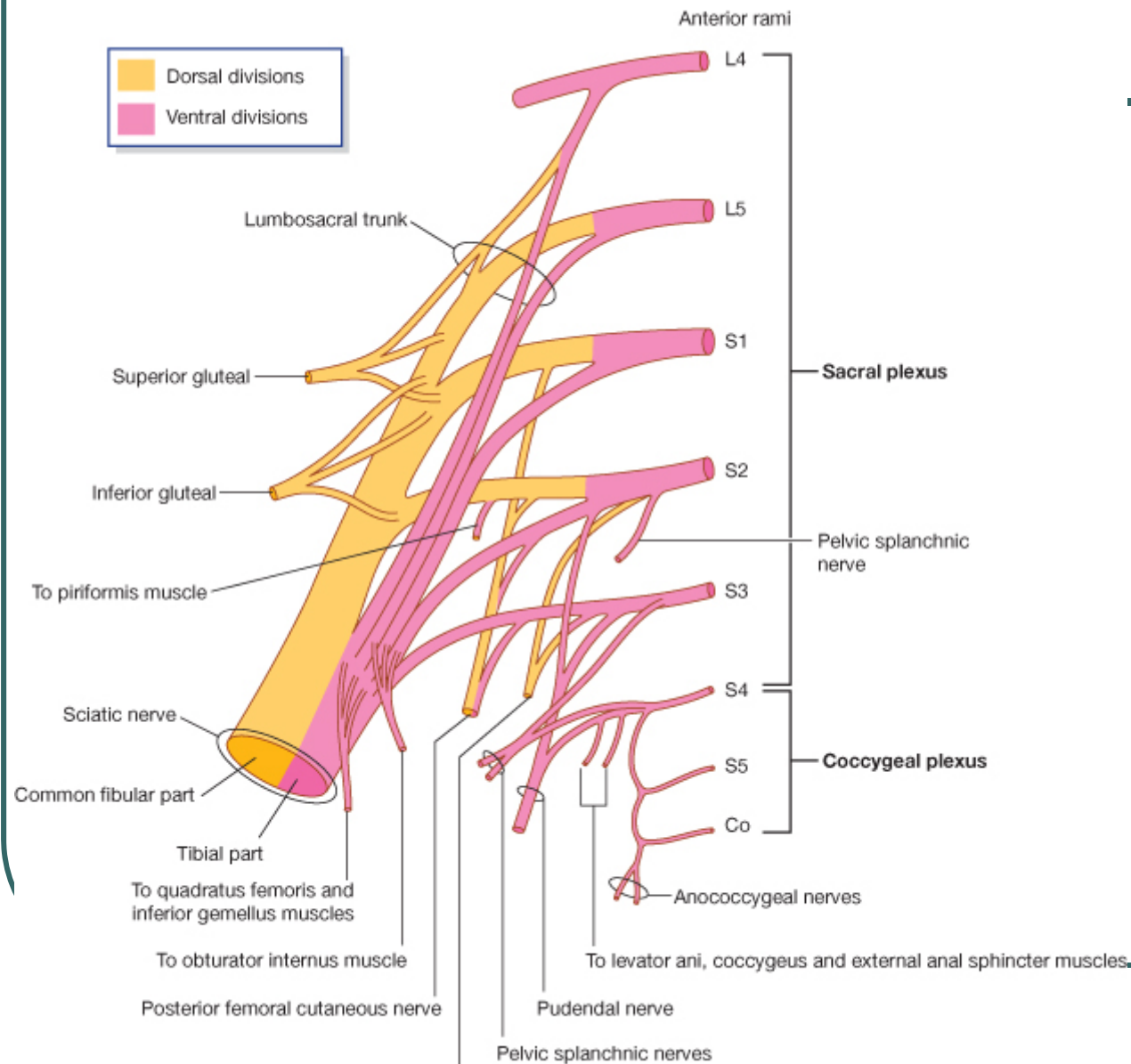
Sacral Plexus



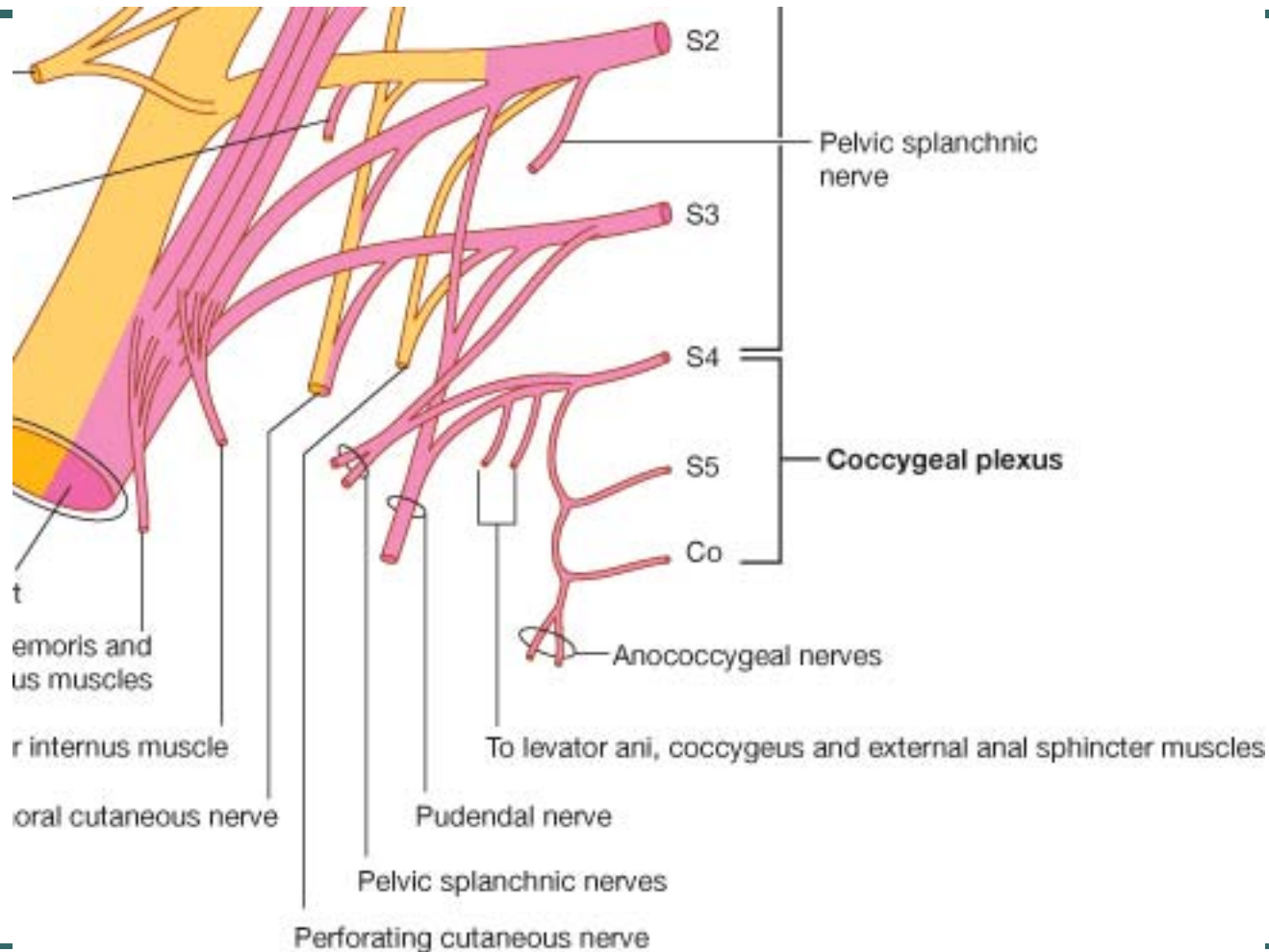
Small Nerves from Sacral Plexus

- Branch to Quadratus Femoris and Inferior Gemellus (L4,L5,S1) [ant. div.]
- Branch to Obturator Internus and Superior Gemellus (L5, S1, S2)
- Nerve to Piriformis (S1, S2) [post. div.]
- Pudental Nerve (S3, S4)

Small Nerves

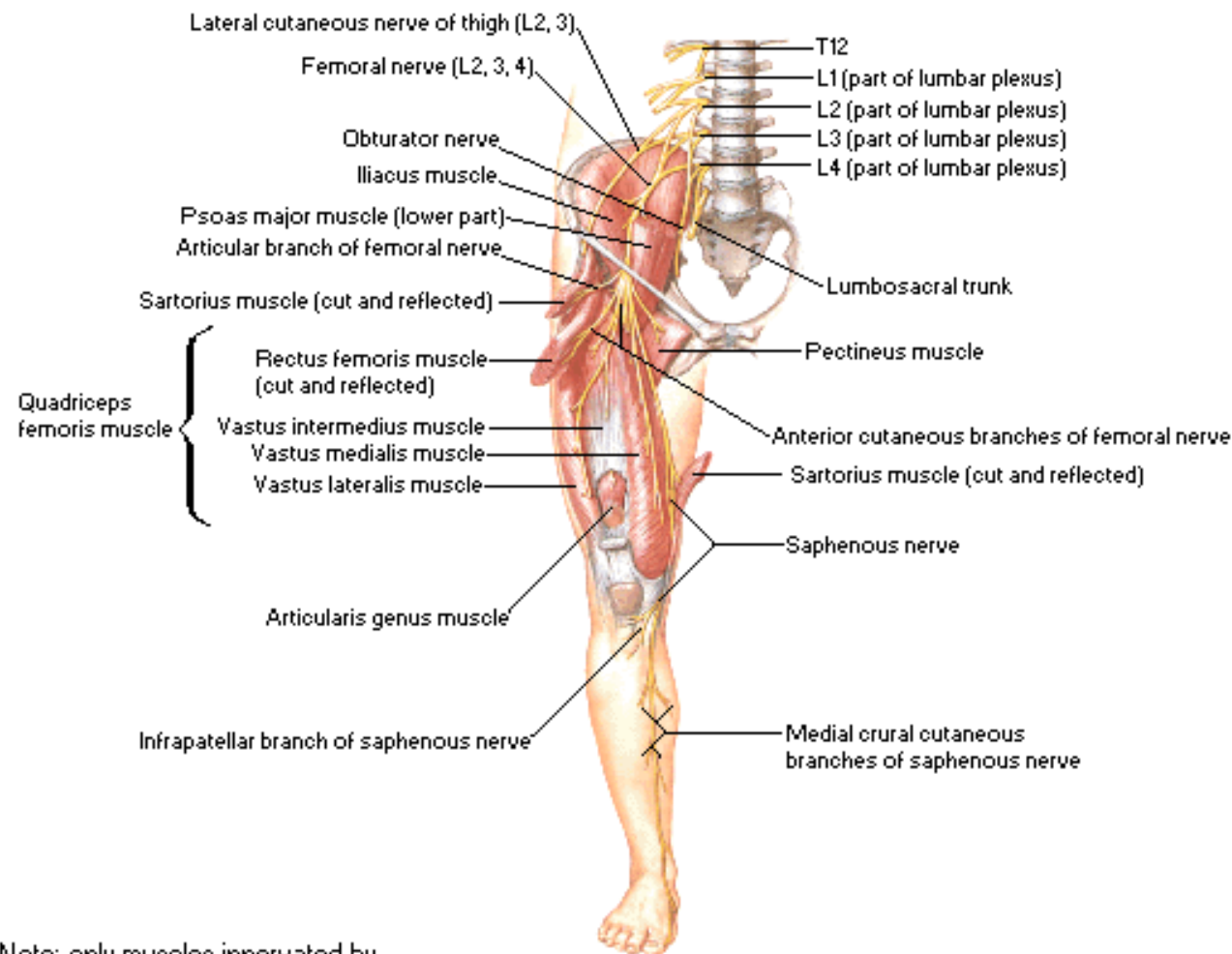


Coccygeal Plexus



Femoral Nerve

Femoral and Lateral Femoral Cutaneous Nerves

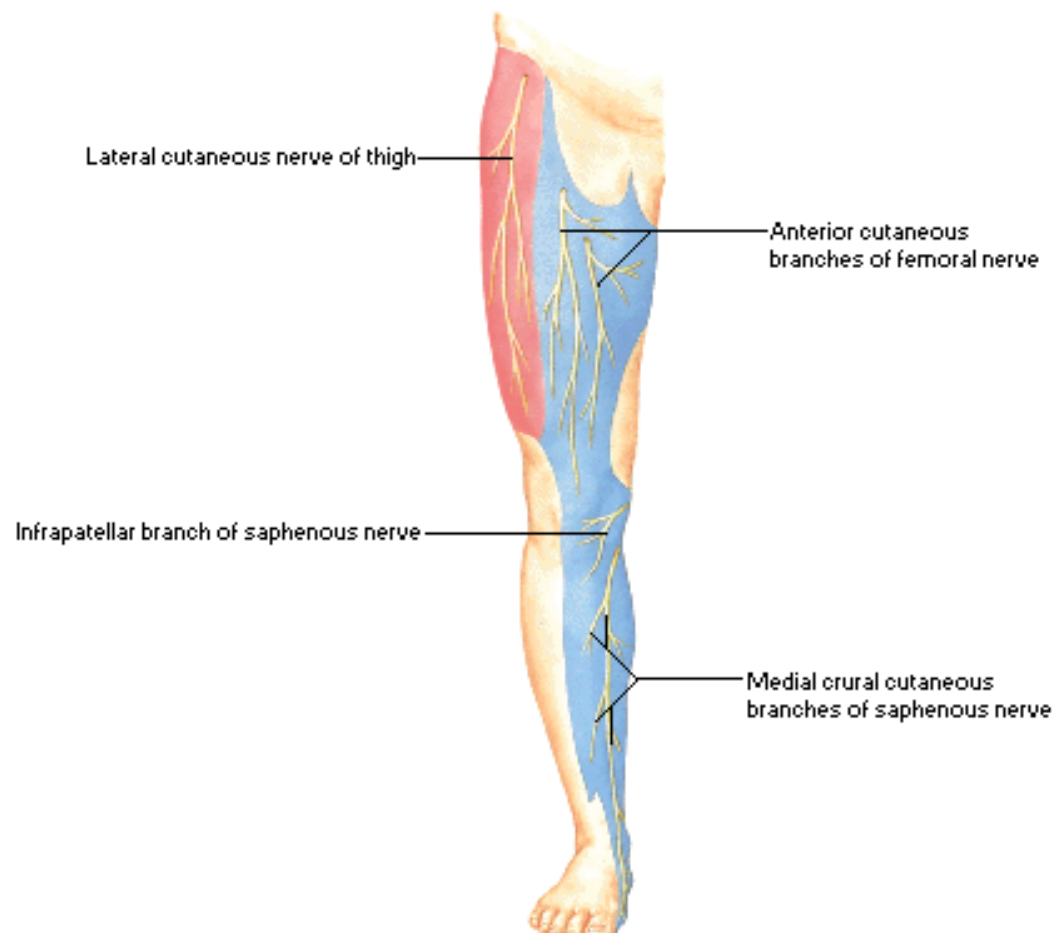


Note: only muscles innervated by femoral nerve shown

Femoral Nerve

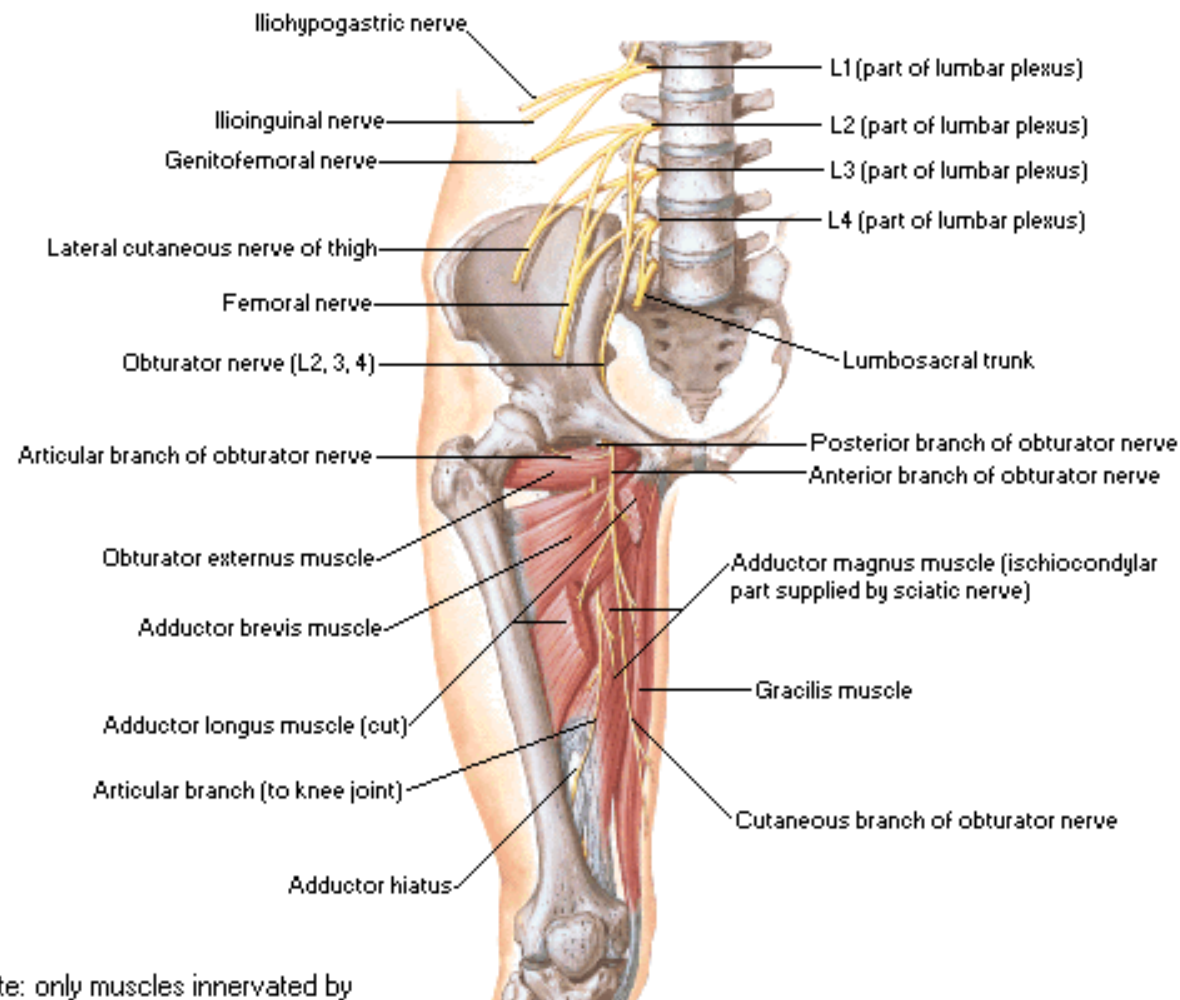
Femoral and Lateral Femoral Cutaneous Nerves

Cutaneous Innervation



Obturator Nerve

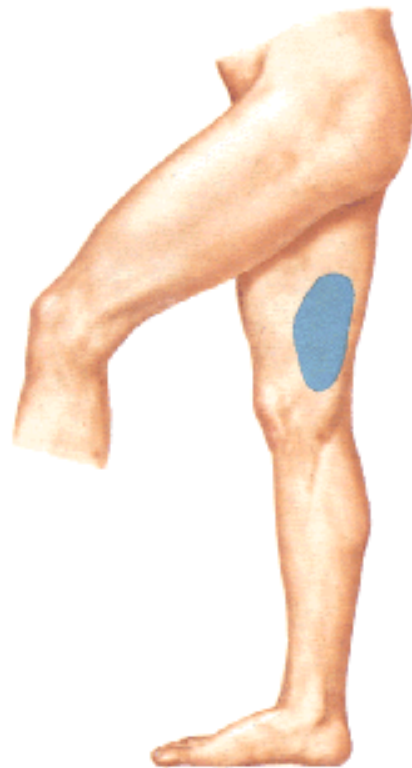
Obturator Nerve



Note: only muscles innervated by obturator nerve shown

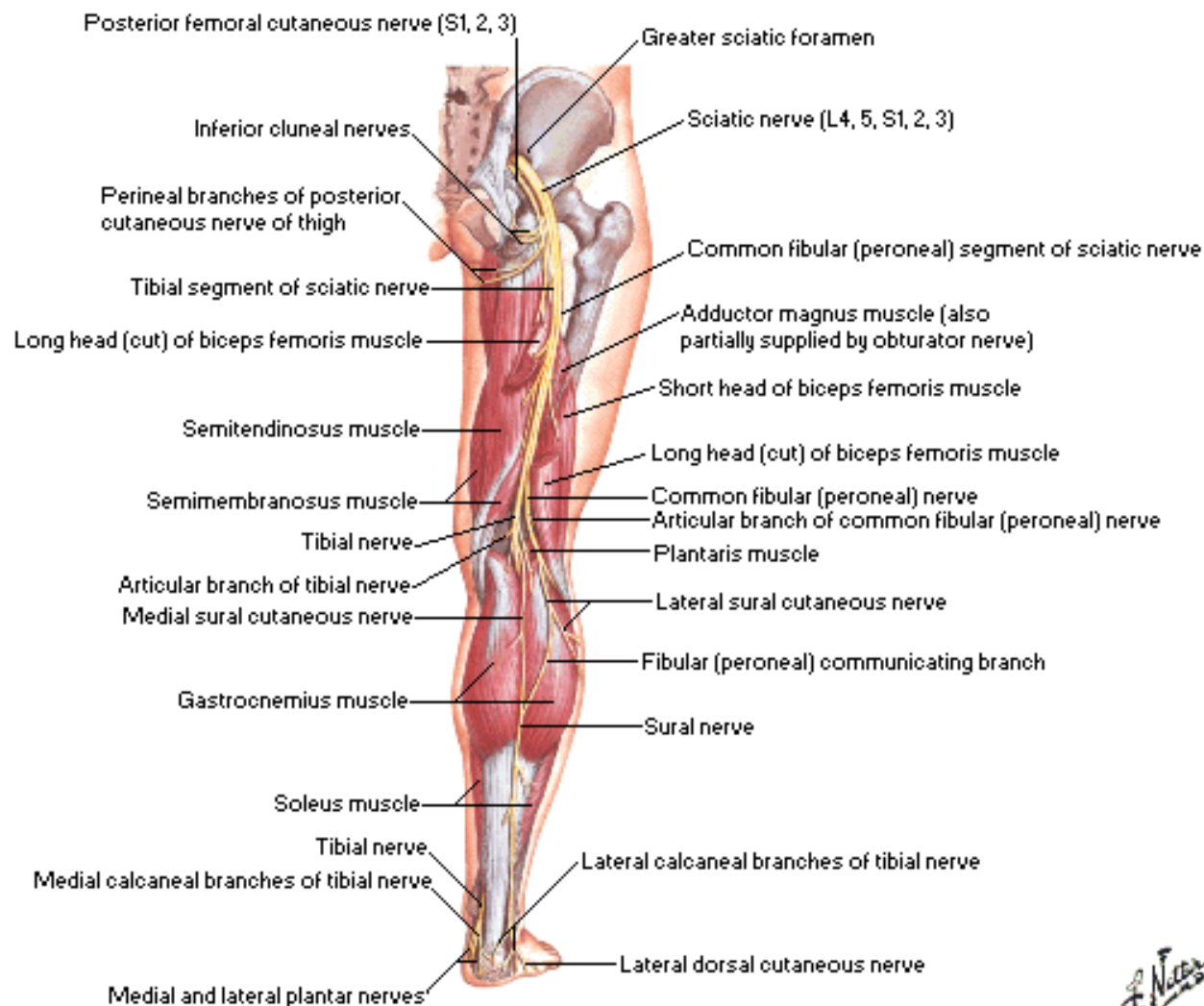
Obturator Nerve

Obturator Nerve
Cutaneous Innervation



"Sciatic" Nerve

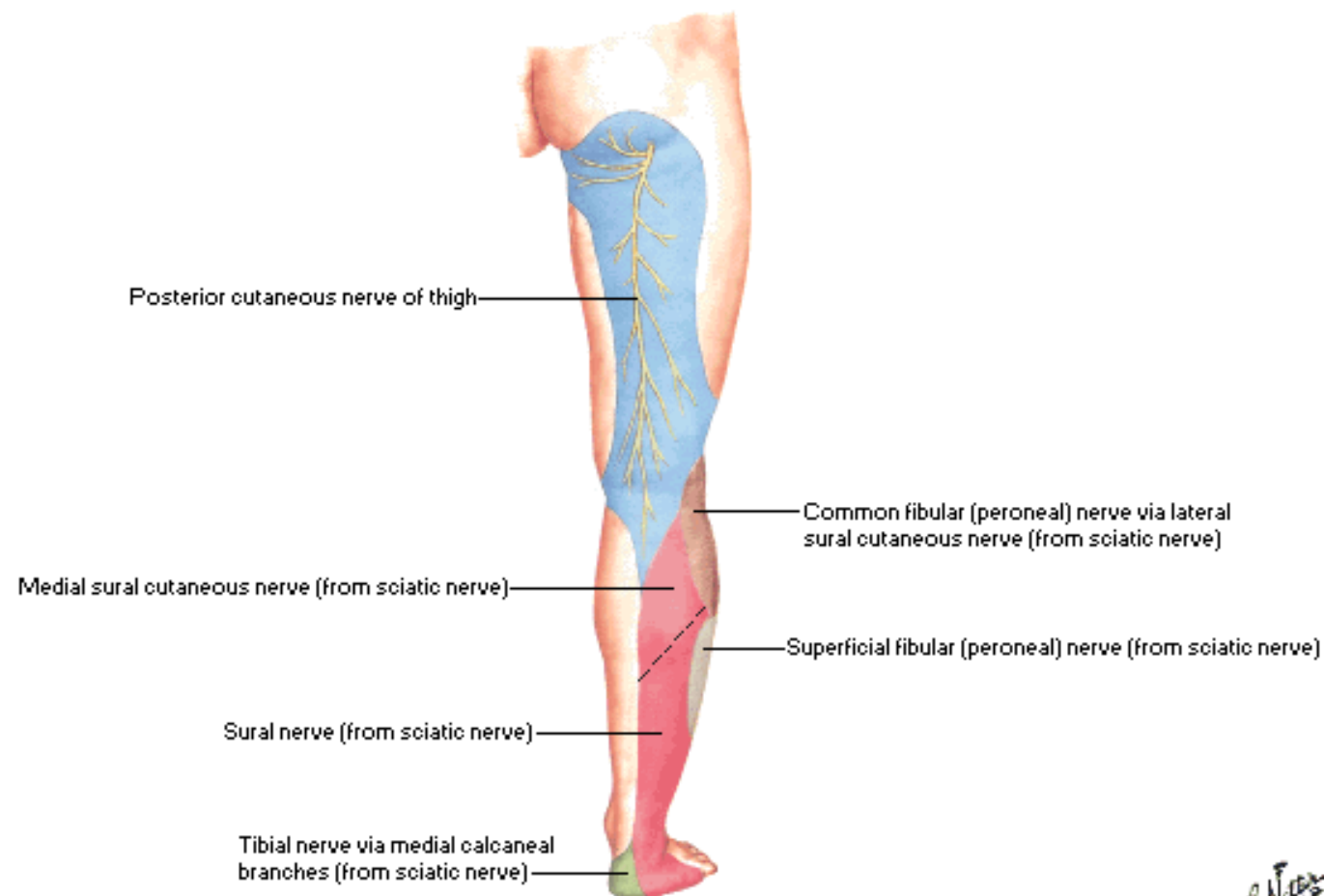
Sciatic and Posterior Femoral Cutaneous Nerves



"Sciatic Nerve"

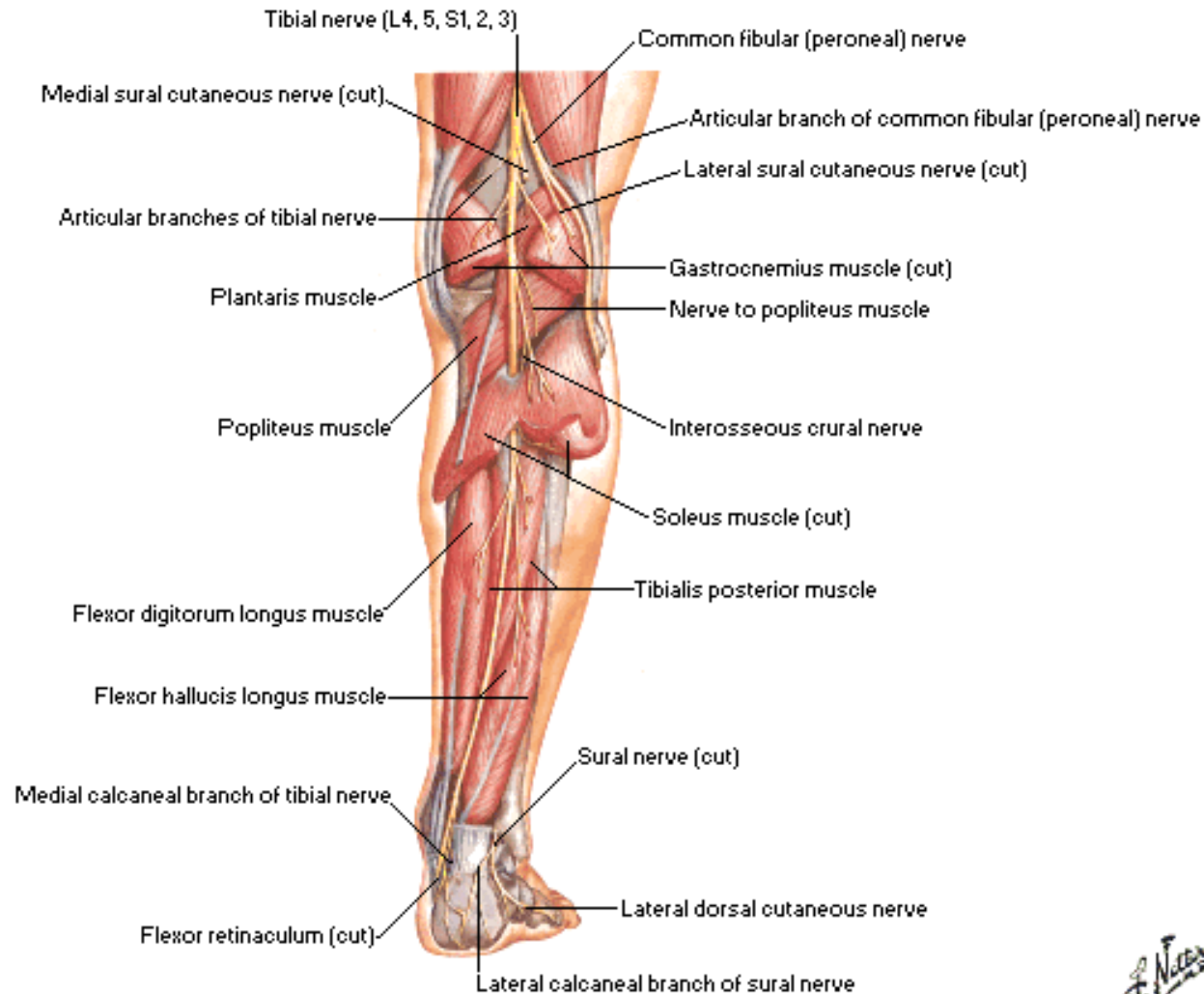
Sciatic and Posterior Femoral Cutaneous Nerves

Cutaneous Innervation



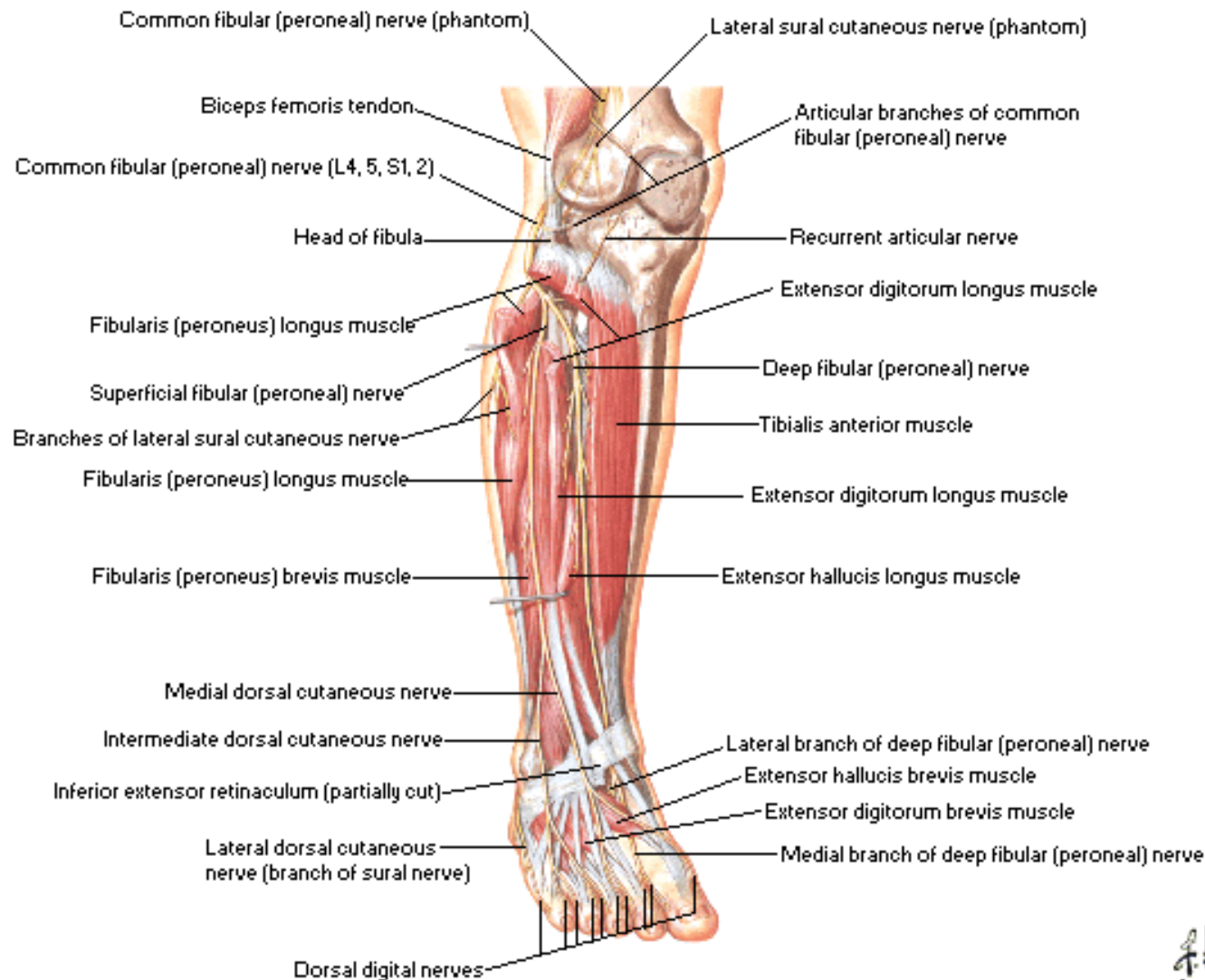
Tibial Nerve

Tibial Nerve



Common Peroneal Nerve

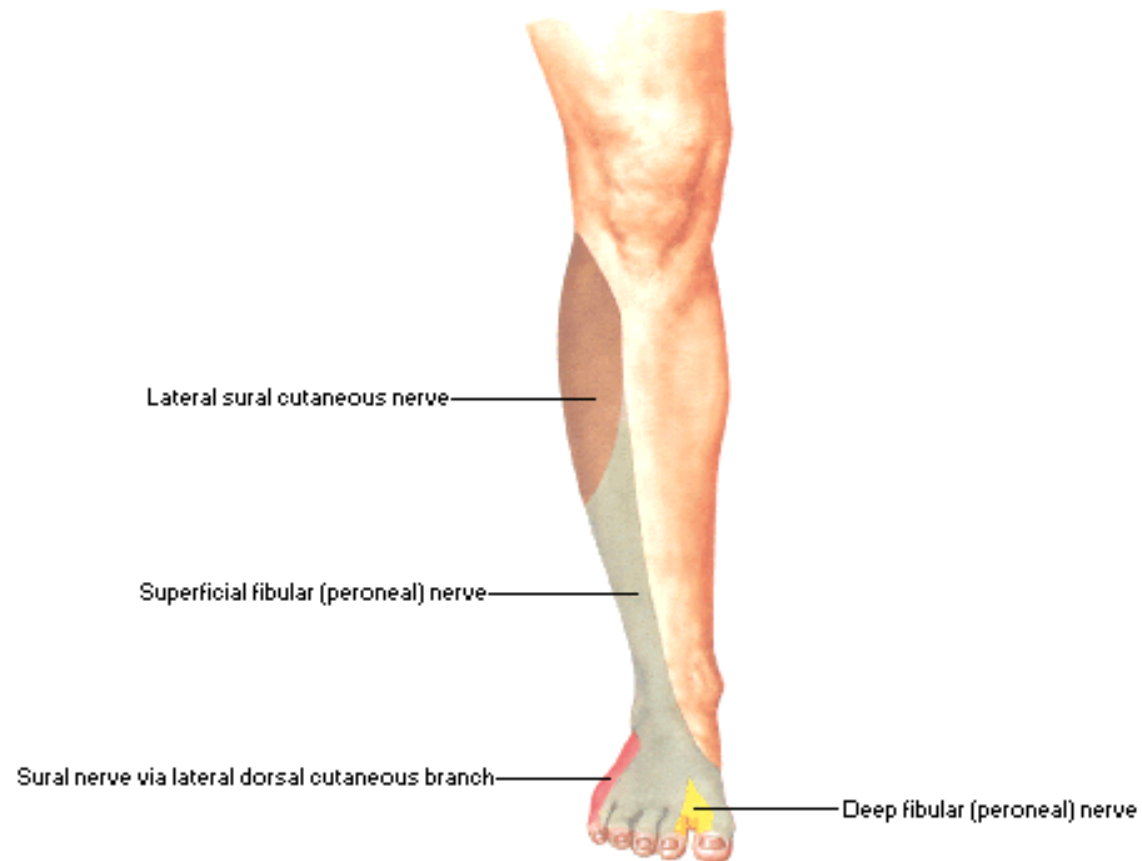
Common Fibular [Peroneal] Nerve



Common Peroneal Nerve

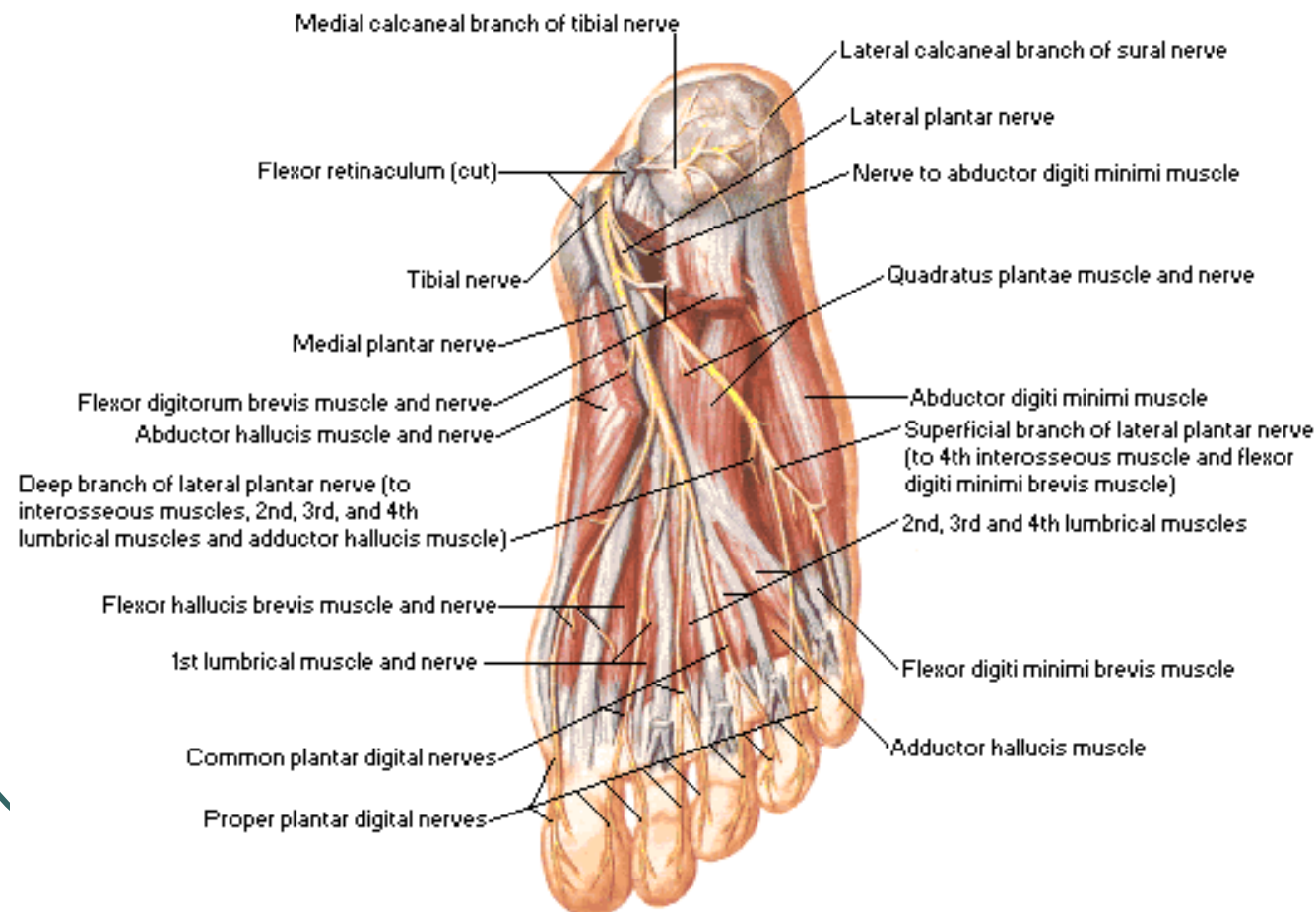
Common Fibular [Peroneal] Nerve

Cutaneous Innervation



Tibial Nerve Foot

Tibial Nerve Plantar View



Tibial Nerve Foot

Tibial Nerve

Cutaneous Innervation of Sole of Foot

