

Brachial Plexus & Lumbosacral Plexus

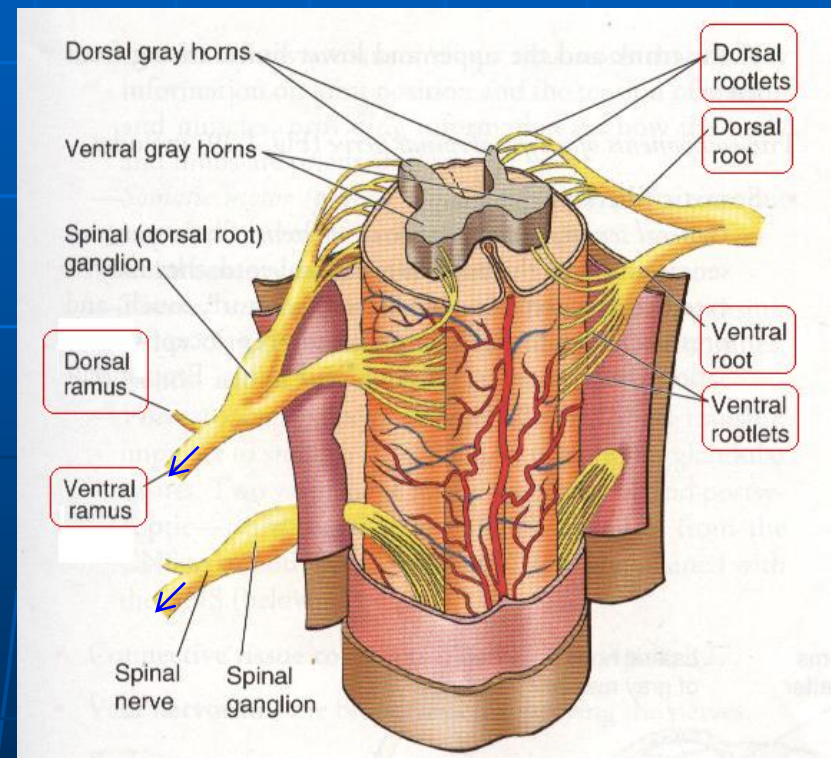
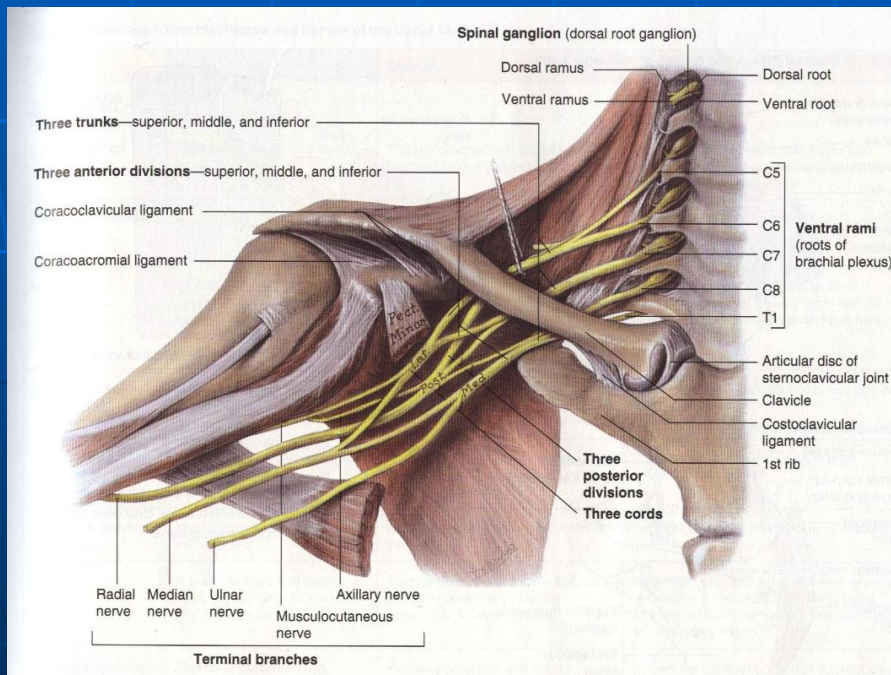
Prof. Mussad Alfayer

Objectives

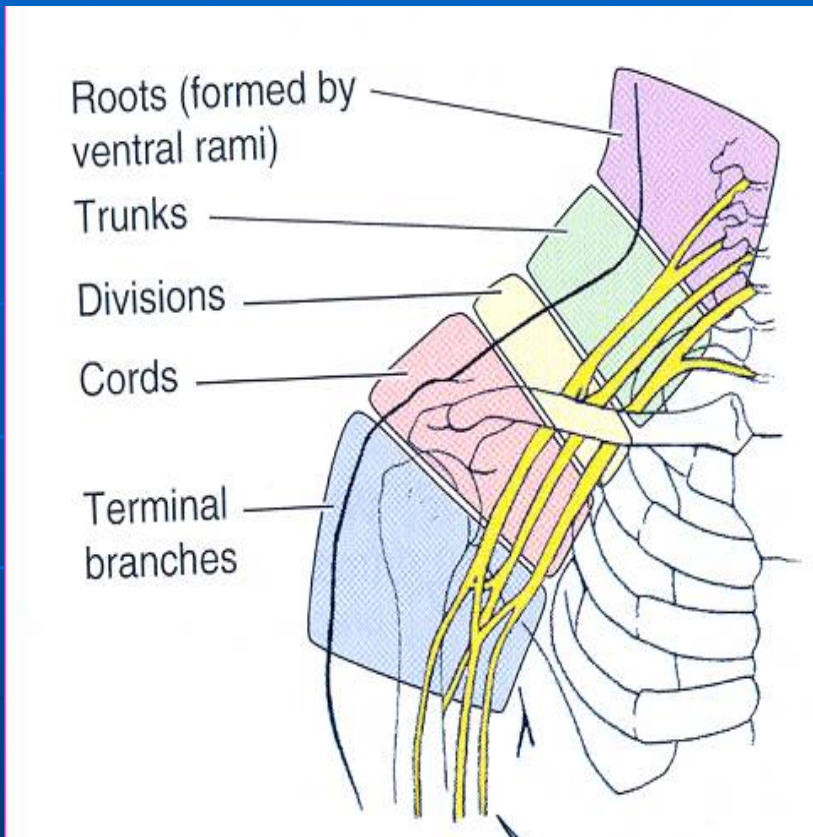
- At the end of this lecture, the students should be able to :
- Describe **the formation** of brachial plexus (site, roots)
- List the **main branches** of brachial plexus
- Describe **the formation** of lumbosacral plexus (site, roots)
- List the **main branches** of lumbosacral plexus
- Describe the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

FORMATION OF BRACHIAL PLEXUSES

- **Site** : It is formed in the **posterior triangle** of the neck.
- **Roots** : It is the union of the **anterior rami** of the **5th ,6th ,7th ,8th cervical** and the **1st thoracic** spinal nerves

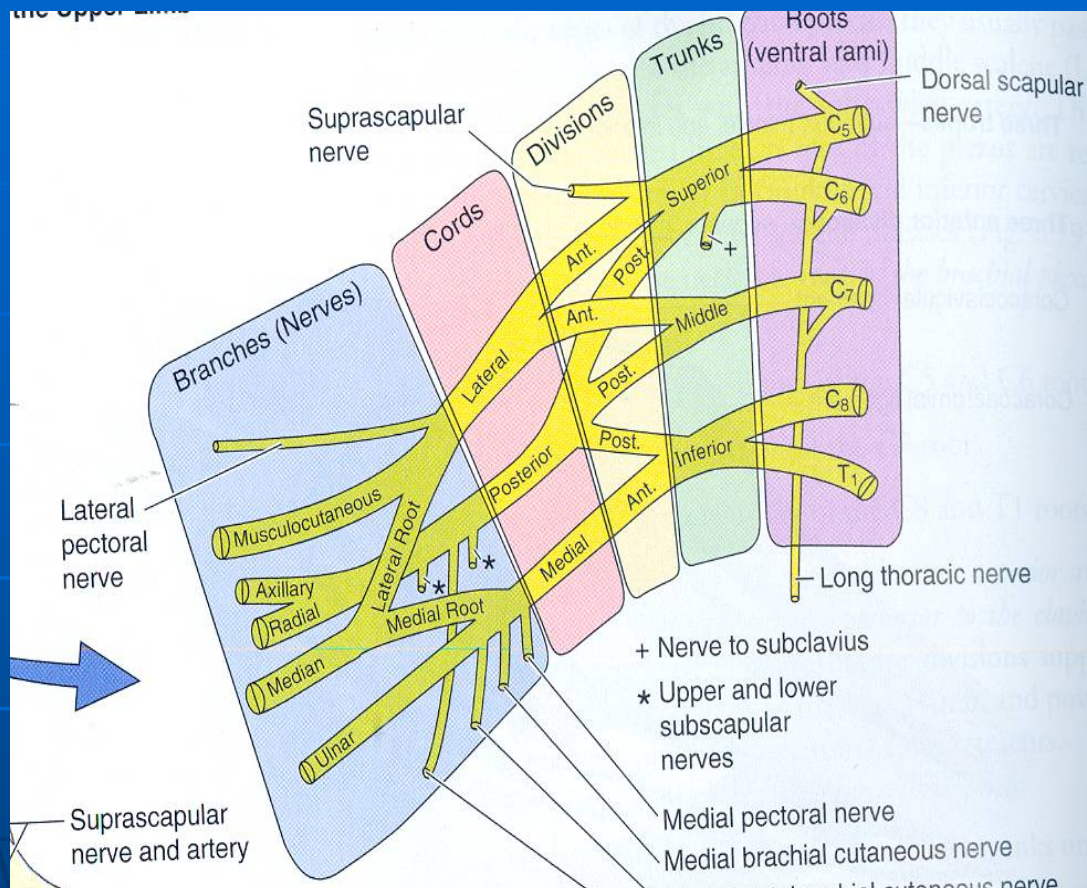


DIVISIONS (STAGES)



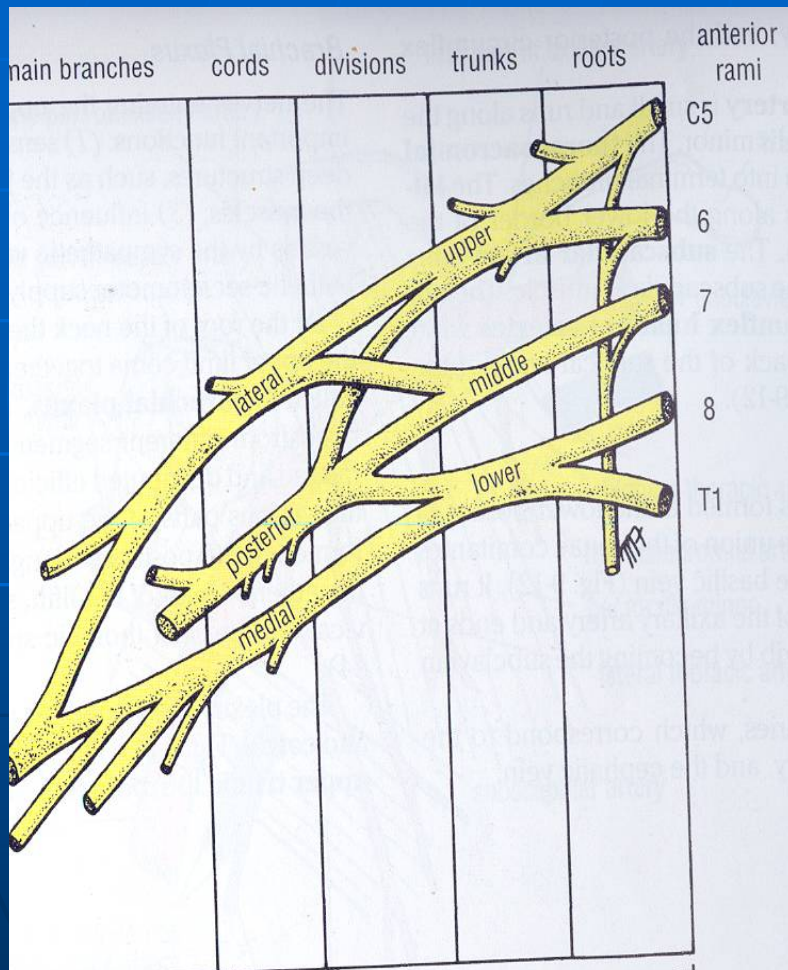
- The plexus is divided into :
 - **Roots**
 - **Trunks**
 - **Divisions**
 - **Cords**
 - **Terminal branches**

TRUNKS



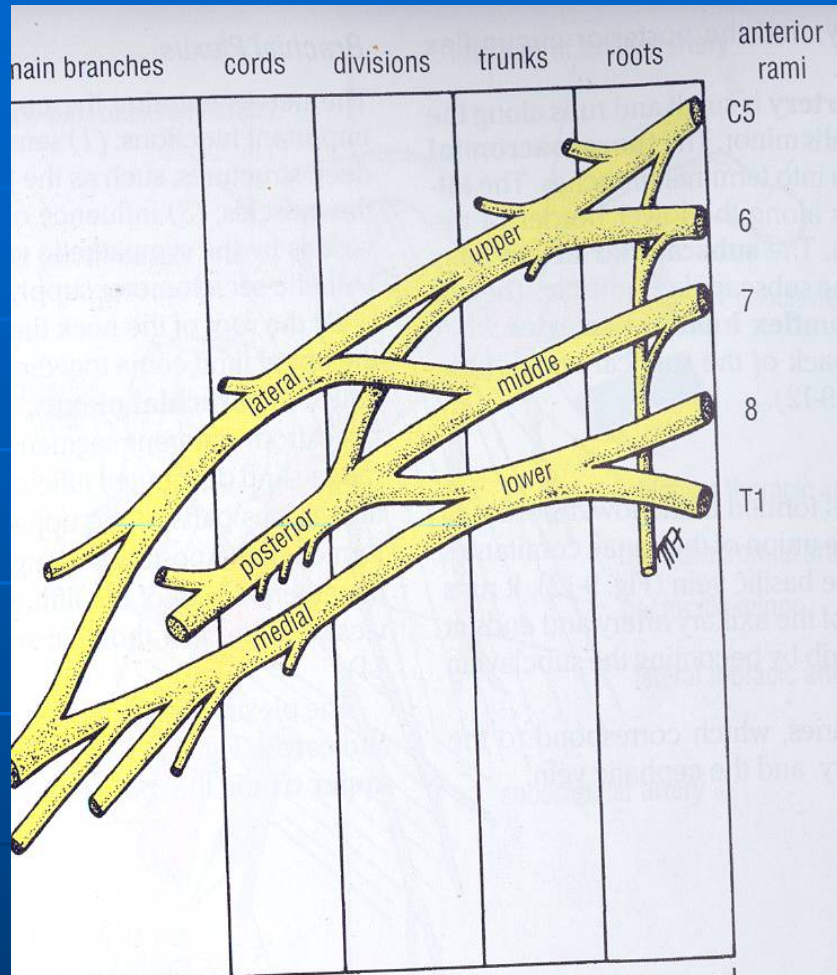
- **Upper trunk**
 - Union of the roots of **C5 & 6**
- **Middle trunk**
 - Continuation of the root of **C7**
- **Lower trunk**
 - Union of the roots of **C8 & T1**

DIVISIONS & CORDS



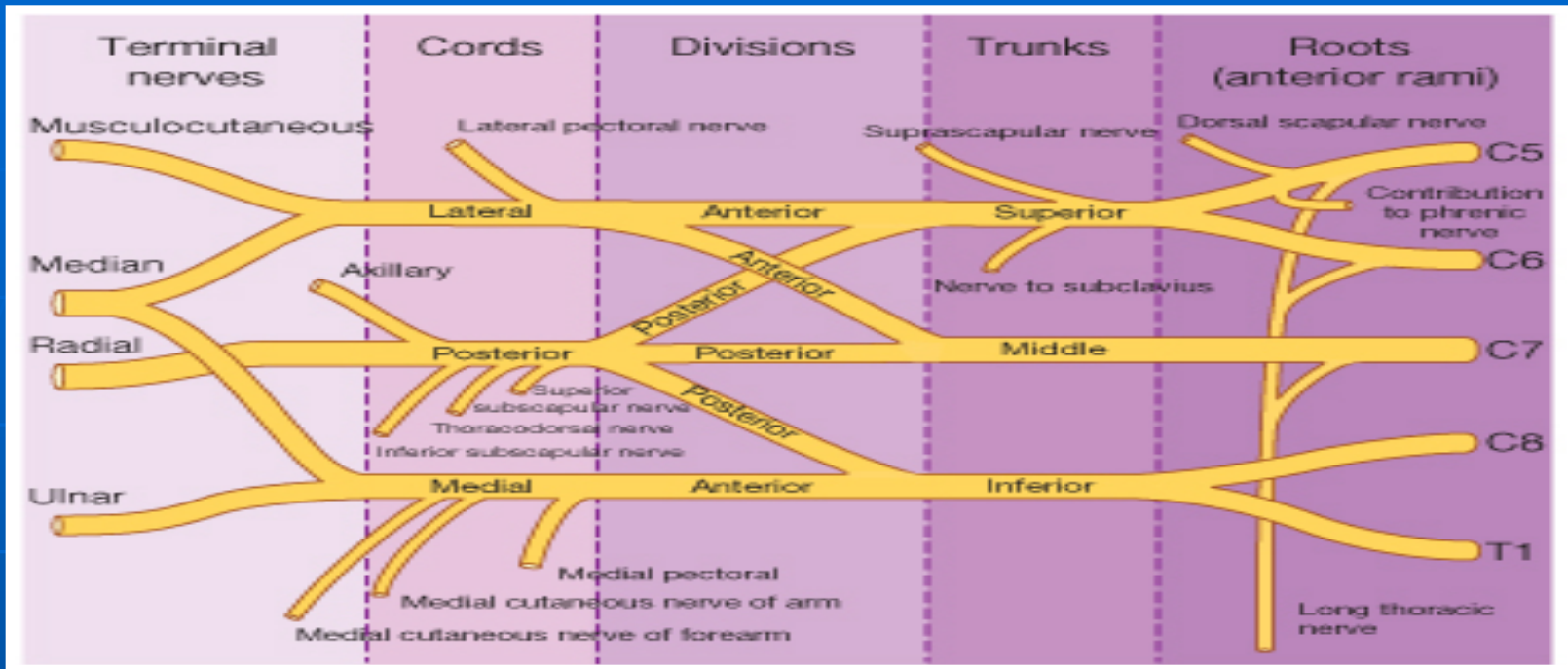
- **Each trunk** divides into **anterior** and **posterior** division
- **Posterior cord:**
 - From the **3 posterior** divisions of the **3 trunks.**
- **Lateral cord:**
 - From the **anterior** divisions of the **upper** and **middle** trunks.
- **Medial cord :**
 - It is the **continuation** of the **anterior** division of the **lower trunk.**

CORDS & BRANCHES



■ Branches

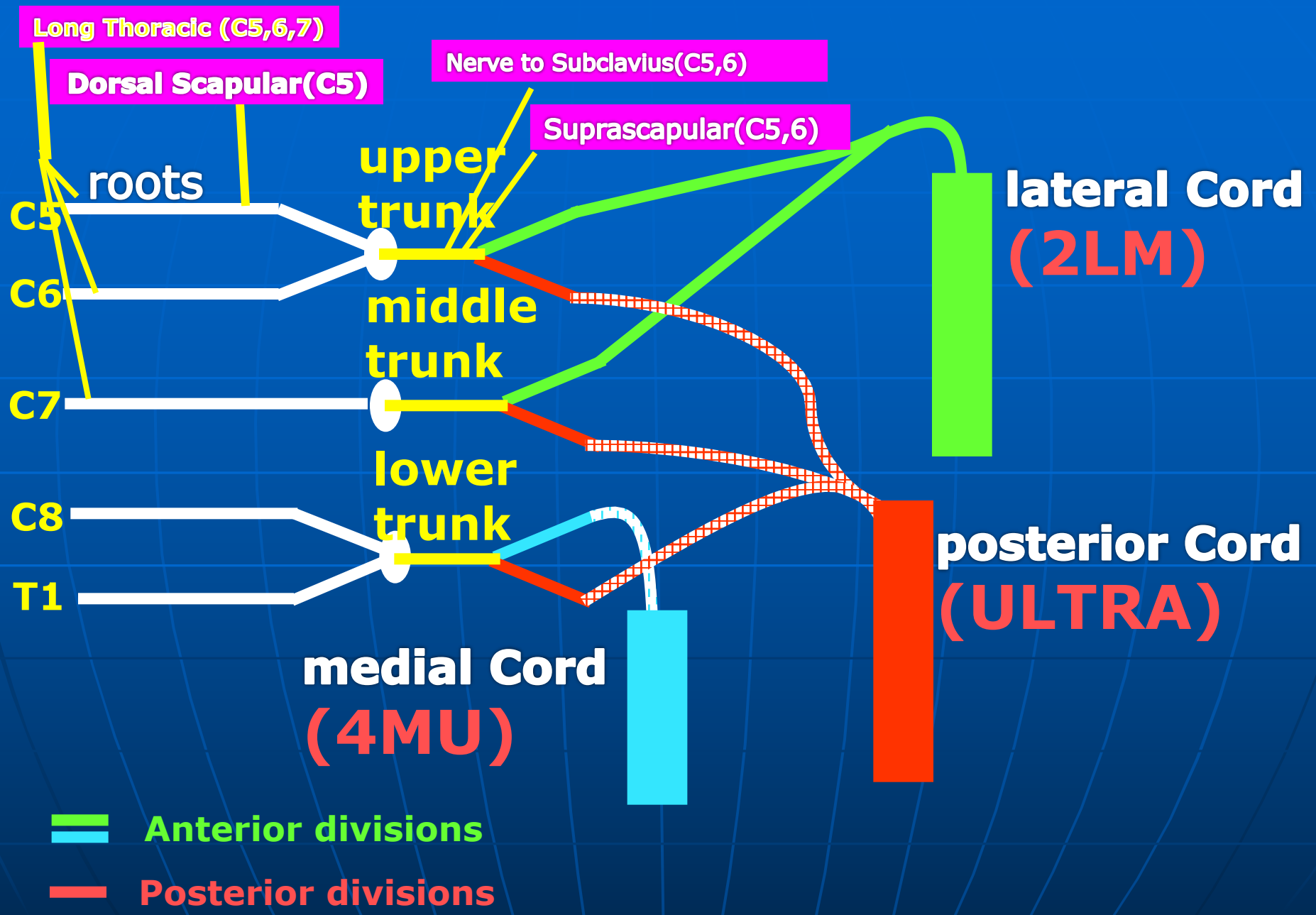
- All three cords will give branches in the axilla, those will supply their respective regions



The Plexus can be divided into 5 stages:

- **Roots:** in the posterior Δ
- **Trunks:** in the posterior Δ
- **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.

The Brachial Plexus



BRANCHES

■ (A) From Roots:

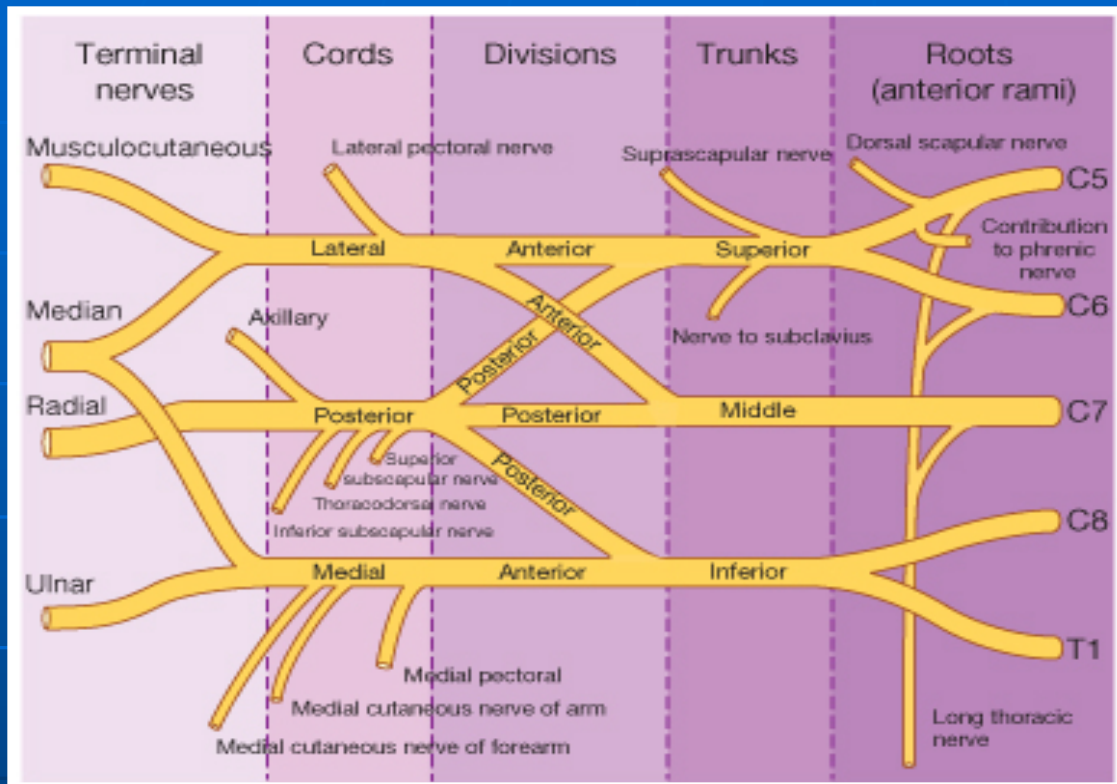
1. **C5:** Nerve to rhomboids (**dorsal scapular nerve**).

2. **C5,6 &7:** **Long thoracic nerve** (supplies serratus anterior).

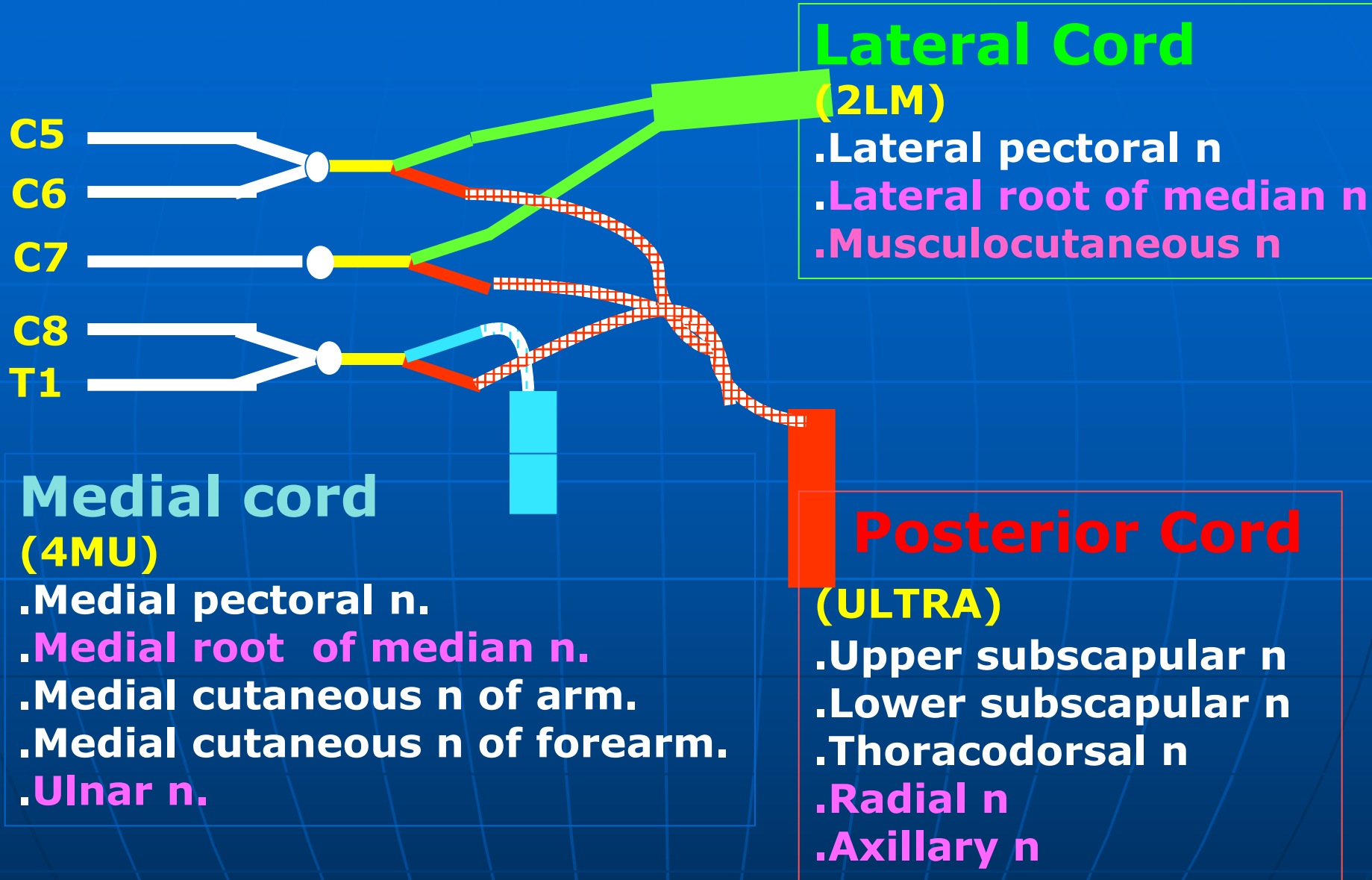
(B) From Trunk (upper trunk):

1. **Nerve to subclavius**

2. **Suprascapular nerve** (supplies supraspinatus & infraspinatus)



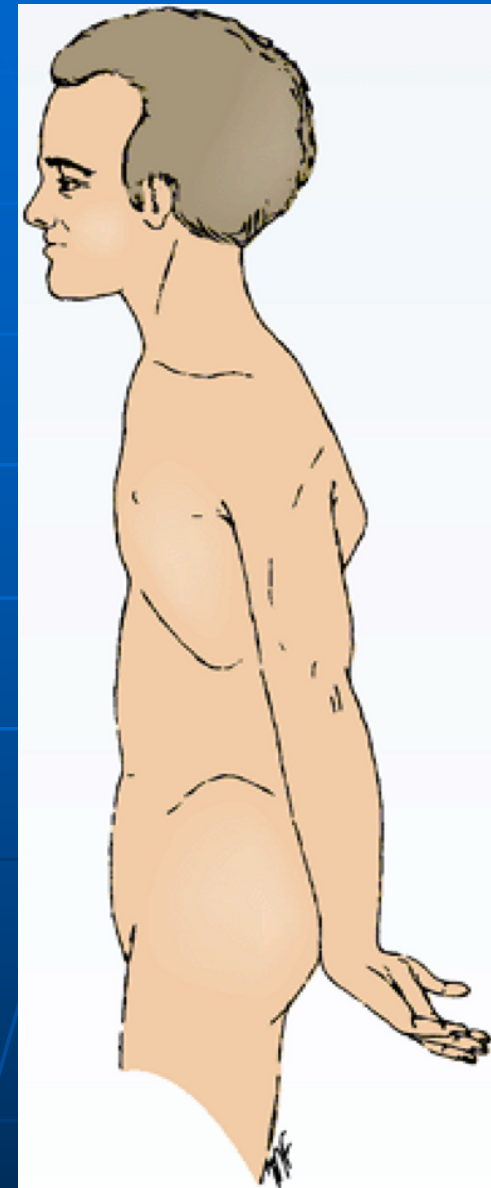
(C) BRANCHES From Cords



Brachial Plexus Injuries

Upper Lesion of the Brachial Plexus Upper Trunk C5,6 (Erb-Duchenne Palsy "waiter's tip position".

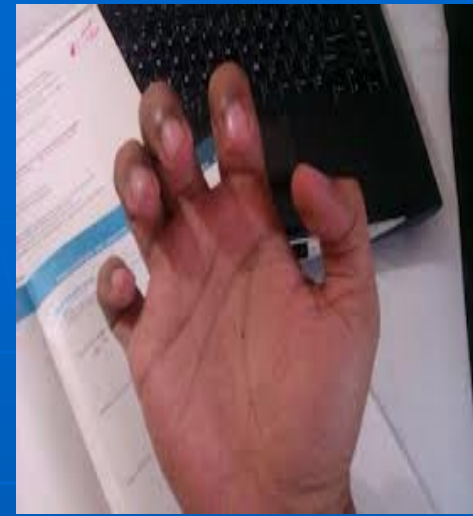
- Resulting from excessive displacement of the head to the opposite side and depression of the shoulder on the same side (a blow or fall on shoulder).
- The position of the upper limb in this condition has been likened to that of a porter or waiter's tip position .
- The arm hangs by the side and is rotated medially. The forearm is extended and pronated.



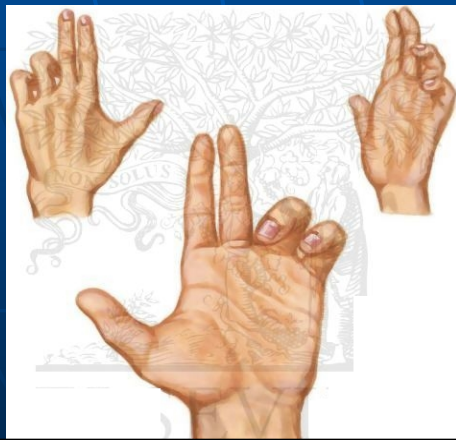
Brachial Plexus Injuries

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

- 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**.



*Claw
Hand*



(APE HAND) will result from median nerve injury.



LUMBAR PLEXUS

Formation:

By **ventral rami** of **L1,2,3** and most of **L4**

Site:

In the substance of psoas major muscle

Main branches:

Iliohypogastric & ilioinguinal:

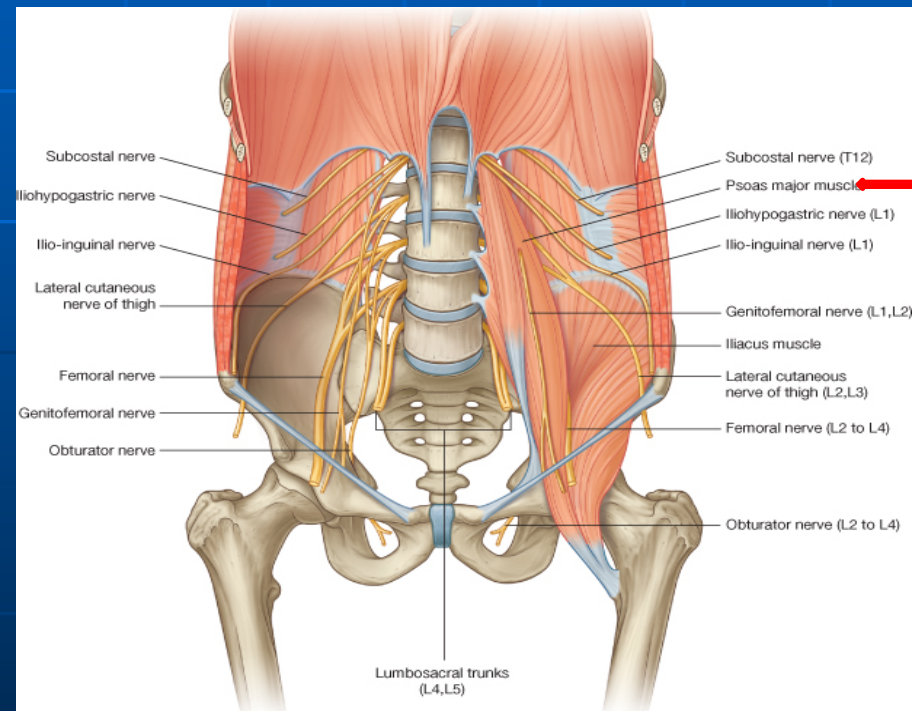
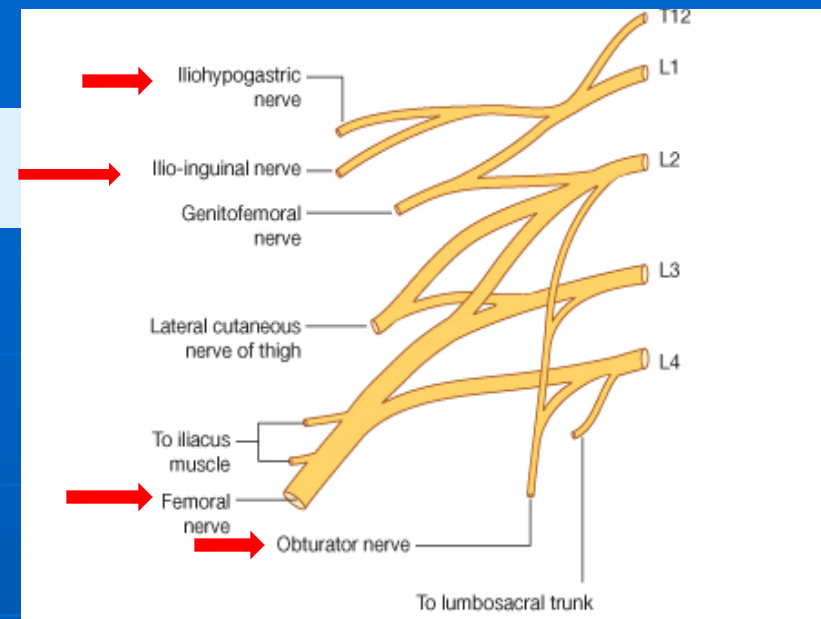
to anterior abdominal wall

Obturator:

to medial compartment of thigh

Femoral:

to anterior compartment of thigh



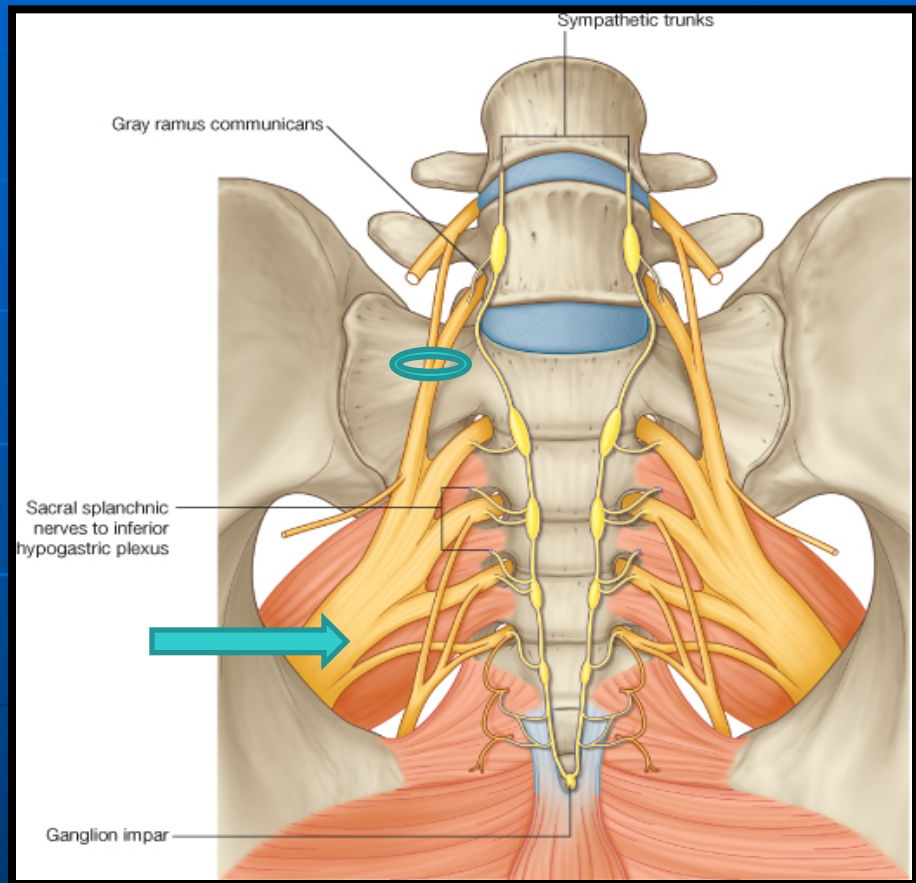
SACRAL PLEXUS OR LUMBOSACRAL PLEXUS

□ 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



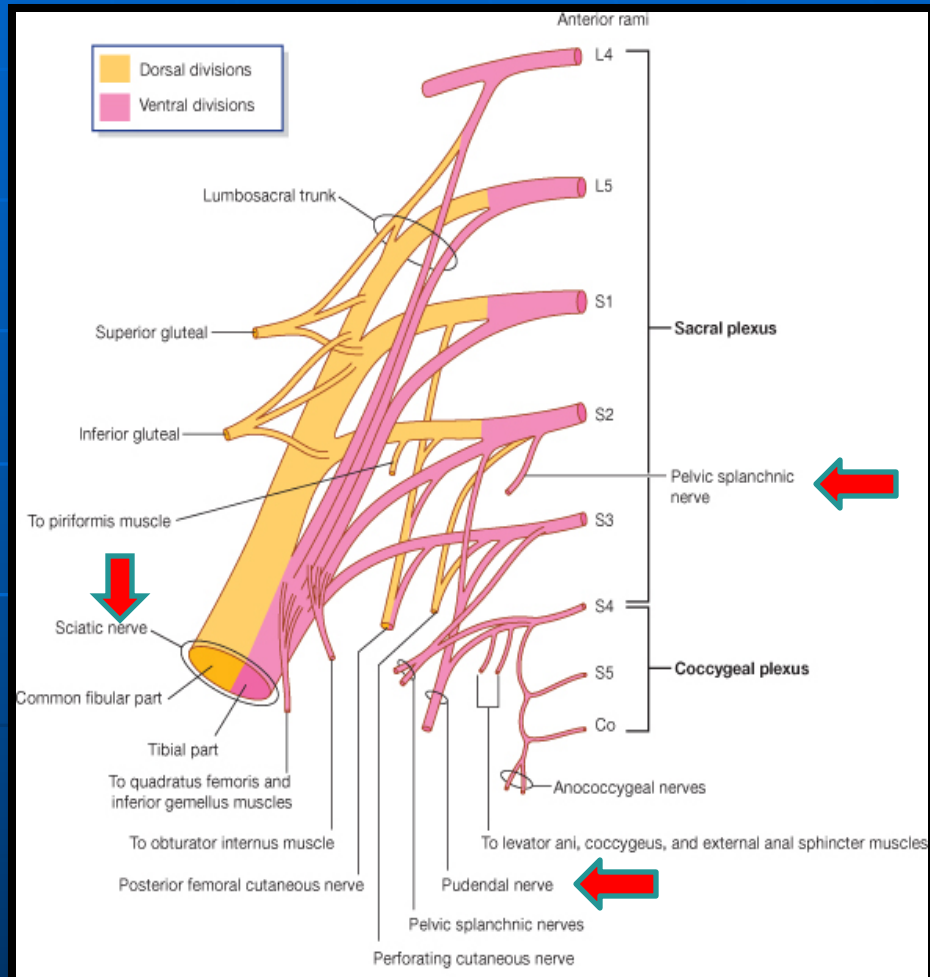
SACRAL PLEXUS

□ Main branches:

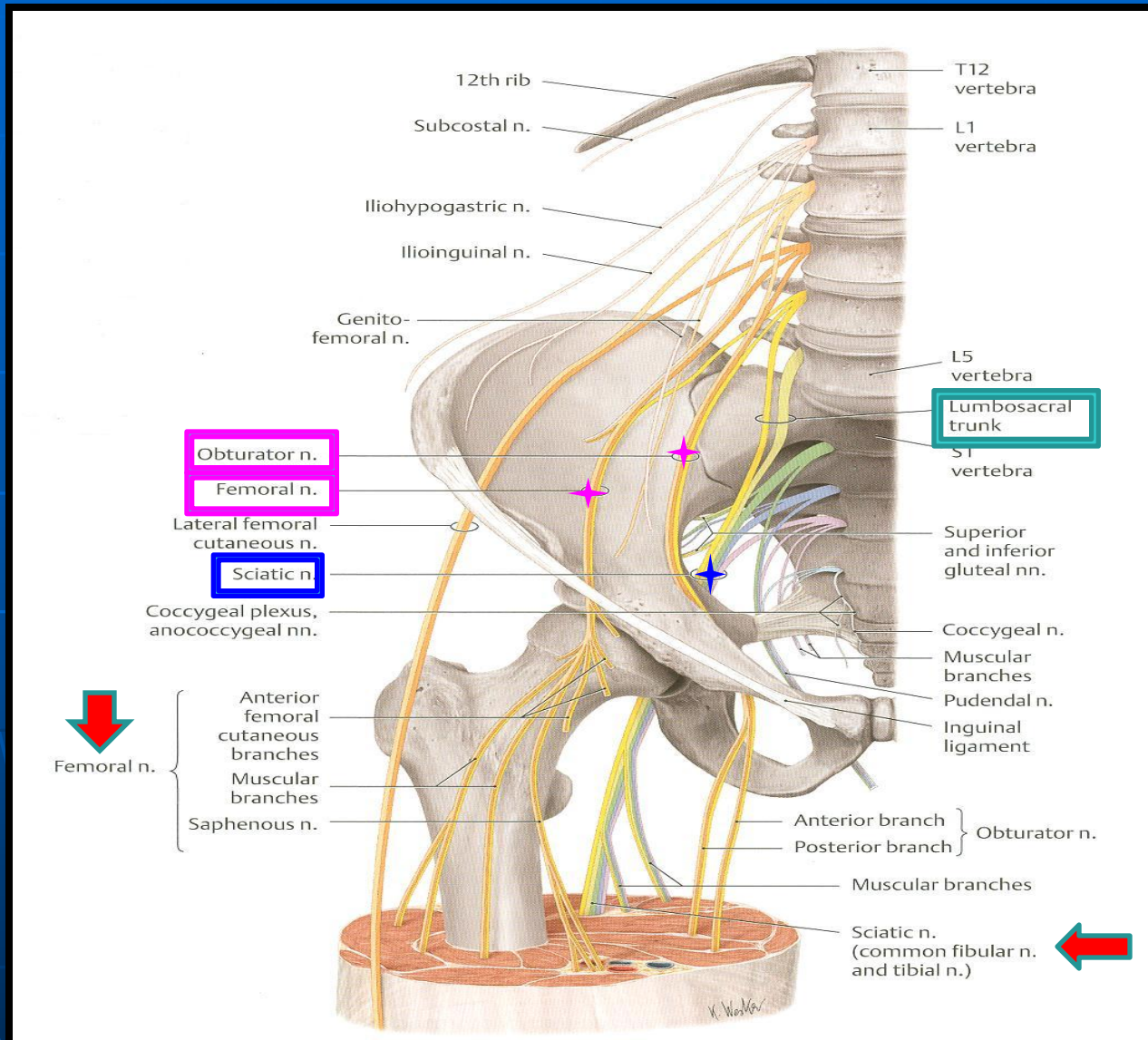
Pelvic splanchnic nerve (from sacral S2,3,4): preganglionic parasympathetic to pelvic viscera & hindgut

Pudendal nerve (from sacral plexus S1,2,3): to perineum

Sciatic nerve (From Lumbosacral L4&5+S1,2,3) : to lower limb

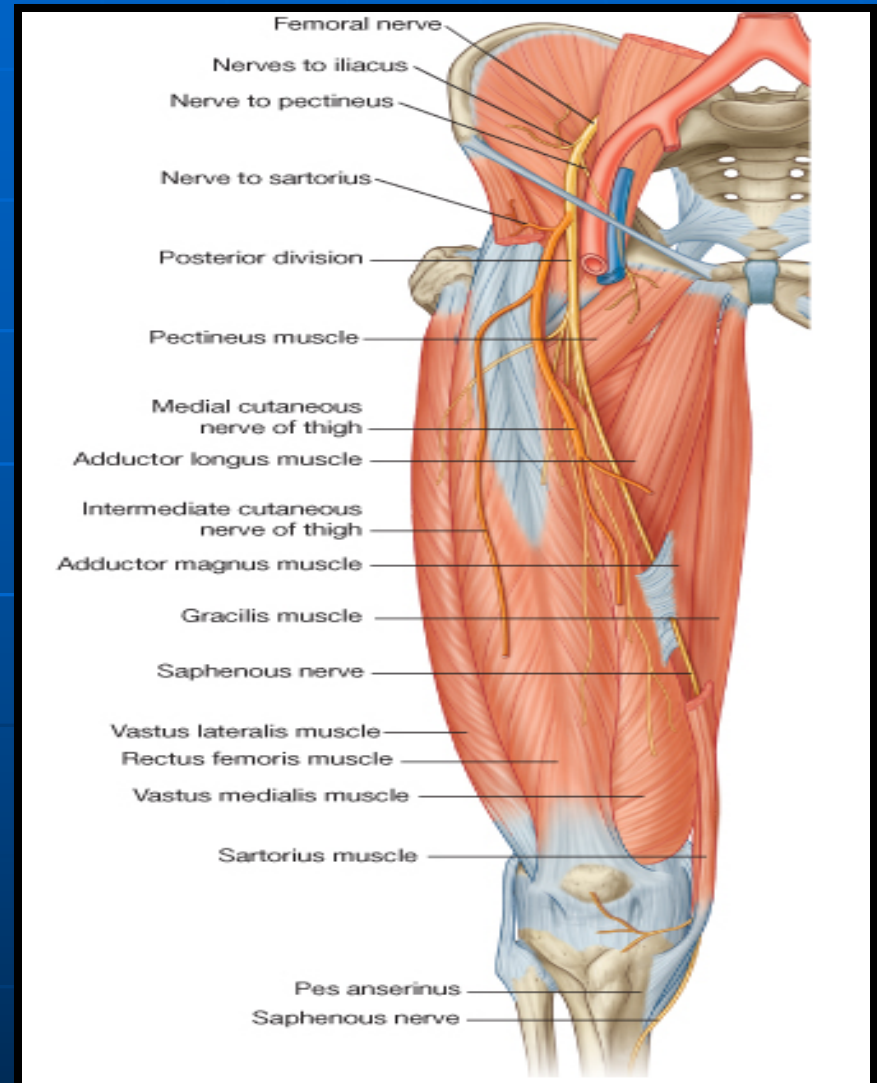


LUMBOSACRAL PLEXUS



FEMORAL NERVE

- ❑ **Origin:**
 - ❑ A branch from lumbar plexus (L2,3,4)
- ❑ **Course:**
 - ❑ Descends lateral to psoas major & enters the thigh **behind the inguinal ligament**
 - ❑ Passes lateral to femoral artery & divides into terminal branches.



FEMORAL NERVE INJURY

□ Motor effect:

- Wasting of quadriceps femoris
- **Loss of extension of knee**
- **Weak flexion of hip** (psoas major is intact ; because it takes supply from other fibers of the lumbar plexus)

□ Sensory effect:

- loss of sensation over areas supplied **antero-medial aspect of thigh & medial side of leg & foot** (injury of Saphenous br.of femoral)



SCIATIC NERVE

The largest nerve of the body

□ Origin:

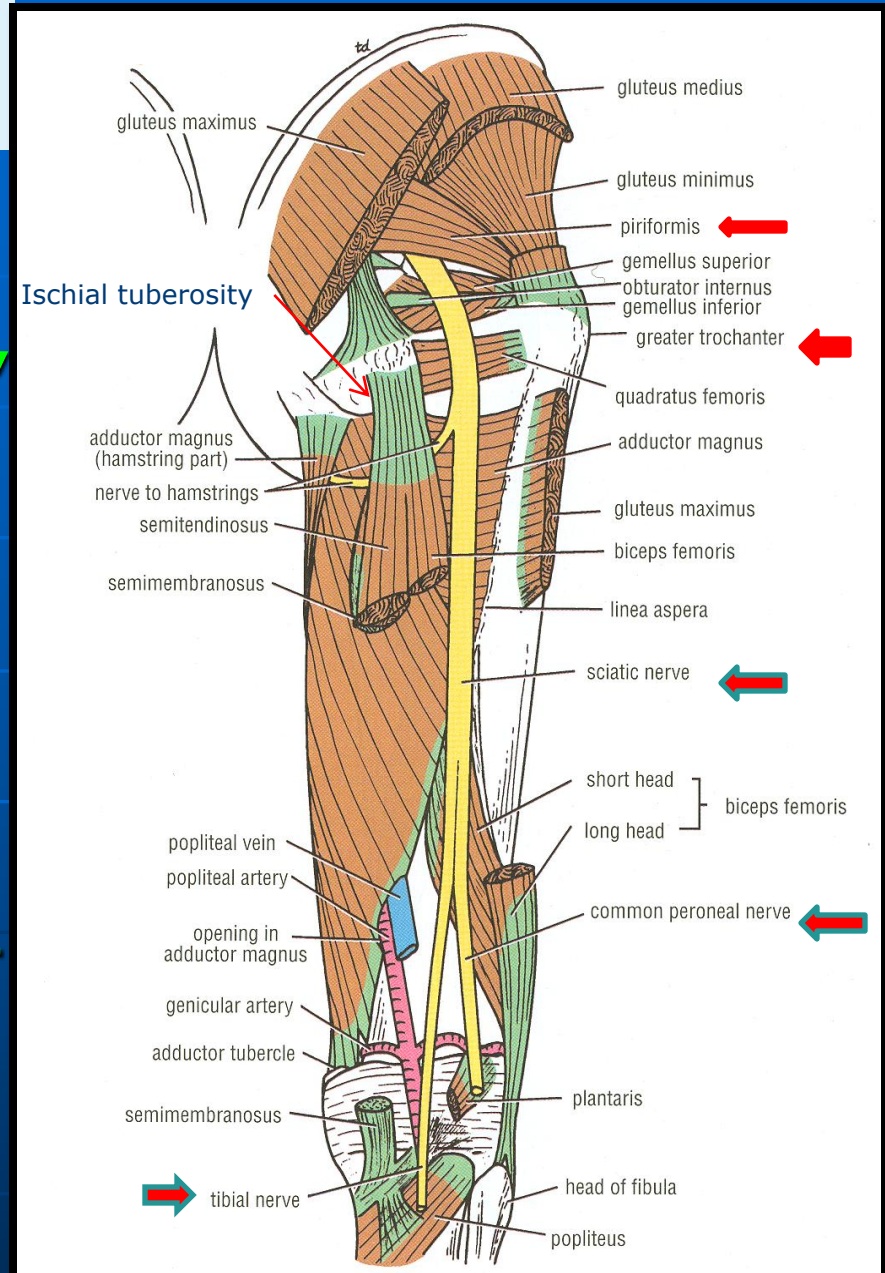
□ from **sacral plexus (L4, 5, S1, 2, & 3)**

□ It is one of the terminal branch of sacral plexus.

□ Course:

• Leaves the pelvis through **greater sciatic foramen**, **below piriformis** & passes in the **gluteal region** (between **ischial tuberosity** & **greater trochanter**) then to **posterior compartment of thigh**

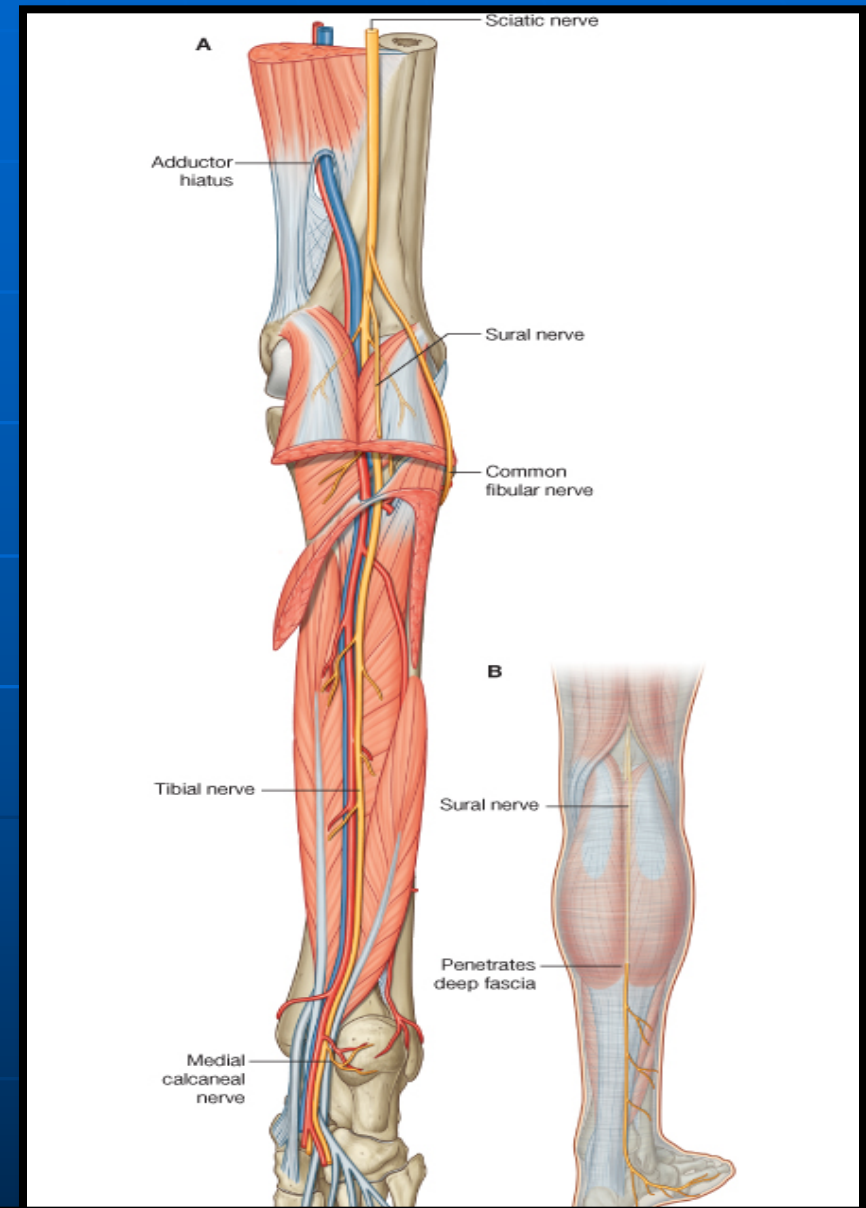
• Divides into **tibial** & **common peroneal** (fibular) nerves



TIBIAL NERVE

□ Course:

- Descends through popliteal fossa to **posterior** compartment of **leg**, accompanied with posterior tibial vessels
- Passes deep to flexor retinaculum to reach the **sole of foot** where it divides into 2 terminal branches



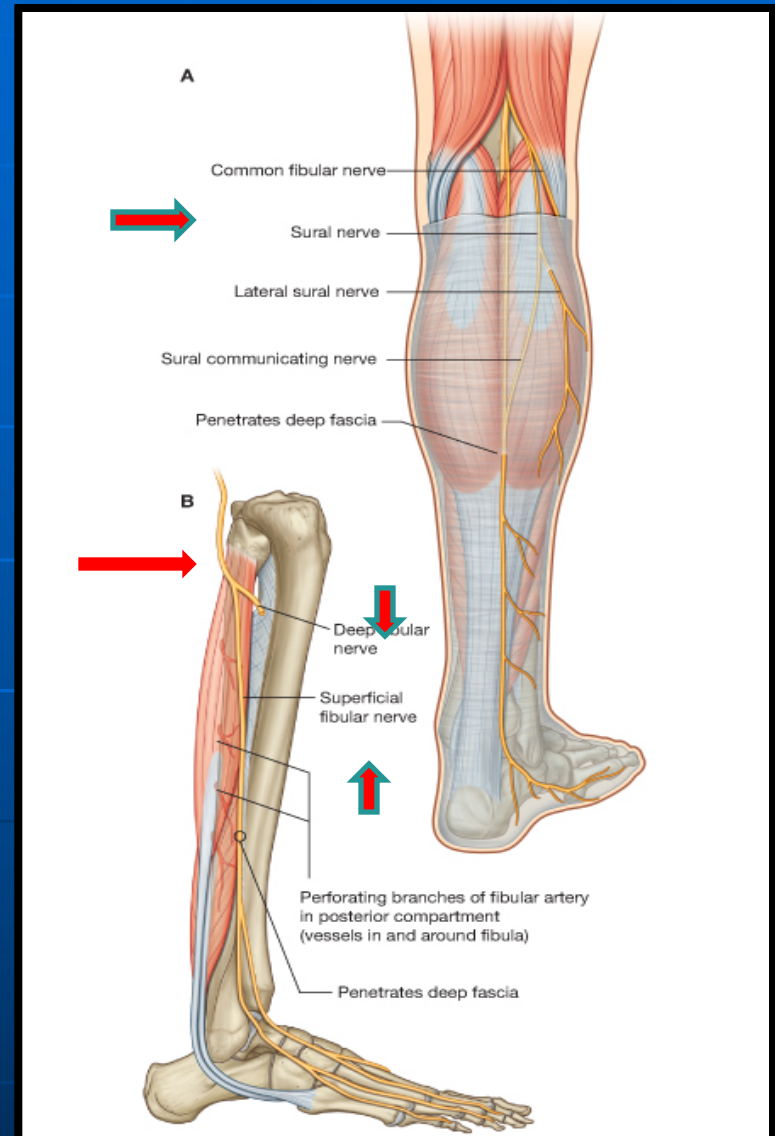
COMMON PERONEAL (FIBULAR) NERVE

□ Course:

- Leaves popliteal fossa & turns **around the lateral aspect of neck of fibula.**

Then divides into:

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 **affect** the flexion of hip & extension of knee as well as **loss of sensation** of skin of anteromedial aspects of the thigh, medial side of knee, leg and foot (Saphenous br.of femoral).
- **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

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 1

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

QUESTION 2

- **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**