

# Brachial Plexus & Lumbosacral Plexus

*Dr. Sanaa Alshaarawy*

*&*

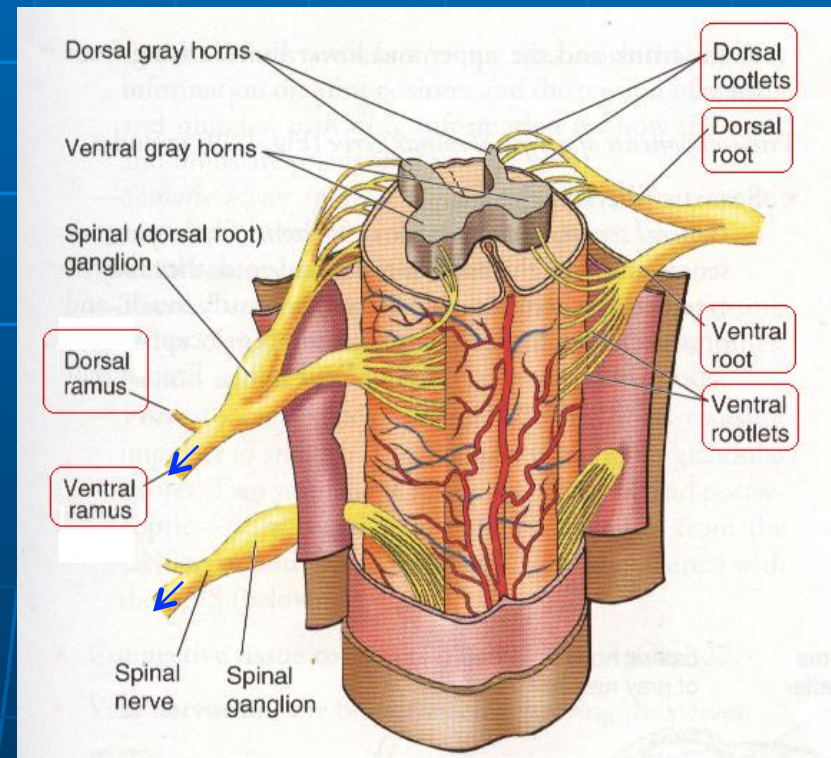
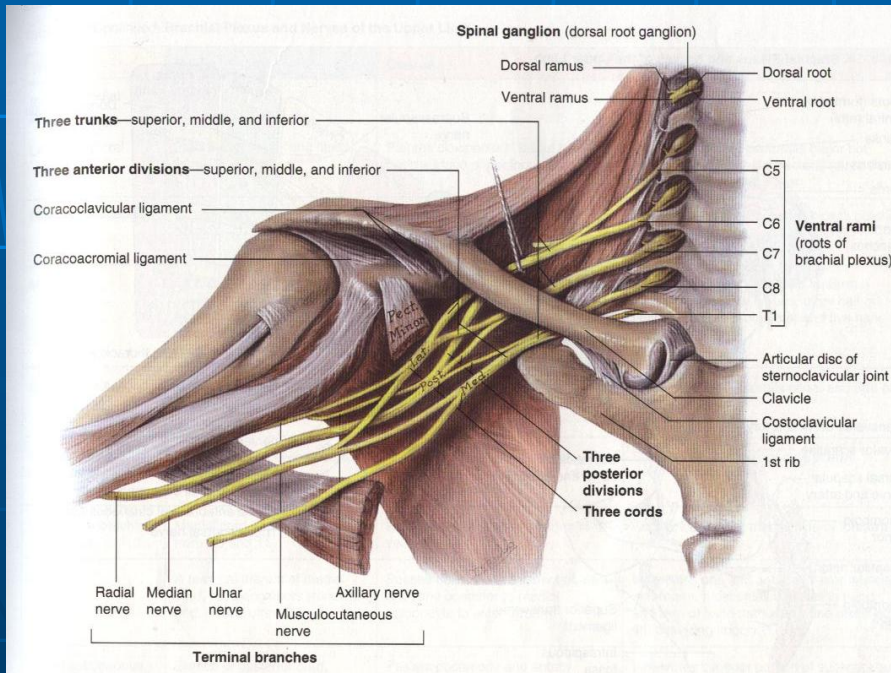
*Dr. Saeed Vohra*

# Objectives

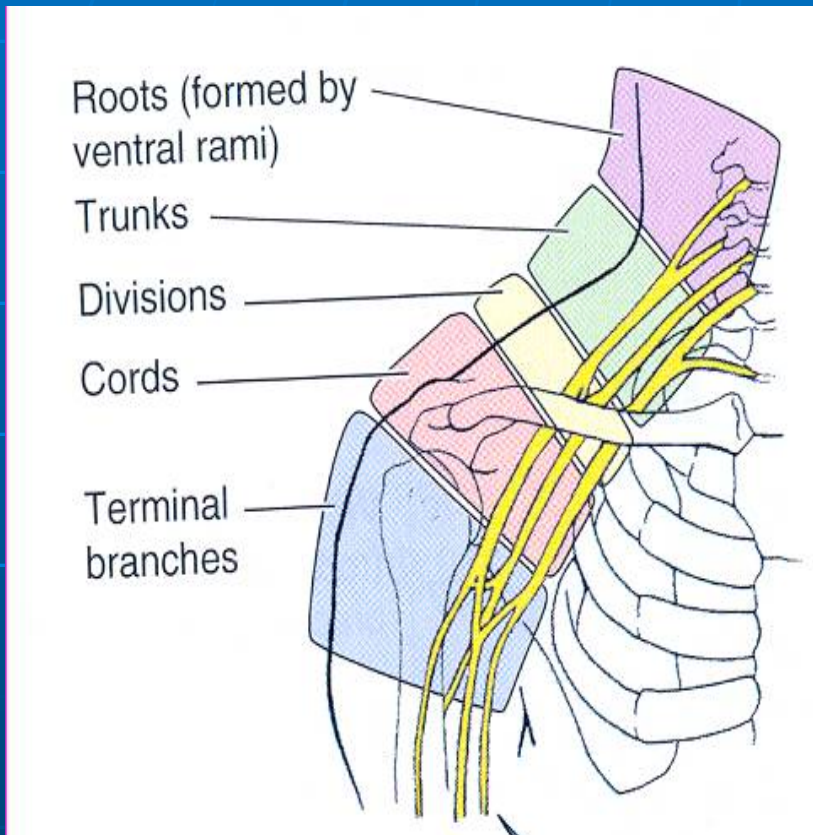
- At the end of this lecture, the students should be able to :
- Describe **the formation** of brachial plexus (site, roots)
- List the **main branches** of brachial plexus
- Describe **the formation** of lumbosacral plexus (site, roots)
- List the **main branches** of lumbosacral plexus
- Describe the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

# FORMATION OF BRACHIAL PLEXUSES

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

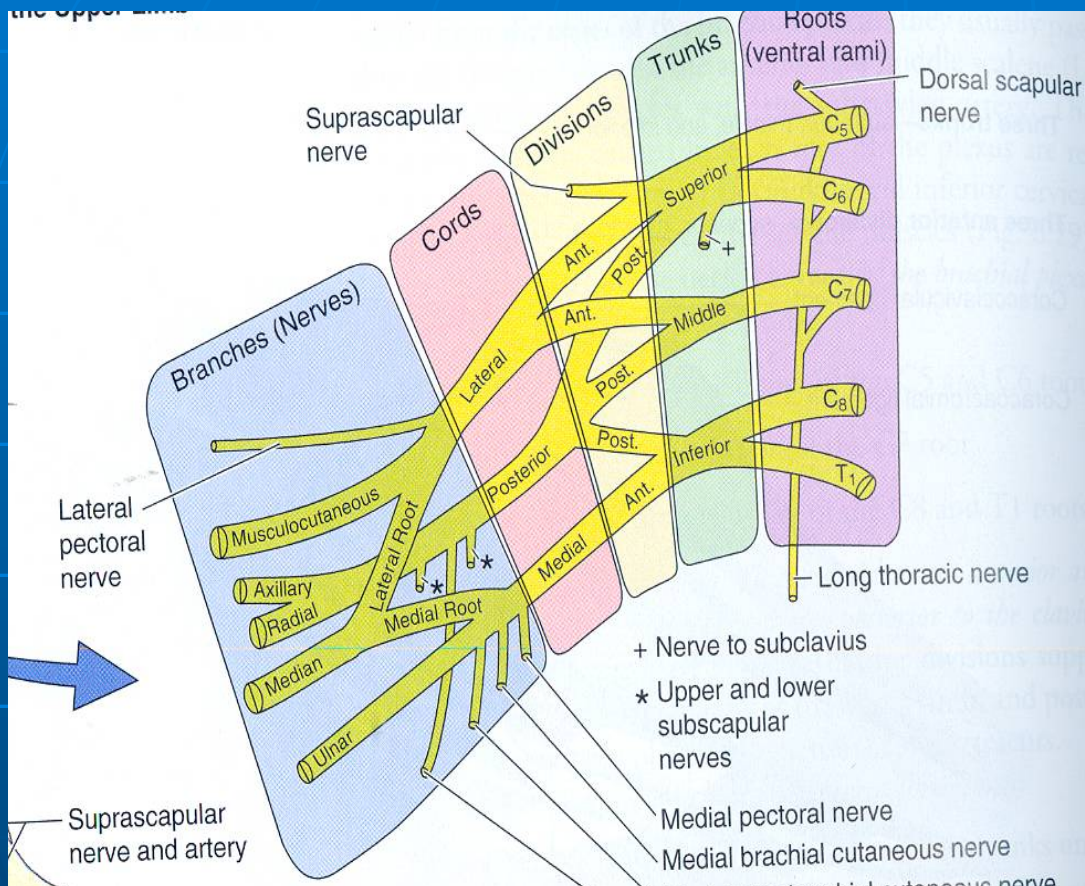


# DIVISIONS (STAGES)



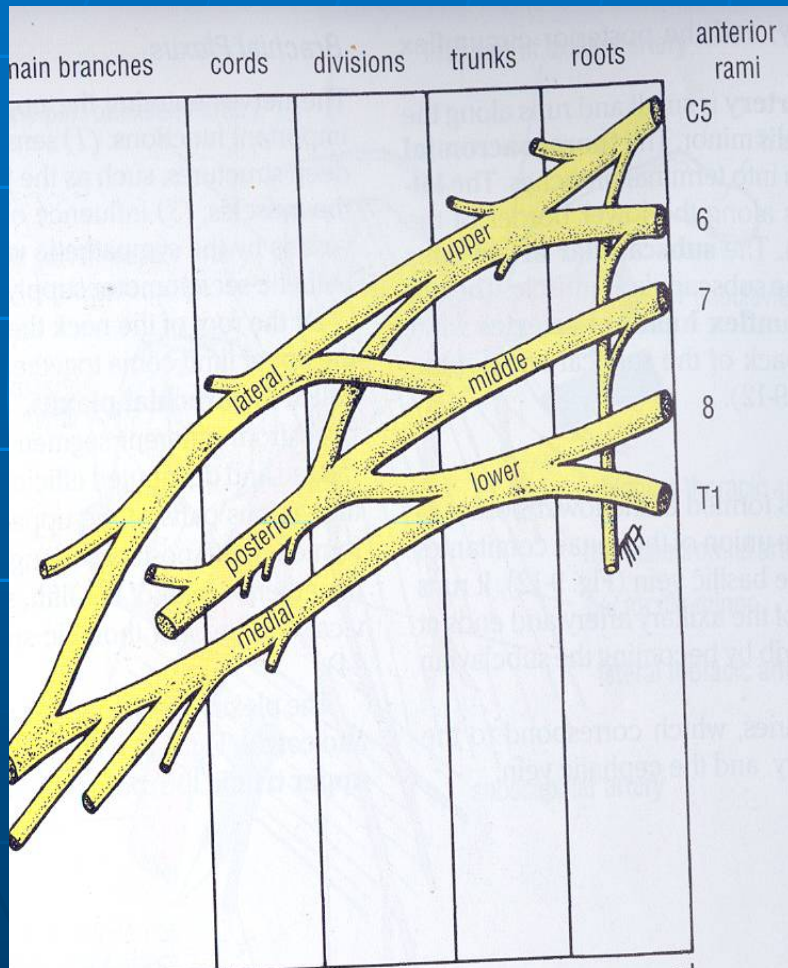
- The plexus is divided into :
  - **Roots**
  - **Trunks**
  - **Divisions**
  - **Cords**
  - **Terminal branches**

# TRUNKS



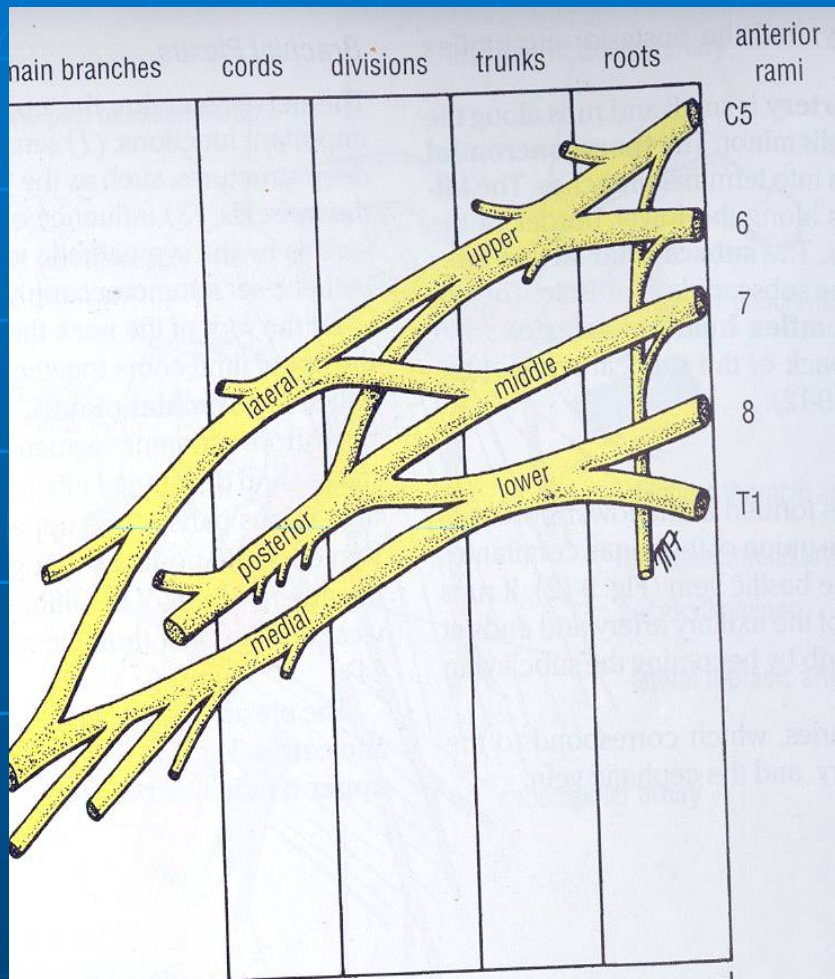
- **Upper trunk**
  - Union of the roots of **C5 & 6**
- **Middle trunk**
  - Continuation of the root of **C7**
- **Lower trunk**
  - Union of the roots of **C8 & T1**

# DIVISIONS & CORDS



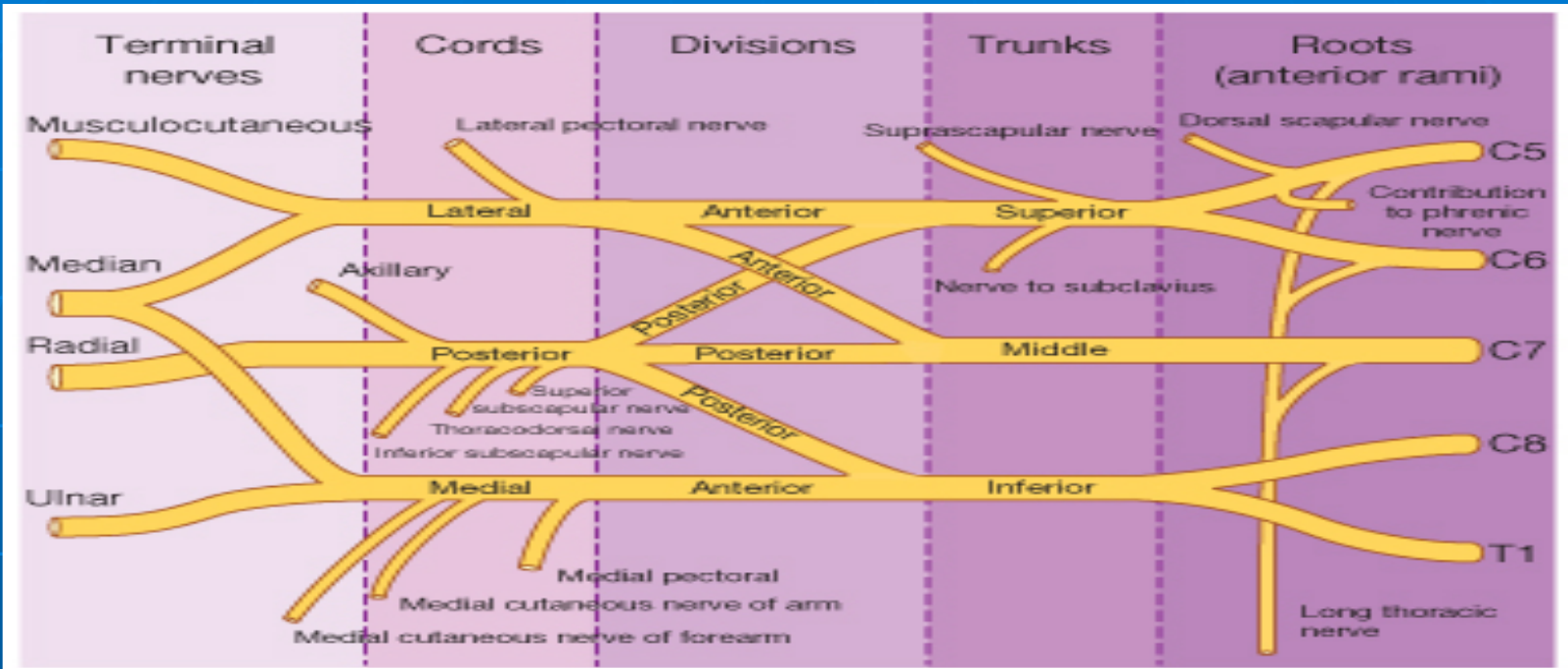
- **Each trunk** divides into **anterior** and **posterior** division
- **Posterior cord:**
  - From the **3 posterior** divisions of the **3 trunks.**
- **Lateral cord:**
  - From the **anterior** divisions of the **upper** and **middle** trunks.
- **Medial cord :**
  - It is the **continuation** of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

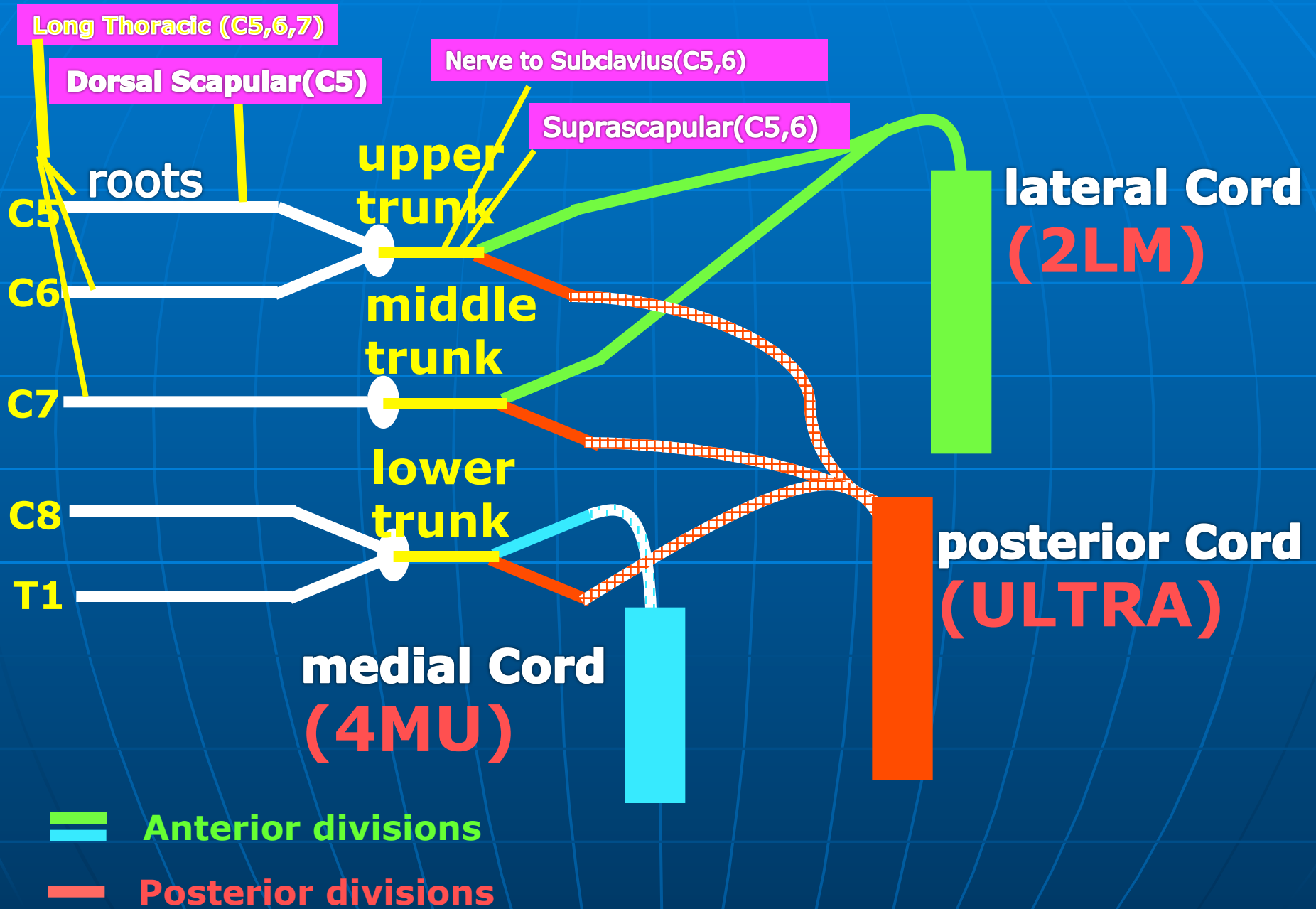


The Plexus can be divided into 5 stages:

- **Roots:** in the posterior  $\Delta$
- **Trunks:** in the posterior  $\Delta$
- **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

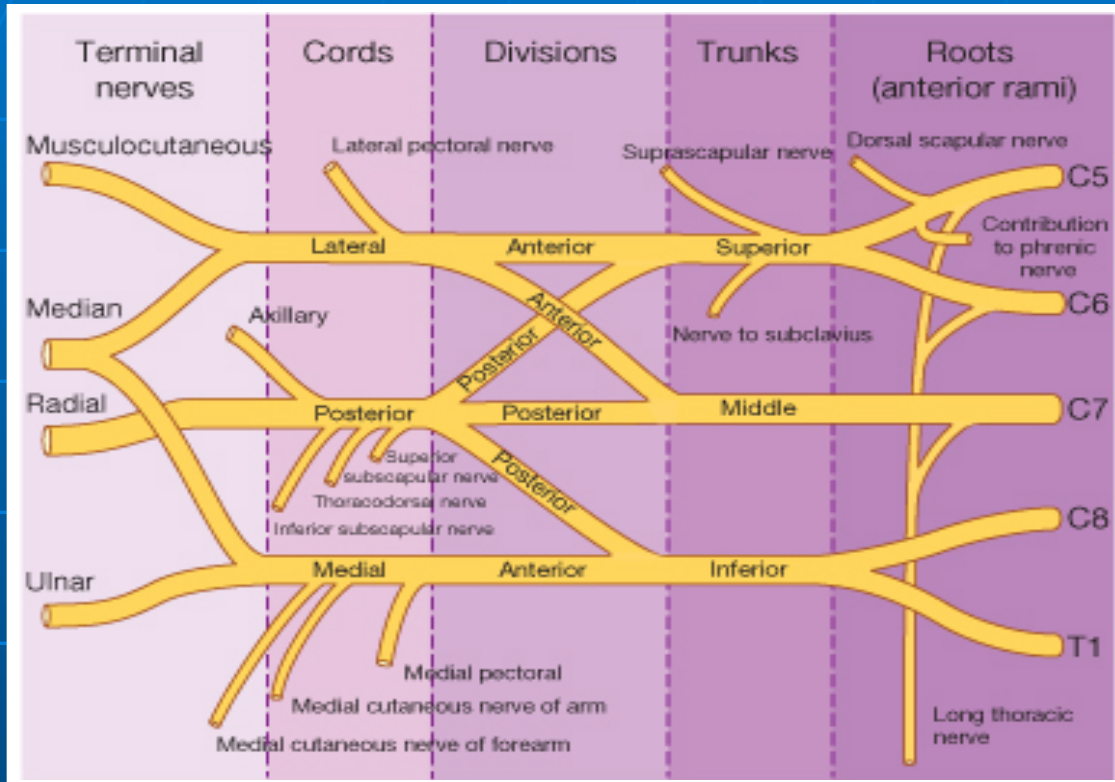


# BRANCHES

## ■ (A) From Roots:

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

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

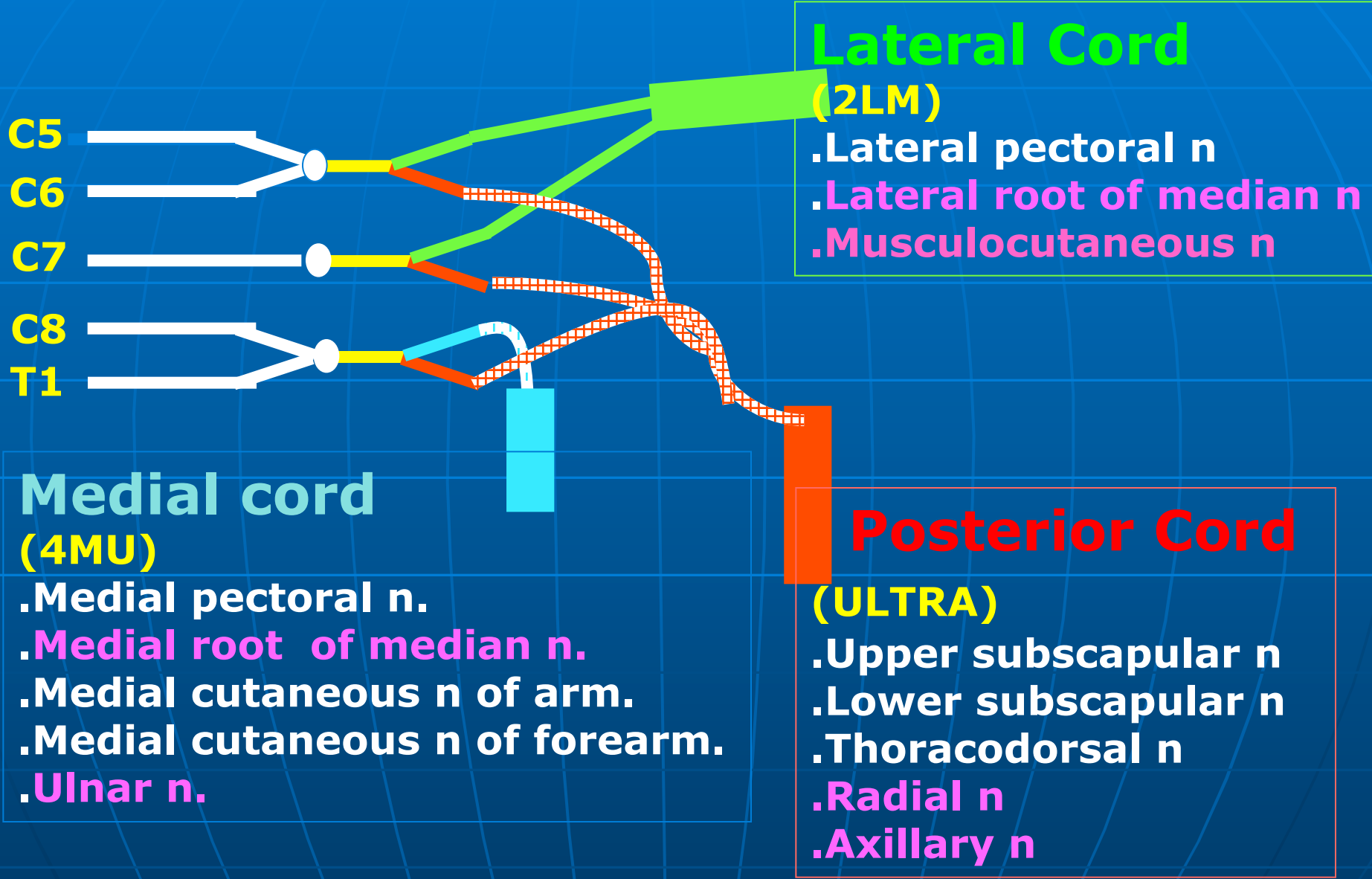


## (B) From Trunk (upper trunk):

1. **Nerve to subclavius**

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

# (C) BRANCHES From Cords



## Lateral Cord

(2LM)

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

## Medial cord

(4MU)

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

## Posterior Cord

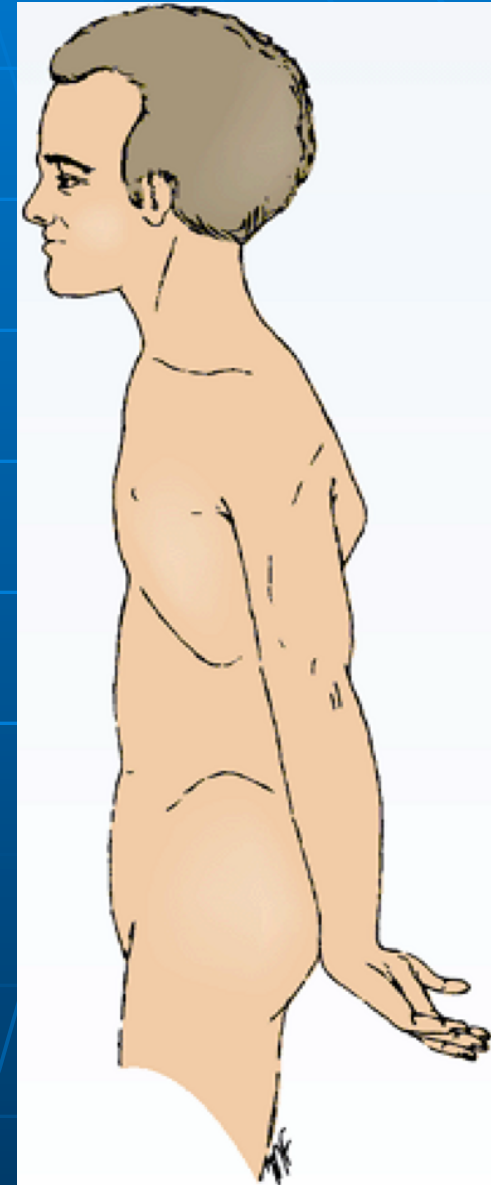
(ULTRA)

- .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".

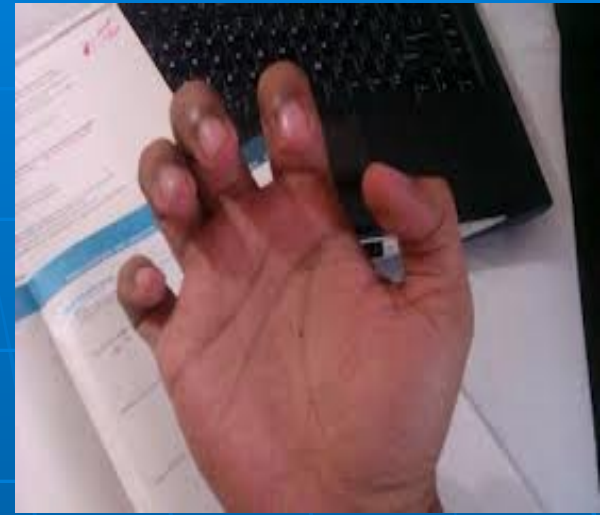
- Resulting from excessive displacement of the head to the opposite side and depression of the shoulder on the same side (a blow or fall on shoulder).
- The position of the upper limb in this condition has been likened to that of a porter or waiter hinting for a tip or policeman's tip hand.
- The arm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



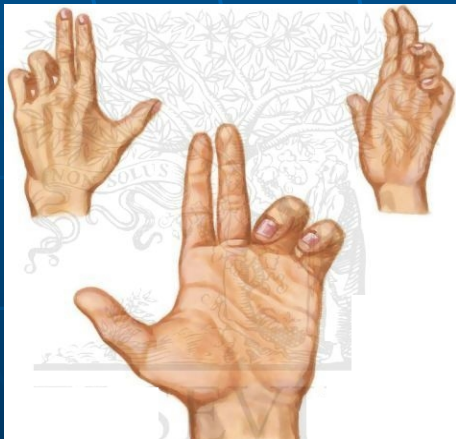
# Brachial Plexus Injuries

## 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.**



**Claw Hand**

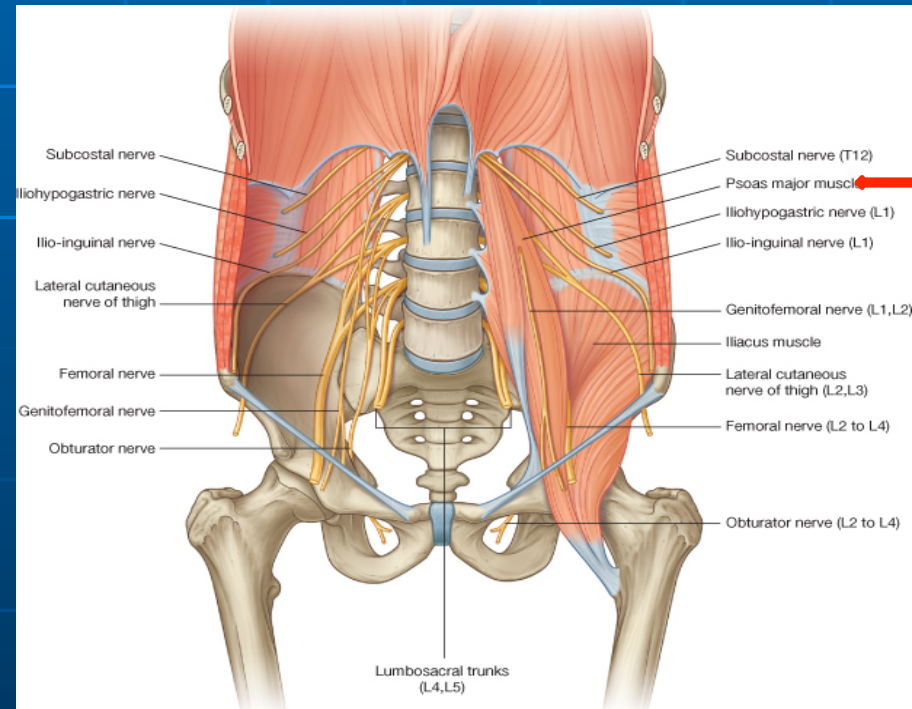
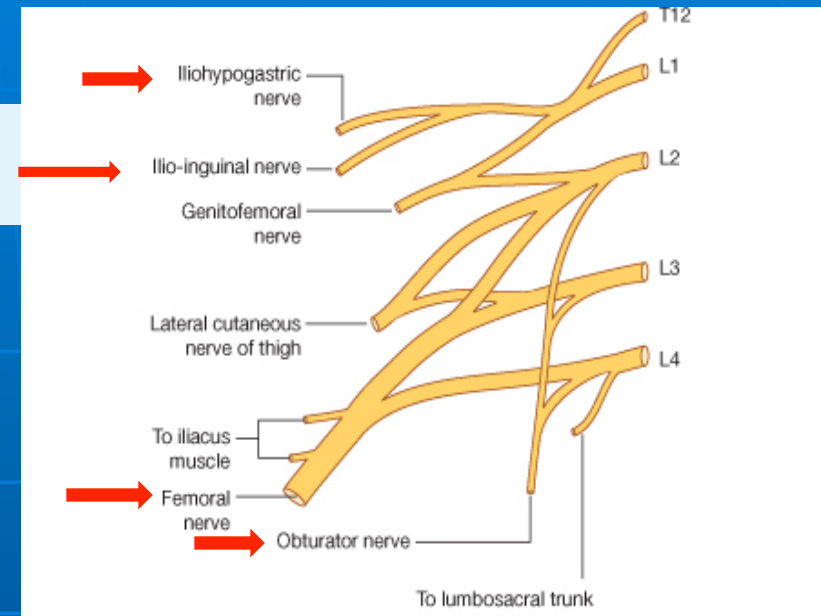


**Hand of Benediction or Pop's Blessings (APE HAND) will result from median nerve injury.**



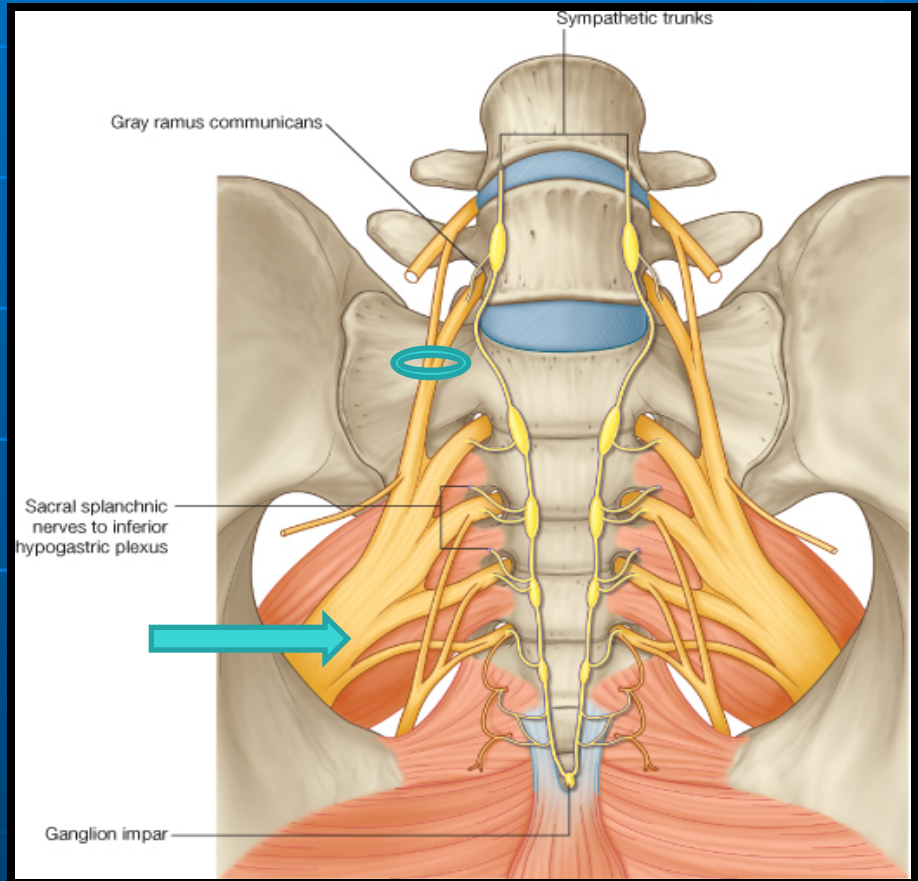
# LUMBAR PLEXUS

- **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

- **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 msucle



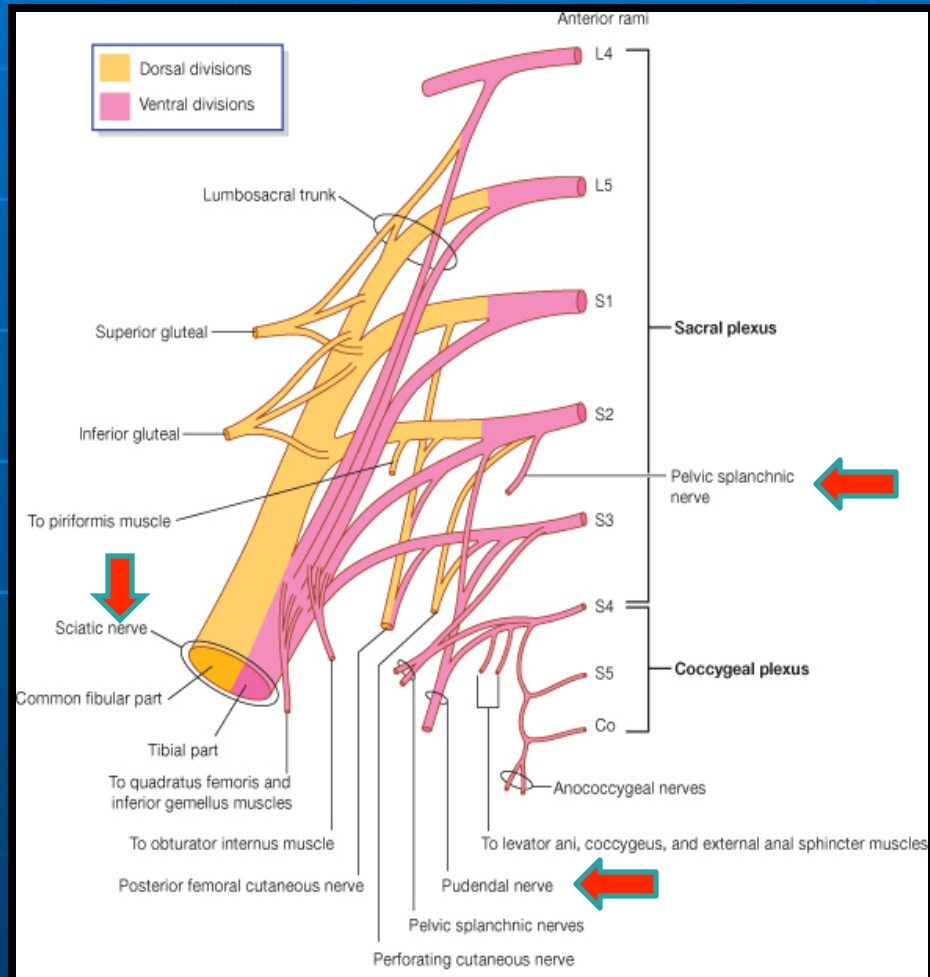
# SACRAL PLEXUS

## □ Main branches:

**Pelvic splanchnic nerve (from sacral):** preganglionic parasympathetic to pelvic viscera & hindgut

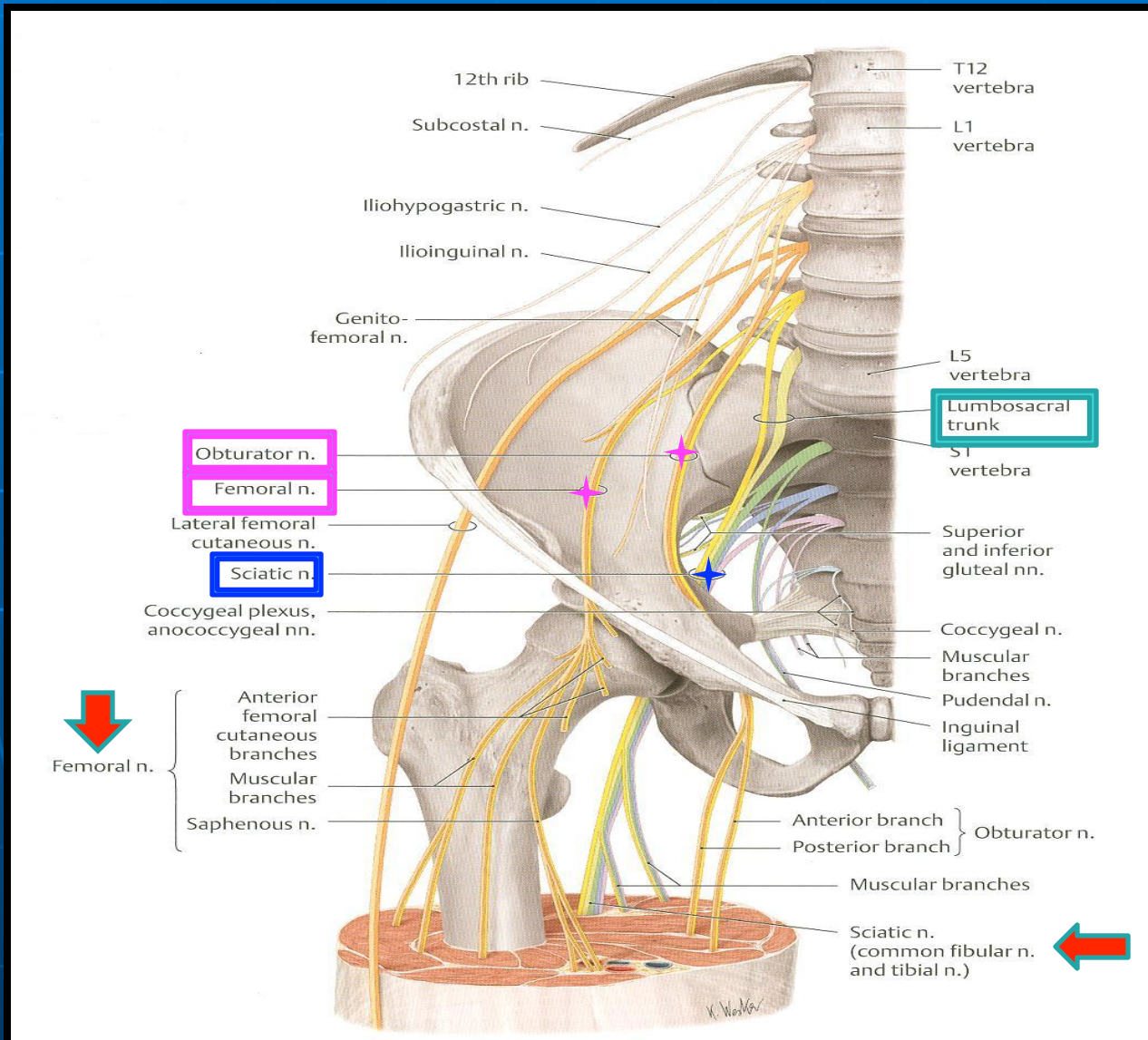
**Pudendal nerve (from sacral plexus):** to perineum

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





# LUMBOSACRAL PLEXUS



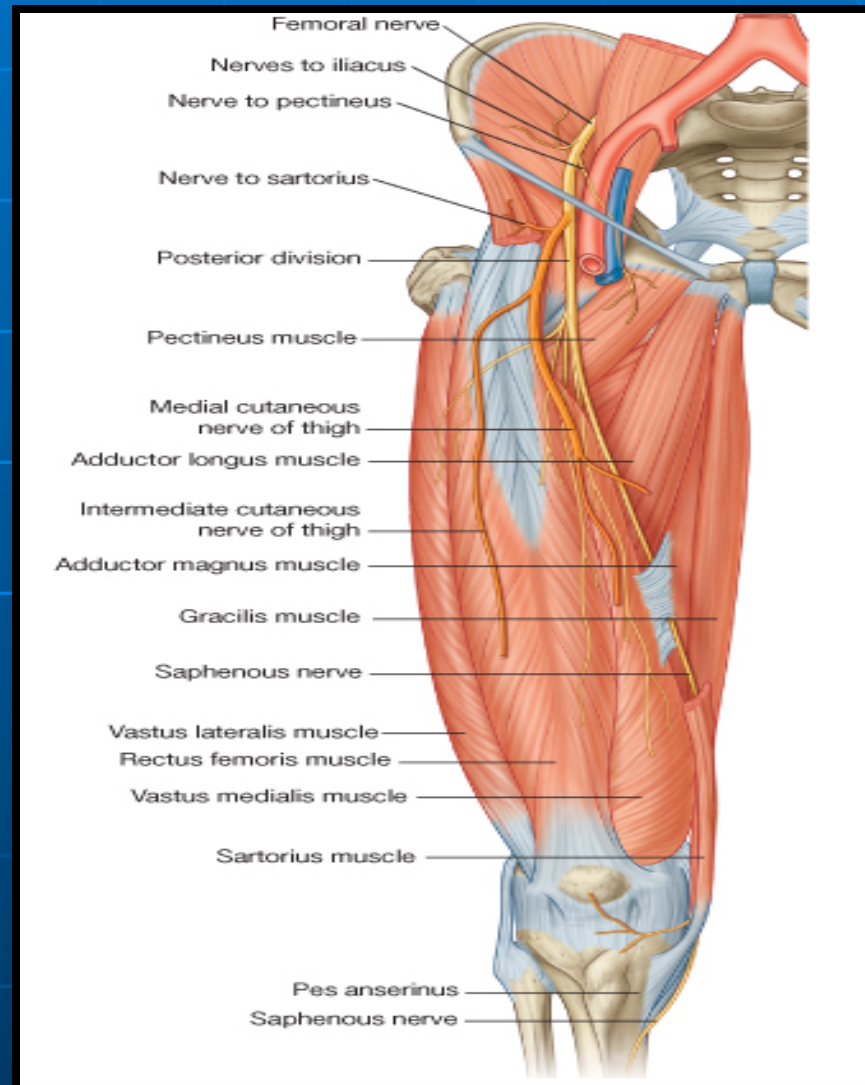
# FEMORAL NERVE

## □ 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.



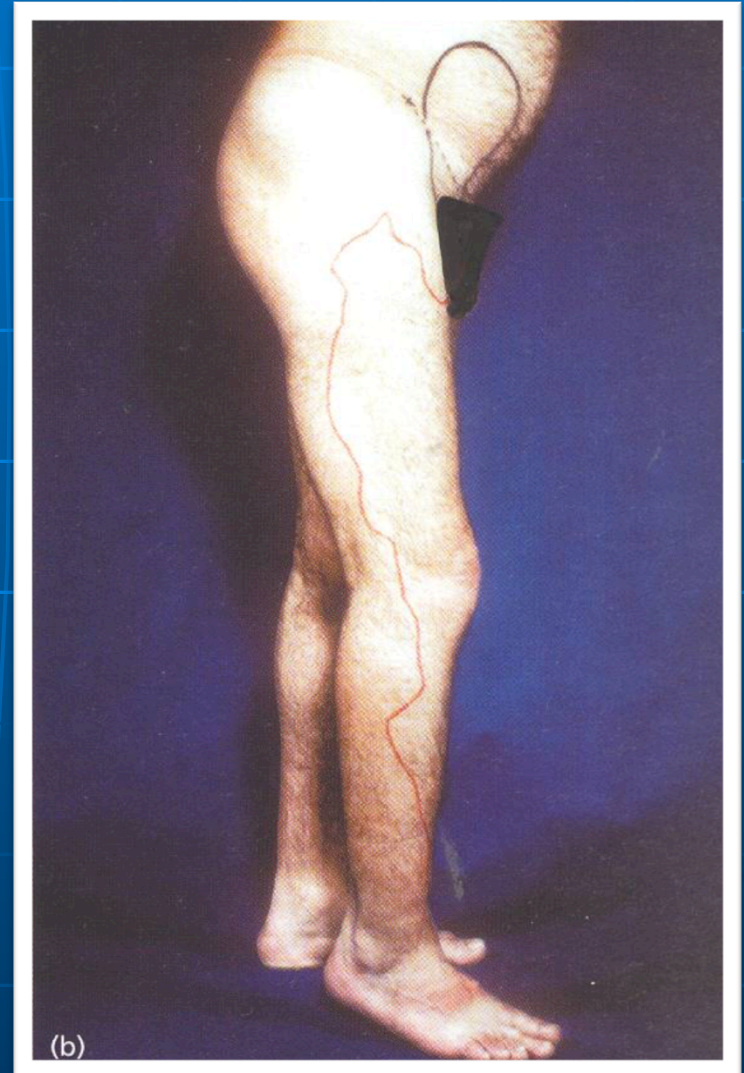
# FEMORAL NERVE INJURY

## □ 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:

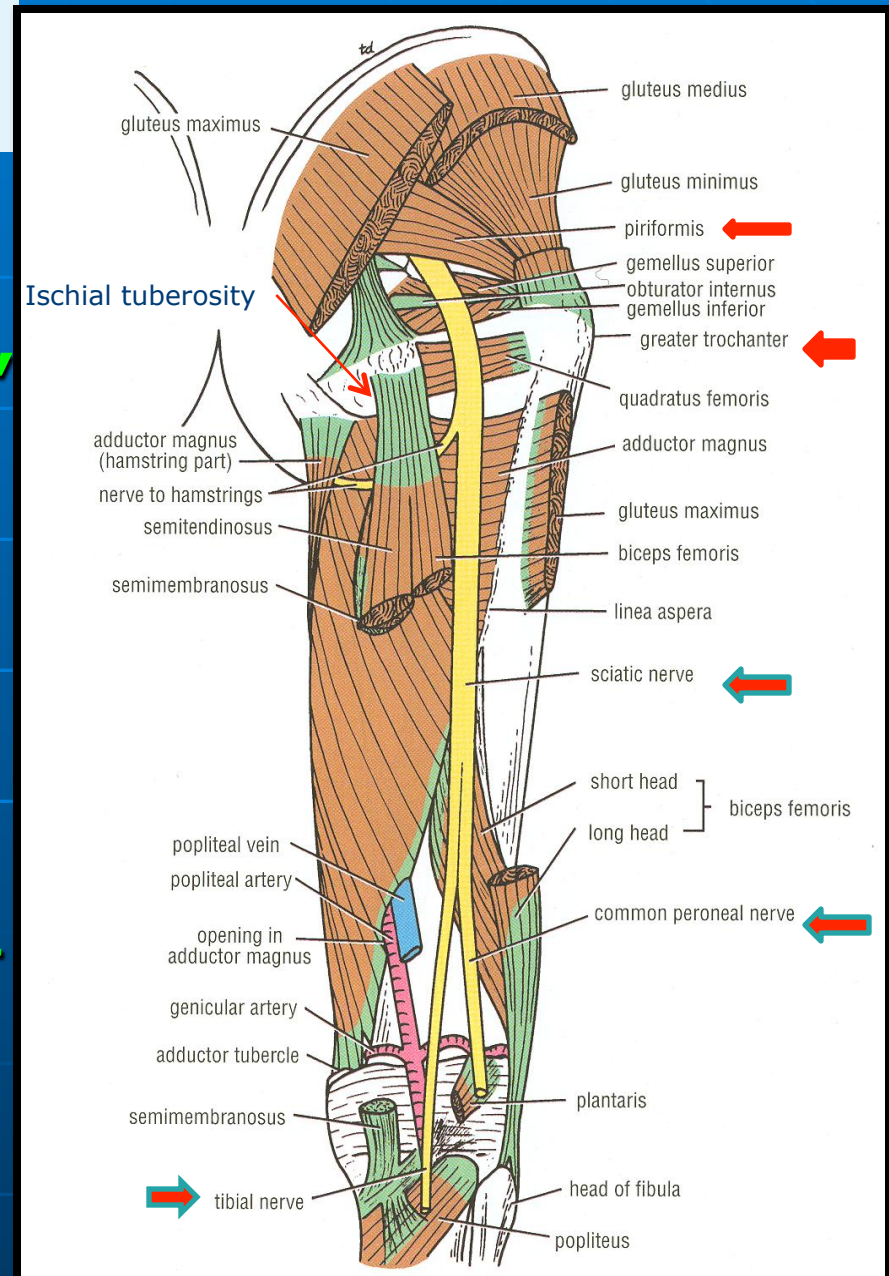
□ from **sacral plexus (L4, 5, S1, 2, & 3)**

□ 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**

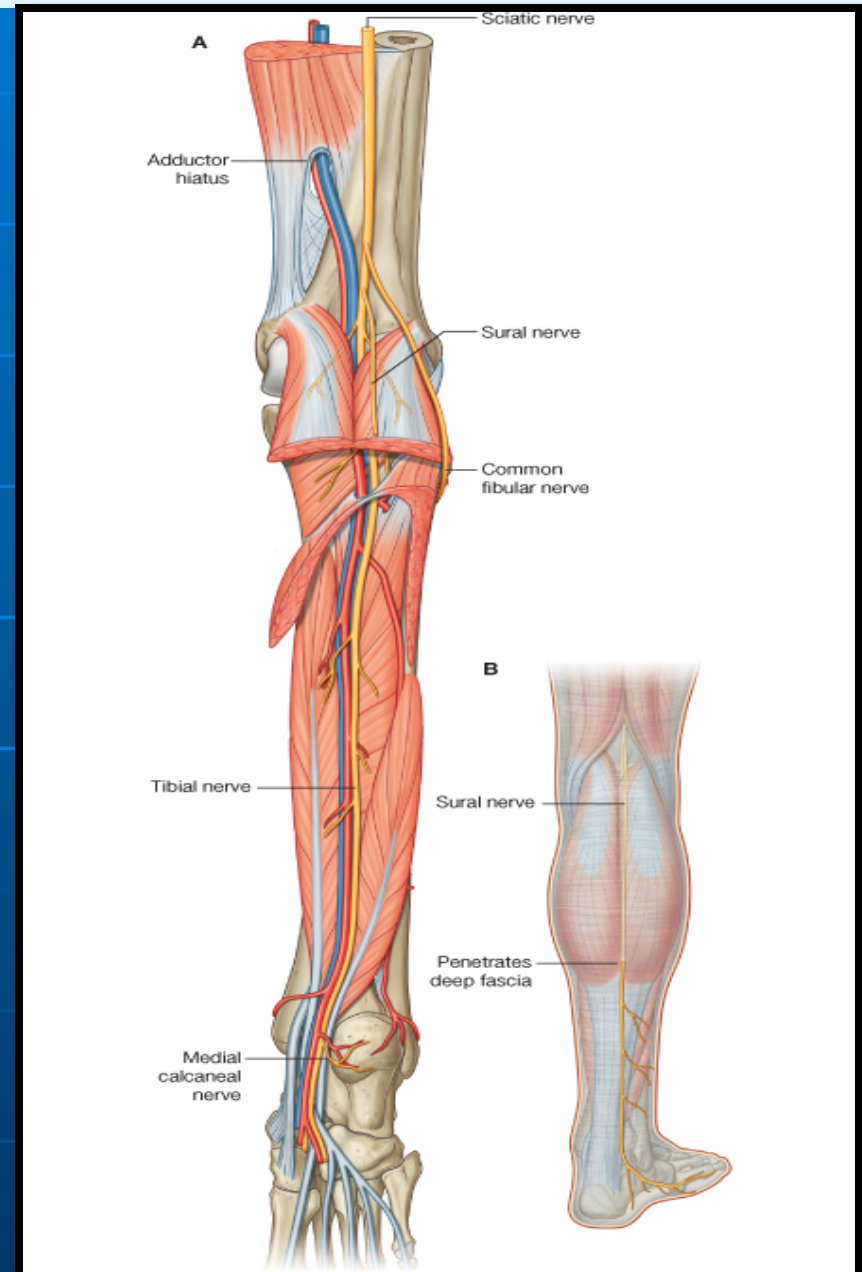
• Divides into **tibial** & **common peroneal** (fibular) nerves



# 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



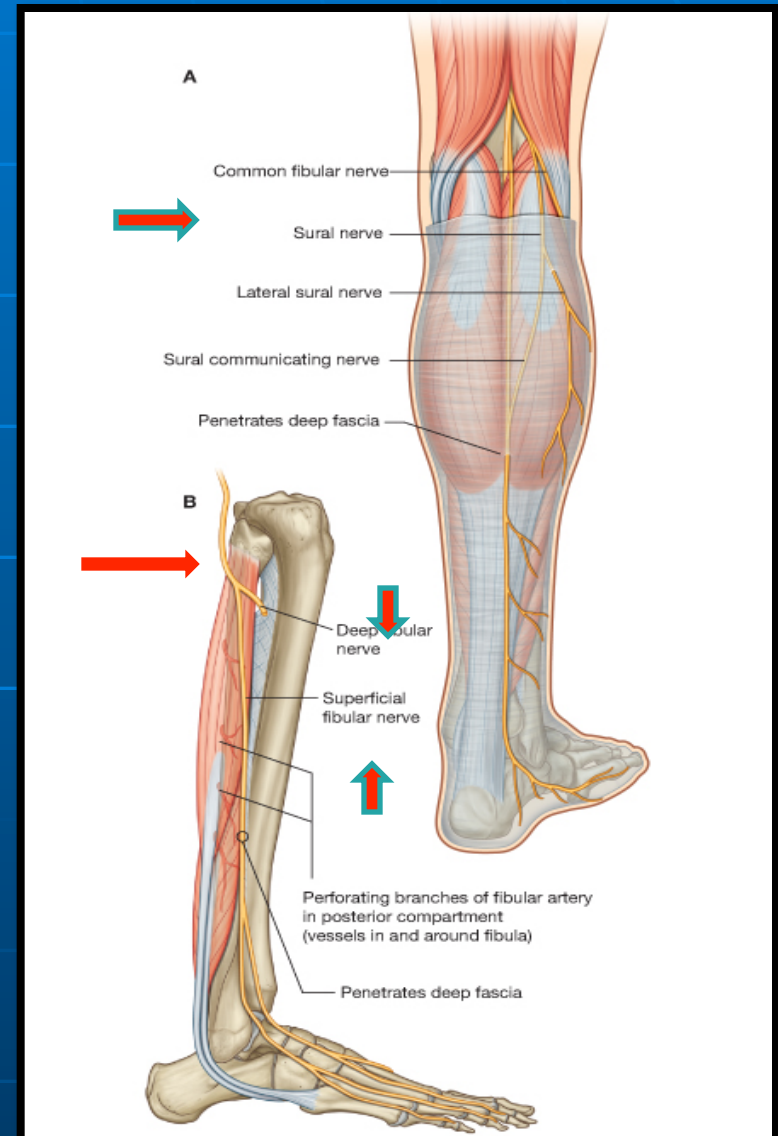
# COMMON PERONEAL (FIBULAR) NERVE

## □ 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



Thank you

# 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)



## **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**