

Radial and Ulnar Nerves

Musculoskeletal block- Anatomy-lecture 10



Objectives

- ✓ Describe the anatomy of the radial & ulnar nerves regarding:
origin, course, and distribution.
- ✓ List the branches of the nerves.
- ✓ Describe the causes and manifestations of nerve injury.

Color guide :

Only in boys slides in **Blue**

Only in girls slides in **Purple**

important in **Red**

Doctor note in **Green**

Extra information in **Grey**

Radial Nerve

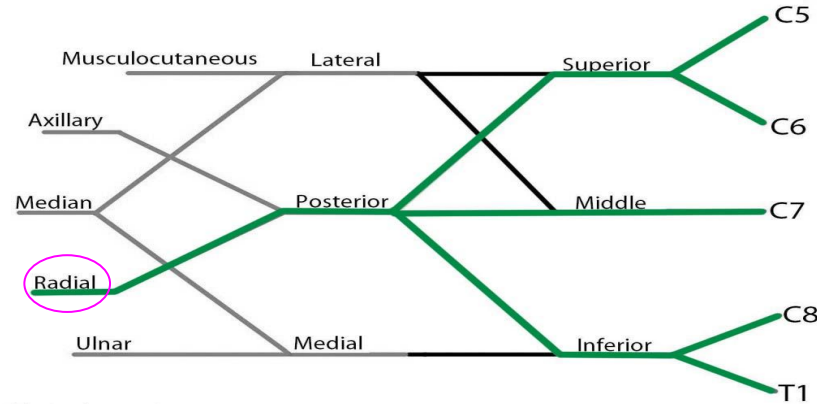
Origin: One of the five branches of the Posterior cord of the brachial plexus.

- ❖ Begins in the axilla
- ❖ The **largest** branch of nerves in the upper limb

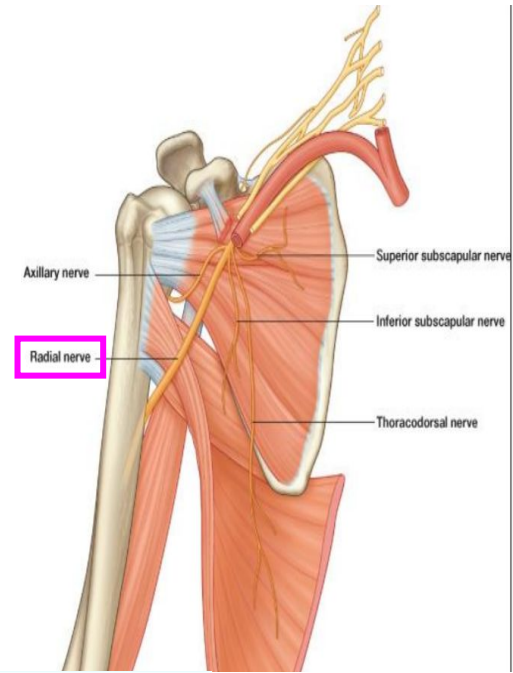
Supplies: Nerve of the extensor compartment.

- All muscles of the **posterior** compartment of the arm and forearm

The radial nerve arises from the posterior cord of the brachial plexus. The radial nerve receives branches from each nerve root from C5-T1

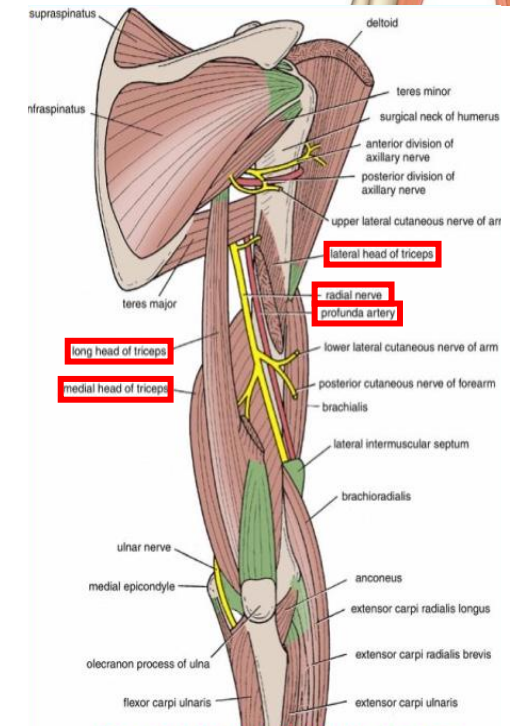


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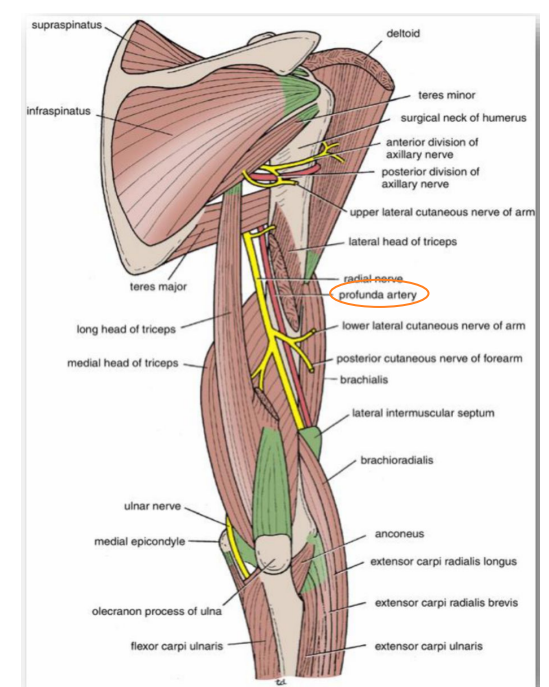
Radial nerve in the axilla

The radial nerve lies posterior to the axillary artery. The radial nerve continuous into the posterior compartment of the arm. The radial nerve then gives three branches in the axilla



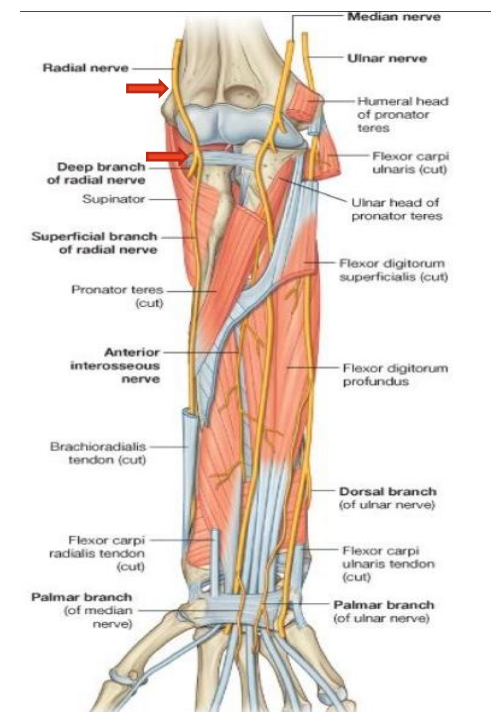
Radial Nerve course & Distribution In the Arm

- It **winds** around the back of the arm in the **Spiral Groove** (radial 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).



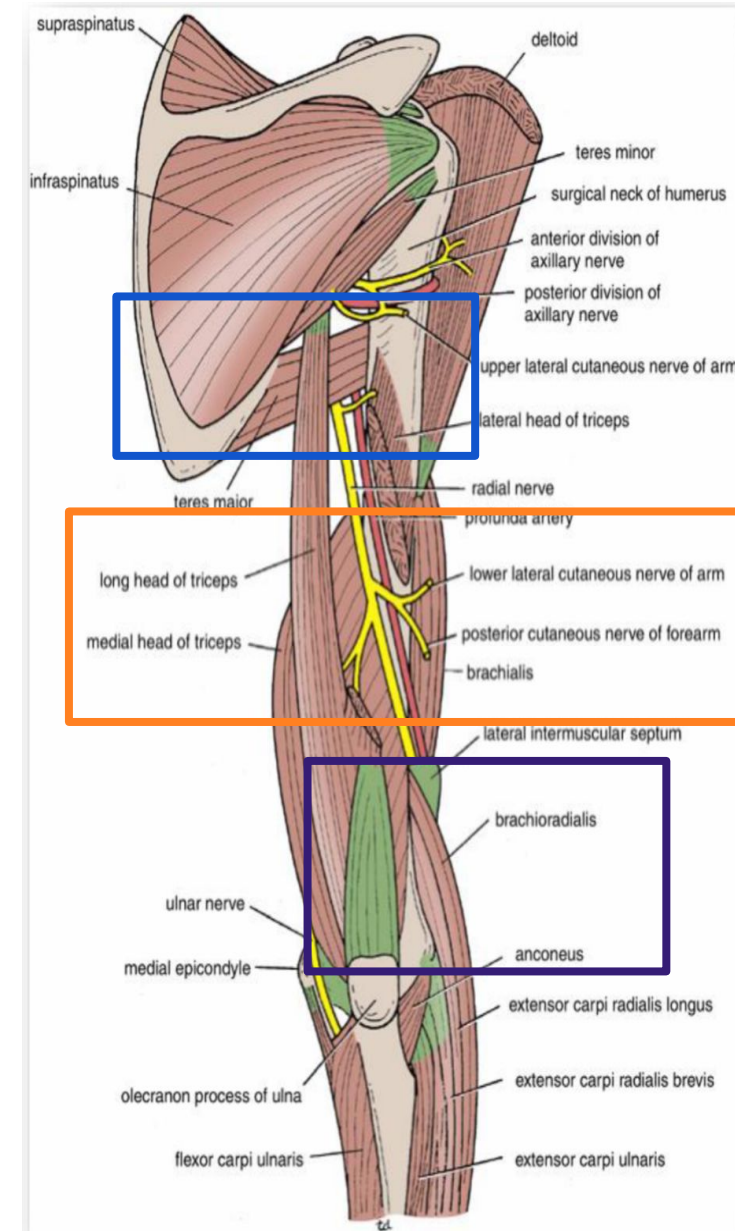
Course In the Forearm

- It pierces the Lateral Intermuscular septum.
 - Descends in front of the **Lateral Epicondyle**.
 - Passes forward into the **Cubital Fossa**.
 - Divides into
1. **Superficial branches**
 - Conti. of the radial nerve
 - Purely cutaneous
 2. **Deep branches.**
 - (Post. interosseous)



Radial Nerve Branches

in the Axilla	in the Spiral Groove arm	close to lateral epicondyle: In the flexor compartment of Arm
<p>Cutaneous to:</p> <ol style="list-style-type: none"> 1. Posterior cutaneous nerve of arm 	<p>Cutaneous to:</p> <ol style="list-style-type: none"> 1. Lower lateral cutaneous nerve of arm 2. Posterior cutaneous nerve of forearm 	<p>Muscular to:</p> <ol style="list-style-type: none"> 1.Brachioradialis 2.Extensor carpi radialis longus 3.Brachialis
<p>Muscular to:</p> <ol style="list-style-type: none"> 1. Long & Medial heads of Triceps 	<p>Muscular to:</p> <ol style="list-style-type: none"> 1. Lateral & Medial heads of Triceps 2. Anconeus 	<p>Articular to:</p> <ol style="list-style-type: none"> 1. Elbow joint



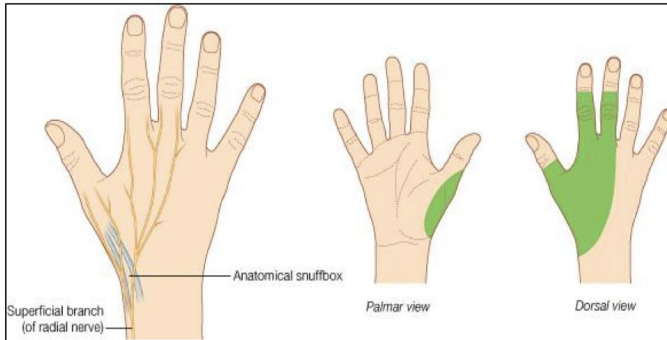
Superficial Branch

1. Conti. of the radial nerve
2. Purely cutaneous.
3. **Runs down in the flexor compartment.**
4. Winds around the lower end of the radius deep to BR
5. Crosses the pollicis muscle to reach the back of the hand.

Supplies:

It's a **sensory nerve** supplying the majority of the dorsum of the hand .

- The skin on the lateral (radial) two and half digits or the 3 and a half of proximal phalanges.
- The skin corresponding half of the hand.



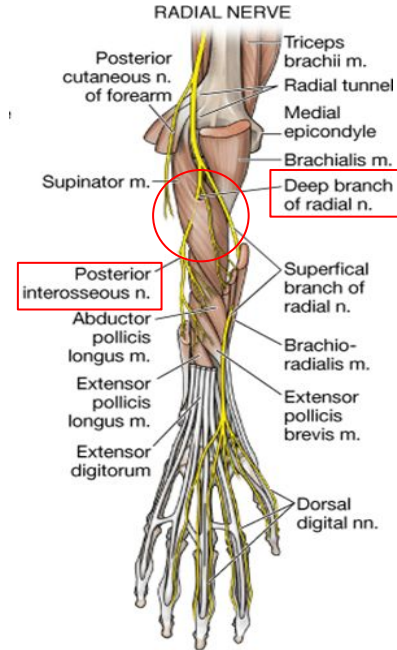
Deep Branch (posterior interosseous)

Course:

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

Muscular:

Extensor compartment



1. **Extensor carpi radialis brevis**
2. **Extensor carpi ulnaris**
3. **Extensor digitorum**
4. **Extensor digiti mini**

1. **Supinator**
2. **Abductor pollicis longus**
3. **Extensor pollicis brevis**
4. **Extensor pollicis longus**
5. **Extensor indicis.**

The superficial branch is sensory whereas the deep branch is motor.
Supinator and ECRB in cubital fossa
All other from extensor compartment

Applied Anatomy: Injury of Radial Nerve

In The Axilla

Transient paralysis

1. **Improper use of crutch (pressing the nerve in the axilla).**
2. **Saturday night palsy (draping the arm over the chair in a state of diminished consciousness)** The triceps, the anconeus, and the long extensors of the wrist are paralyzed.

“All muscles and skin supplied by it will be affected”

Wrist dropping : **YES**

Extension of Elbow : **NO**

Extension of Fingers : **NO**



In The Spinal Groove (In The Arm)

- Most common-fracture of the shaft of the humerus.
- The characteristic lesion is **“WRIST DROP”** the inability to extend **WRIST and metacarpophalangeal joint.** All the branches from this point will be affected, while the branches from axilla (posterior of the forearm, long and medial head of triceps) are intact.

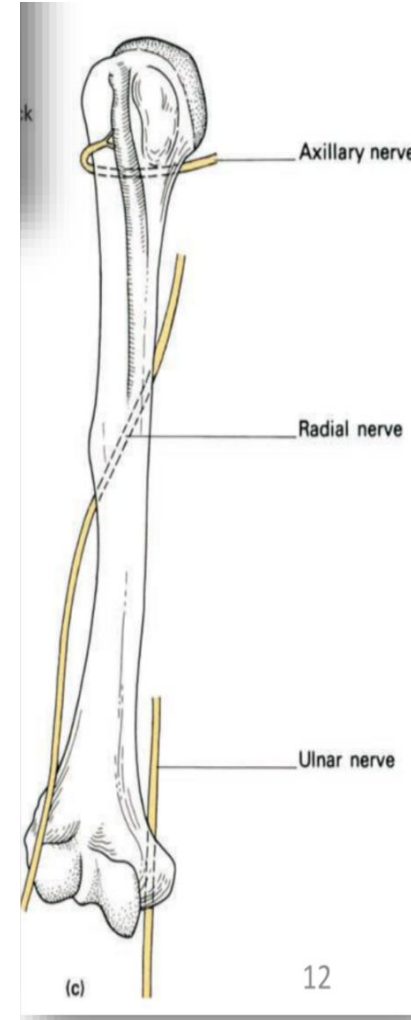
Wrist dropping: **YES**

Extension of Elbow : **YES**

Extension of Fingers : **NO**



“The 2 heads of triceps are working therefor patient can extend the elbow joint “



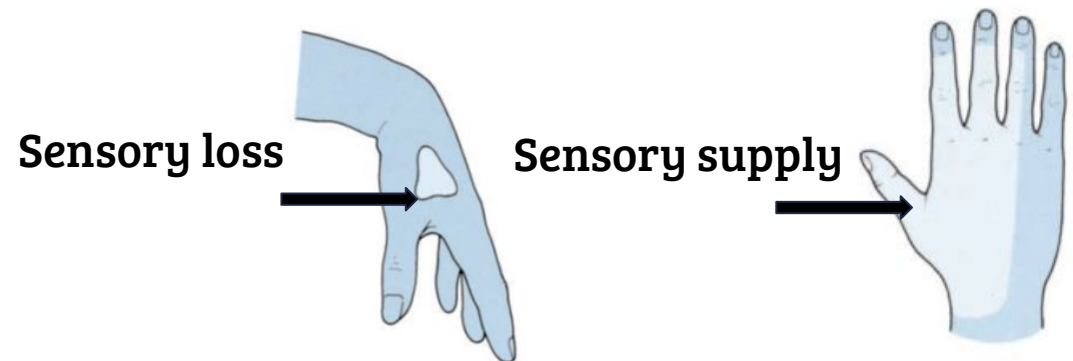
Applied Anatomy: Injury of Radial Nerve In The Forearm

Injuries of **Deep Branch** of the Radial Nerve

- Deep radial nerve **is Motor nerve.**
- Causes:
 - Fractures of the proximal end of the radius.
 - During dislocation of the radial head.
- **No wrist Drop**, 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 loss of sensation.**

Injuries of **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 and half fingers up to the base of their distal phalanges.** (or distal interphalangeal joint)
- Sensory loss is **minimal** caused by **Overlapping by the median and ulnar nerves.**



Ulnar Nerve

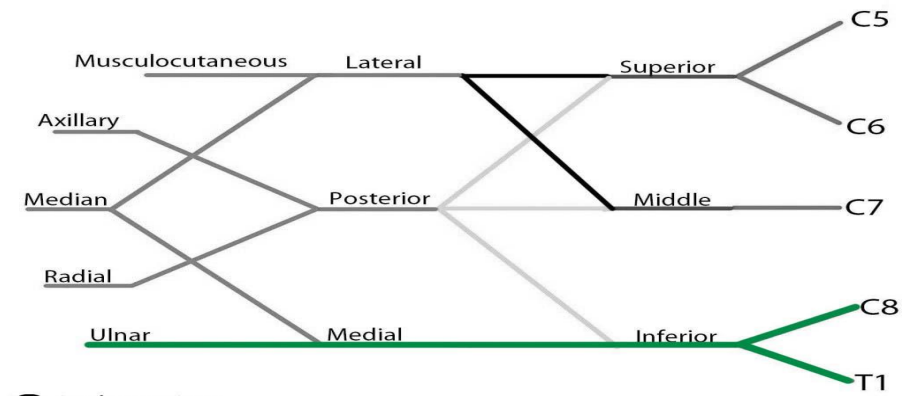
Origin: Begins in the axilla (Continuation of the **medial cord**)

Supplies: 1- Some flexors muscle on ulnar side of the forearm. (flexor carpi ulnaris, medial side of flexor digitorum)

2- Most of intrinsic muscles of the hand.

3- Skin of the ulnar one and a half digit.

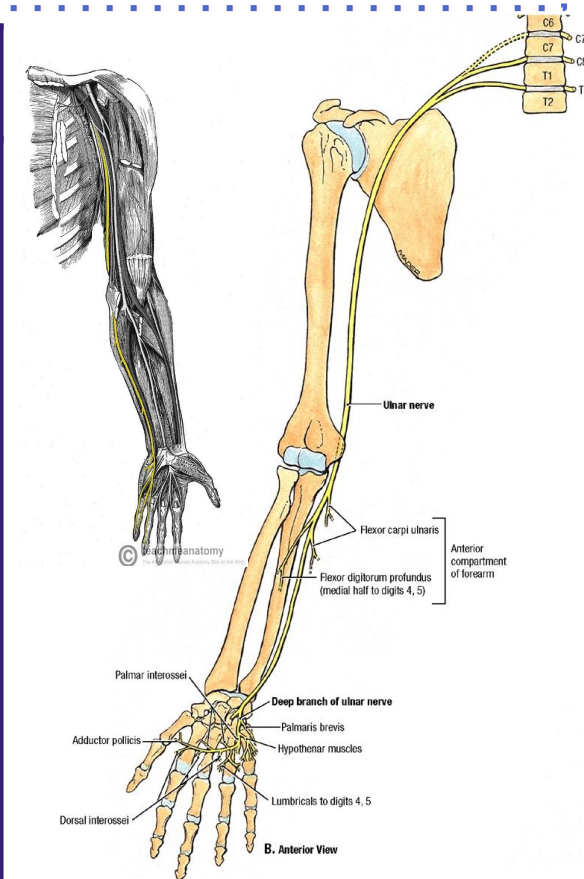
Ulnar Nerve: Course



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The ulnar nerve originates from the C8- T1 nerve roots which form the medial cord of the brachial plexus.

In Axilla & Arm	In forearm	In the wrist
<ul style="list-style-type: none"> • Descends along the medial side of the following arteries: Axillary & Brachial. • Pierces the medial intermuscular septum. • Passes behind the medial epicondyle of humerus at the elbow. (Funny Bone) 	<ul style="list-style-type: none"> • Enters between the two heads of the Flexor Carpi Ulnaris muscle. • Descend on DF profundus • Descends behind the flexor carpi ulnaris. • Medial to ulnar artery. 	<ul style="list-style-type: none"> • Passes anterior (superficial) to flexor retinaculum. • Lateral to pisiform bone. • Medial to ulnar artery. • Divides into: superficial and deep branches



Ulnar Nerve: Branches

Of the Forearm

Muscular to

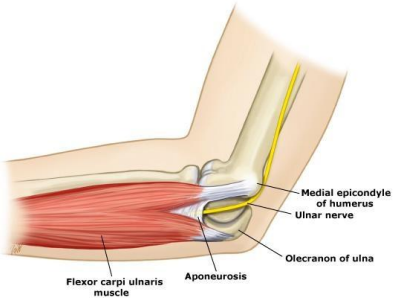
(1 & ½) muscle

Medial ½ Flexor Digitorum Profundus

Flexor Carpi Ulnaris

Articular to

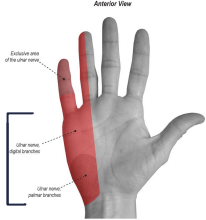
Elbow joint



Cutaneous to

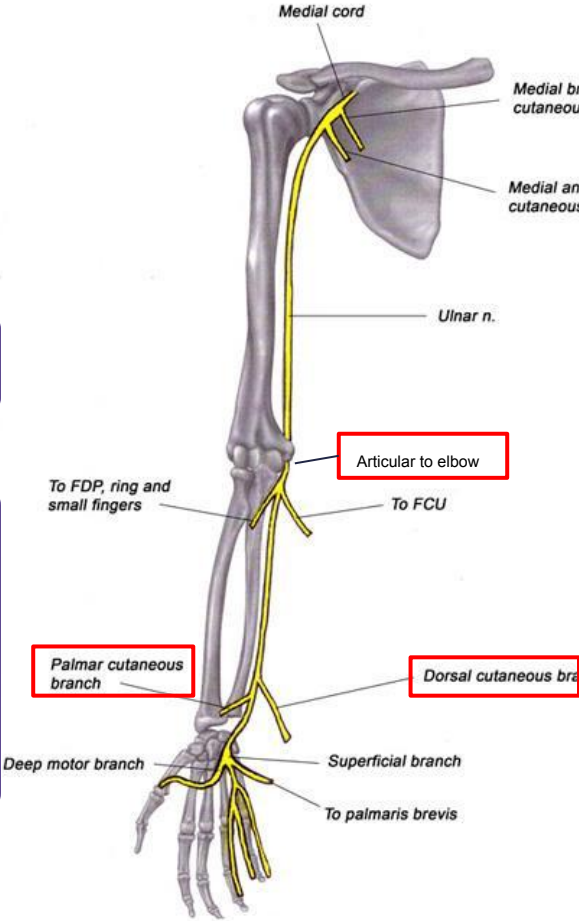
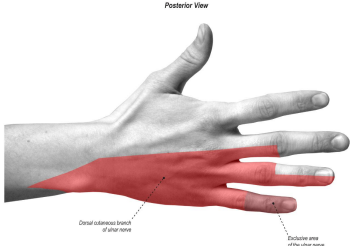
Palmar cutaneous

Supplies the skin over the medial part of the palm



Dorsal cutaneous

Supplies the skin over the back of medial side of the hand & medial 1+ ½ fingers



It has no branches in the arm or axilla

Ulnar Nerve: Branches of the hand

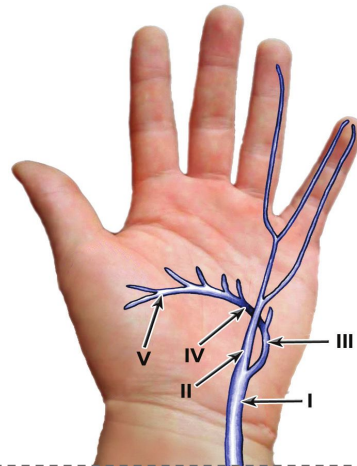
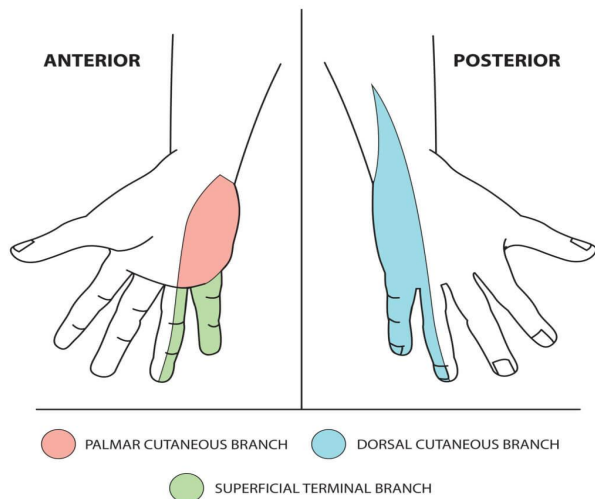
Branches of **Superficial** Terminal Branch:

1. Muscular:

- Palmaris Brevis.

2. Cutaneous:

- Skin over the Palmar aspect of the **medial** 1+ ½ fingers (including nail beds).



I = Ulnar nerve
II = superficial branch of ulnar nerve
III & IV & V = deep branch of ulnar nerve

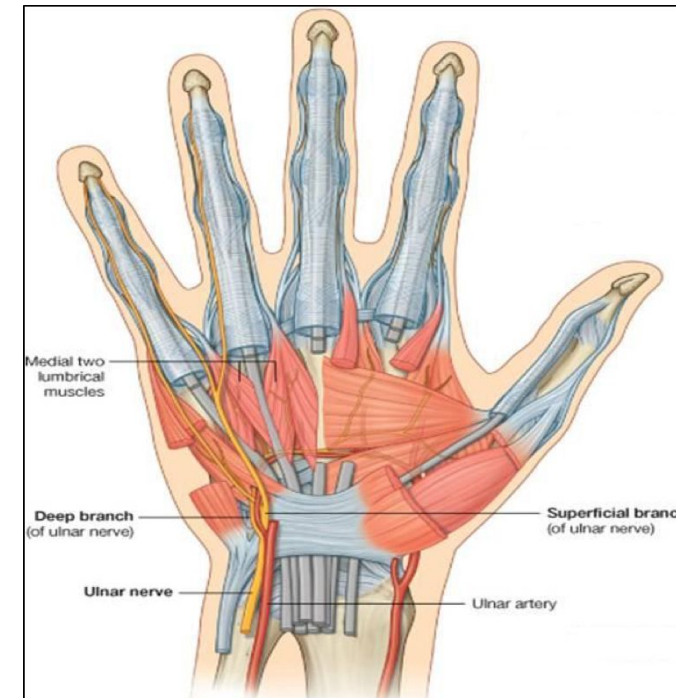
Branches of **Deep** Terminal Branch:

1. Muscular:

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

2. Articular:

- **Carpal** joints.


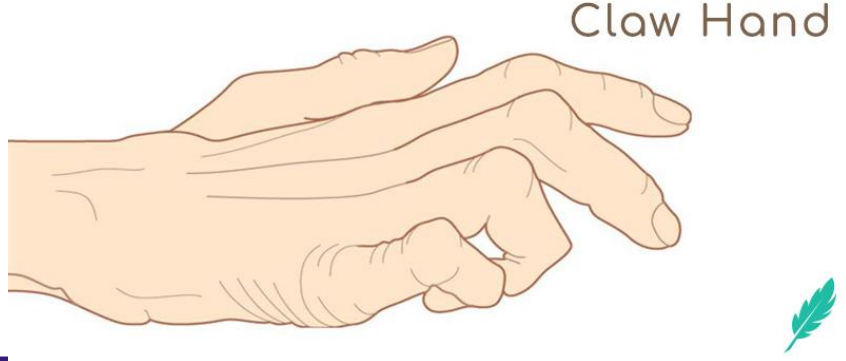


Ulnar Nerve: Injury

Most commonly injured • Behind the elbow • At wrist

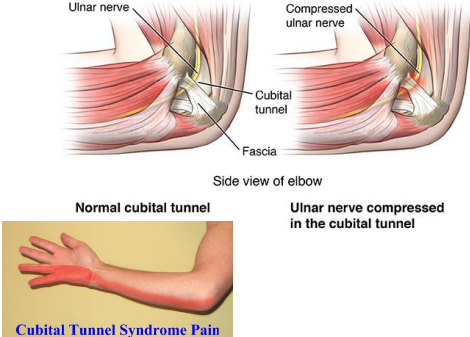
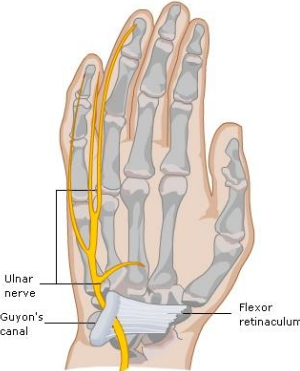
• The classical sign of a low lesion “CLAW HAND”

• Hyperextension of the MCP joints of ring and little fingers • Flexion of the IP joints

Behind the Elbow:	At the Wrist:
<ul style="list-style-type: none">• Atrophy of Ulnar (medial) side of forearm.• Flexion of the wrist with Abduction*.• Claw hand.• Wasting of Hypothenar Eminence.• Claw hand. <p>*There will be flexion with radial deviation since the flexor carpi radialis is working while the flexor carpi ulnaris is not</p>	<ul style="list-style-type: none">• Claw Hand.• Wasting of Hypothenar Eminence.
	

This slide was a homework in males slides

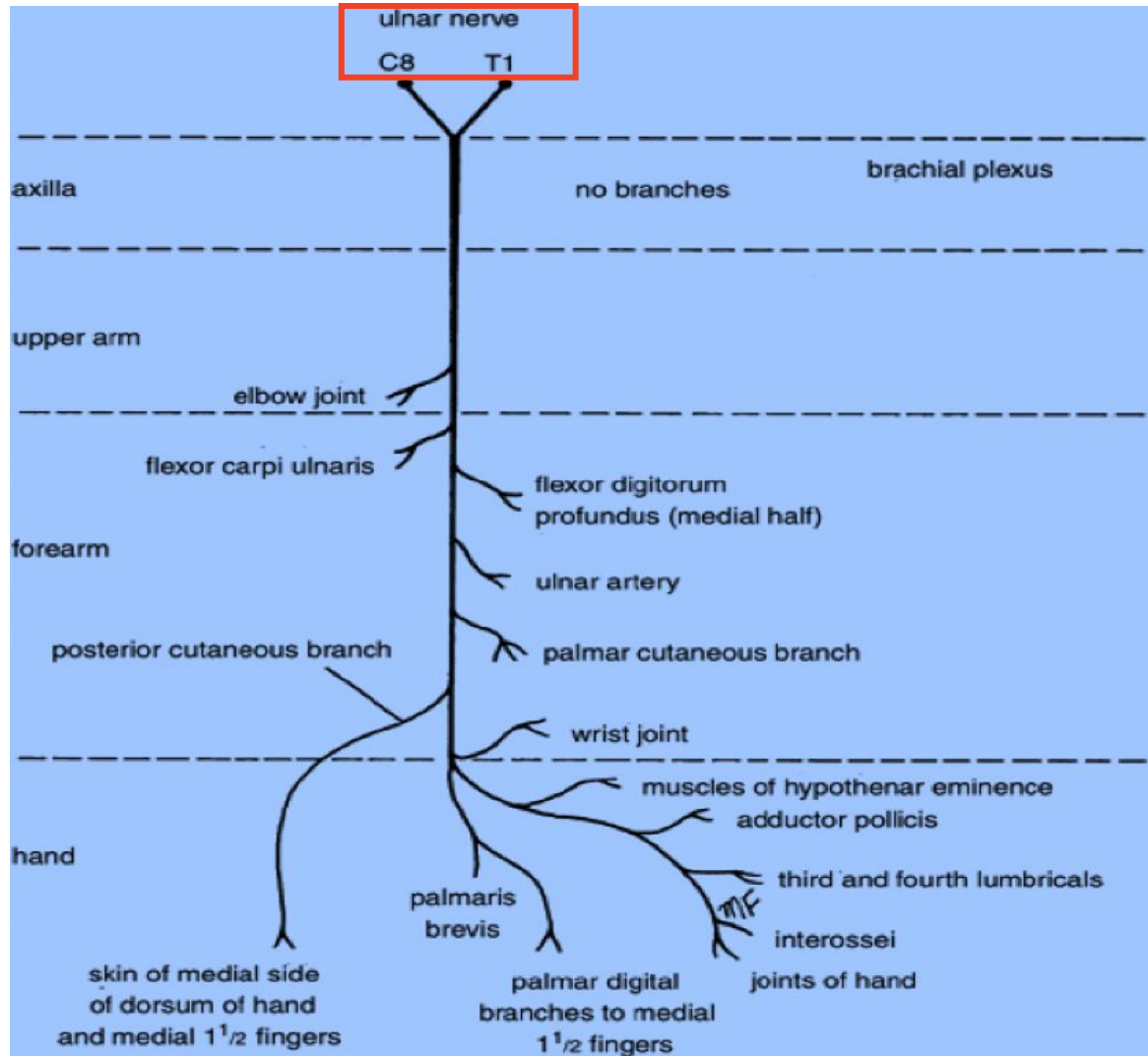
We got the Information from wikipedia

The conditions	Definition	Signs	Picture
<p>Cubital tunnel syndrome. At the elbow joint</p>	<p>Condition that involves pressure or stretching of the ulnar nerve (also known as the "funny bone" nerve).</p>	<ul style="list-style-type: none"> - Numbness or tingling in the ring - Small fingers - Pain in the forearm - May involve weakness in the hand 	
<p>Ulnar tunnel syndrome (Guyon's canal syndrome) At the wrist joint</p>	<p>Caused by entrapment of the ulnar nerve in the Guyon canal as it passes through the wrist</p>	<p>Usually begin with a feeling of pins and needles in the ring and little fingers before progressing to a loss of sensation and/or impaired motor function of the intrinsic muscles of the hand</p>	

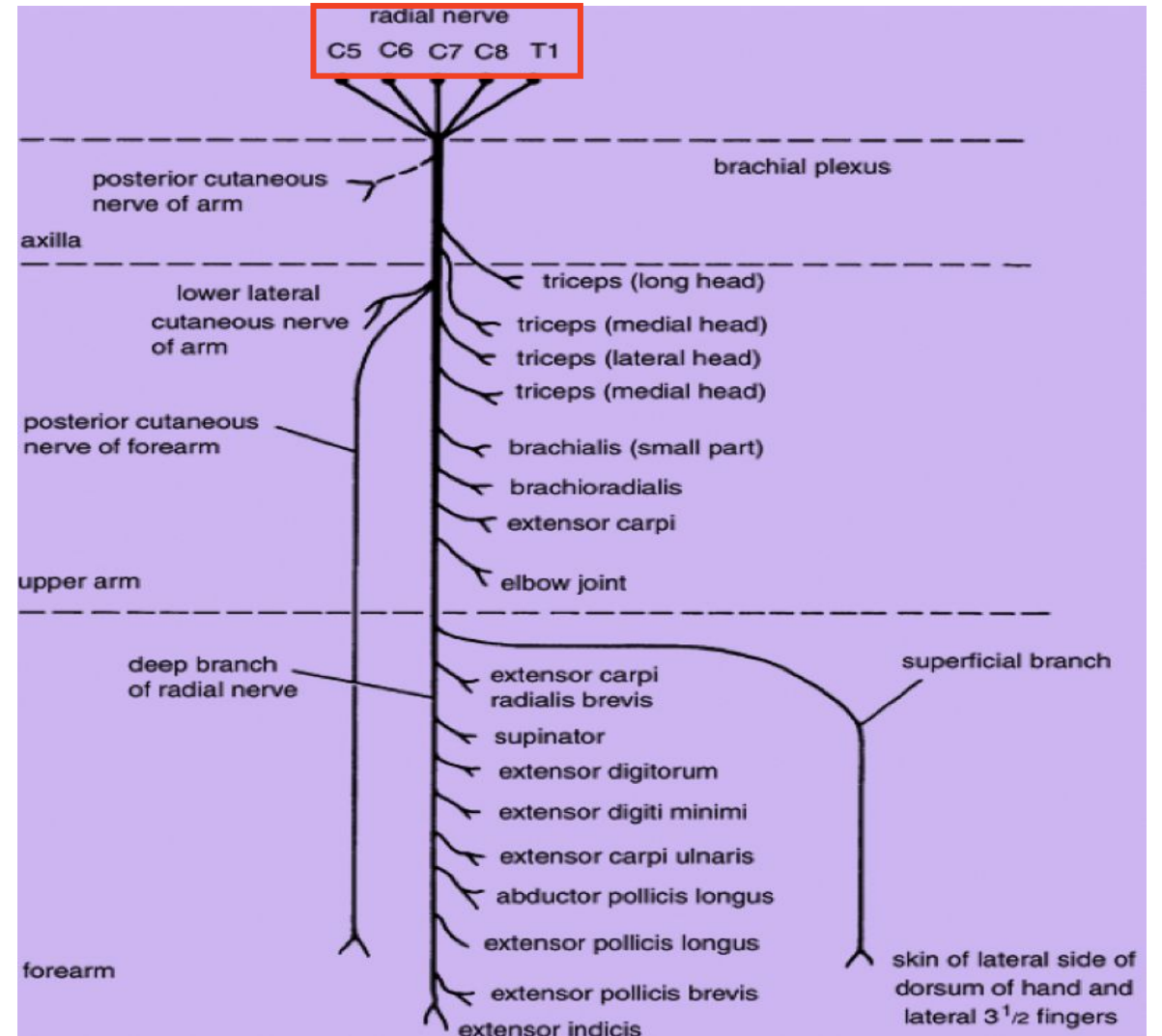
Why it's called funny bone?

Because of the funny feeling you feel after you hit the ulnar nerve in the elbow region "cubital fossa" in the 4&5 fingers

Summary of branches of Ulnar Nerve:



Summary of branches of Radial Nerve:



MCQs

Question 1: Which one of the following nerves is the largest branch in the upper limb?

- A. ulnar nerve
- B. radial nerve
- C. median nerve
- D. axillary nerve

Question 2: Where does the radial nerve divide?

- A. spiral groove
- B. lateral epicondyle
- C. cubital fossa
- D. wrist

Question 3: The radial nerve is derived from:

- A. C5, C6
- B. C5, C6, C7
- C. C5, C6, C7, C8
- D. C5, C6, C7, C8, T1

Question 4: Injury of the deep branch of radial nerve causes wrist drop.

- A. true
- B. false

Question 5: The ulnar nerve at the wrist:

- A. Lies lateral to the ulnar artery
- B. Passes through the carpal tunnel into the hand
- C. Lies superficial to palmaris brevis
- D. Gives off a deep terminal branch lateral to the pisiform bone

Question 6: As a result of injury of the ulnar nerve at the wrist:

- A. marked atrophy of the thenar eminence
- B. wasting of hypothenar eminence
- C. loss of sensation over the thumb
- D. both A and C are correct

Question 7: A patient presented with injury to the superficial branch of the ulnar nerve. Which muscle is affected?

- A. Palmaris Brevis
- B. Palmaris Longus
- C. Palmaris Superficialis
- D. Palmaris Profundus

Question 8: The ulnar nerve descends _____ along the brachial and axillary artery.

- A. anteriorly
- B. posteriorly
- C. medially
- D. laterally

Team members

Boys team:

- Khalid Al-Dossari
- Naif Al-Dossari
- Faisal Alqifari
- Salman Alagla
- Ziyad Al-jofan
- Suhail Basuhail
- Ali Aldawood
- Khalid Nagshabandi
- Mohammed Al-huqbani
- Jihad Alorainy
- Khalid AlKhani
- Omar Alammari

Team leaders

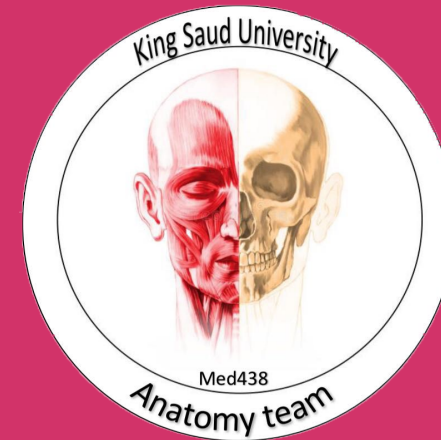
- Abdulrahman Shadid
- ★ Ateen Almutairi

★ =This lecture done by

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- Fay Al Buqami
- Jude Al Khalifah
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- ★ Danah Al Halees
- Haifa Al Waily
- Rema Al Mutawa
- Amirah Al Dakhilallah
- ★ Maha Al Nahdi
- ★ Renad Al Mutawa
- Ghaida Al Braithen
- Reham Yousef

Special thank for
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Good luck

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