



Abdominal muscles. Subinguinal hiatus and inguinal canal. Femoral and adductor canals. Neurovascular system of the lower limb.

Sándor Katz M.D.,Ph.D.

# External oblique muscle

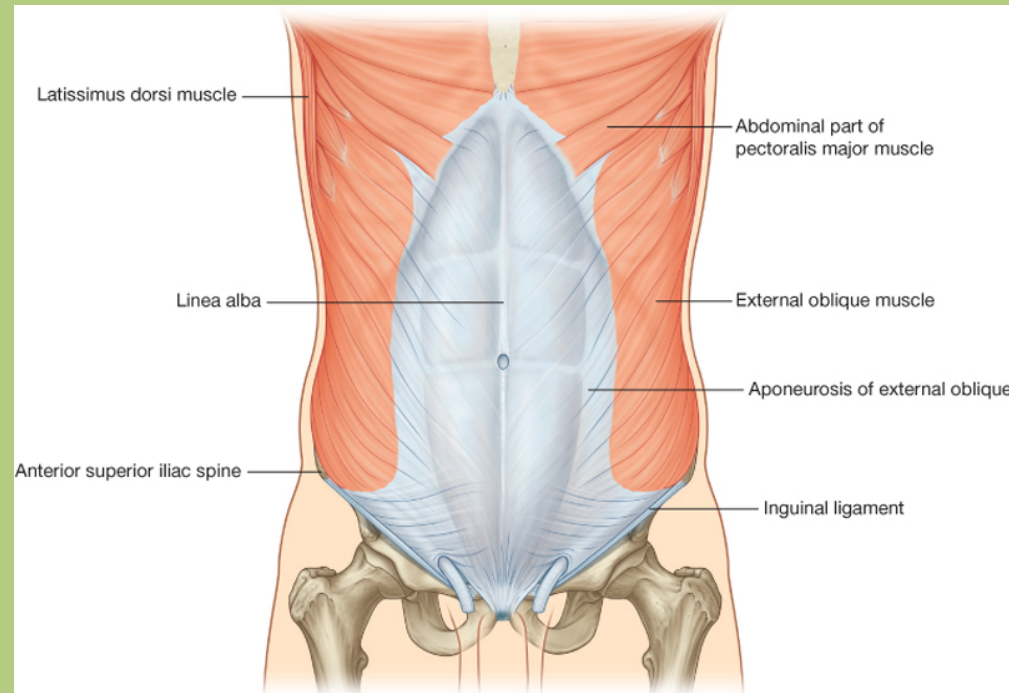


**Origin:** outer surface of the 5th to 12th ribs

**Insertion:** outer lip of the iliac crest, rectus sheath

**Action:** flexion and rotation of the trunk,  
active in expiration

**Innervation:** intercostal nerves (T5-T11), subcostal  
nerve (T12), iliohypogastric nerve



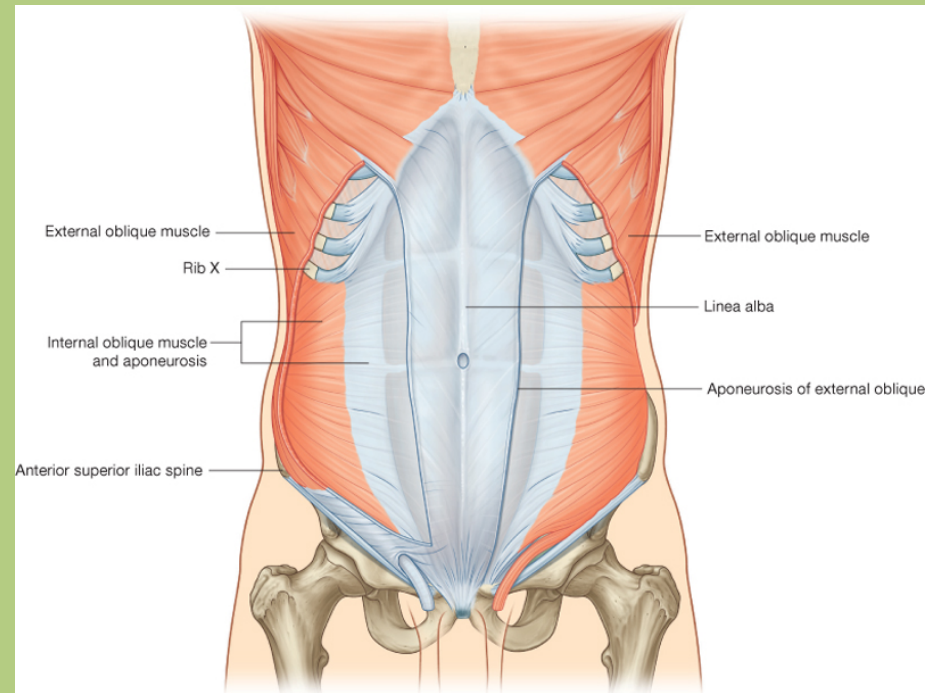
# Internal oblique muscle

**Origin:** thoracolumbar fascia, intermediate line of the iliac crest, anterior superior iliac spine

**Insertion:** lower borders of the 10th to 12th ribs, rectus sheath, linea alba

**Action:** flexion and rotation of the trunk, active in expiration

**Innervation:** intercostal nerves (T8-T11), subcostal nerve (T12), iliohypogastric nerve, ilioinguinal nerve



# Transversus abdominis muscle

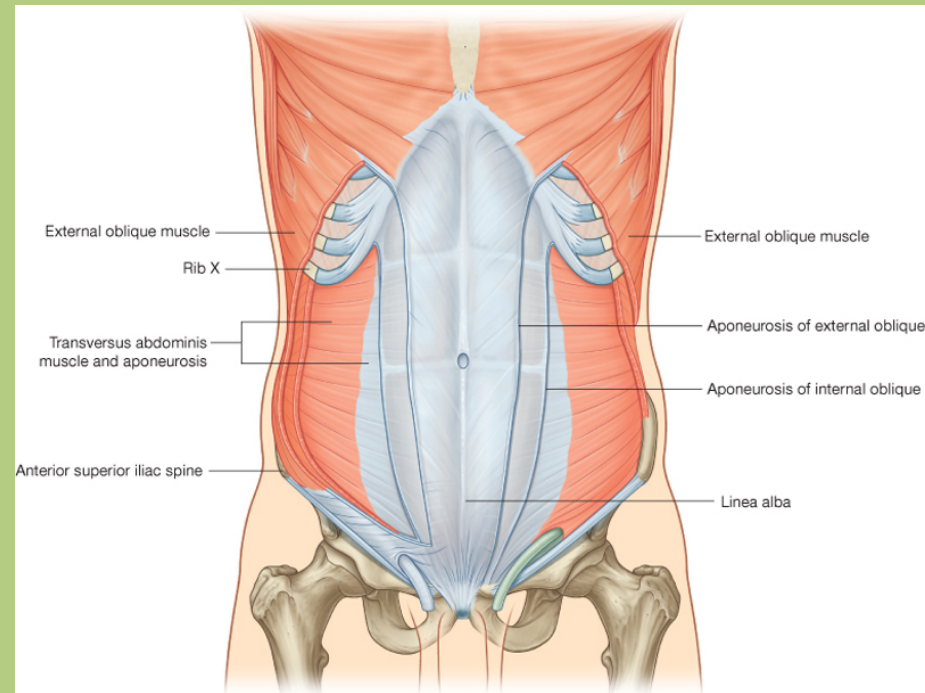


**Origin:** inner surfaces of the 7th to 12th ribs, thoracolumbar fascia, inner lip of the iliac crest, anterior superior iliac spine, inguinal ligament

**Insertion:** rectus sheath, linea alba, pubic crest

**Action:** rotation of the trunk, active in expiration

**Innervation:** intercostal nerves (T5-T11), subcostal nerve (T12), iliohypogastric nerve, ilioinguinal nerve



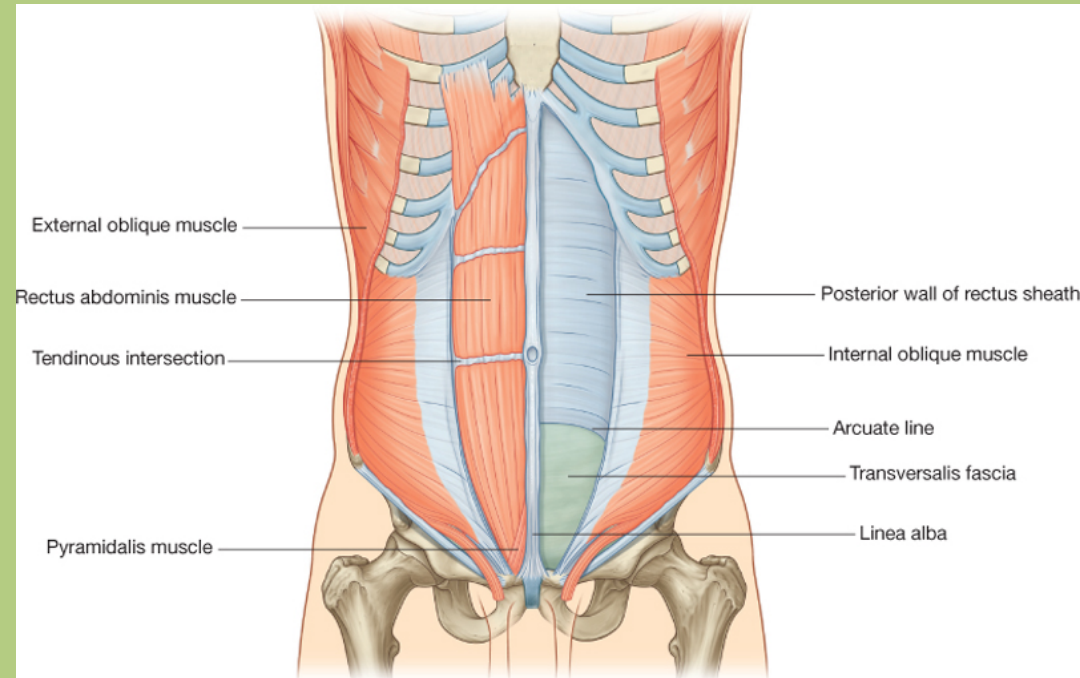
# Rectus abdominis muscle

**Origin:** cartilages of the 5th to 7th ribs, xyphoid process

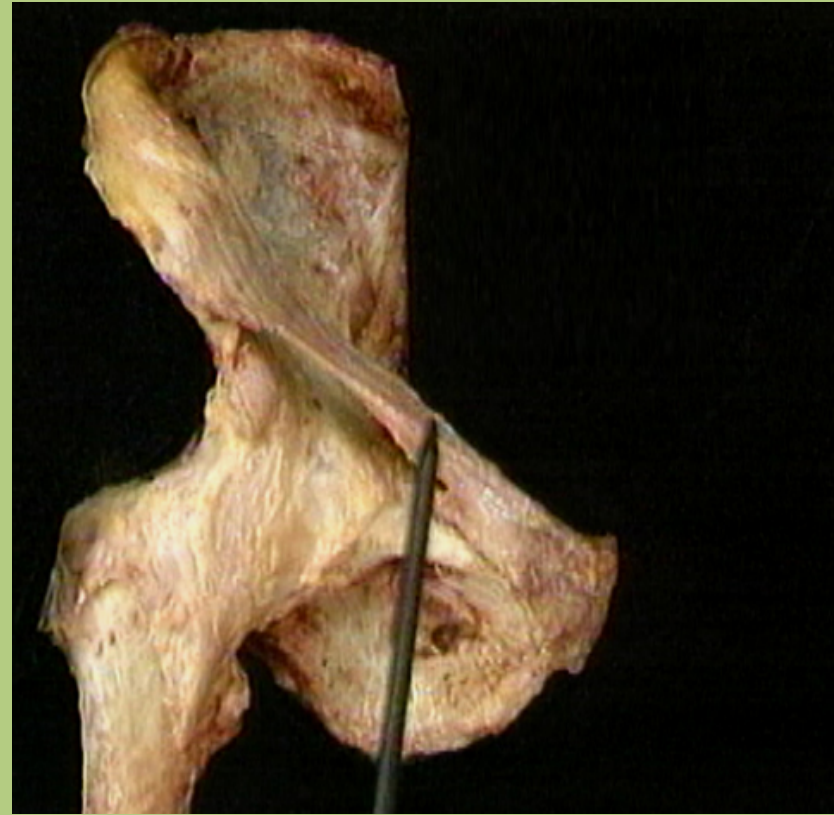
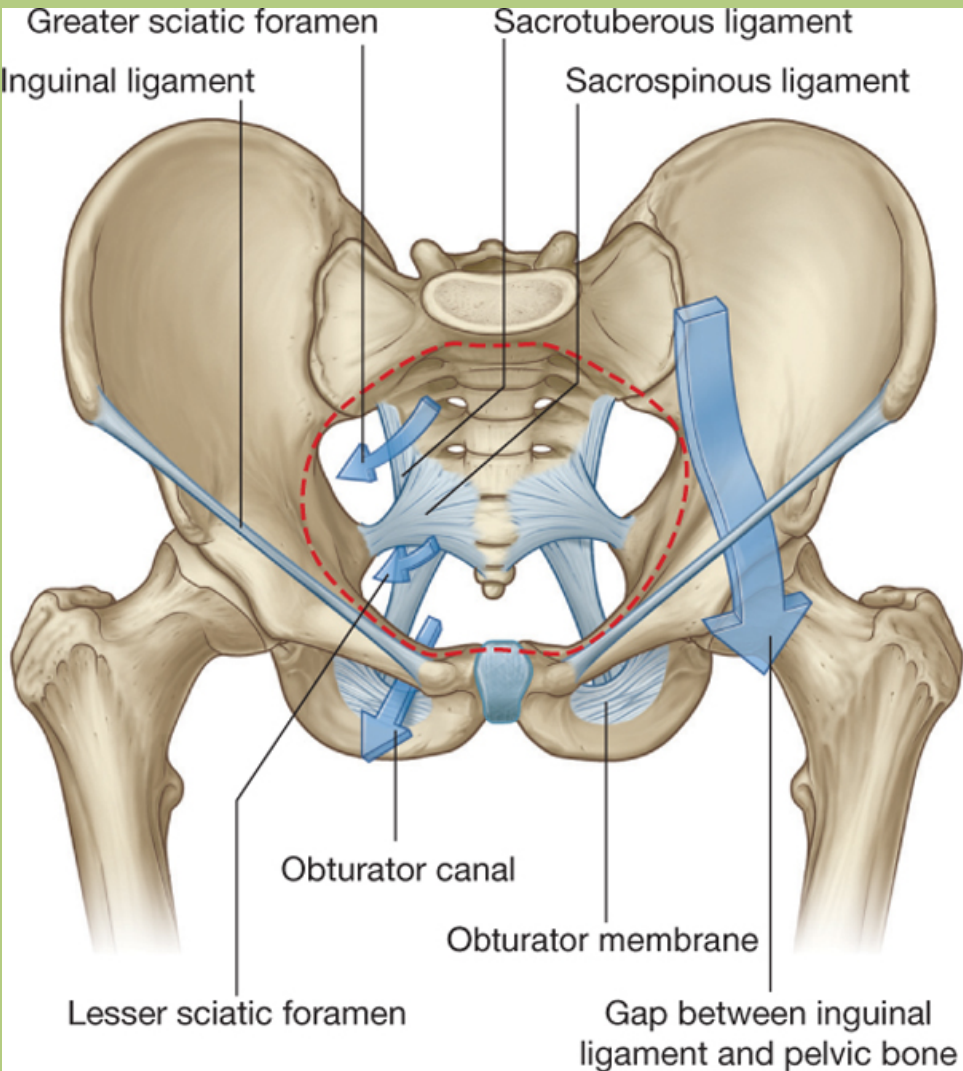
**Insertion:** between the pubic tubercle and and symphysis

**Action:** flexion of the lumbar spine, active in expiration

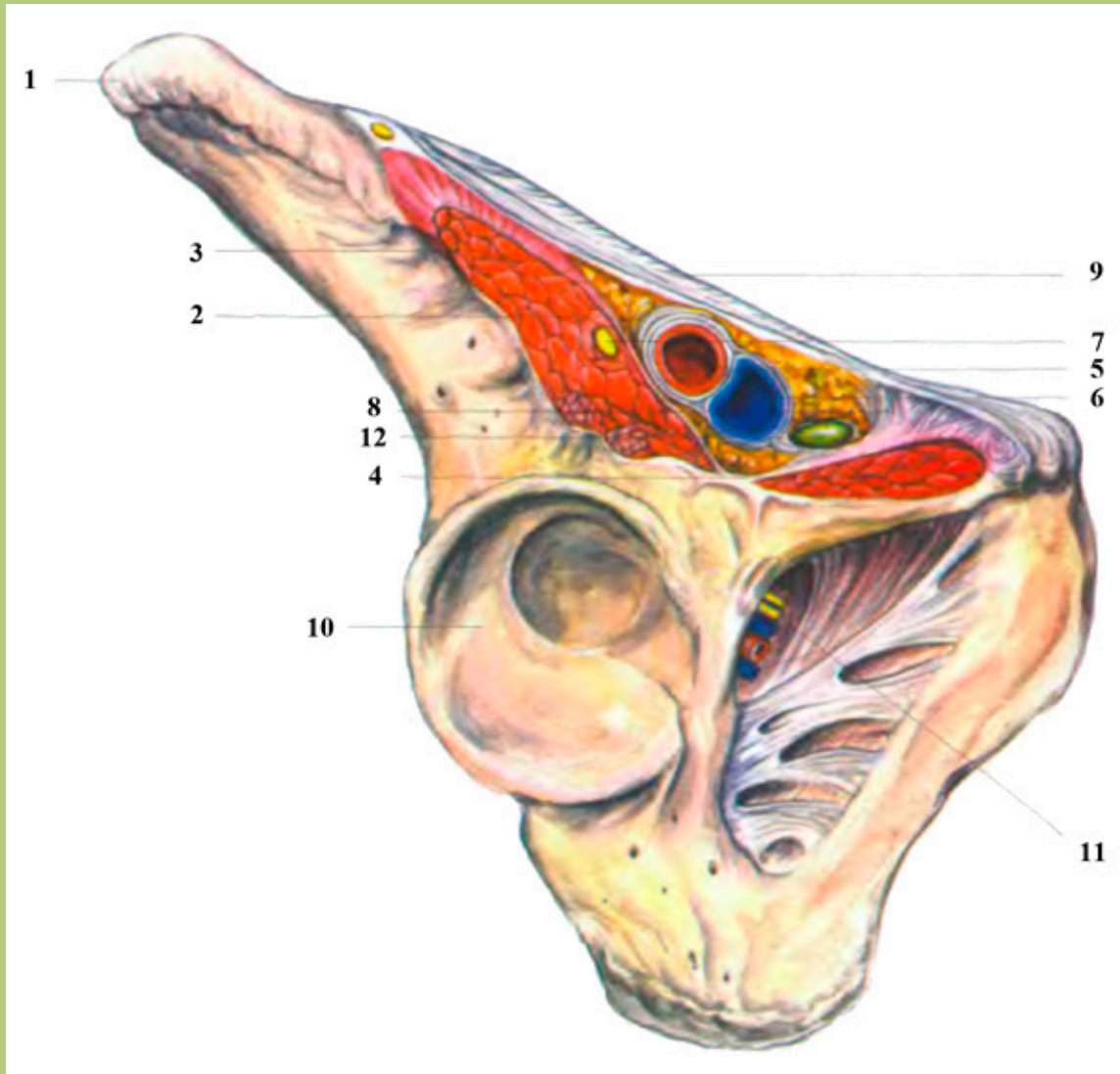
**Innervation:** intercostal nerves (T5-T11), subcostal nerve (T12)



# Subinguinal hiatus - inguinal ligament



# Sublingual hiatus

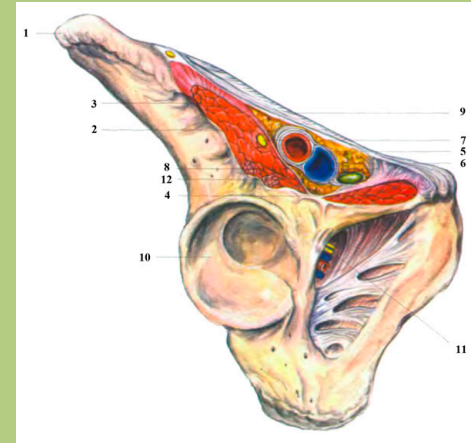


**Lacuna musculonervosa**

**Lacuna vasorum**

**Lacuna lymphatica**

# Lacuna musculonervosa



- Iliopsoas muscle
- Femoral nerve
- Lateral femoral cutaneous nerve



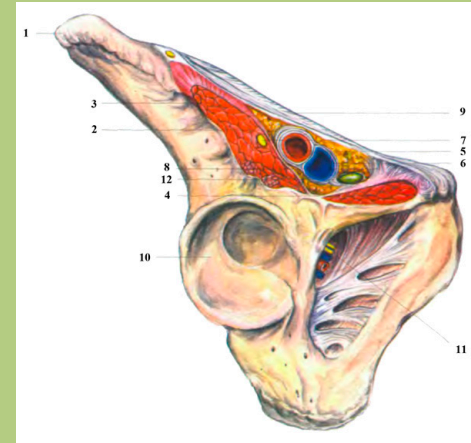
Psoas major muscles



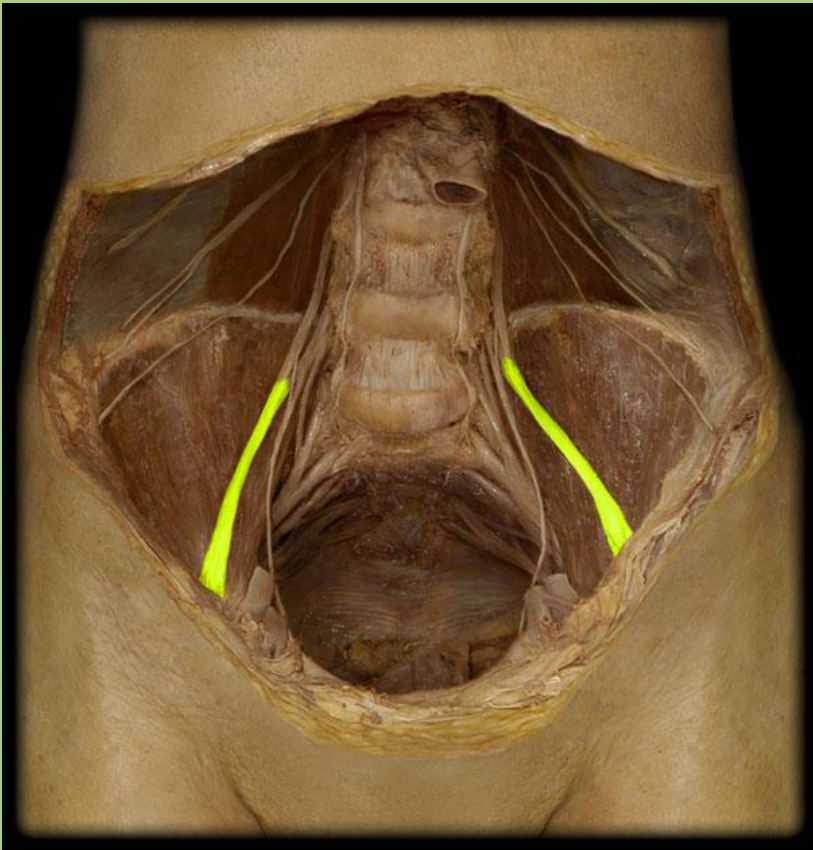
Iliacus muscles



# Lacuna musculonervosa



- Iliopsoas muscle
- Femoral nerve (L2-4)
- Lateral femoral cutaneous nerve (L2,3)

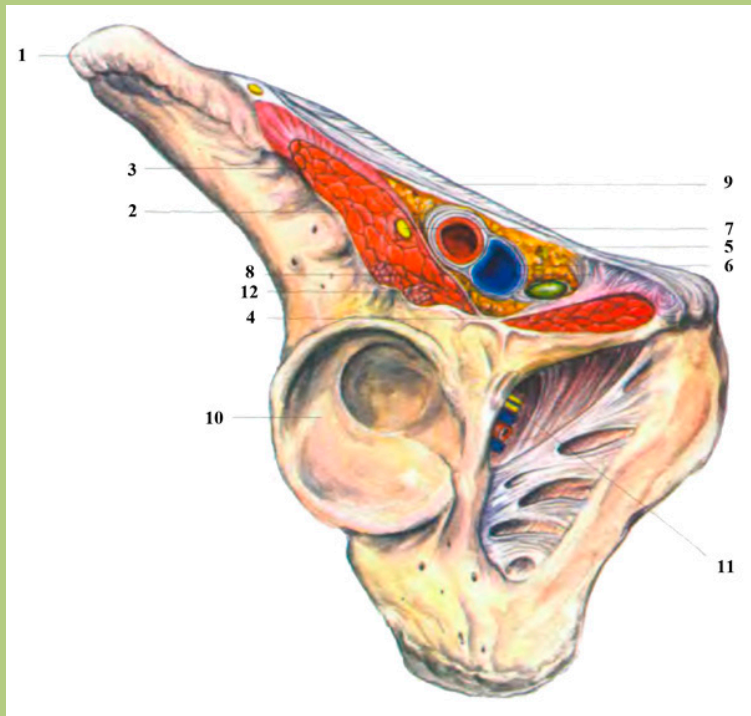


Femoral nerve

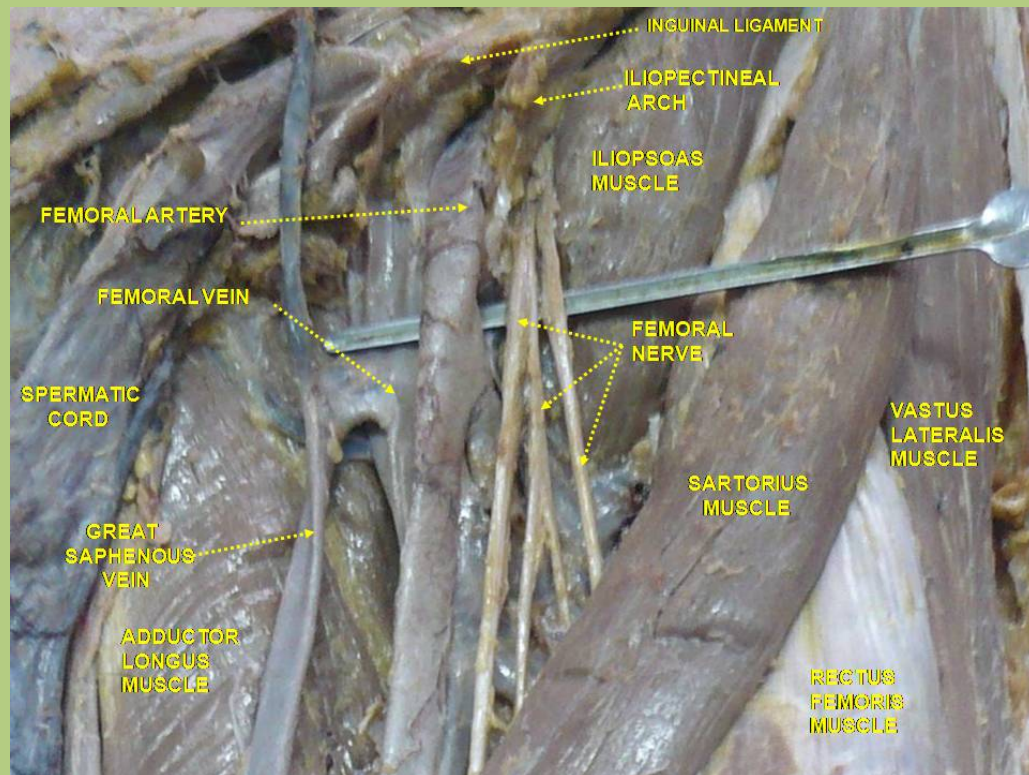


Lateral femoral cutaneous nerve - 4

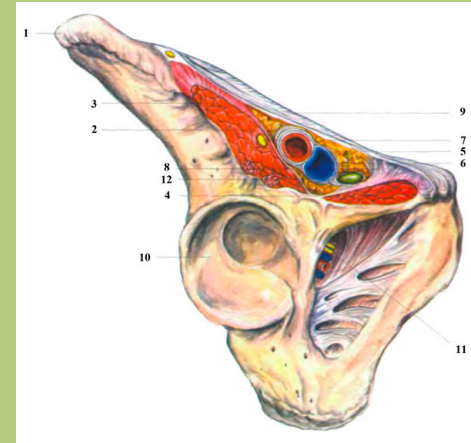
# Lacuna musculonervosa - Lacuna vasorum



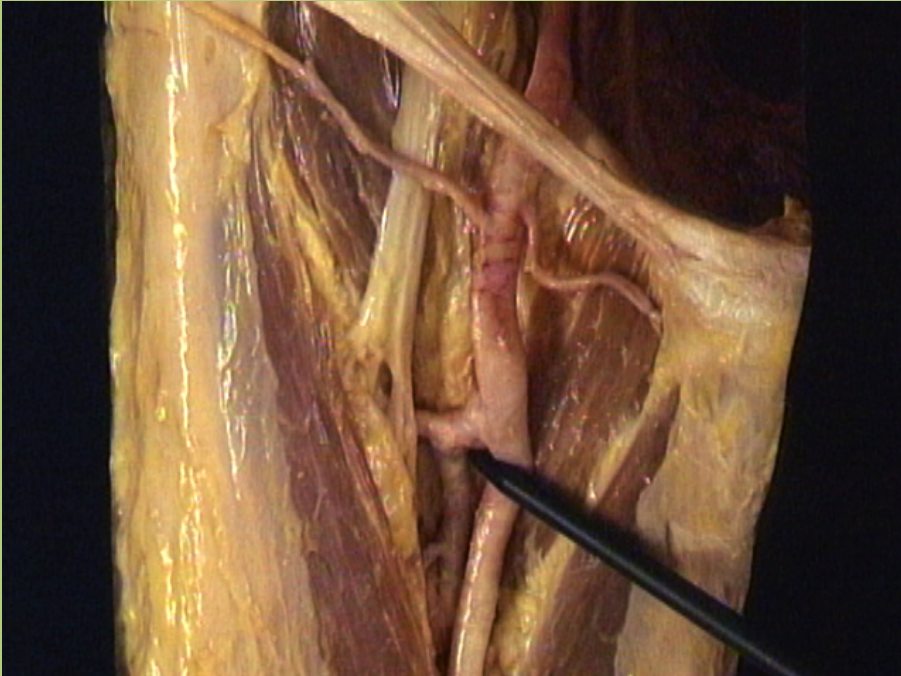
Iliopsoas arch



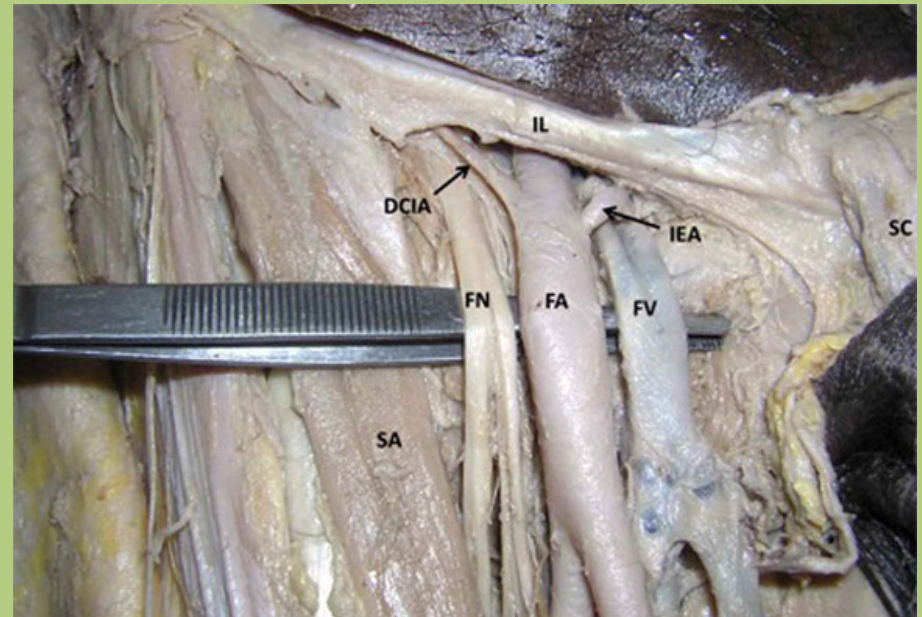
# Lacuna vasorum



- Femoral artery (laterally)
- Femoral vein (medially)
- Femoral branch of the genitofemoral nerve (L1)

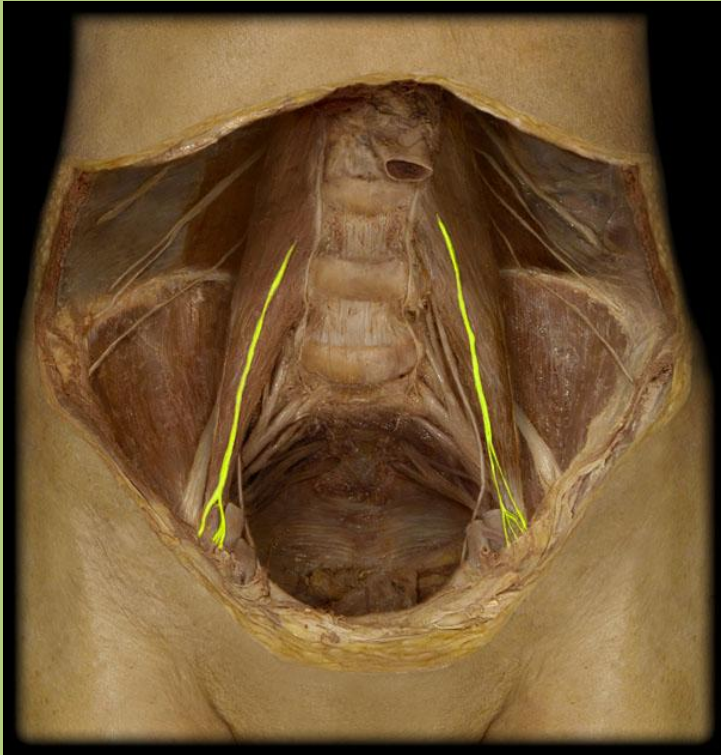
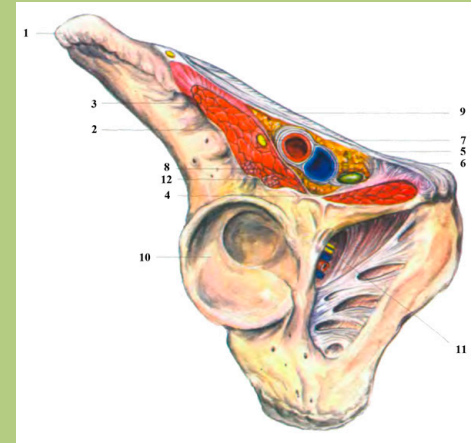


Femoral artery



Femoral vein

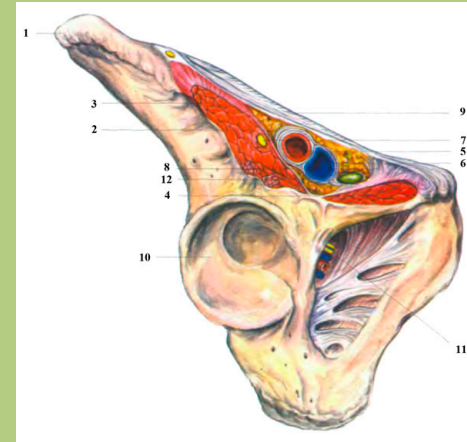
# Lacuna vasorum



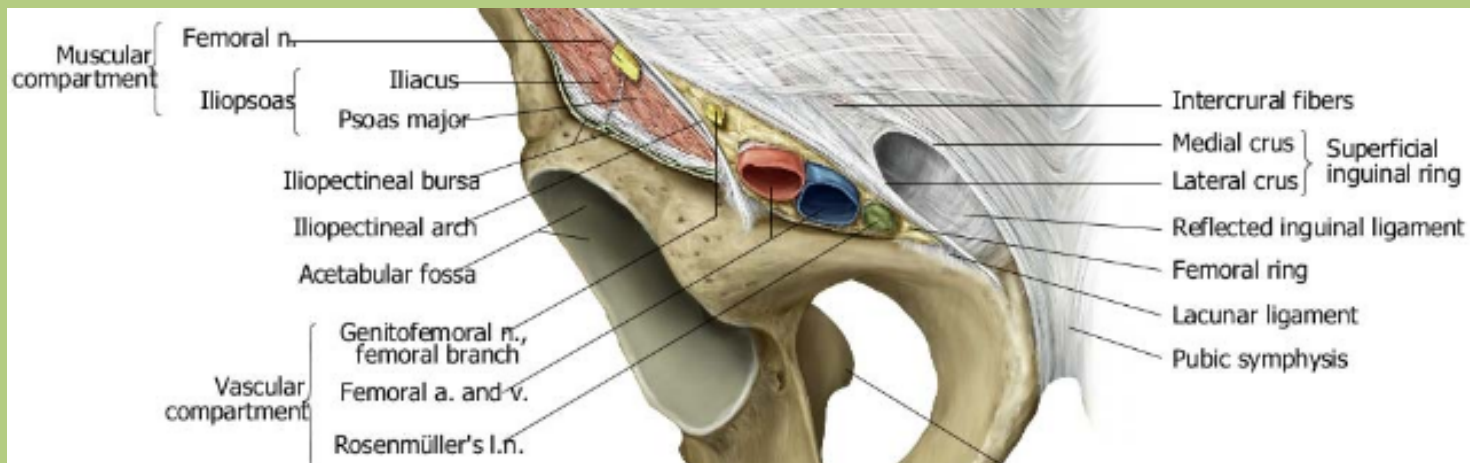
- Femoral artery
- Femoral vein
- Femoral branch of the genitofemoral nerve (L1)



# Lacuna lymphatica = Lacuna herniosa

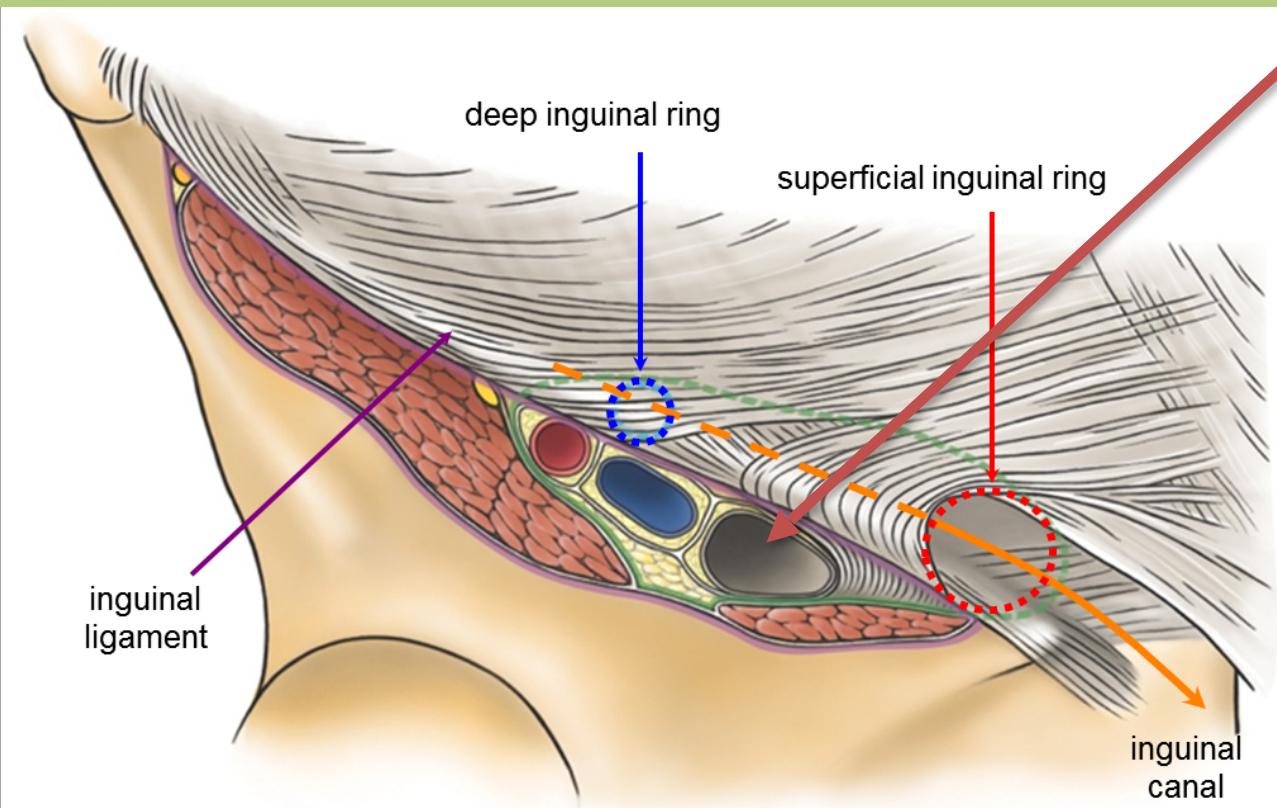
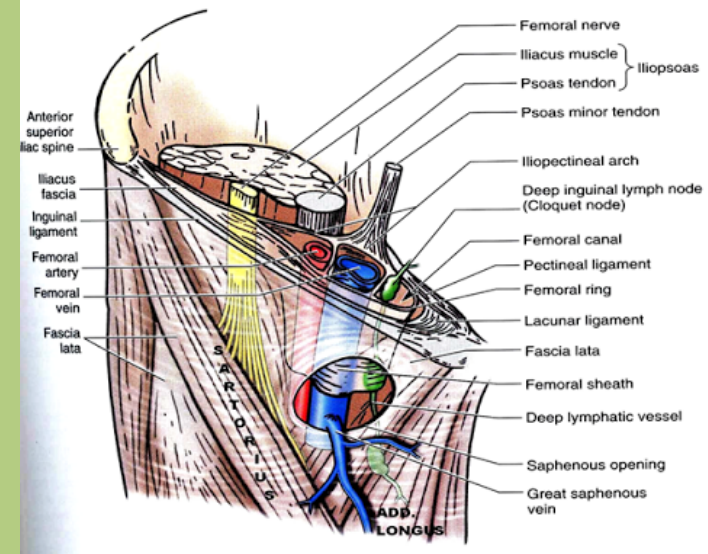


- Rosenmüller's lymph node



# Femoral canal

A virtual space from the femoral ring to the saphenous hiatus.

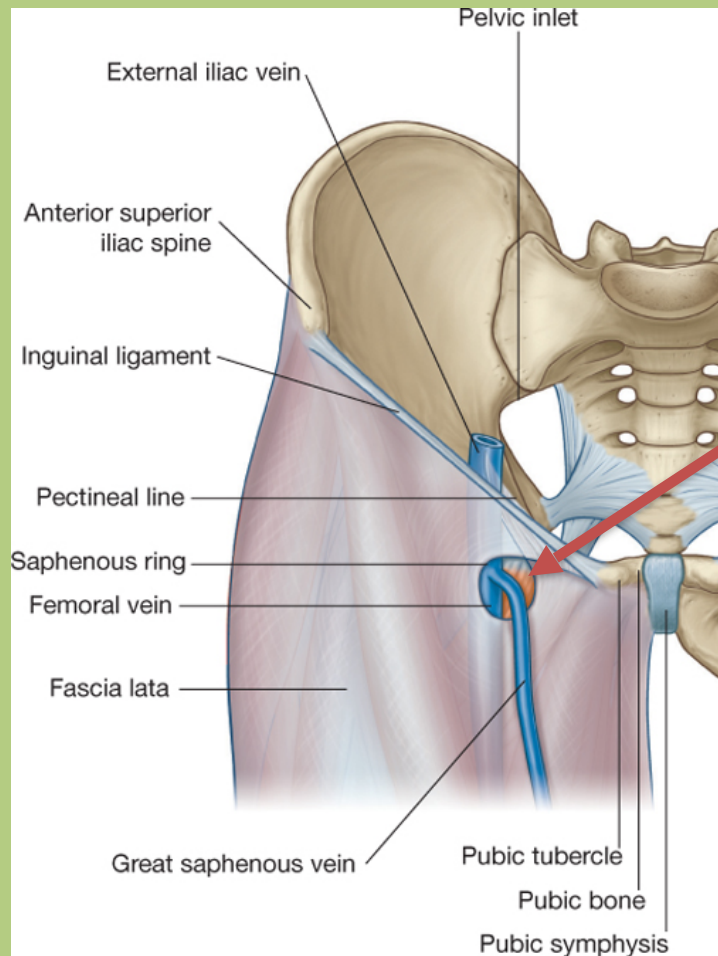
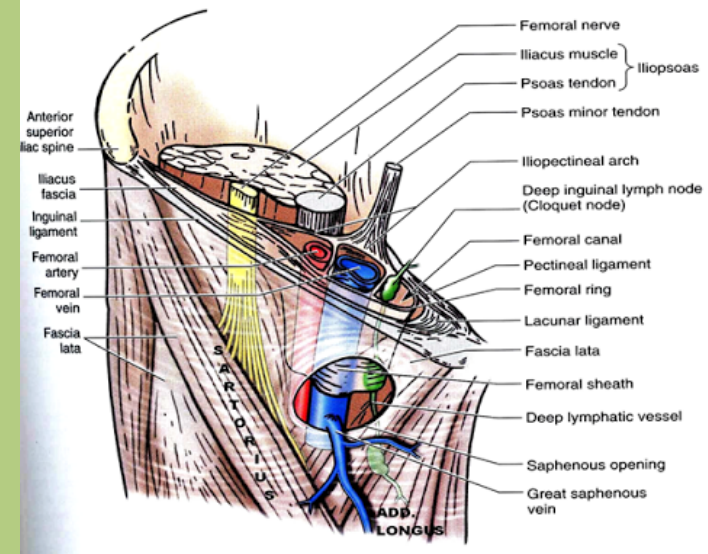


## Femoral ring:

- Lateral wall: femoral vein
- Medial wall: lacunar ligament
- Superior wall: inguinal ligament
- Inferior wall: pectineal fascia and superior ramus of the pubic bone

# Femoral canal

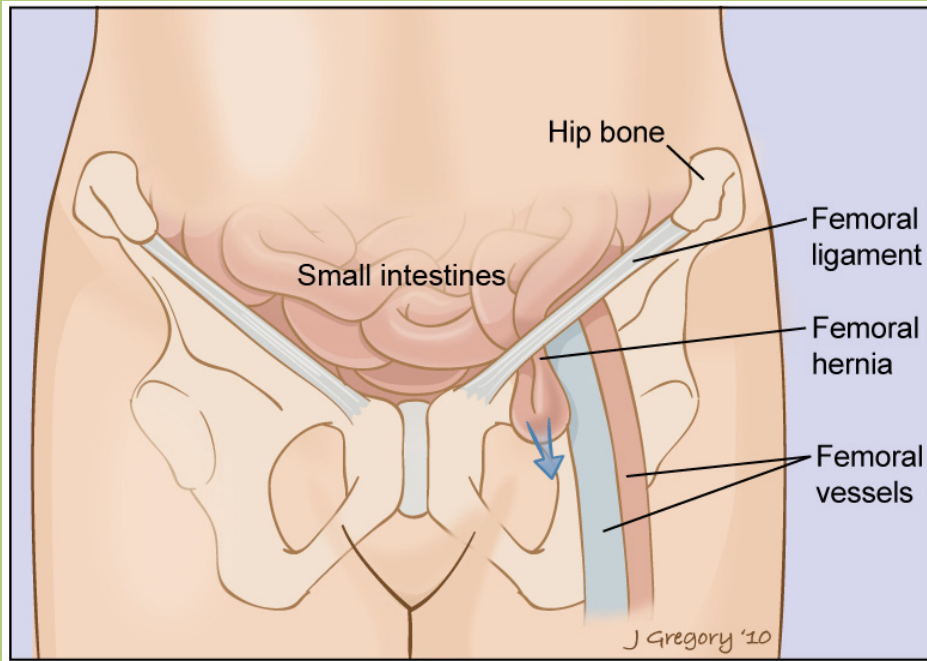
A virtual space from the femoral ring to the saphenous hiatus.



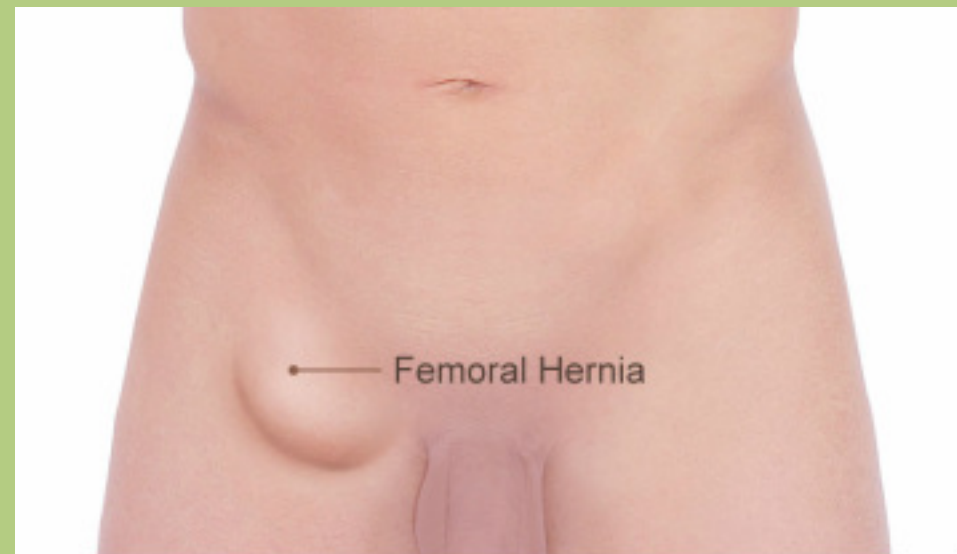
**Saphenous hiatus (closed by lamina cribrosa):**

- Great saphenous vein
- Lymph vessels

# Femoral herniation

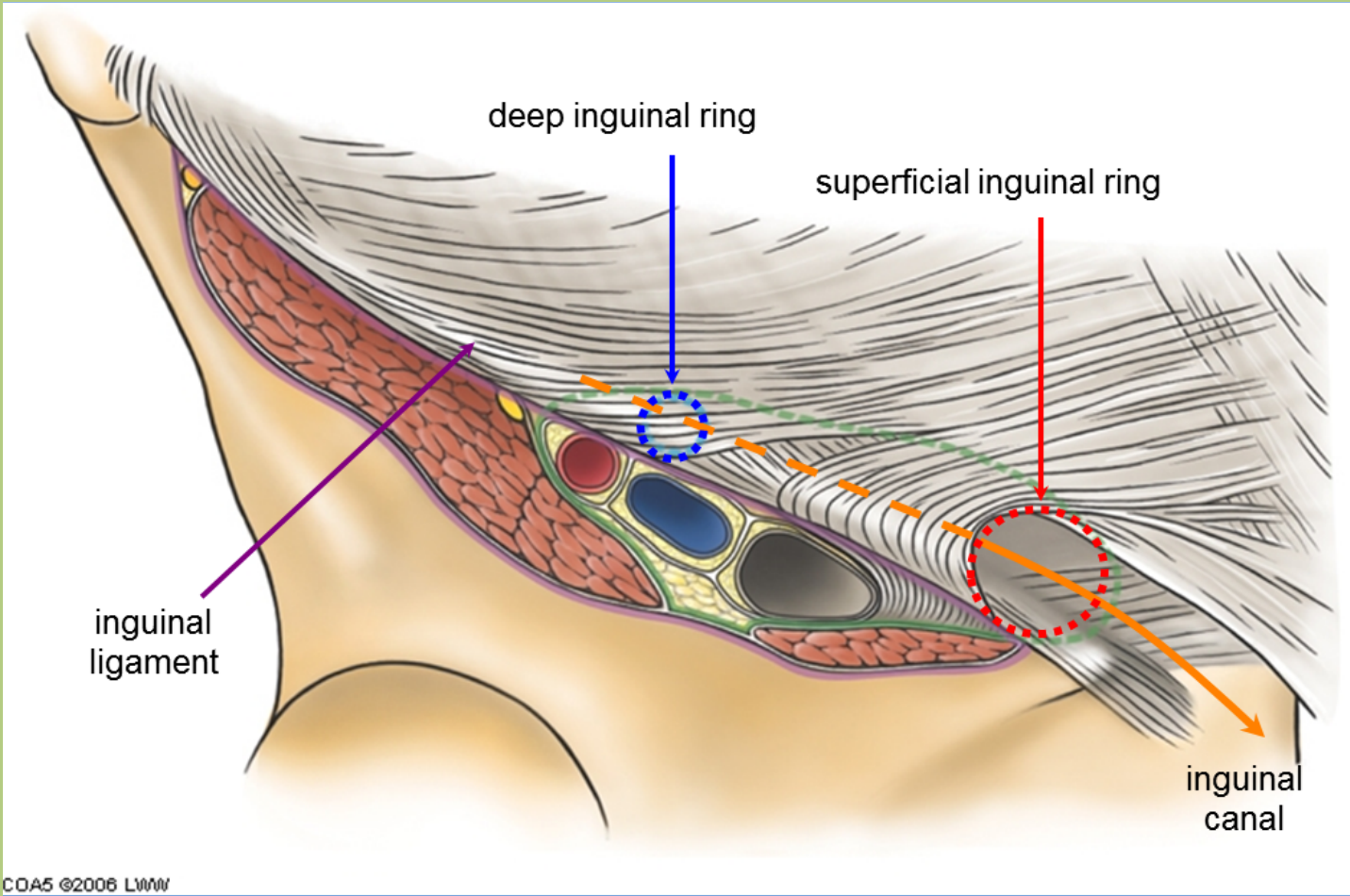


- Inferior to the inguinal ligament
- The sac may contain preperitoneal fat, omentum and small intestine
- Increased prevalence in females

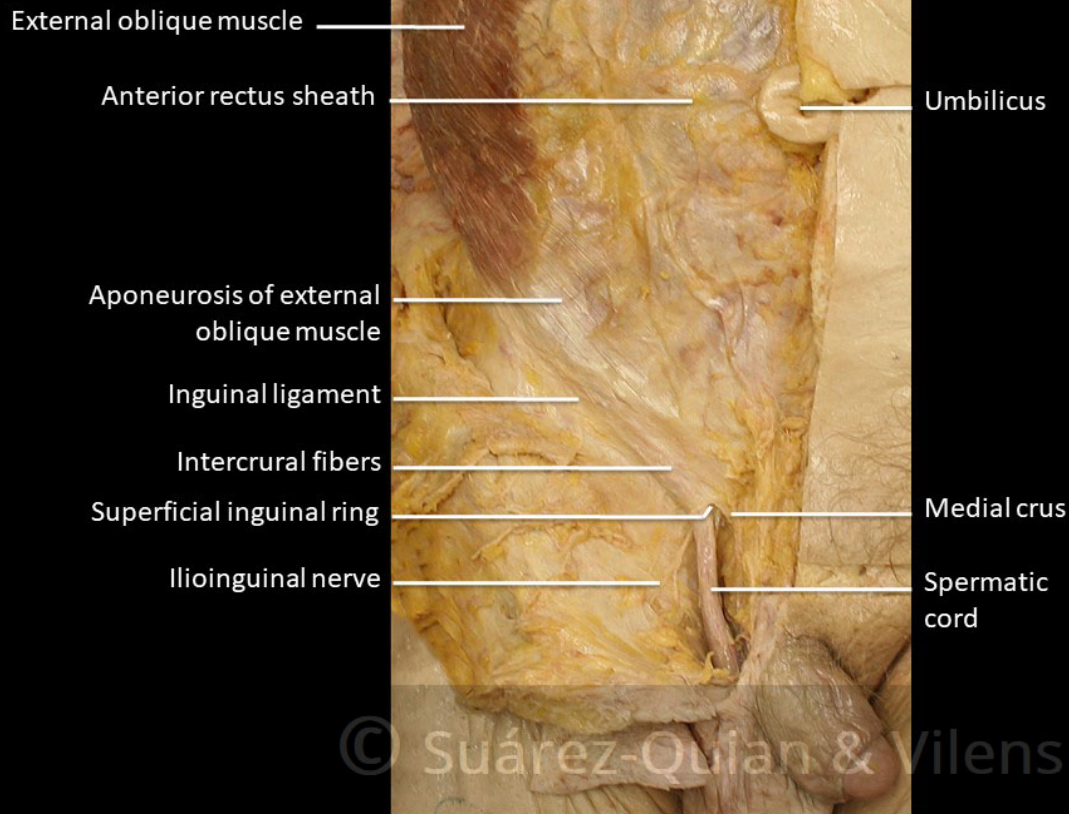
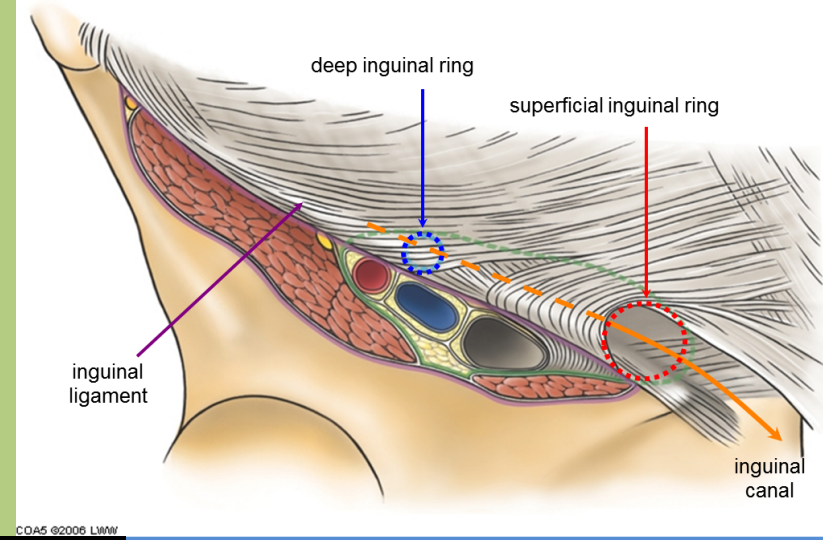




# Inguinal canal



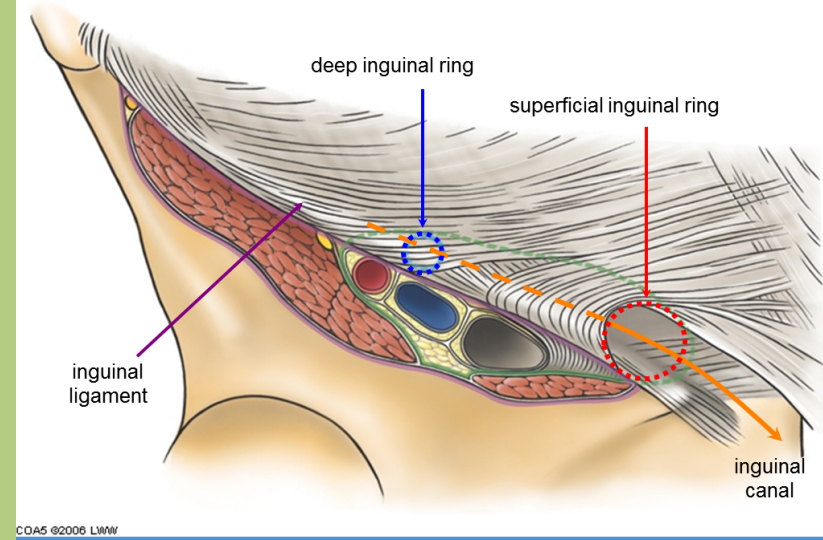
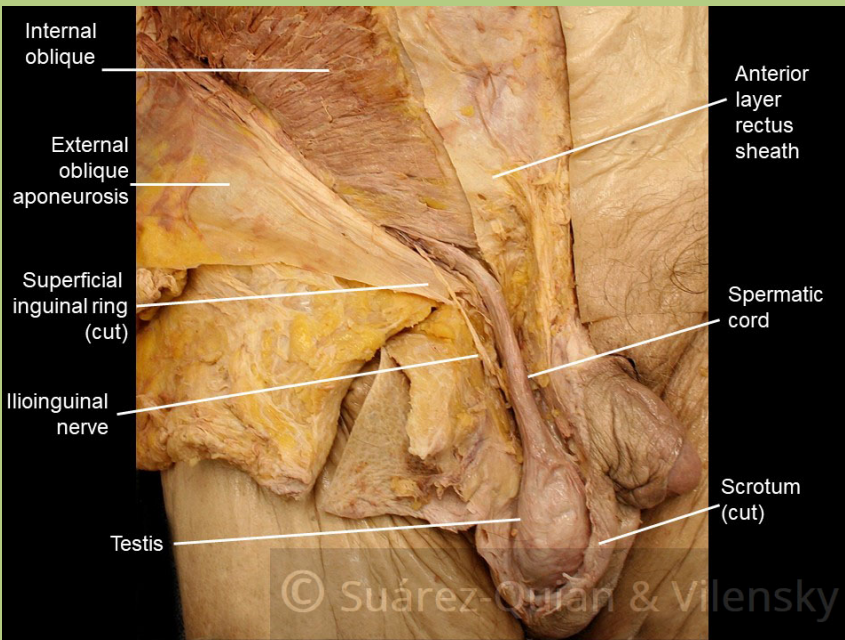
# Inguinal canal



- **Floor:** inguinal ligament
- **Anterior wall:** external oblique aponeurosis



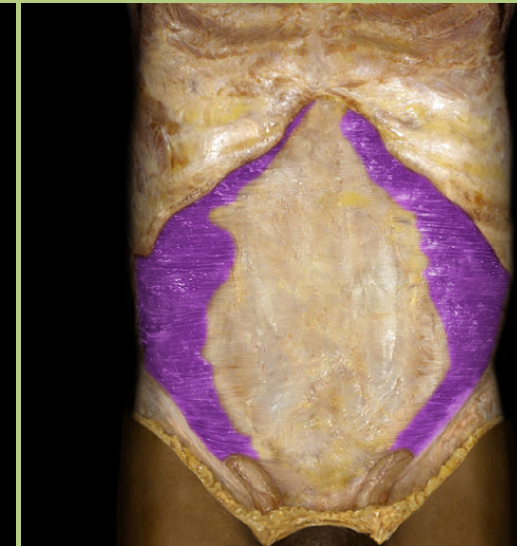
# Inguinal canal



- **Roof:** Internal oblique and transverse abdominis muscle

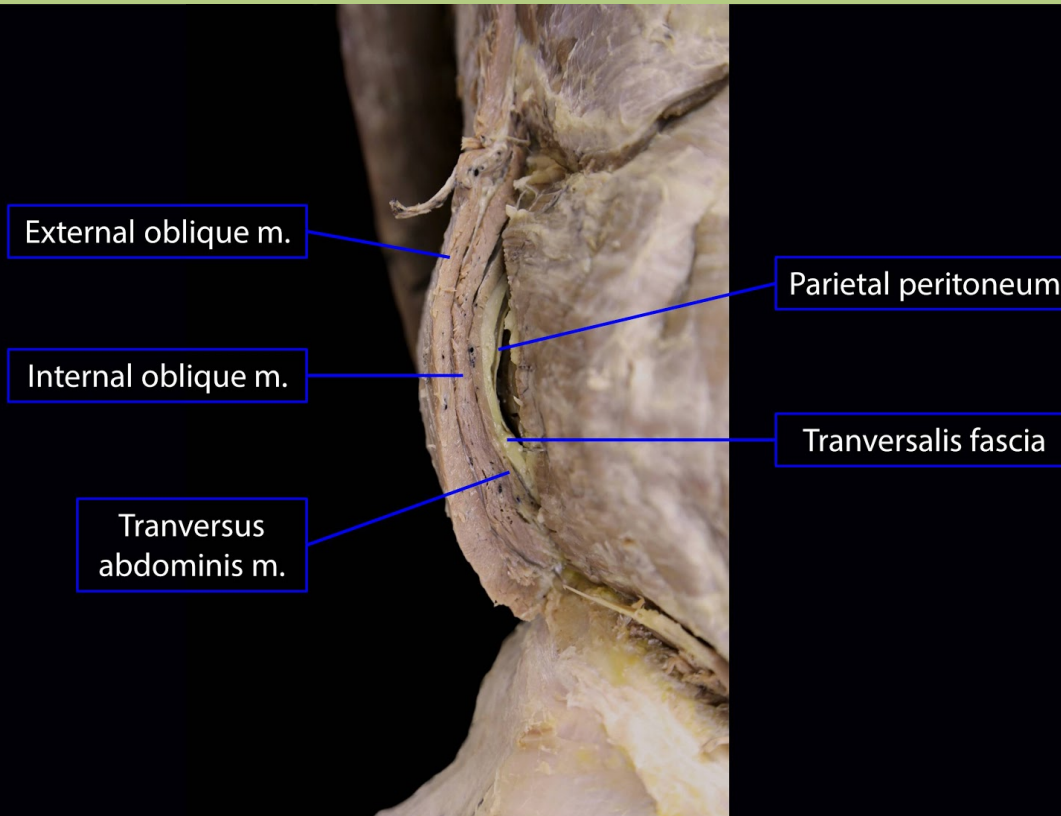
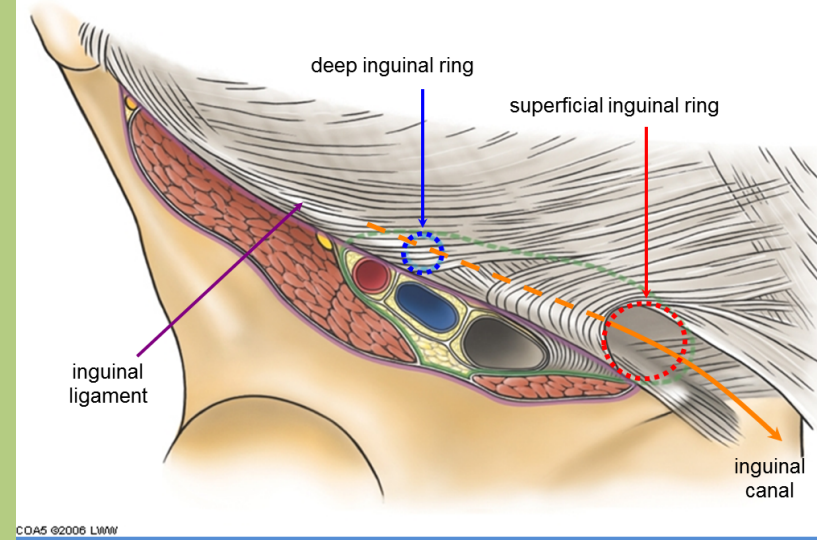


Internal oblique



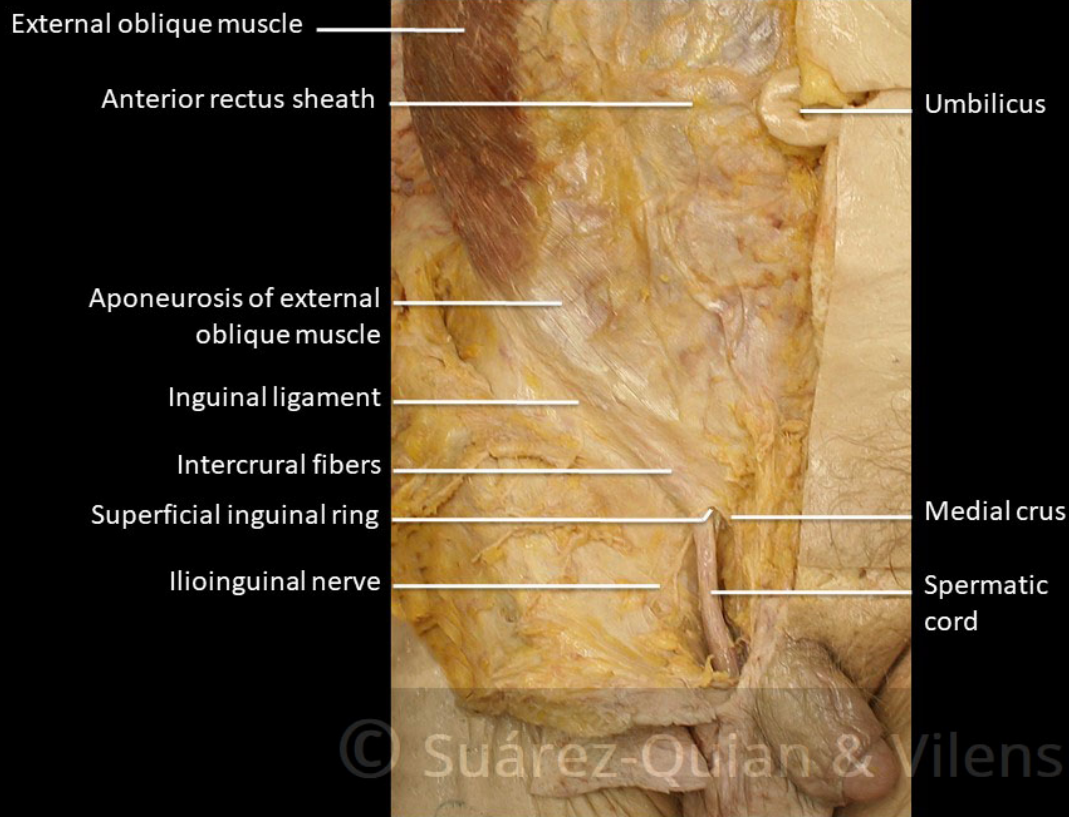
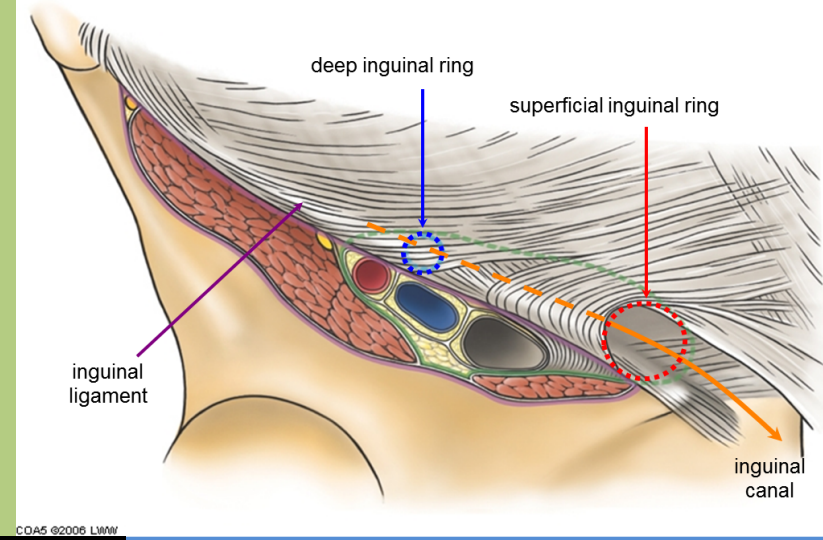
Transverse abdominis

# Inguinal canal



- **Posterior wall:**  
Transversalis fascia and parietal peritoneum

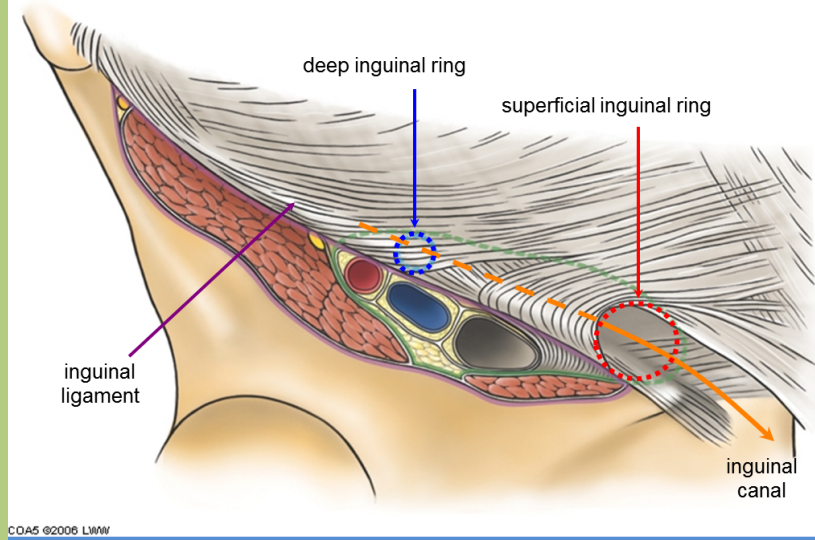
# Inguinal canal



## Superficial inguinal ring:

- Opening in the external oblique aponeurosis
- Medial and lateral crura

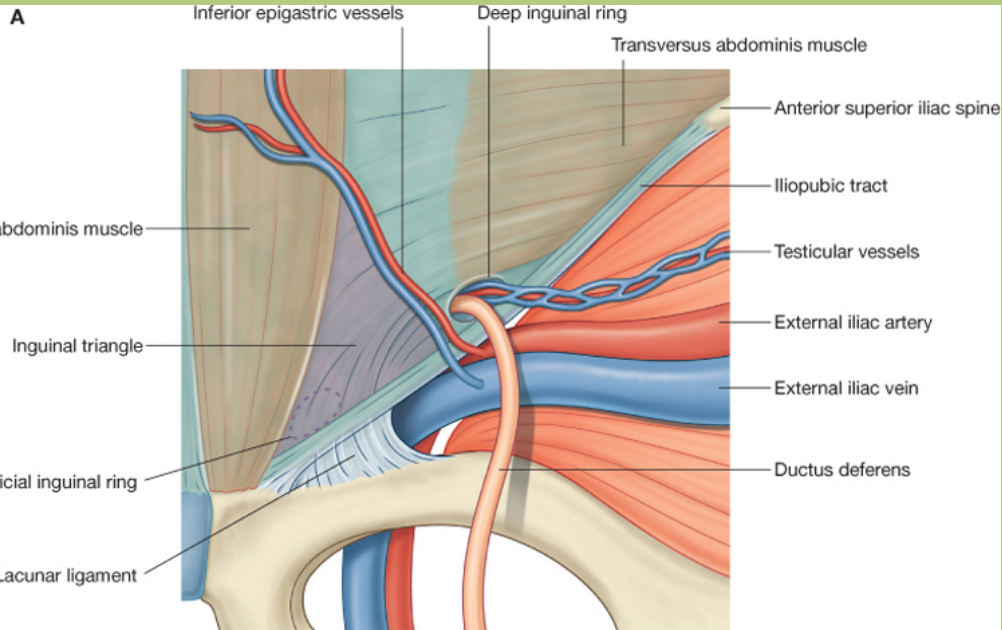
# Inguinal canal



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## Deep inguinal ring:

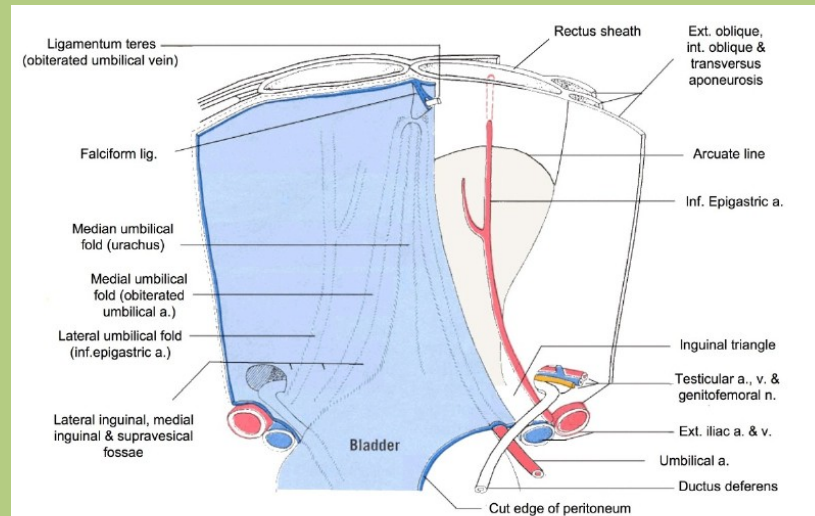
- Formed by the transversalis fascia
- Located in the lateral inguinal fossa



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## Contents:

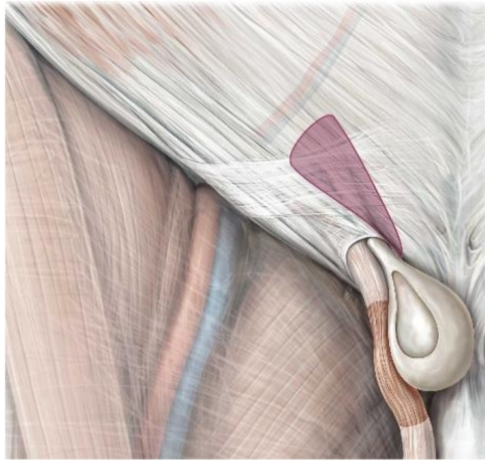
- Spermatic cord or round ligament of the uterus
- Ilioguingal nerve and genital branch of the genitofemoral nerve



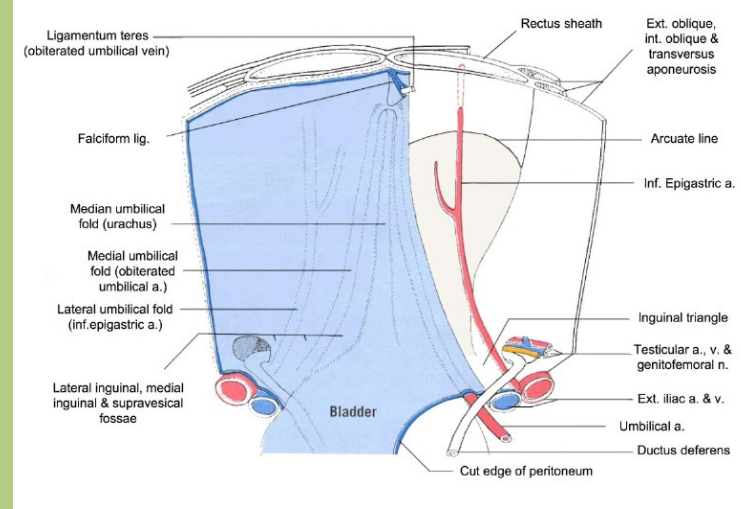
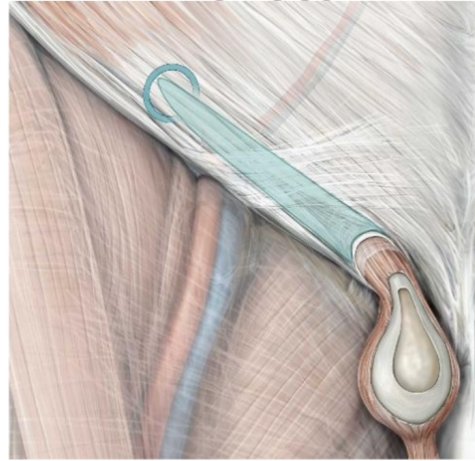
# Inguinal herniation

## Clinical Correlations: Hernias

### Direct



### Indirect

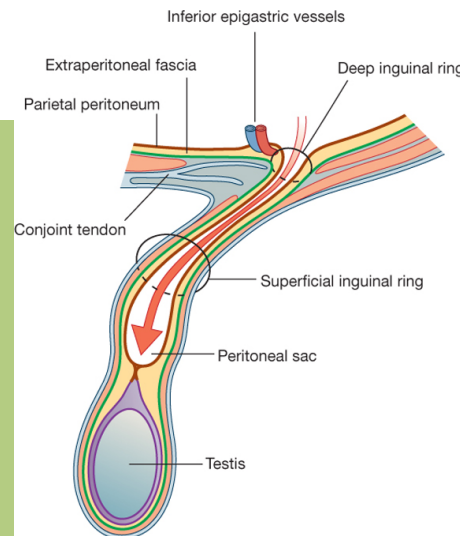
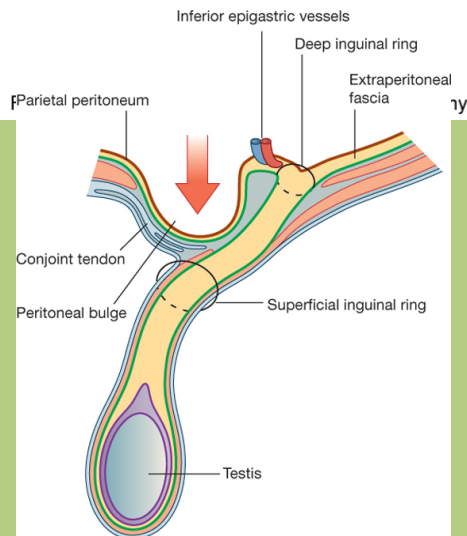


### Indirect inguinal hernia:

- From the lateral inguinal fossa
- Through the deep and superficial inguinal rings
- Congenital or acquired

### Direct inguinal hernia:

- From the medial inguinal fossa
- Through the superficial inguinal ring
- Always acquired

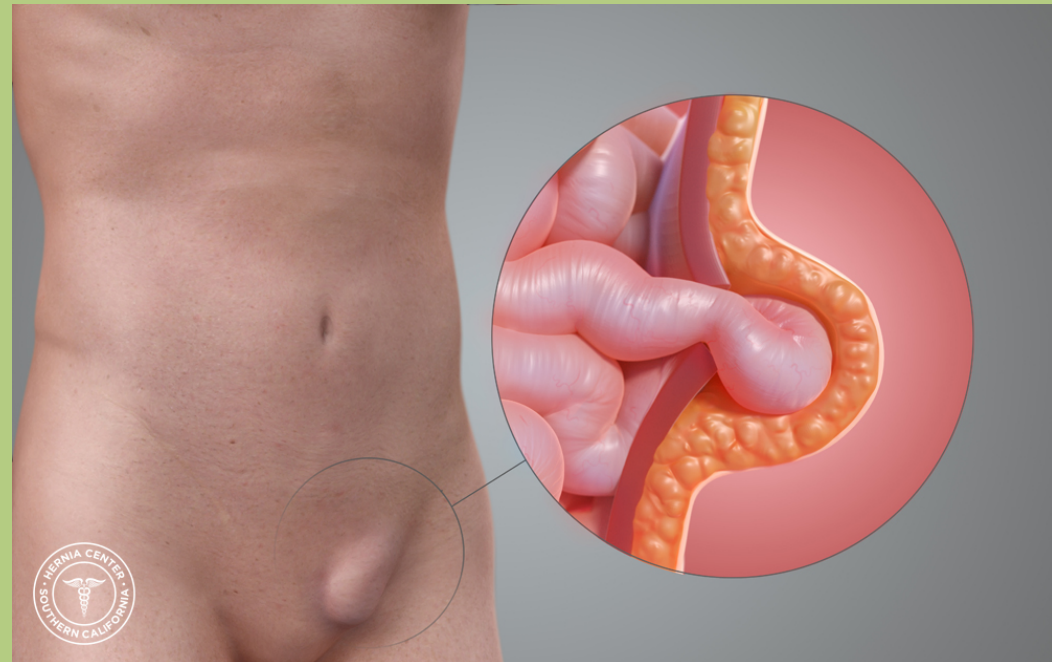


# Inguinal herniation



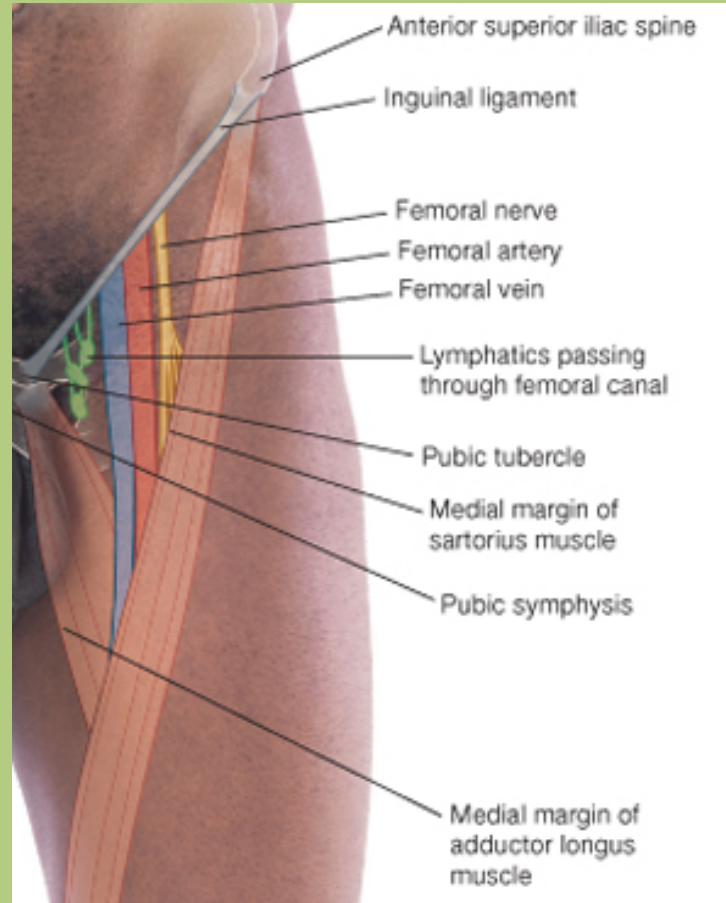
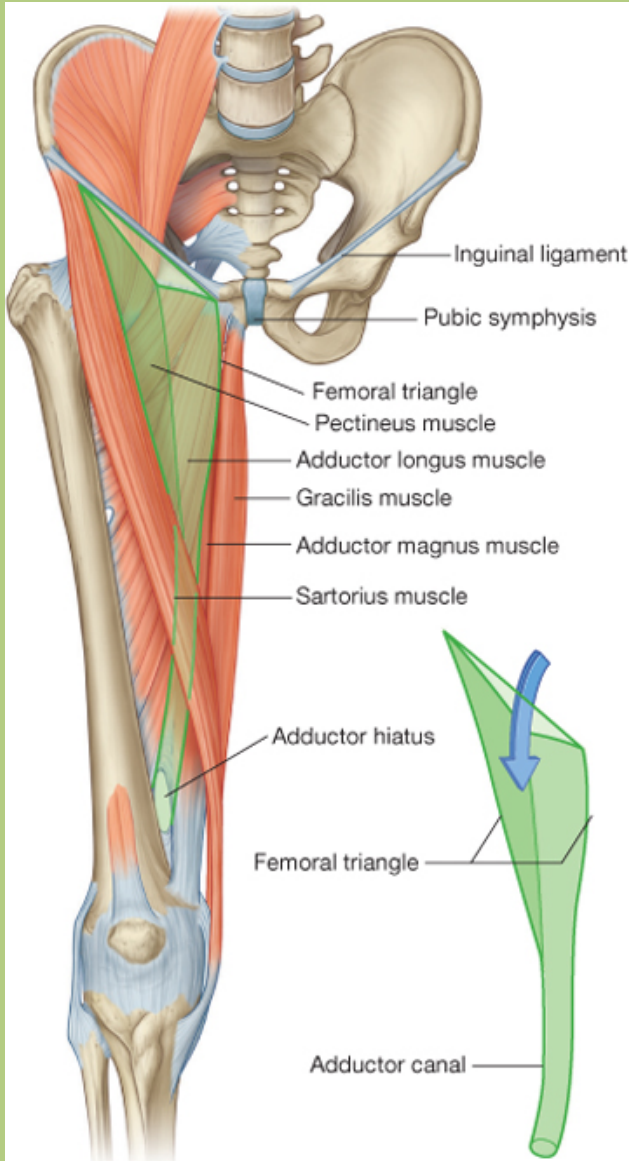
Indirect inguinal hernia

Direct inguinal hernia





# Femoral trigone



**Base:** inguinal ligament

**Medial wall:** adductor longus muscle

**Lateral wall:** sartorius muscle

**Floor:** iliopsoas and pectineus muscles

**Roof:** fascia lata

**Contents:**  
Femoral artery and vein  
Femoral nerve

# Femoral trigone



Iliopectineal fossa:

1: Femoral artery

2: Femoral nerve

3: Femoral vein

5: Inguinal ligament

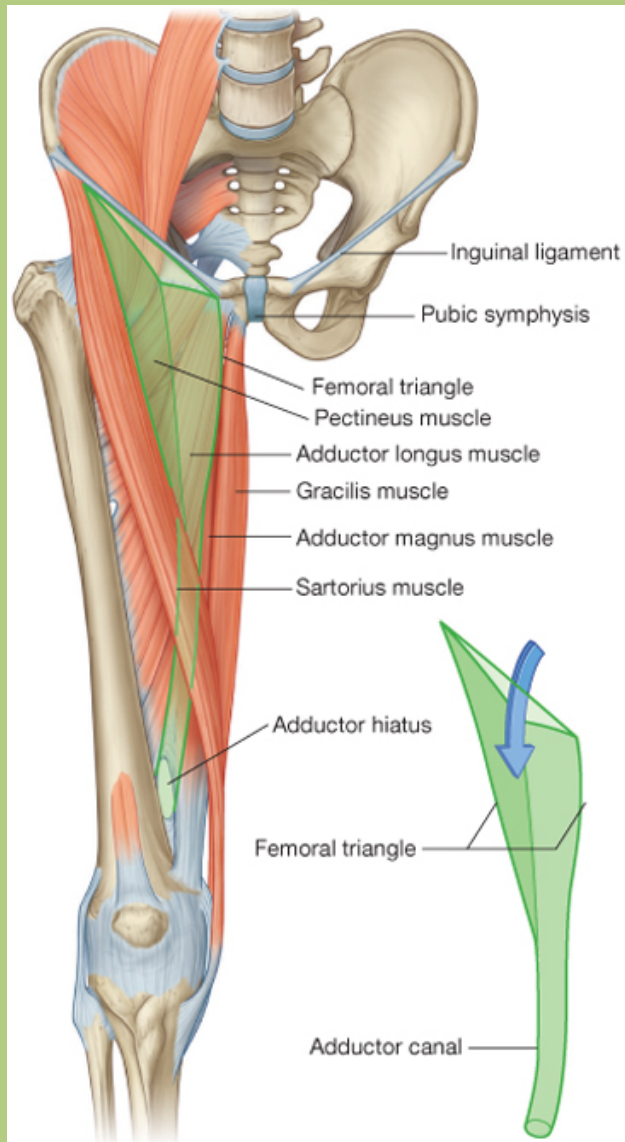
6: Sartorius muscle

7: Adductor longus muscle

8: Pectineus muscle

9: Iliopsoas muscle

# Adductor canal

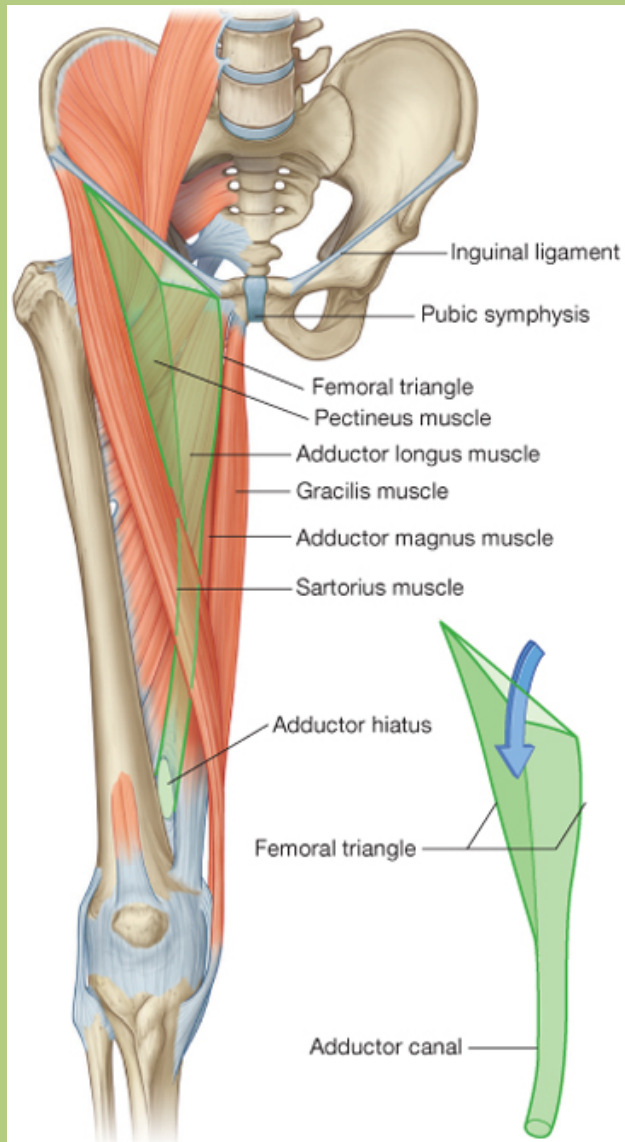


**Superior wall:** sartorius muscle



**Lateral wall:** vastus medialis muscle

# Adductor canal

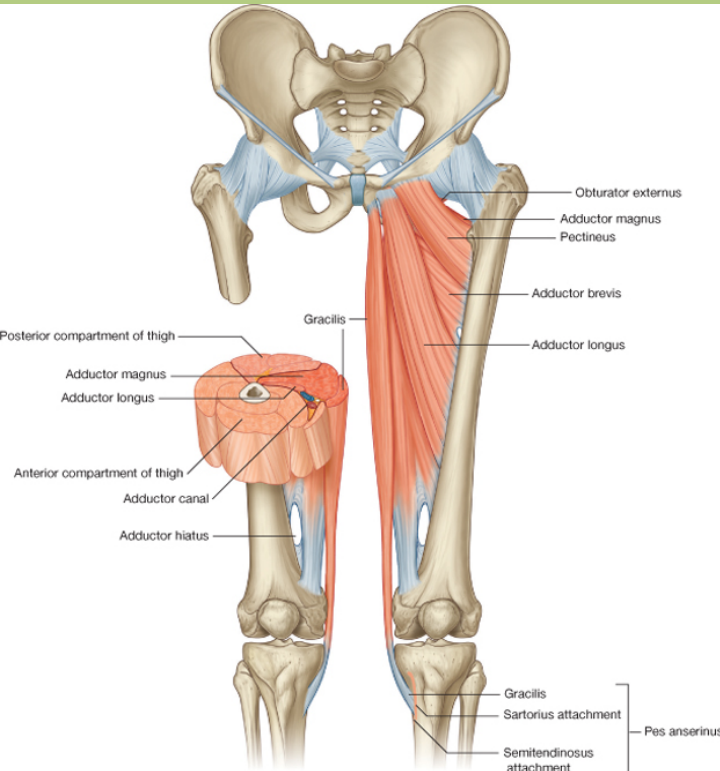


**Medial wall:** adductor longus muscle

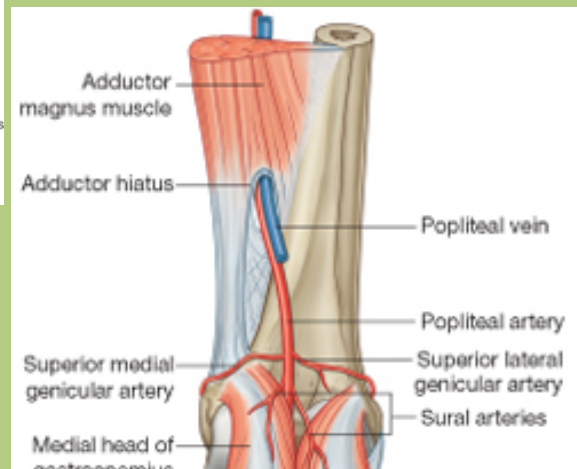
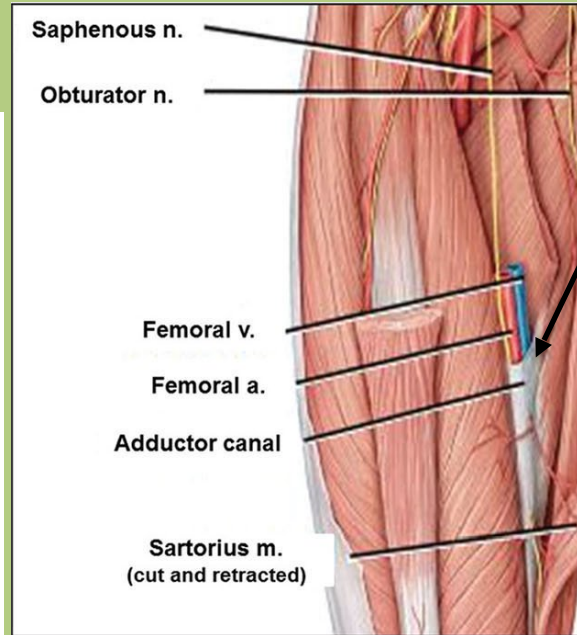


adductor magnus muscle

# Adductor canal



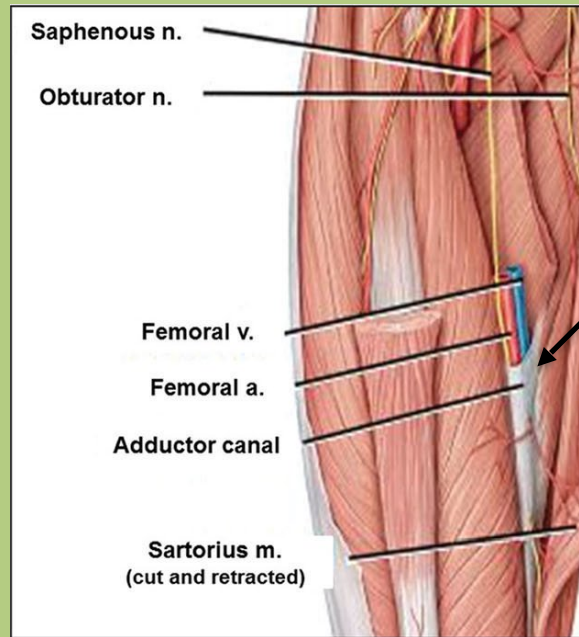
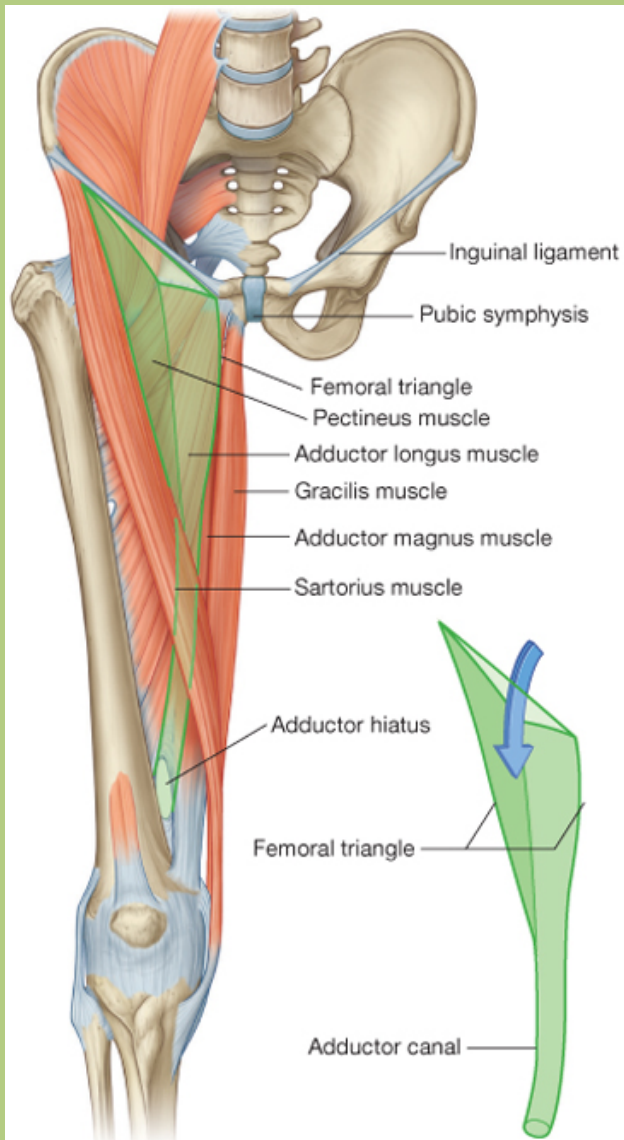
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Vastoadductor membrane

**Exit:** adductor hiatus (formed by the two insertions of adductor magnus muscle)

# Adductor canal



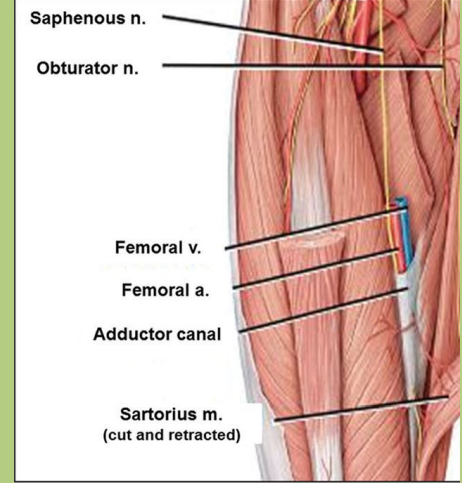
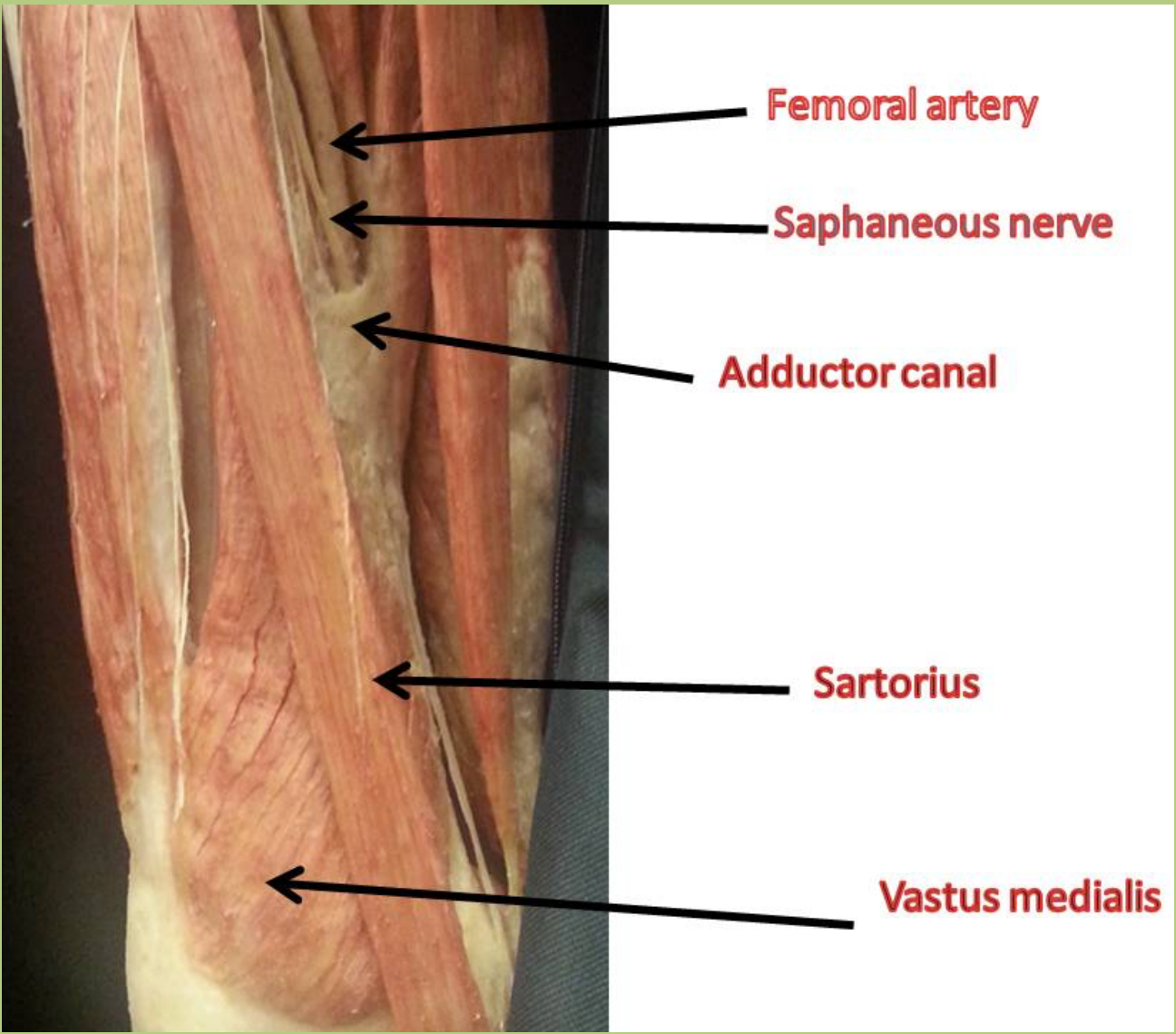
Vastoadductor membrane

## Contents:

- Femoral artery
- Femoral vein
- Saphenous nerve (pierces the vastoadductor membrane)
- Descending genicular artery (pierces the vastoadductor membrane)



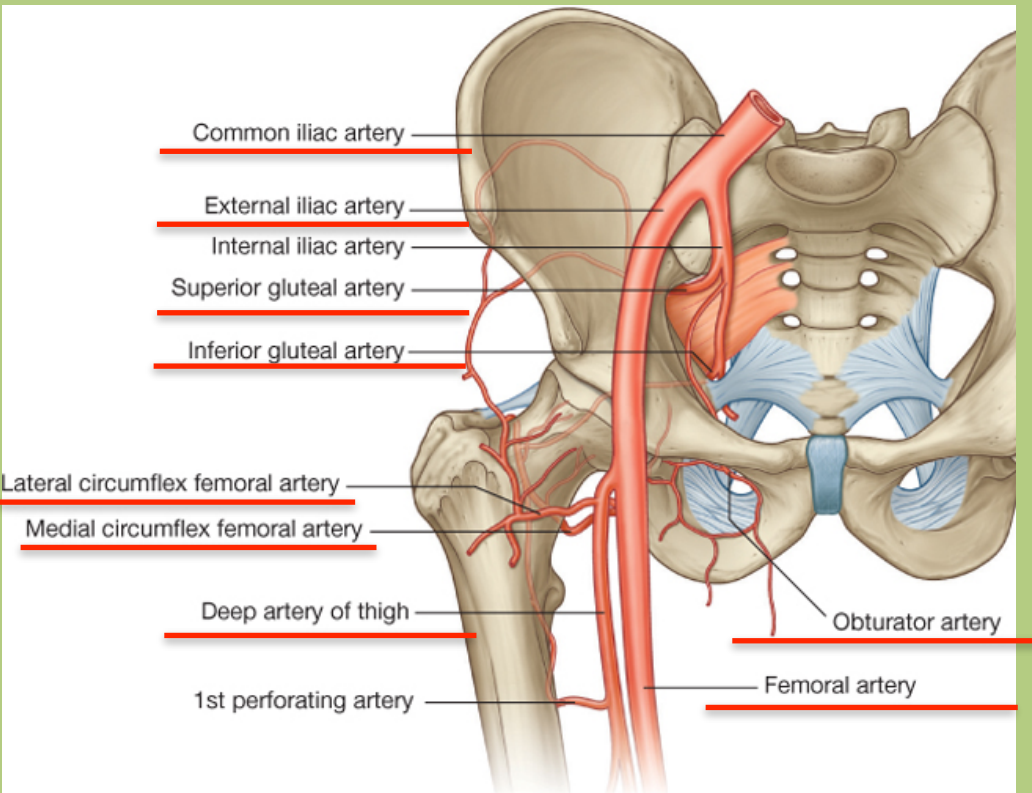
# Adductor canal



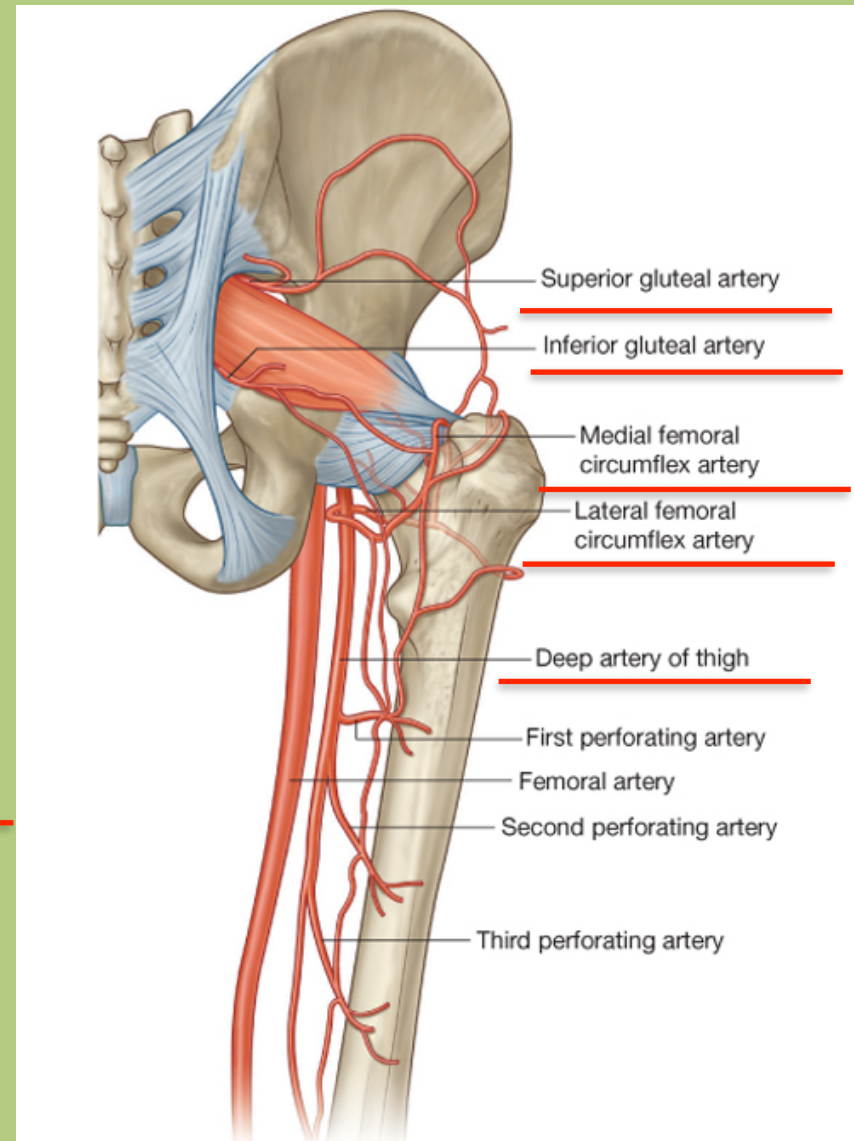
## Contents:

- Femoral artery
- Femoral vein
- Saphenous nerve (pierces the vastoadductor membrane)
- Descending genicular artery (pierces the vastoadductor membrane)

# Vasulature of the lower limb

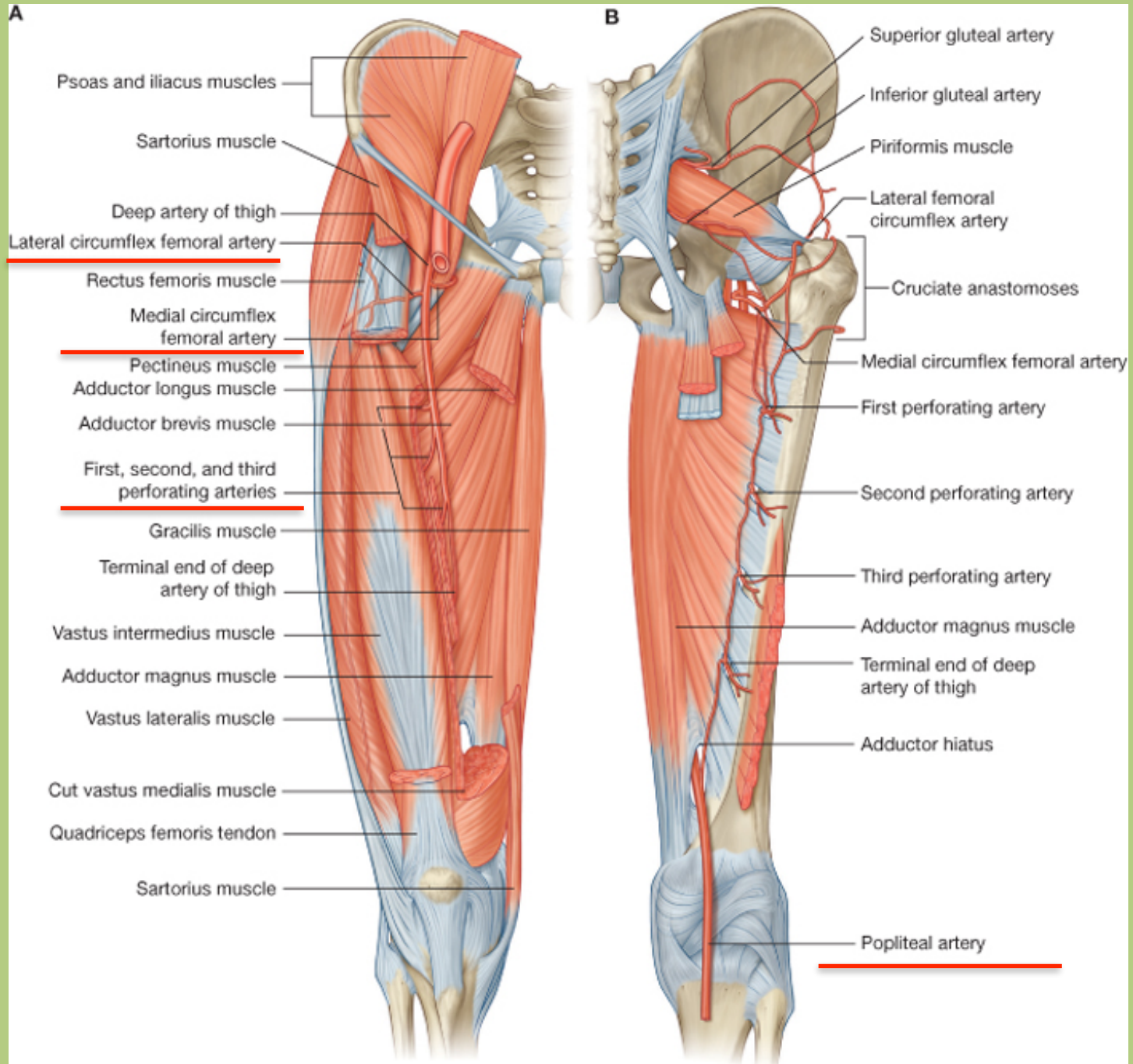


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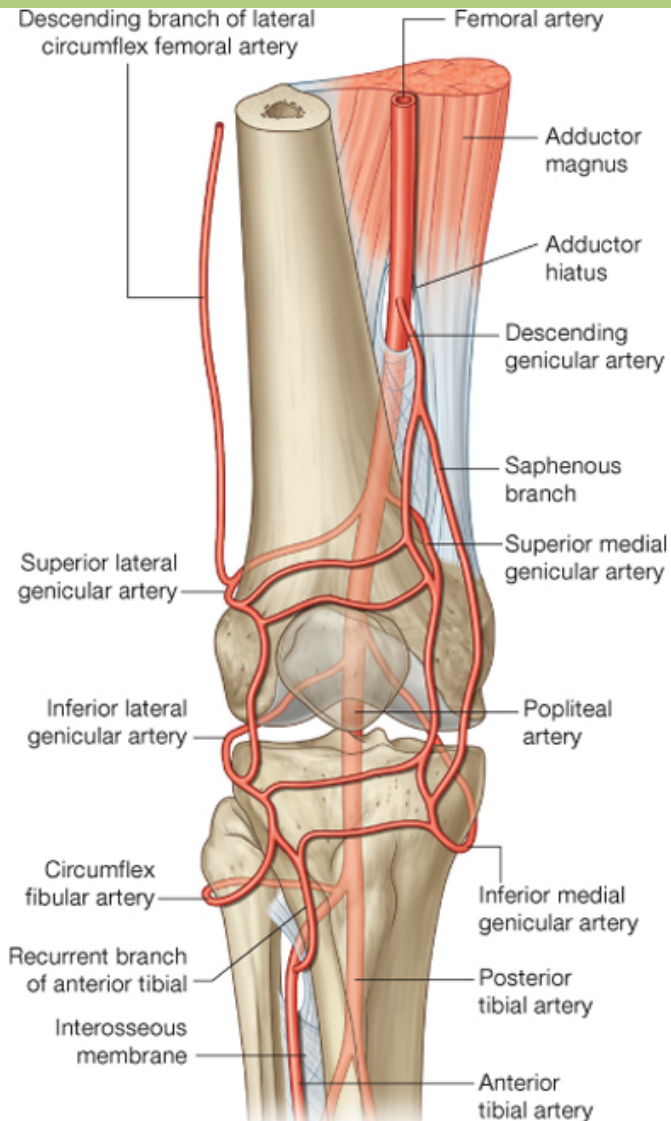


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# Rete genu



## Components:

Descending genicular art.

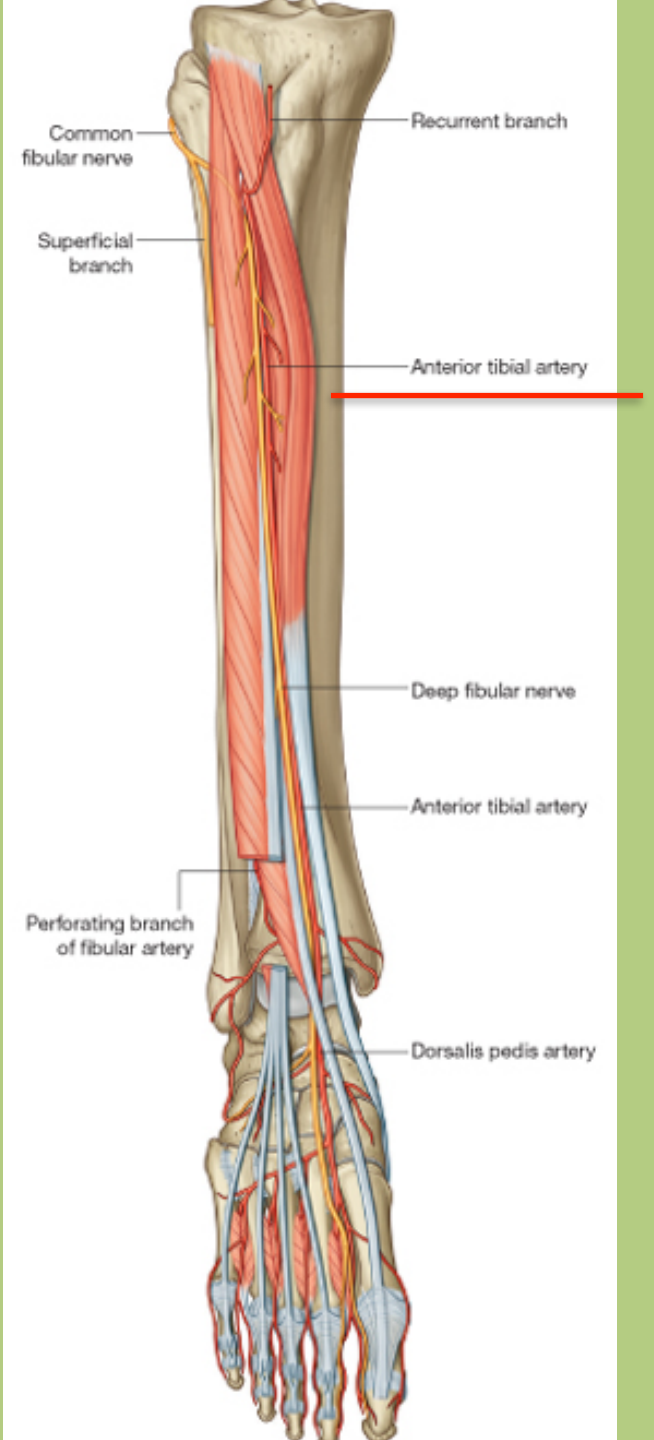
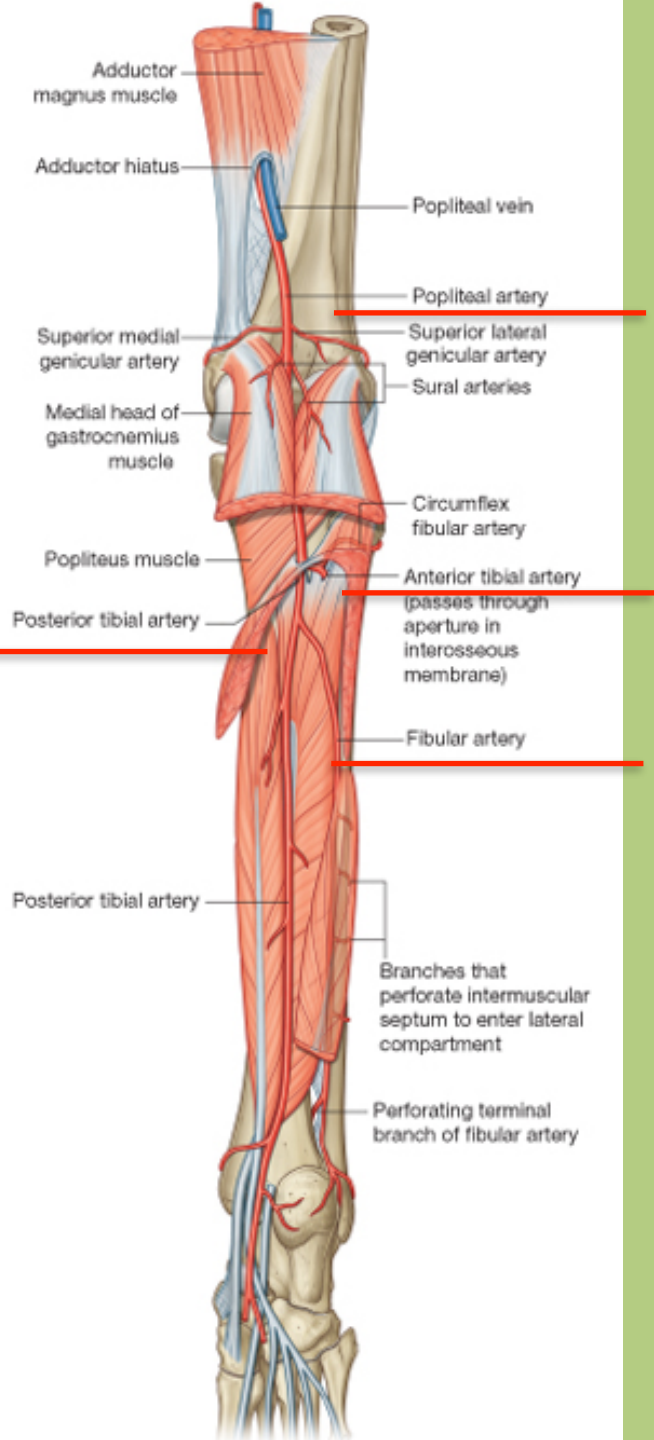
Superior medial and superior lateral genicular art.

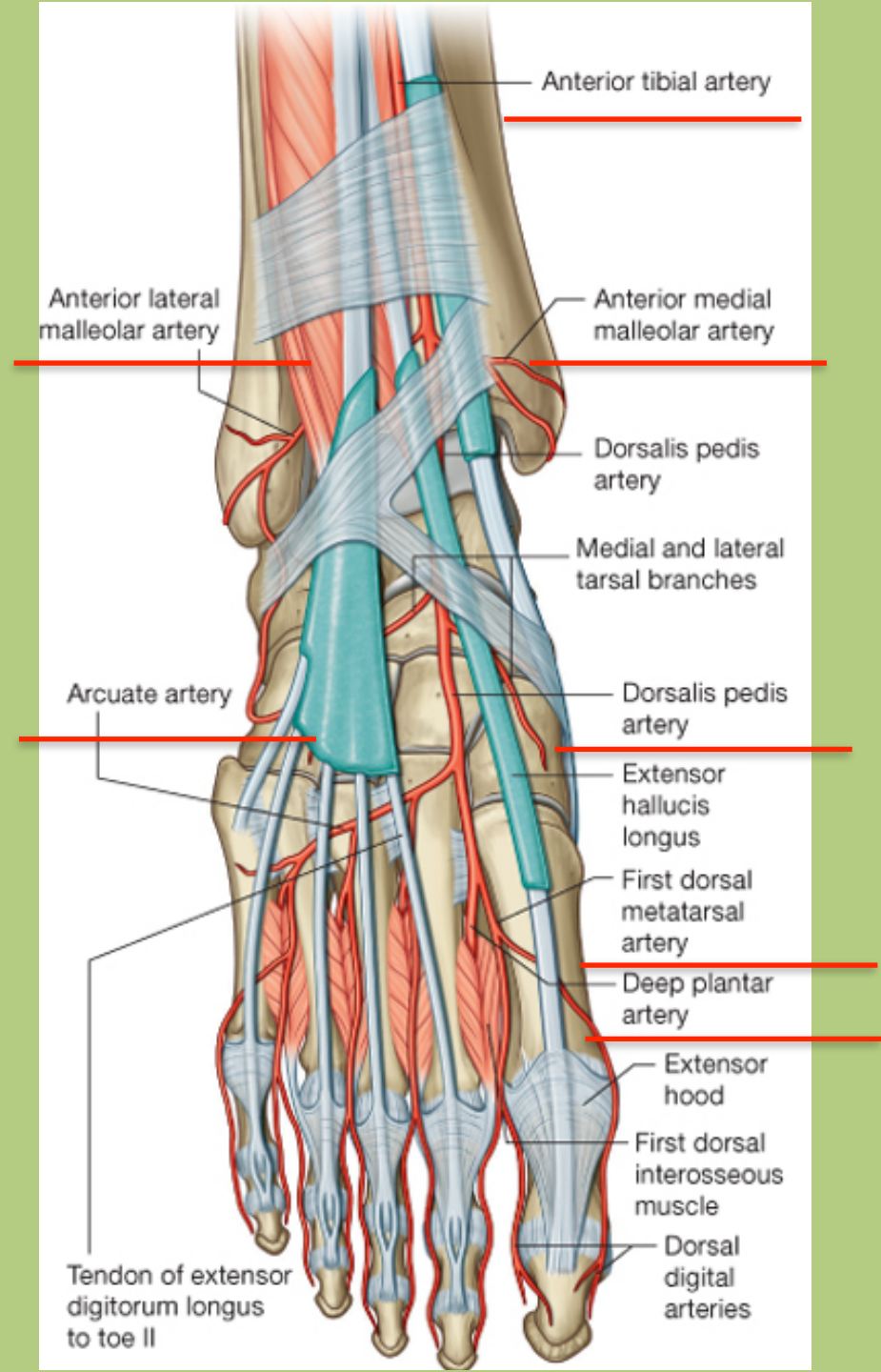
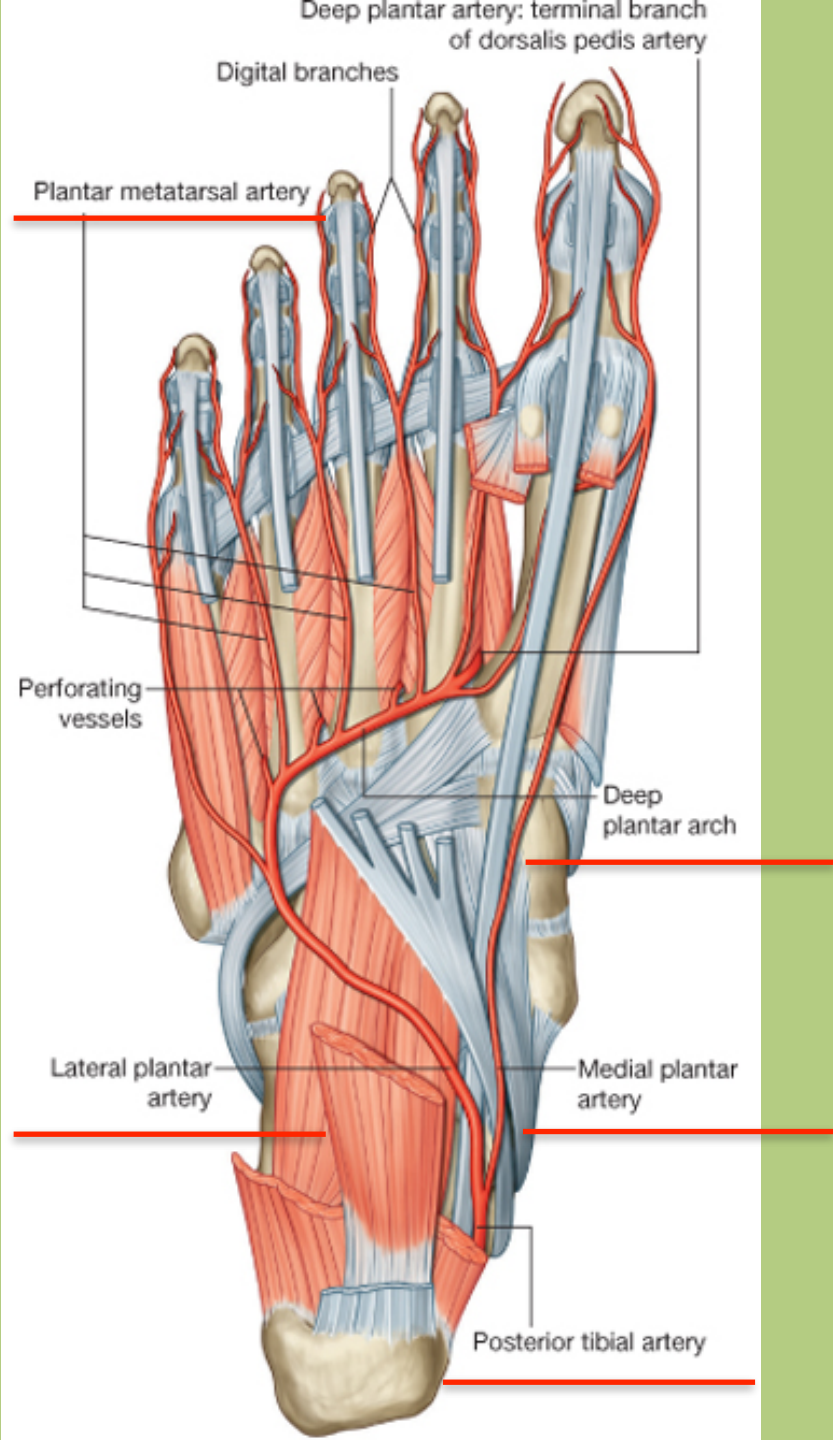
Middle genicular art.

Inferior medial and inferior lateral genicular art.

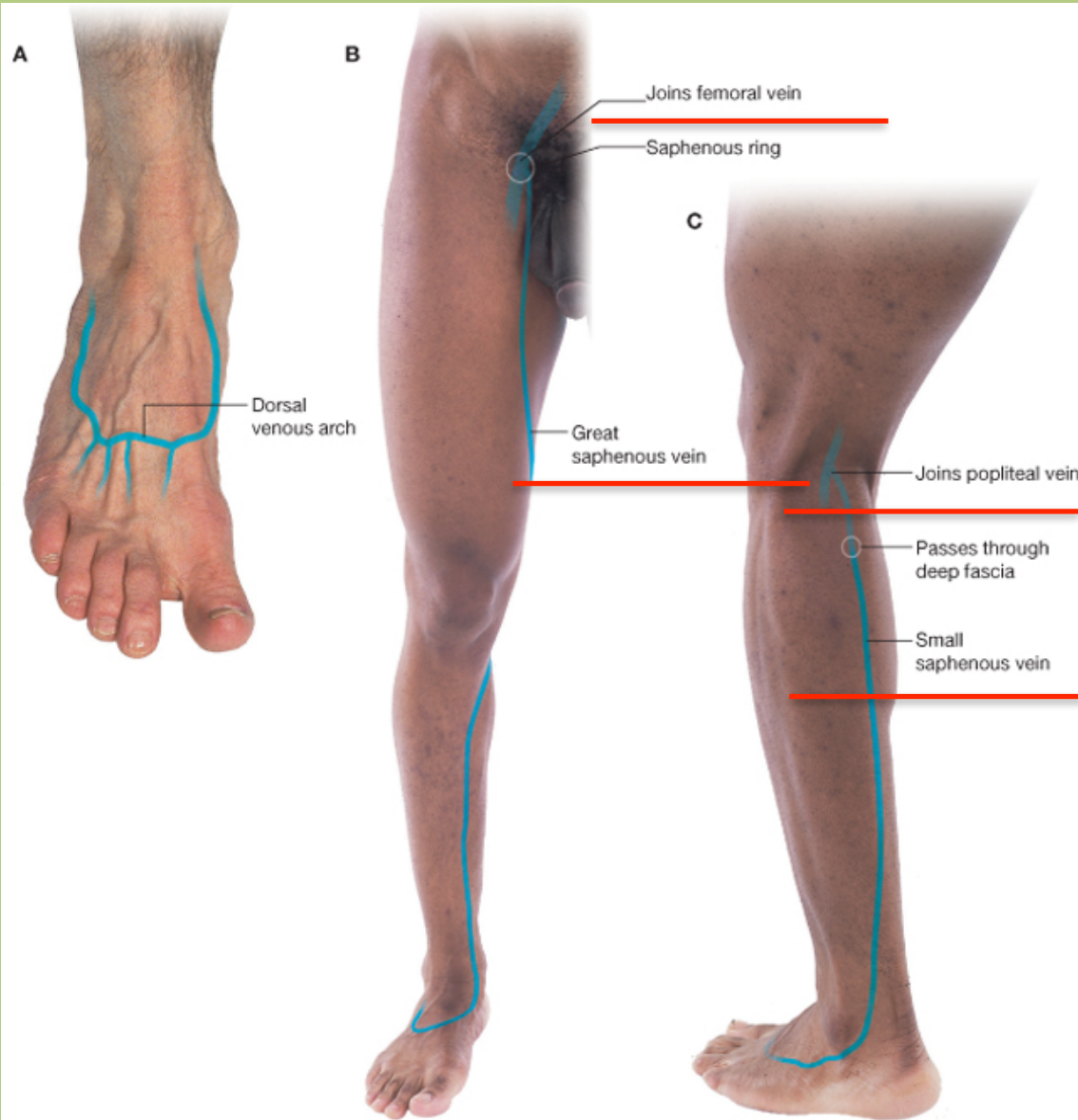
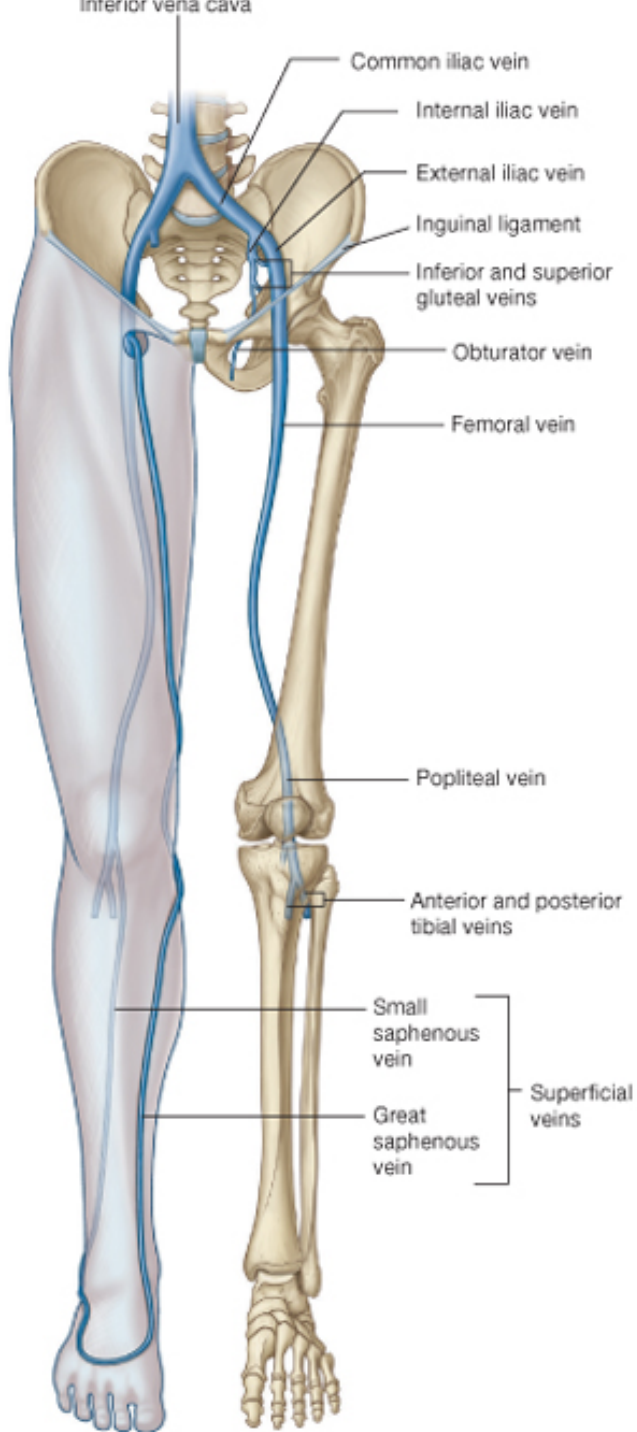
Anterior tibial recurrent art.

Posterior tibial recurrent art.

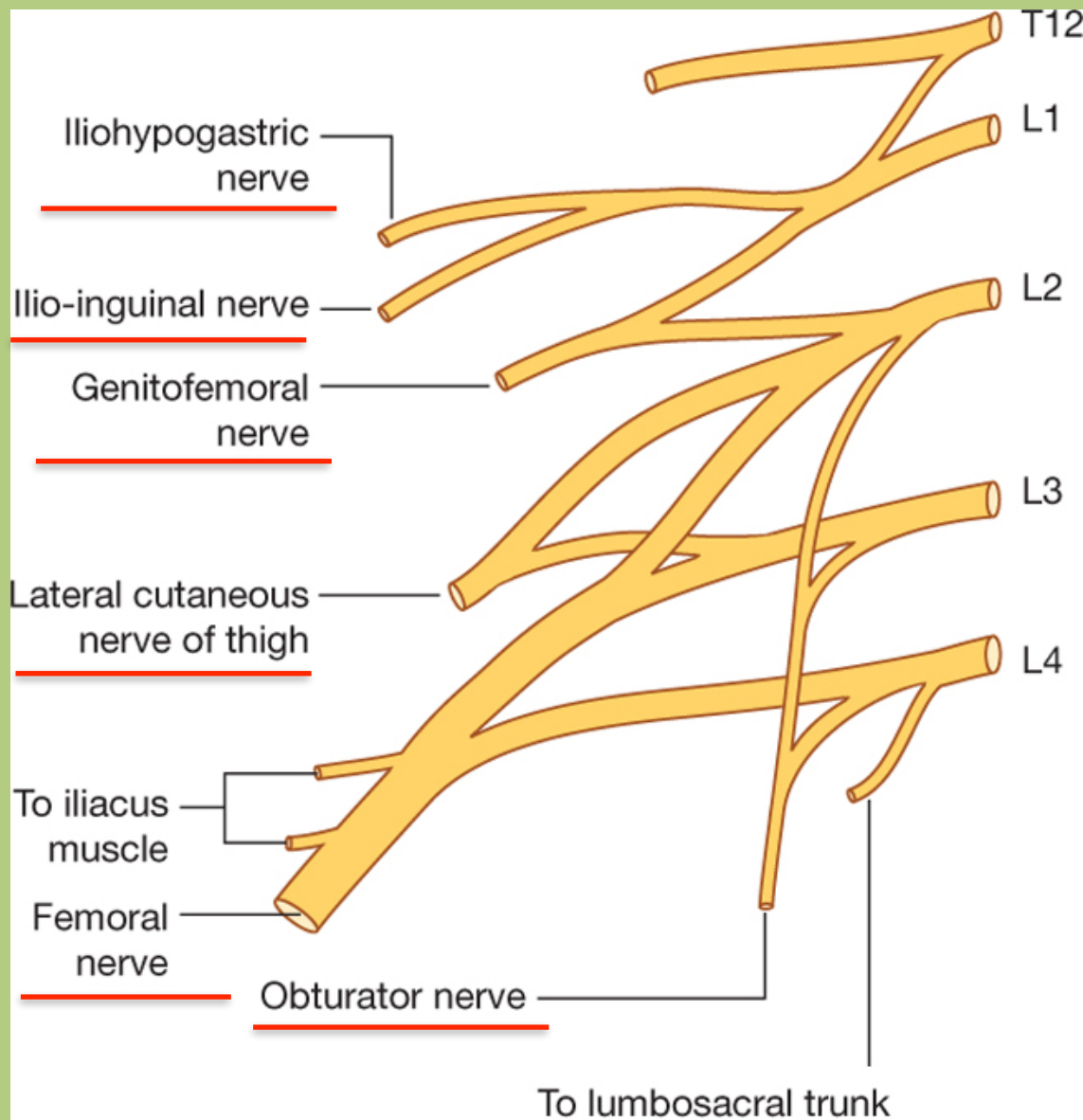




# Superficial veins

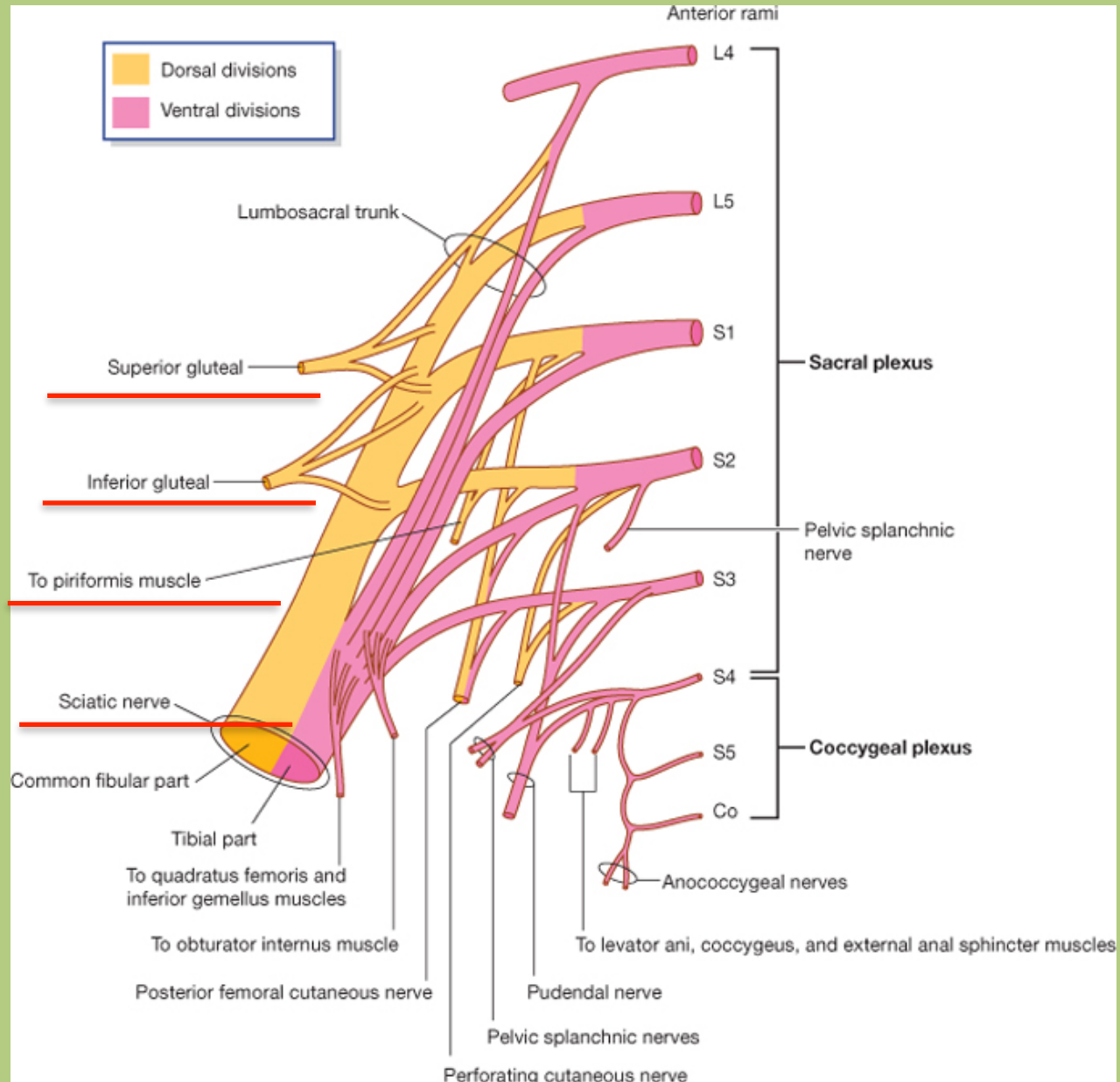


# Plexus lumbalis



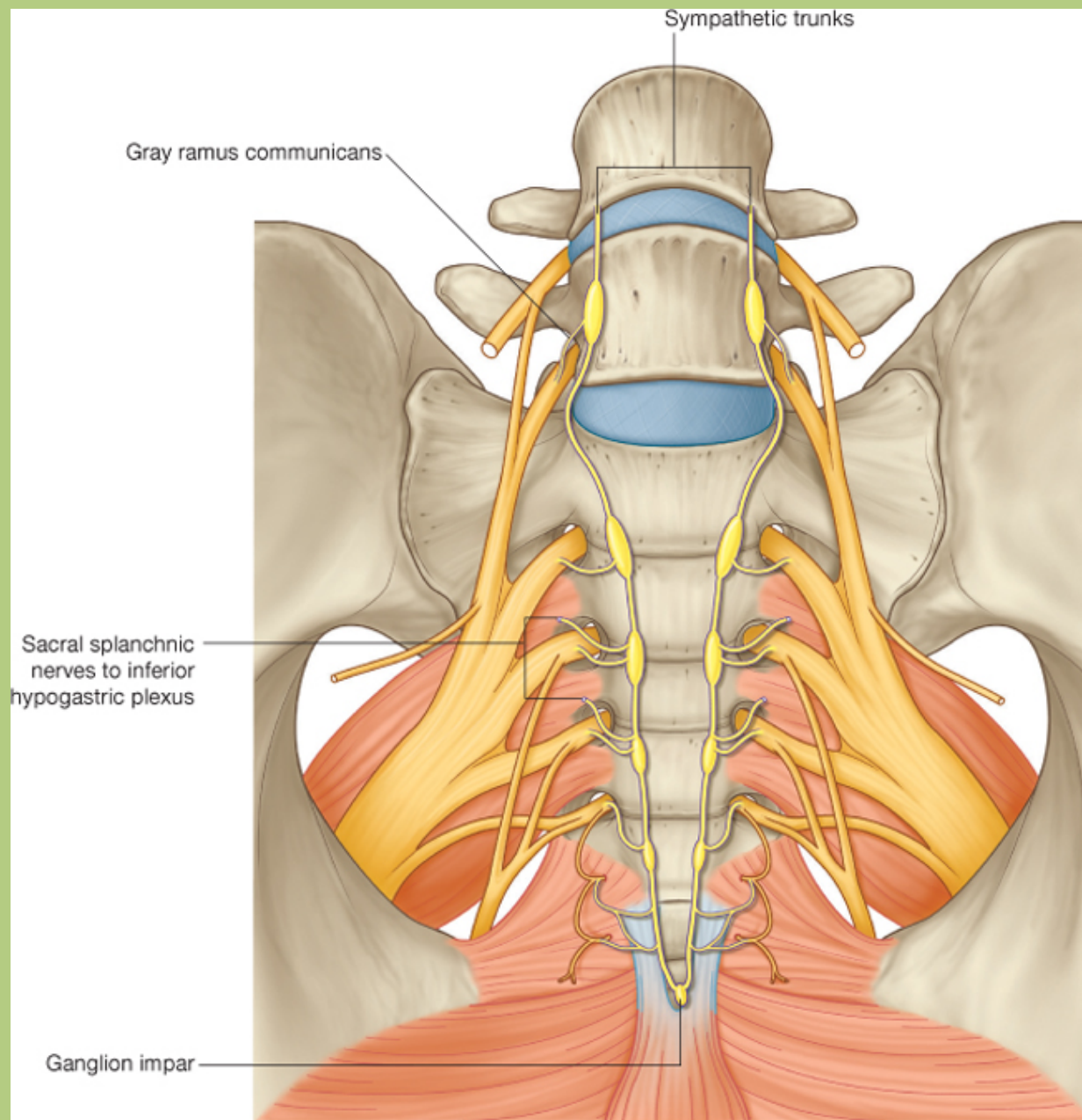
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# Sacral plexus



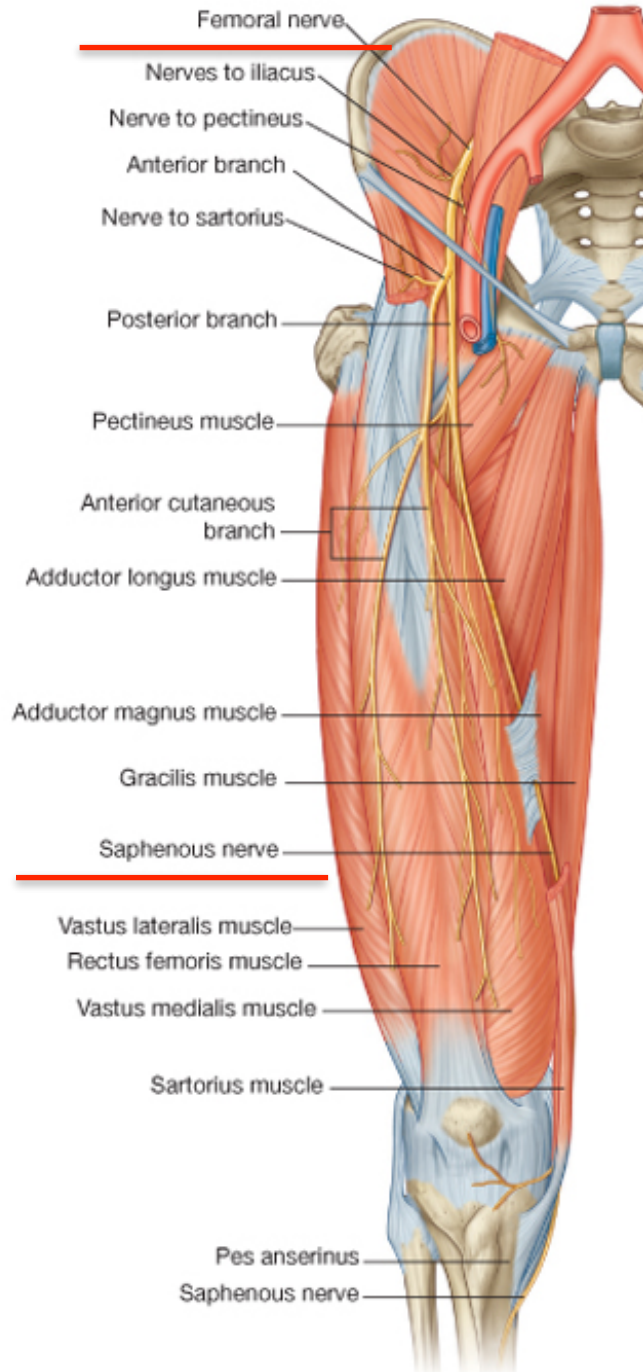
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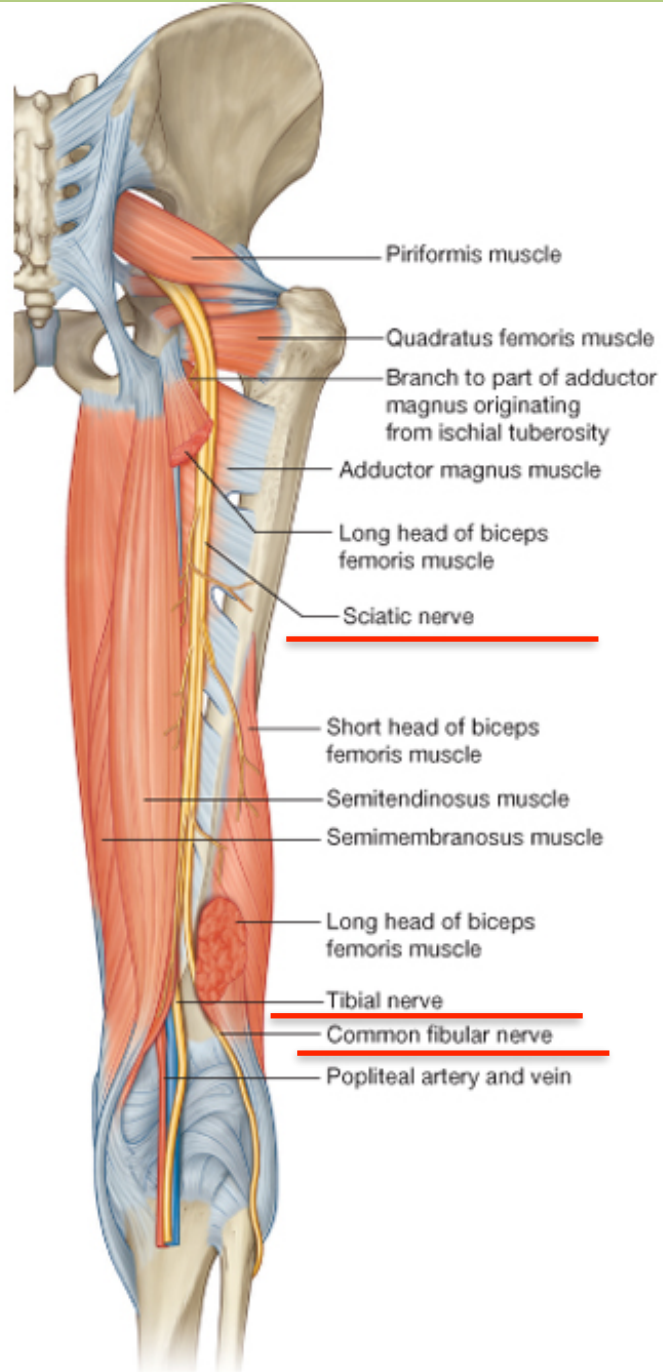
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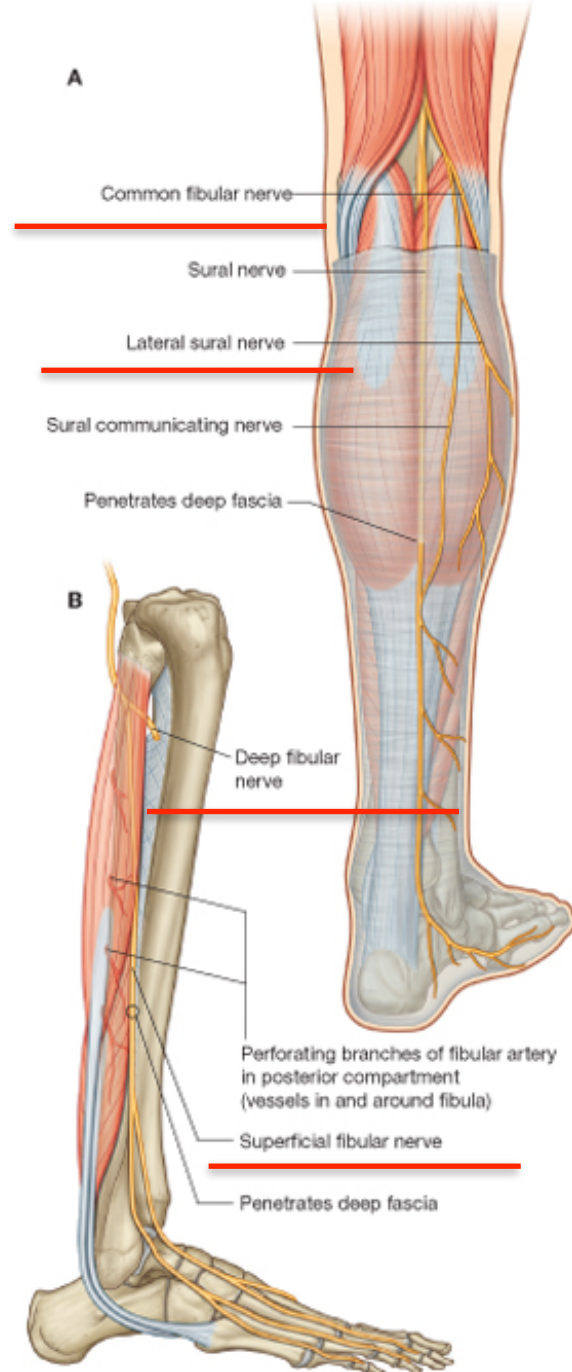


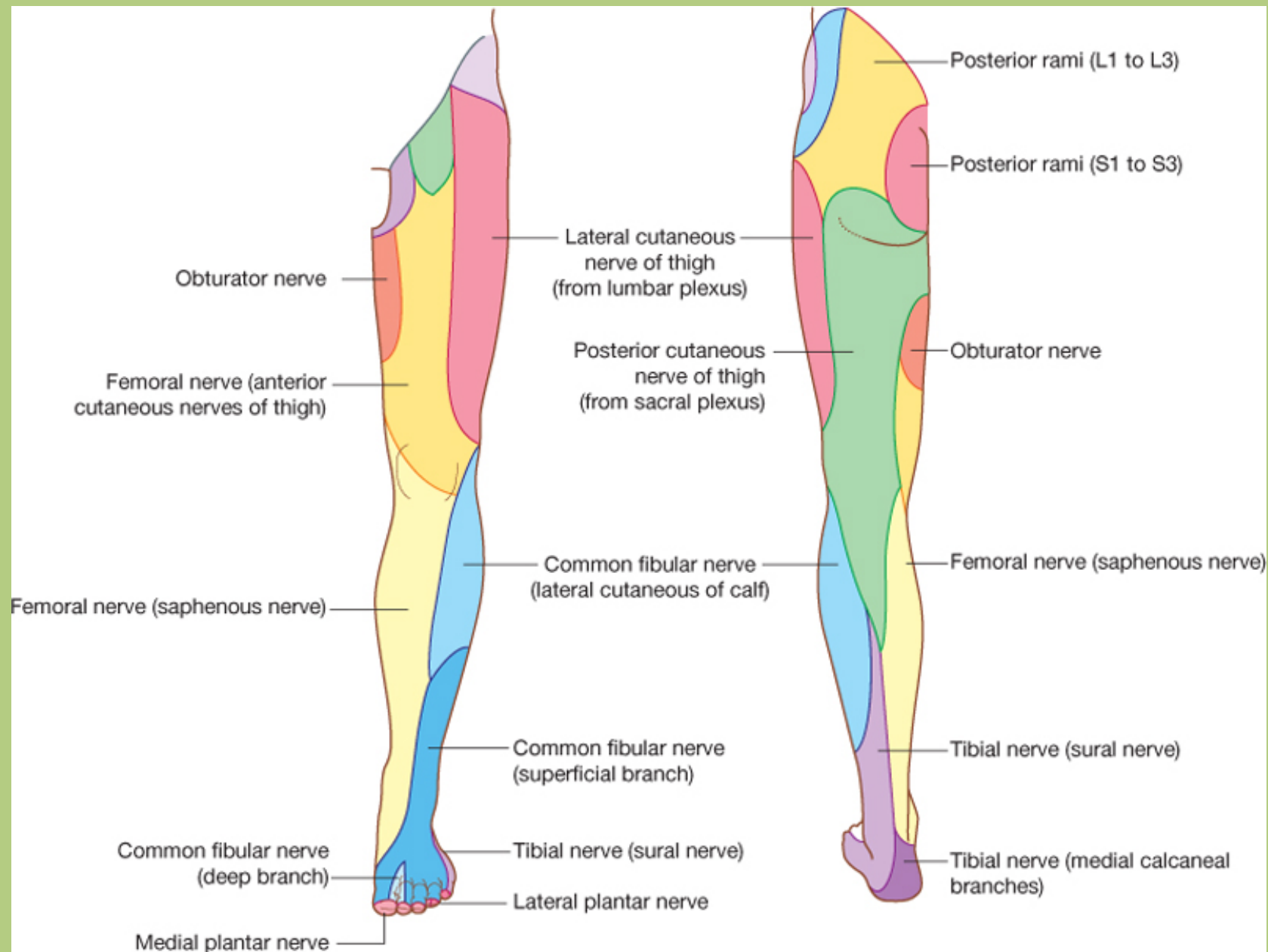
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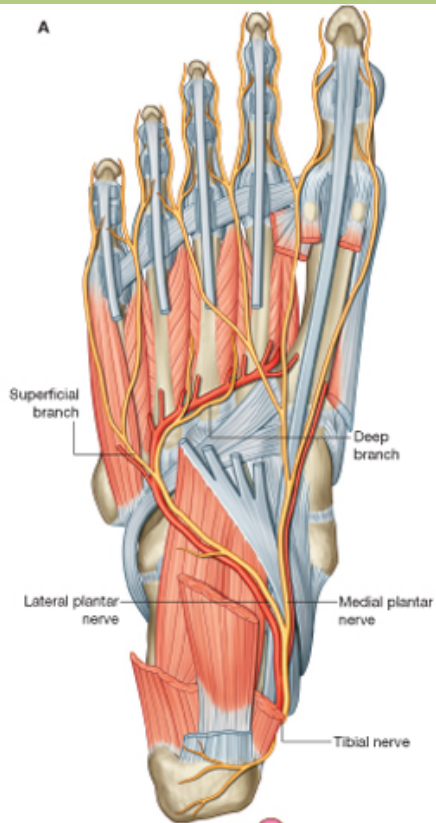




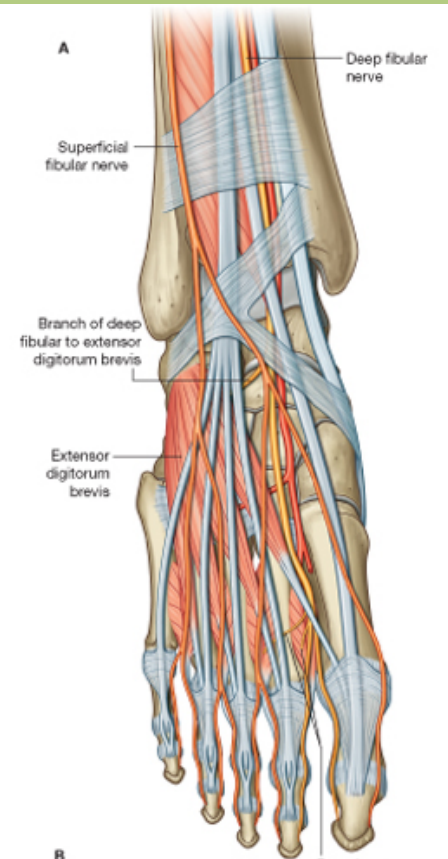


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"It's probably nothing."

# Thank you for your attention.

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