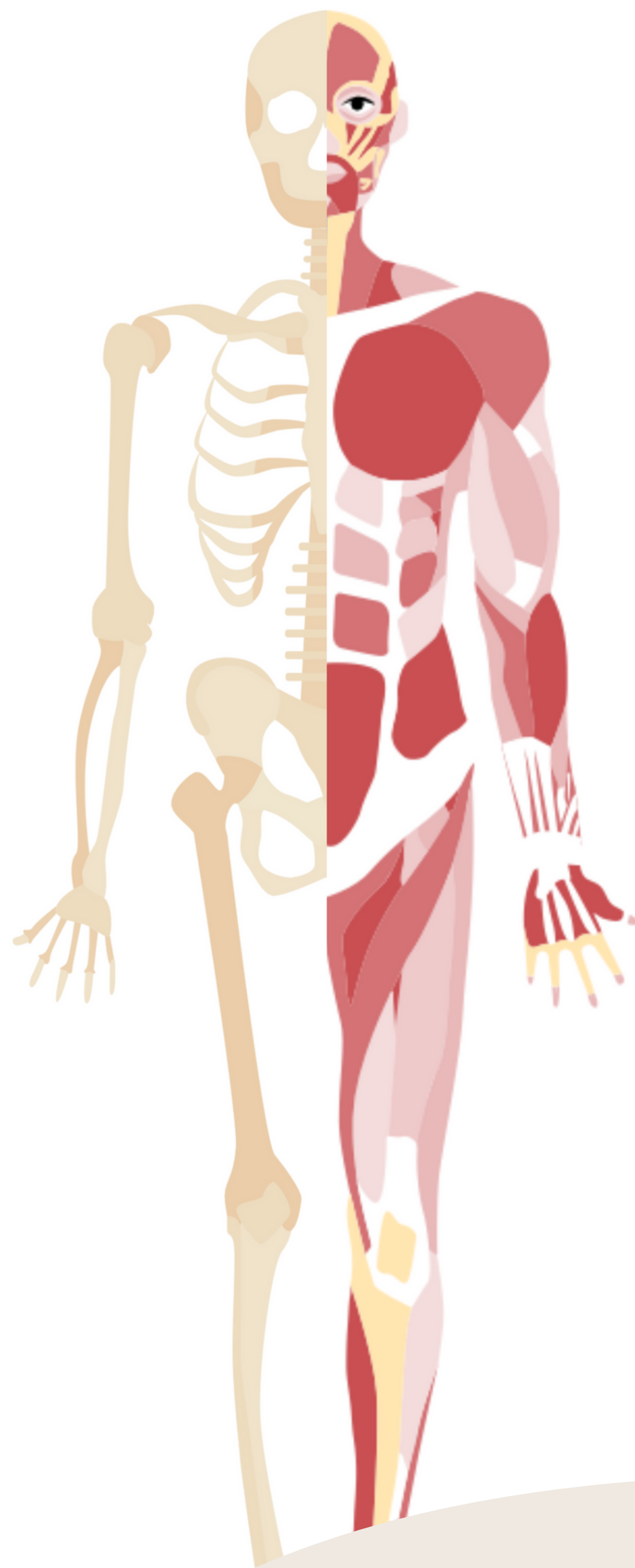


Lecture 10

AXILLARY & MEDIAN NERVES

OBJECTIVES

- Describe the origin, course, relation, branches and distribution of the axillary & median nerves
- Describe the common causes and effects of injury to the axillary and median nerves



Color Index:

- Main text
- Boys' Slides
- Girls' Slides
- Important
- Dr's Notes
- Extra

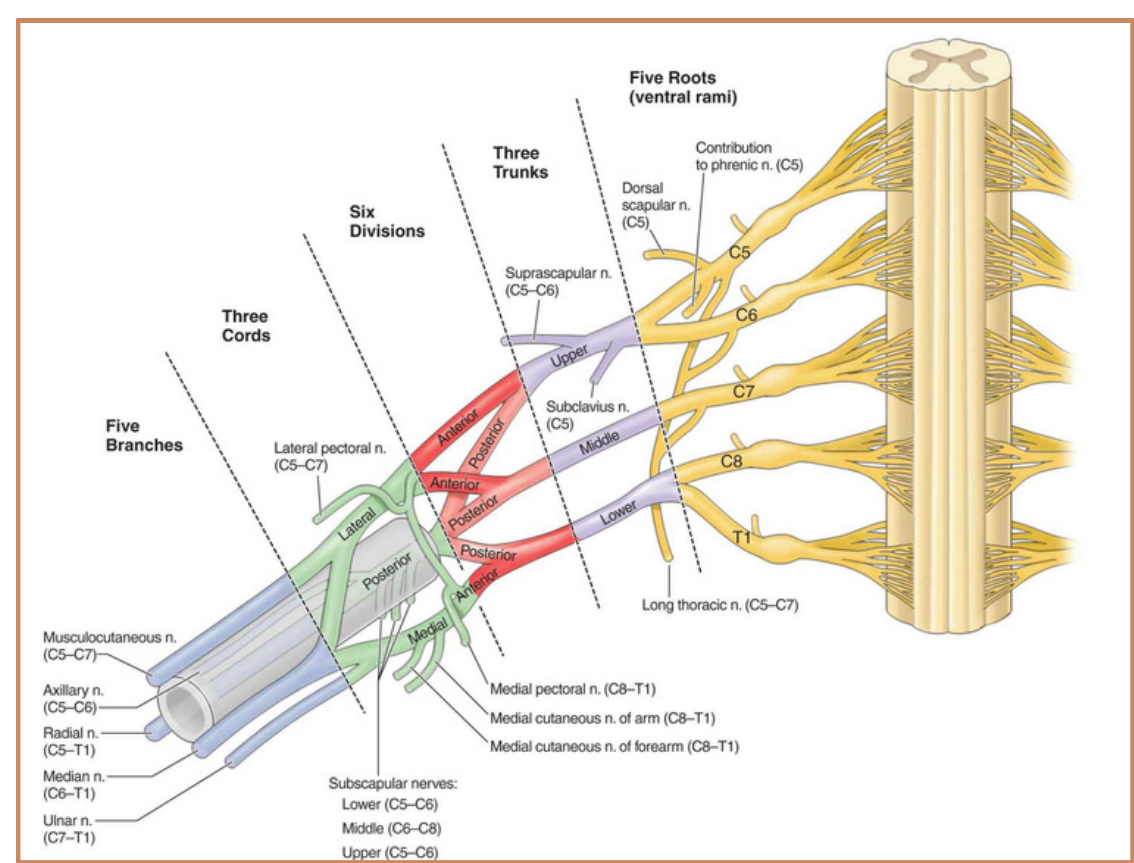
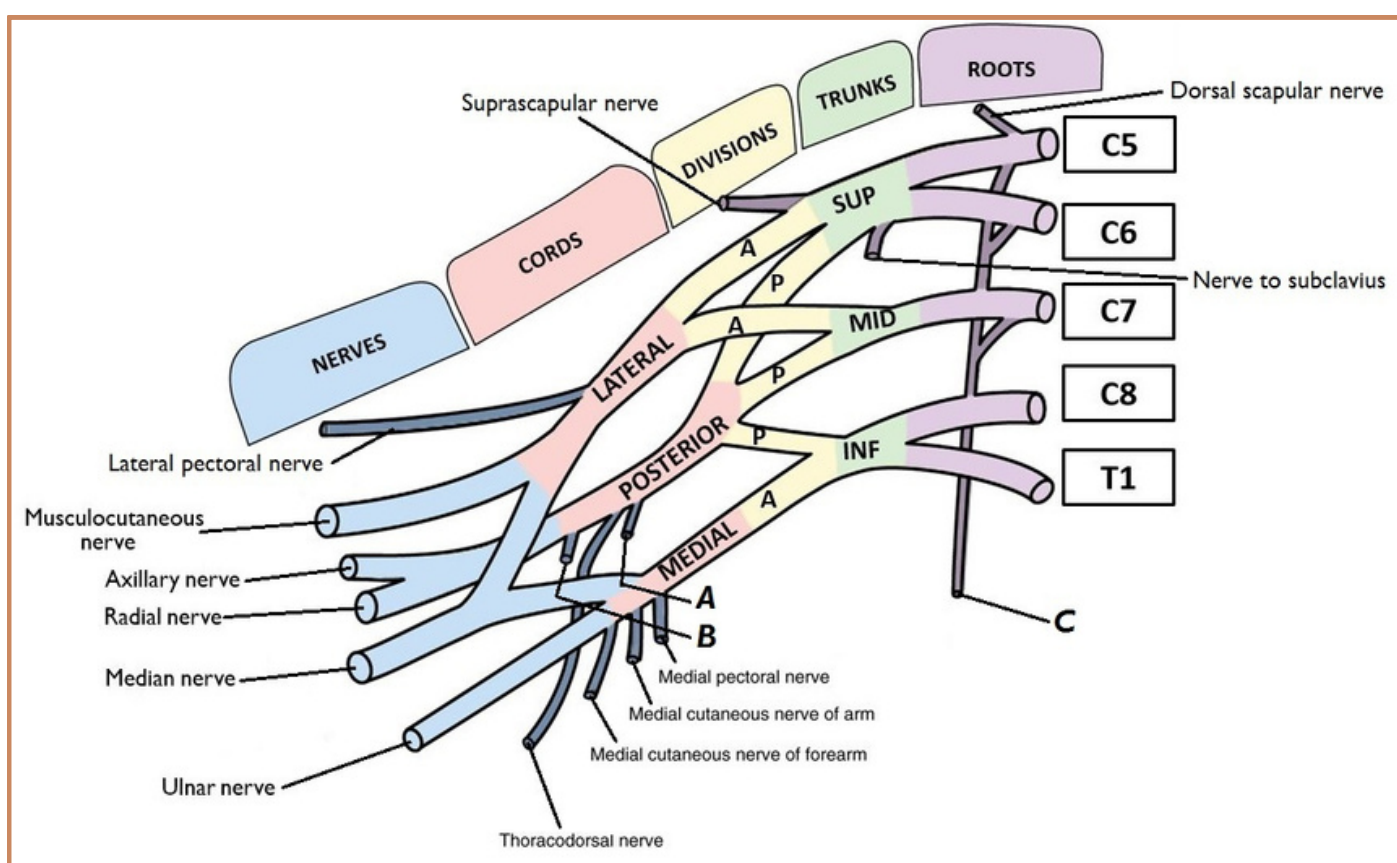


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Introduction to the Axillary Nerve

- The axillary nerve is a major peripheral nerve of the upper limb.
- It is formed within the axilla area of the upper limb.
- It is a direct continuation of the posterior cord from the brachial plexus, and therefore contains fibers from the C5 and C6 nerve roots.
- In the axilla, the axillary nerve is located posterior to the **axillary artery** and anterior to the **subscapularis muscle**.
- It exits the axilla at the inferior border of subscapularis via the quadrangular space, often accompanied by the posterior circumflex humeral artery and vein.

The only one of the five nerves to end in the arm, (Musculocutaneous, Axillary, Median, Radial, and Ulnar).



Remember To Drink Cold Beer

Axillary Nerve



1

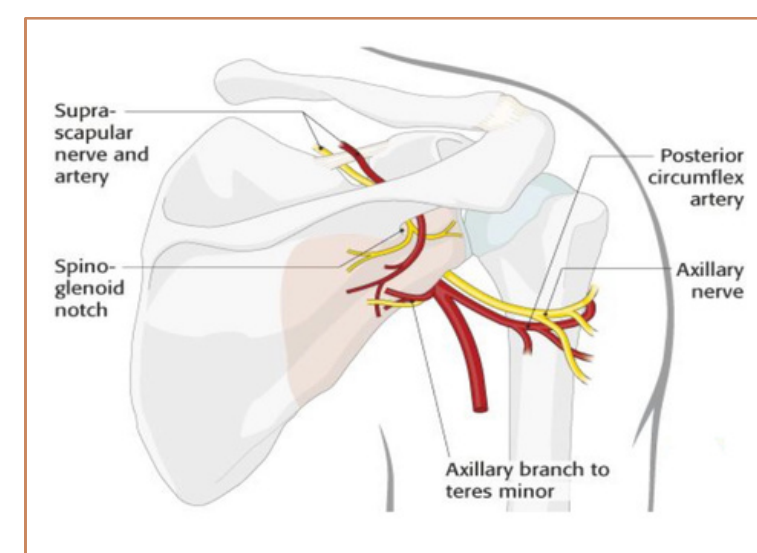
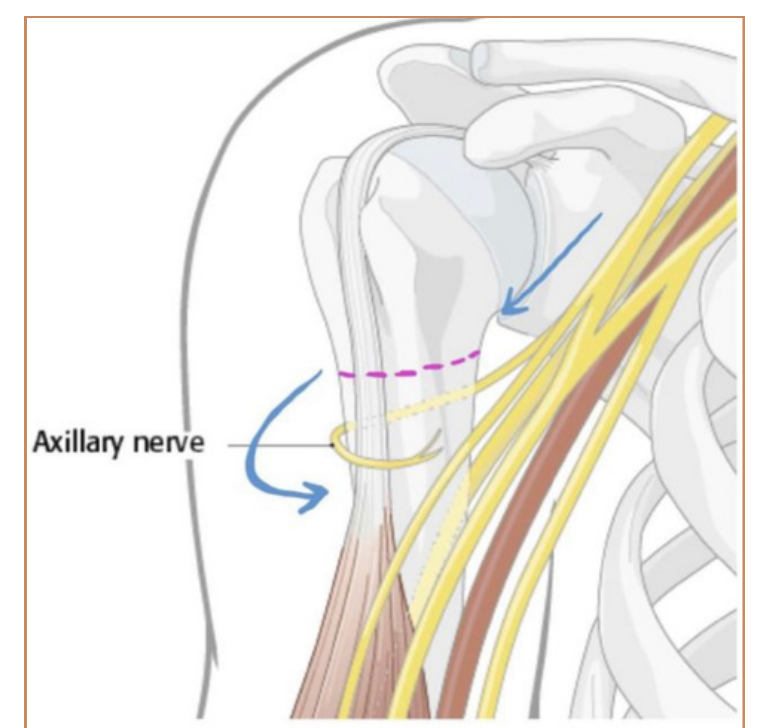
Origin

- (C5 & C6)
- the **Posterior cord** of brachial plexus

2

Course

- It passes inferiorly and laterally along the posterior wall of the axilla to exit
- Then, it passes posteriorly around the **surgical neck** of the humerus
- It is accompanied by the **posterior circumflex humeral artery**



Axillary Nerve

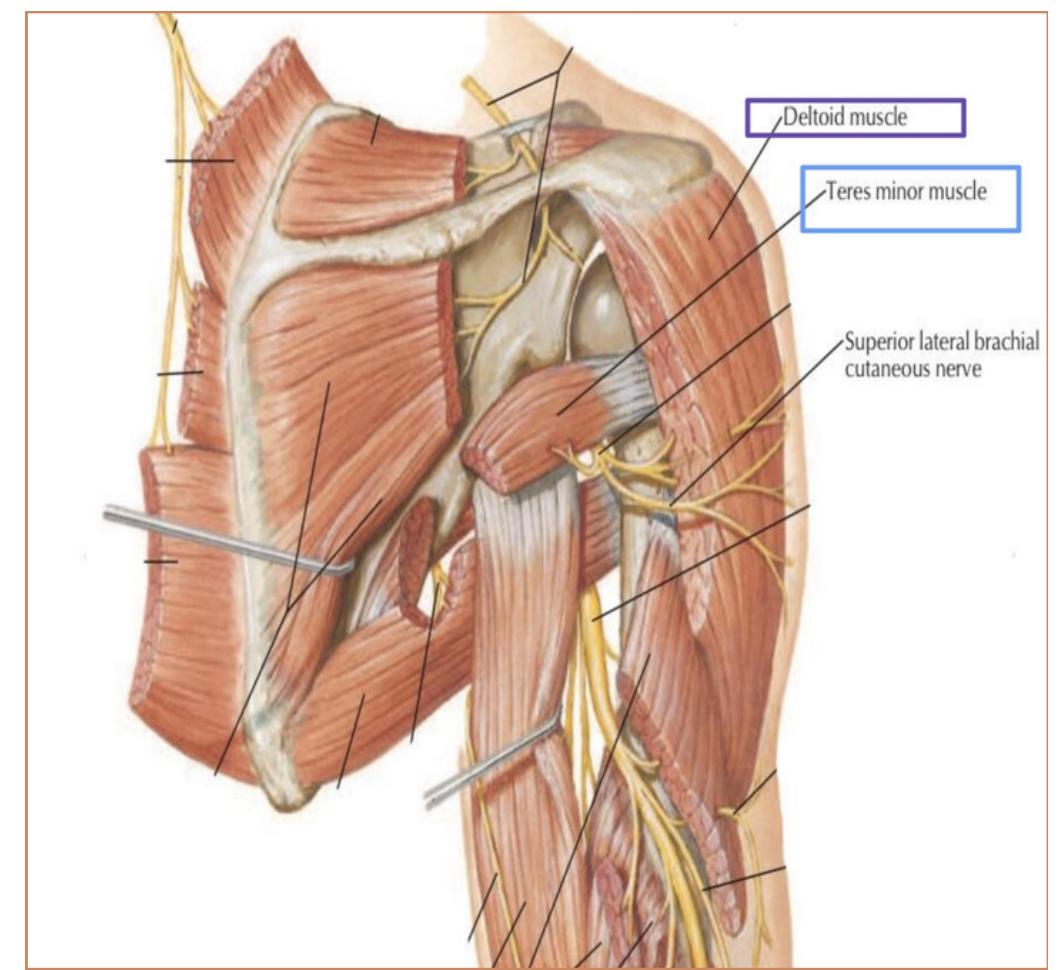
3 Branches

Motor:

to **deltoid** and **teres minor muscles**.

Sensory:

superior lateral cutaneous nerve of the arm that loops around the posterior margin of the deltoid muscle to innervate skin in that region.



Lesions

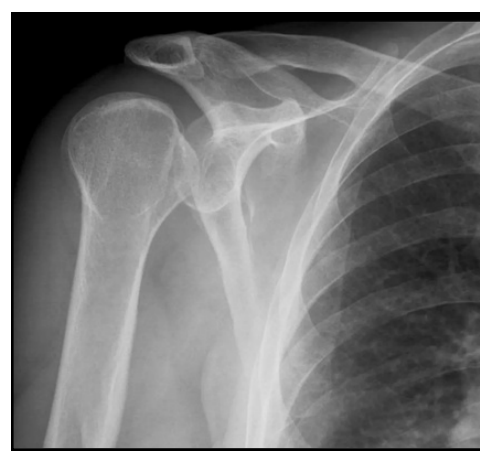
The axillary nerve is usually injured due to:

Fracture of surgical neck of the humerus



focus it is in the surgical neck if it is in shaft it will be Radial nerve

Downward dislocation of the shoulder joint



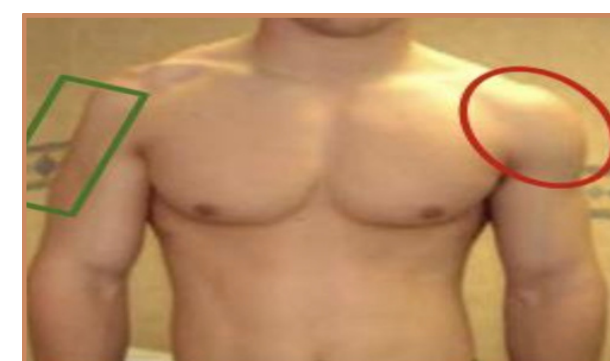
Compression from the incorrect use of crutches (عكازه)



Effects

Motor:

- 1- **Impaired abduction of the shoulder** (15/30-90°)
- 2- Paralysis of the deltoid and teres minor muscles.
 - The paralyzed deltoid wastes rapidly.
 - As the deltoid atrophies, the **rounded** contour of the shoulder is lost and becomes **flattened** compared to the uninjured side.



Sensory:

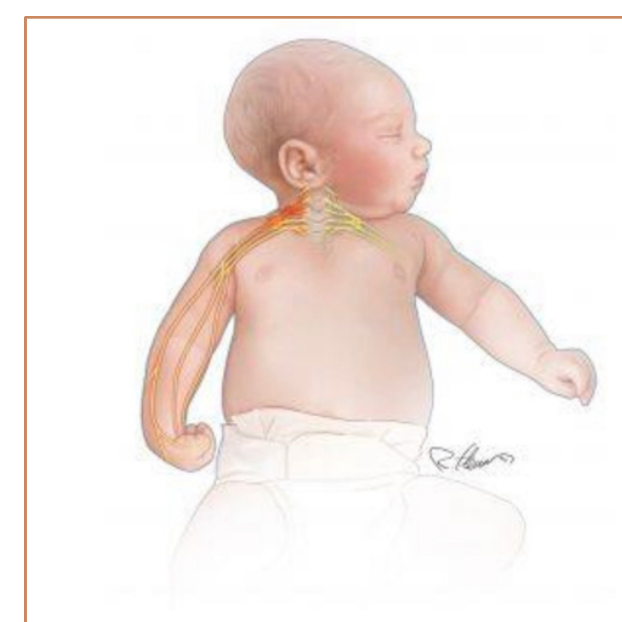
Loss of sensation over the upper lateral side of the proximal part of the arm.



Erb's palsy

It is a condition resulting from damage to C5-C6 roots of the brachial plexus.

- The axillary nerve is affected, and the individual is usually unable to abduct or externally rotate the shoulder joint.
- It commonly occurs where there is an excessive increase in the angle between the neck and shoulder, which stretches (or even tears) the nerve roots.



Introduction to the Median Nerve

- The median nerve is a major peripheral nerve of the upper limb.
- It is derived from the medial and lateral cords of the brachial plexus.
- It contains fibres from roots C6-T1 and can contain fibres from C5 in some individuals.
- After originating from the brachial plexus in the axilla, the median nerve descends to the arm, lateral to the brachial artery.
- The median nerve enters the anterior compartment of the forearm via the cubital fossa.

Median Nerve

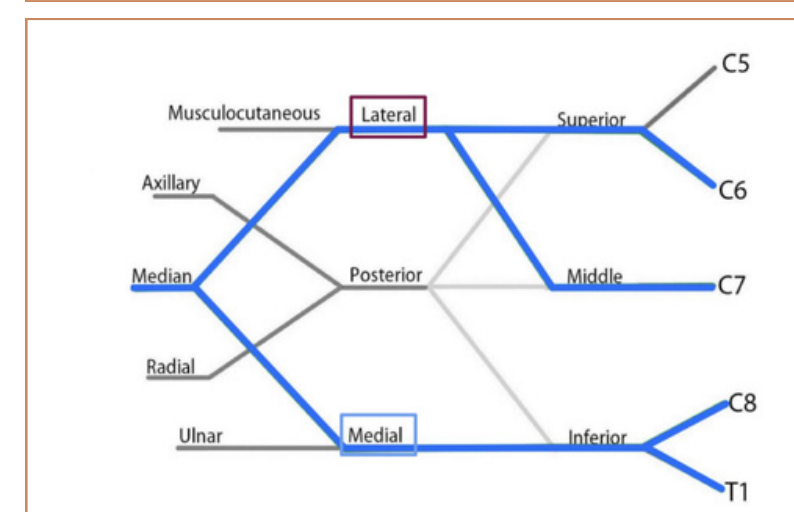
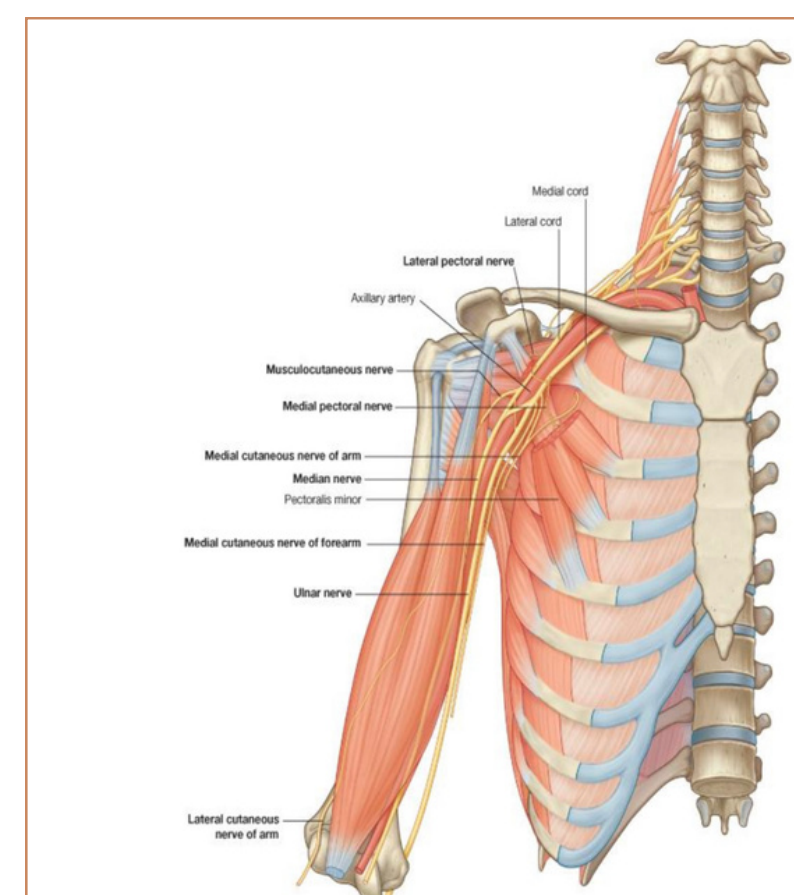


1 Origin

(C5,C6,C7,C8,T1) from the lateral and medial cords of brachial plexus

2 Course

The median nerve is formed anterior to the third part of the axillary artery by the union of lateral and medial roots originating from the lateral and medial cords of the brachial plexus..



Median Nerve

Arm

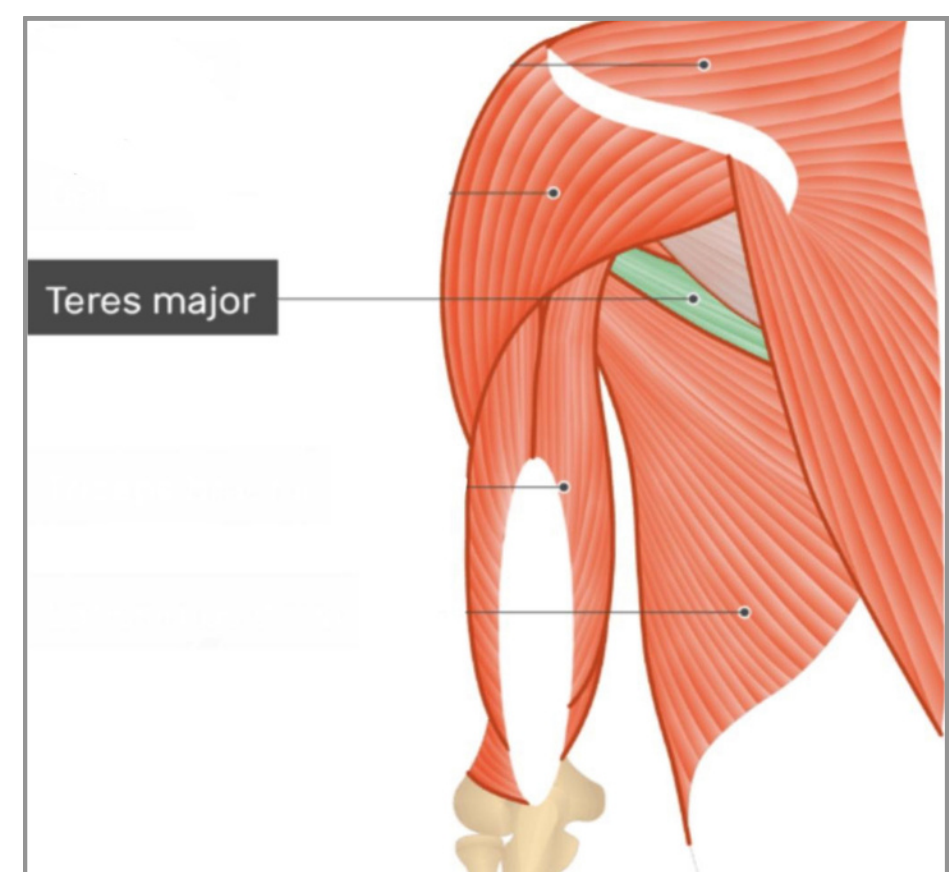
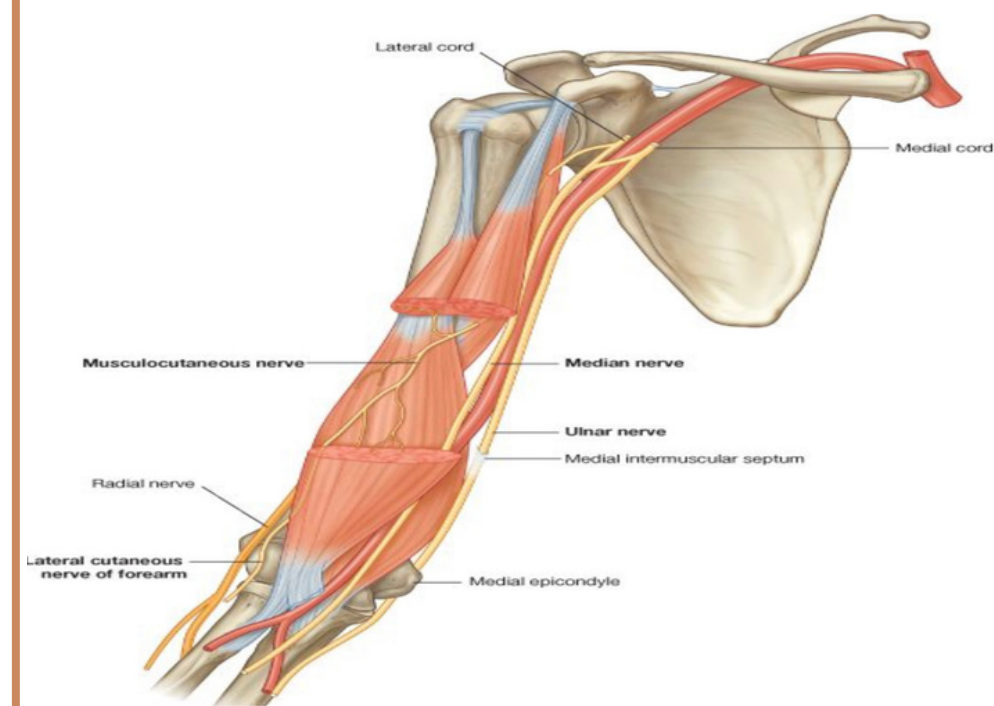
It enters the arm from the axilla at the inferior margin of the **teres major** muscle.

It passes vertically down the medial side of the arm in the **anterior** compartment and is related to the brachial artery throughout its course:

-In proximal regions, (in upper 1/2 of the arm) it lies immediately lateral to the **brachial artery**.

-In more distal regions (in the middle of the arm) it crosses **the artery from lateral to medial** to the medial side of the **brachial artery**, and lies anterior to the elbow joint.

The median nerve has **no major branches in the arm**, but a branch to one of the muscles of the forearm, **the pronator teres muscle**. This branch may originate from the nerve immediately proximal to the elbow joint.



Forearm

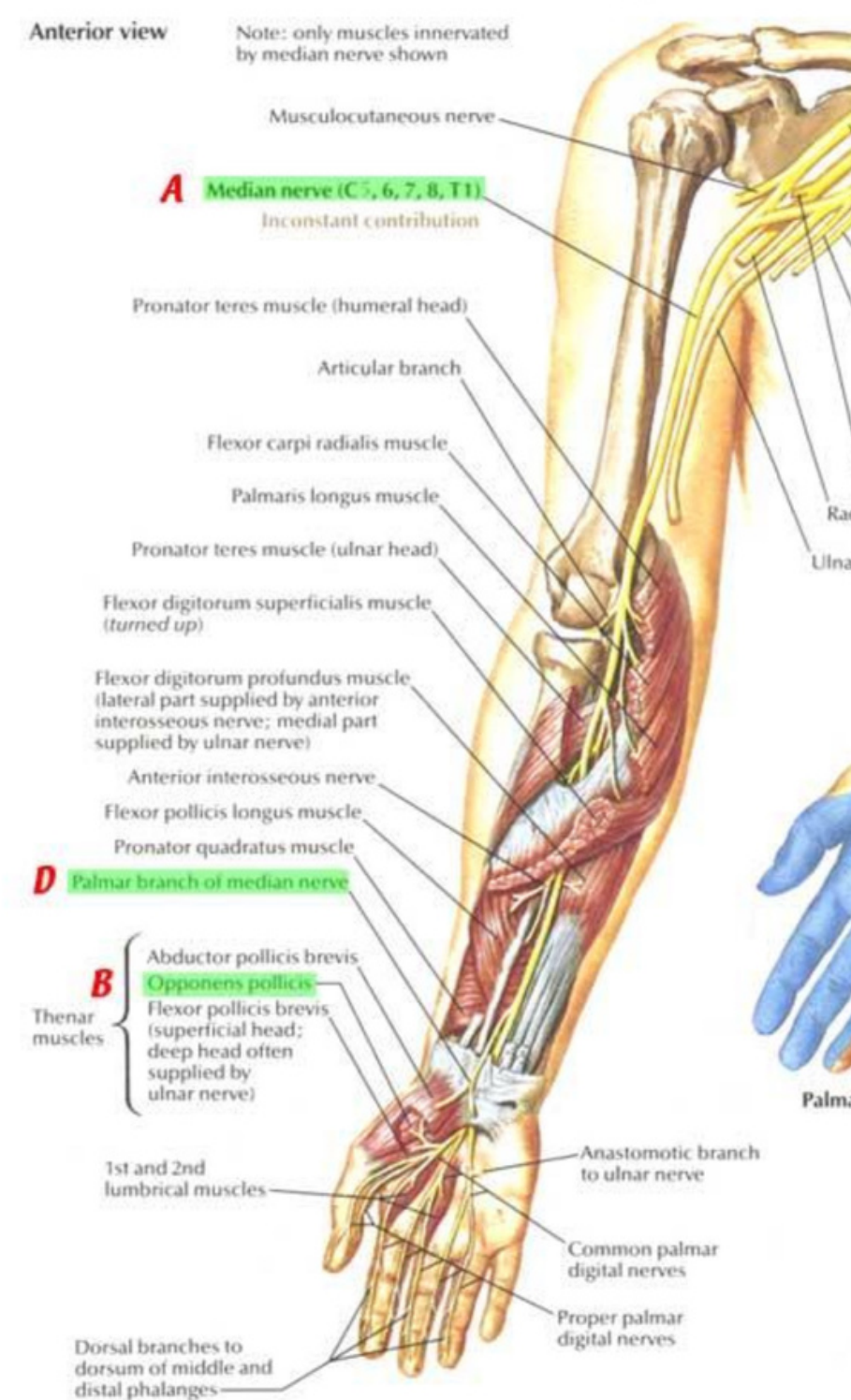
- Median nerve passes into the forearm anterior to the elbow joint (between the 2 heads of pronator teres)

Where its branches innervate most of the muscles in the anterior compartment of the forearm (6.5 muscles) **Except** the:

- Flexor Carpi Ulnaris (4)(note that it's Ulnaris NOT radials, which is innervated by medial nerve)

- The medial half of the Flexor Digitorum Profundus (5)(note that it's profundus not superficialis, which is innervated by medial nerve. Also note that it's medial not lateral which is innervated by medial nerve)

(Both are innervated by the **ulnar nerve**).

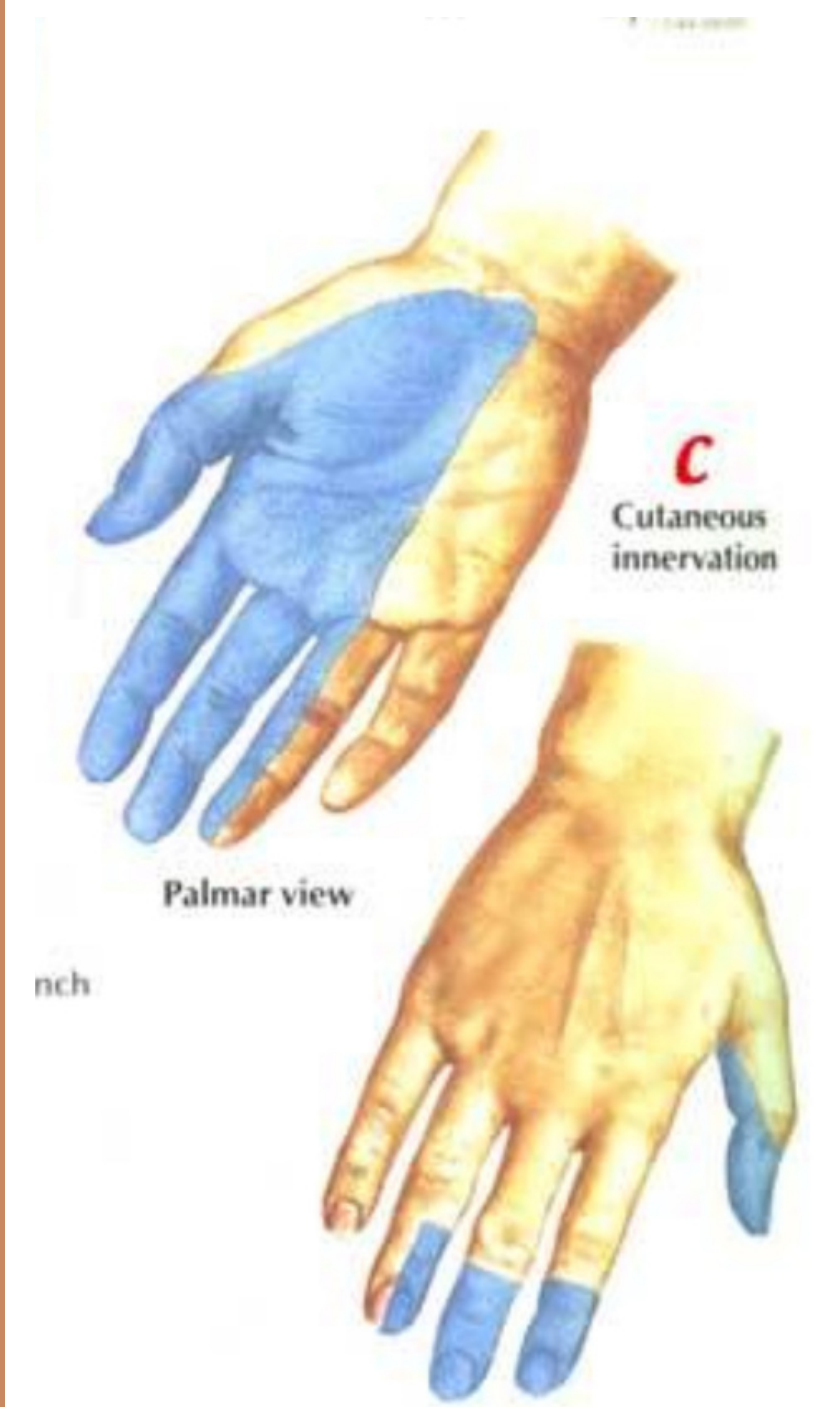


Hand

- The median nerve continues into the hand by passing deep to the flexor retinaculum in front of the carpal bones (6).

- It innervates:

1. The 3 thenar eminence muscles (7) associated with the thumb.
2. Lateral 2 lumbrical muscles associated with movement of the index and middle fingers.
3. Skin over the palmar surface of the lateral 3 1/2 digits and over the lateral side of the palm and middle of the wrist.(8)
(The lateral 2/3rd of the palm of the hand.)



Median Nerve Lesion

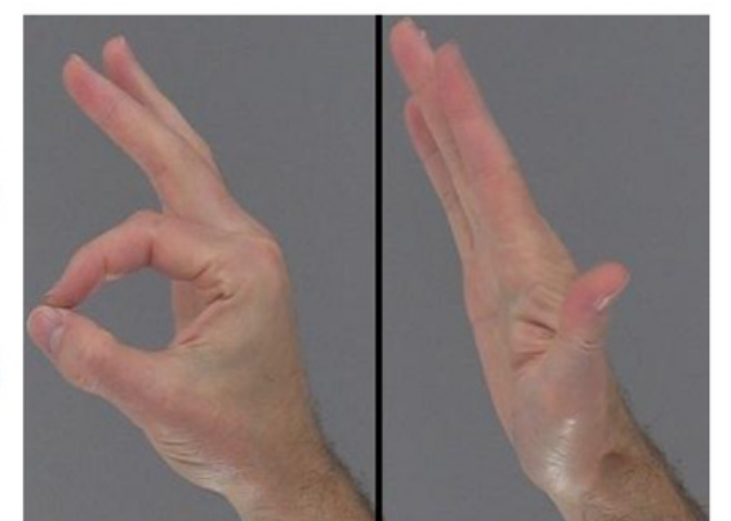
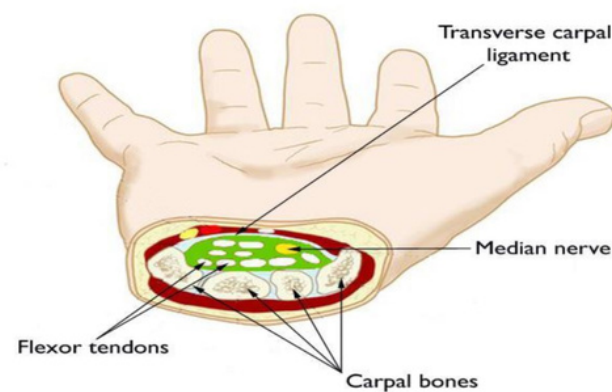
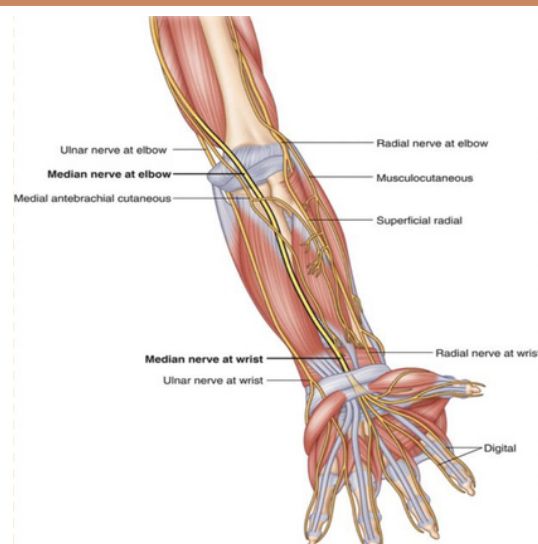
- Injury of the median nerve at different levels causes different syndromes
- In the **arm** and **forearm** the median nerve is usually not injured by trauma, due to its relatively **deep position**.

Sites of damage

- **In the elbow region**, (supracondylar fracture of the humerus).
- **At the wrist** above the flexor retinaculum.
- **In the carpal tunnel**.

Serious disabilities

- **Loss of opposition** of the thumb. The delicate pincer-like action is not possible.(1)
- **Loss of sensation** from lateral 3 1/2 fingers & lateral 2/3 of the palm.(2)



Median Nerve Lesions in Elbow region

About

Damaged in supracondylar fracture of humerus. (3)

the Muscles that are affected:

- Pronator muscles of the forearm (they will always be supinated).
- All long flexors of the wrist and fingers (**except** flexor carpi ulnaris and medial half of flexor digitorum profundus).



Sensory

Sensory:

Loss of sensation from:

- The radial side of the palm.
- Palmar aspect of the lateral 3 1/2 fingers.
- Distal part of the dorsal surface of the lateral 3 1/2 fingers.

Trophic Changes:

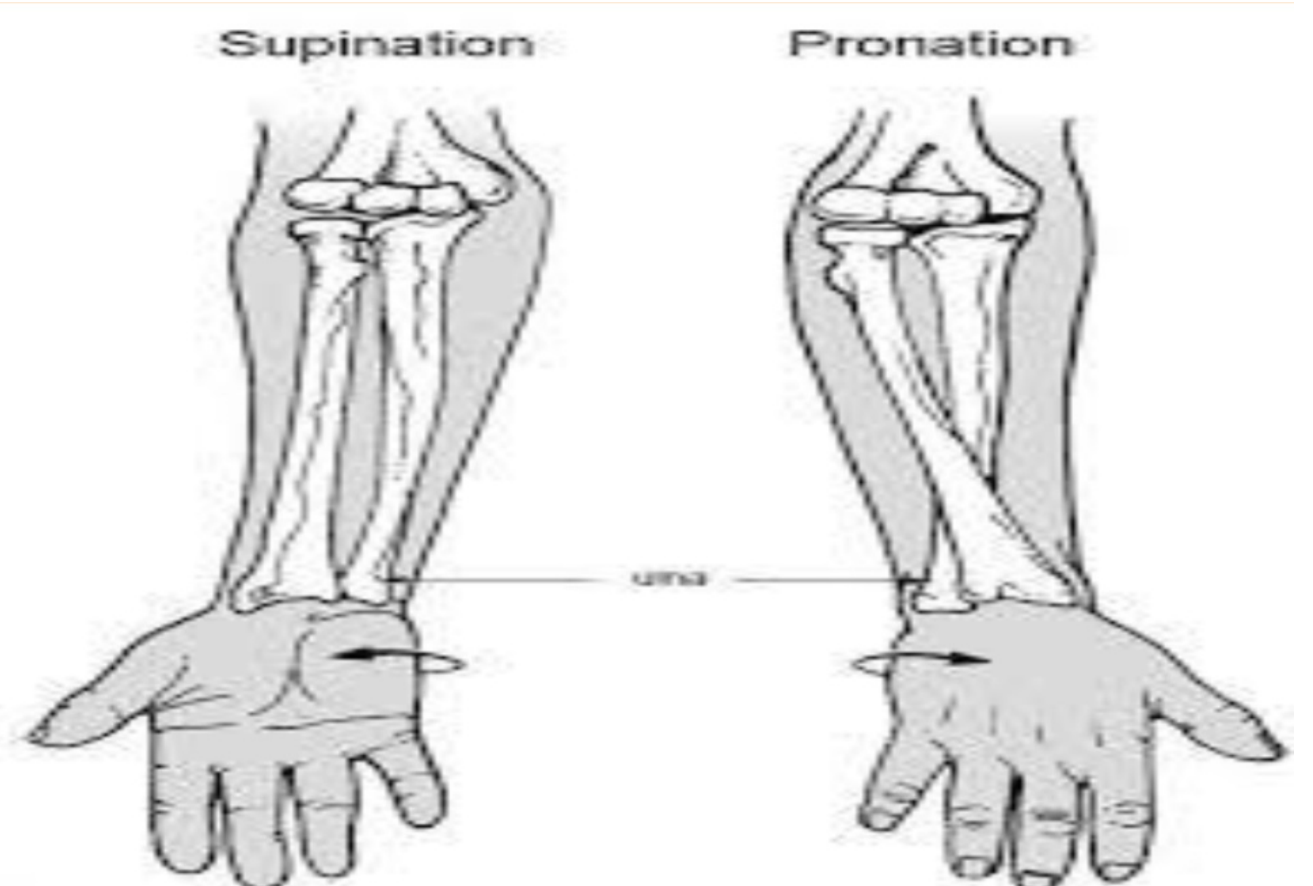
- Dry and scaly skin
- Easily cracking nails
- Atrophy of the pulp of the fingers.)



Motor

Loss of pronation.

- Hand is kept in supine position.
- Wrist shows weak flexion, and ulnar deviation.
- **No** flexion possible on the interphalangeal joints of the index and middle fingers.
- Weak flexion of ring and little finger.
- Thumb is adducted and laterally rotated, with loss of flexion of terminal phalanx and loss of opposition.
- Wasting of thenar eminence. (4)
- Hand looks flattened and "**apelike**", and presents an **inability to flex** the three most radial digits when asked to make a fist.



Median Nerve Lesions at the Wrist

About

Often injured by penetrating wounds (stab wounds or broken glass) of the forearm.



Motor

- **Thenar muscles** are paralyzed and atrophy happens with time so that the **thenar eminence** becomes flattened..
- Opposition and abduction of **thumb** are lost, and **thumb** and **lateral two fingers** are arrested in adduction and hyperextension position. (**Apelike hand**).



Sensory

Sensory & trophic changes are the same as in the **elbow region** injuries

Carpal tunnel syndrome

About

The **most common** neurological problem associated with the median nerve is the compression beneath the flexor retinaculum at the **wrist**.

Motor

Weak motor function of **thumb**, index & middle fingers.

Sensory

- Burning pain or 'pins and needles' along the distribution of median nerve to lateral 3 1/2 fingers.
- No sensory changes over the palm as the palmar cutaneous branch is given before the median nerve enters the carpal tunnel.

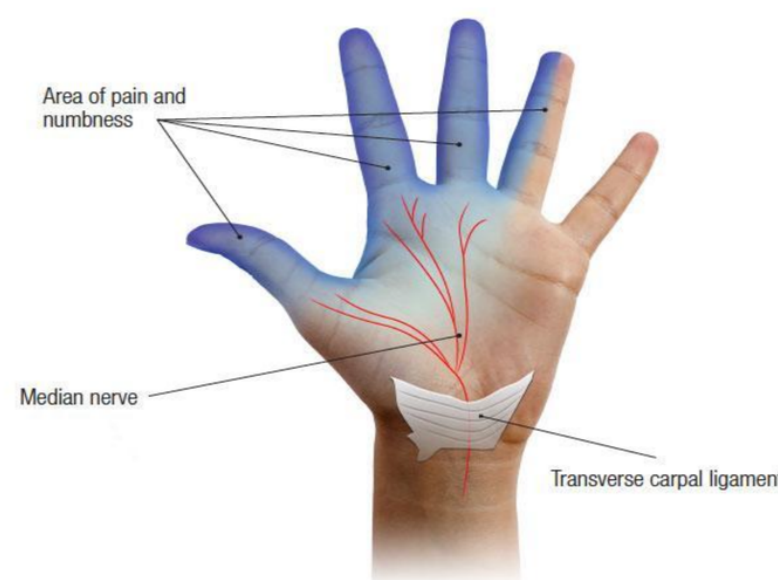


Figure 1. Sensory representation of carpal tunnel syndrome.

MCQs

1

Which of the following is formed of the posterior divisions of the three trunks ?

A) Axillary nerve

B) Ulnar nerve

C) Median nerve

D) Musculocutaneous nerve

2

2-A syndrome caused by the excessive increase of the angle between neck and shoulder common in infants ?

A) Carpal tunnel

B) Saturday night palsy

C) Erb's palsy

D) Cerebral palsy

3

3-Which of the following muscle does the Axillary nerve supply ?

A) Deltoid

B) Biceps brachii

C) Triceps brachii

D) Brachialis

4

4-Which of the following accompanied with the posterior circumflex humeral artery through its course ?

A) Median nerve

B) Radial nerve

C) Axillary nerve

D) Ulnar nerve

5

Lesion of nerve causes ape like hand ?

A) Ulnar nerve

B) Brachial plexus

C) Axillary nerve

D) Median nerve



1-A 2-C 3-A 4-C 5-D

MCQs

6

Which of the following is usually accompanied with fractures of the supracondyle ?

A) Loss of sensation in the elbow	B) Weak flexion of the ring finger	C) Burning pain in lateral 3 1/2 fingers	D) Loss of wrist extension
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7

Patient came to the clinic with a stab at the wrist and he can't flex lateral 3 fingers, what is his injury?

A) Injury of flexor tendons	B) injury in median nerve	C) injury of bone	D) infection in wound
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8

Which of the following is lateral to the brachial artery in proximal regions of hand and medial to it in distal regions of hand?

A) Basilic vein	B) Median nerve	C) Axillary nerve	D) Ulnar nerve
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6-B 7-B 8-B

SAQs


1

What muscles in the forearm are not innervated by the median nerve?

 Flexor carpi ulnaris and the medial half of the flexor digitorum profundus

2

What does the median nerve in the hand innervate?

 the 3 thenar eminence muscles associated with the thumb and the skin over the palmar surface of the lateral three and a half digits and over the lateral side of the palm and middle of the wrist

3

What are the motor effects of carpal tunnel syndrome?

 Weak motor function of thumb, index and middle fingers.

4

List the 3 sites of damage in a median nerve lesion.

 Elbow, wrist and carpal.



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