Brachial Plexus & Lumbosacral Plexus

By

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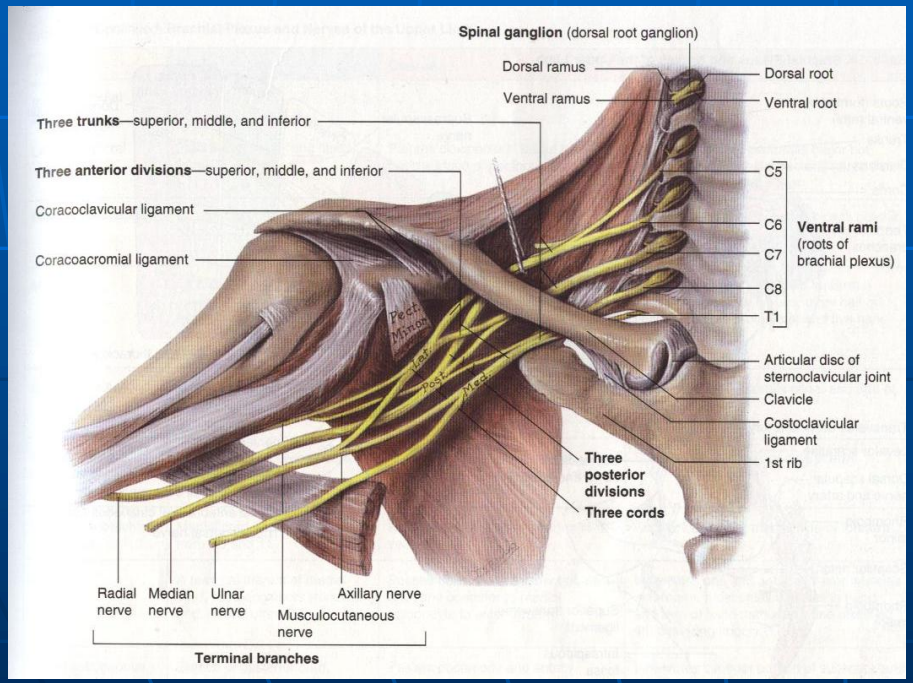
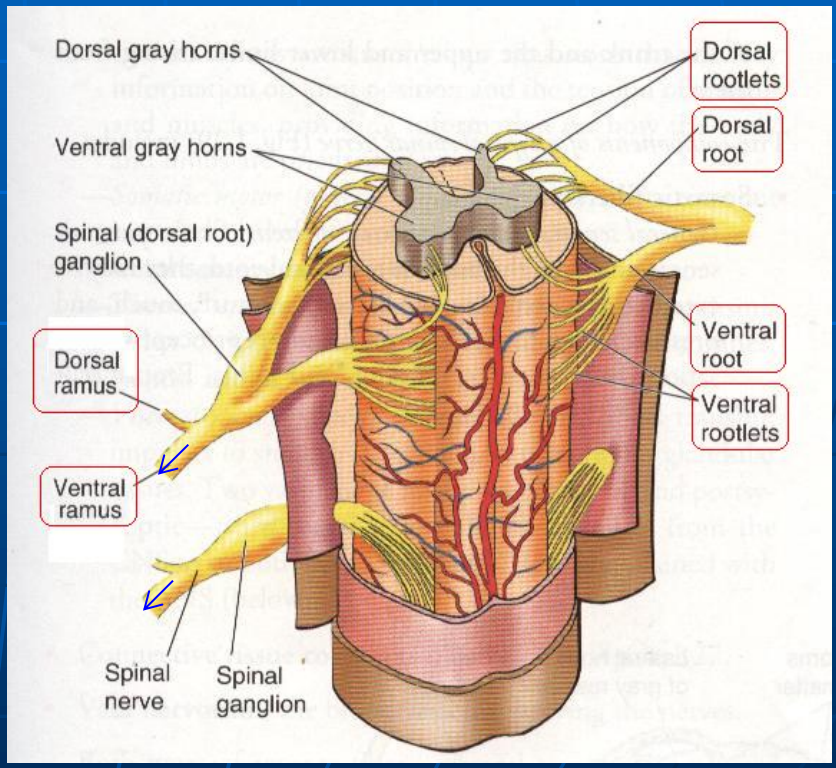
Objectives

- **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.**

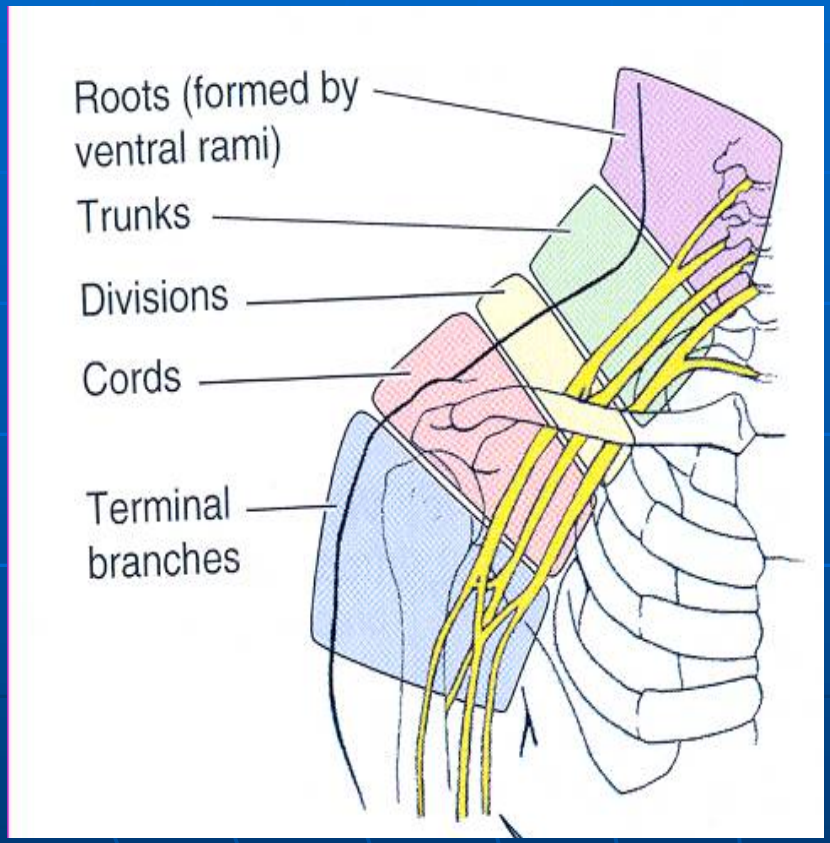
FORMATION OF BRACHIAL PLEXUSES

- **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



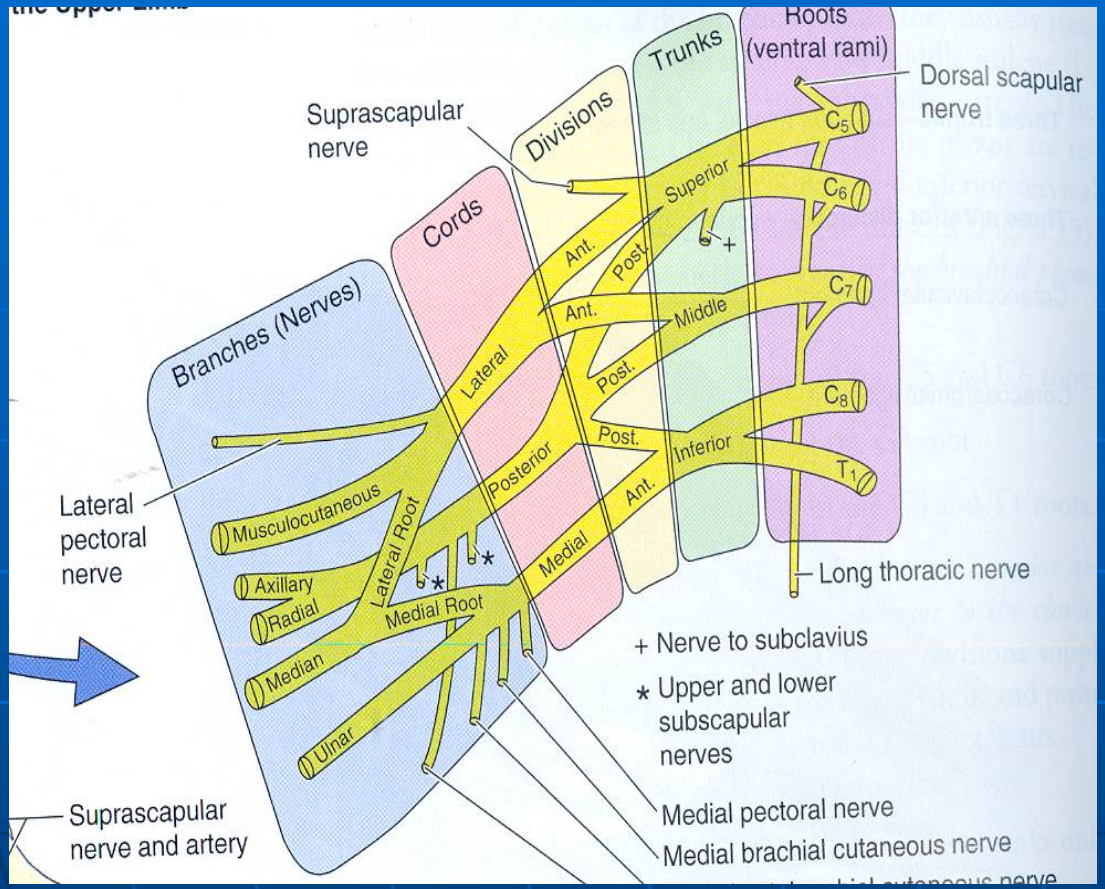


DIVISIONS (STAGES)



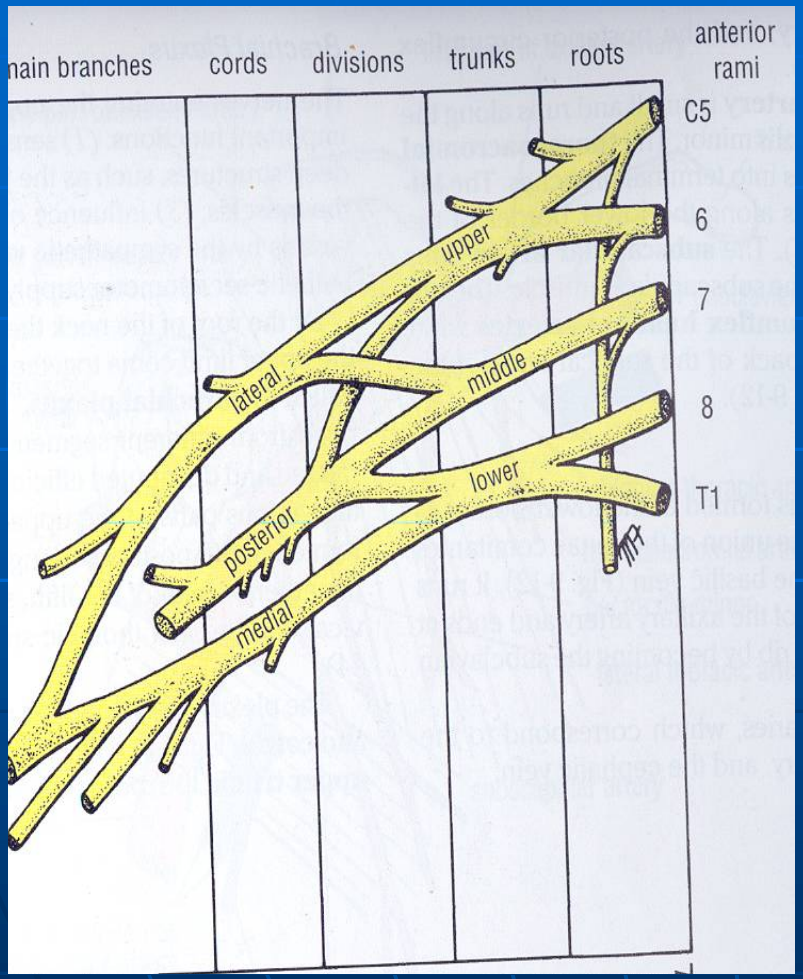
- **The plexus is divided into :**
  - **Roots**
  - **Trunks**
  - **Divisions**
  - **Cords**
  - **Terminal branches**

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**

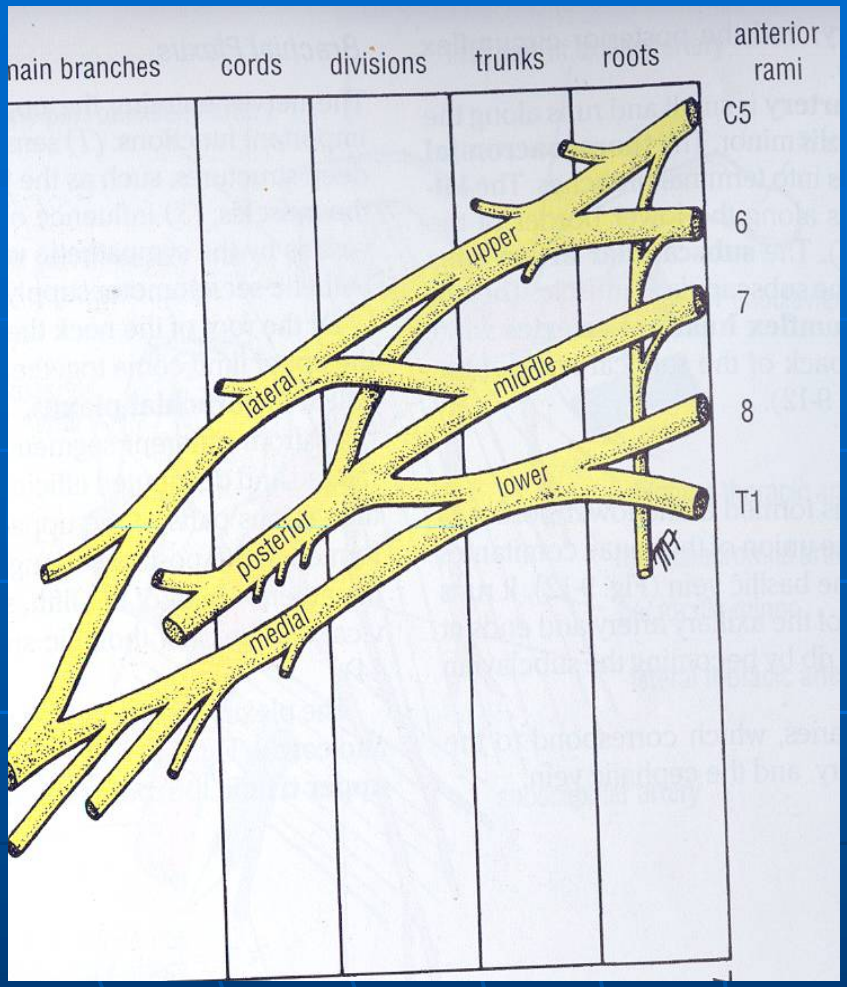
DIVISIONS & CORDS



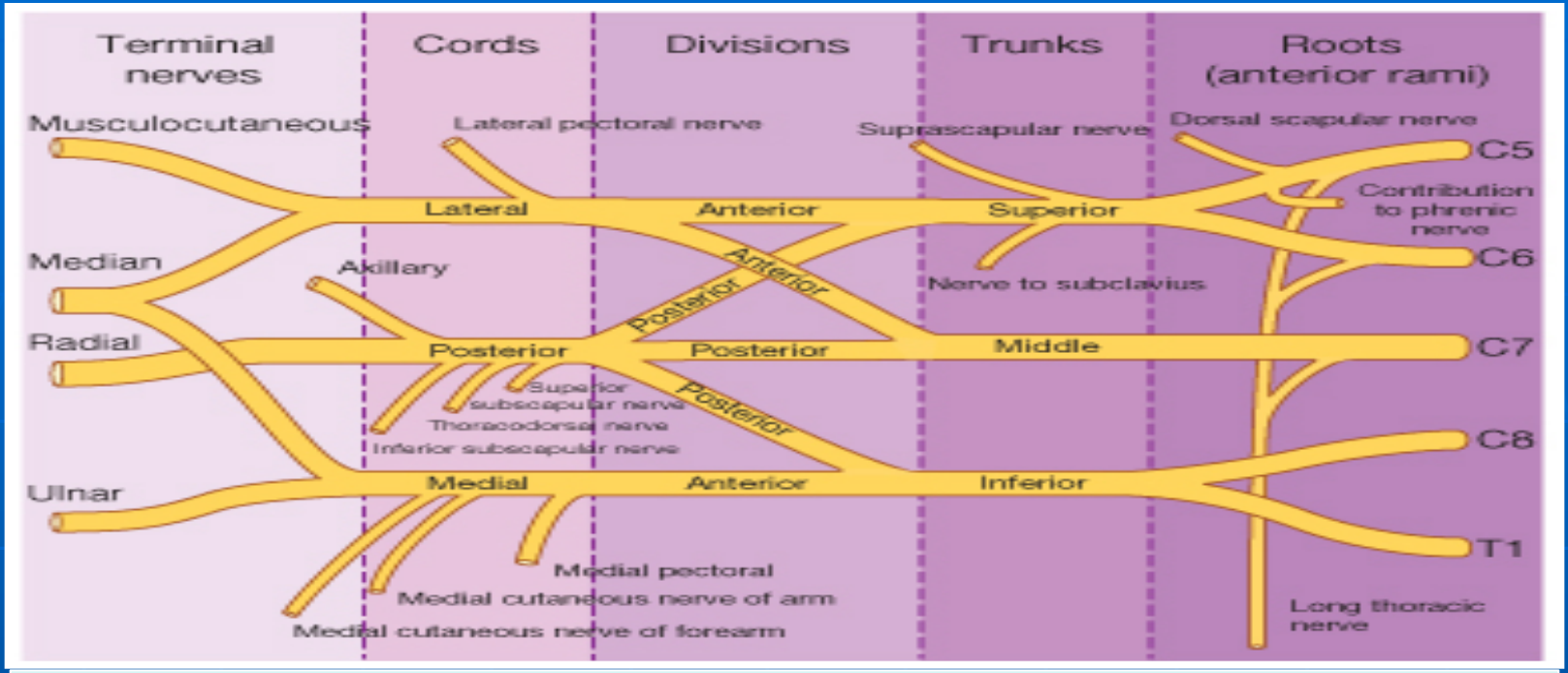
- **Each trunk divides into anterior and posterior division**
- **Posterior cord:**
  - **From the 3 posterior divisions of the 3 trunks.**
- **Lateral cord:**

  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



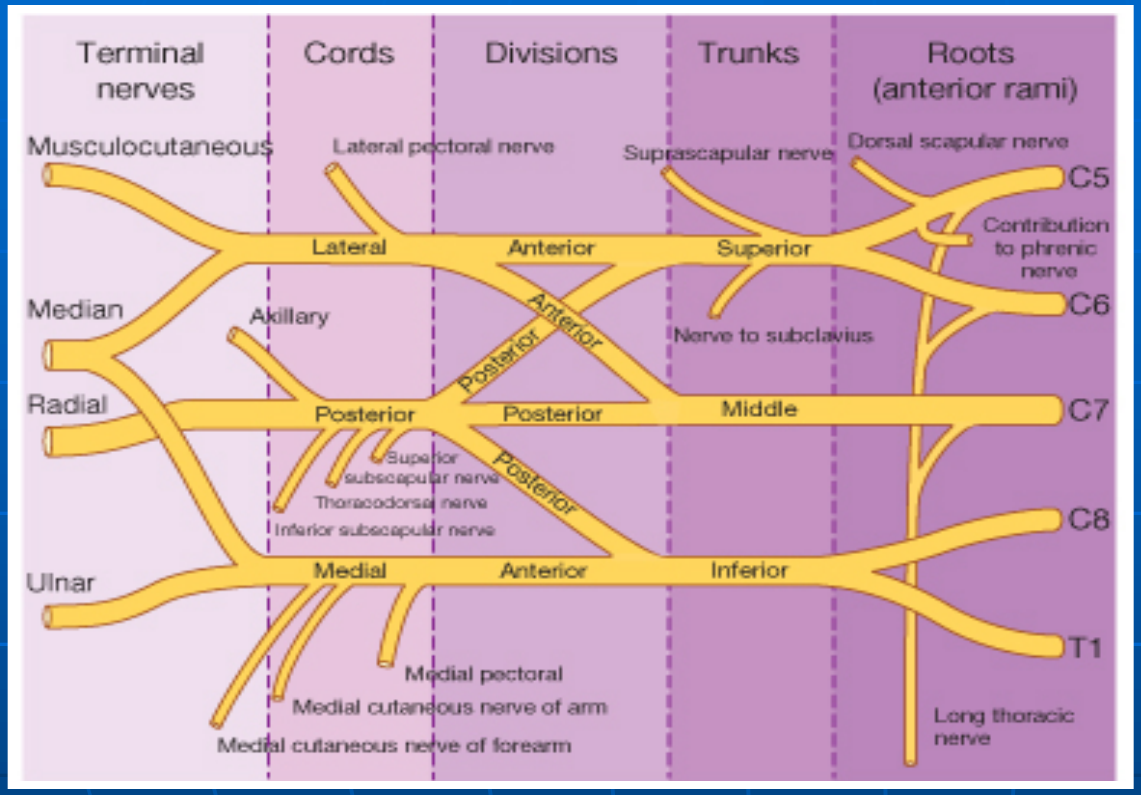
- **Branches**
  - **All three cords will give branches in the axilla, those will supply their respective regions**



The Plexus can be divided into 5 stages:

- **Roots:** in the posterior∆
- **Trunks**: in the posterior∆
- **Divisions**: behind the clavicle
- **Cords:** in the axilla
- **Branches**: in the axilla

BRANCHES



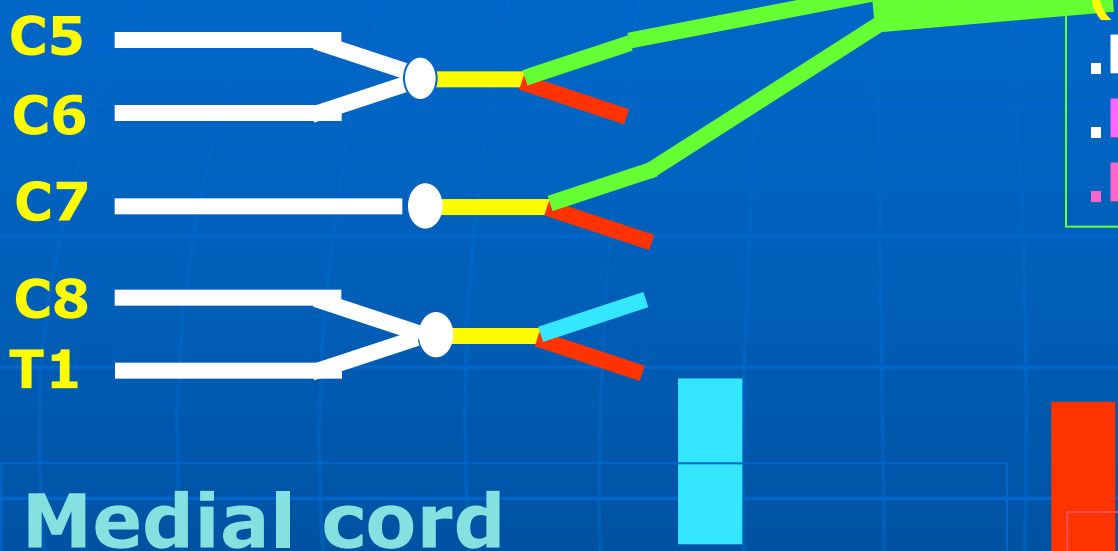
(A) From Roots:

- **1. C5: Nerve to rhomboids (dorsal scapular nerve).**
- **2. C5 : contribution to phrenic N.(3-5).**
- **3. C5,6 &7: Long thoracic nerve** (N.to 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.(for LD muscle)

.Radial n

.Axillary n

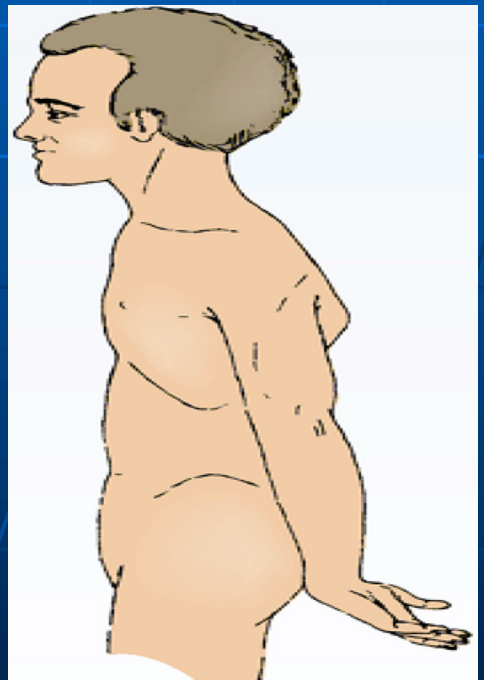
Brachial Plexus Injuries

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 or policeman's tip hand.**

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



Brachial Plexus Injuries

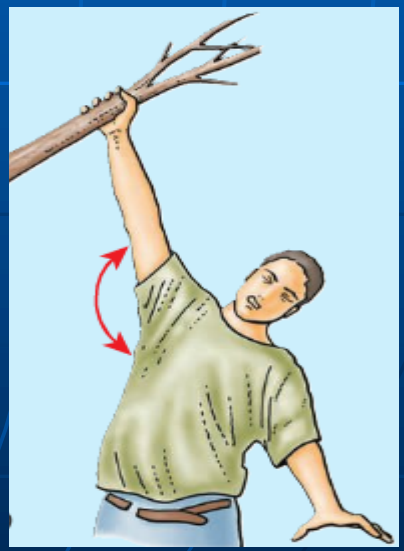
Lower Lesions of the Brachial Plexus

LowerTrunk (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 results from ulnar nerve injury

APE HAND results 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 (L1):***

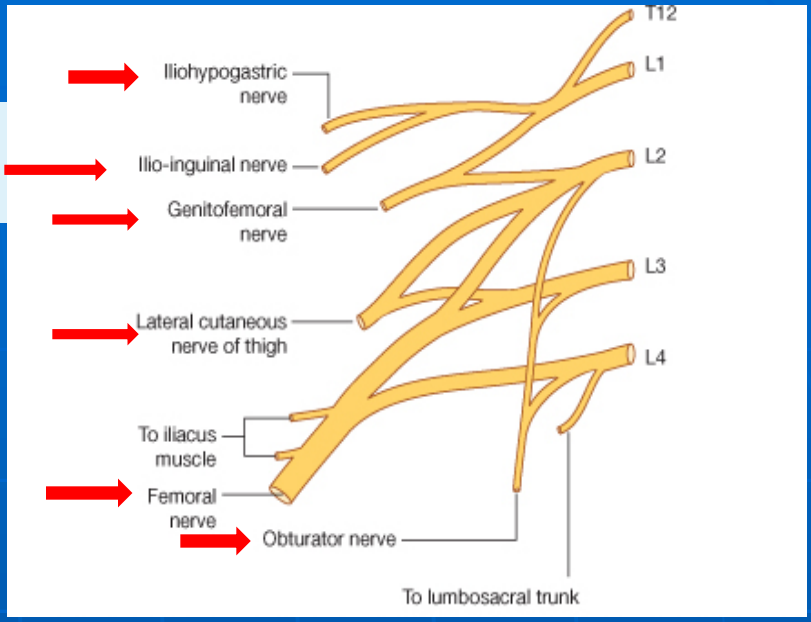
    to anterior abdominal wall.

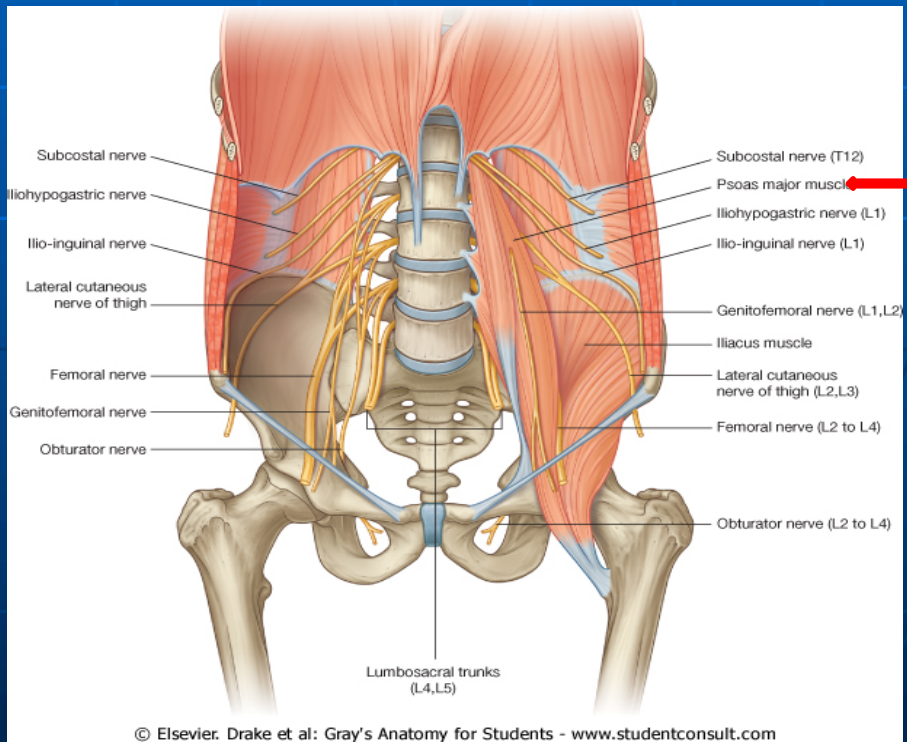
  - **Genitofemoral (L1&2).**
  - **Lateral cut.n.of thigh (L2&3)**
  - ***Obturator (L2,3&4):***

    to medial compartment of thigh

  - ***Femoral (L2,3&4):***

    to anterior compartment of thigh





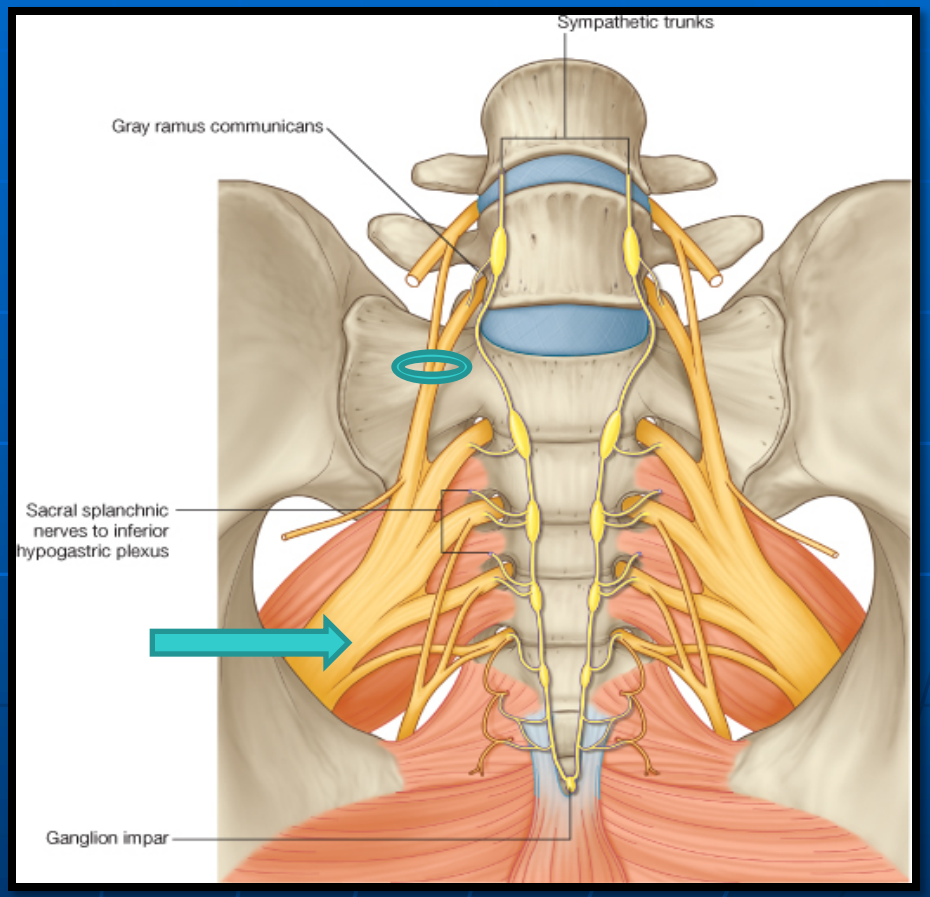
SACRAL PLEXUS

- **Formation:**

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

- **Site:**

  In front of piriformis muscle



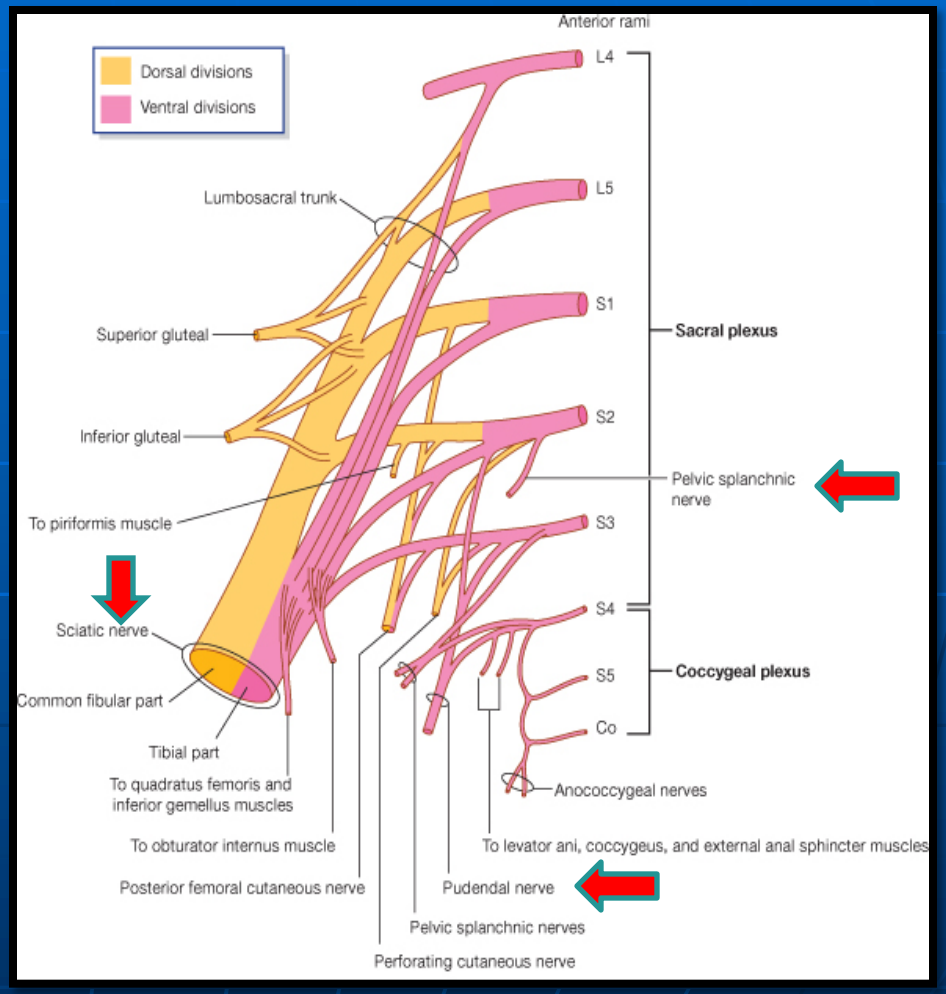
SACRAL PLEXUS

- **Main branches:**

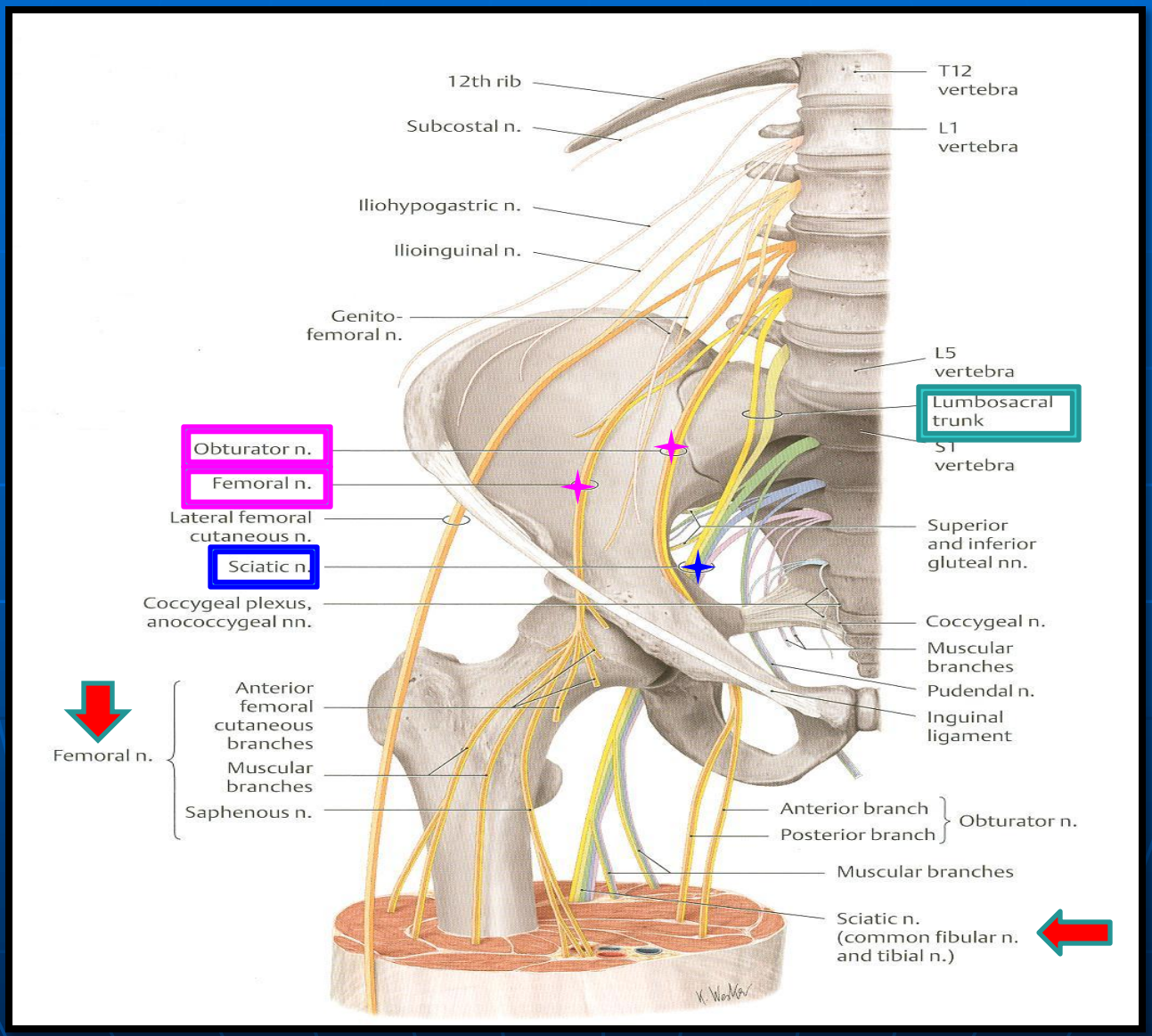
  Pelvic splanchnic nerve (from sacral S2,3): **preganglionic parasympathetic to pelvic viscera & hindgut**

  Pudendal nerve (from sacral plexus (S2,3,4):
  to perineum

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

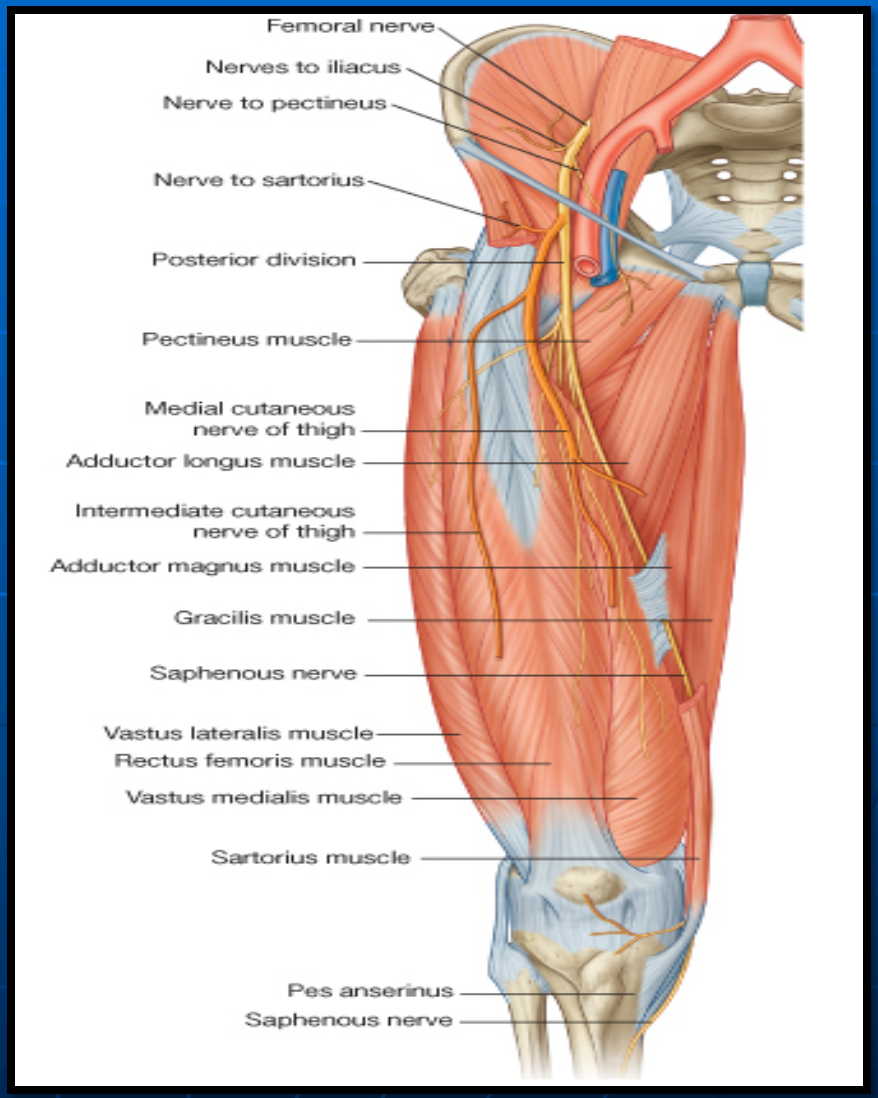


LUMBAR & SACRAL PLEXUS



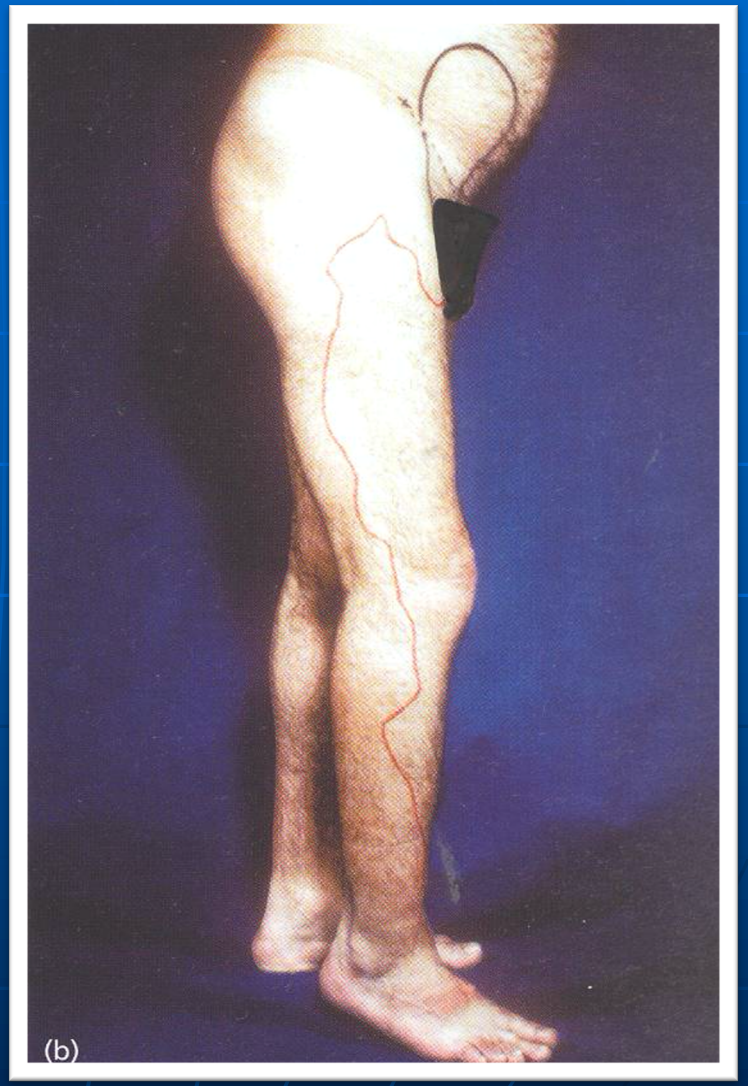
FEMORAL NERVE

- **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

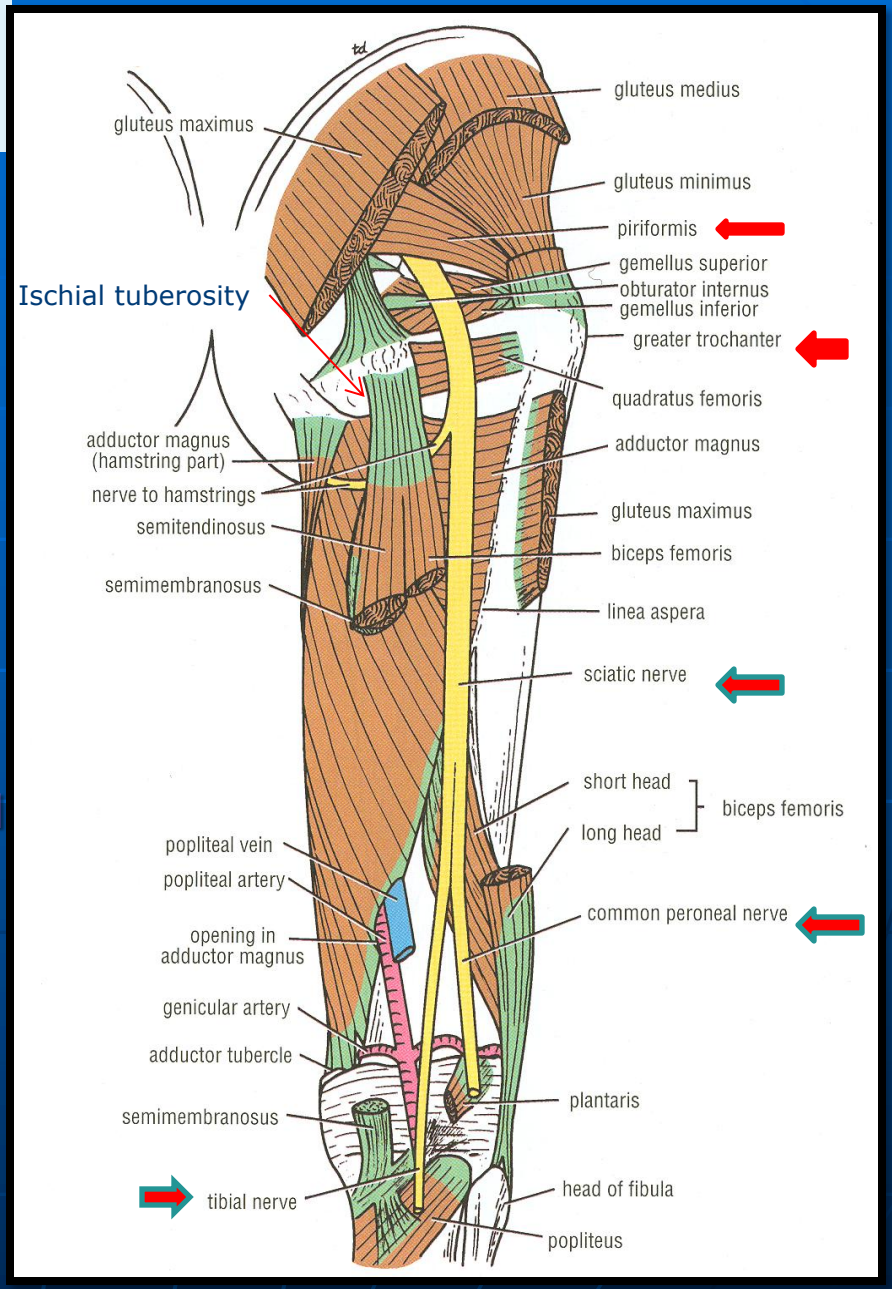
- **Motor effect:**
  - Wasting of quadriceps femoris
  - Loss of extension of knee
  - Weak flexion of hip (psoas major is intact ; and it takes supply from other fibers of the lumbar plexus)
- **Sensory effect:**
  - loss of sensation over areas supplied antero-medial aspect of thigh & medial side of leg & foot (injury of Saphenous br.of femoral)



SCIATIC NERVE

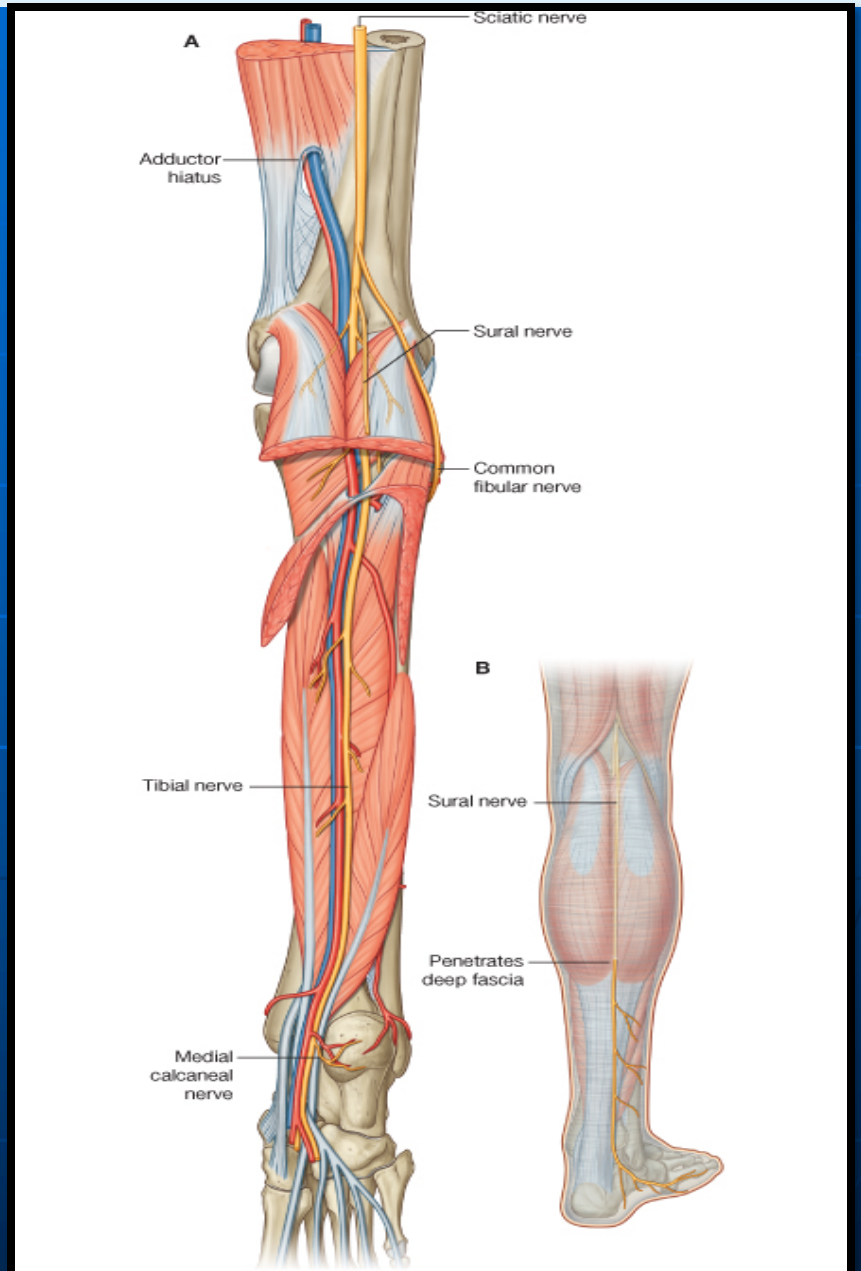
The largest nerve of the body

- **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 supply **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 (Medial & lateral plantar nerves)



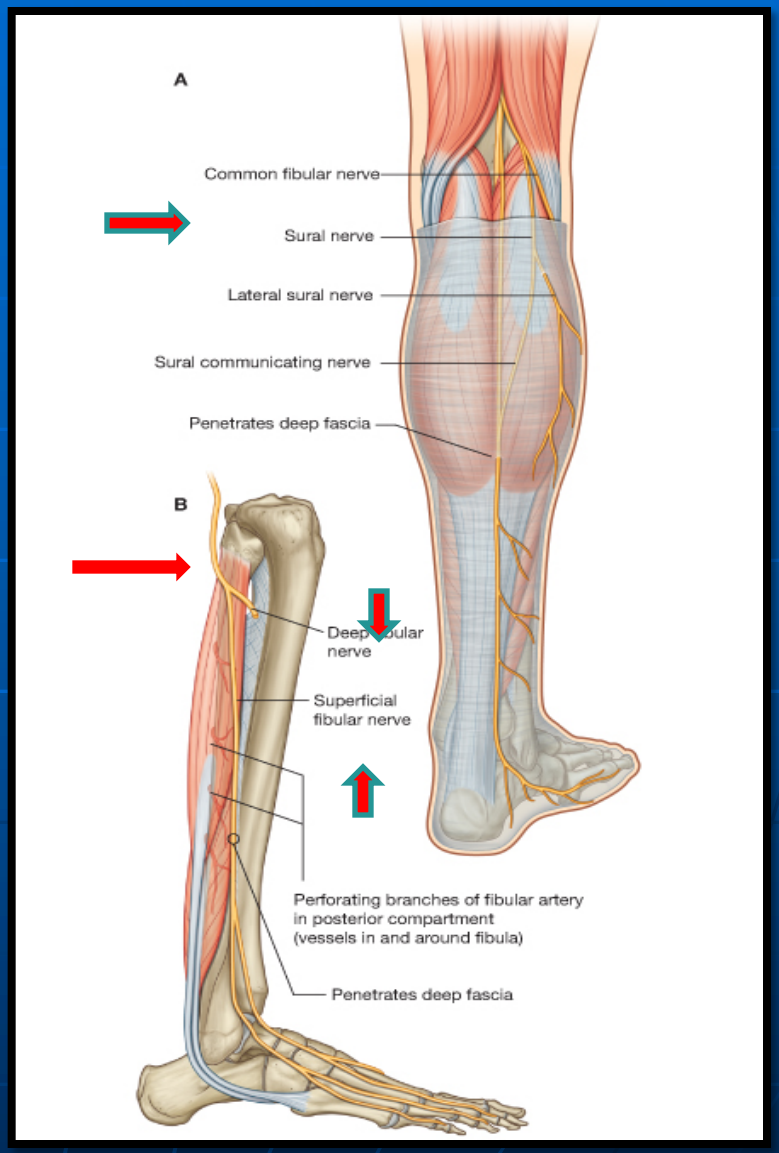
COMMON PERONEAL (FIBULAR) NERVE

- **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 msucle.
- **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 hamstring muscles ;so weak flexion of knee ; weak extension of hip, and affect also all movements of leg & foot.
  - **Foot drop** (injury of common peroneal N.) is the common manifestation of sciatic nerve injury.
  - As well as loss of sensation of skin of back of leg ; lateral side and dorsum of 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
- Musclocutanous

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**