

Radial & Ulnar Nerves

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Objectives

- **At the end of the lecture, students should be able to:**
- **Describe the anatomy of the radial & ulnar nerves regarding: origin, course & distribution.**
- **List the branches of the nerves.**
- **Describe the causes and manifestations of nerve injury.**

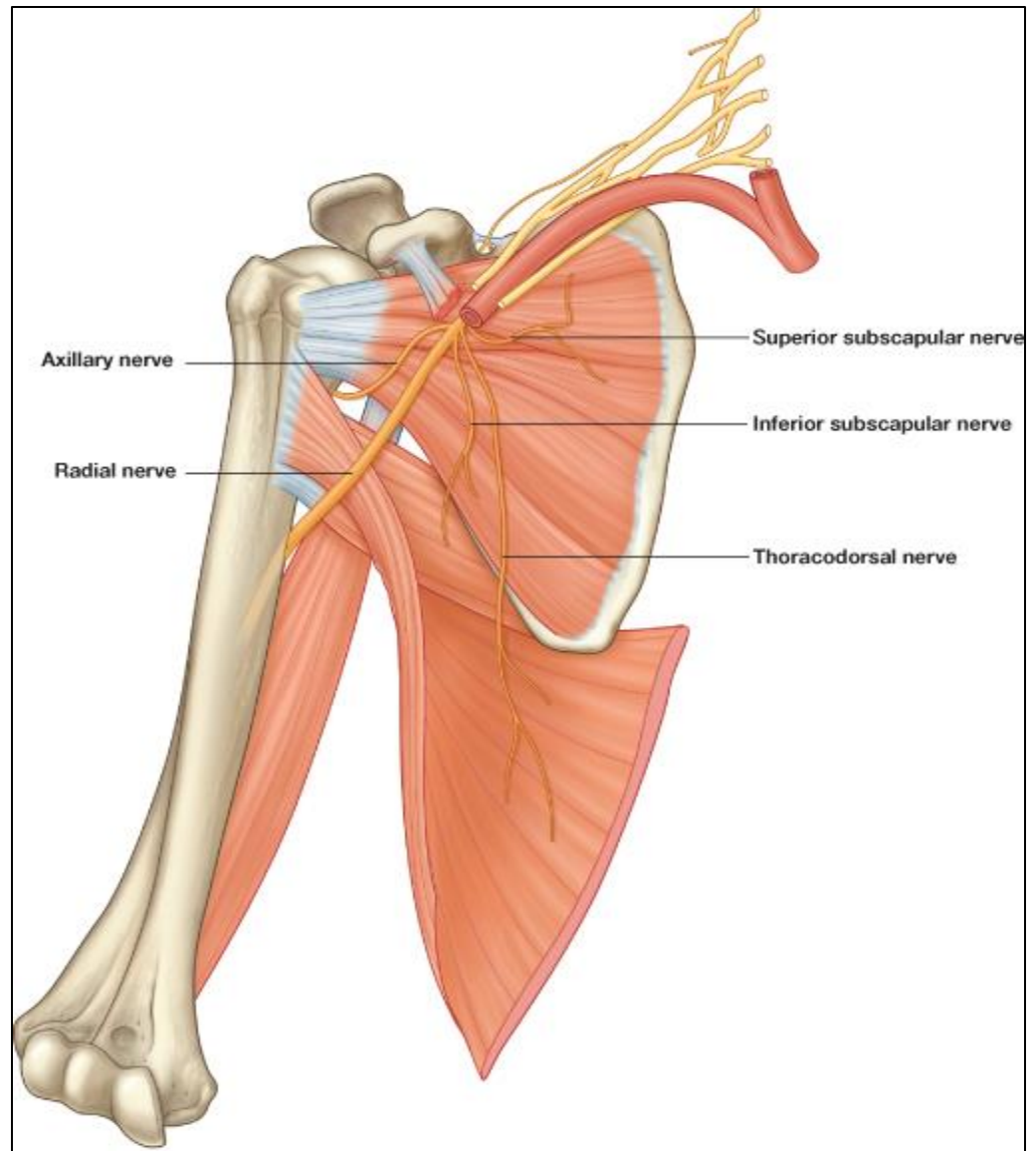
Radial Nerve

Origin:

Posterior cord of the brachial plexus in the axilla (the largest branch)

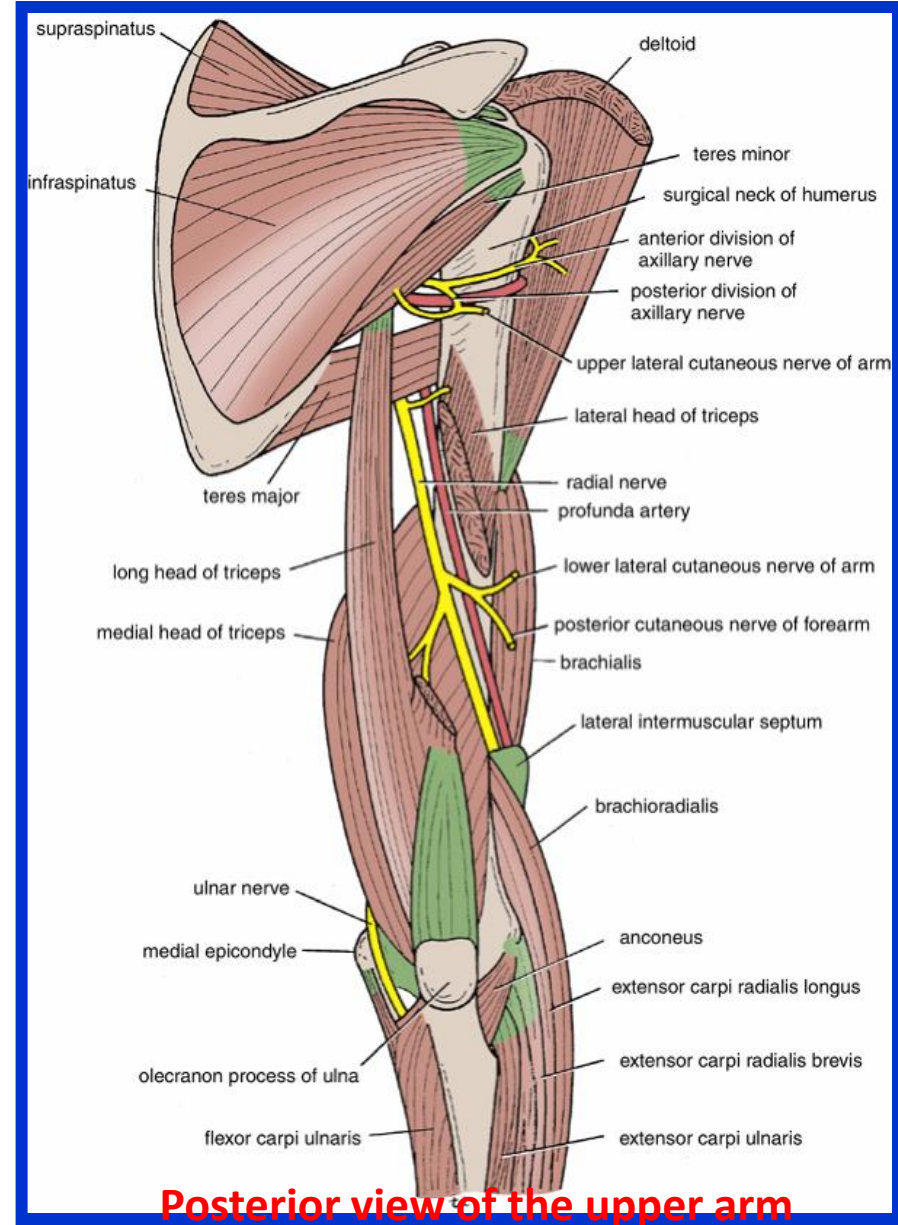
Supplies:

All Muscles of the posterior compartment of the arm & the fore arm



Course & Distribution In the Arm

It winds around the back of the arm in the **Spiral Groove** on the back of the humerus between the heads of the triceps. In the **spiral groove**, the nerve is accompanied by the **Profunda Vessels**, and it lies directly in contact with the shaft of the humerus (a **Dangerous Position**).



Branches

In the forearm

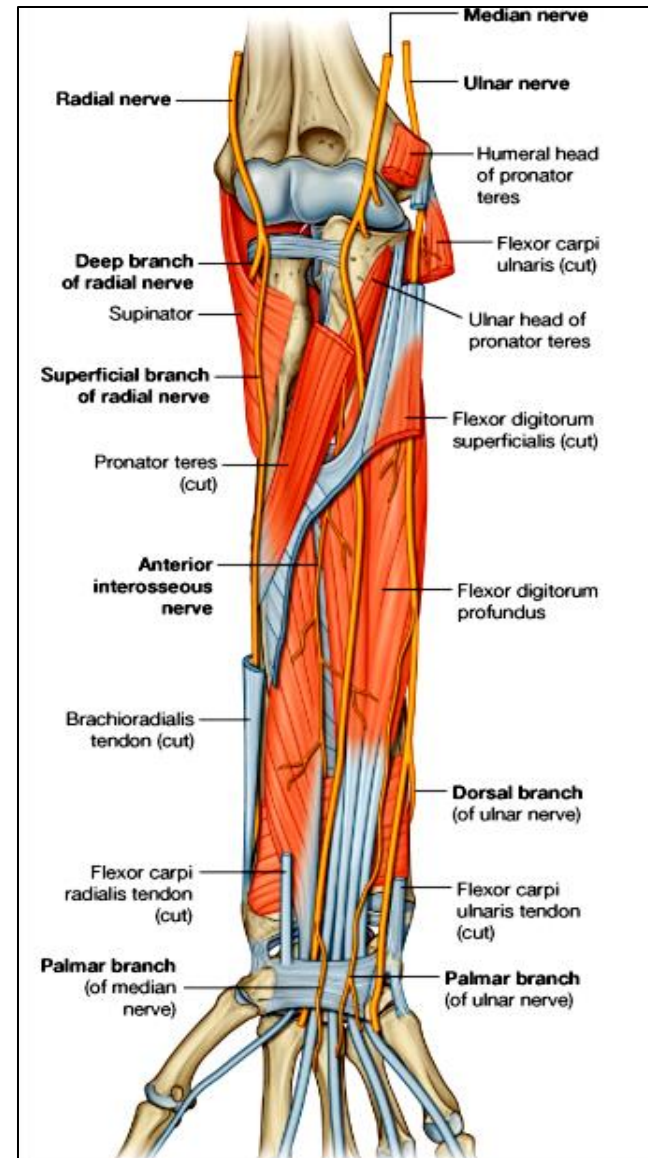
It pierces the Lateral Intermuscular septum.

Descends in front of the Lateral Epicondyle.

Passes forward into the Cubital Fossa

Divides into

Superficial & Deep branches.



Branches

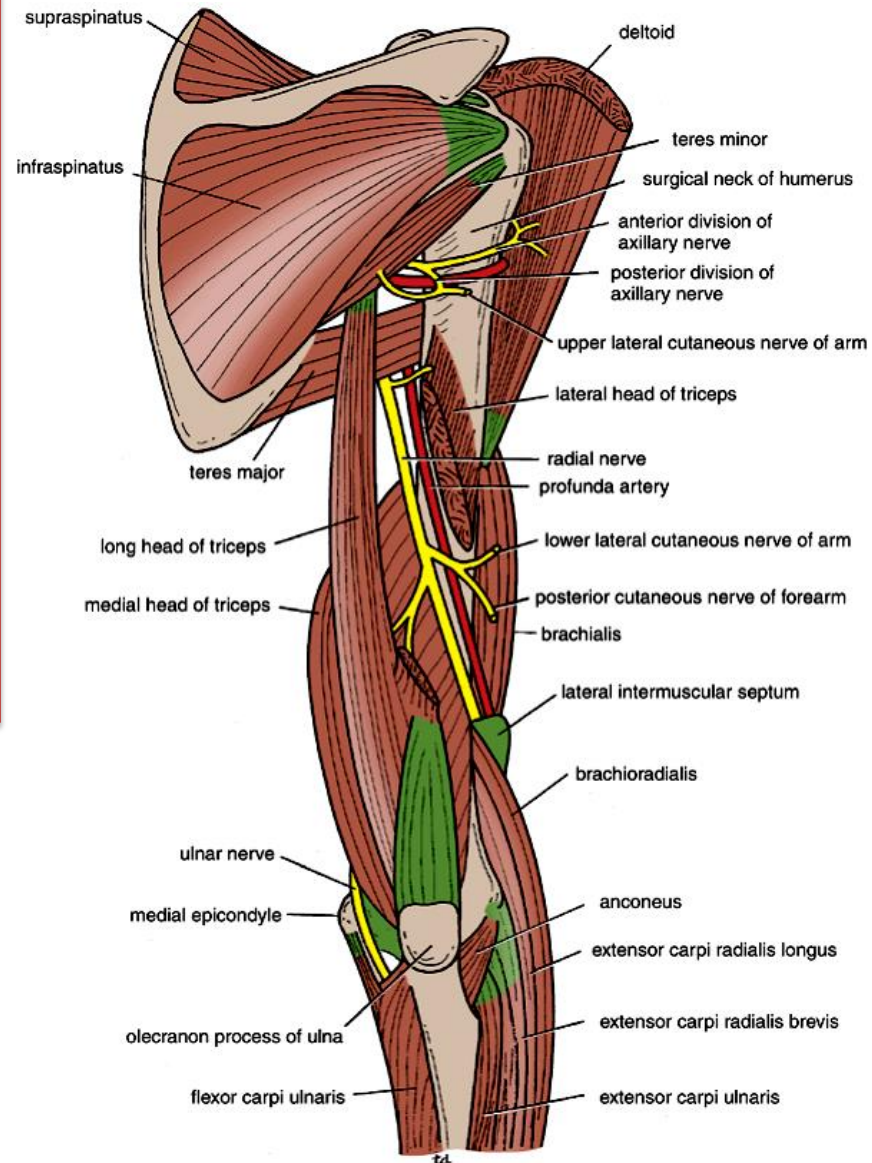
In the Axilla:

Cutaneous:

Posterior cutaneous nerve of arm.

Muscular:

Long & Medial Heads of Triceps.



Branches

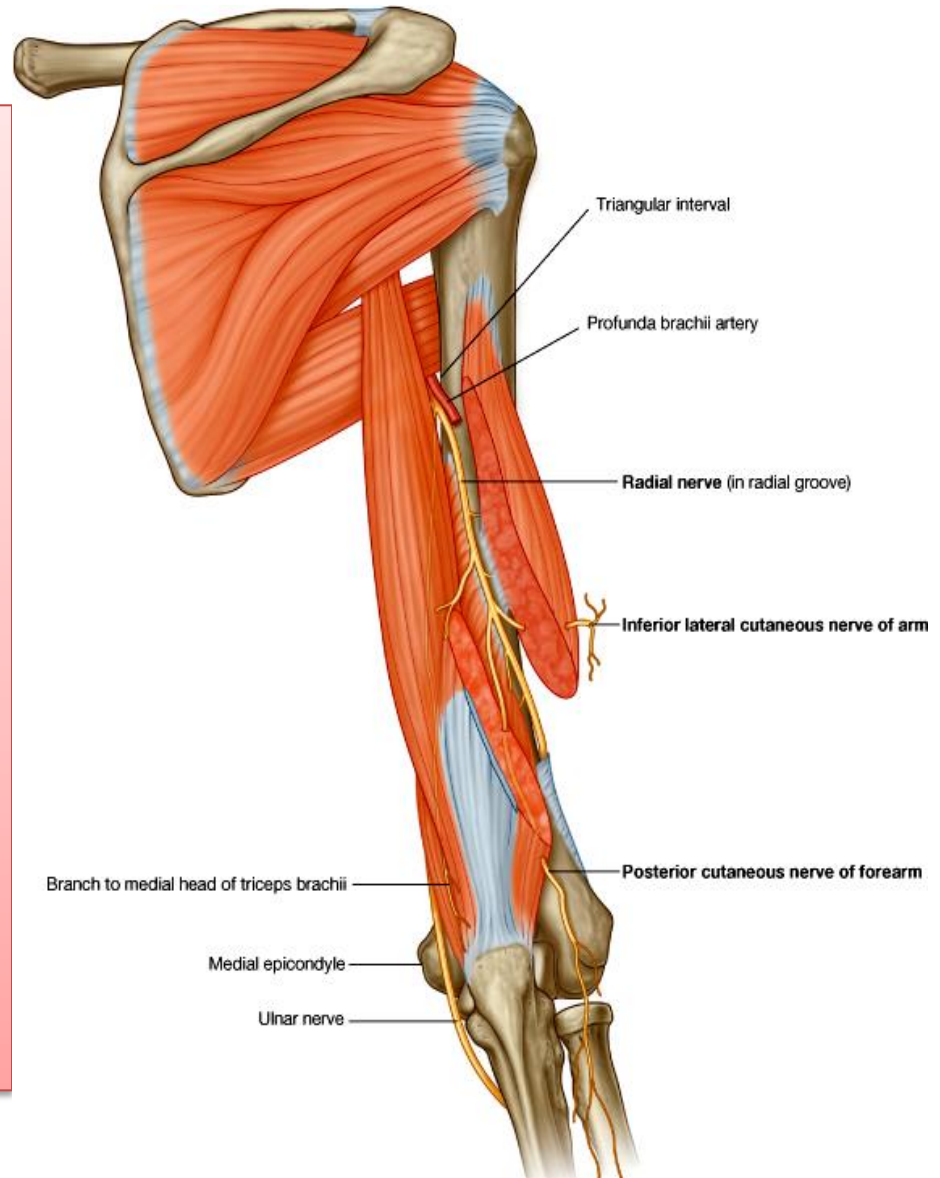
In the Spiral Groove:

Cutaneous:

- 1. Lower lateral cutaneous nerve of arm.*
- 2. Posterior cutaneous nerve of forearm.*

Muscular:

Lateral & Medial heads of triceps.
Anconeus.



Branches

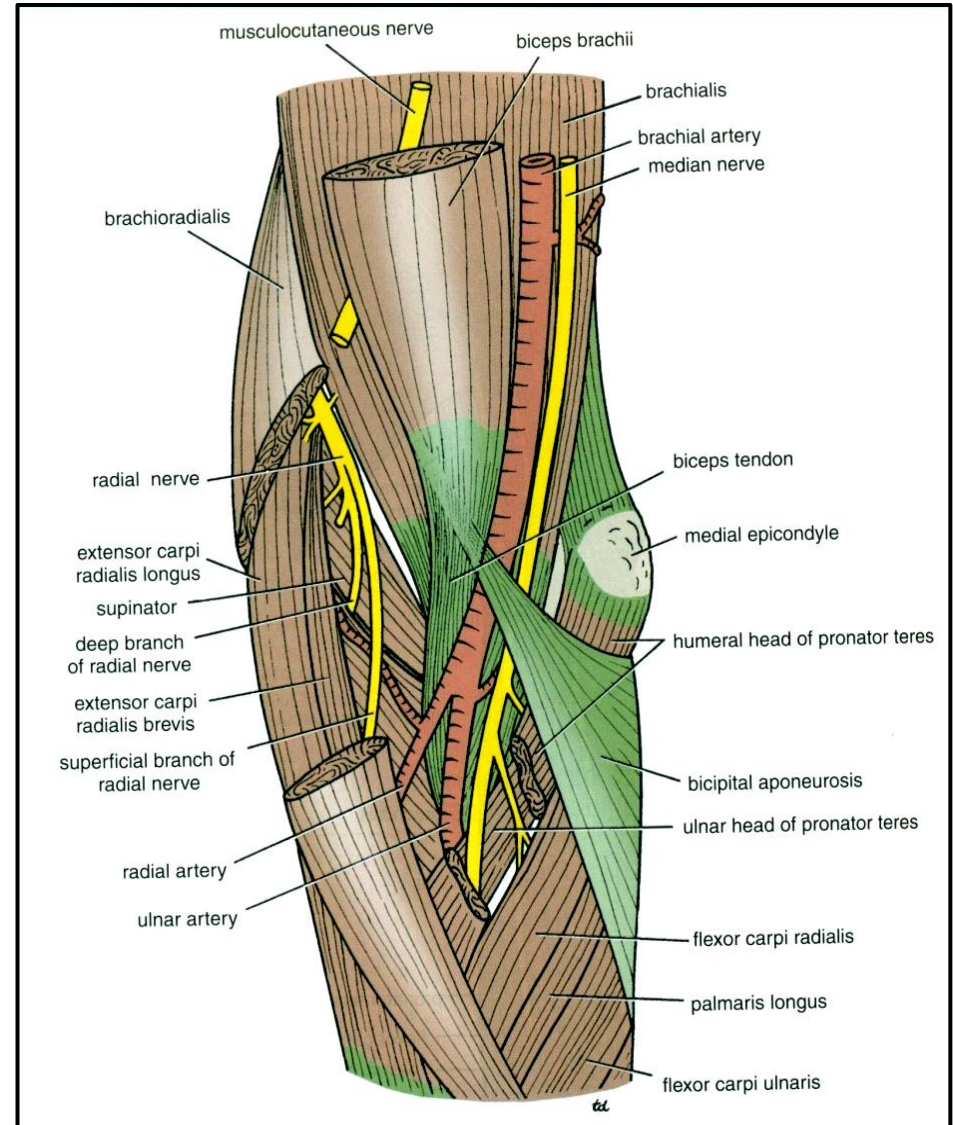
Close to Lateral Epicondyle:

1. Muscular to:

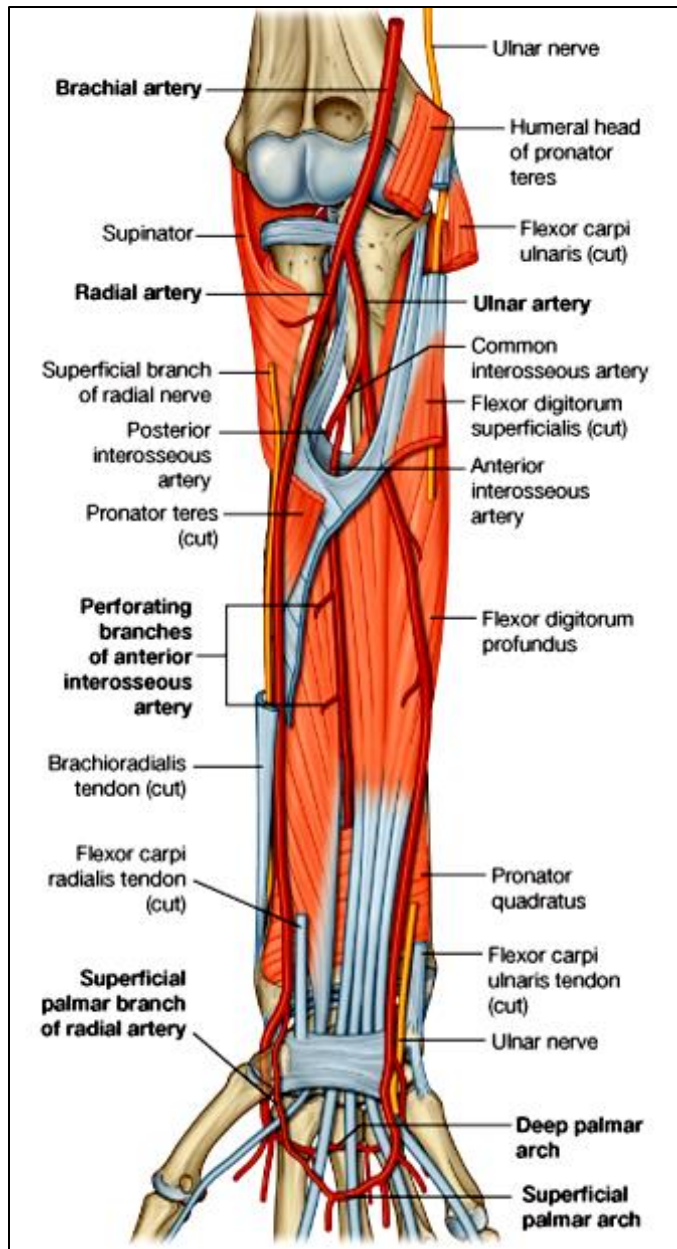
Brachioradialis.

Extensor carpi radialis longus. Brachialis.

2. Articular to the elbow joint



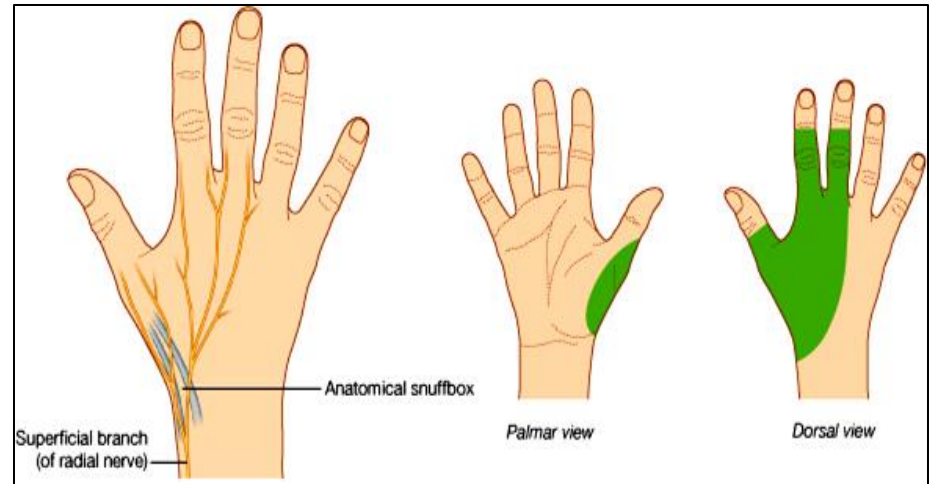
Superficial Branch



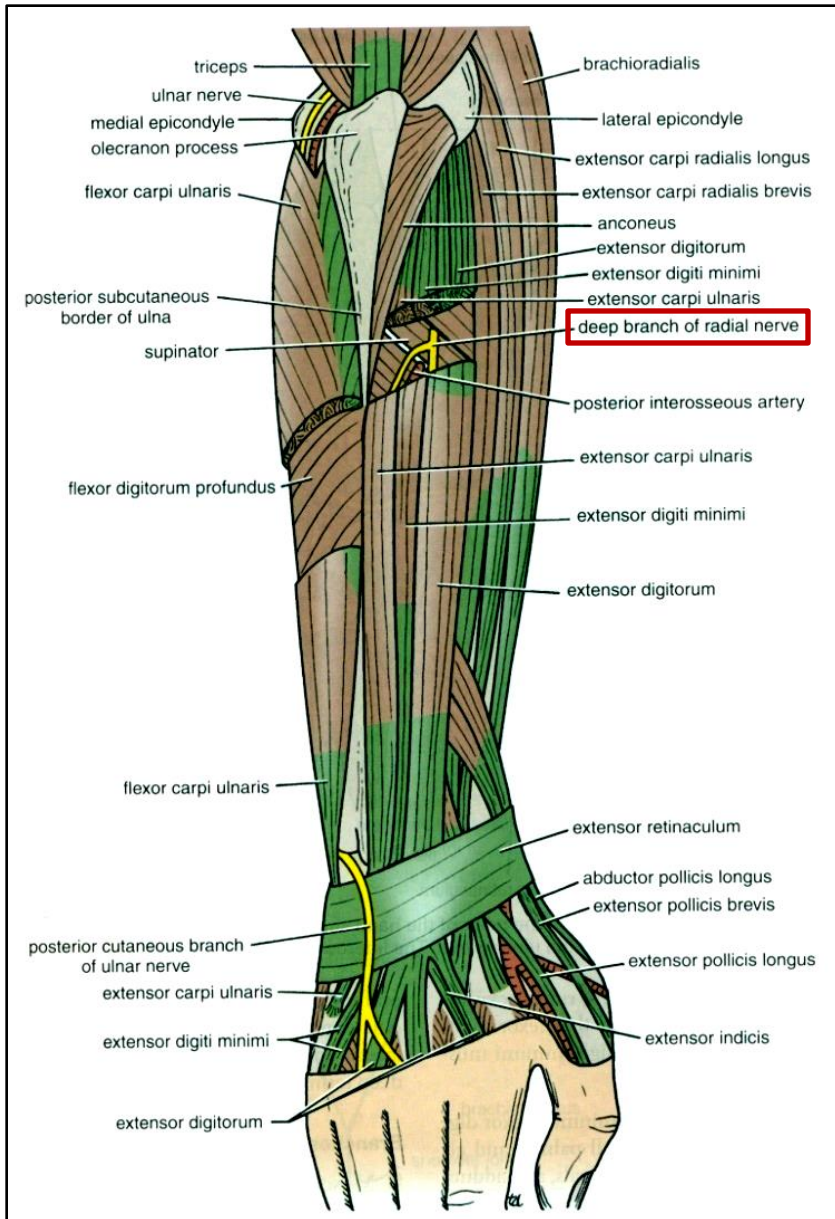
- It descends under cover of Brachioradialis
- Lateral to radial artery.
- It emerges beneath the brachioradialis tendon.

Termination of Superficial Branch

It reaches the posterior surface of the wrist, where it divides into terminal branches that supply the skin on ***the lateral two thirds of the posterior surface of the hand and the posterior surface over the proximal phalanges of the lateral three and a half fingers.*** The area of skin supplied by the nerve on the dorsum of the hand is variable.

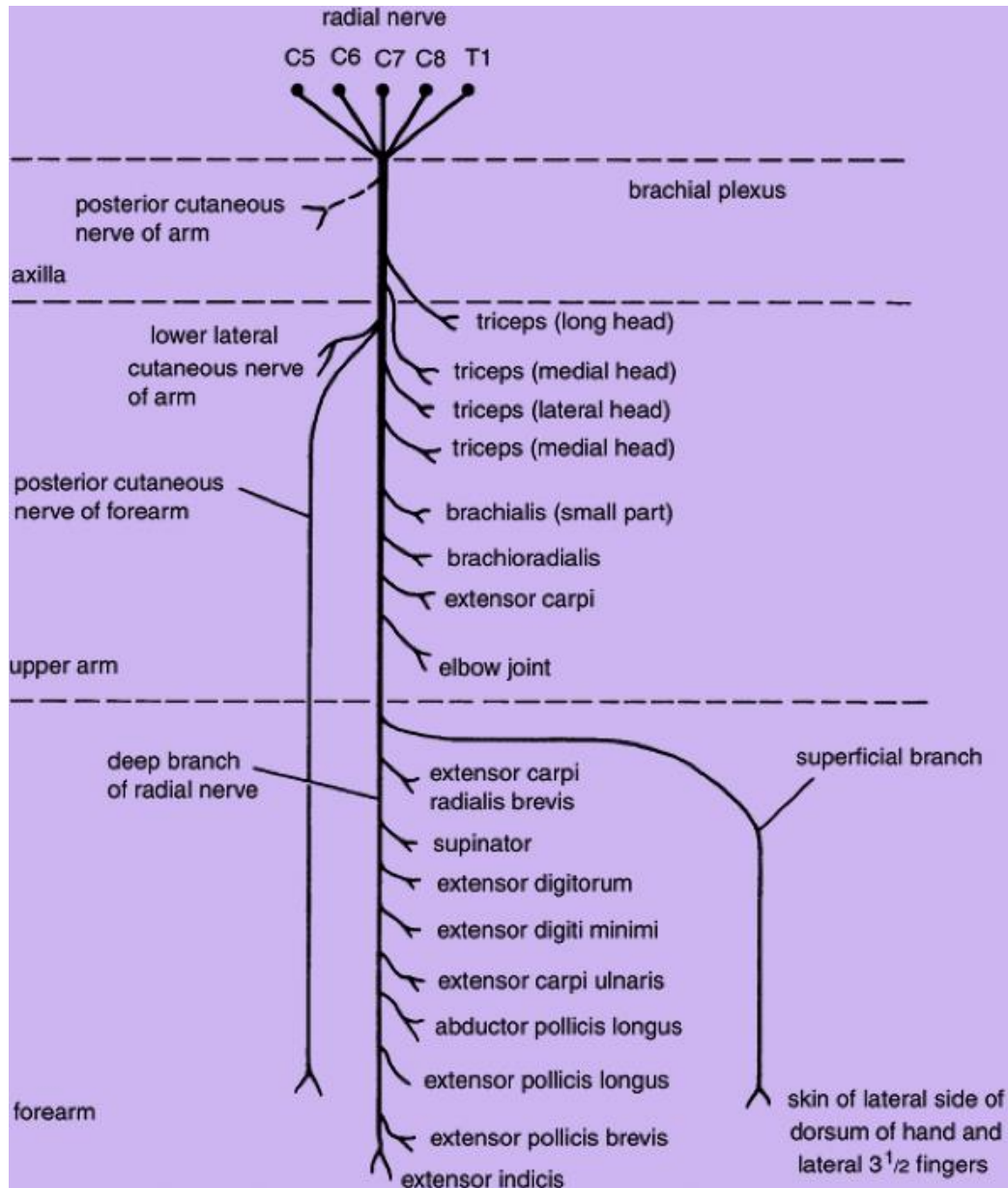


Deep Branch



- *It winds around the neck of the radius, within the supinator muscle, and enters the posterior compartment of the forearm.*
- *It supplies :*
- *Extensor carpi radialis brevis.*
- *Extensor carpi ulnaris.*
- *Supinator.*
- *Abductor pollicis longus.*
- *Extensor pollicis brevis.*
- *Extensor pollicis longus.*
- *Extensor indicis.*

Summary of branches of radial nerve



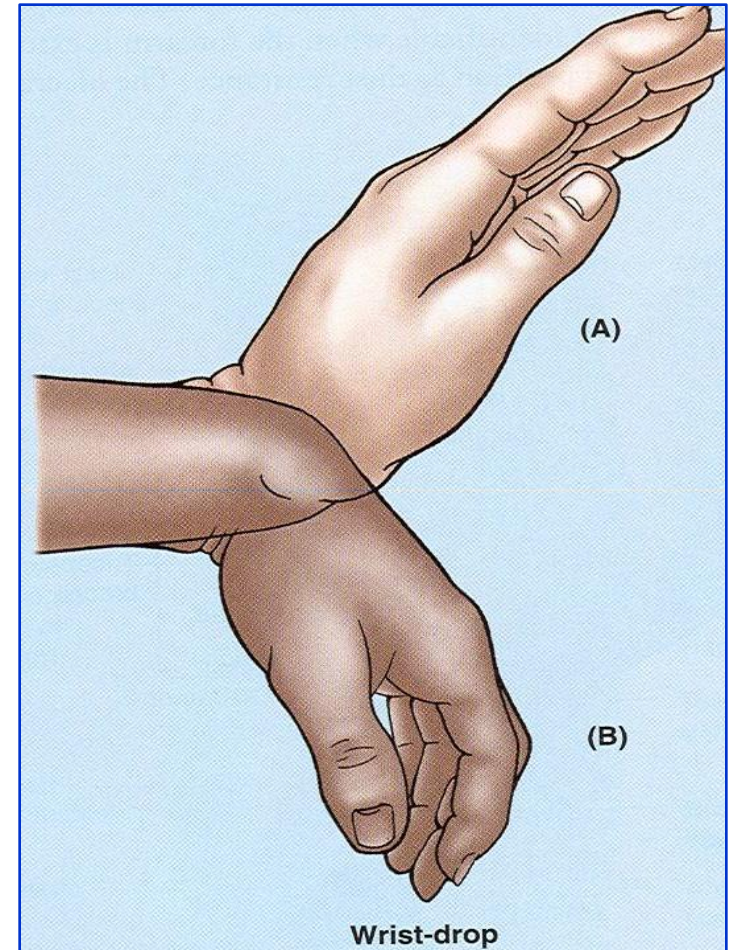
Injuries to the Radial Nerve

In the Axilla:

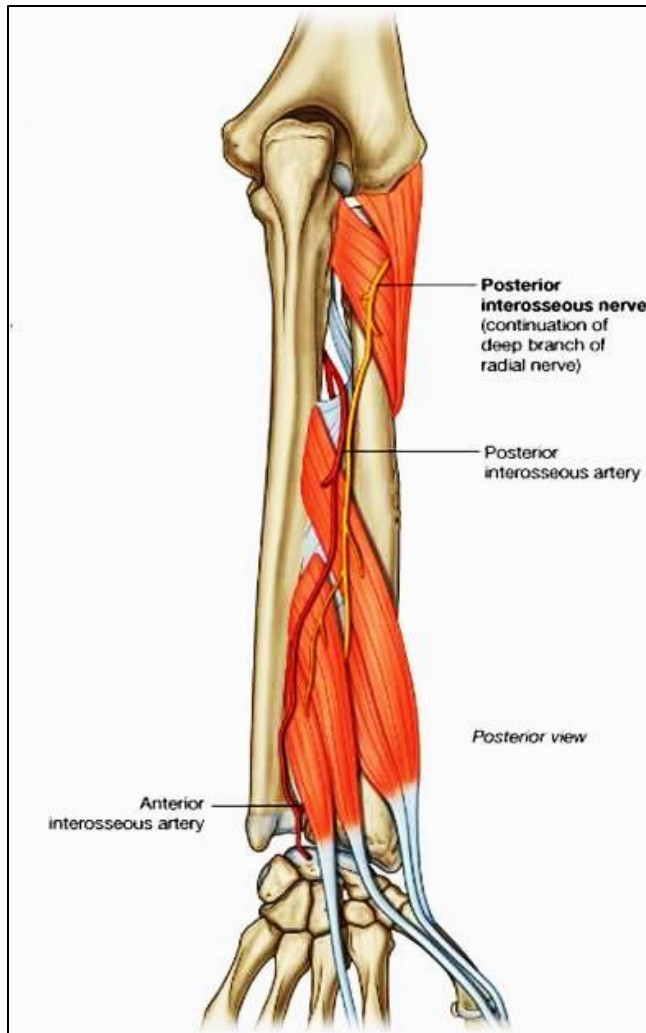
In the axilla the nerve can be injured by a drunkard falling asleep with one arm over the back of a chair, also by fractures and dislocations of the proximal end of the humerus. The triceps, the anconeus, and the long extensors of the wrist are paralyzed. The patient is unable to extend the elbow joint, the wrist joint, and the fingers **Wrist Drop**

In the Spiral Groove:

Injury or fracture of the spiral groove of the humerus, the patient is unable to extend the wrist and the fingers **(Wrist Drop)**.



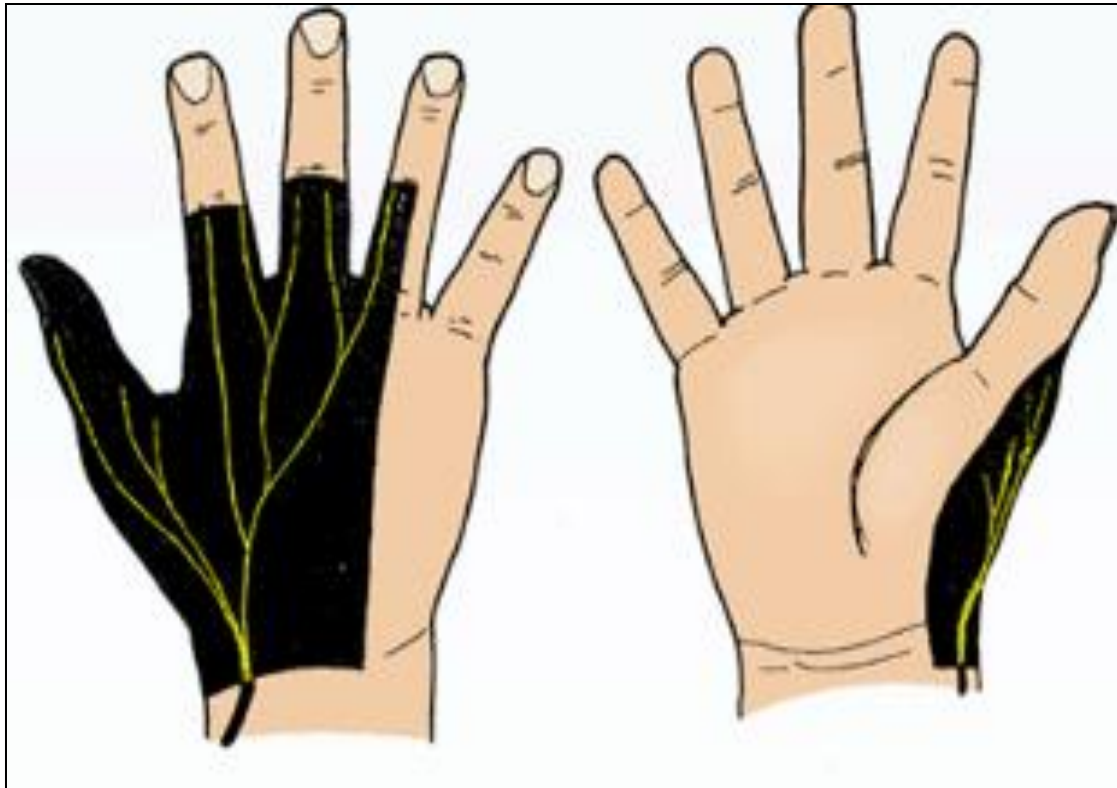
Injuries to the Deep Branch of the Radial Nerve



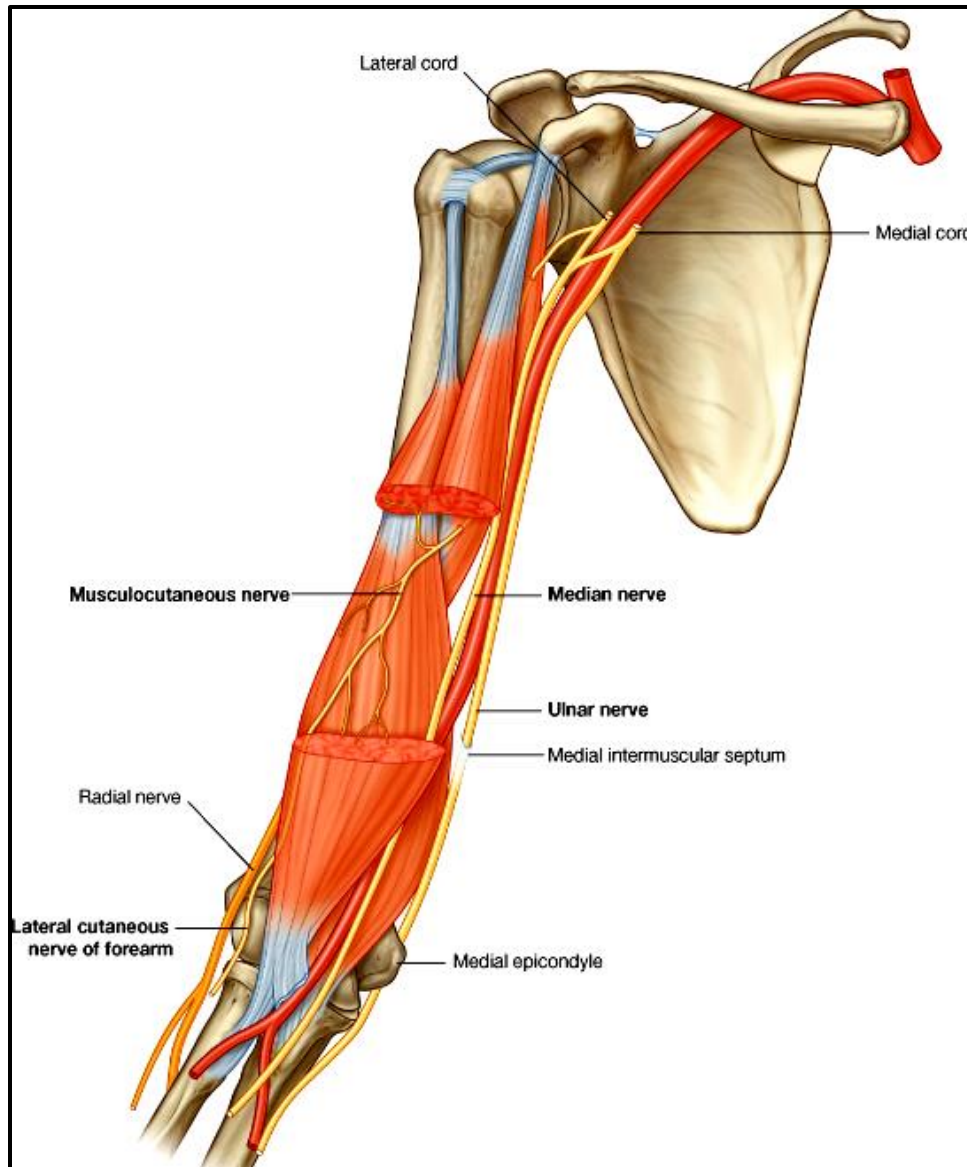
- The deep branch of the radial nerve is ***PURELY Motor nerve*** (It supplies the extensor muscles in the posterior compartment of the forearm).
- It can be damaged in fractures of the proximal end of the radius or during dislocation of the radial head.
- **The nerve that supply the supinator and the extensor carpi radialis longus will be undamaged**, and because the latter muscle is powerful, it will keep the wrist joint extended, (**No wrist Drop**)
- **No sensory loss**

Injuries to the superficial Branch of the Radial Nerve

Superficial radial nerve, is **Sensory nerve**. Injury like a stab wound, results in a variable small area of anesthesia over the **dorsum of the hand and lateral three & half fingers up to the base of their distal phalanges.**



Ulnar Nerve



- **Origin:**
- Medial cord of BP.
- **Course:**
- Descends along the *medial side of the following arteries:*
- ***Axillary.***
- ***Brachial.***
- ***Pierces the Medial Intermuscular Septum.***
- ***Passes behind the Medial Epicondyle of the humerus.***

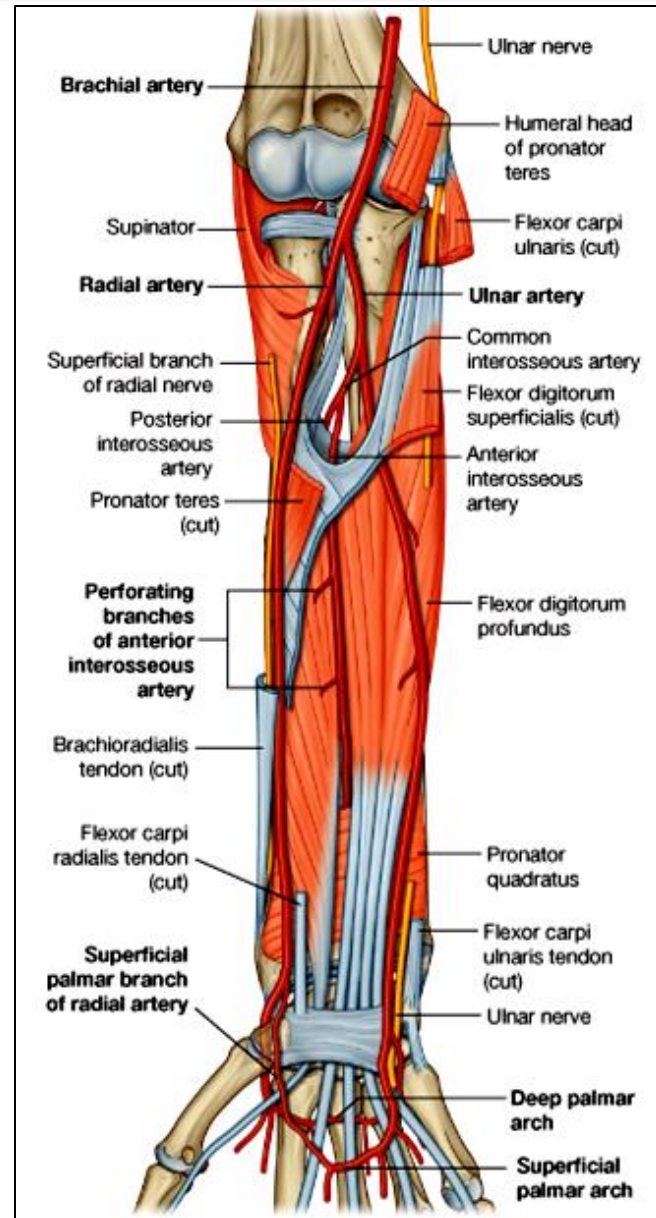
In the Forearm

Enters the anterior compartment.

Descends:

Behind the Flexor Carpi Ulnaris.

Medial to Ulnar Artery.



At the Wrist

Passes:

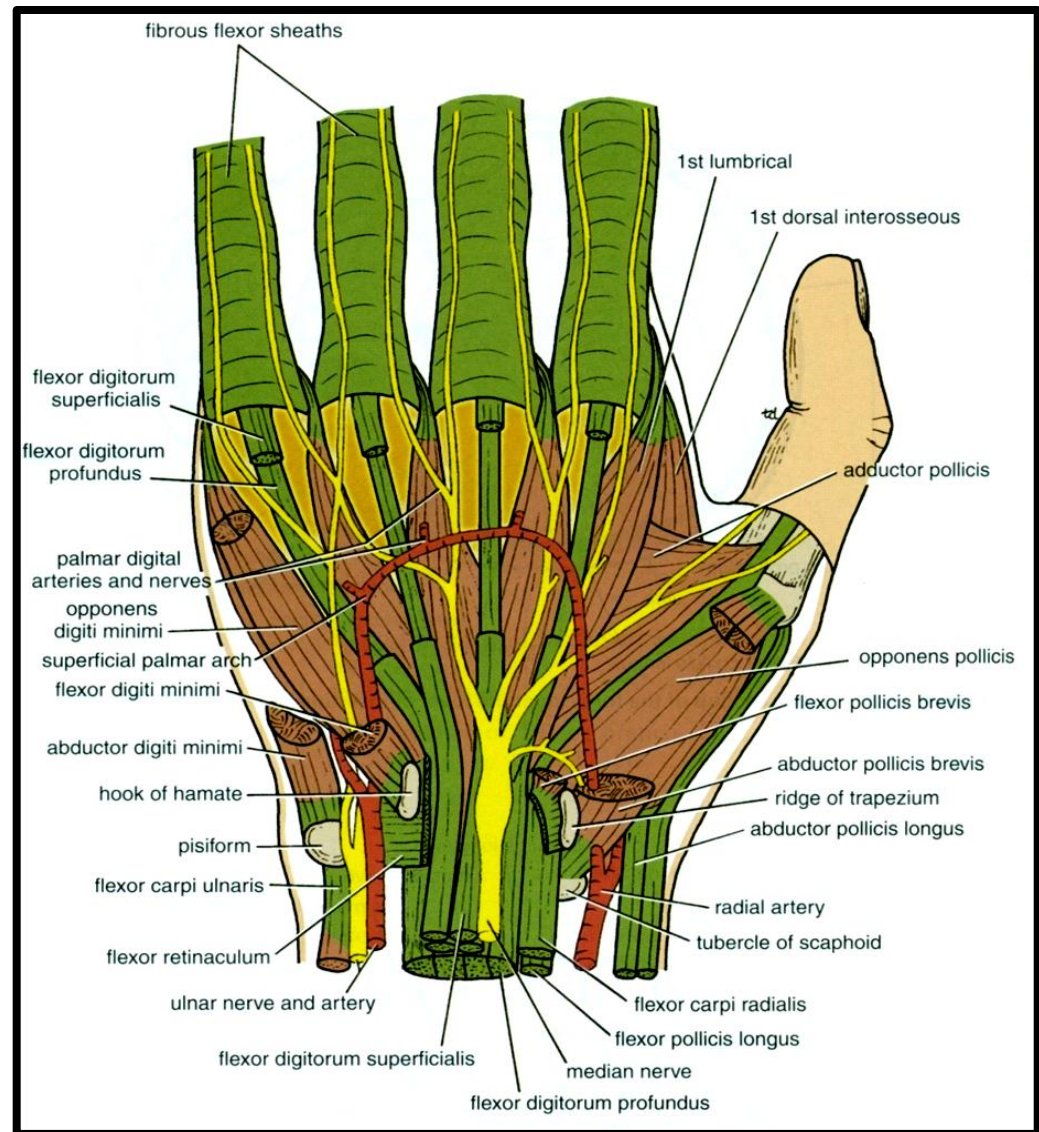
Anterior to Flexor Retinaculum.

Lateral to Pisiform bone.

Medial to Ulnar artery.

Divides into :

Superficial & Deep branches.



Branches

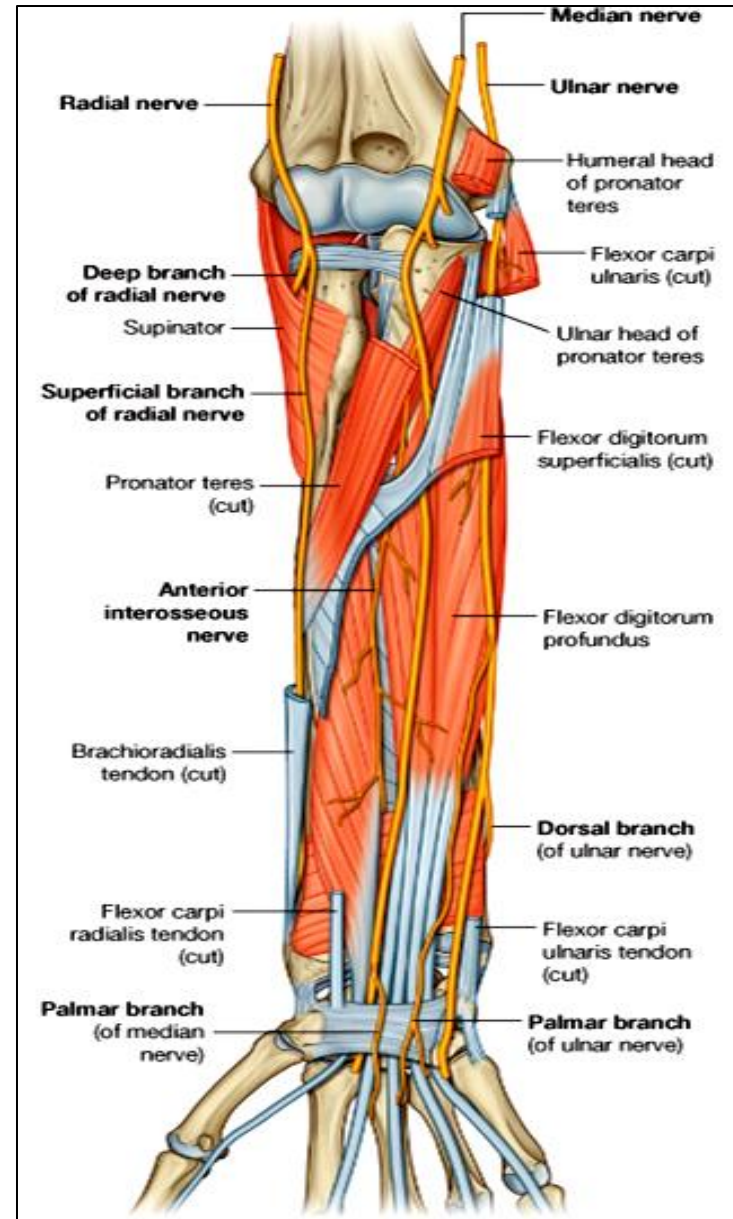
In the Forearm:

a. Muscular to (1 & 1/2 muscles)

1. Flexor Carpi Ulnaris

2. Medial 1/2 of Flexor Digitorum Profundus

b. Articular to Elbow joint



Branches

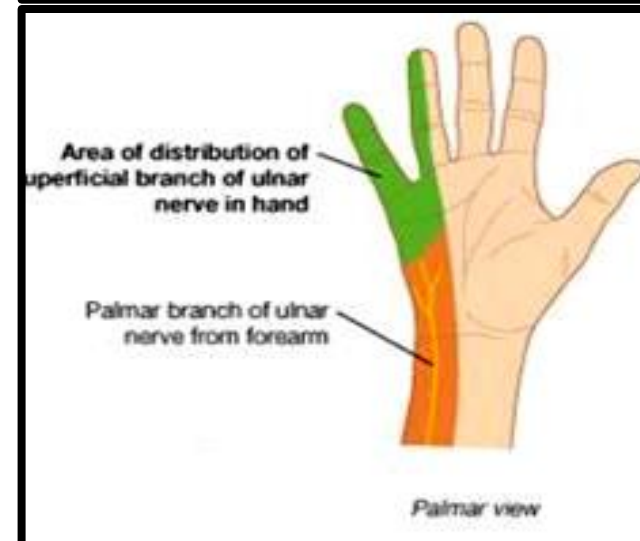
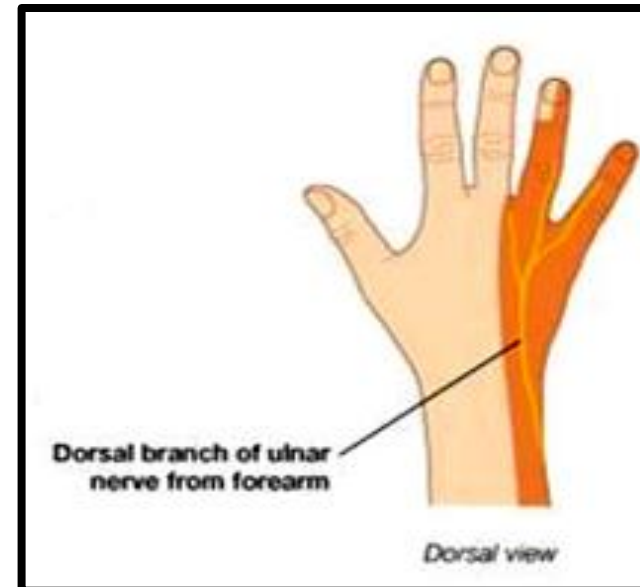
c. Cutaneous:

1. *Dorsal (posterior) cutaneous:*

Supplies the skin over the back of Medial side of the hand & Medial 1+1/2 fingers

2. *Palmar cutaneous:*

Supplies the skin over the Medial part of the palm.

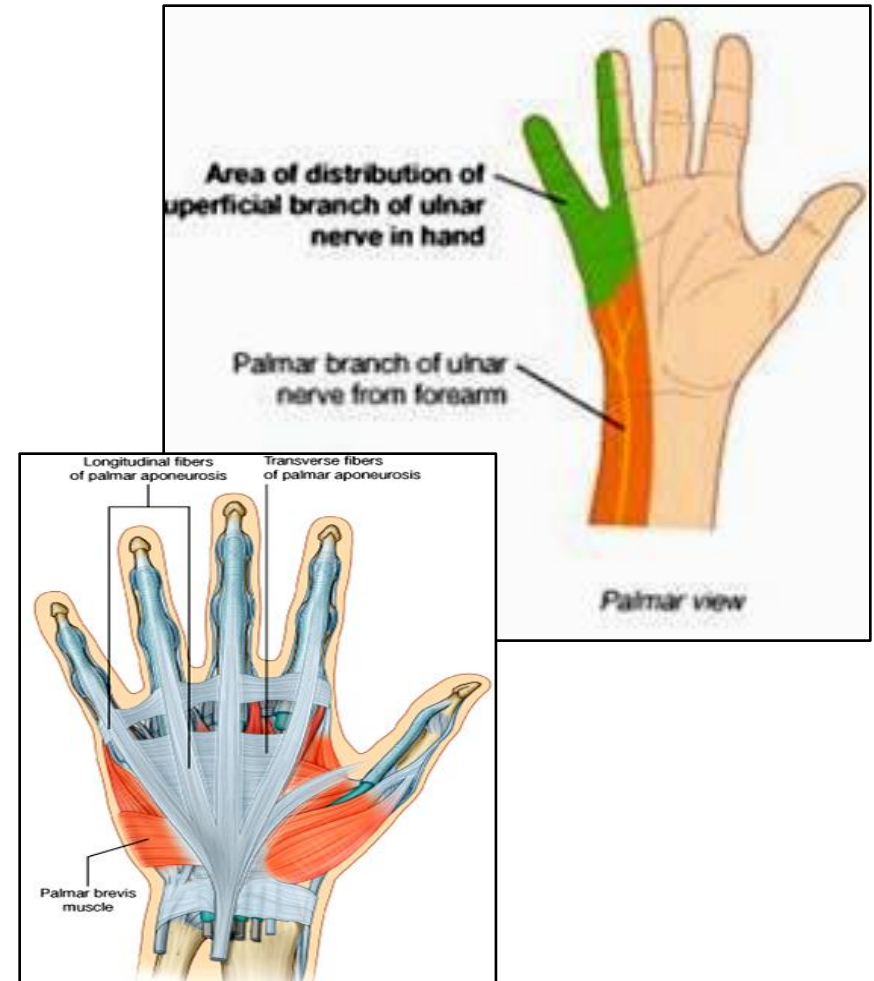


Superficial Terminal Branch

Gives

1. Muscular branches to Palmaris Brevis.

2. Cutaneous branches to the skin over the Palmar aspect of the medial 1+ ½ fingers (including nail beds).



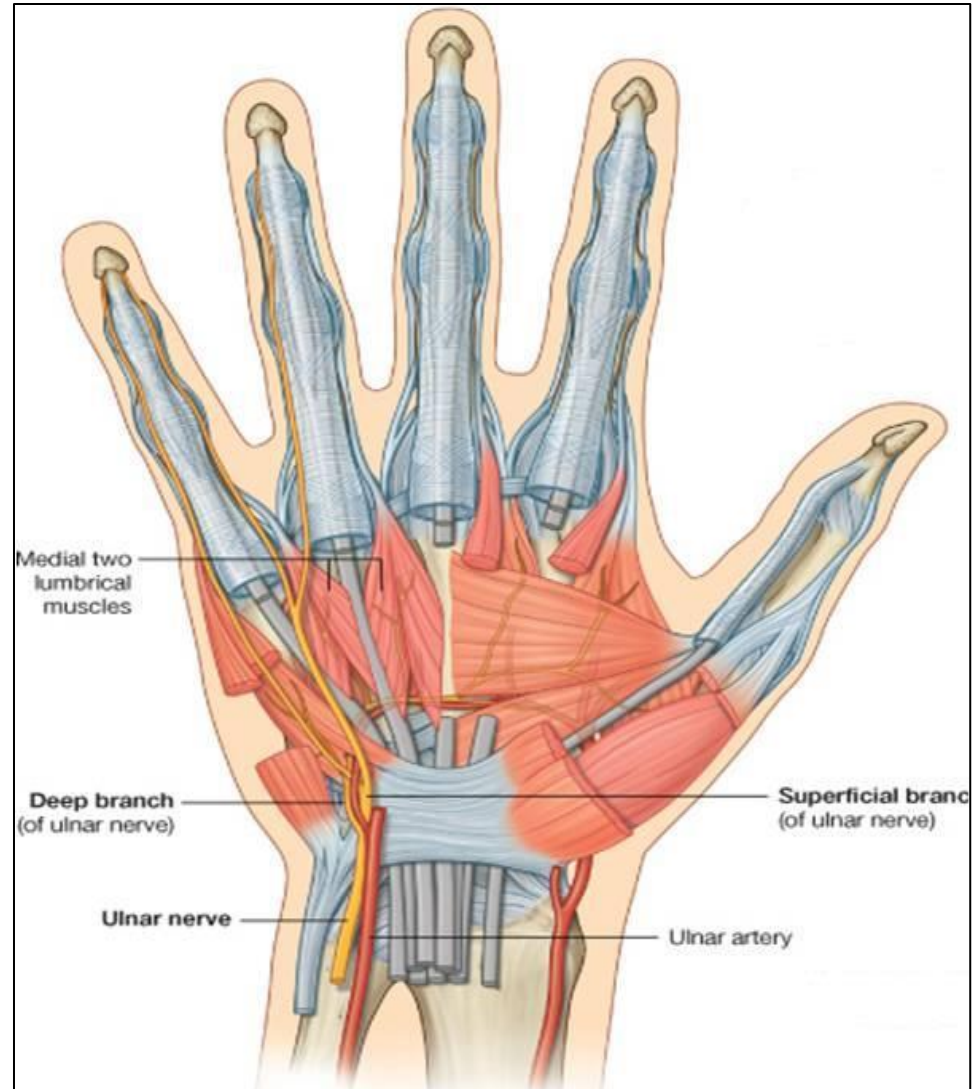
Deep Terminal Branch

(A) Muscular branches to:

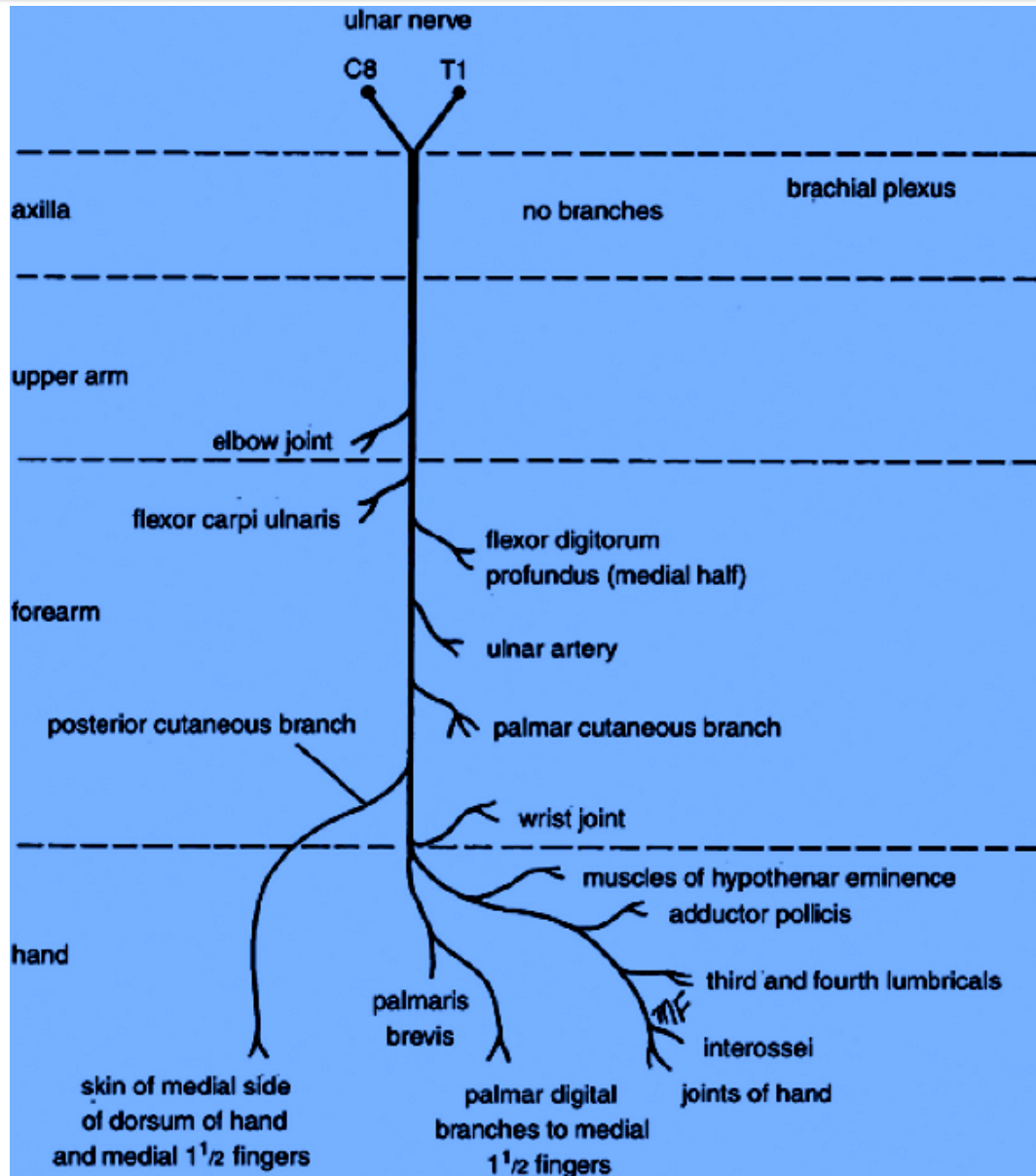
- 1. Hypothenar Eminence.**
- 2. All Interossei (Palmar & Dorsal).**
- 3. 3rd & 4th Lumbricals.**
- 4. Adductor pollicis.**

(B) Articular branches to:

Carpal joints



Summary of branches of Ulnar Nerve



Ulnar Nerve Injury

At the

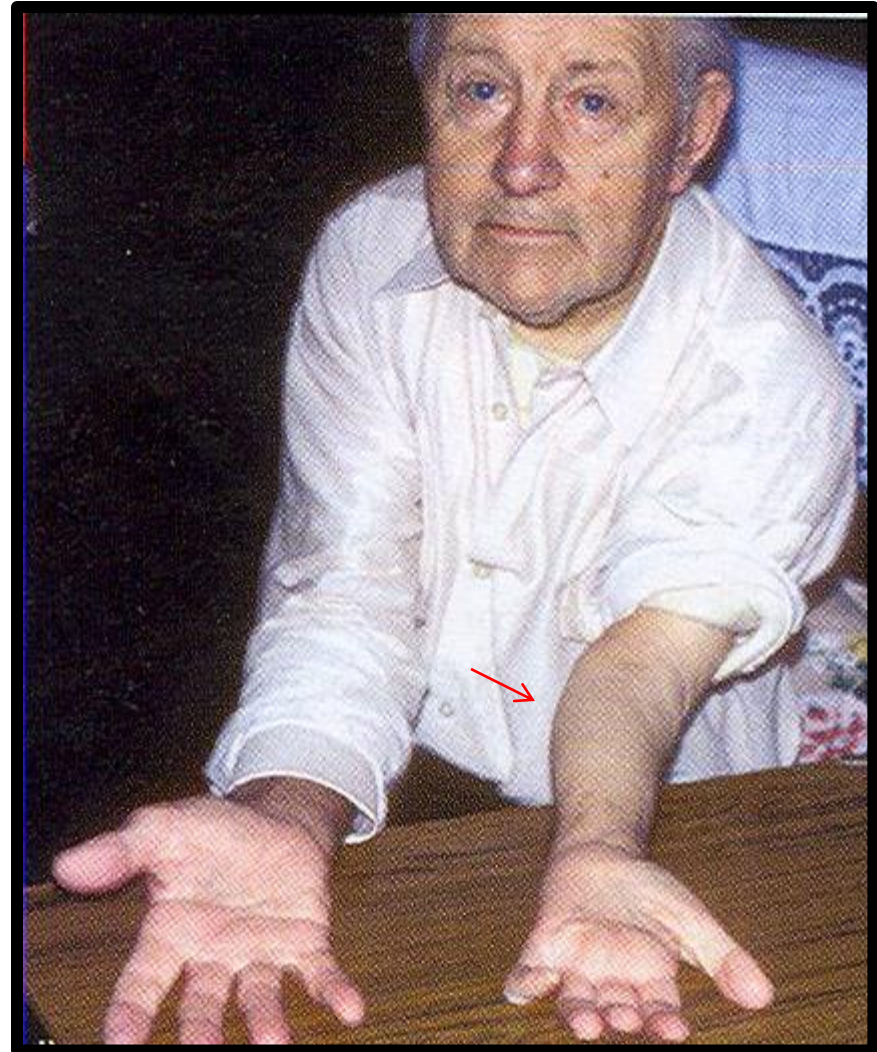
Elbow:

*Atrophy of Ulnar side
of forearm.*

*Flexion of the wrist
with Abduction.*

Claw hand.

*Wasting of
Hypothenar Eminence.*

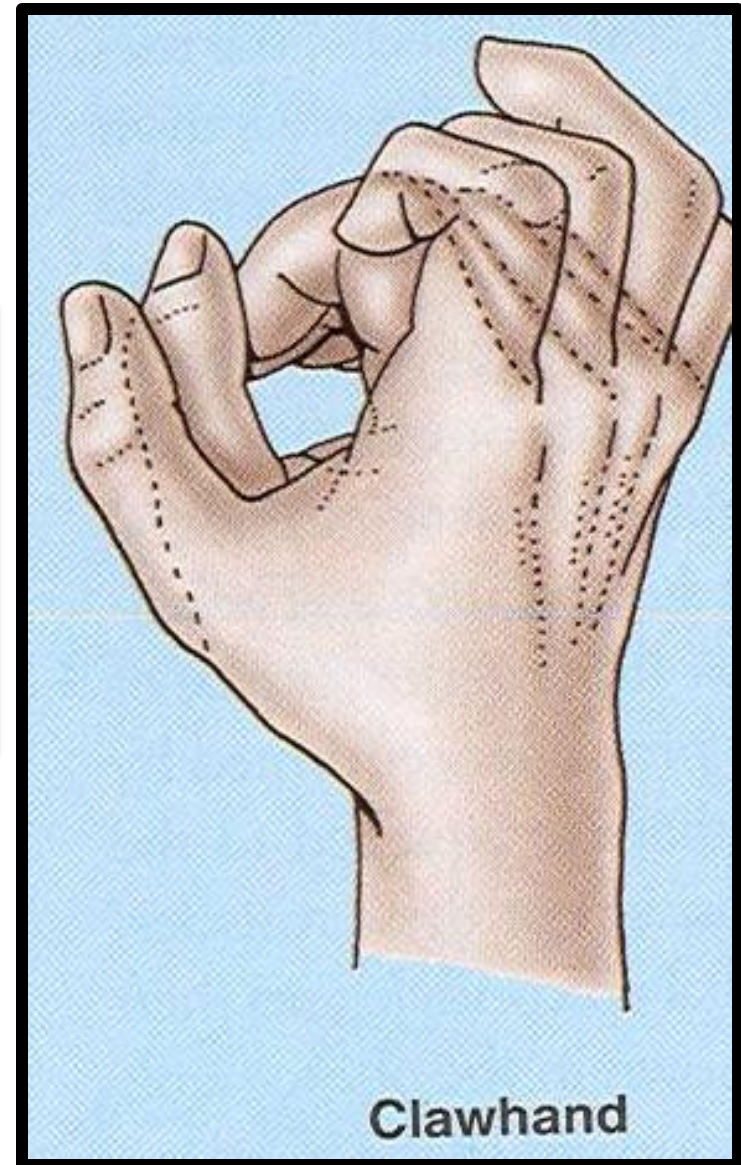


Ulnar Nerve Injury

At the wrist:

Claw Hand.

Wasting of Hypothenar Eminence.



Cutaneous Nerves of Hand

Autonomous area for testing - Ulnar nerve

Autonomous area for testing - Median nerve

Digital branches of ulnar

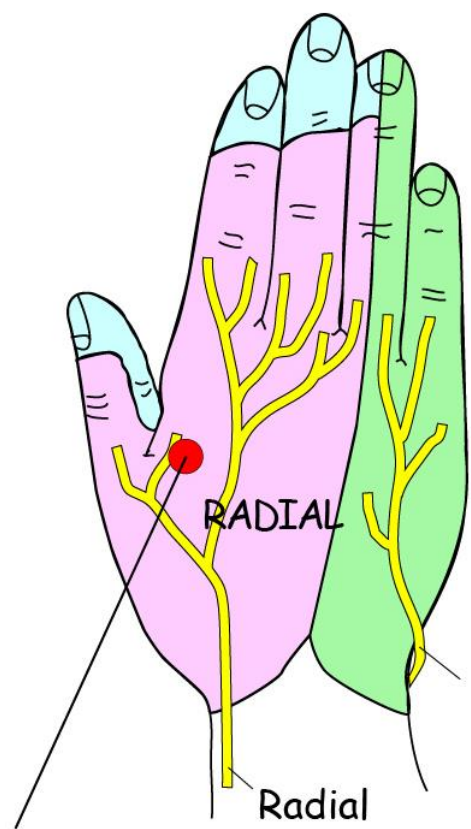
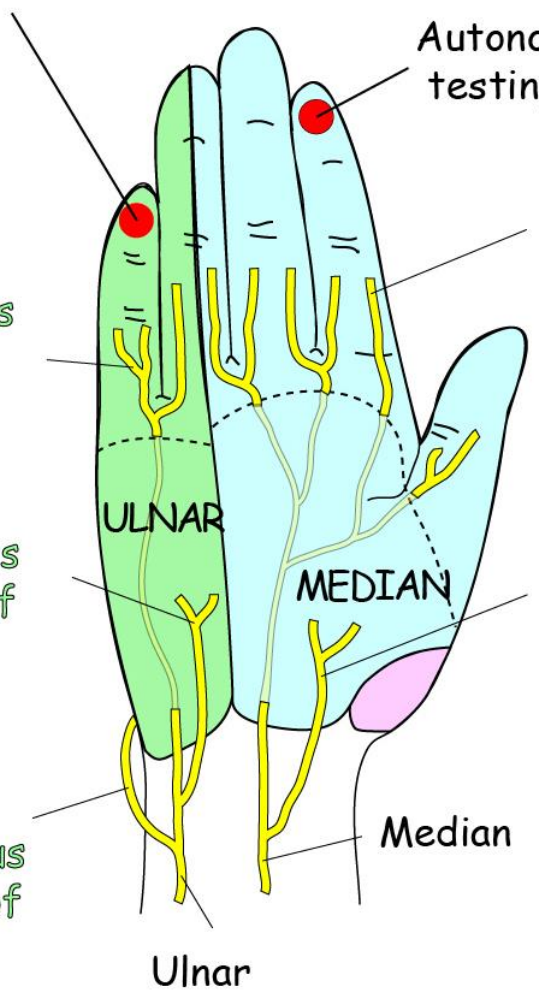
Digital branches of median

Palmar cutaneous branch of ulnar

Palmar cutaneous branch of median (spared in carpal tunnel syndrome)

Dorsal cutaneous branch of ulnar

Dorsal cutaneous branch of ulnar



Autonomous area for testing - Radial nerve

The End