بسم الله الرحمن الرحيم

Radial & Ulnar Nerves

DR. ZAHID KAIMKHANI
MD,M.Phil,PhD

Objectives

By the end of this session we 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(C_{5-8},T_1)

Origin:

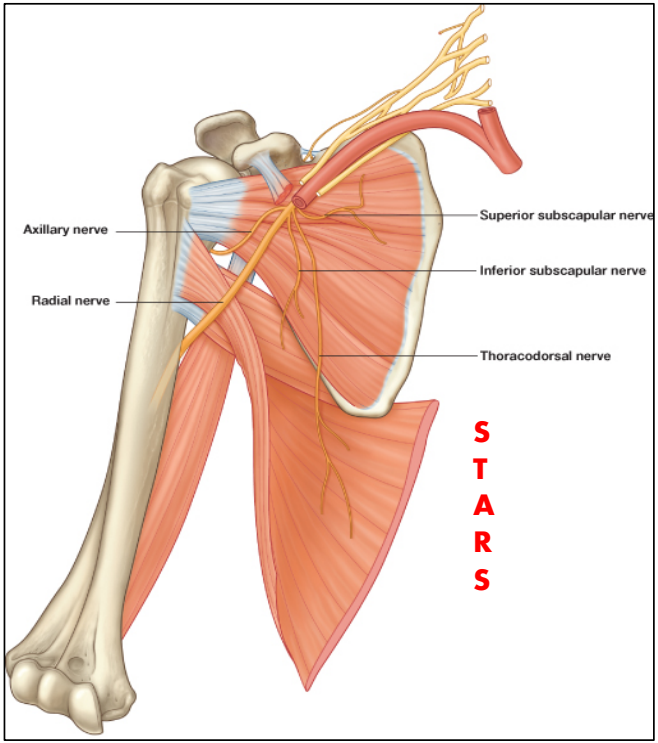
One of the five branches of the Posterior cord of the brachial plexus (other branches?)

Begins in the axilla

The largest branch

Supplies:

Nerve of the extensor compartment i.e. Muscles of the posterior compartment of the arm & the fore arm

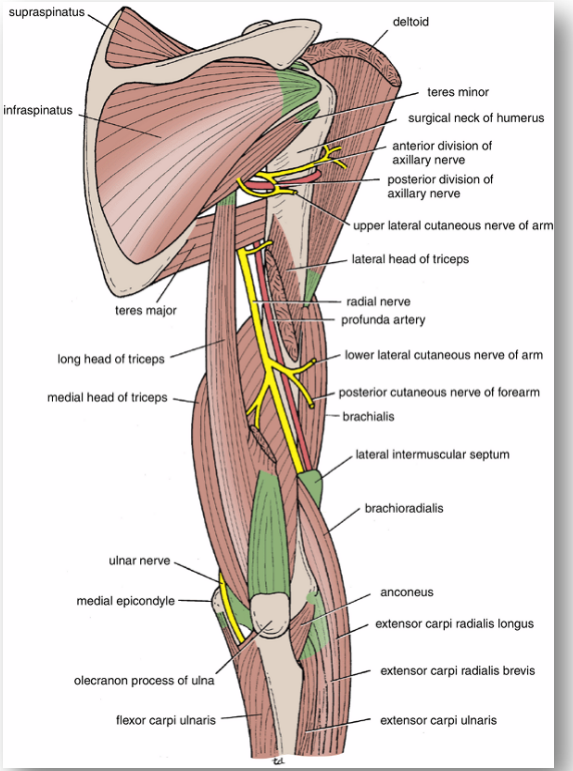


Radial Nerve

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).



Radial Nerve

In the lower arm

- ***It pierces the Lateral Intermuscular septum of arm.***
- ***Descends in front of the Lateral Epicondyle.***
- ***Passes forward into the Cubital Fossa***

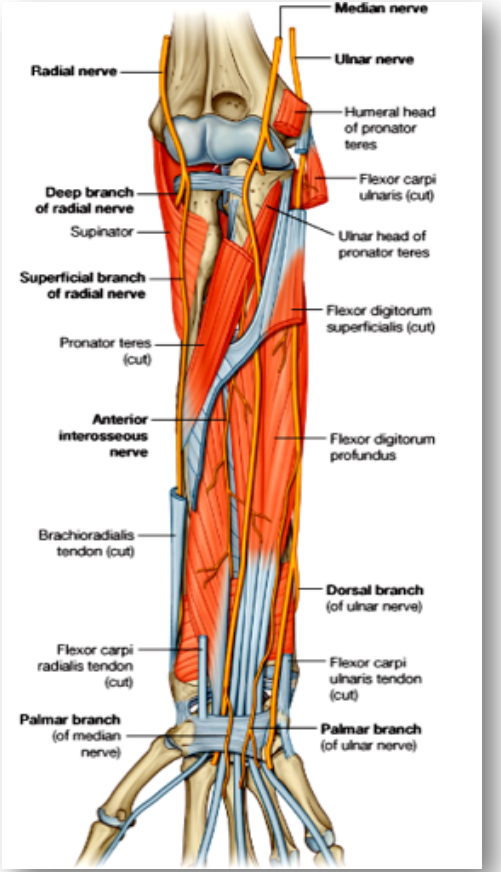
Enter In the Forearm

Divides into

1.Superficial branch

- **Conti. of the radial nerve**
- **Purely cutaneous**

2. Deep branch (Post. interosseous)



Radial Nerve

Branches in Axilla

Cutaneous:

Posterior cutaneous nerve of arm.

Muscular:

Long & Medial Heads of Triceps.

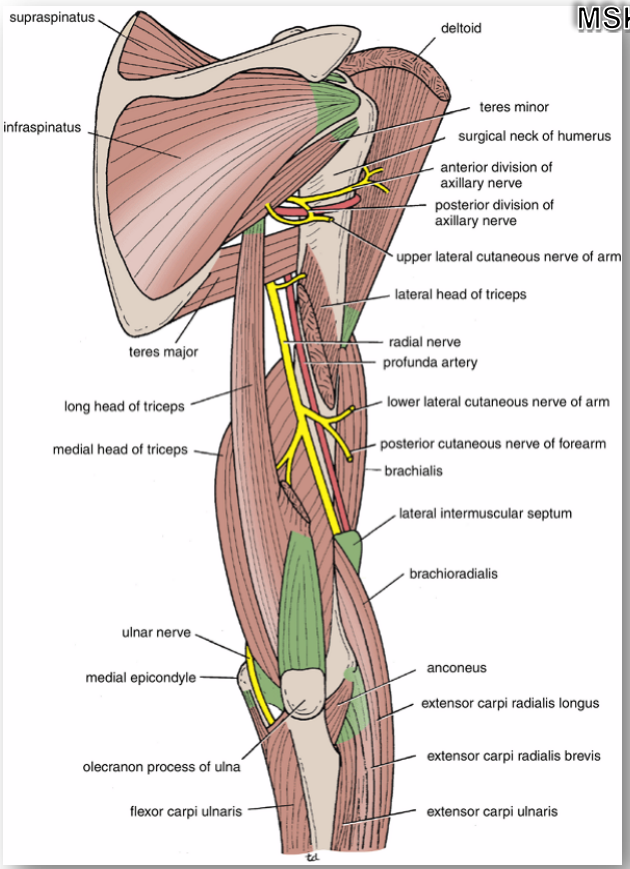
Branches in Spiral Groove

Cutaneous:

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

Muscular:

Lateral & Medial heads of triceps.
Anconeus.



Radial Nerve

Branches

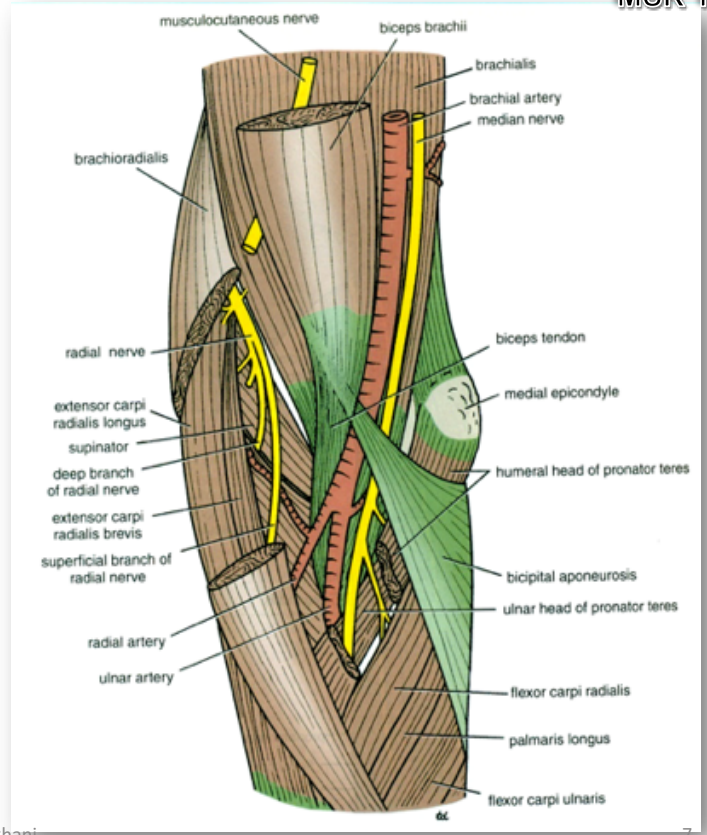
Close to Lateral Epicondyle:
In the flexor compartment of Arm

Muscular:

1. ***Brachialis.***
2. ***Brachioradialis.***
3. ***Extensor carpi radialis longus.***

Articular

- ***to the elbow joint***



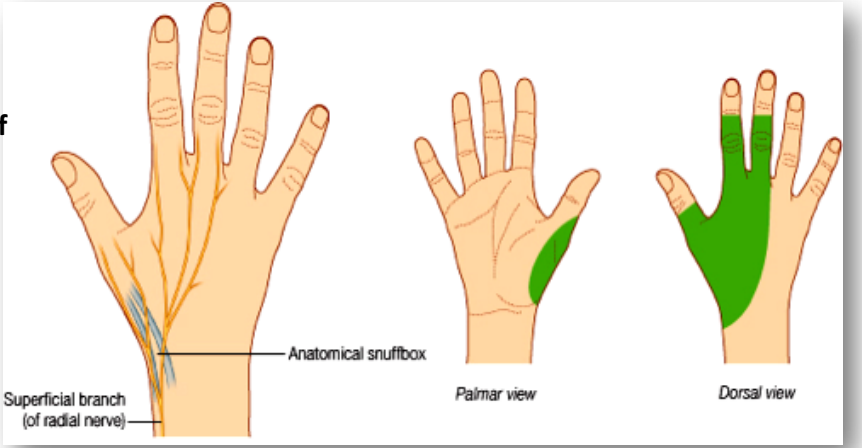
Radial Nerve

Terminal Branches

Superficial Branch

- Conti. of the radial nerve
- Purely cutaneous
- Runs down the flexor comp of the forearm
- Winds around the lower end of the radius deep to BR
- Crosses the pollicis muscles to reach the back of the hand.

- **Supplies:**
  - The skin on the lateral (radial) two and half digits or three and a half of proximal phalanges
  - The skin of the corresponding half of the hand



Radial Nerve

Terminal Branches

Deep Branch (Post. interosseous)

Course

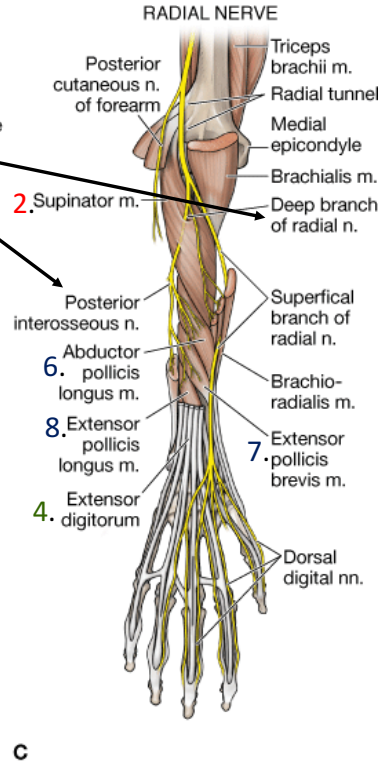
It winds around the neck of the radius, within the supinator muscle, and enters the posterior compartment of the forearm

Muscular:

1. ***Extensor carpi radialis brevis.***
2. ***Supinator.***
3. ***Extensor carpi ulnaris.***
4. ***Extensor digitorium***
5. ***Extensor digitimini***
6. ***Abductor pollicis longus.***
7. ***Extensor pollicis brevis.***
8. ***Extensor pollicis longus.***
9. ***Extensor indicis.***

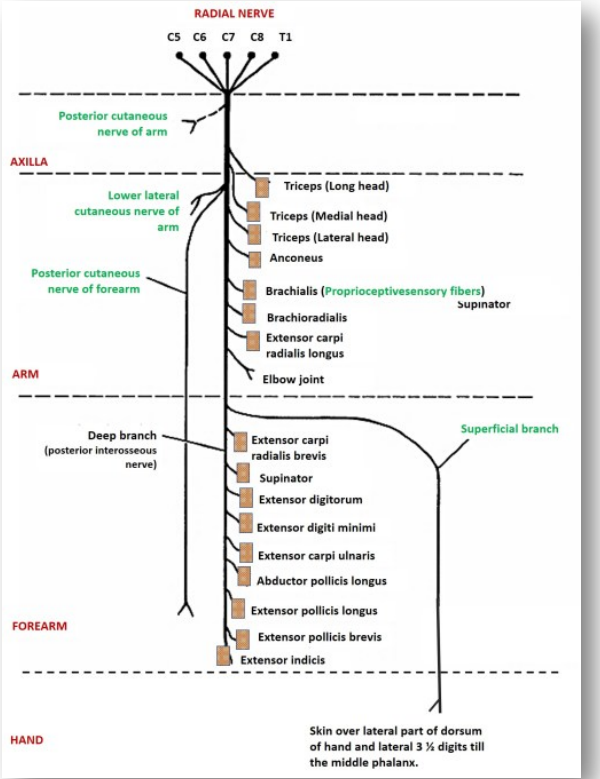
Cubital Fossa

Extensor Compartment



Radial Nerve

Summary of main branches



Radial Nerve

Applied Anatomy

Transient paralysis

1. **Improper use of crutch** (pressing the nerve in the axilla) **"CRUCH PALSY"**
2. **Saturday night palsy** (draping the arm over the chair in a state of diminished consciousness)

Test. Extension of elbow. Result ?

Injury of the radial nerve

Most common-fracture of the shaft of the humerus

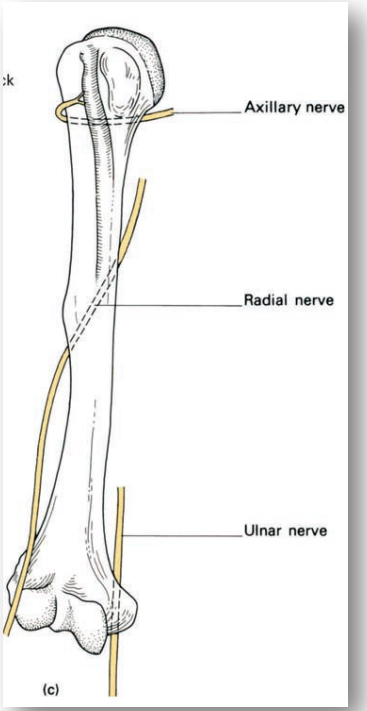
The characteristic lesion is "WRIST DROP"

Inability to extend WRIST and metacarpophalangeal joint

Elbow joint ????

Interphalangeal Joints???

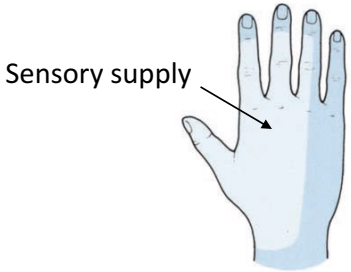
Sensory loss –MINIMAL – WHY??



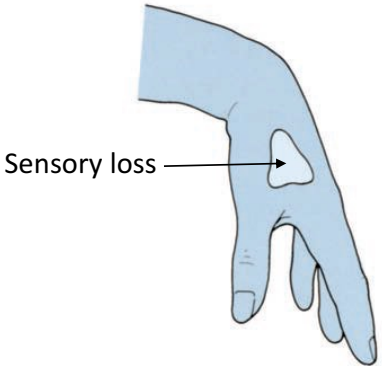
Radial Nerve

Applied Anatomy

Injury of the radial nerve



Sensory loss –MINIMAL – WHY??



Overlapping by the median and ulnar nerves

Radial Nerve

Applied Anatomy

Injury of the Deep Branch (Post. interosseous)

Causes:

- **Fractures of the proximal end of the radius.**
- **During dislocation of the radial head.**

Clinical picture

"No wrist Drop" {Ref. snell p-539}

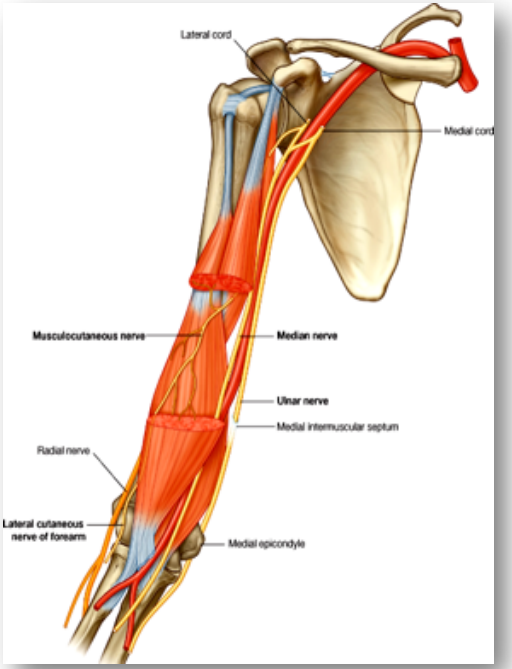
Why?

The nerve supply to 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.

Sensory loss – Nothing

Overlapping by the median and ulnar nerves

Ulnar Nerve


Lateral cord
Medial cord
Musculocutaneous nerve
Median nerve
Ulnar nerve
Medial intermuscular septum
Radial nerve
Lateral cutaneous nerve of forearm
Medial epicondyle

Ulnar Nerve

Origin:

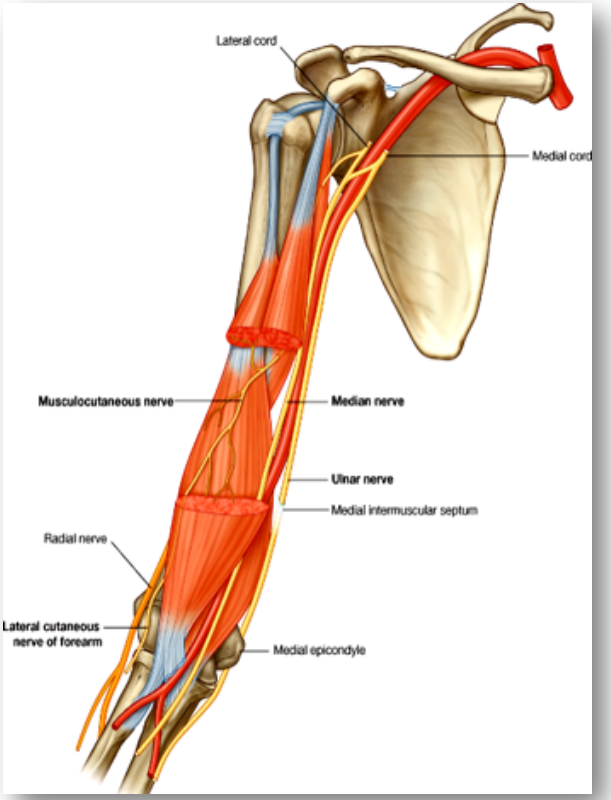
- *Begins in the axilla*
- *Continuation of the medial cord (Other Branches?)*

Supplies:

- *Some flexors muscles on ulnar side of the forearm*
- *Most of the intrinsic muscles of the hand*
- *Skin of the ulnar one and a half digits*

Course: In Arm

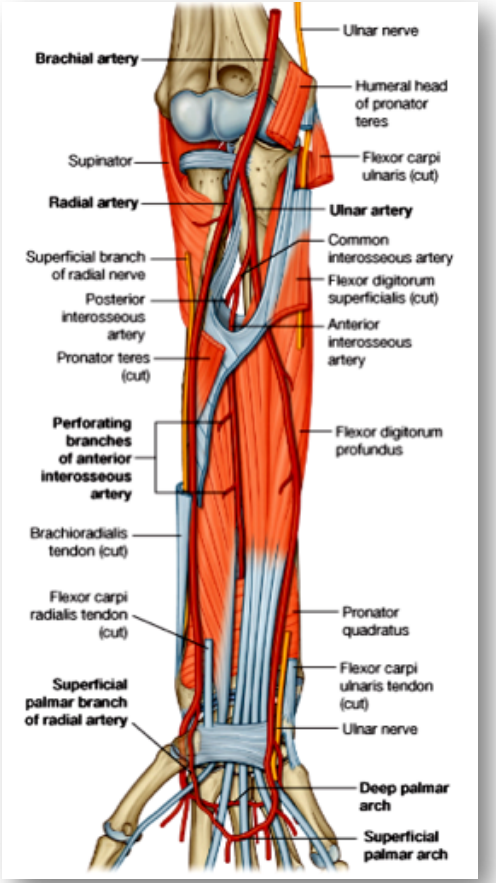
- *Descends along the medial side of the following arteries:*
  - *Axillary.*
  - *Brachial.*
- *Pierces the Medial Intermuscular Septum.*
- *Passes behind the Medial Epicondyle of the humerus. (Funny Bone)*



Ulnar Nerve

Course: In Forearm

- *Descend on FD Profundus*
- *Deep to the Flexor Carpi Ulnaris.*
- *It is medial to Ulnar Artery*



Ulnar Nerve

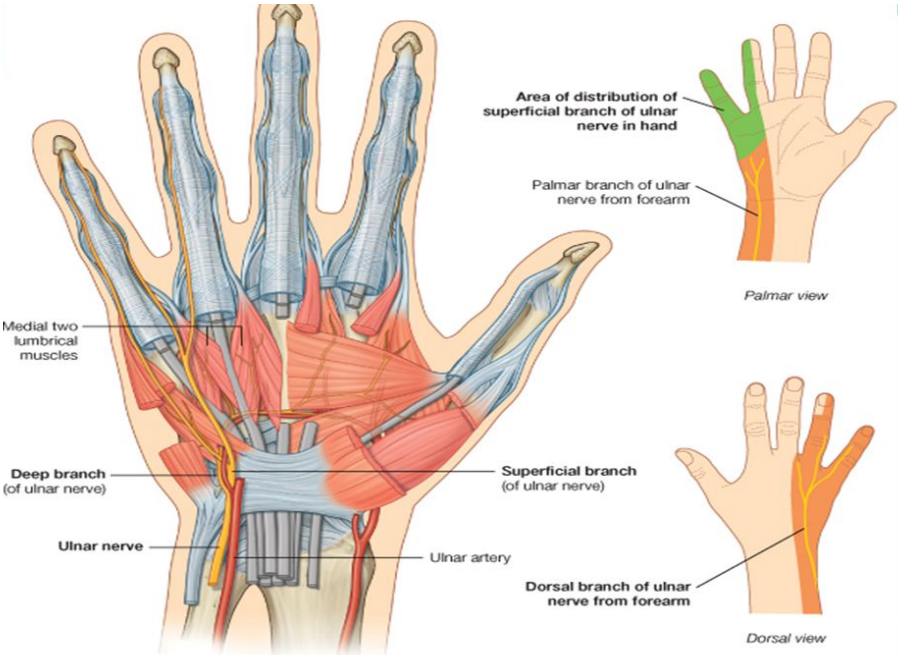
Course: At wrist

Passes:

- ***Anterior to Flexor Retinaculum.***
- ***Lateral to Pisiform bone.***
- ***Medial to Ulnar artery.***

Divides into :

Superficial & Deep branches



Ulnar Nerve

Branches: in the Forearm

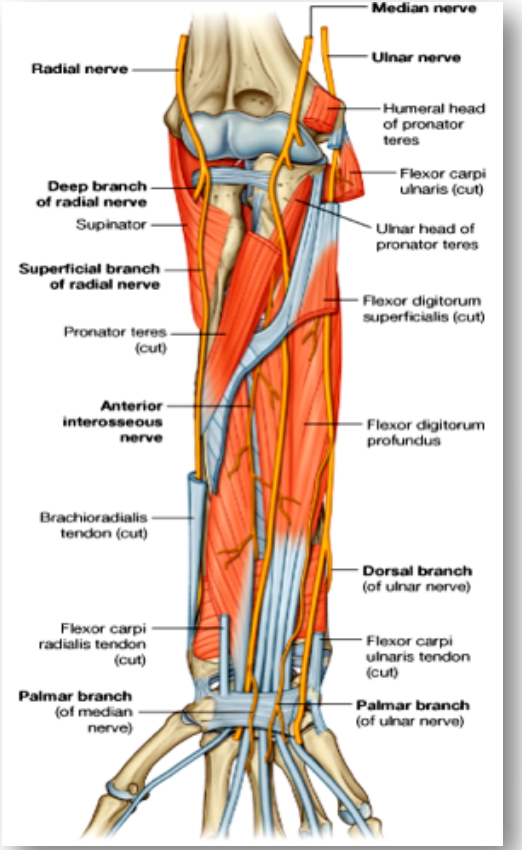
***Muscular to** (1 & 1/2 muscles)*

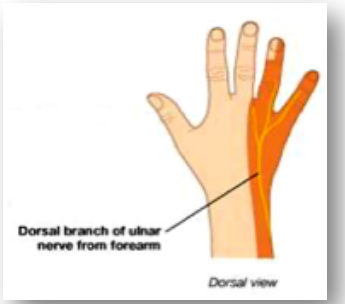
1. *Flexor Carpi Ulnaris*
2. *Medial 1l2 of Flexor Digitorum Profundus*

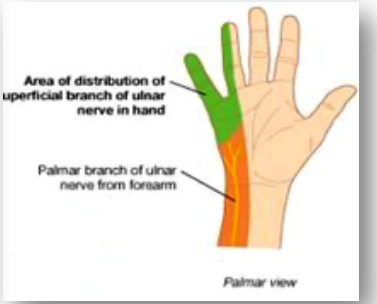
***Articular to** Elbow joint*

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(skin over hypothenar eminence .



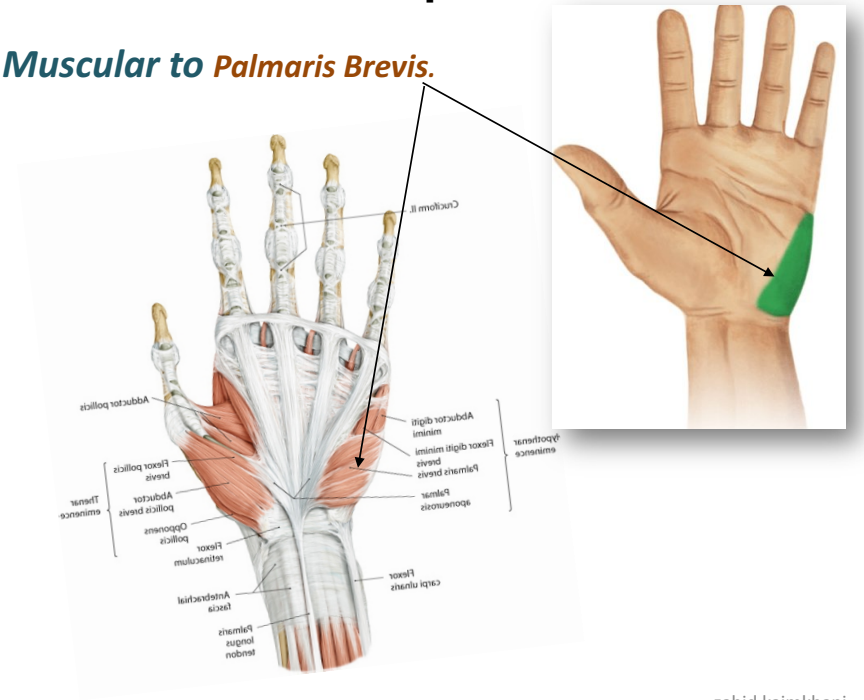


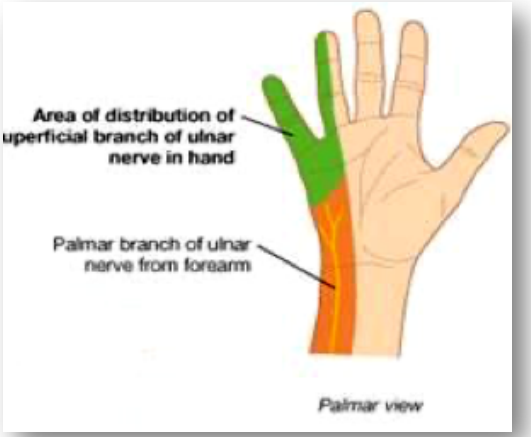


Ulnar Nerve

Terminal Branches: Superficial

Muscular to Palmaris Brevis.





Cutaneous:

Supplies the skin over the Palmar aspect of the medial 1+ ½ fingers (including nail beds).

Ulnar Nerve

Terminal Branches: Deep Branch

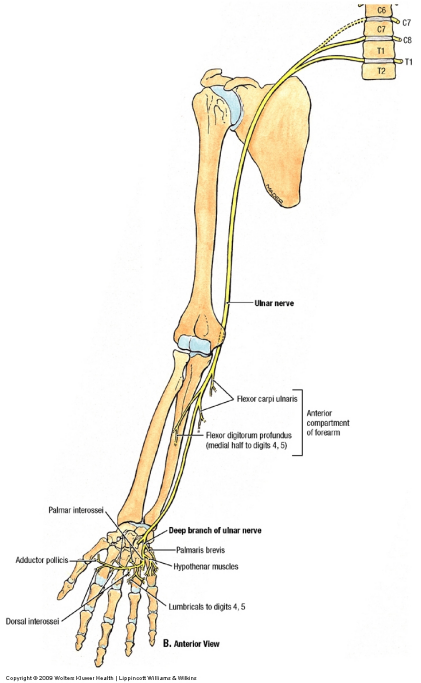
Muscular to:

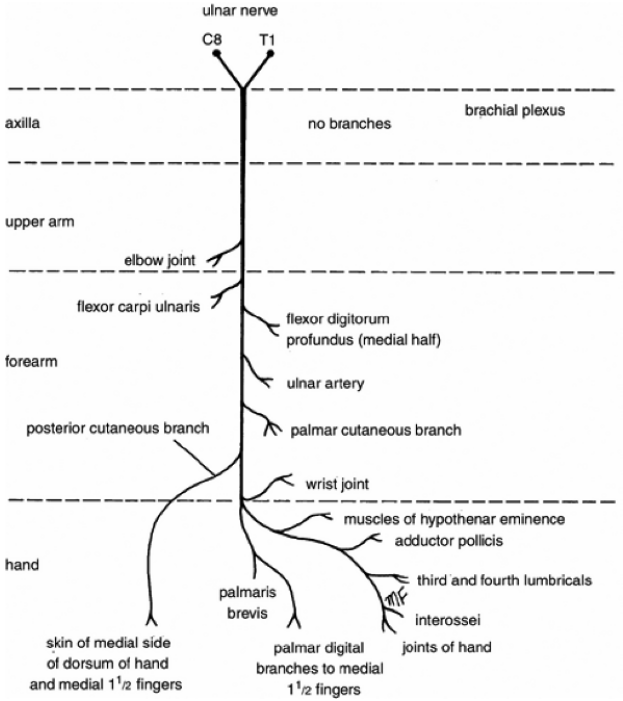
1. ***Hypothenar Eminence.***
2. ***All Interossei (Palmar & Dorsal).***
3. ***3rd & 4th (Radial) Lumbricals.***
4. ***Adductor pollicis***
   (ends by supplying it)

Articular to Carpal joints

Ulnar Nerve

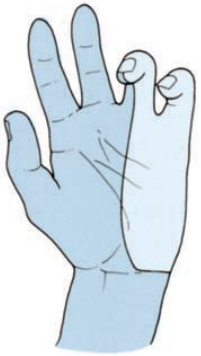
Summary of main branches





Ulnar Nerve

Applied Anatomy



Most commonly injured

- Behind the elbow
- At wrist

- The classical sign of a low lesion "CLAW HAND"
  - Hyperextension of the MCP joints of ring and little fingers
  - Flexion of the IP joints

WHY?

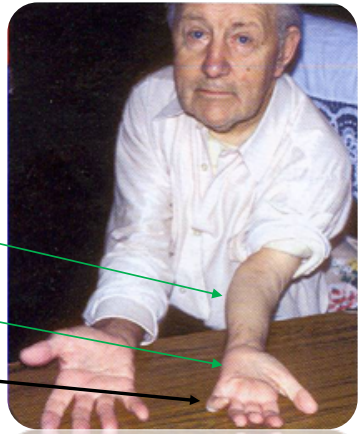
- Paralysis of interossei & lumbricals
- Unopposed actions of extensors & FDP

Ulnar Nerve

Applied Anatomy

Behind the elbow

- *Atrophy of Ulnar side of forearm.*
- *Flexion of the wrist with Abduction.*
- *Wasting of Hypothenar Eminence*
- *Claw hand.*



At the elbow

- *Claw Hand.*
- *Wasting of Hypothenar Eminence.*

HOME WORK

- **Cubital Tunnel Syndrome ??** **Funny bone**
- **Ulnar tunnel syndrome**, also known as **Guyon's canal syndrome** is caused by entrapment of the ulnar nerve in the **Guyon canal**

Thanks for Listening