PECTORAL REGION & AXILLA

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OBJECTIVES

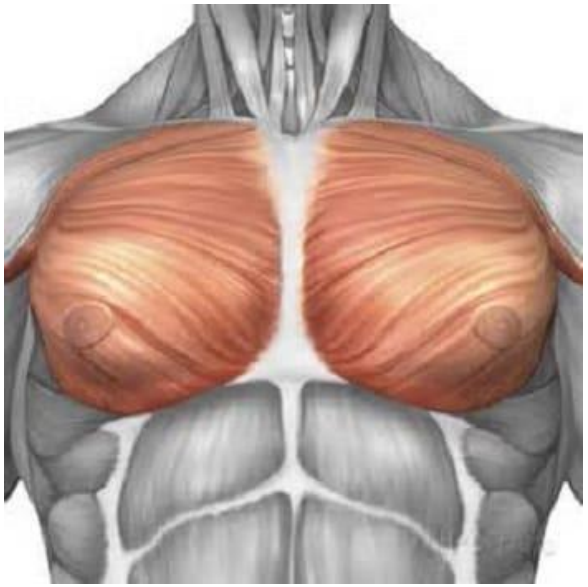
At the end of the lecture the students should be able to :

- Identify and describe the muscles of the pectoral region.
  - Pectoralis major
  - Pectoralis minor
  - Subclavius
  - Serratus anterior
- Describe and demonstrate the boundaries and contents of the axilla.
- Brachial Plexus
- Clinical Significances

PECTORAL REGION

INTRODUCTION

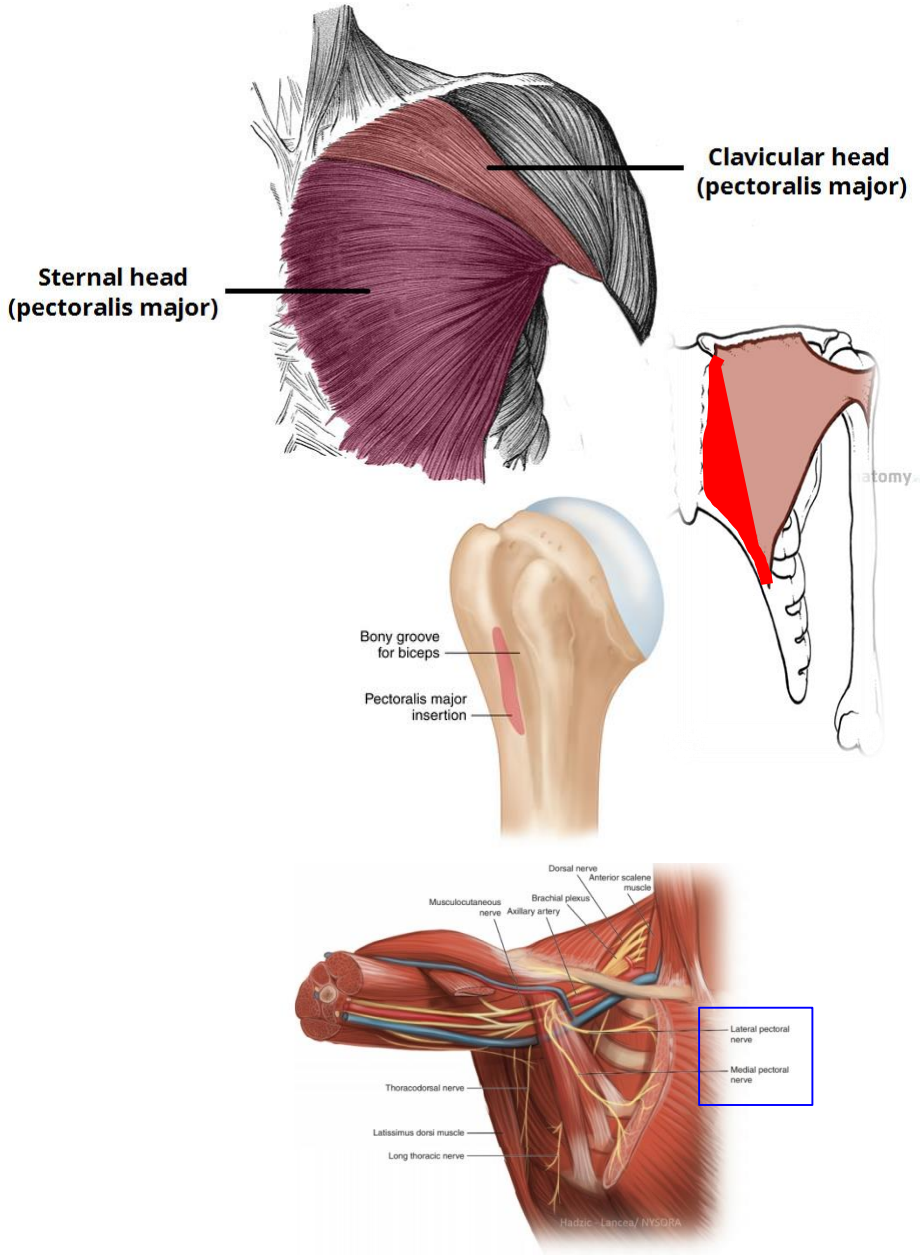
- The pectoral region is located on the anterior aspect of the thorax.
- It contains muscles that connect the front of the human chest with the bones of the upper arm and shoulder



PECTORALIS MAJOR

- The pectoralis major is the most superficial muscle in the pectoral region.
- It is large and fan shaped, and is composed of a sternal head and a clavicular head.

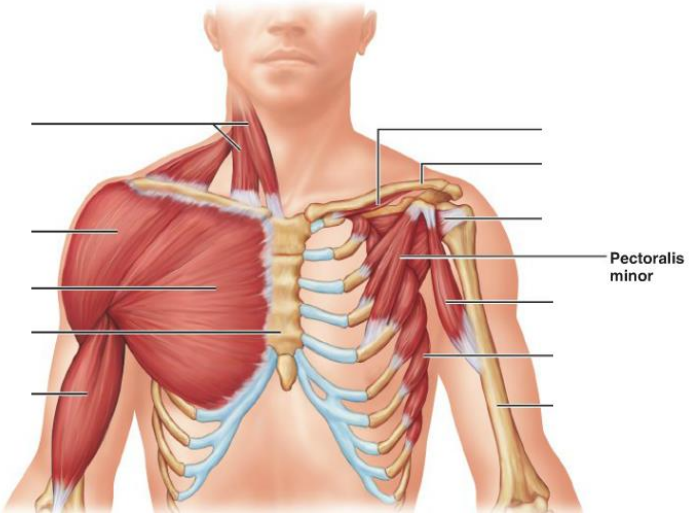
- Origin: 2 heads
  - Clavicular head
    - From medial ½ of the front of the clavicle.
  - Sternocostal head
    - From Sternum, Upper 6 costal cartilages and Aponeurosis of external oblique muscle.
- Insertion:
  - Lateral lip of bicipital groove.
- Nerve supply:
  - Medial & lateral pectoral nerves.
- Action:
  - Adduction and medial rotation of the arm.
  - Clavicular head helps in flexion of arm (shoulder).

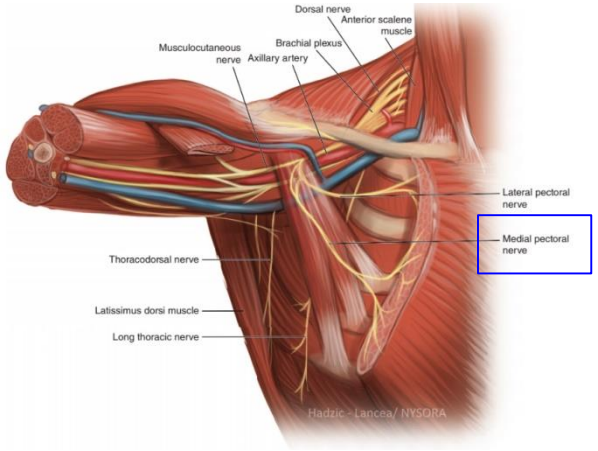


PECTORALIS MINOR

- The pectoralis minor lies underneath pectoralis major.
- Both of these muscles form part of the anterior wall of the axilla region.

- **Origin:**
  - From 3rd ,4th & 5th ribs close to their costal cartilages.
- **Insertion:**
  - Coracoid process.
- **Nerve supply:**
  - Medial pectoral nerve.
- **Action:**
  - Depression of shoulder.
  - Draw the ribs upward and outwards during deep inspiration.

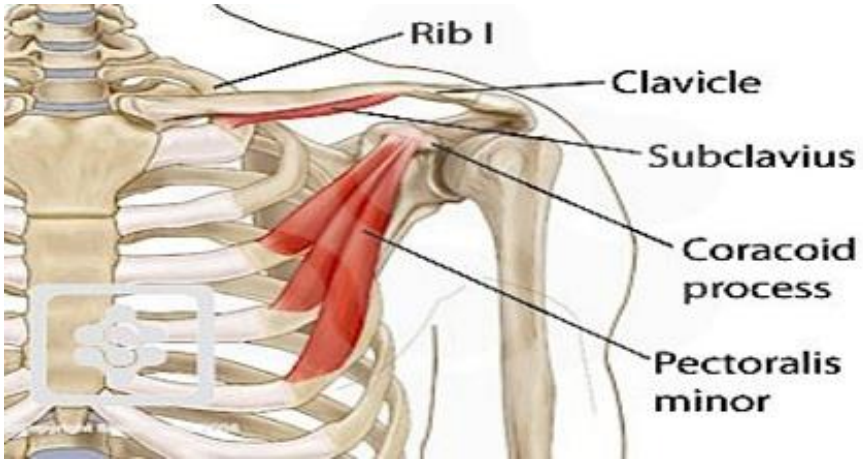




SUBCLAVIOUS

- The subclavius is small muscle which is located directly underneath the clavicle running horizontally.

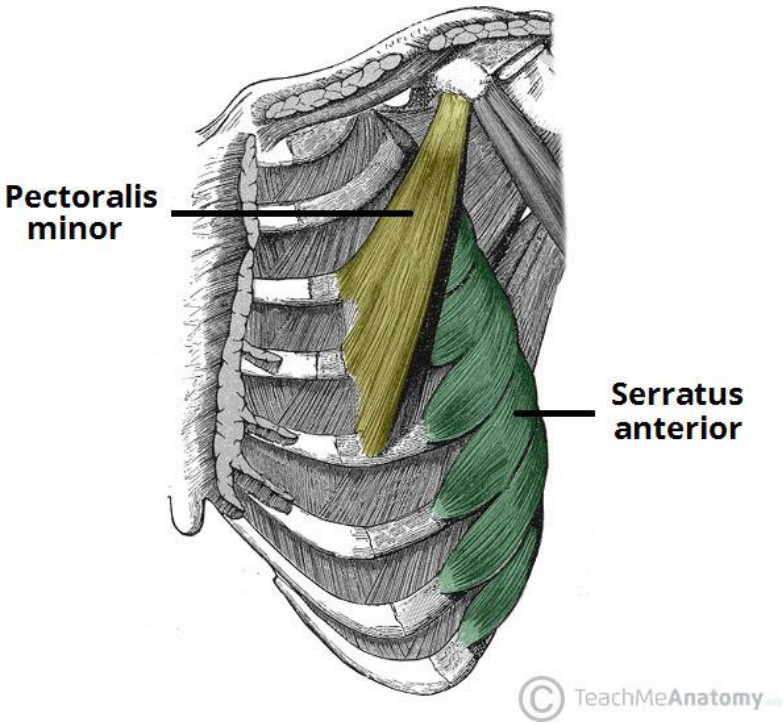
- Origin:
  - From 1st rib at its junction with the 1st costal cartilage.
- Insertion:
  - Subclavian groove at the middle 1/3 of the inferior surface of clavicle.
- Nerve supply:
  - Nerve to subclavius from upper trunk of brachial plexus.
- Action:
  - Fixes the clavicle during movement of shoulder joint.

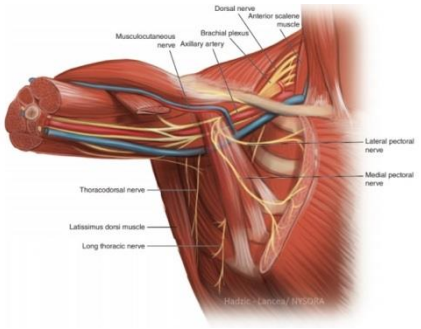


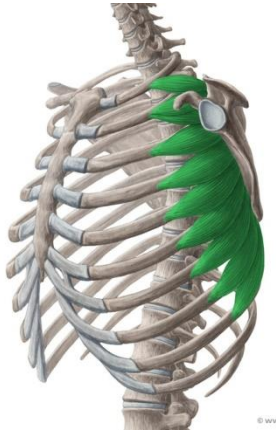
SERRATUS ANTERIOR

- The serratus anterior is located more laterally in the chest wall, and forms the medial border of the axilla region.

- Origin:
  - Upper eight ribs.
- Insertion:
  - Anterior aspect of the medial border and inferior angle of scapula.
- Nerve supply:
  - Long thoracic nerve.
- Action:
  - Draws the scapula forward.
  - Rotates scapula outwards in raising the arm above 90 degree.





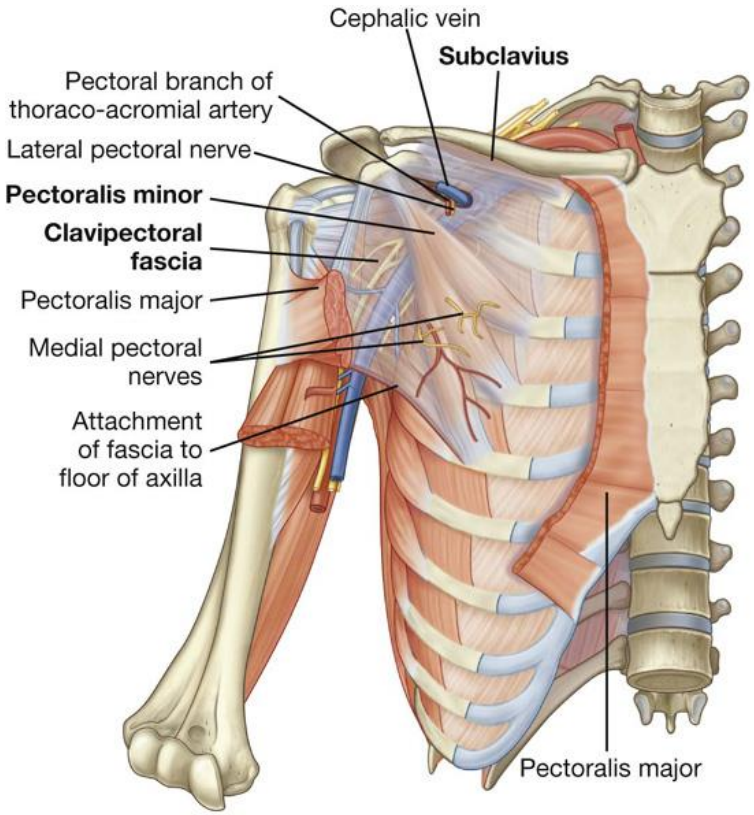


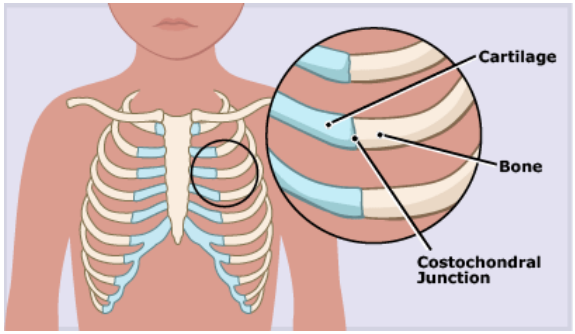
CLAVIPECTORAL FASCIA

- A fascia is a fibrous connective tissue that can be found throughout the body.
- They wrap around neurovascular structures, organs and muscles in order to protect them.

CLAVIPECTORAL FASCIA

- A thick, bilateral connective tissue structure deep to pectoralis major.
- It extends superiorly from the clavicle, medially from the costochondral joints, and superolaterally from the coracoid process.
- The fascia converges in the axilla, where it acts as a protective structure over the neurovascular structure of the axilla.
- It is pierced by:
  - Lateral pectoral nerve.
  - Thoraco- acromial artery.
  - Cephalic vein.
  - Few lymph vessels.

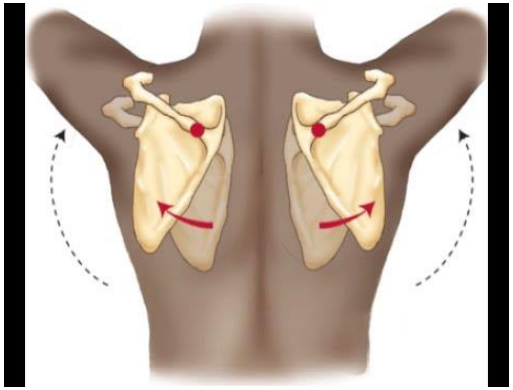




CLINICAL SIGNIFICANCE

Winging of the Scapula

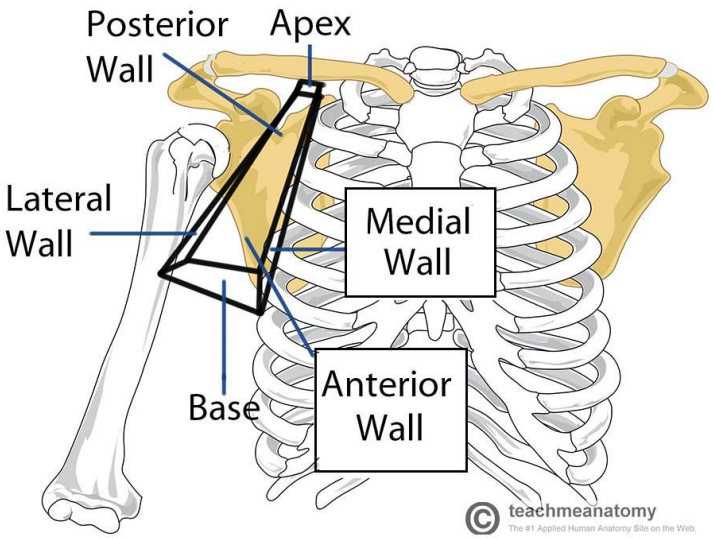
- One of the actions of the serratus anterior is to hold the scapula against the ribcage.
- If the long thoracic nerve is damaged (and the serratus anterior therefore paralysed), a specific clinical sign is produced.
- In cases such as this, the scapula is no longer held against the ribcage – and protrudes out of the back.
- It is said to have a winged appearance.
- Long thoracic nerve palsy is thought to most commonly occur from traction injuries, where the upper limb is stretched violently.



AXILLA

INTRODUCTION

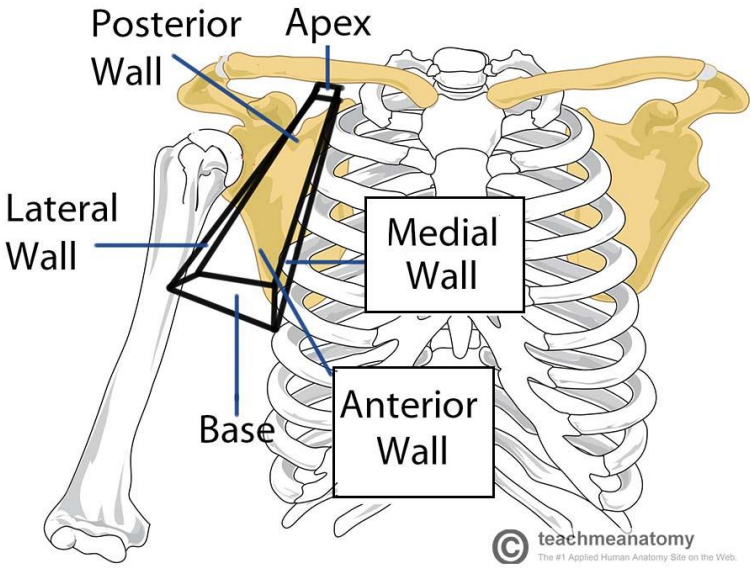
- The axilla is the name given to an area that lies underneath the glenohumeral joint at the junction of the upper limb and the thorax.
- It is a passageway by which neurovascular and muscular structures can enter and leave the upper limb.
- Axilla has an apex, a base and four walls.



BOUNDRIES

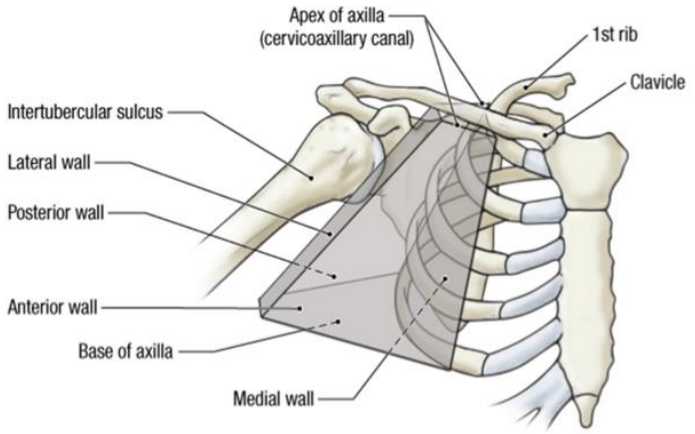
Apex

- Directed upwards into the root of the neck.
- Bounded by 3 bones:
  - Clavicle anteriorly.
  - Upper border of the scapula posteriorly.
  - Outer border of the first rib medially.
  - It is called cervico-axillary canal.
    - the passageway that extends between the neck and the upper extremities through which the long thoracic nerve and other structures pass



Base

- Formed by skin stretching between the anterior and posterior walls.
- Bounded:
  - In FRONT by the anterior axillary fold (formed by the lower border of the Pectoralis major muscle).
  - BEHIND by the posterior axillary fold (formed by the tendons of latissimus dorsi and teres major muscle).
  - MEDIALLY by upper 4 to 5 ribs & the chest wall.



WALLS OF AXILLA

Anterior

- Formed by
  - Pectoralis major
  - Pectoralis minor
  - Subclavius
  - Clavipectoral fascia

Posterior

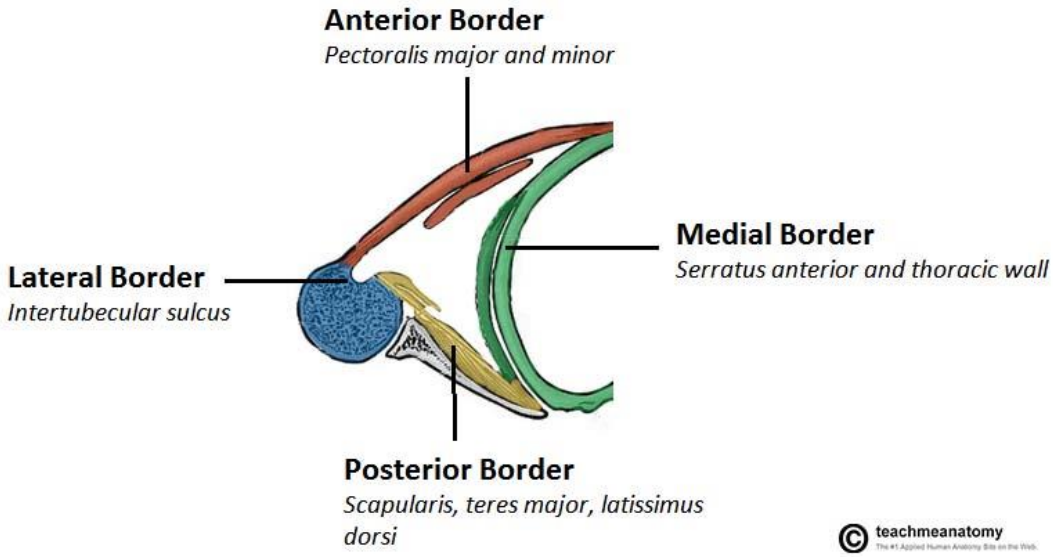
- Formed by:
  - Subscapularis.
  - Latissimus dorsi.
  - Teres major muscles.

Medial

- Formed by:
  - Serratus anterior
  - Upper 4-5 ribs & Intercostal muscles.

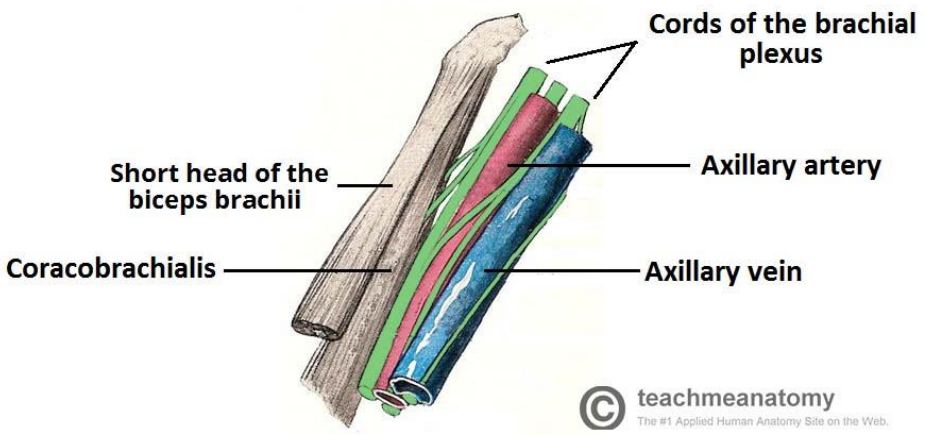
Lateral

- Formed by:
  - Coracobrachialis.
  - Biceps brachii.
  - Intertubercular groove of the humerus.



CONTENTS

- Axillary artery: It is the main artery supplying the upper limb.
- Axillary vein: The main vein draining the upper limb, its two largest tributaries are the cephalic and basilic veins.
- Brachial plexus: A collection of spinal nerves that form the peripheral nerves of the upper limb.
- Biceps brachii and coracobrachialis: These muscle tendons move through the axilla, where they attach to the coracoid process of the scapula.
- Axillary Lymph nodes: The axillary lymph nodes filter lymph that has drained from the upper limb and pectoral region. In women, axillary lymph node enlargement is a non-specific indicator of breast cancer.

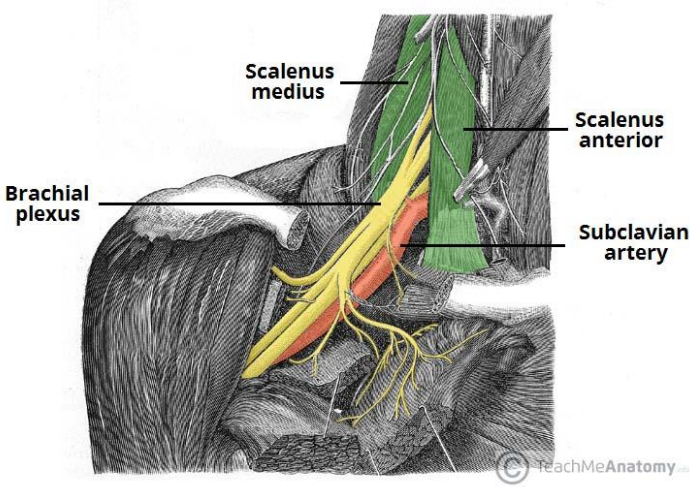


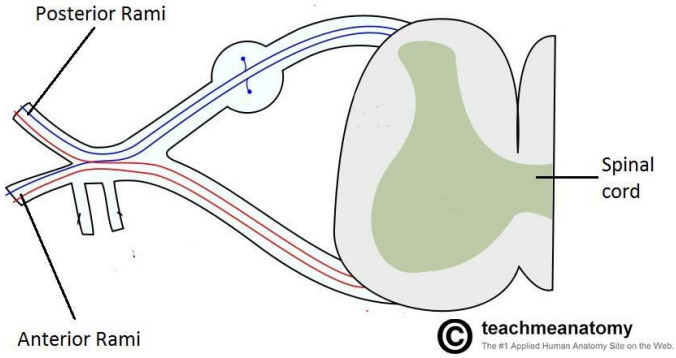
VIDEO

BRACHIAL PLEXUS

BRACHIAL PLEXUS

- The brachial plexus is a network of nerve fibers that supplies the skin and musculature of the upper limb.
- It begins in the root of the neck, passes through the axilla, and enters the upper arm.
- The plexus is formed by the anterior rami (divisions) of the cervical spinal nerves C5, C6, C7 and C8, and the first thoracic spinal nerve, T1.
- At each vertebral level, paired spinal nerves arise.
- They leave the spinal cord via the intervertebral foramina of the vertebral column.
- Each nerve then divides into anterior and posterior nerve fibers.
- The roots of the brachial plexus are formed by the anterior divisions of spinal nerves C5-T1.
- The posterior divisions go on to innervate the skin and musculature of the trunk.





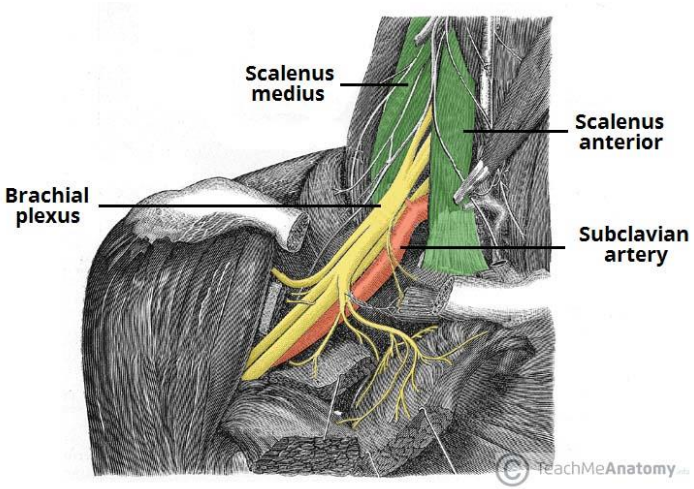
BRACHIAL PLEXUS

What is a Brachial Plexus ?

- Brachial Plexus is a network of nerves that present at the root of the neck to enter the upper limb.

Location & Formation

- Brachial Plexus is present in the posterior triangle of the neck & axilla.
- It is formed by the union of the anterior Rami of the C 5th , 6th , 7th & 8th and the 1st thoracic spinal nerve.



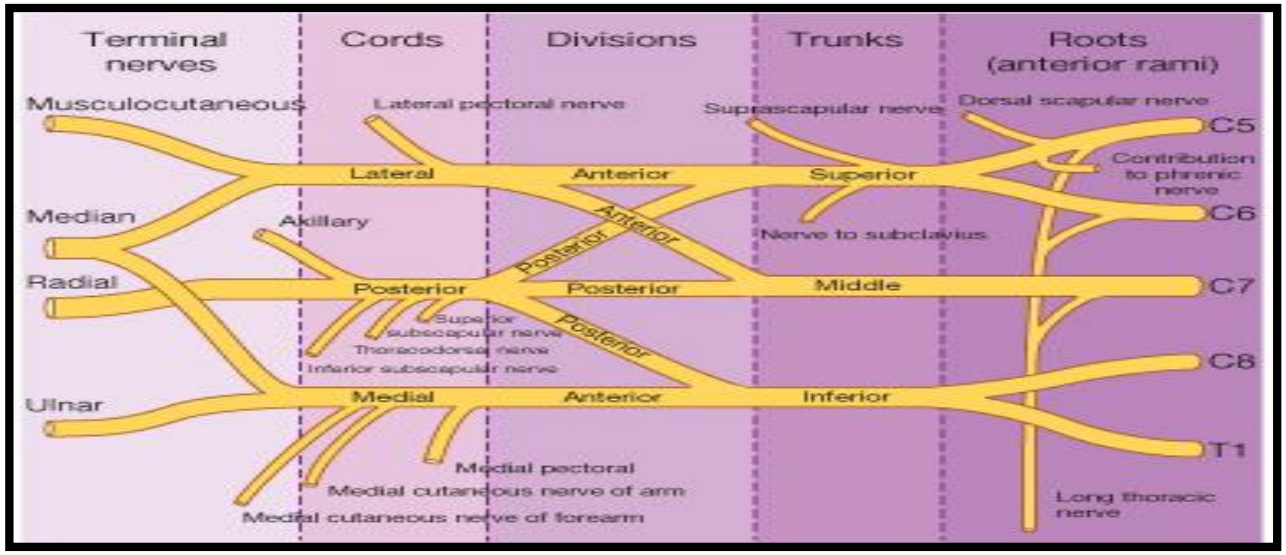
Roots of C5 & C6 unite to form ----- Upper trunk
Root of C7 continues as the --------- Middle trunk
Roots of C8 & T1 unite to form ---- Lower trunk

BRACHIAL PLEXUS

The Plexus can be divided into 5 stages:

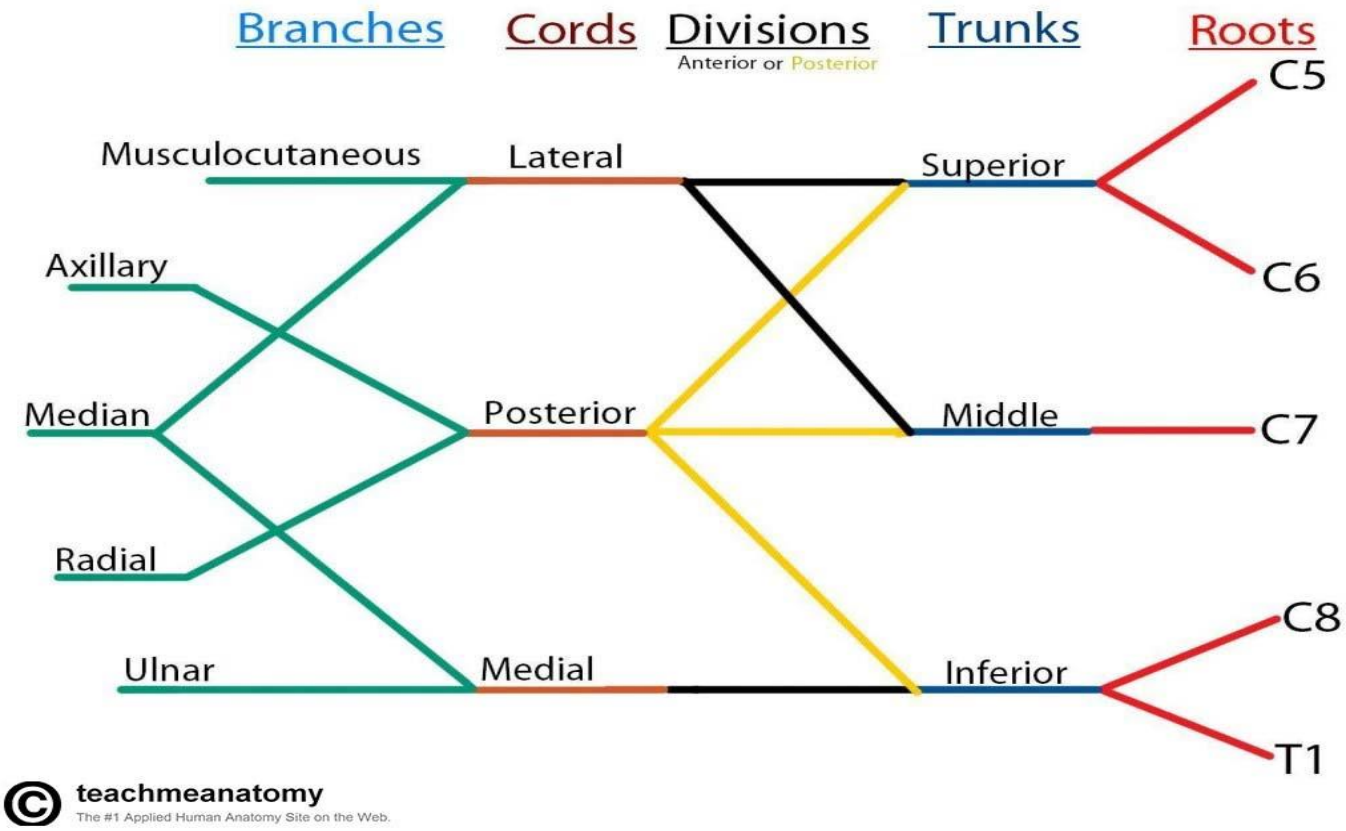
- Roots: in the posterior
- Trunks: in the posterior
- Divisions: behind the clavicle (in cervico-axillary canal)
- Cords: in the axilla
- Branches: in the axilla

The first 2 stages lie in the posterior triangle, while the last 2 sages lie in the axilla.



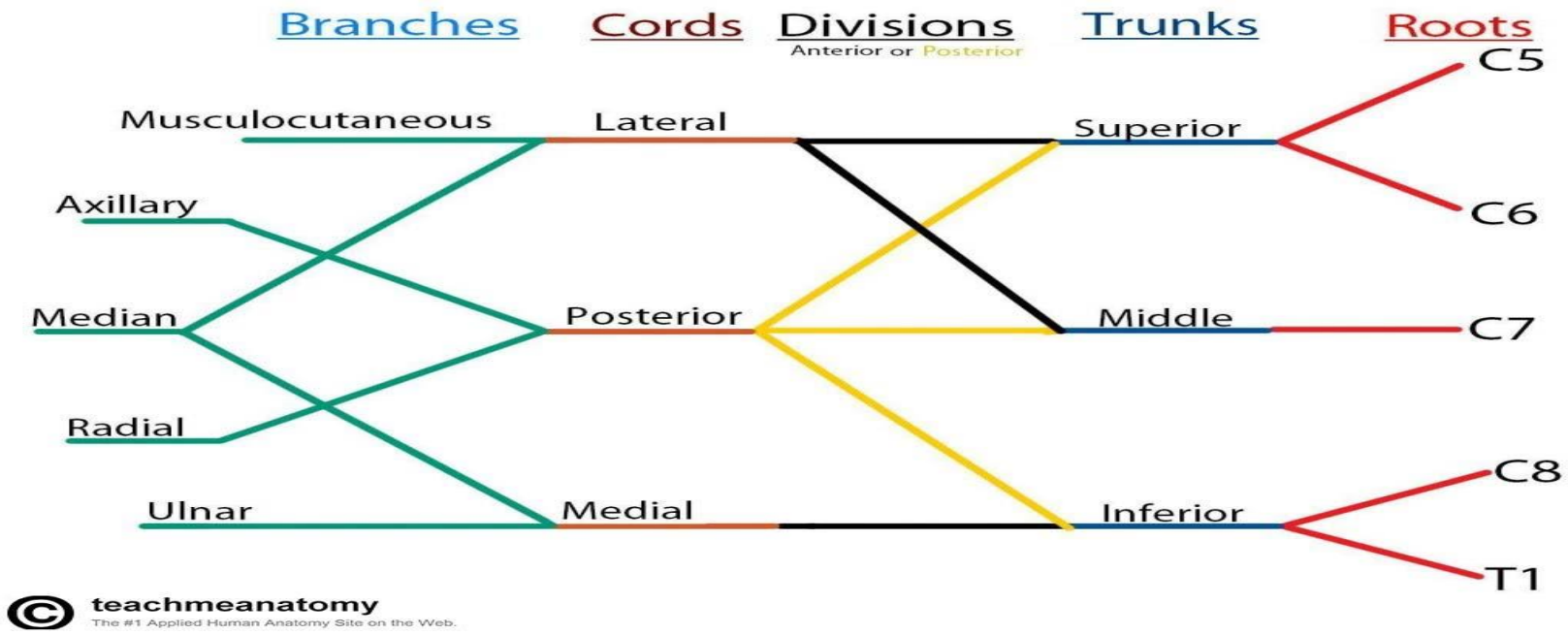
BRACHIAL PLEXUS

- The anterior divisions of the upper and middle trunks unite to form the Lateral cord.
- The anterior division of the lower trunk continues as the Medial cord.
- All the posterior divisions of three trunks join to form the Posterior cord.



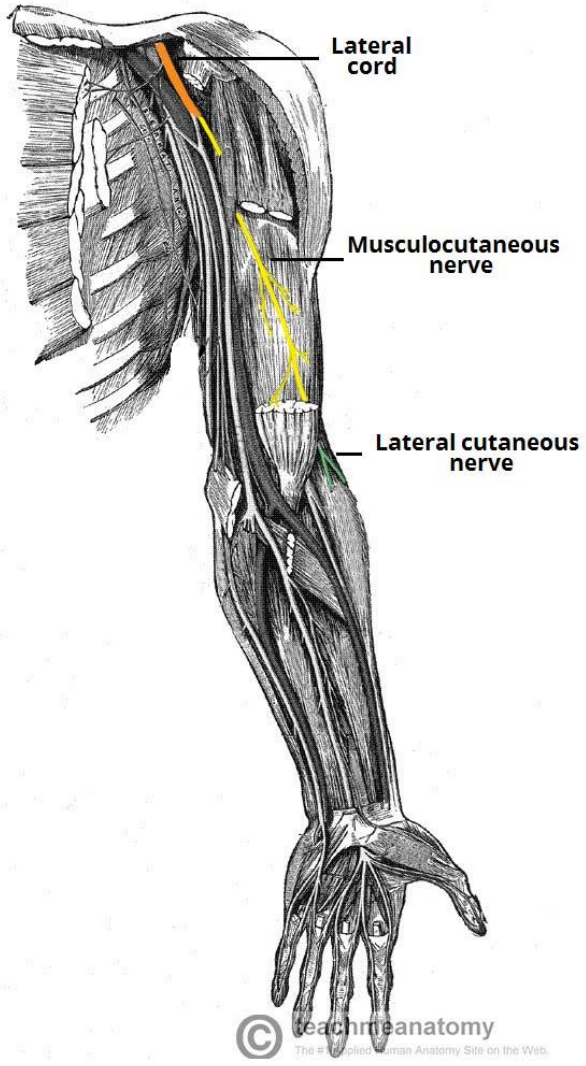
BRACHIAL PLEXUS

Lateral cord-3	Medial cord-5	Posterior cord-5
Lateral pectoral nerve.	Medial pectoral nerve.	Axillary nerve.
Musculocutaneous nerve.	Ulnar nerve.	Radial nerve.
Median nerve (lateral root).	Median nerve (medial root).	Upper & lower subscapular nerves.
	Medial cutaneous nerve of arm & forearm.	Thoracodorsal or N. to latissimus dorsi.



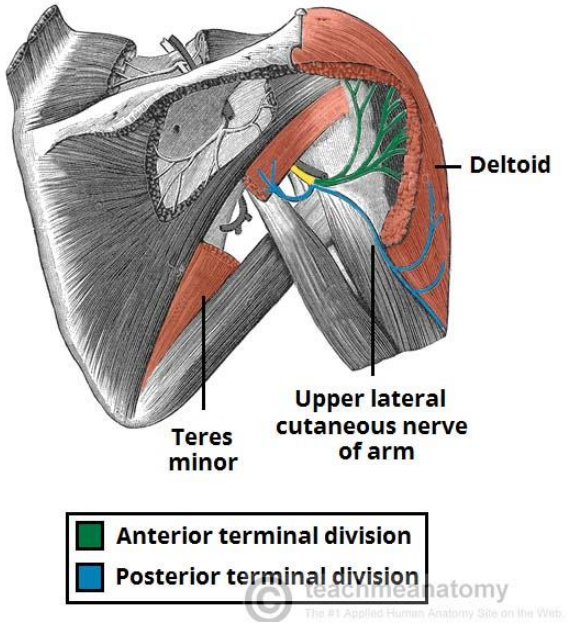
THE MUSCULOCUTANEOUS NERVE

- **Roots:** C5, C6, C7.
- **Motor Functions:** Innervates the following muscles:
  - Brachialis
  - Biceps brachii
  - Coracobrachialis
- **Sensory Functions:** Gives off the lateral cutaneous branch of the forearm, which innervates the lateral half of the anterior forearm, and a small lateral portion of the posterior forearm.



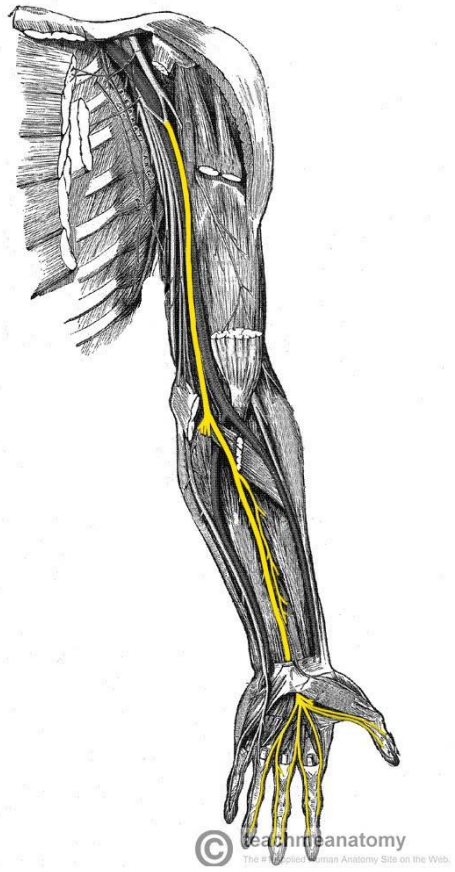
THE AXILLARY NERVE

- **Roots:** C5 and C6.
- **Motor Functions:** Innervates the following muscles:
  - Teres minor
  - Deltoid
- **Sensory Functions:** Gives off the superior lateral cutaneous nerve of arm, which innervates the inferior region of the deltoid ("regimental badge area").



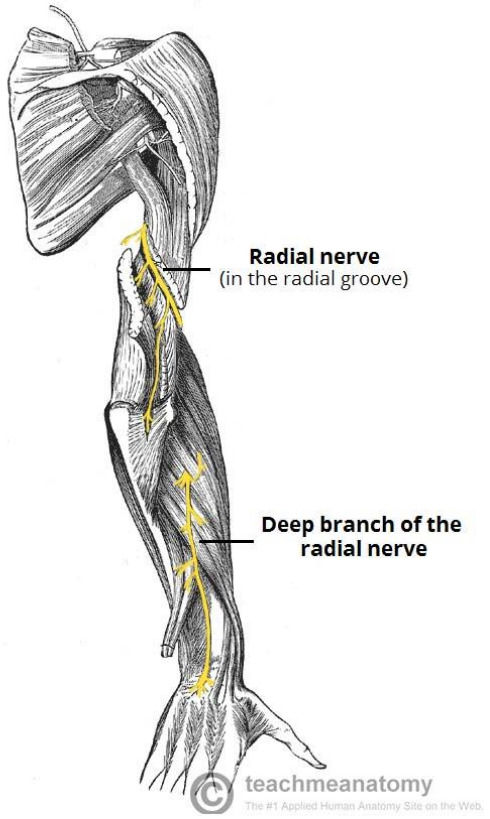
THE MEDIAN NERVE

- **Roots:** C6 – T1.
- **Motor Functions:** Innervates the following muscles:
  - Most of the flexor muscles in the forearm.
  - The thenar muscles.
  - The two lateral lumbricals that move the index and middle fingers.
- **Sensory Functions:** Gives off the palmar cutaneous branch, which innervates the lateral part of the palm, and the digital cutaneous branch, which innervates the lateral three and a half fingers on the anterior (palmar) surface of the hand.



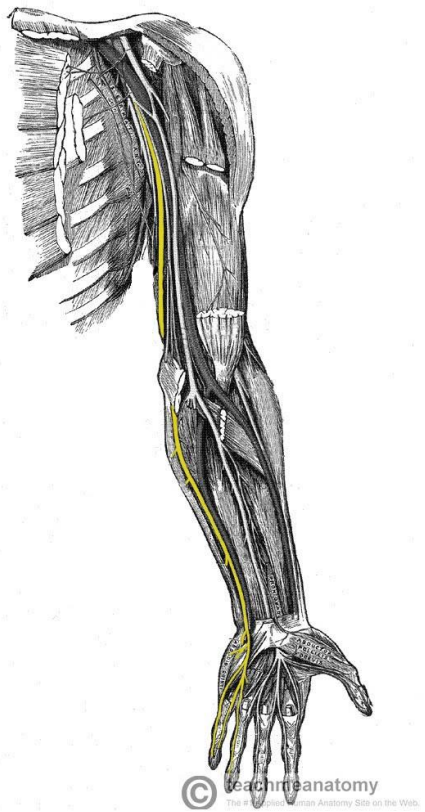
THE RADIAL NERVE

- **Roots:** C5-C8 and T1.
- **Motor Functions:** Innervates the following muscles:
  - The triceps brachii
  - The extensor muscles in the posterior compartment of the forearm
- **Sensory Functions:** Gives off the palmar cutaneous branch, which innervates the lateral part of the palm, and the digital cutaneous branch, which innervates the lateral three and a half fingers on the anterior (palmar) surface of the hand.



THE ULNAR NERVE

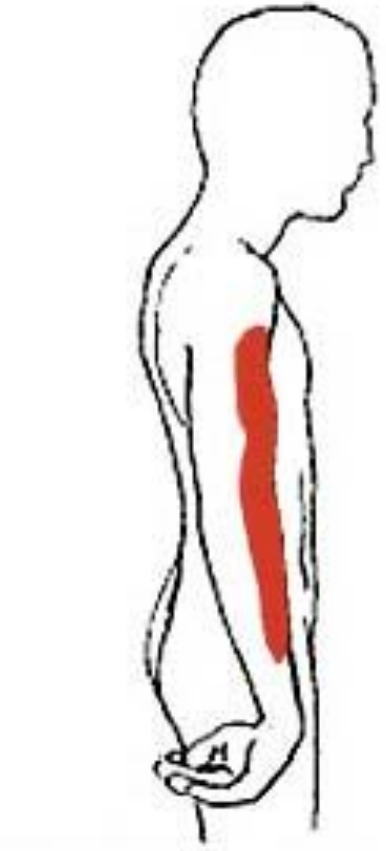
- **Roots:** C8 and T1.
- **Motor Functions:** Innervates the following muscles:
  - The muscles of the hand (apart from the thenar muscles and two lateral lumbricals)
  - Flexor carpi ulnaris
  - Medial half of flexor digitorum profundus
- **Sensory Functions:** Innervates the anterior and posterior surfaces of the medial one and half fingers, and associated palm area.



CLINICAL SIGNIFICANCE

Brachial plexus injury

- Minor damage often occurs during contact sports such as football or wrestling when the brachial plexus nerves get stretched or compressed.
- These are called stingers or burners, and can produce the following symptoms:
  - A feeling like an electric shock or a burning sensation shooting down your arm.
  - Numbness and weakness in your arm.
- More severe symptoms result from injuries that seriously injure or even tear or rupture the nerves.
- The most serious brachial plexus injury (avulsion) occurs when the nerve root is torn from the spinal cord.
- Signs and symptoms of more severe injuries can include:
  - Weakness or inability to use certain muscles in your hand, arm or shoulder.
  - Complete lack of movement and feeling in your arm, including your shoulder and hand.
  - Severe pain.



SUMMARY

- Muscles of the pectoral region are connecting the upper limb with anterior and lateral thoracic wall:
  - Pectoralis major
  - Pectoralis minor
  - Subclavius
  - Serratus anterior
- The axilla is a pyramidal space situated between the upper part of arm and the side of the chest, it has 4 walls (anterior, posterior, medial and lateral), base, and apex.
- The axilla is an important space as it transmits the neurovascular bundle from the neck and thorax to the upper limb.
- The contents of Axilla include:
  - Axillary vessels
  - Cords and branches of the brachial plexus
  - Axillary lymph nodes
- The brachial plexus
  - Roots
  - Trunks
  - Divisions
  - Cords
  - Branches
- Clinical Significances
  - Winging of the Scapula
  - Brachial plexus injury

QUESTIONS!