

Brachial & Lumbosacral Plexuses

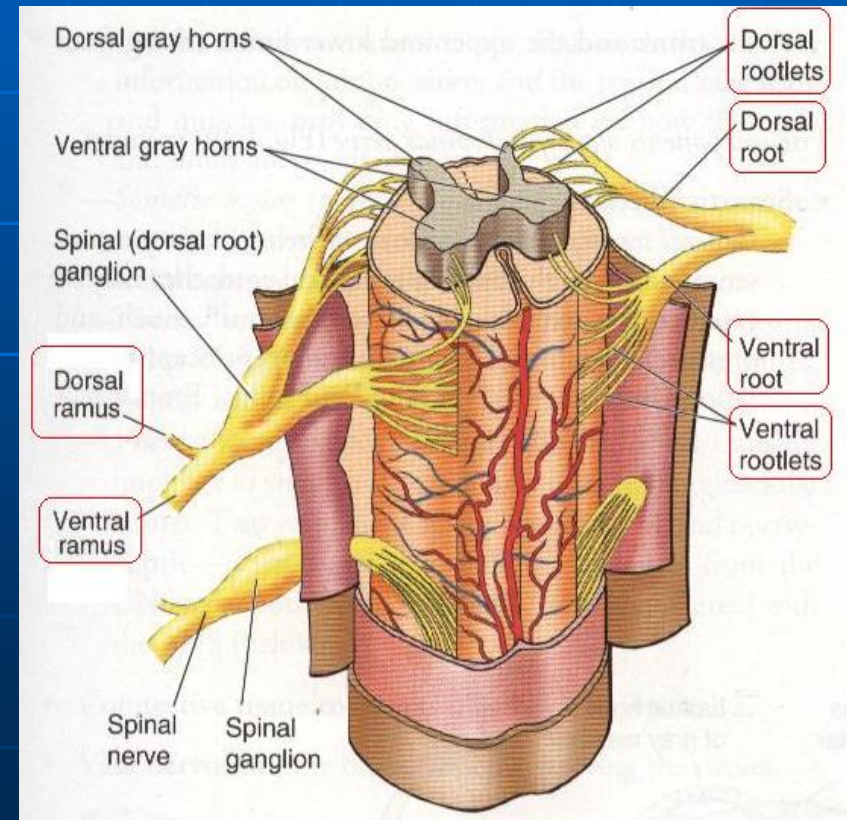
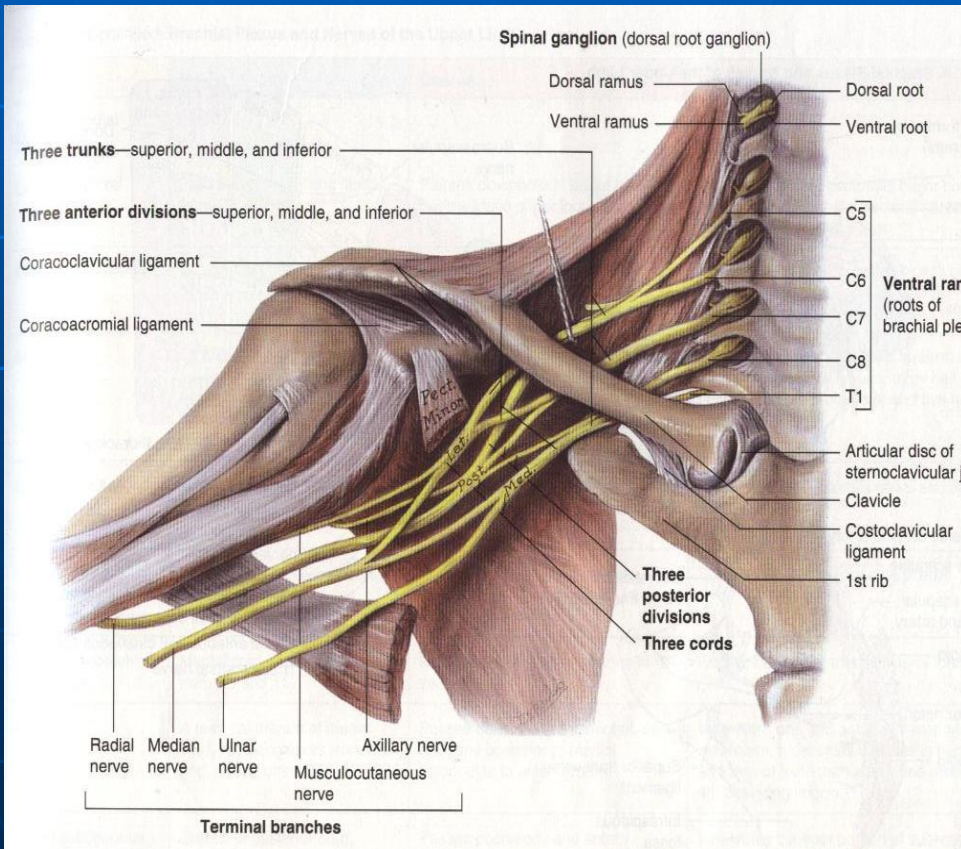
Prof. Saeed Abuel Makarem.

Objectives

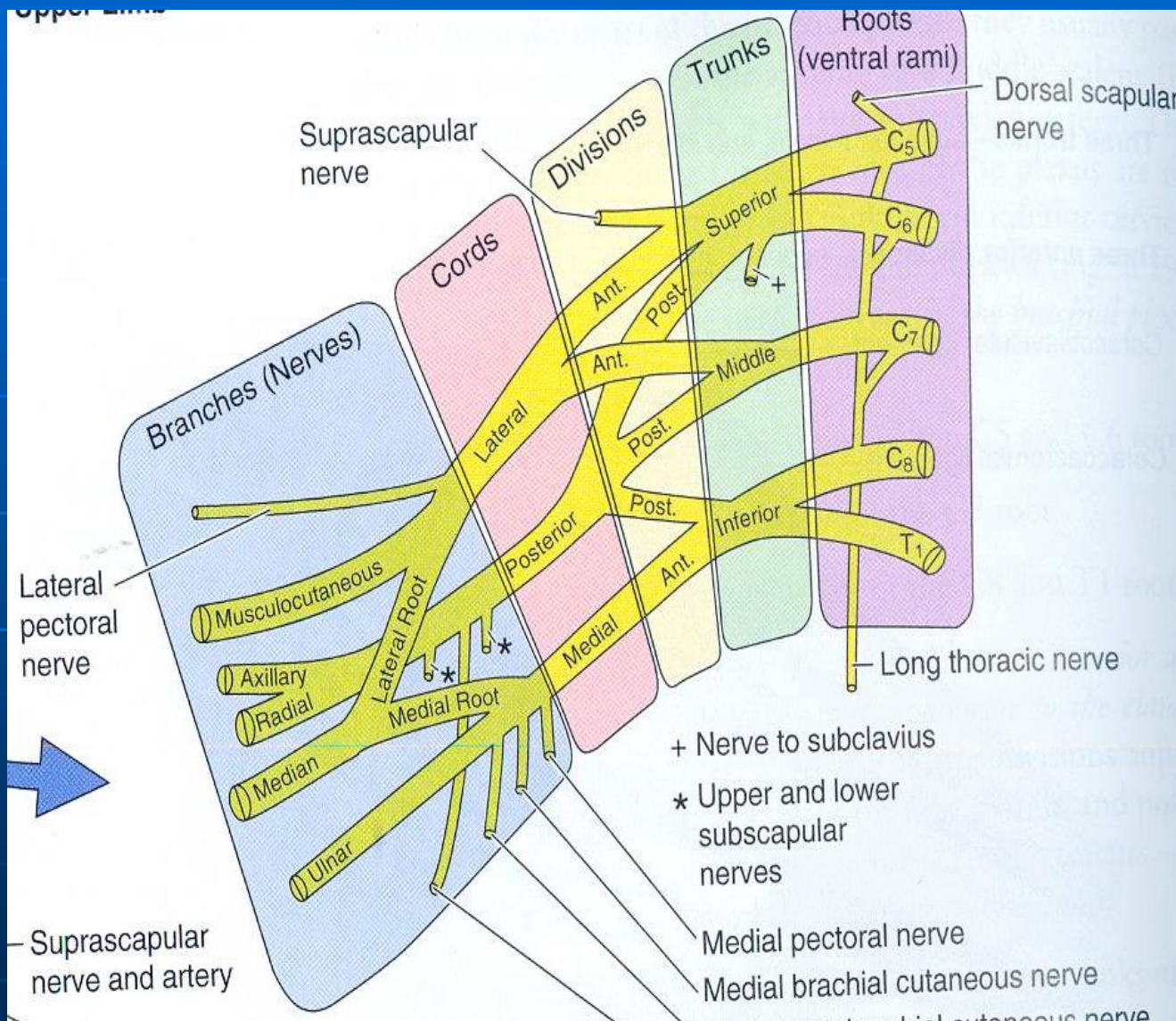
- By the end of this lecture, you should be able to :
- Describe **the formation** of brachial plexus (site, roots)
- List the **main branches** of brachial plexus.
- Describe **the formation** of lumbosacral plexus (site, roots)
- List the **main branches** of lumbosacral plexus.
- Describe some important **applied Anatomy** related to the brachial & lumbosacral plexuses.

Formation of Brachial Plexus

- It is formed within the **posterior triangle** of the neck.
- It is formed by the union of the **anterior rami** of cervical 5th ,6th ,7th ,8th & 1st thoracic spinal nerves.



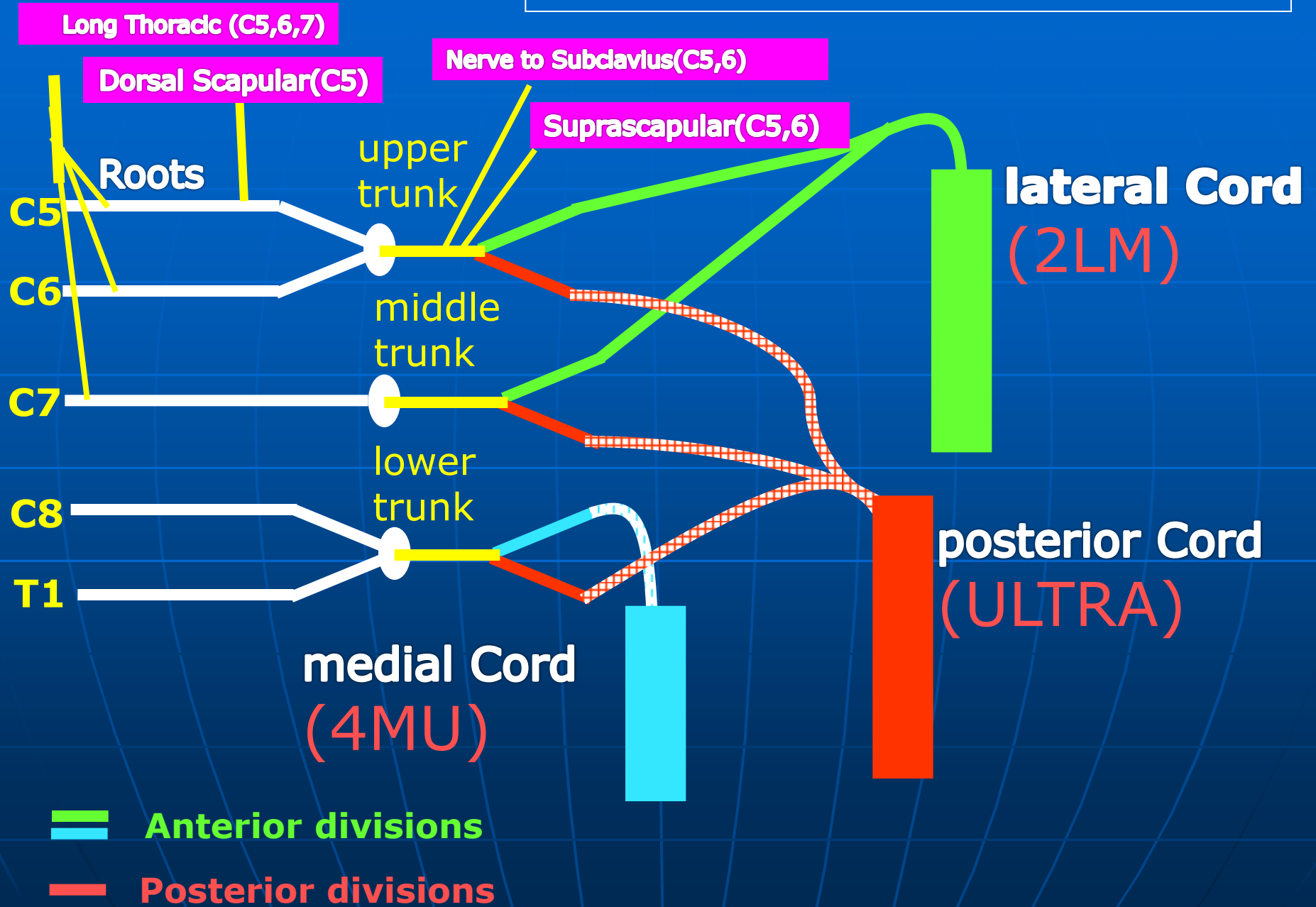
Stages of the plexus



■ The plexus is divided into 5 stages:

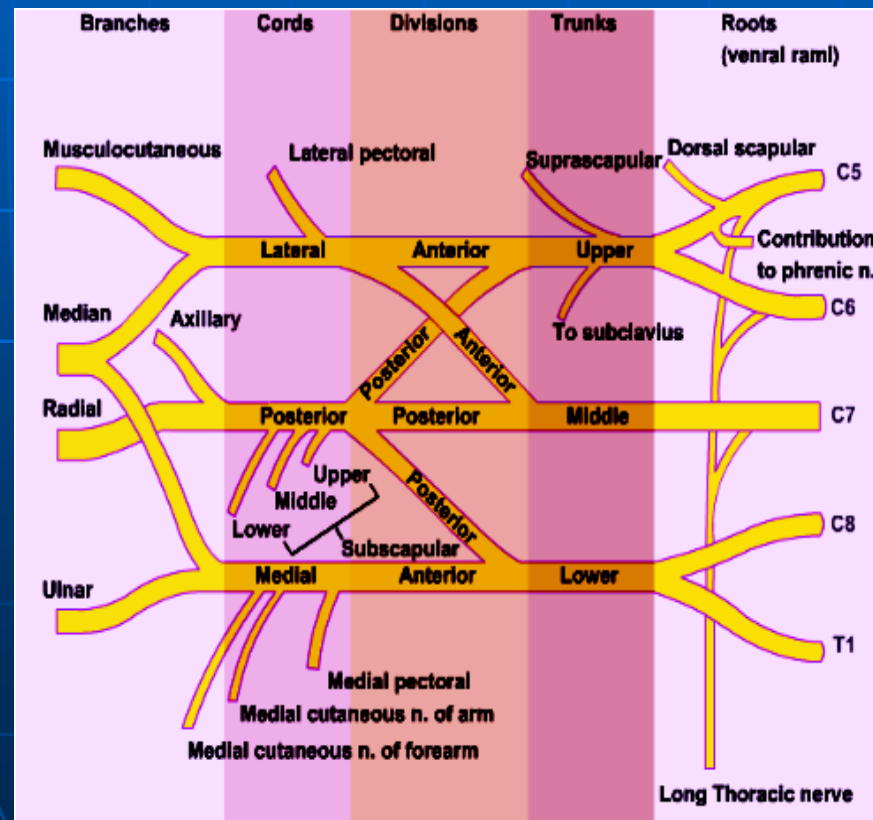
1. **Roots.**
2. **Trunks.**
3. **Divisions.**
4. **Cords.**
5. **Branches.**

Brachial Plexus



The Plexus can be divided into 5 stages:

- **Roots:** in the posterior Δ of the neck.
- **Trunks:** in the posterior Δ of the neck.
- **Divisions:** behind the clavicle.
- **Cords:** in the axilla.
- **Branches:** in the axilla.
- **The first 2 stages lie in the posterior triangle, while the last 2 stages lie in the axilla.**

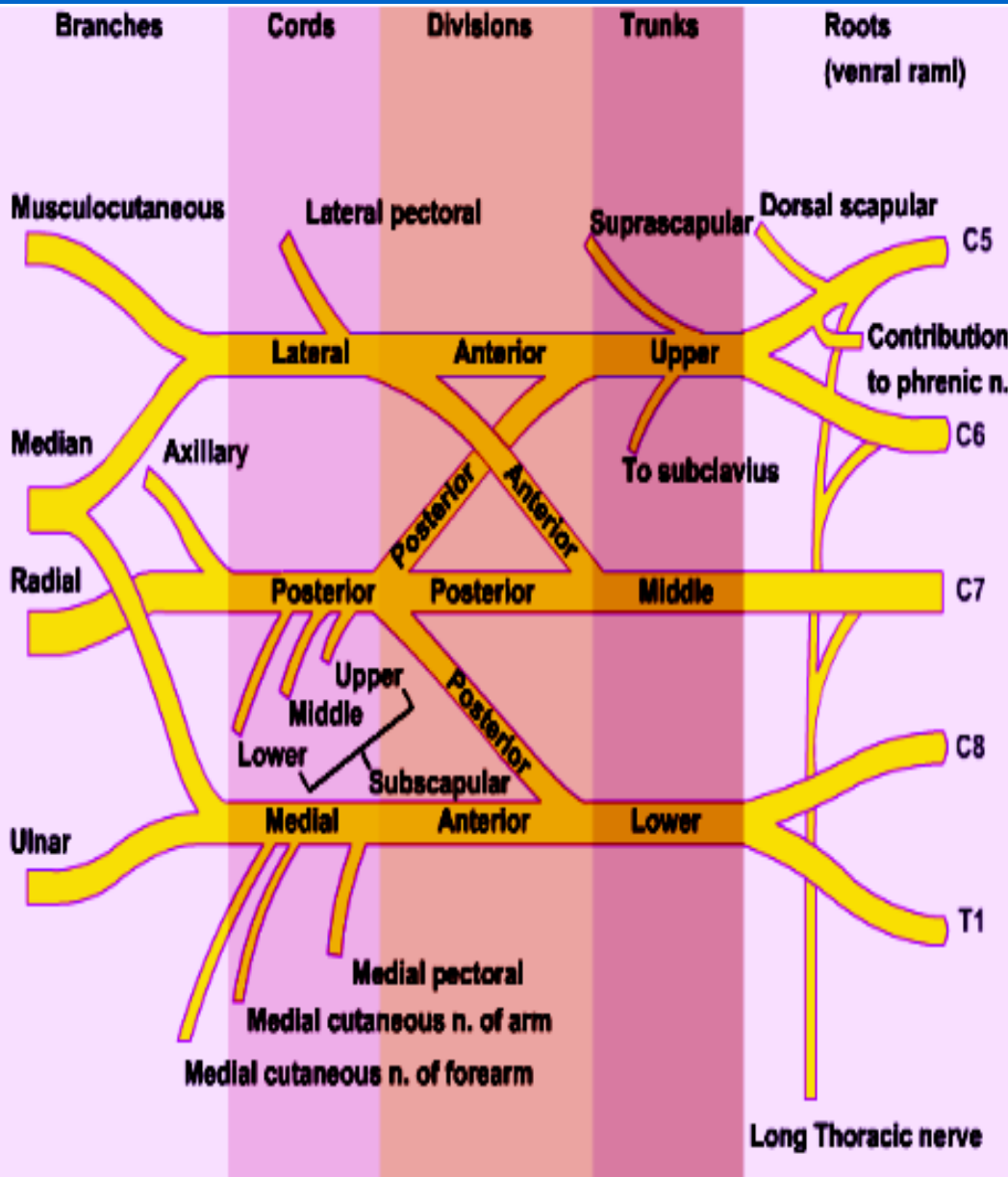


Branches from Roots

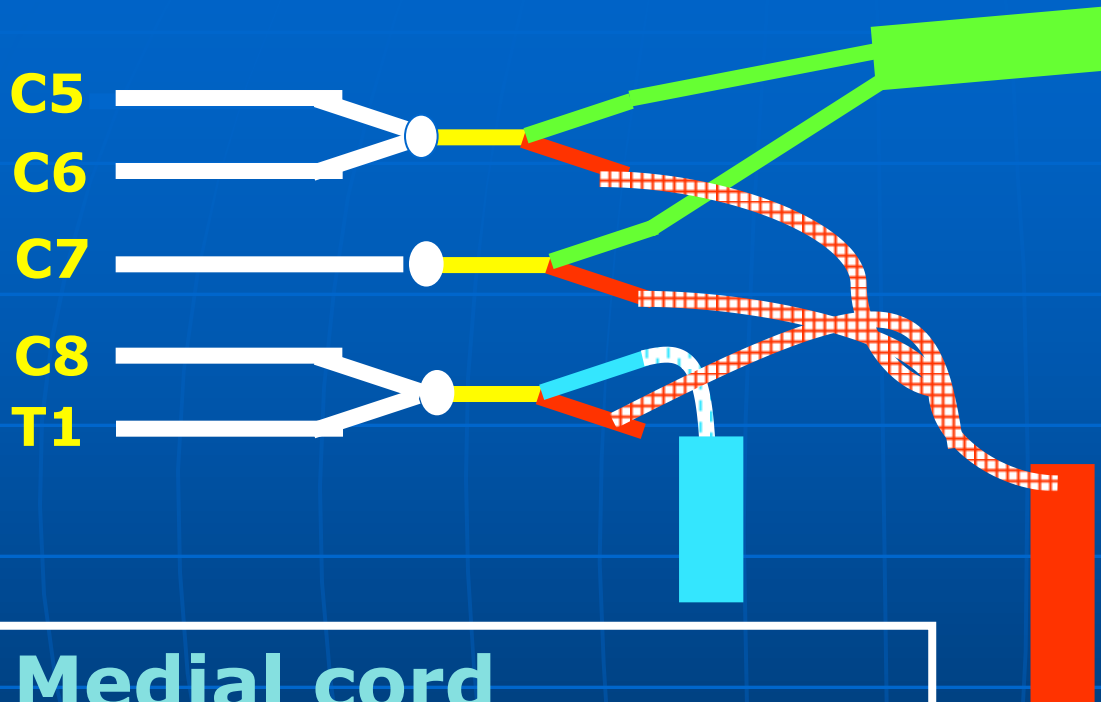
- 1. Nerve to rhomboids (dorsal scapular nerve) C5.
- 2. Long thoracic nerve C5, 6 & 7.

Branches from Trunk

- Nerve to Subclavius.
- Suprascapular nerve, (supplies supraspinatus & infraspinatus).



Branches of Cords



Lateral Cord (2LM)

- .Lateral pectoral nerve.
- .Lateral root of median nerve.
- .Musculocutaneous nerve.

Medial cord (4MU)

- .Medial pectoral n.
- .Medial root to median n.
- .Medial cutaneous n of arm.
- .Medial cutaneous n of forearm.
- .Ulnar n.

Posterior Cord (ULTRA)

- .Upper subscapular n
- .Lower subscapular n
- .Thoracodorsal n
- .Radial n
- .Axillary n

Brachial Plexus Injuries

Upper Lesions of the Brachial Plexus

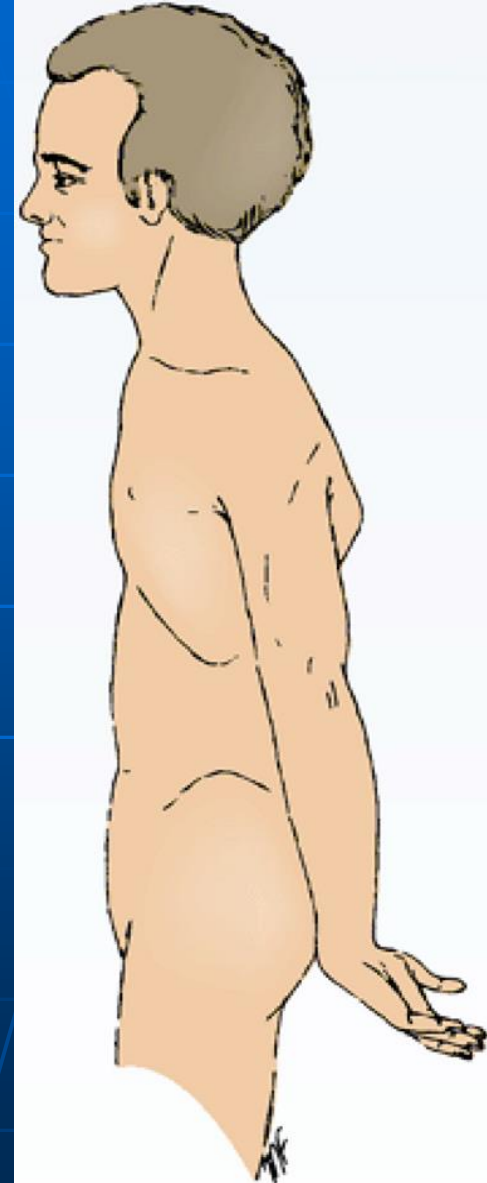
Upper Trunk C5,6 (Erb-Duchenne Palsy "waiter's tip position").

- **Resulting**

from traumatic injury to the upper part of the brachial plexus resulting from excessive displacement of the head to the opposite side and depression of the shoulder on the same side (a blow or fall on shoulder or obstructed Labour).

- The position of the upper limb in this condition has been compared to that of a porter or waiter hinting for a tip or policeman's tip hand.

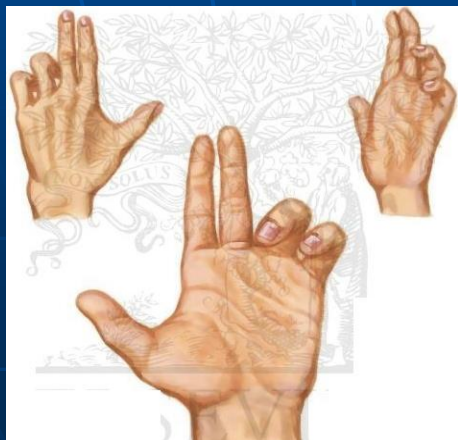
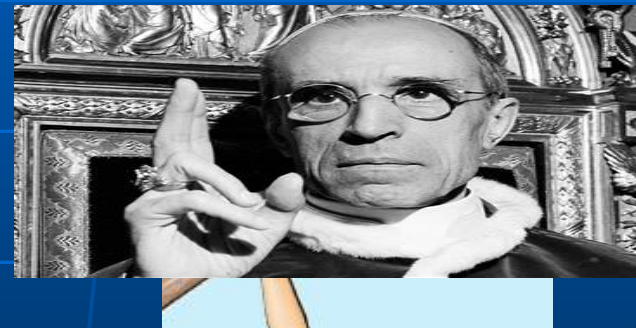
- The arm hangs by the side and is rotated medially. The forearm is extended and pronated.



Brachial Plexus Injuries

Lower Lesions of the Brachial Plexus, (Klumpke Palsy)/Lower Trunk (C8,T1) Lesion .

- Lower lesions of the brachial plexus are usually traction injuries caused by a person falling from a height clutching at an object to save himself.
- The first thoracic nerve is usually torn.
- The nerve fibers from this segment run in the **ulnar and median nerves** to supply all the small muscles of the hand. The hand has a **clawed appearance due to ulnar nerve injury**



Hand of Benediction or Pop's Blessings (APE HAND) will result from median nerve injury.



LUMBAR PLEXUS

Formation:

By ventral rami of upper 4 lumbar nerves (L1, 2, 3 and most of L4).

Site:

Within the substance of psoas major muscle.

Main branches:

Iliohypogastric & ilioinguinal (L1):

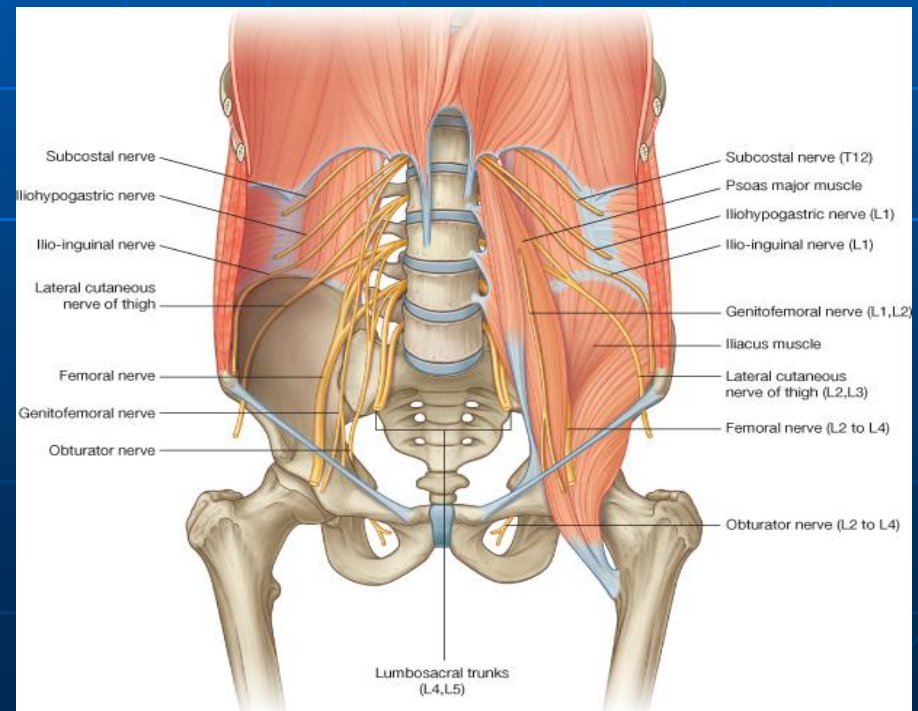
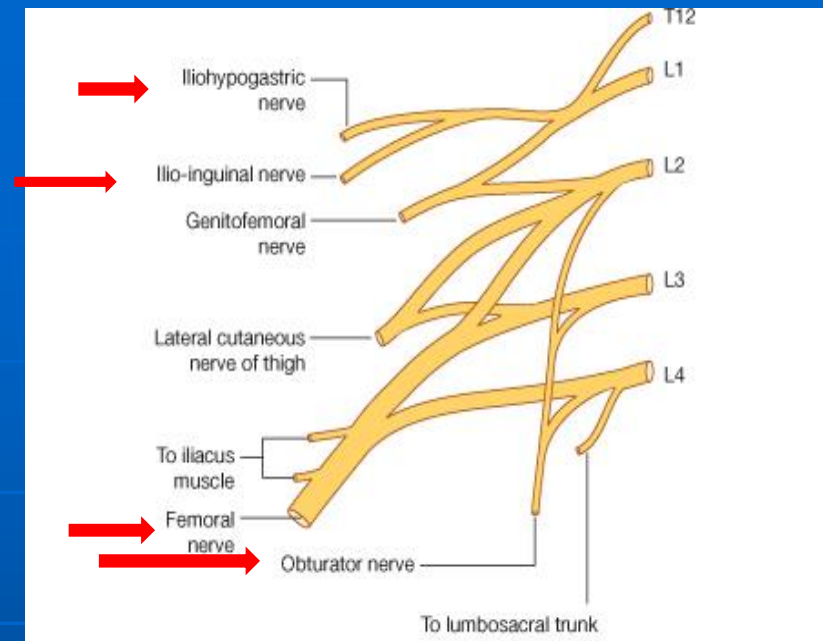
to anterior abdominal wall.

Obturator (L2,L3 & L4):

to medial compartment of the thigh

Femoral (L2,L3 & L4):

to anterior compartment of the thigh



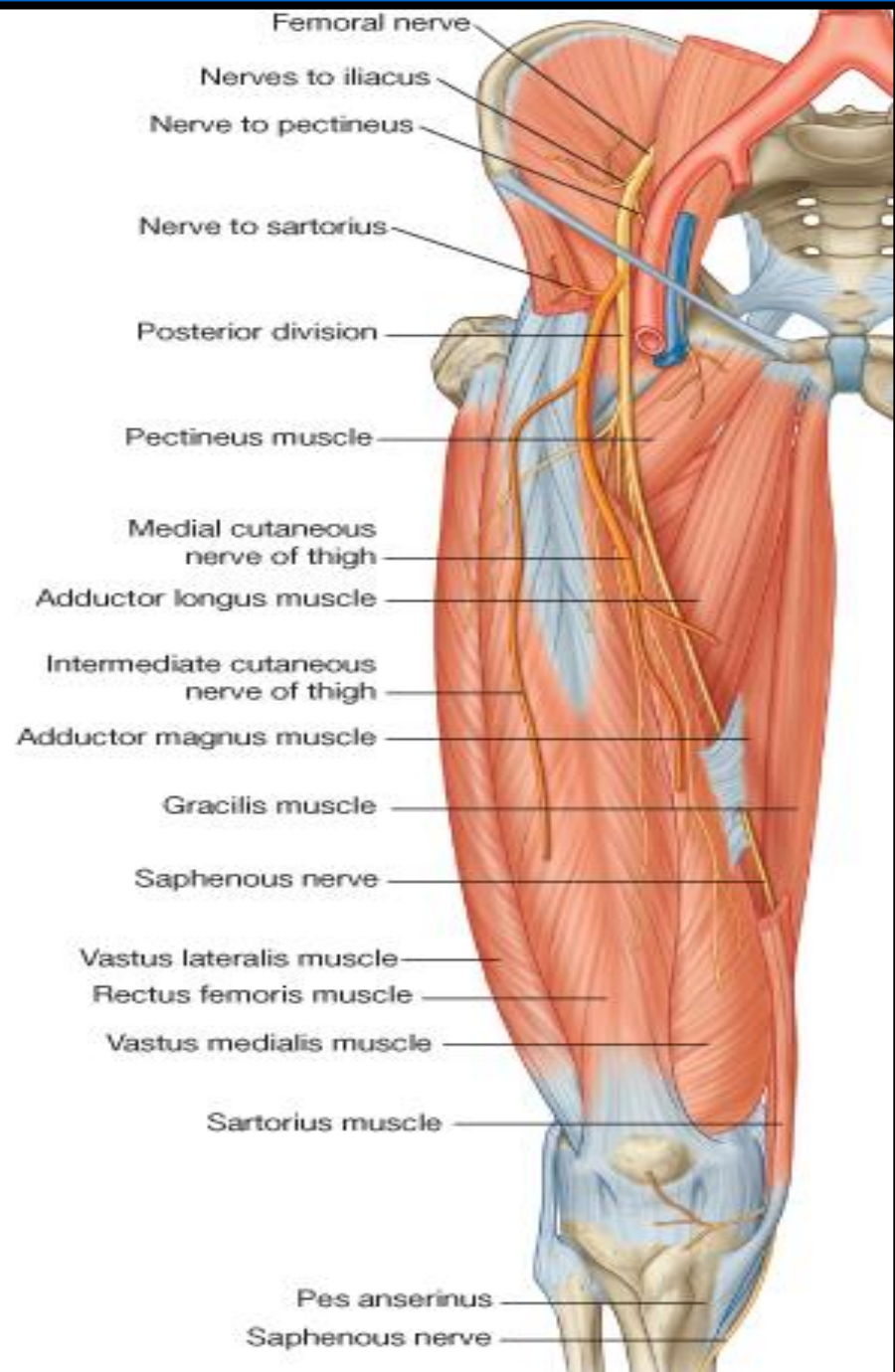
FEMORAL NERVE

□ Origin:

- A branch from lumbar plexus (L2,3,4).

□ Course:

- Descends lateral to psoas major.
- Enters the thigh behind the middle of the inguinal ligament.
- Passes lateral to femoral artery outside the femoral sheath.
- It divides into anterior & posterior divisions.



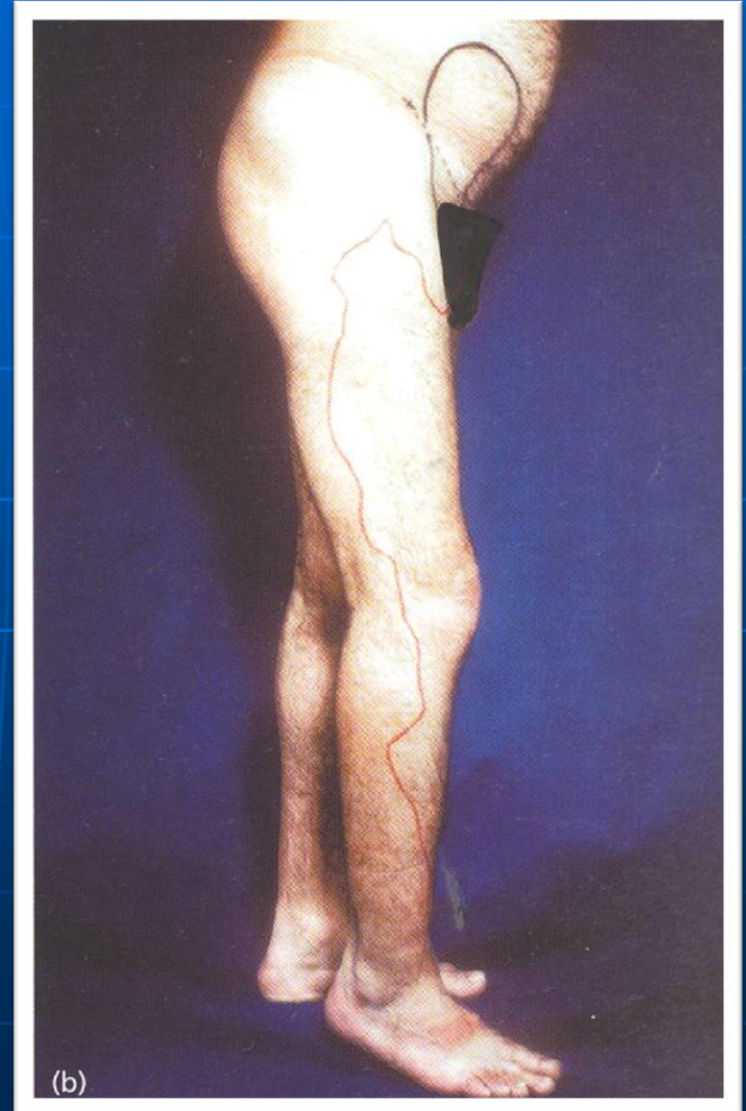
FEMORAL NERVE INJURY

□ Motor effect:

- Wasting of quadriceps femoris.
- Loss of extension of knee.
- Weak flexion of hip (psoas major is intact).

□ Sensory effect:

- Loss of sensation over antero-medial aspect of thigh & medial side of leg & foot (areas supplied by the femoral nerve).



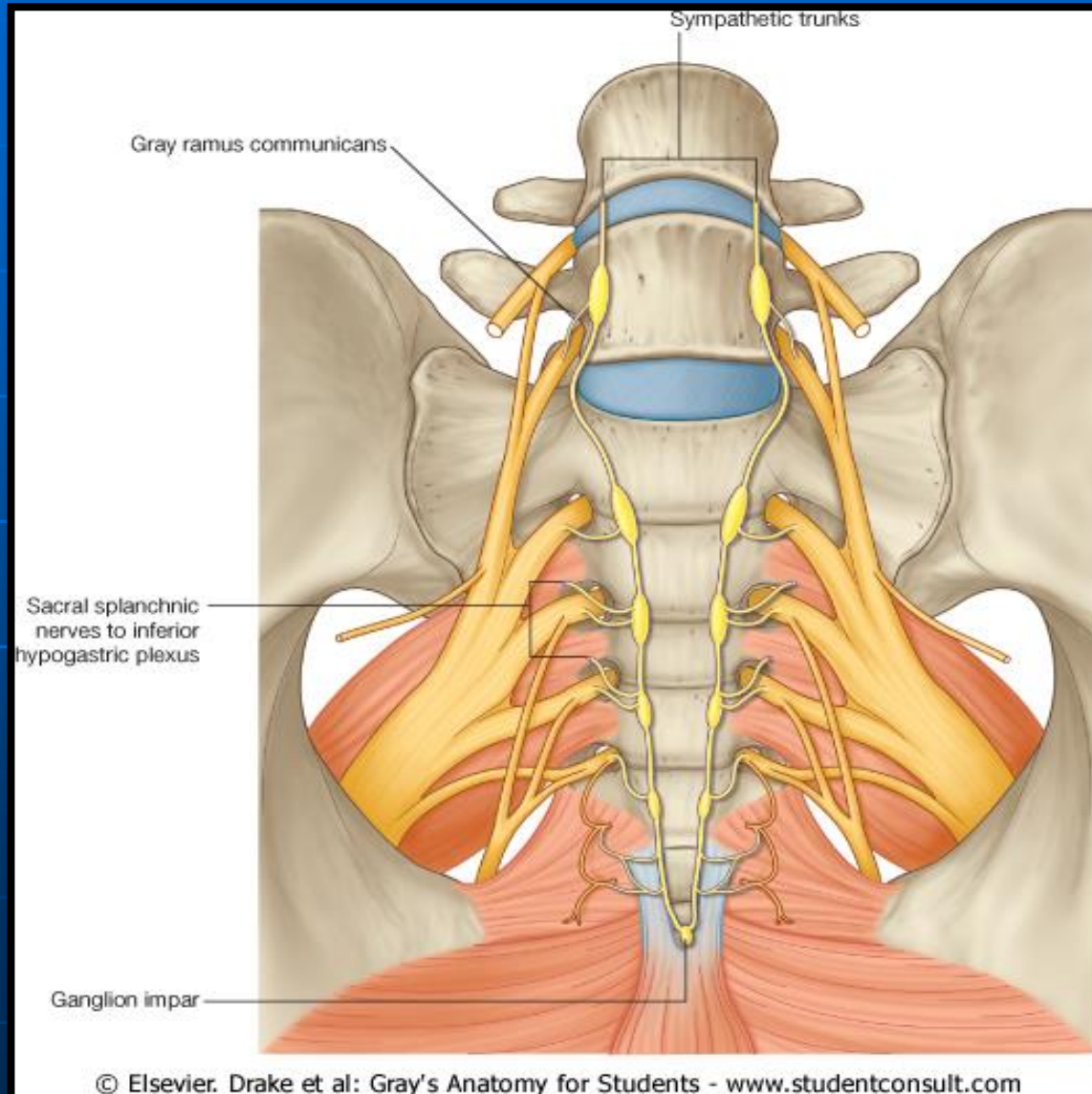
SACRAL PLEXUS

□ Formation:

By ventral rami of a part of L4 & whole L5 (lumbosacral trunk) + S1, 2, 3 and most of the S4.

□ Site:

In front of piriformis muscle.



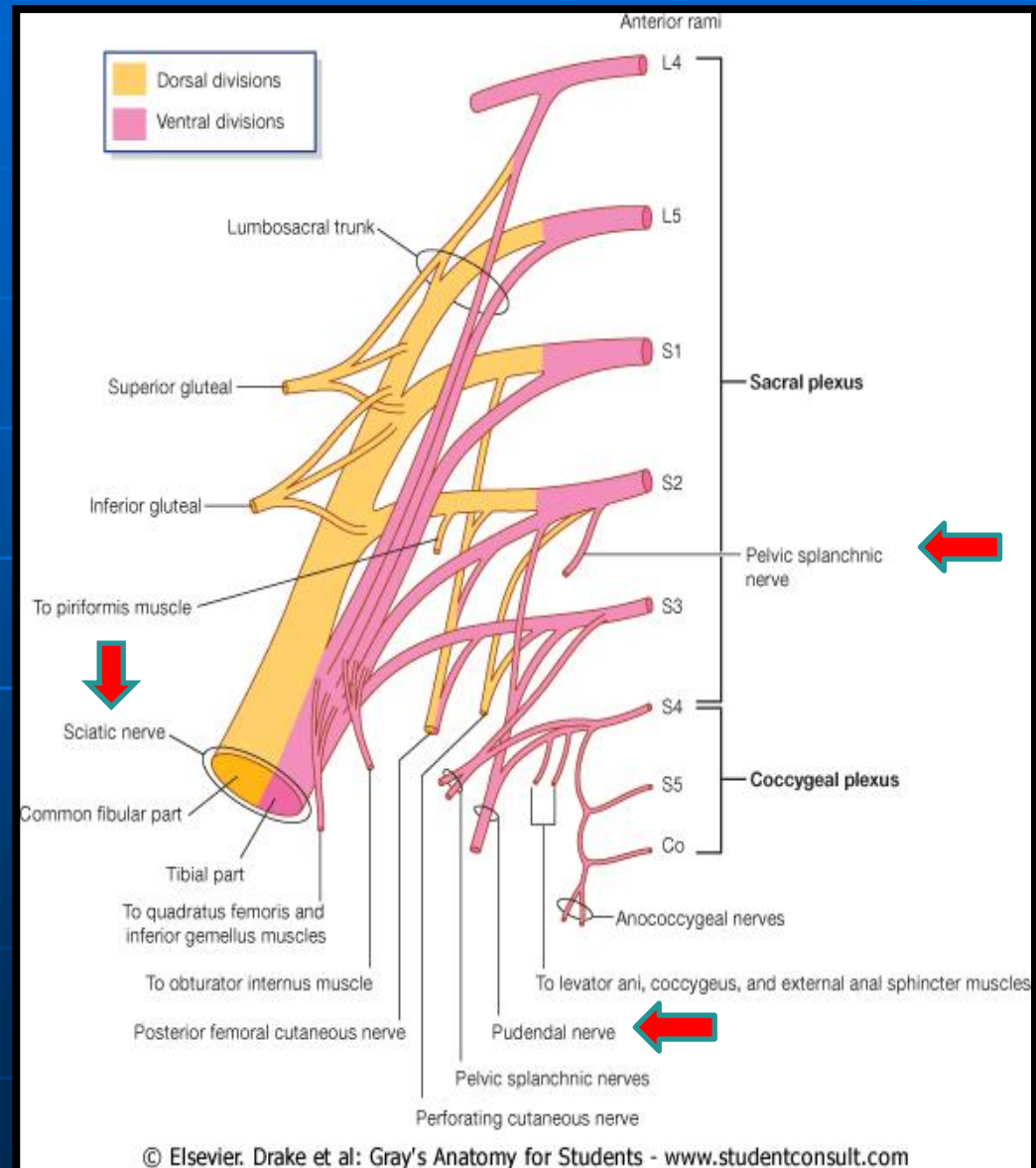
SACRAL PLEXUS

□ Main branches:

Pelvic splanchnic nerve
preganglionic
parasympathetic to pelvic
viscera & hindgut.

Pudendal nerve
to perineum.

Sciatic nerve
to lower limb.



SCIATIC NERVE

The largest nerve of the body

Origin:

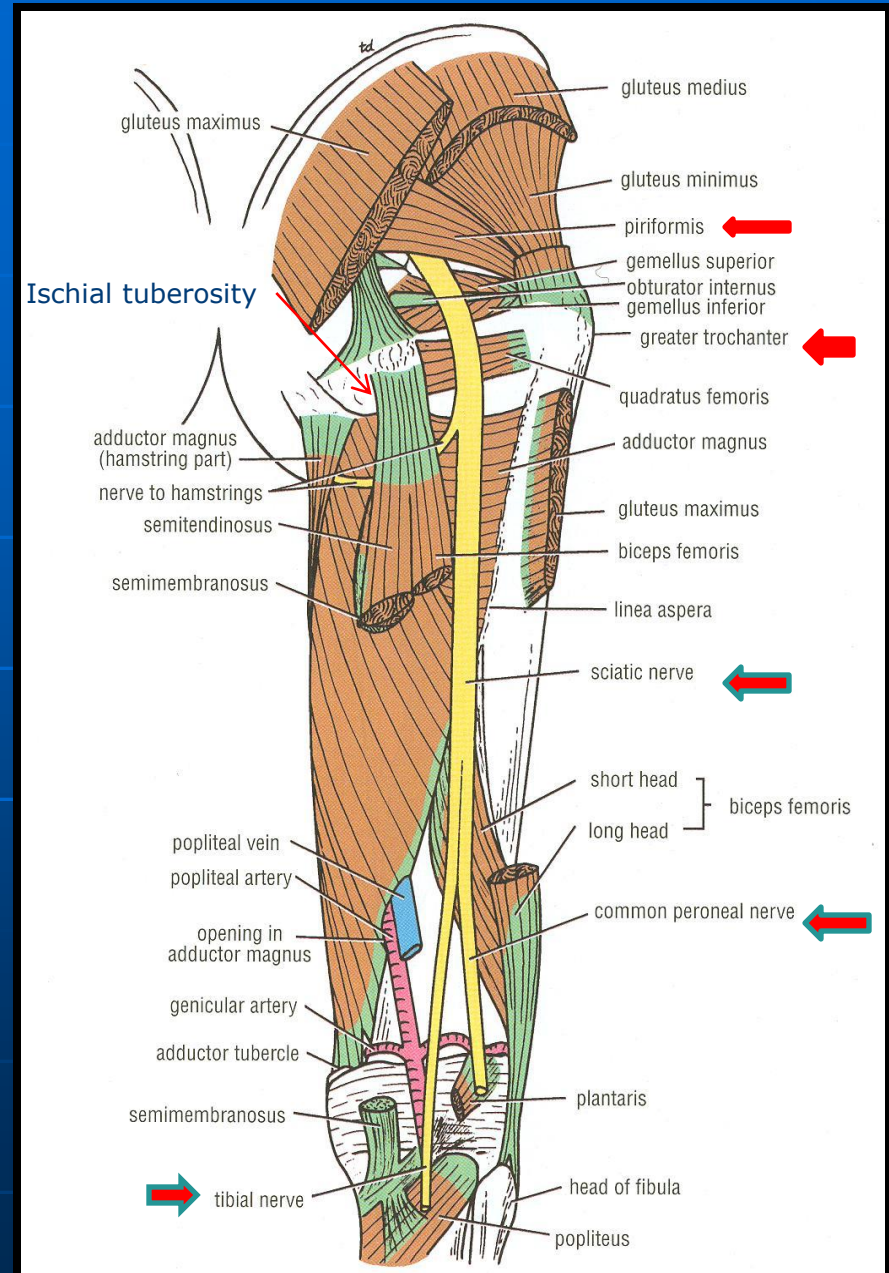
- from sacral plexus (L4, 5, S1, 2, & 3).

Course:

- Leaves the pelvis through greater sciatic foramen, below piriformis.
- Passes in the gluteal region midway between ischial tuberosity & greater trochanter.
- Then it passes to the posterior compartment of thigh.

Divides into:

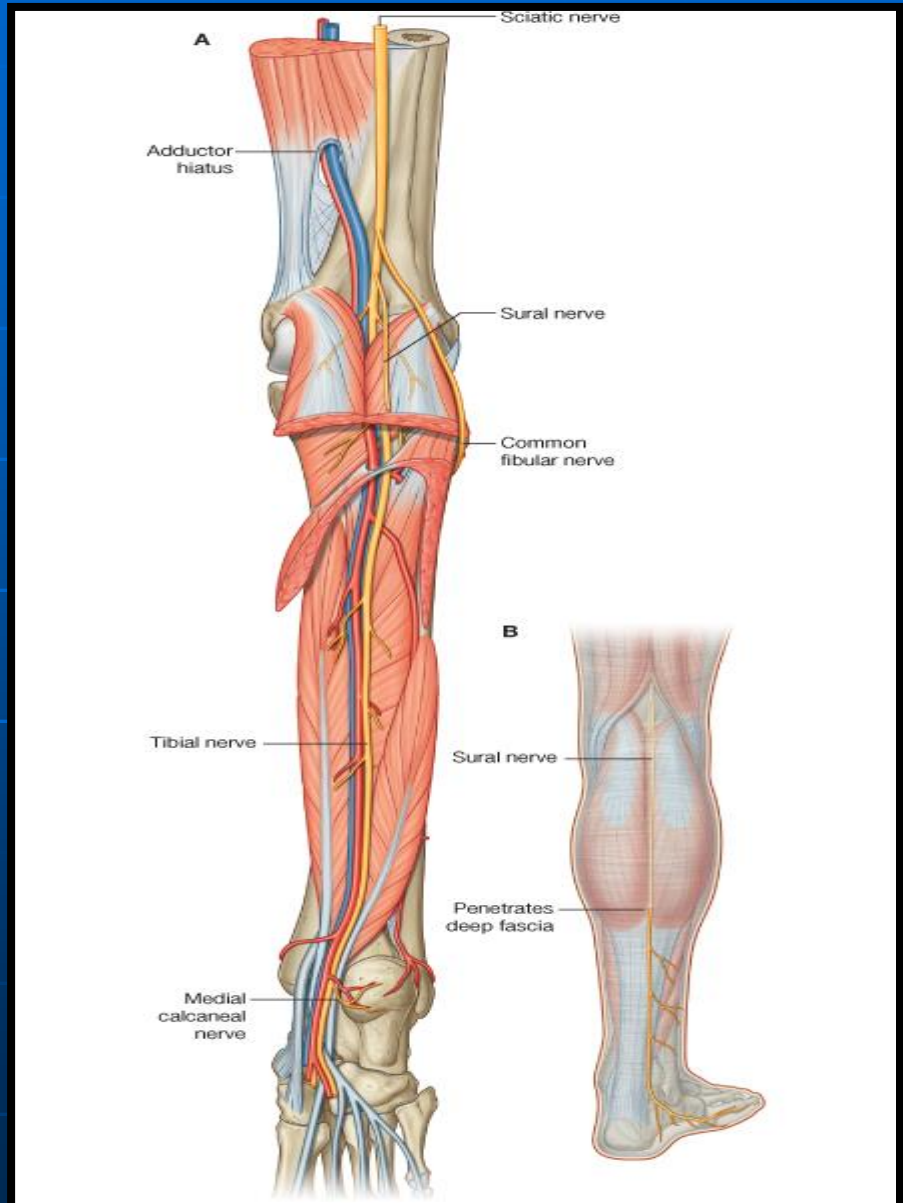
- Tibial nerve.
- Common peroneal (fibular) nerve.



TIBIAL NERVE

□ Course:

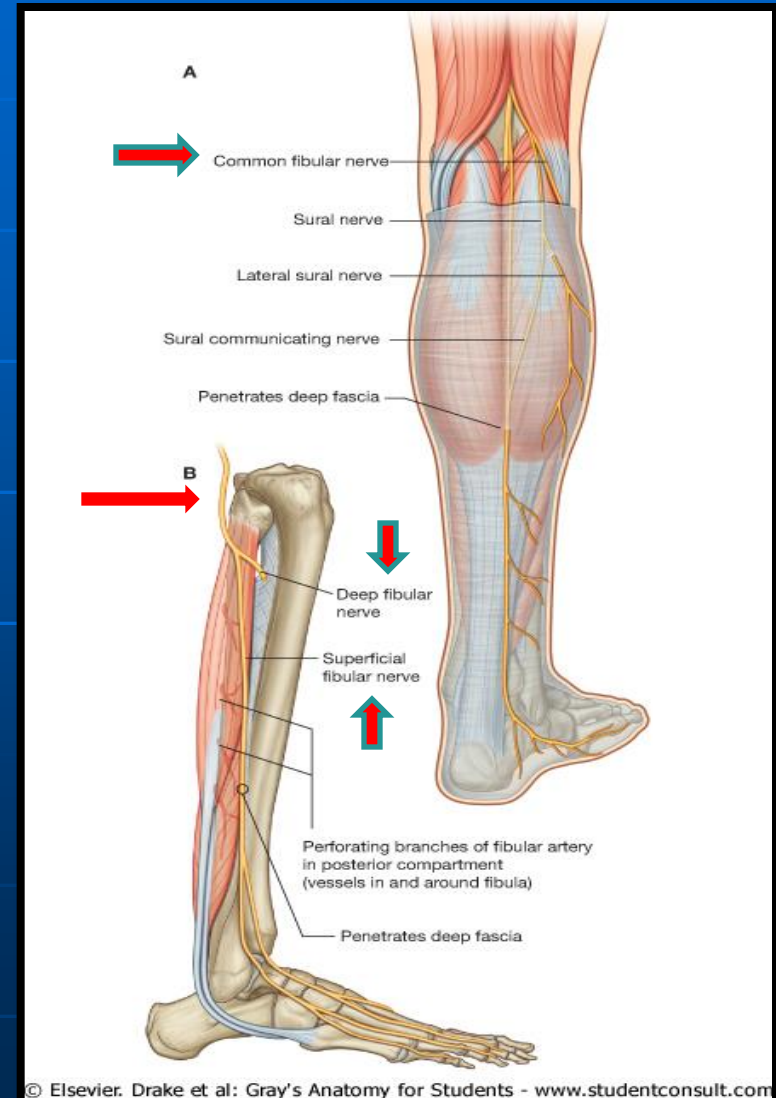
- Descends through popliteal fossa to posterior compartment of leg, accompanied with posterior tibial vessels.
- Passes deep to the flexor retinaculum to reach the sole of foot where it divides into 2 terminal branches:
 - Medial planter nerve.
 - Lateral Planter nerve.



COMMON PERONEAL (FIBULAR) NERVE

□ Course:

- Leaves popliteal fossa & turns around the lateral aspect of neck of fibula (Dangerous position).
- Then divides into 2 terminal branches:
 1. *Superficial peroneal*: descends into lateral compartment of leg.
 2. *Deep peroneal*: descends into anterior compartment of leg.



SUMMARY

- ❑ The lumbar plexus is formed by ventral rami of L1,2,3 and most of L4, in substance of psoas major muscle
- ❑ The sacral plexus is formed by ventral rami of a part of L4 & whole L5 (lumbosacral trunk) plus the S1,2,3 and most of S4, in front of piriformis muscle.
- ❑ The femoral nerve, a branch of lumbar plexus (L2,3,4).
 - ❑ Its injury will lead to weak flexion of hip & loss of extension of knee as well as loss of sensation of skin of anteromedial aspects of the thigh, medial side of knee, leg and foot
- ❑ The sciatic nerve is a branch of sacral plexus (L4,5, S1,2,3)
 - ❑ Its injury will affect the flexion of knee, extension of hip, all movements of leg & foot, as well as loss of sensation of skin of leg & foot (except areas supplied by saphenous branch of femoral nerve)

**Thank you
And
Good Luck**

1. Lesion of the upper trunk of the brachial plexus leads to :

- Klumpke palsy.
- Erb-Duchenne palsy
- Drop wrist & hand.
- Ape hand.

2. Which one of the following nerves is a branch of posterior cord of brachial plexus?

- Ulnar
- Radial
- Median
- Musclocutaneous

QUESTION 3

- **The femoral nerve supplies:**
 - a. **Extensors of hip.**
 - b. **Skin of dorsum of foot.**
 - c. **Hamstrings.**
 - d. **Extensors of knee**

QUESTION 4

- **Injury of common peroneal nerve leads to:**
 - a. **Loss of dorsiflexion of ankle**
 - b. **Loss of inversion of foot**
 - c. **Loss of extension of knee**
 - d. **Loss of flexion of toes**