MED439
KING SAUD UNIVERSITY

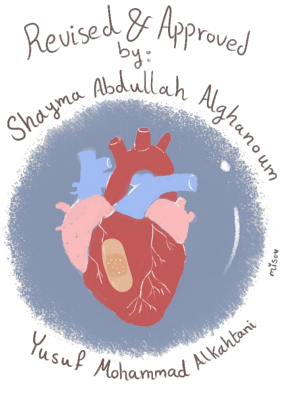
Radial and Ulnar nerves

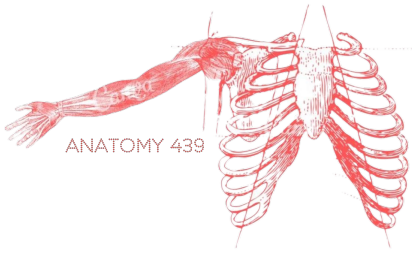
Musculoskeletal Block - Lecture 10

Objective:

✓ 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 index:
Important
In male's slides only
In female's slides only
Extra information, explanation





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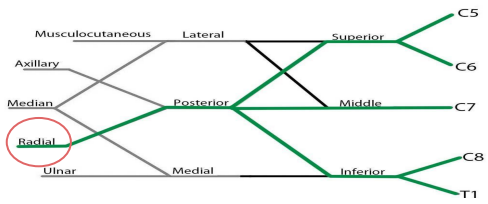
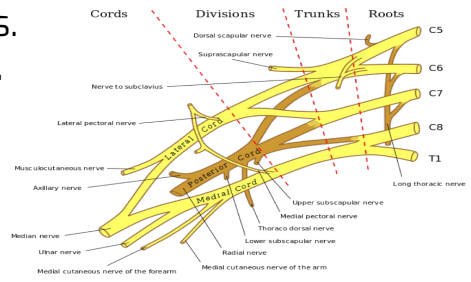
Contact us:
Anatomy439@gmail.com

Radial Nerve

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



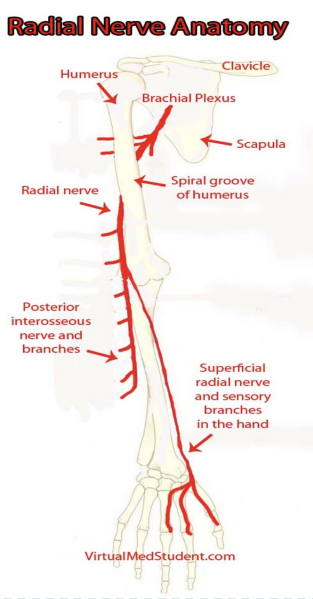


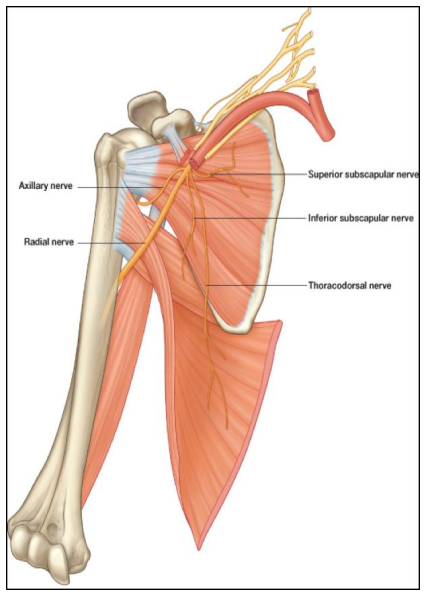
Origin:

-One of the five branches of the **Posterior cord** of the brachial plexus
-Begins in the **axilla**
-the **largest** branch

Supplies:

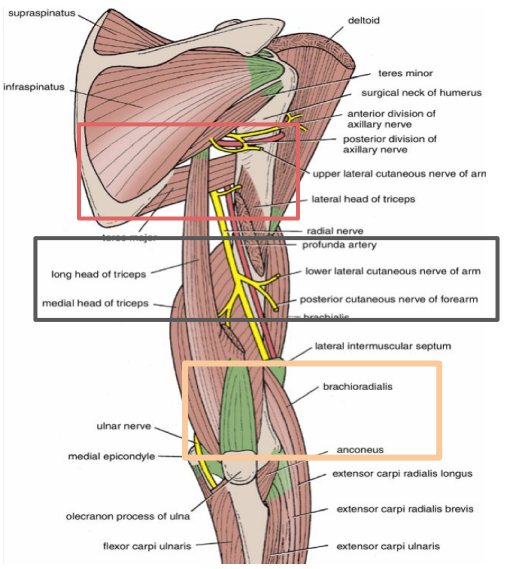
-Nerve of the **extensor** compartment
-Muscles of the **posterior** compartment of the **arm** & the **forearm**





Radial Nerve

Axilla	Arm	Forearm
-The radial nerve lies **posterior** to the **axillary artery** (anterior compartment) -The radial nerve continuous into the **posterior compartment** of the arm -Then gives **three** branches in the axilla:	-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).	-It pierces the **Lateral Intermuscular septum** & enters the anterior compartment of the arm (**7.5** cm) above elbow joint. -Descends in **front** of the Lateral Epicondyle. -Passes forward into the Cubital Fossa
Cutaneous: Posterior cutaneous nerve of arm.	**Cutaneous**: 1. Lower lateral cutaneous nerve of arm. 2. Posterior cutaneous nerve of forearm.	Divides into: **1.Superficial branch:** Conti. of the radial nerve Purely cutaneous **2. Deep branch** (Post. interosseous)"motor no sensory "
Muscular: Long & Medial Heads of Triceps. The radial nerve next travels through the triangular interval with the profunda brachii artery posteriorly	**Muscular**: 3. Lateral & Medial heads of triceps. 4. Anconeus.	



Radial Nerve

Branches

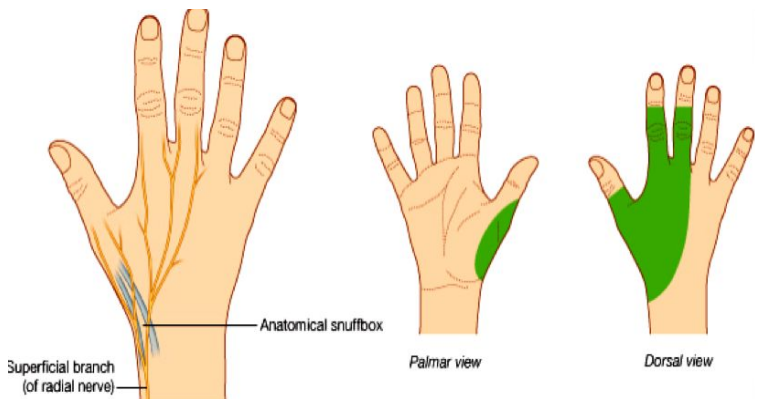
Close to Lateral Epicondyle: In the flexor compartment of Arm

Muscular:
1. Brachialis.
2. Brachioradialis.
3. Extensor carpi radialis longus.

Articular
-to the elbow joint

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"Brachioradialis"
- Crosses the pollicis muscles to reach the back of the hand

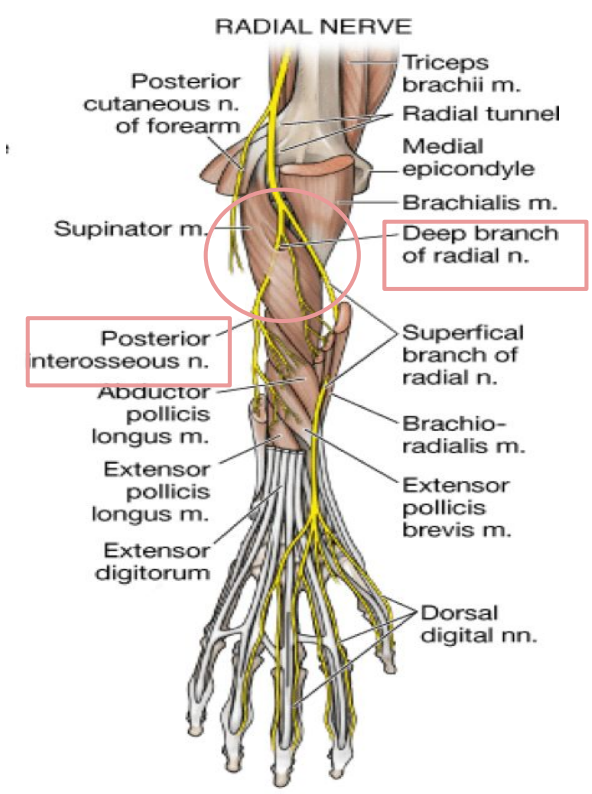
Supplies:

The superficial radial nerve is a **sensory** nerve supplying the majority of the **dorsum** of the hand.

-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

Deep Branch (Post.interosseous)

"motor no sensory "



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	5. Supinator. 6. Abductor pollicis longus. 7. Extensor pollicis brevis. 8. Extensor pollicis longus. 9. Extensor indicis.

Applied anatomy: Injury of Radial nerve

In 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).

Characteristic :

-Wrist dropping

-Inability to extend WRIST and metacarpophalangeal joint.

All muscle and skin supplied by radial nerve will be affected

Sensory loss –MINIMAL – WHY??

Overlapping by the median and ulnar. nerves

In The Spiral (Radial) Groove (In The Arm):

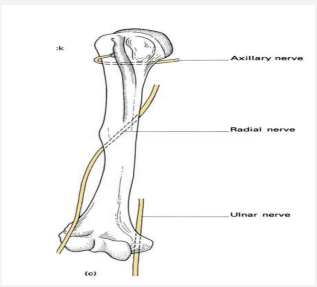
-Most common-fracture of the shaft of the humerus.

Characteristic :

-Wrist dropping

-can extend the elbow

-No extension of wrist and metacarpophalangeal joint(finger).



Injuries of Deep Branch of the Radial Nerve in forearm (posterior interosseous):

-Deep radial nerve is motor.

Causes:

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

Characteristic :

-No wrist Drop, 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 loss of sensation.

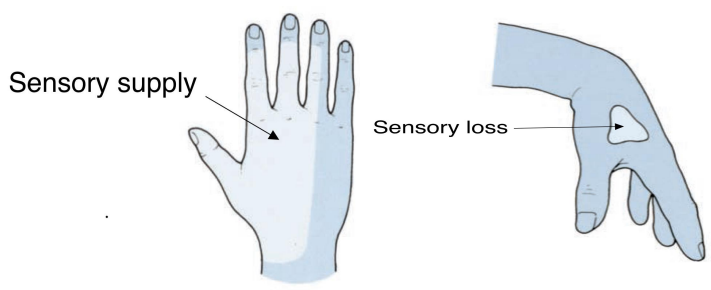
Sensory loss – Nothing Overlapping by the median and ulnar nerves

Injuries of Superficial Branch of the Radial Nerve in forearm:

-Superficial radial nerve is sensory.

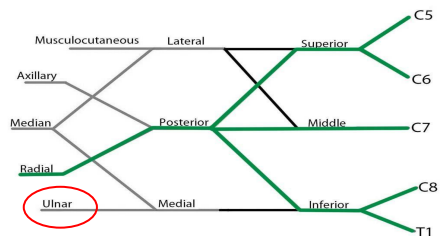
Team 438: Injury like a stab wound, results in a variable small area of anesthesia over the dorsum of the hand and lateral three and half fingers up to the base of their distal phalanges. (or distal interphalangeal joint).

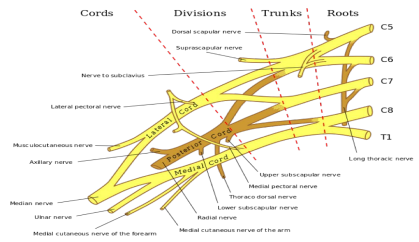
- Sensory loss is minimal caused by Overlapping by the median and ulnar nerves.



Ulnar Nerve

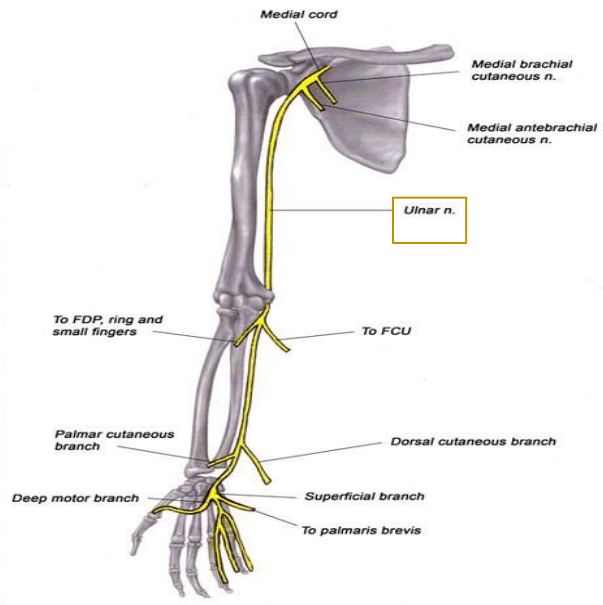
-The ulnar nerve originates from the C8-T1 nerve roots which form the medial cord of the brachial plexus.





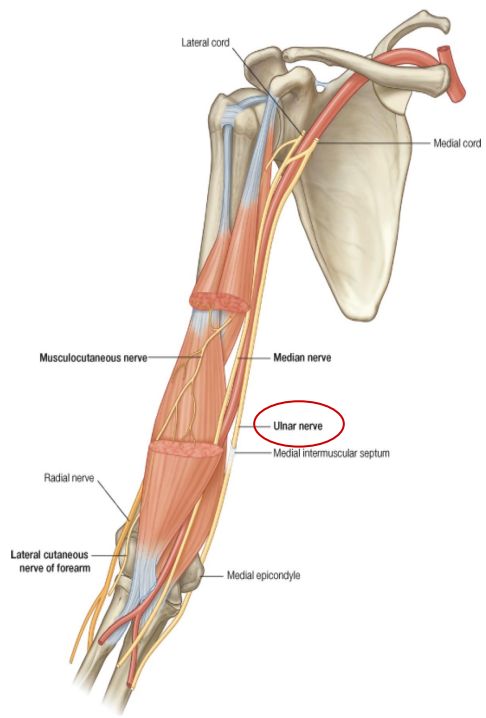
Origin:
-Begins in the **axilla**
-Continuation of the **medial cord**

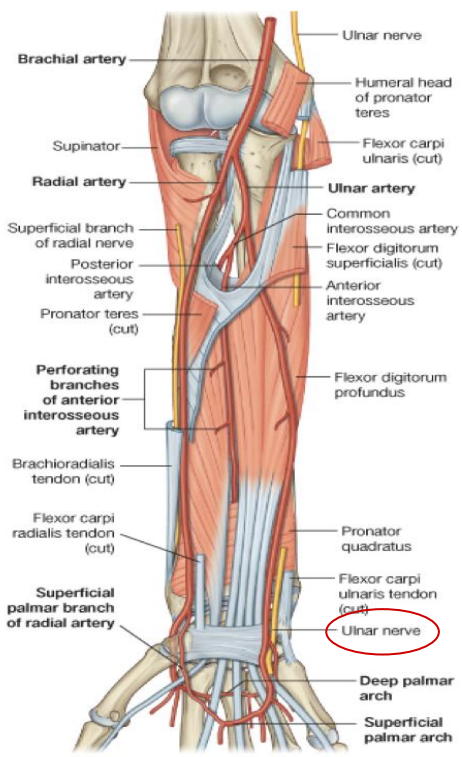
Supplies:
-Some flexors muscles on ulnar side of the forearm.
-Most of the intrinsic muscles of the hand
-Skin of the ulnar one and a half digits.



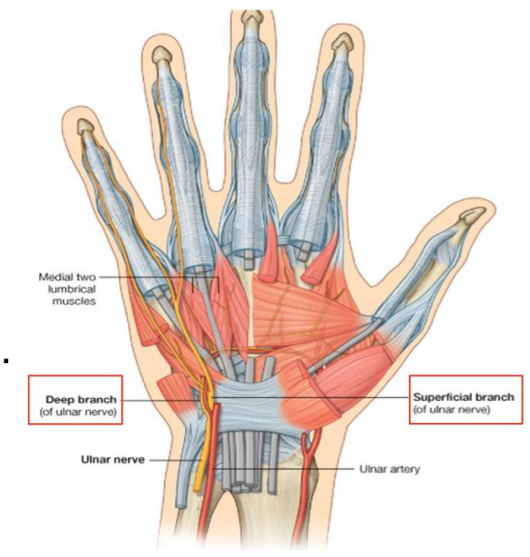
Ulnar Nerve

Arm	Foream	Wrist
Descends along the medial side of the following arteries: **Axillary**. **Brachial**. -Pierces the **Medial Intermuscular Septum.** -Passes **behind** the Medial Epicondyle of the humerus at the elbow (funny bone)	-Enters between the two heads of the Flexor Carpi Ulnaris muscle. -Lies deep to the Flexor Carpi Ulnaris. -Descend on flexor digitorum profundus -It is medial to **Ulnar Artery**	The ulnar nerve enters the palm of the hand. Course: At wrist Passes: · Anterior to Flexor Retinaculum. · Lateral to Pisiform bone. · Medial to Ulnar artery.





Divides into :
- Superficial branches
- Deep branches



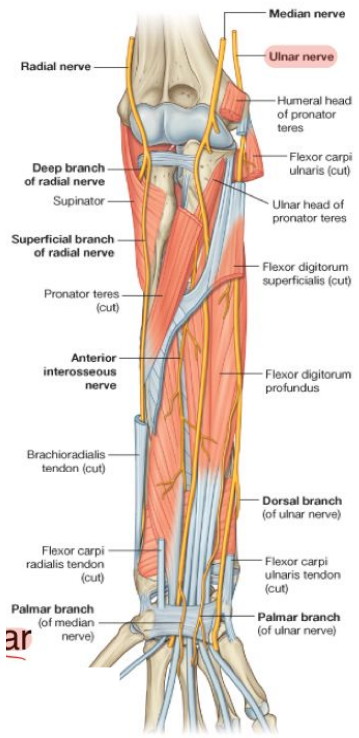
Ulnar Nerve Branches

Arm & axilla	No branches

Forearm

Muscular to: (1 & 1/2 muscles)

1. Flexor Carpi Ulnaris
2. Medial 1/2 of Flexor Digitorum Profundus



Articular to: Elbow joint.

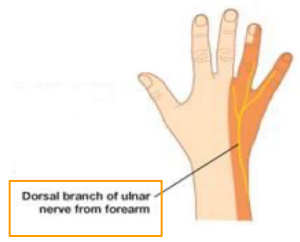
-The ulnar nerve then travels alongside the ulna bone of the forearm into the wrist.

- In the lower part of the forearm the ulnar nerve lies lateral to the FCU & medial to ulnar artery.

Cutaneous to:

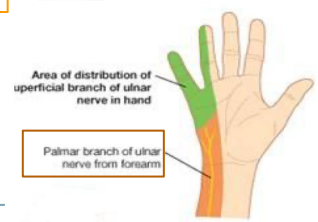
1. **Dorsal (posterior) cutaneous:**

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



2. **Palmar cutaneous:**

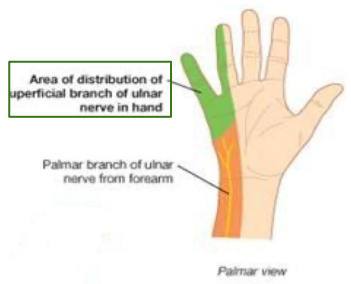
Supplies the skin over the Medial part of the palm over the hypothenar eminence.



- **Terminal Branches: Superficial Branch.**

Muscular to:
Palmaris Brevis.

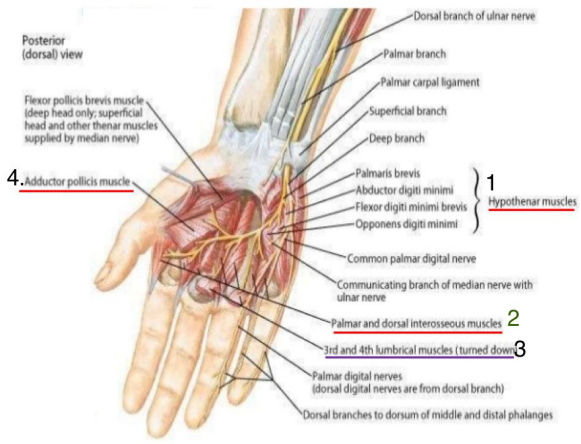
Cutaneous to:
Supplies the skin over the Palmar aspect of the medial 1+ 1/2 fingers (including nail beds).



Wrist

- **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

Applied Anatomy: Ulnar Nerve Injury

- Most commonly injured:

1. **Behind the elbow.**
2. **At wrist**

- The classical sign of a low lesion "CLAW HAND"

Claw Hand is:

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

Reason of Claw Hand:

➢ Paralysis of interossei & lumbricals (loss of function).
➢ Unopposed actions of extensors & FDP

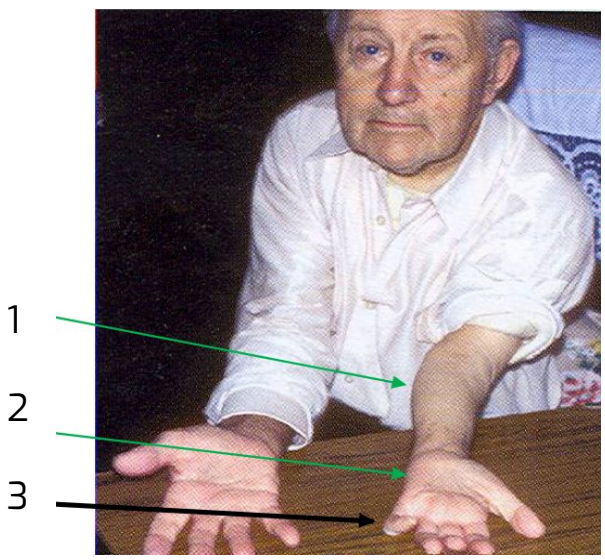
Ulnar Nerve Injury:

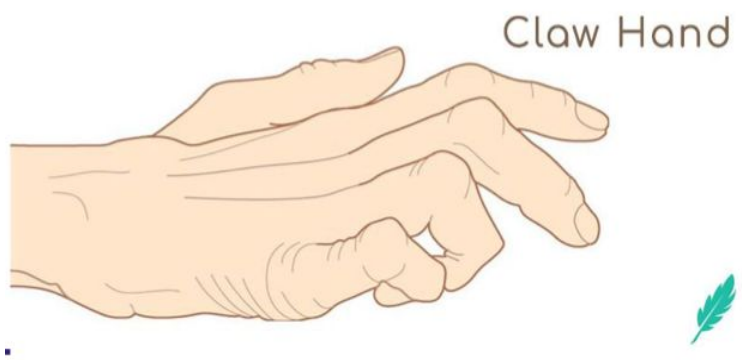
1-Behind the elbow

- Atrophy of Ulnar side of forearm. (1)
- Flexion of the wrist with Abduction.
- Wasting of Hypothenar Eminence. (2)
- Claw hand. (3)

2-At wrist

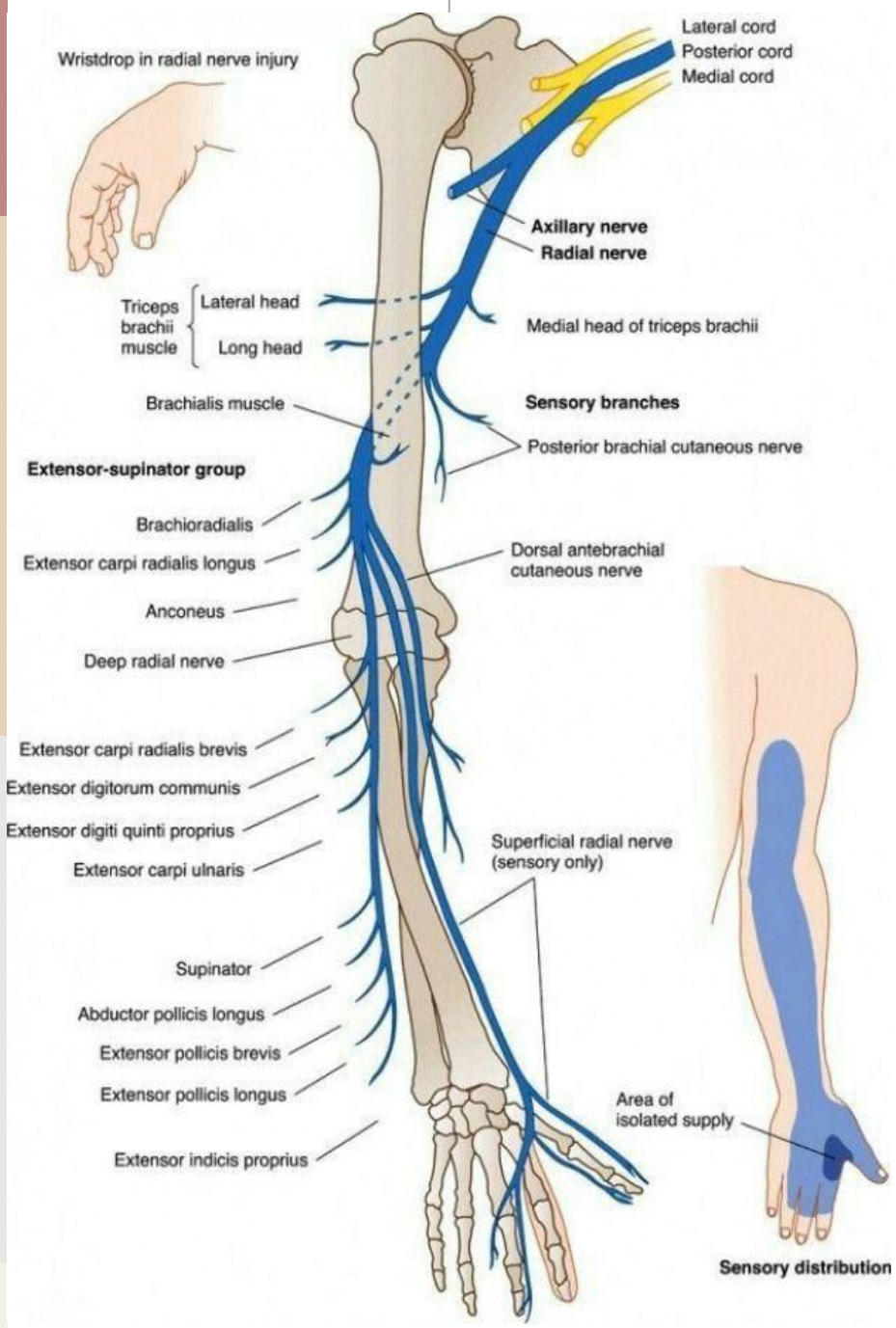
- Claw Hand.
- Wasting of Hypothenar Eminence.

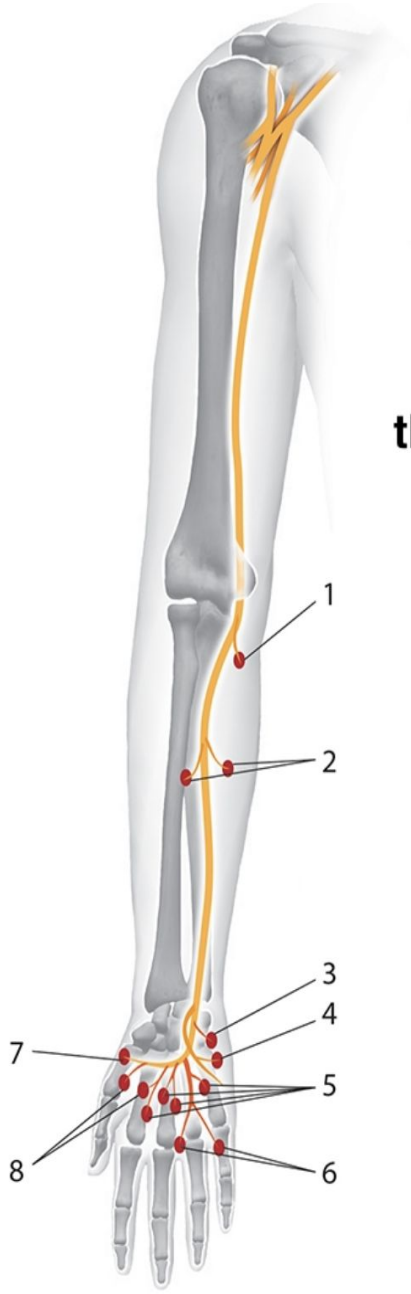




Summary

Radial nerve :
C5,C6,C7,C8,T1

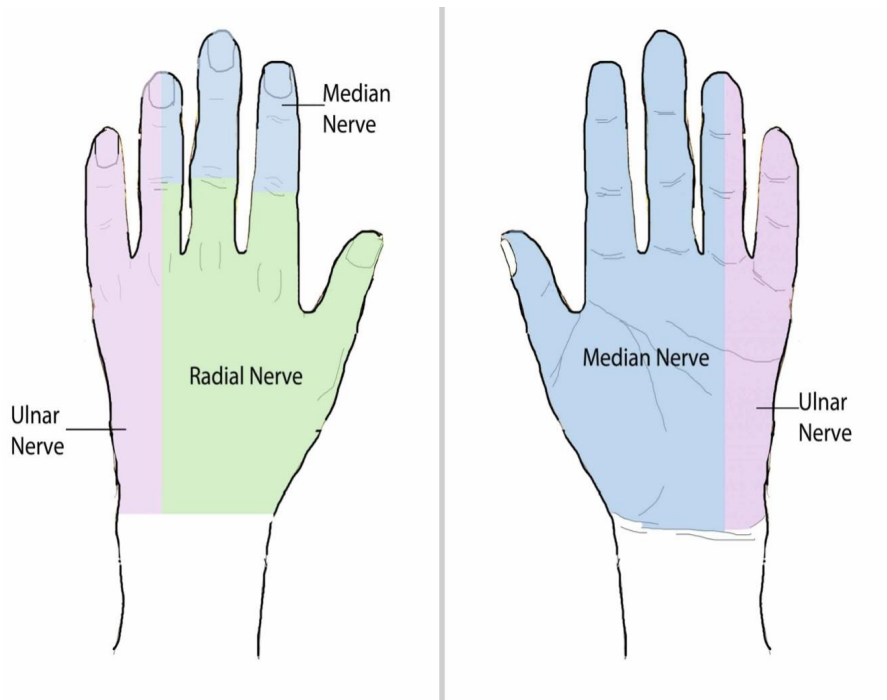


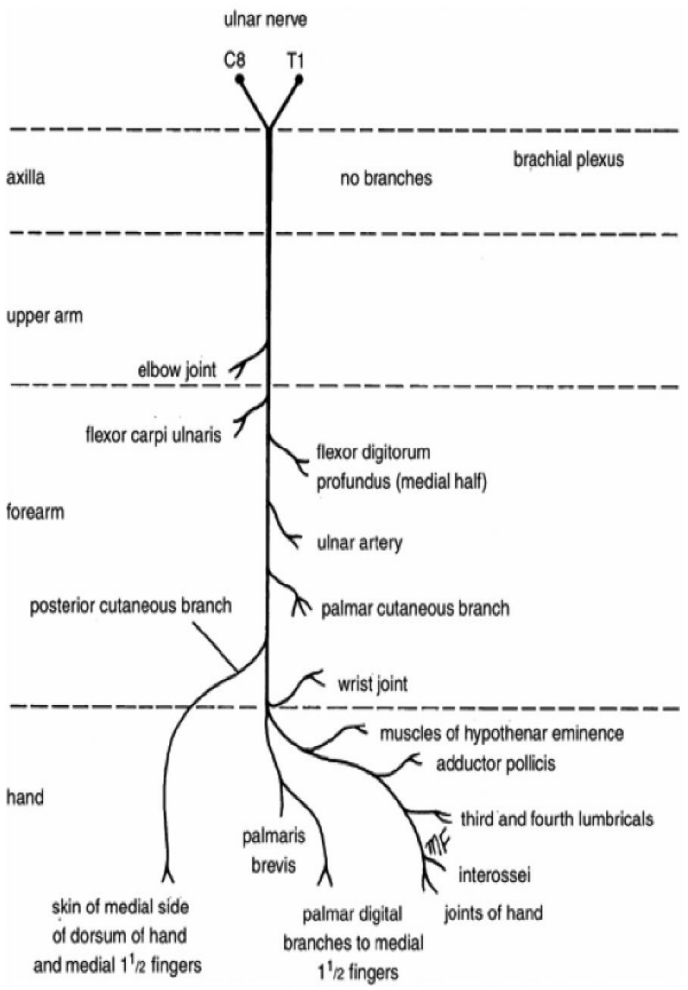


Ulnar Nerve

Distribution of the Motor Branches

1 - Flexor carpi ulnaris
2 - Flexor digitorum profundus
ulnar portion
3 - Hypothenar muscles: abductor, short flexor, opponens of little finger
4 - Palmaris brevis
5 - All dorsal and palmar interossei
6 - Ulnar lumbricals
7 - Deep head of flexor pollicus brevis
8 - Adductor pollicus





MCQs

Q1: The radial nerve arises from the _____of the brachial plexus.
A. Anterior
B. Posterior
C. Medial
D.lateral

Q2:The radial nerve supplies the _____ compartment.
A. Flexors
B.Abductors
C.Extensor
D.adductors

Q3:The superficial branch of radial nerve Winds around the lower end of the radius deep to ?
A.Brachialis
B.Brachioradialis
C.Extensor carpi radialis longus
D.Extensor digitorum

Q4:Injury of radial nerve at Axilla cause:
A.extension of elbow
B.extension of finger
C.flexion of shoulder
D.wrist drooping

Q5:Ulnar nerve lies deep to:
A.flexor carpi radialis
B.flexor carpi ulnaris
C.flexor digitorum profundus
D.flexor digitorum superficialis

Q6: At wrist, Ulnar nerve passes ……. to Flexor Retinaculum
A.anterior
B.posterior
C.medial
D.lateral

Q7: At wrist, Ulnar nerve superficial branch is muscular to
A.Hypothenar Eminence.
B.Palmaris Brevis.
C.Flexor Carpi Ulnaris
D.Extensor carpi ulnaris.

Q8: In the wrist the ulnar nerve articular to…….
A.metacarpal joint
B.phalanx
C.carpal joints
D.flexor retinaculum

Q9:Branches of…….Close to Lateral Epicondyle In the flexor compartment of Arm.
A.radial nerve
B.ulnar nerve
C.median nerve
D.axillary nerve

Q10:Paralysis of interossei & lumbricals leads to …

A.claw hand
B.wrist drop
C.ape like hand
D. Carpal tunnel syndrome

Q11:…….supplies Most of the intrinsic muscles of the hand Skin of the ulnar one and a half digits.
A. radial nerve
B.axillary nerve
C.ulnar nerve
D.median nerve

Q12:Deep Radial nerve is…….

A.sensory
B.cutaneous
C.mixed
D.motor

1) B 8)C
2) C 9)A
3) B 10)A
4) D 11)C
5) B 12)D
6) A
7) B

SAQs

Q1:What does the radial nerve muscular branches supply ?

Q2: Where is the ulnar nerve originate from ?

Q3: Ulnar nerve injury at **wrist** causes? (mention 2)

Q1 :
1. Brachialis.
2. Brachioradialis.
3. Extensor carpi radialis longus.

Q2:
C8,T1

Q3:
1. Claw Hand.
2. Wasting of Hypothenar Eminence.

This lecture is done by:

Reema alhadlaq
Abdulaziz Alghuligah
May Barakah
Special thanks to Fatimah Almeather

Team leaders:
Mayasem Alhazmi
Fahad Alajmi
SPECIAL THANKS TO THE AMAZING
#MED438 ANATOMY TEAM