بسم الله الرحمن الرحيم

ANATOMY

FINAL | Lecture 15

Nerve Injuries of The Lower Limb

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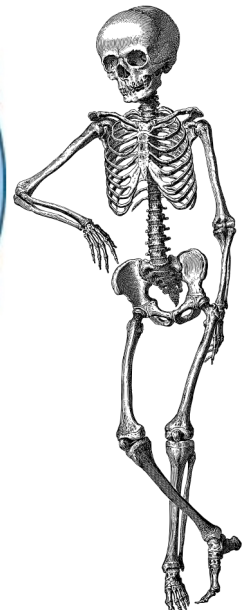
وَإِن تَتَوَلَّوْا يَسْتَبْدِلْ قَوْمًا غَيْرَكُمْ ثُمَّ لَا يَكُونُوا أَمْثَالَكُم

اللهم استعملنا ولا تستبدلنا

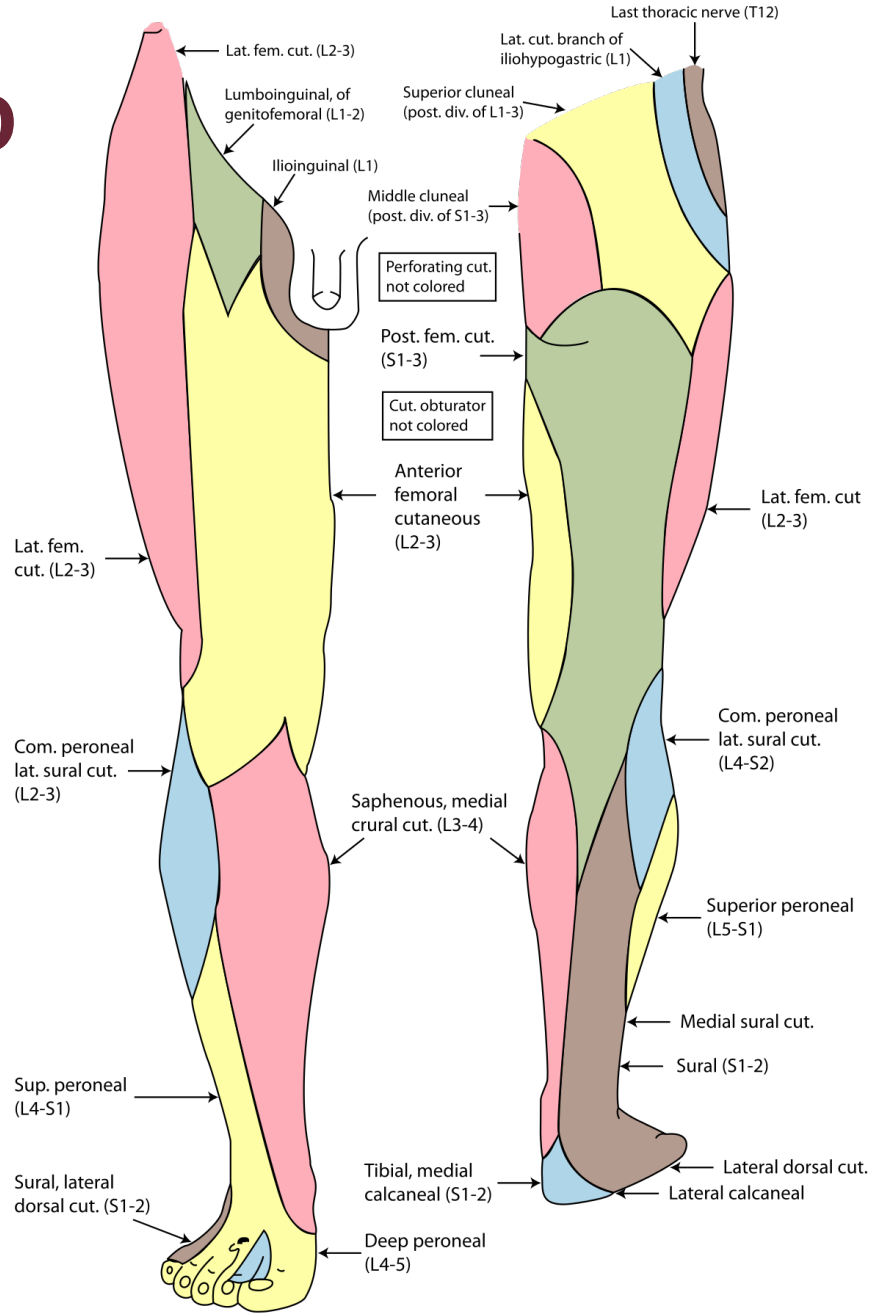


Color Code: Slides + Dr. doesn't mention | Slides + Dr. mentions | Extra from Dr.

Nerves Injuries of The Lower Limb

Nerve Injuries of The Lower Limb

Nerve injuries in the lower limbs are less common than in the upper limbs because muscles are bulkier and therefore, protect the nerves more. To benefit most from this lecture, recall the nerves in the lower limbs, their branches, what muscles they supply (and their actions), to ease the understanding process. Most of these slides are filled w/ info we've alr taken, don't stress. And as always, لا تنسوا الصلاة والدعاء لأهلنا في غزة وسوريا بسم الله نبدأ :)

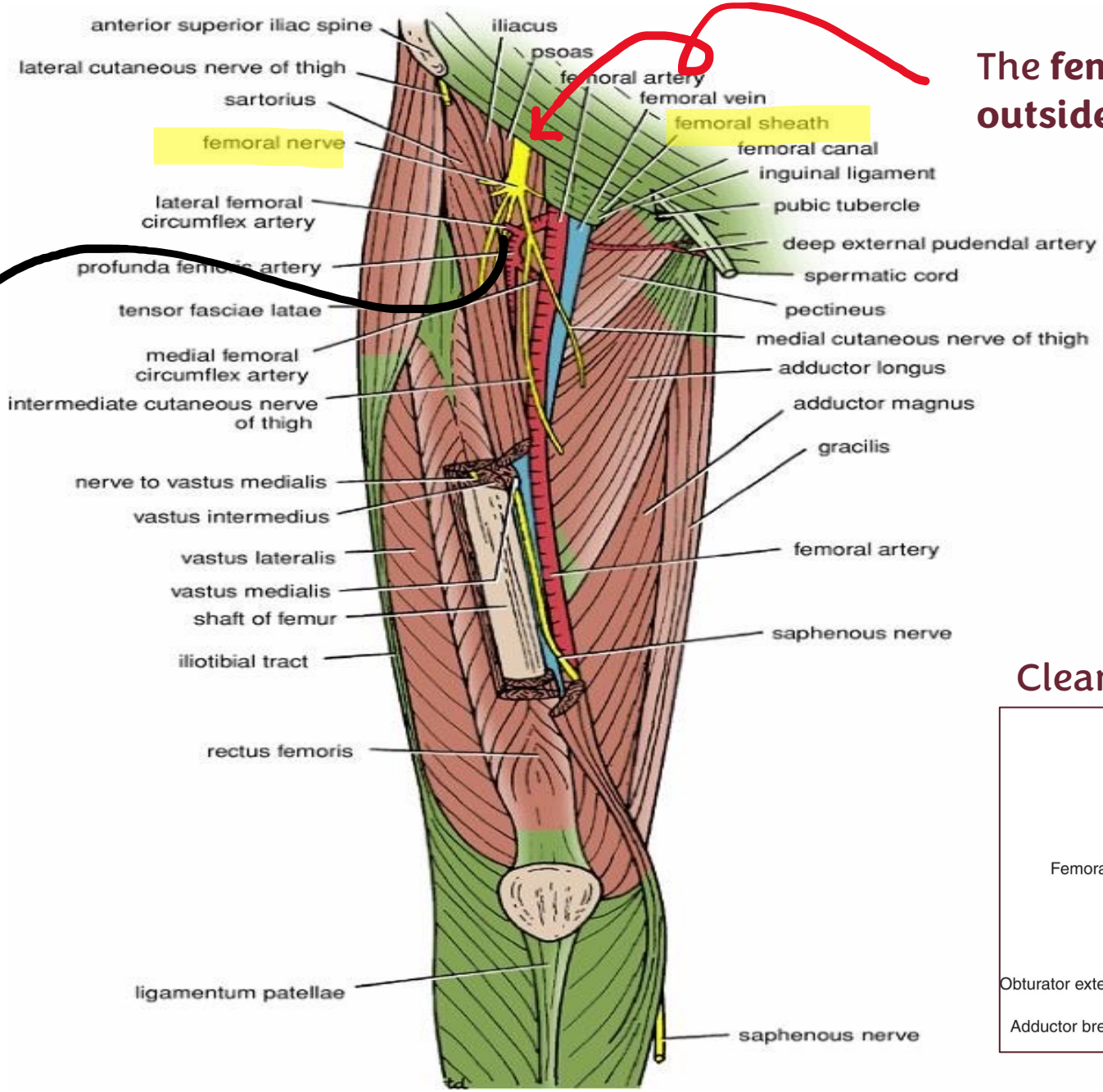


Femoral Nerve: Recap

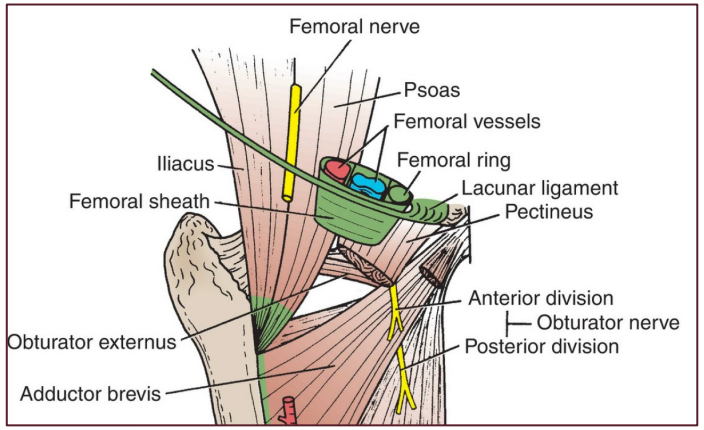
The **femoral** nerve originates from the **posterior** division of the anterior primary rami of L2, 3, & 4. (This is the same origin as the **obturator nerve** except it originates from the **anterior** division of the anterior primary L2, 3, 4 rami). The **femoral** nerve supplies the muscles in the anterior compartment of the thigh: quadriceps femoris (rectus, vastus lateralis, medialis, & intermedius), iliacus, pectineus, & sartorius. Remember, these muscles flex the thigh, extend the leg, adduct and abduct the thigh. It also gives off **medial & intermedial cutaneous** nerve that supply the anterior and medial aspects of the thigh (+ patellar plexus). Lastly, the **saphenous nerve** which goes to the medial side of the leg and foot down to the ball of the big toe is also a branch of the femoral nerve.

The **femoral nerve** resides **outside** of the femoral sheath.

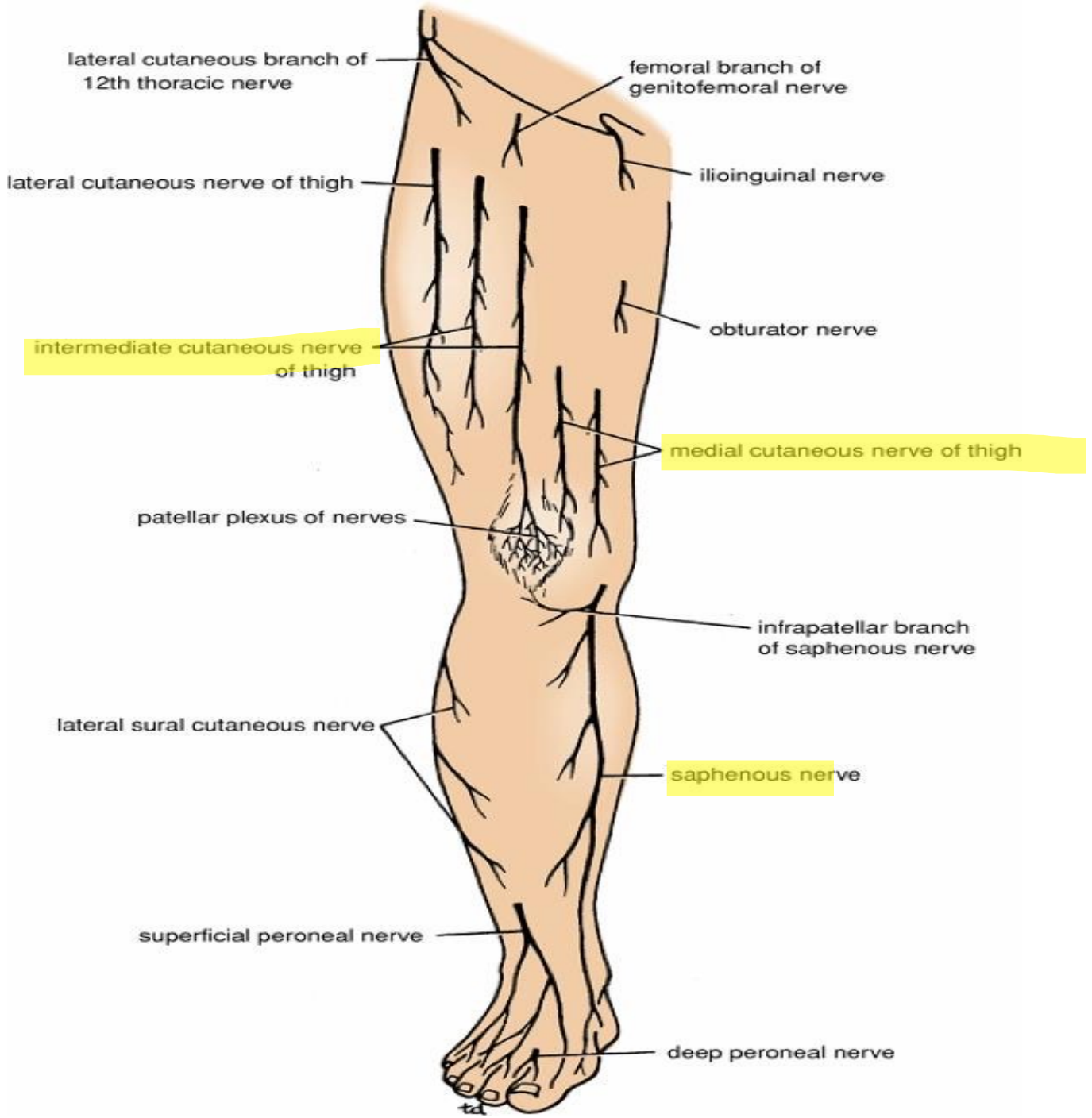
The **femoral nerve** gives off **anterior & posterior divisions.** The anterior division supplies the muscles of the anterior compartment, and cutaneous nerves to the medial and intermediate cutaneous nerves. The posterior division gives off the saphenous nerve.



Clearer picture



Supplies the medial leg & foot all the way down to the ball of the big toe.



لا إله الا الله

Femoral nerve (L 2, 3, 4)

- **Injured in:**
  1. Stab wound
  2. Gun shot

Complete division of nerve is very rare. In case of complete division of the nerve clinical features are:

1- Motor:

- paralysis of quadriceps muscles → loss of ext. of knee
- In walking this compensated by add. muscles

Quads are the most important extenders of the knee.

2- Sensory:

- Loss of sensation over the thigh & the medial side of the leg
- Loss of sensation along the medial border of the foot , as far as the ball of big toe(by saphenous)

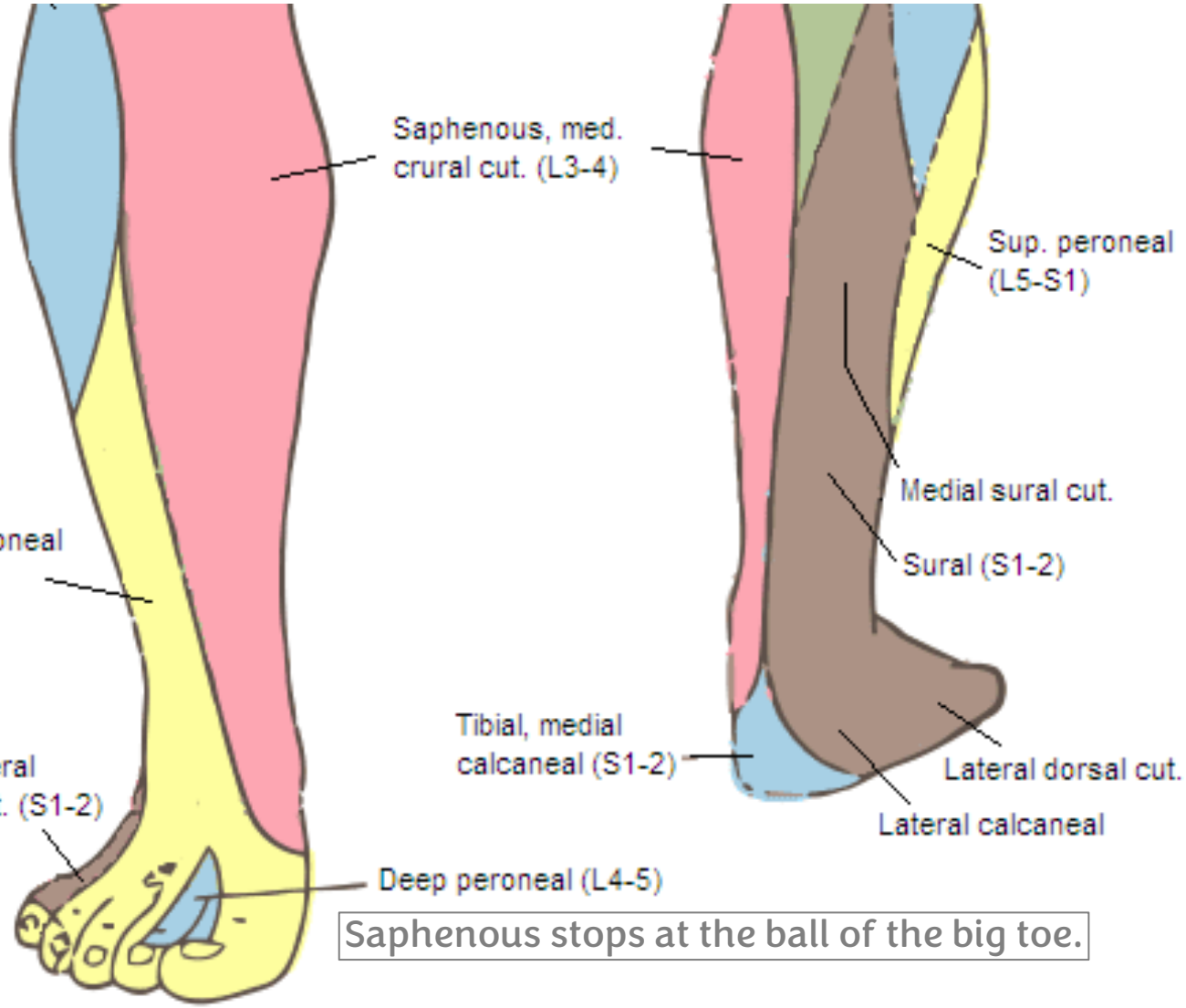
Sciatic Nerve Injury

اللهمّ يا مسهّل الشديد، ويا مُليّن الحديد، ويا منجز الوعيد، ويا من هو كل يوم في أمرٍ جديد، سهّل عليّ دراستي، اللهمّ بك أدفع ما لا أطيق، ولا قوة إلا بالله العلي العظيم.

Sciatic Nerve: Recap

The **sciatic nerve** is the largest nerve in the body, it originates from the L4, L5, S1, S2, & S3. The most common injury regarding the sciatic nerve is when administering IM injections. If the sciatic nerve was injured by the needle, it may cause immediate foot drop and loss of sensation, because the lower limbs are supplied by the sciatic nerve and its branches (anterior and posterior tibial nerves that supply the leg and foot). It divides halfway down the back of the thigh into the **common peroneal** and **tibial nerves.** The **common peroneal** supplies the lateral and anterior compartments of the leg, whereas the **tibial** nerve continues down the popliteal fossa, supplying the posterior and medial sides of the leg. At the lower border of the popliteus muscle, the **tibial** nerve becomes the **posterior tibial nerve,** which supplies the posterior compartment of the leg. The tibial nerve supplies all the calf muscles (posteriorly), which are responsible for running and walking. It also gives off the cutaneous **sural nerve** that supplies the lateral side of the leg and foot (stops at the pinkie toe). The saphenous nerve (femoral nerve) supplies the medial side of the leg & foot (stops at the ball of the big toe).

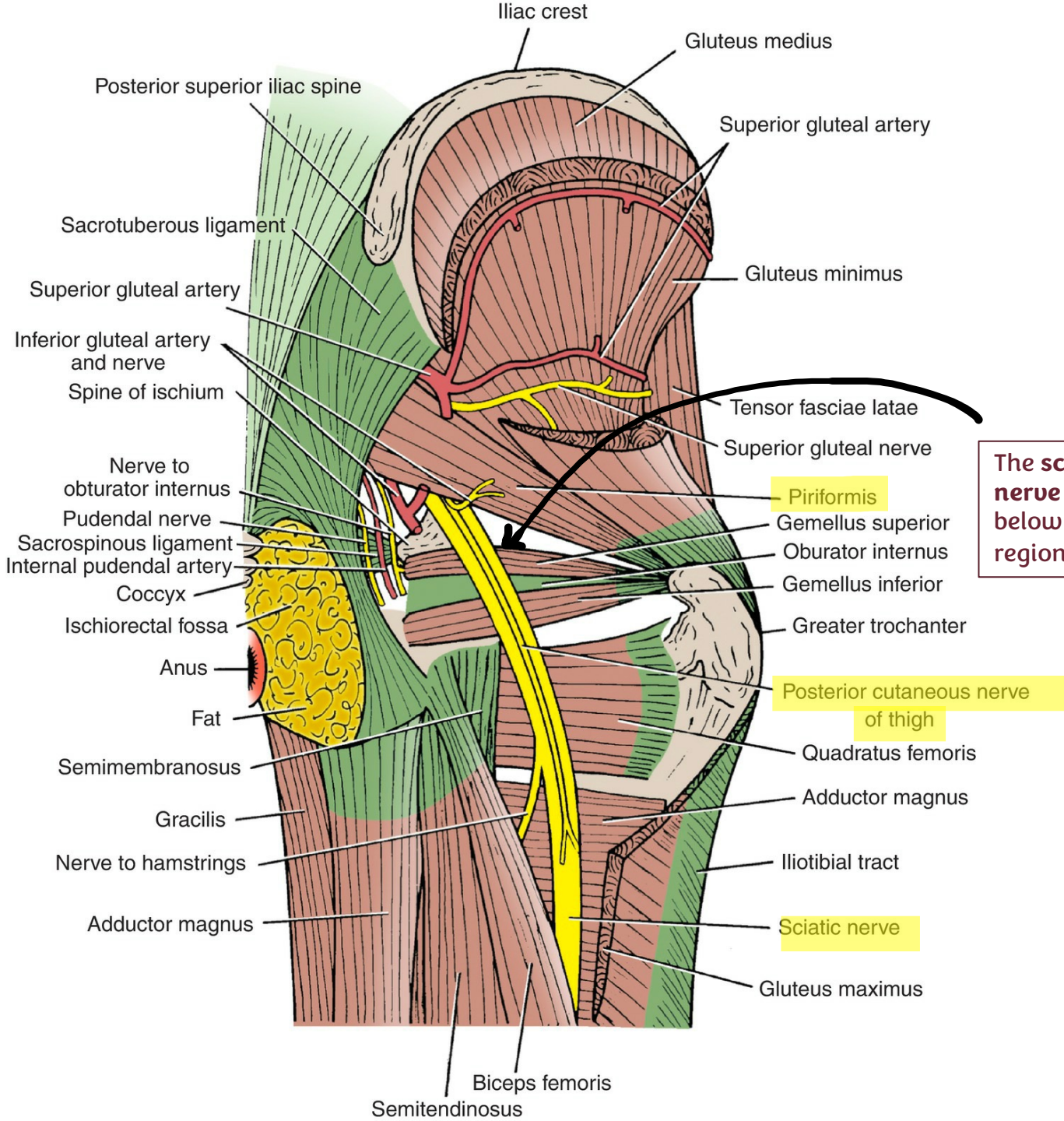
Extra Slide



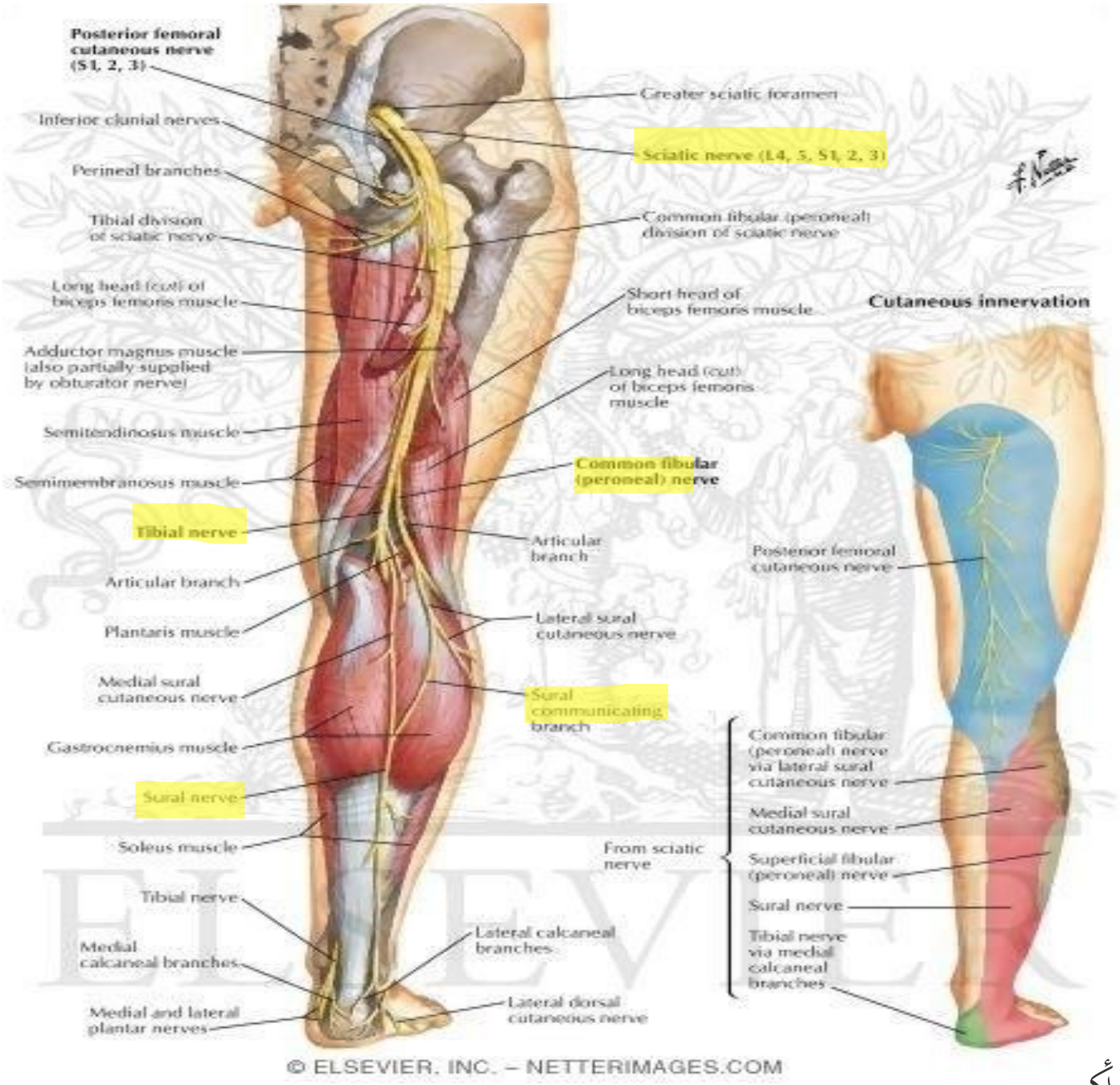
Sural stops at the pinkie toe.

Saphenous stops at the ball of the big toe.

A visual for saphenous and sural nerve supply.



The **sciatic** and **posterior cutaneous nerve of the thigh** both emerge from below the piriformis muscle in the gluteal region.



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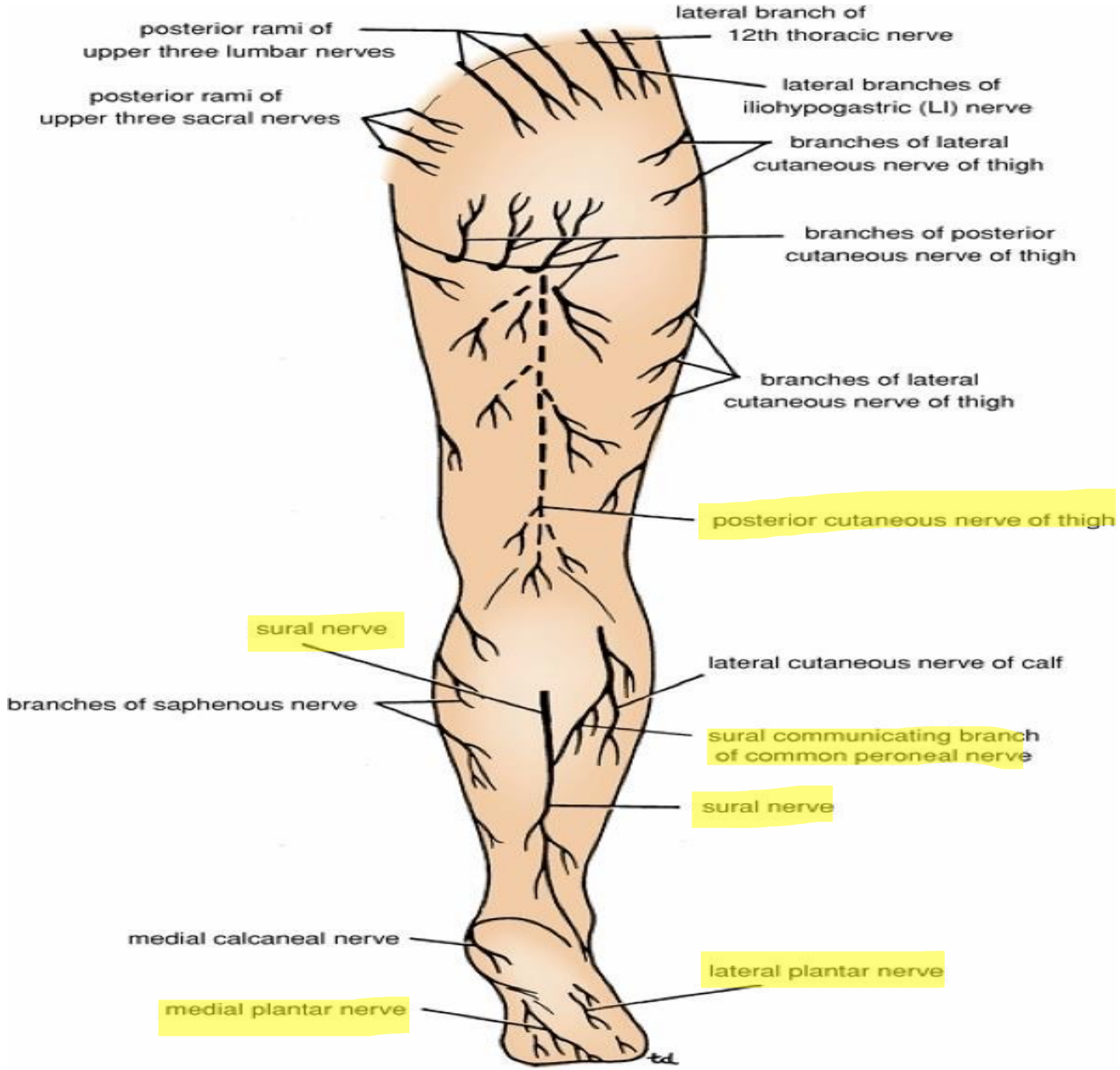
سبحان الله والحمد لله ولا إله الا الله والله أكبر


posterior rami of upper three lumbar nerves
posterior rami of upper three sacral nerves
lateral branch of 12th thoracic nerve
lateral branches of iliohypogastric (LI) nerve
branches of lateral cutaneous nerve of thigh
branches of posterior cutaneous nerve of thigh
branches of lateral cutaneous nerve of thigh
posterior cutaneous nerve of thigh
sural nerve
lateral cutaneous nerve of calf
branches of saphenous nerve
sural communicating branch of common peroneal nerve
sural nerve
medial calcaneal nerve
lateral plantar nerve
medial plantar nerve
td

Sciatic Nerve

- **Injured by :**
  1. Penetrating wounds
  2. Fracture pelvis
  3. Dislocation of hip joint

- Frequently injured by badly placed intramuscular injections in the gluteal region
- 90% of injuries affected the common peroneal nerve (superficial fibers)

- **Incomplete injury; the clinical features are:**
  1. **Motor:**
     - Paralysis of hamstring muscles → weak flexion at the knee joint (by action of sartorius + gracilis)
     - Paralysis of all muscle of leg and foot → foot drop
  2. **Sensory:**
     - Loss of sensation below the knee except medial side of leg and foot till the ball of big toe (saphenous nerve)

N.B:

Sciatica (pain along the sensory distribution of sciatic nerve) caused by:

1. Prolapse of an intervertebral disc
2. Intrapelvic tumor → pressure on origin of nerve
3. Inflammation of sciatic nerve

Many people suffering from perforating discs in the L5, S1 region face pain & loss of sensation in the leg due to the increased pressure from the herniated disc onto the nerve. Sciatica could be unilateral or bilateral. Inflammation of the sciatic nerve may cause pain along all sciatic nerve distributions.

Common Peroneal Nerve

Peroneus- eversion
Tibialis- inversion

- Commonly injured in fracture of the neck of fibula

Recall from last year that the **neck of the fibula** is the most common site of injury. The **common peroneal nerve** winds around the neck of the fibula. Therefore, a fracture in the neck of the fibula would cause injury to the nerve. The **lateral** side of the fibular neck is a more common injury site. Injuries like this may occur in children falling off their bikes,

- **Clinical features are:**

1 Motor:

- Paralysis of the muscles of anterior & lateral compartment of the led causes foot drop + inversion of foot (equinovarus) Due to the unopposed eversion that would normally be carried out by peroneal (fibular) muscles.

2 Sensory:

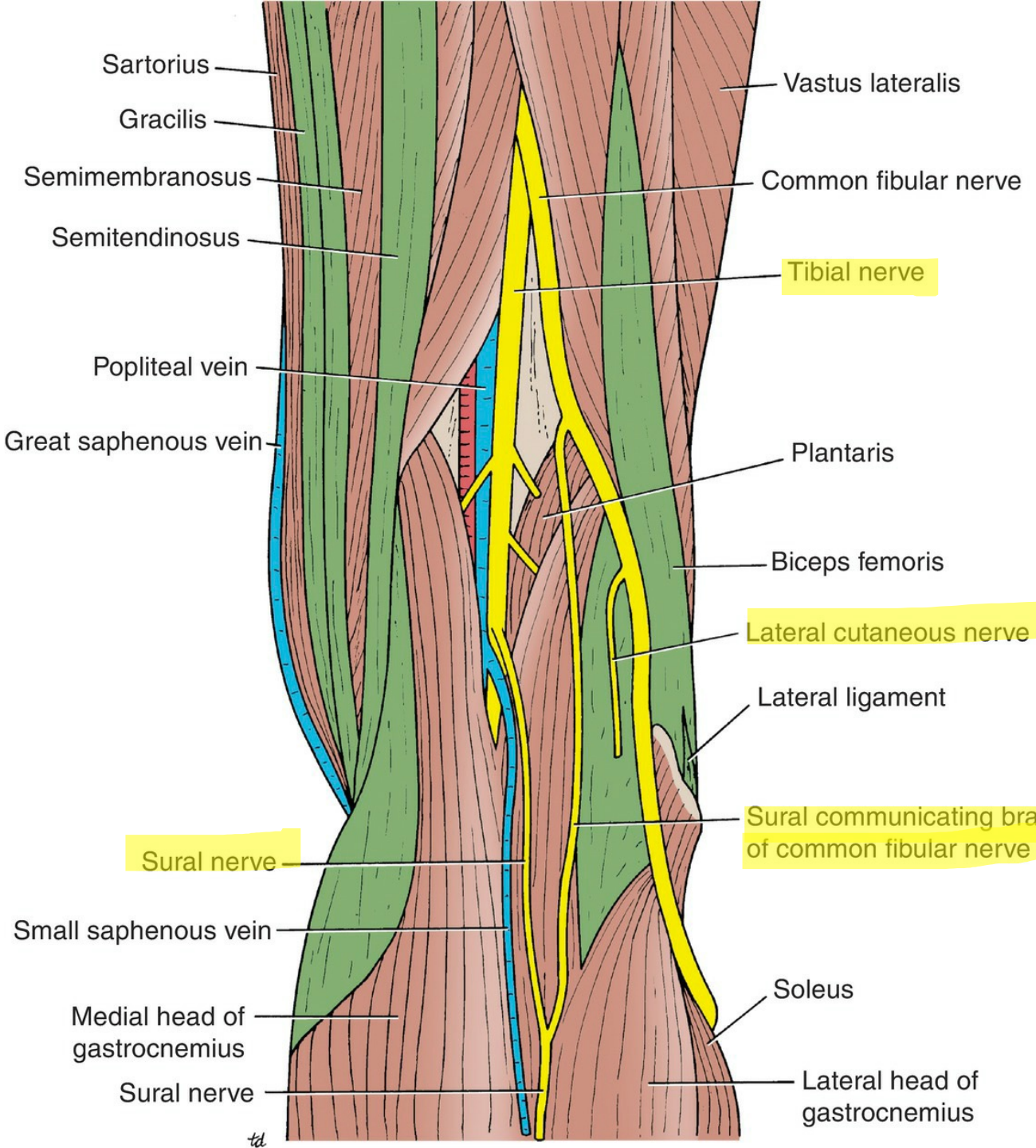
- Loss of sensation over the anterior & lateral side of leg
- Loss of sensation over dorsum of the foot and toes
- Loss of sensation on the medial side of big toe

Deep peroneal is also called **anterior tibial.** Superficial peroneal is also known as **musculocutaneous**, because it supplies **peroneus longus** and **brevis** before becoming cutaneous.

The **common peroneal** gives off **superficial** and **deep branches,** therefore, injury to it would also mean loss of the sensations its branches provide.

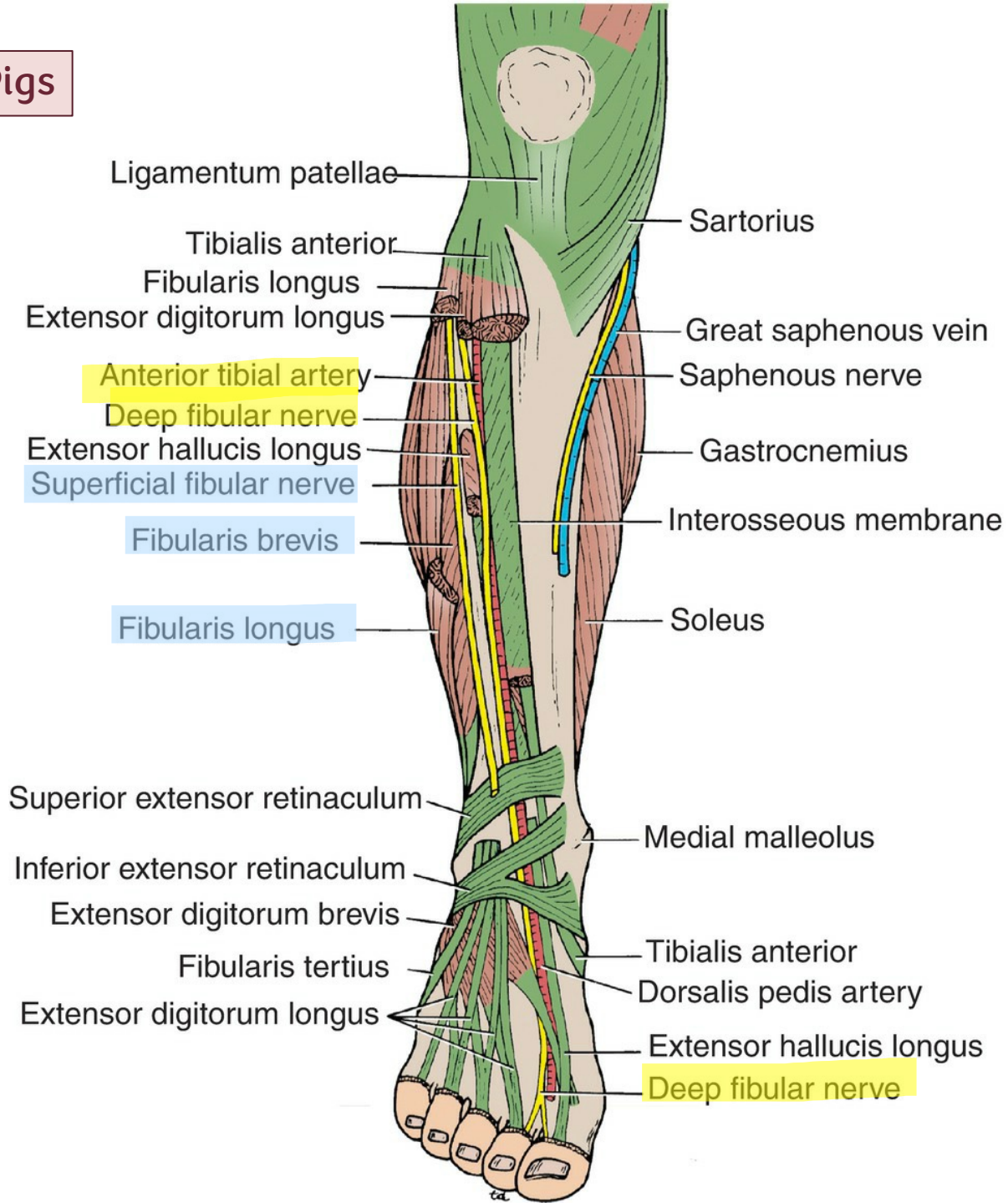
N.B

- Lat. side of the foot and little toe is unaffected because it is innervated by sural nerve. Also, medial border of the foot as far as the ball of the big toe is innervated by saphenous nerve



The **common peroneal nerve** gives off the lateral cutaneous nerve of the thigh and a sural communicating branch. It continues downwards and divides into superficial and deep peroneal branches in the peroneus longus.

Tom Has Very Nice Dogs & Pigs



Tibial Nerve

- Rarely injured (well protected by muscles) Lies deep to them

- **complete division results in the following features:**

1- Motor:

- **Paralysis of the muscles of the posterior compartment of the leg and the sole of the foot causes:**

A- Dorsiflexion of the foot at ankle joint Patient starts walking on their heels.

B- Eversion of the foot at subtarsal and transvers tarsal joint→ calcaneovalgus

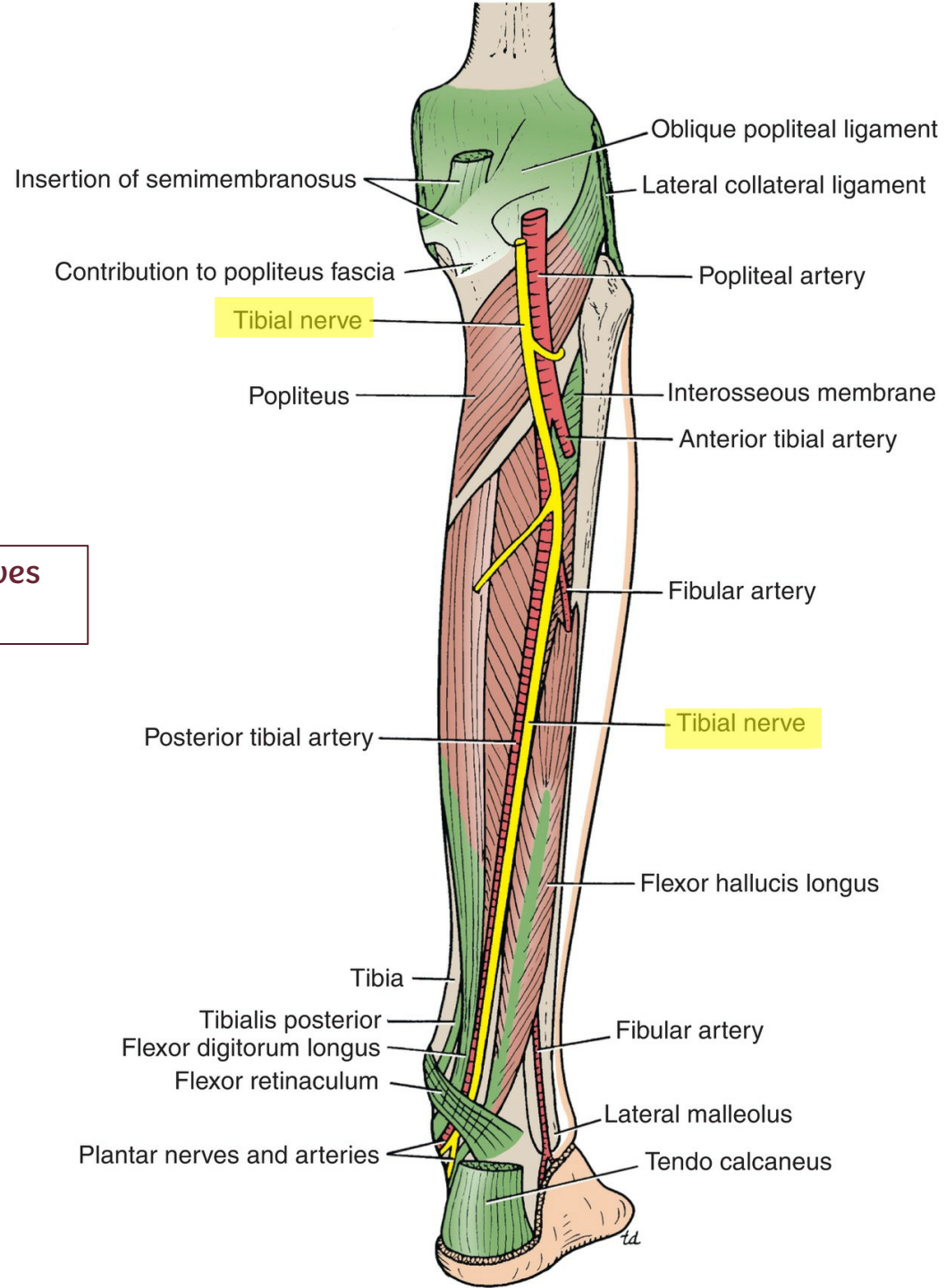
Eversion: the sole of the foot points **away** from the midline.

2- Sensory:

- Loss of sensation on the sole of the foot Medial and lateral plantar nerves.

Tom Does Very Nice Hats

In the sole of the foot, the tibial nerve gives off medial and lateral plantar branches.



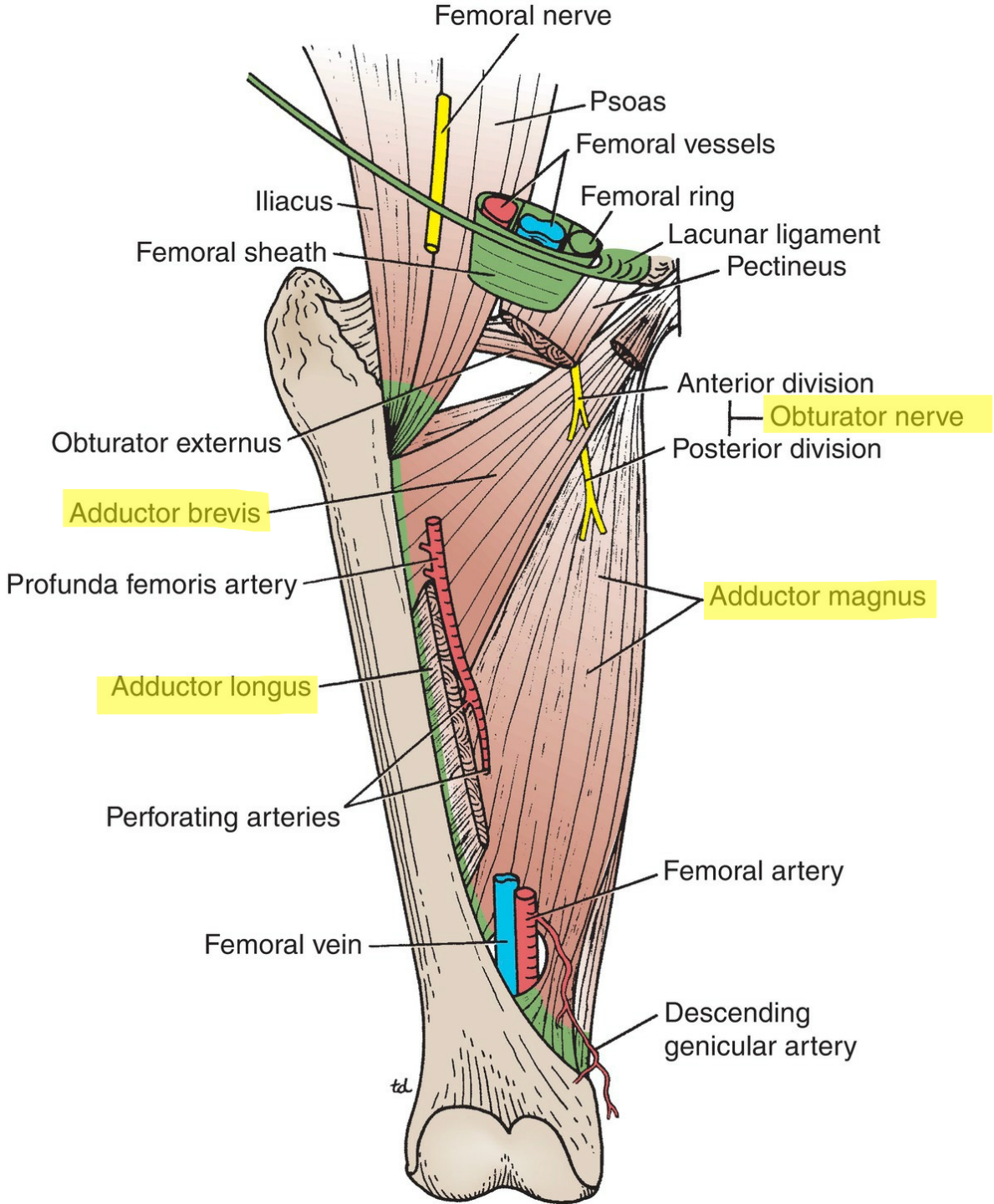
Obturator nerve

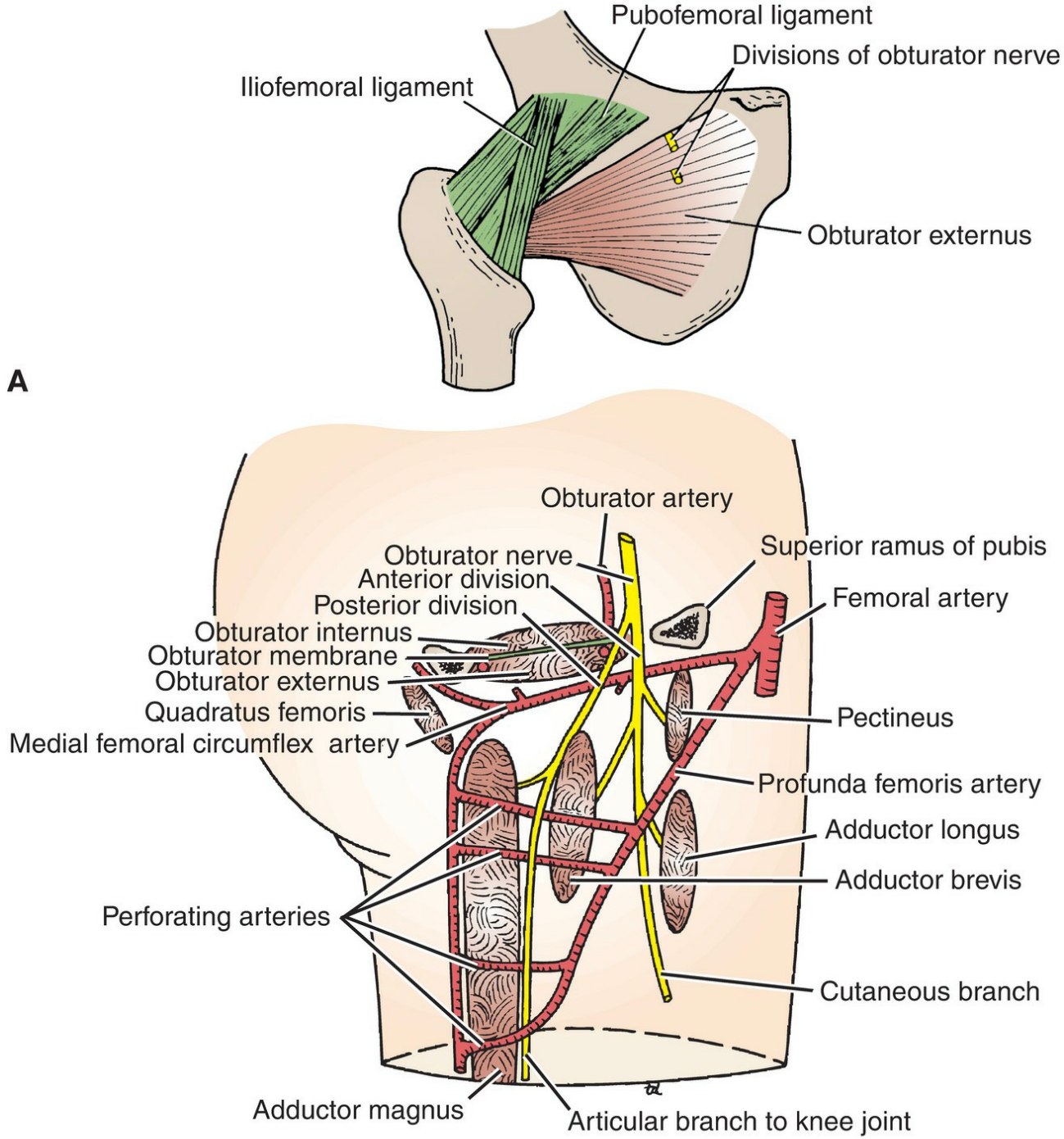
Supplies the muscles in the medial compartment of the thigh (gracilis and adductors, except for the hamstring part of the adductor magnus).

- Very rarely injured in penetrating wounds or in anterior dislocation of the hip joint. Surrounded and protected by muscles.

- **Incomplete injury:**
  1. **Motor:**
     - Paralysis of adductor muscles except hamstring part of adductor magnus → weak adduction of the thigh
  2. **Sensory:**
     - Small area on the middle of the medial side of the thigh (minimal loss of sensation)

These areas are covered & overlapped by other nerves; therefore, the loss of sensation isn't very apparent/extensive.


Femoral nerve
Psoas
Femoral vessels
Femoral ring
Iliacus
Lacunar ligament
Femoral sheath
Pectineus
Anterior division
Obturator nerve
Obturator externus
Posterior division
Adductor brevis
Profunda femoris artery
Adductor magnus
Adductor longus
Perforating arteries
Femoral artery
Femoral vein
Descending genicular artery
td


Pubofemoral ligament
Divisions of obturator nerve
Iliofemoral ligament
Obturator externus
A
Obturator artery
Obturator nerve
Anterior division
Posterior division
Obturator internus
Obturator membrane
Obturator externus
Quadratus femoris
Medial femoral circumflex artery
Superior ramus of pubis
Femoral artery
Pectineus
Profunda femoris artery
Adductor longus
Adductor brevis
Perforating arteries
Cutaneous branch
Adductor magnus
Articular branch to knee joint
B
Posterior
Anterior

For any feedback, scan the code or click on it.

Corrections from previous versions:

Versions	Slide # and Place of Error	Before Correction	After Correction
V0 → V1	Slide # 4	"supplies the muscles in the medial compartment of the **leg**"	"supplies the muscles in the medial compartment of the **thigh**"
	Slide # 20	"...that supply the anterior and **lateral**..."	"...that supply the anterior and **medial**..."
V1 → V2			

رسالة من الفريق العلمي:

عن أبي العباس عبد الله بن عباس رضي الله عنهما قال : كنت خلف النبي صلى الله عليه وسلم يوما ، فقال : (يا غلام، إني أُعلمك كلمات: احفظ الله يحفظك، احفظ الله تجده تجاهك، إذا سألت فاسأل الله، وإذا استعنت فاستعن بالله، واعلم أن الأُمة لو اجتمعت على أن ينفعوك بشيء، لم ينفعوك إلا بشيء قد كتبه الله لك، وإن اجتمعوا على أن يضروك بشيء، لم يضروك إلا بشيء قد كتبه الله عليك، رفعت الأقلام وجفت الصحف) رواه الترمذي.