THE FCPS-I MANUAL

For the Preparation Of FCPS-I

For all specialities

FCPS PART-1 PREPARATION GROUP 2024
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THE FCPS-I MANUAL

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THE FCPS-I MANUAL

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About Author

I am Dr. Rashid Mahmood, the author of esteemed medical publications such as "**The FCPS-I Manual**," "**Residents' way to Residency,**" "**The FCPS Recalls**" and **"The Night Before Exam."** I am from Bahawalpur, Punjab, I did my graduation from Quaid-e-Azam Medical College Bahawalpur, graduating with the class of 2013-18. Currently, I am dedicated to my role as a Resident Surgeon at Bahawal Victoria Hospital Bahawalpur, where I am diligently honing my skills. With an unwavering commitment to the field of medical, I aspire to specialize as a Liver Transplant Surgeon in the future, InshaAllah.

About Co-author

I am Dr. Maria Zaib, co-author of "**The FCPS-I Manual**," "**Residents' way to Residency**" and "**The FCPS Recalls**". I did my graduation from Quaid-e-Azam Medical College in 2014-2019, I completed my house job at Bahawal Victoria Hospital. Presently, I serve as a regular WMO at a Rural Health Centre in Bahawalpur district. Having passed the FCPS-1 exam in Gynaecology and Obstetrics twice, in May 2021 and February 2024, I've contributed to this book with my knowledge and experience, aiming to make it as beneficial for you as it has been for us.

About Contributors

DR. EIRAJ

Dear reader, I am Dr Eiraj, I did FSc (Pre-Medical) from Lahore College for Women University, Lahore and then graduation from Avicenna Medical College, Lahore (Batch 2013-2018). I completed my housejob from Jinnah Hospital, Lahore in May 2020. Due to the blessings of Allah Almighty and prayers and support of my parents, siblings and friend, I cleared FCPS-I in GYNAE OBS in Feb 2021 Alhumdulillah. Currently I am working as third year resident Obstetrics and Gynaecology in Gulab Devi Teaching Hospital, Lahore. During preparation of exam, I came across the first edition of this book written solely by Dr. Rashid Mahmood i.e 'The Night Before Exam.' Since it helped me a lot, I decided to become a member of his team and contributed by adding some high yield points that are frequently tested in 2nd edition as a token of voluntary charity in response to the blessings of Allah Almighty due to which I was able to pass as ' Success has nothing to do with what you gain or accomplish in life for yourself. It is what you do for others.' It contains all the minor topics at a single place arranged concisely. I hope that it will be helpful for you. May Allah be with you all. Remember me in your prayers. JazakAllah. "My success is only by Allah" - AL QURAN

DR. AMNA HAQ

Dear reader, I am Dr Amna Haq, a graduate of Bolan Medical College. I completed my housejob and training from Reputable hospitals of Quetta. I have also passed MRCPCH Part-I and Part-II and have made contributions for FCPS Part-I aspirants. As there are many resources available these days for FCPS Part-I preparation, however something concise is very rare that we find and can help for the purpose of revision so this book is highly recommended. I did my contributions for the purpose of ongoing charity the knowledge that is being shared with others being double. And the last but not the least, I would advise everyone that keep on working hard as there is famous Quote by Stephen King which states as: "Talent is cheaper than table salt. What separates talented individuals from successful ones is alot of hard work."

DR. QURAT-UL-AIN

Dear reader, I am Dr. Qurat-Ul-Ain (Distinction holder/Bronze Medalist), working as a third year postgraduate resident paediatrics at PAF Hospital, Islamabad. I have contributed to the neurology section of this book, in addition to the bits and pieces in histology, embryology, and microbiology. This book is an extended form of "The night before exam" which helped me during my preparation of the FCPS-1 exam, hence, a purely non-monetary effort from our side. A thorough and detailed yet concise merger of major and minor theory subjects just right to help you ace the post-grad entrance exam.

DR. MUHAMMAD IBRAHIM SHAHZAD

Dear reader, I am Dr Muhammad Ibrahim Shahzad (Gold medalist). I've made contribution to the General Pathology section of this book. Let's join forces to delve deeper into the ever-evolving field of pathology and explore its captivating intricacies together!

DR. ABIDA MAJID

Dear reader, I am Dr Abida Majid (MBBS, M.phil). I've made contribution humble contribution in Anatomy section.

DR. MAMOONA RAZZAQ

Dear reader, I am Mamoona Razzaq, I did my FSC (Pre-Medical) from Punjab College for Women, Faisalabad and currently pursuing my MBBS degree at Punjab Medical College, Faisalabad. It is with great honor that I convey my involvement as a member of Dr. Rashid's team. Under his esteemed supervision, I have had the privilege to design colourful flowcharts,summarized tables and labeled visuals for this book to make studying more engaging and visually stimulating experience for all readers.

Dedication

"In the Name of Allah, the Most Beneficent, the Most Merciful"

This book is dedicated to my Parents (**Mahmood Ahmad shahid and Saima Murtaza**) , my Wife (**Dr. Maria Zaib**), my daughter (**Noor-e-Rashid**) and my parent institute, **Quaid-e-Azam Medical College** (which gave me prefix 'Dr"). Without whom, I wouldn't be able to stand where I am today and without whom all these little efforts made, were impossible.

Special Acknowledgments

I am deeply indebted to those who have been instrumental in the realization of this book. Foremost, my heartfelt gratitude extends to my family for their unwavering support and encouragement throughout this journey. Their love and understanding have served as a constant wellspring of inspiration, and I am profoundly thankful for their presence in my life. I extend my sincere appreciation to my friends, colleagues, and teachers, whose invaluable feedback and constructive criticism have significantly enhanced the quality of this work.

Special thanks to **Prof. Dr. Munawar Jamil** (Professor of Surgery, Bahawal Victoria Hospital Bahawalpur), Dr. **Najam Iqbal** (Associate Professor of Surgery, Bahawal Victoria Hospital Bahawalpur) and **Dr. Sidra Aleem** (Assistant Professor of Surgery, Bahawal Victoria Hospital Bahawalpur) for their guidance in surgery and building my surgical skills. Their advocacy for constructive endeavors and commitment to nurturing junior colleagues have been a guiding light in my professional journey.

I'm also grateful to **Prof. Dr. Soufia Faruukh** (Principal Quaid-e-Azam Medical College Bahawalpur), **Prof. Dr. Rashad Qamar Rao** (Principal Nishtar Medical College Multan), and **Prof. Dr. Javed Iqbal** (Former Principal Quaid-e-Azam Medical College Bahawalpur), whose unwavering motivation and encouragement have propelled me forward in my medical career.

Finally, I express my profound appreciation to the publishers, editors, and all individuals involved in the production of this book. Their dedication and diligence have ensured the presentation of my ideas in the best possible manner, and I am deeply grateful for their contributions.

To each and every individual who has played a role in the creation of this book, I extend my sincerest thanks. Your support and encouragement have been integral to realizing my vision, and I am truly grateful for your unwavering belief in this endeavor.

Preface

Welcome to “The FCPS 1 Manual,” an indispensable resource meticulously tailored to align with the exam pattern set by the College of Physicians and Surgeons Pakistan (CPSP) for FCPS 1 candidates. We are thrilled to introduce you to this comprehensive guide, carefully crafted to equip you with the knowledge and skills necessary for success.

We understand the challenges faced by aspiring candidates, particularly when it comes to grappling with complex topics such as anatomy and neuroanatomy. To address this, we have integrated vibrant and detailed illustrations throughout the book. These images serve as visual aids, enabling you to grasp complex concepts with ease and confidence. But that’s not all. We’ve taken great care to present information in a user-friendly format, eschewing lengthy paragraphs in favor of concise key points, accompanied by captivating visuals and interactive elements. This approach not only facilitates comprehension but also ensures that your interest and engagement are sustained throughout your study sessions.

In addition to theory, we recognize the importance of practice in solidifying your understanding and preparing you for the exam. To this end, we have included a valuable resource at the end of each topic: oneliners containing past MCQs. These serve as effective tools for self-assessment, allowing you to gauge your progress and identify areas for further review. “The FCPS 1 Manual” is more than just a book—it is a testament to our dedication and commitment to your success. We have spared no effort in ensuring that this manual serves as your comprehensive and reliable companion on your journey towards achieving your FCPS 1 certification.

Author,

Dr. Rashid Mahmood

How to use "The FCPS-I Manual"

A comprehensive guide tailored for CPSP patterned exams. Packed with frequently tested topics, vibrant visuals aid memorization. Features past 10 years' MCQs under each topic. Easy-to-digest format ensures quick preparation. The go-to resource for acing FCPS Part 1 across all specialties.

- The FCPS-1 Manual is an extensive theory book meticulously crafted for FCPS-1 aspirants, aligning closely with the curriculum set forth by the College of Physicians and Surgeons Pakistan (CPSP).
- It covers both major and minor subjects commonly encountered in the exam, making it an essential resource for candidates.
- This manual is tailored for individuals who are genuinely interested in strengthening their core knowledge rather than simply memorizing past MCQs.
- It is particularly beneficial for house officers preparing for the FCPS-1 exam, allowing them to stay connected with theoretical concepts while undertaking their house job. Furthermore, the FCPS-1 Manual caters to candidates who have relied solely on memorizing past MCQs without achieving desired success.
- Unlike traditional methods, this manual emphasizes conceptual understanding, ensuring candidates are well-equipped to tackle any variations in question stems that may arise in the exam.
- Each topic within the manual is presented in a comprehensive manner, facilitating thorough understanding.
- Additionally, past MCQs related to each topic are provided at the end of chapters to reinforce comprehension and application of key concepts.
- With dedicated study of the FCPS-1 Manual alongside recent past papers relevant to your specialty, you can significantly enhance your likelihood of success in the exam.
- This manual serves as a valuable tool for aspiring physicians aiming to excel in their FCPS-1 endeavors.

How to Contribute

Dear Readers,

If you aspire to be an integral part of our team and contribute to our endeavors, we extend a warm welcome to you. Your voluntary participation is greatly appreciated; however, we also offer a limited number of paid positions for individuals who can dedicate themselves wholeheartedly to our cause. We seek individuals who possess unwavering dedication and devotion to their work. If you believe you embody such qualities, we encourage you to contact us at 03087747686 or reach out via email at dr.rashid157@gmail.com. We eagerly anticipate the opportunity to collaborate with individuals who share our passion and commitment.

Author,

Dr. Rashid Mahmood

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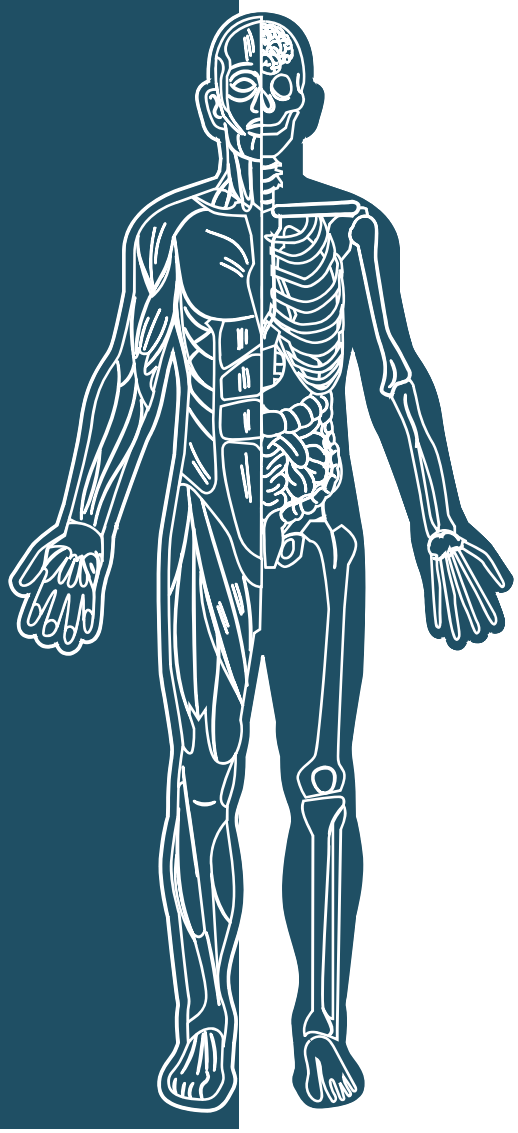


UPPER LIMB

1. BRACHIAL PLEXUS

A 3629-g (8-lb) newborn is examined shortly after spontaneous vaginal delivery. She was delivered at 40 weeks' gestation and pregnancy was uncomplicated. Her mother is concerned because she is not moving her left arm as much as her right arm. Physical examination shows her left arm to be adducted and internally rotated, with the forearm extended and pronated, and the wrist flexed. The Moro reflex is present on the right side but absent on the left side. Which of the following brachial plexus structures is most likely injured in this infant?

A. Lower trunk
B. Upper trunk ✓
C. Medial cord
D. Lateral cord
E. Posterior cord

EXPLANATION:

BRANCHES OF BRACHIAL PLEXUS

Roots:

- Dorsal scapular nerve
- Long thoracic nerve (C5, C6, and C7)

Upper trunk:

- Nerve to subclavius
- Suprascapular nerve (supraspinatus and infraspinatus)

Lateral cord: (LL)

- Lateral pectoral nerve
- Lateral root of median nerve
- Musculocutaneous nerve

Medial cord: (MMU)

- Medial cutaneous nerve of arm and medial cutaneous nerve of forearm
- Medial pectoral nerve
- Ulnar nerve
- Medial root of median nerve

Posterior cord: (STAR)

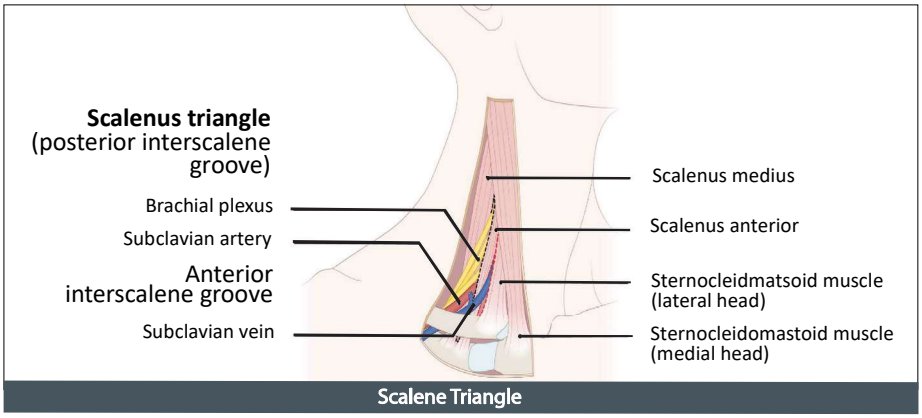
- Subscapular nerves (upper and lower)
- Thoracodorsal nerve
- Axillary nerve
- Radial nerve

HOTSPOT

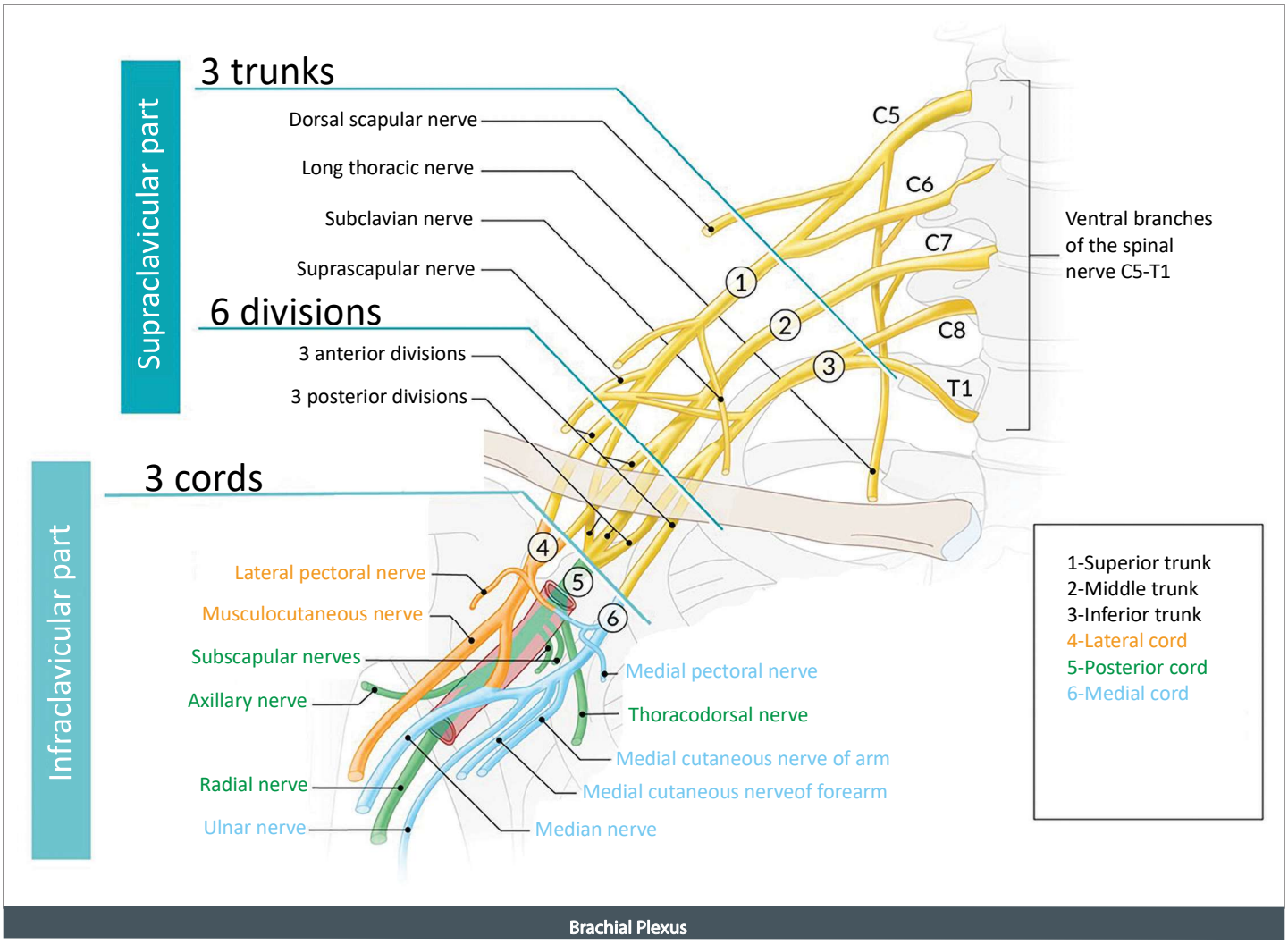
- Can't scratch his back muscles- Latissimusdorsi (Thoracodorsal nerve)
- Shrugging of shoulders- Trapezius (Accessory nerve)
- Can't comb his hairs,nerve damage- Serratus anterior (long thoracic nerve)
- Winging of scapula-Serratus anterior (long thoracic nerve)

SCALENE TRIANGLE

- **Boundaries:** Scalenus anterior, Scalenus medius, and the clavicle.
- **Contents:** Subclavian artery and the three trunks of the brachial plexus.



Scalene Triangle



Brachial Plexus

Root values

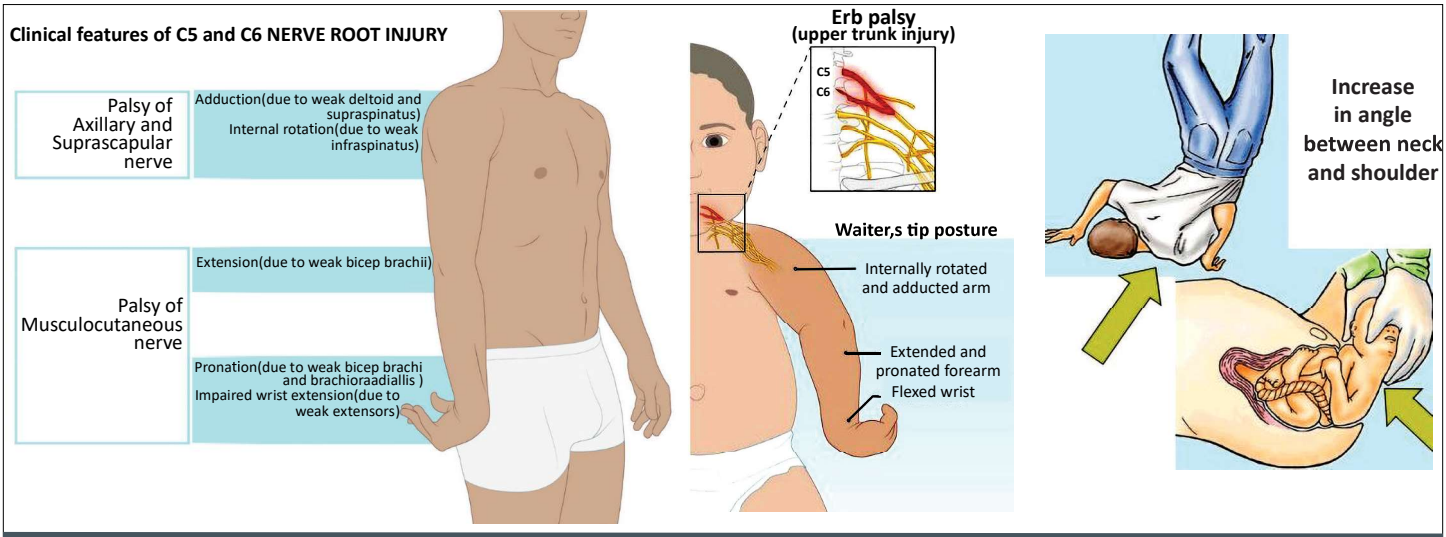
- Axillary nerve - C5, C6
- Radial nerve - C5, C6, C7, C8, TI
- Ulnar nerve - C8, TI
- Musculocutaneous nerve - C5, C6 ,C7
- Median nerve

Cords formation in brachial plexus

- Lateral Cord - Anterior division of upper and middle trunk
- Medial Cord - Anterior division lower trunk
- Posterior Cord - Posterior division of upper, middle and lower trunk

UPPER BRACHIAL PALSY (ERB-DUCHENNE PALSY OR WAITER'S TIP DEFORMITY)

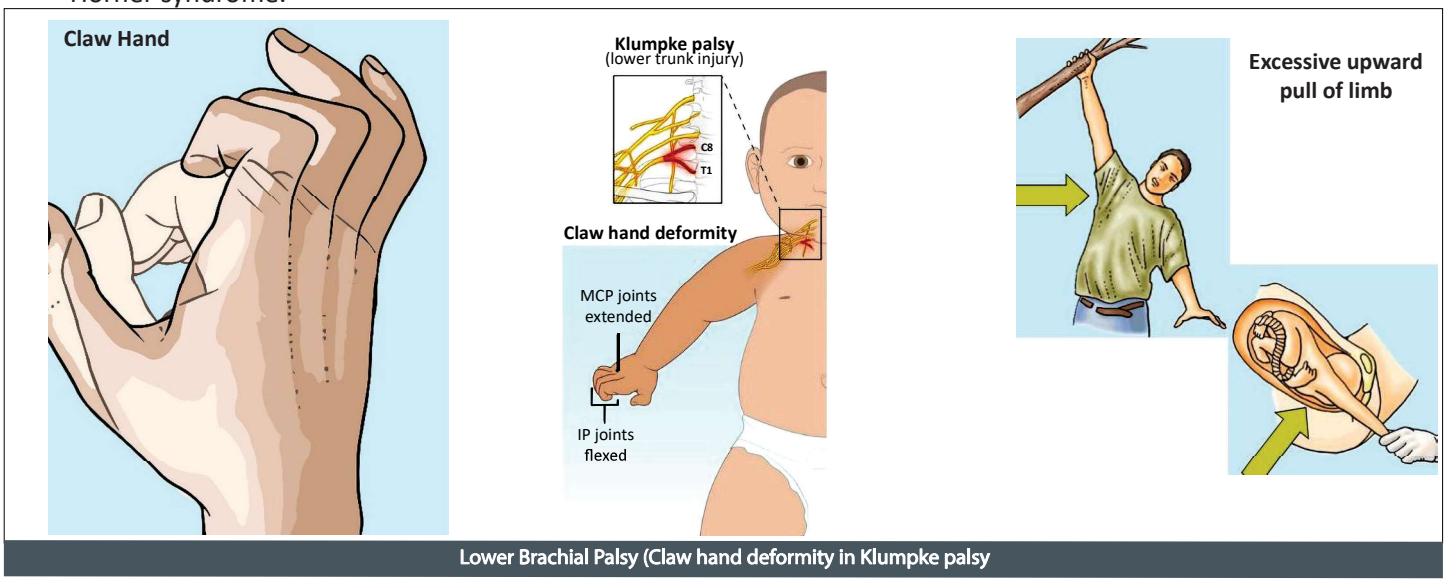
- It typically results from excessive increase in the angle between the neck and the shoulder, leading to stretching or tearing of the superior parts of the brachial plexus (C5 and C6 roots or superior trunk).
- It may occur as a birth injury, often due to forceful pulling on the infant's head during a difficult delivery.
- Paralysis of the muscles of the shoulder and arm supplied by C5 and C6 spinal nerves (roots) of the upper trunk.
- It presents as a "waiter's tip" hand deformity characterized by an adducted shoulder, medially rotated arm, extended elbow, and loss of sensation in the lateral aspect of the upper limb.
- Sensory loss in the C5 and C6 dermatoms (thumb and lateral surface of the forearm and arm).
- "**BIRDS**" (Biceps, Infraspinatus, wRist extensors, Deltoid, Supraspinatus).



Upper Brachial Palsy (Erb Palsy or Waiter's Tip Palsy)

LOWER BRACHIAL PALSY (KLUMPKE PARALYSIS OR CLAW HAND)

- It typically results from the sudden superior pull on the upper limb, causing stretching or tearing of the inferior parts of the brachial plexus (C8 and T1 roots or inferior trunk).
- It may occur due to actions such as grabbing support during a fall from height, birth injury, or as a result of thoracic outlet syndrome.
- Paralysis of all intrinsic muscles of the hand supplied by the C8 and T1 roots of the lower trunk.
- It presents as a “claw hand” deformity and involves combination lesions of ulnarnerve (“claw hand”) and median nerve (“ape hand”).
- It may lead to the loss of sensation in the medial aspect of the upper limb and medial 1.5 fingers. It may include a Horner syndrome.



Lower Brachial Palsy (Claw hand deformity in Klumpke palsy

PAST MCQS:

- Which nerve roots are likely to be damaged when there is a loss of innervation in the lateral forearm? Nerve Roots C5, C6
- Which cord of the brachial plexus gives nerves to the extensors of the arm? Posterior cord
- Which cord of the brachial plexus provides innervation to the medial side of the forearm? Medial cord
- What is the potential nerve injury that is associated with a fracture of the Hook of Hamate in the Cuboidal tunnel? Ulnar Nerve Injury
- Which structure is responsible for pain within the anatomical snuffbox? Radial Artery
- Which nerve gets affected in the fracture of a Surgical Neck of the Humerus? Axillary Nerve

- Which nerve gets damaged in a fracture of the medial epicondyle? Ulnar Nerve
- Which part of the Humerus is associated with Radial nerve damage? Shaft
- Which nerve damage results in wrist drop? Radial Nerve
- Which neurovascular structures get affected by anterior dislocation of the shoulder joint? Axillary Nerve and Posterior Circumflex Artery
- Which neurovascular structures get damaged in Quadrangular space injury? Axillary Nerve and Posterior Circumflex Artery
- Which nerves supply the small muscles of the hand? Median nerve and Ulnar nerve
- Which nerve lesion leads to Thenar Eminence wasting? Median nerve
- Where the lymph from the thumb and index finger drains? Infraclavicular Lymph Nodes
- Which nodes receive lymph from the middle, ring, and little finger? Infraclavicular Lymph Nodes
- Which nerve give rise to Lateral cutaneous nerve of forearm? Musculocutaneous nerve
- From which nerve Posterior cutaneous nerve of forearm arise? Radial nervew
- Which nerve mainly supply poterior portion of upper limb> Radial nerve

2. MEDIAN NERVE

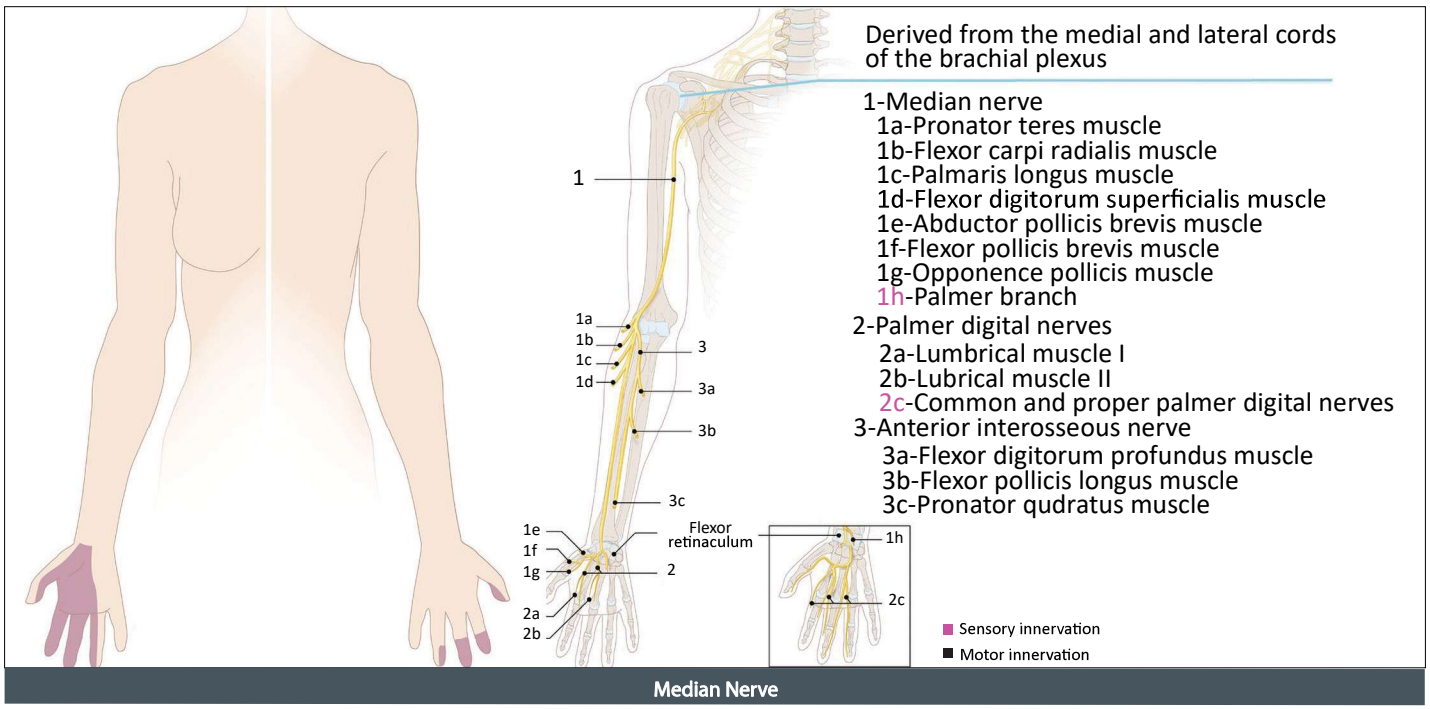
A 25-year-old man is brought to the emergency department 30 minutes after he was involved in a motorcycle collision. Physical examination shows a deep laceration on the volar surface of the distal left forearm. Neurological examination shows loss of abduction and opposition of the left thumb. The radial and ulnar pulses are palpable. Based on these findings, which of the following nerves is most likely injured in this patient?

A. Median nerve ✓
B. Ulnar nerve
C. Radial nerve
D. Axillary nerve
E. Nerve to subclavius

EXPLANATION:

MEDIAN NERVE

- Formed by the union of lateral **(C5,6,7)** and medial **(C8 and T1)** cords of the brachial plexus.
- In arm, the nerve descends lateral to the brachial artery, crosses to its medial side.
- It passes deep to the bicipital aponeurosis and the median cubital vein at the elbow.
- It passes between the two heads of the pronator teres muscle, and runs on the deep surface of flexor digitorum superficialis.



- Near the wrist, it becomes superficial between the tendons of flexor digitorum superficialis and flexor carpi radialis, deep to palmaris longus tendon.
- It passes deep to the flexor retinaculum to enter the palm, but lies anterior to the long flexor tendons within the carpal tunnel.

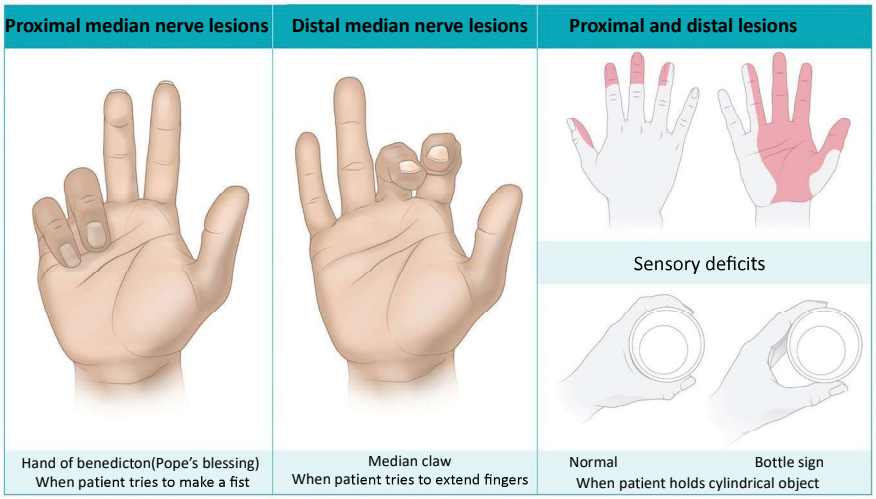
Hand Motor Supply (LOAF):

- Lateral 2 lumbricals
- Oppoenes pollicis
- Adductor pollicis brevis
- Flexor pollicis brevis

MEDIAN NERVE NEUROPATHY

Damage at wrist:

- e.g. Carpal tunnel syndrome
- Paralysis and wasting of thenar eminence muscles and opponens pollicis (ape hand deformity)
- Sensory loss to palmar aspect of lateral (radial) 2 ½ fingers



Damage at elbow, as above plus:

- Unable to pronate forearm
- Weak wrist flexion
- Ulnar deviation of wrist

Anterior interosseous nerve (branch of median nerve):

- Leaves just below the elbow
- Results in loss of pronation of forearm (PQ) and weakness of long flexors of thumb and index finger (FDP)
- Loss of pincer movement of the thumb and index finger.

PAST MCQS

- Which nerve lesion is responsible for laterally rotated and adducted thumb? Median nerve lesion
- What nerve is likely to be injured if the patient is unable to oppose his thumb and little finger? Median Nerve
- Which nerve is most susceptible to injury when drawing blood from the cubital fossa? Median Nerve
- Which nerve is affected by post-traumatic loss of sensation on the lateral palmar surface and inability to flex the index finger? Median Nerve
- Which nerve is responsible when a patient is unable to hold bottles, has mixed sensation at the thumb, and loss of flexion at the distal phalanx of the thumb? Median Nerve
- What functional alteration is associated with the Thenar eminence in Carpal tunnel syndrome? Loss of Thenar eminence
- Which clinical condition is indicative of defects in the median nerve? Carpel Tunnel Syndrome
- Which nerve lesion is associated with wasting of the thenar eminence and loss of sensation over the thumb and index finger? Median Nerve lesion
- Which specific thumb movement is also impaired when the median nerve gets damaged above the flexor retinaculum in addition to the loss of thenar eminence? Opposition of thumb
- What is the specific pattern of sensory deficit in patients diagnosed with Carpal Tunnel Syndrome? Sensory loss to lateral third and half fingers
- Which nerve is likely to get compressed when a patient is unable to oppose his thumb and little finger? Median Nerve
- Which nerve is affected in a patient who is unable to flex his index finger and experiences loss of sensation on the lateral palmar surface? Median Nerve
- Which nerve gets affected in the supracondylar fracture of Humerus? Median Nerve
- Which metabolic disorder is often associated with the development of carpal tunnel Syndrome? Myxedema (Hypothyroidism)
- Which motor function is lost in a hypothyroid lady who has loss of sensations in the index and middle fingers? Opposition of thumb

- Which nerve is responsible to carry sensations from lateral palmar surface? Median nerve
- A Patient is unable to to pronate forearm, which nerve is damaged? Median nerve
- Which nerve damaged can lead to Ape hand deformity? Median nerve

3. RADIAL NERVE

A 25-year-old woman comes to the physician because of pain and weakness in her right forearm and hand for several months. Two years ago, she sustained a fracture of her ulnar shaft with dislocation of the radial head that was treated surgically. Physical examination shows mild tenderness a few centimeters distal to the lateral epicondyle. She has marked weakness when attempting to extend her right middle finger. There is radial deviation on extension of the wrist. Sensation is not impaired. Which of the following nerves is most likely affected in this patient?

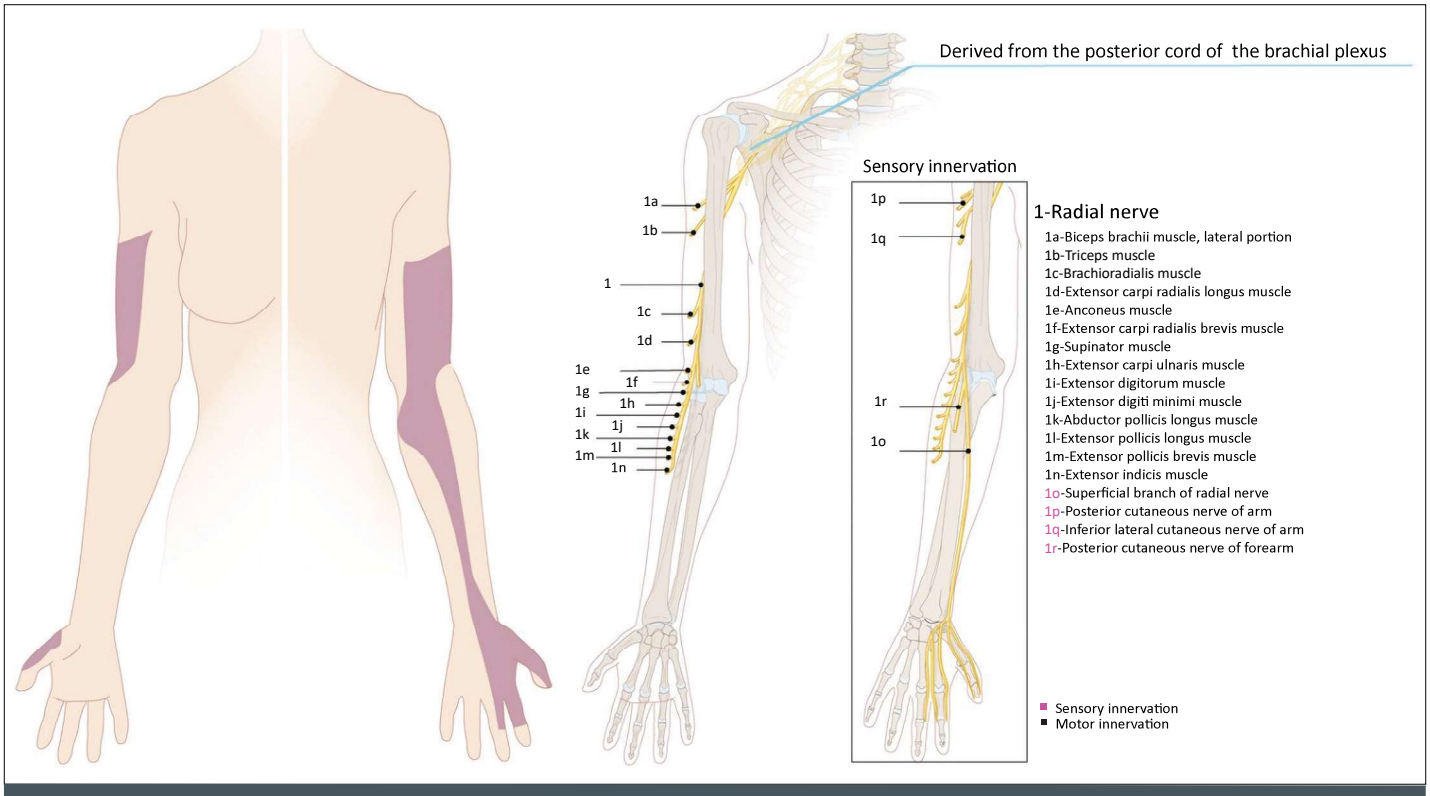
A. The posterior interosseous nerve
B. The anterior interosseous nerve
C. Radial nerve ✓
D. Ulnar nerve
E. Axillary nerve

EXPLANATION:

RADIAL NERVE

- Continuation of the posterior cord of the brachial plexus **(C5 to T1)**
- In the axilla: lies posterior to the axillary artery on subscapularis, latissimus dorsi and teres major.
- Enters the arm between the brachial artery and the long head of triceps (medial to humerus).
- Spirals around the posterior surface of the humerus in the groove for the radial nerve.
- At the distal third of the lateral border of the humerus it then pierces the intermuscular septum and descends in front of the lateral epicondyle.
- At the lateral epicondyle it lies deeply between brachialis and brachioradialis where it then divides into a superficial and deep terminal branch.
- Deep branch crosses the supinator to become the posterior interosseous nerve

RADIAL NERVE NEUROPATHY



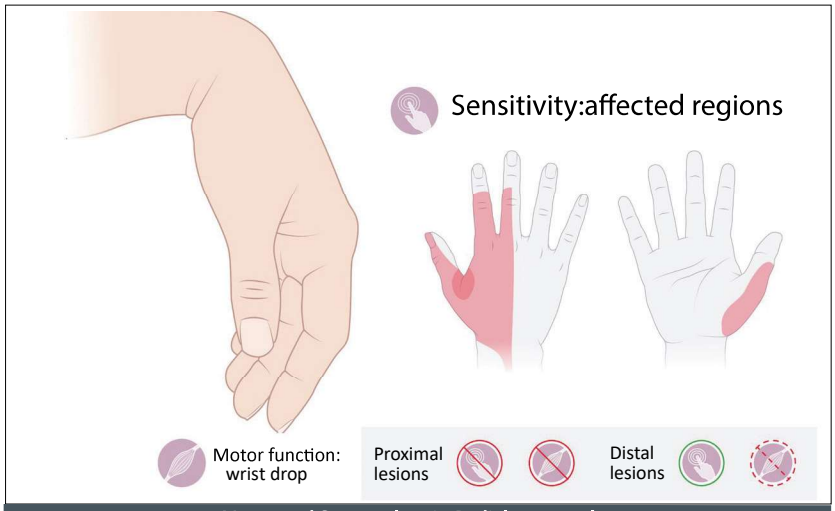
Radial Nerve

Motor deficits:

- Wrist drop: inability to extend (dorsiflex) the wrist
- Inability to extend the fingers at the MCP joints

Sensory deficits:

- Dorsal aspect: radial 2½ fingers (less commonly, 3½ fingers), excluding the tips of the 2nd and 3rd fingers. The 1st web space is the autonomous sensory zone of the radial nerve and is highlighted in red.
- Palmar aspect: the radial border of the thumb



Motor and Sensory loss in Radial nerve palsy

PAST MCQS:

- What is the most likely nerve injury in a 15-year-old male with the inability to extend the metacarpophalangeal joints of the finger, inability to abduct and extend the thumb, but intact sensations after a left elbow injury? Radial nerve
- Which neurovascular structures lie in the spiral groove of Humerus? Radial Nerve and Profunda Brachii Artery
- What is potential nerve injury if a patient with a history of arm trauma experiences numbness in the root of their thumb and difficulty in opening his fist? Radial Nerve
- Which nerve is responsible for carrying sensations from the lateral side of the dorsum of the hand? Radial Nerve
- Which clinical condition arises from bullet injury at the radial groove of the Humerus? Wrist drop due to loss of extension of wrist
- Which nerve accompanies the radial artery in the radial grove at the shaft of Humerus? Deep Radial nerve
- Which nerve accompany the radial artery in radial groove? Deep branch of radial nerve
- Injury to back of arm with loss of flexion at metacarpophalangeal joint and loss of abduction of thumb with no sensation lost, which nerve is damaged? deep branch of radial nerve (Posterior interosseous nerve sensations intact, Sensations lost - radial nerve)

4. ULNAR NERVE

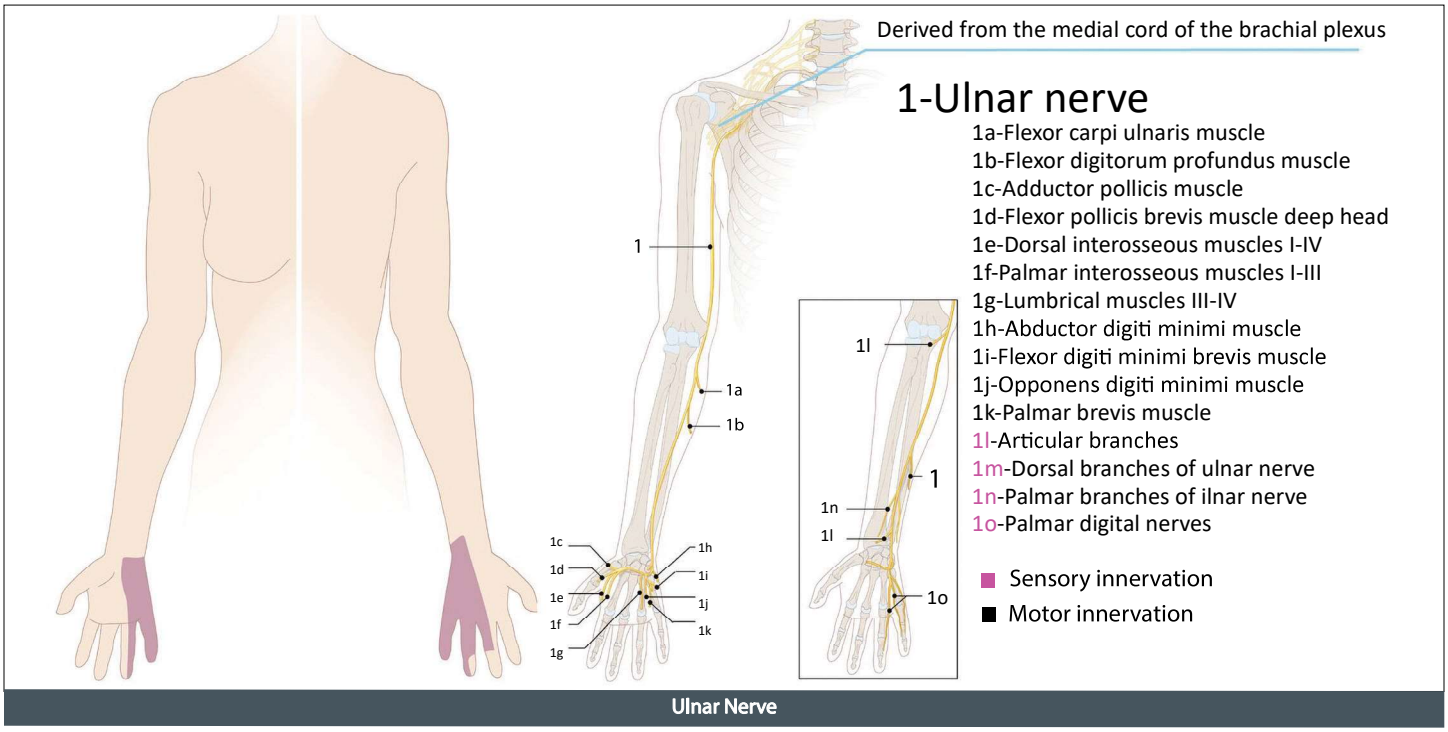
A 32-year-old man comes to the physician because of episodic tingling and numbness in his right hand for the past 3 months. His symptoms are worse in the evening. There is no history of trauma. He is employed as a carpenter. He has smoked 1 pack of cigarettes daily for the past 10 years. He drinks a pint of vodka daily. He does not use illicit drugs. His vital signs are within normal limits. Physical examination shows decreased pinch strength in the right hand. Sensations are decreased over the little finger and both the dorsal and palmar surfaces of the medial aspect of the right hand. Which of the following is the most likely site of nerve compression?

A. Carpal tunnel
B. Cubital tunnel ✓
C. Heads of the pronator teres
D. Guyon canal
E. Cubital fossa

EXPLANATION:

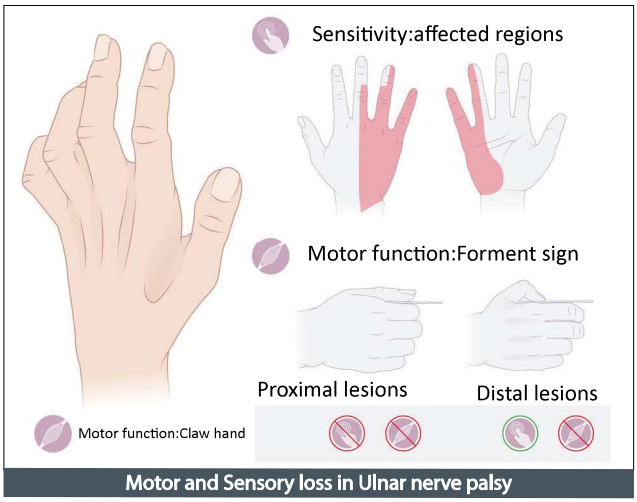
ULNAR NERVE

- It arises from the medial cord of the brachial plexus **(C8, T1)**
- It lies medial to the axillary artery within the medial bicipital groove
- It courses dorsally at the medial upper arm, where it perforates the medial intermuscular septum and enters the posterior (extensor) compartment
- Courses within the groove for the ulnar nerve around the ulnar joint
- Passes through the cubital tunnel back to the flexor aspect of the arm
- Divides above the wrist into its terminal branches (superficial branch and deep branch)



Ulnar Nerve

ULNAR NERVE NEUROPATHY



Motor and Sensory loss in Ulnar nerve palsy

Motor deficits:

- **Claw hand:** The 4th and 5th joints are hyperextended at the MCP and flexed at the IP joints at rest (neutral position).
- **Froment sign:** The patient is asked to grasp a piece of paper between the thumb and the index finger. When the examiner tries to pull the paper away, the thumb flexes at the IP joint because the flexor pollicis longus (supplied by the median nerve) compensates for the paralyzed adductor pollicis (supplied by the ulnar nerve).
- Also depicted here is hollowing of the intermetacarpal spaces and the 1st web space due to the atrophy of the interossei, which is seen in chronic ulnar nerve palsy.

Sensory deficits:

- **Dorsal aspect:** ulnar 2½ fingers (less commonly, 1½ fingers), excluding the tips of the 3rd and 4th fingers
- **Palmar aspect:** ulnar 1½ fingers

Damage at the Wrist:

- Wasting and paralysis of intrinsic hand muscles, resulting in a “claw hand” deformity. This deformity is characterized by hyperextension of the metacarpophalangeal joints and flexion of the interphalangeal joints.
- Wasting and paralysis of hypothenar muscles, contributing to the clawing deformity.
- Loss of sensation in the medial 1 and a half fingers, specifically the ulnar side of the hand (little finger and half of the ring finger).
- Hypothenar, interossei+ lumbricals, cutaneous supply

Damage at the Elbow:

- Radial deviation of the wrist due to unopposed action of the radial wrist extensors.
- Clawing of the 4th and 5th digits, although to a lesser extent than in wrist damage. This is due to the preservation of the flexor digitorum profundus function to these digits. (Lumbricle functions are to MCP flexion at the joint, PIP, and DIP extension).

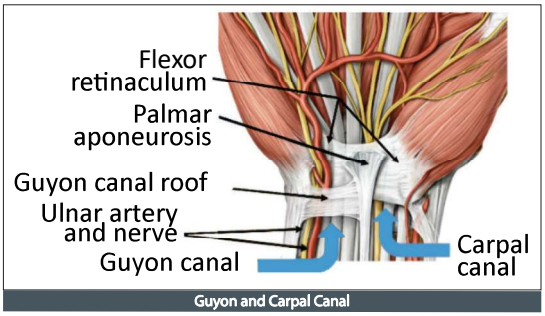
ULNAR NEUROPATHY AT THE ELBOW AND WRIST

	CUBITAL TUNNEL SYNDROME	GUYON CANAL SYNDROME
Location	At elbow (within cubital tunnel)	At the wrist (within the Guyon canal)
Canals	The cubital tunnel is formed by medial epicondyle of the humerus, the olecranon process of the ulna and a ligament called the cubital tunnel retinaculum. Content: Ulnar nerve	Guyon canal (ulnar canal) is 4-cm long, fibro-osseous canal on the medioventral portion of the wrist.The floor of the canal is formed by the transverse carpal ligament, the roof by the palmar carpal ligament, the ulnar (medial) border by the pisiform bone, and the radial (lateral) border by the hook of the hamate bone. Content: Ulnar artery and ulnar nerve.
Etiology	Prolonged flexion of or other stress on the elbow	Sports injuries (cycling, racket sport)
Motor deficit	Muscle atrophy and weakness (less common than sensory symptoms) Loss of dexterity Decreased grip strength Difficulty lifting	Weakness and atrophy of the intrinsic hand muscles innervated by the ulnar nerve
Sensory deficit	Paresthesia or sensory loss of the palmar and dorsal aspects of the medial side of the hand, little finger, and ulnar side of the ring finger Referred pain in the forearm	Paresthesia or sensory loss of the palmar and dorsal aspects of the medial side of the hand, little finger, and ulnar side of the ring finger

Ulnar nerve: (MAFIA-P)

- **M**edial 2 lumbricals
- **A**dductor pollicis
- **F**lexor digitorum profundus/Flexor carpi ulnaris
- **I**nterossei
- **A**bductor and Opponens and flexor digiti minimi (hypothenar eminence)
- **P**almaris brevis

Ulnar nerve innervates all intrinsic muscles of the hand
(EXCEPT 2: thenar muscles & first two lumbricals - supplied by median nerve)



Guyon and Carpal Canal

PAST MCQS:

- What is sensory deficit in Ulnar Nerve injury? Loss of sensation in the Dorsal and palmer aspect of the medial 1/3rd of the hand
- What sensory deficit results from an injury to the Ulnar Nerve behind the medial epicondyle? Loss of sensation in medial 1/3 of the palmar and dorsal aspect of the hand
- What nerve is likely affected if there is sparing of the lateral part of the thenar eminence and noticeable wasting of other small muscles in the hand? Ulnar Nerve
- Which nerve is likely damaged if there is the inability to perform adduction of the thumb and abduction of the little finger, with intact sensation in the skin of the palm following an incised wound at the front of the wrist? Deep Ulnar Nerve
- Which thumb movement is typically unaffected in the ulnar nerve which nerve is likely damaged if there is loss of sensation on the medial side of the hand and clawing of two medial fingers at the distal interphalangeal joint? Ulnar Nerve
- Which nerve gets injured in a fracture of the medial epicondyle of the Humerus? Ulnar nerve
- What is potential nerve injury when there is a fracture of the hook of the hamate due to a fall on the outstretched hand? Ulnar Nerve

5. AXILLARY NERVE INJURY

A 28-year-old male patient presents to the emergency department after a fall from a bicycle. He reports severe pain and

inability to move his left arm after the accident. On examination, you notice that his left shoulder appears. He is unable to abduct his left arm beyond 15 degrees and has reduced external rotation. There is tenderness and swelling in the lower part of the deltoid region and lateral arm. What is the most likely diagnosis?

A. Radial nerve injury
B. Ulnar nerve injury
C. Brachial plexus injury
D. Anterior shoulder dislocation ✓
E. Axillary nerve injury

EXPLANATION:

AXILLARY NERVE

- Posterior cord **(C5–C6)**
- Courses dorsally through the lateral axillary fold
- Courses around the surgical neck of the humerus
- Divides into three branches innervating the deltoid muscle
- Posterior branch ends as the superior lateral cutaneous nerve of arm

AXILLARY NERVE NEUROPATHY

Causes:

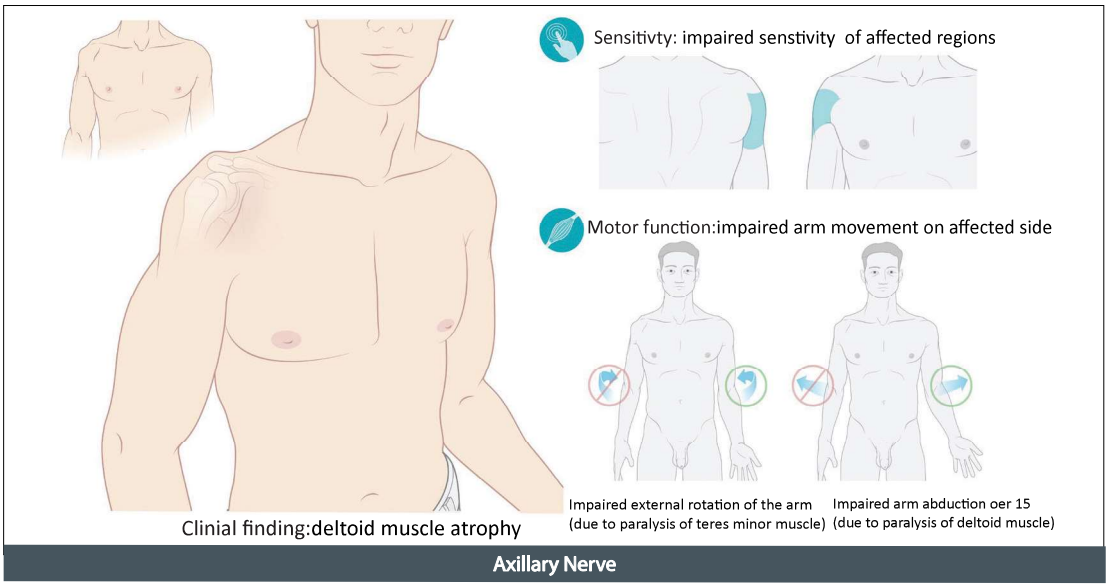
- Anterior (anteroinferior) shoulder dislocation
- Fracture of surgical neck of the humerus

Motor deficits:

- Paralysis of the deltoid muscle → impaired arm abduction (> 15°)
- Paralysis of the teres minor muscle → impaired external rotation of the arm
- Muscle atrophy: flattened deltoid

Sensory deficits:

- Lower part of the deltoid region and lateral arm



PAST MCQS:

- Which nerve is damaged in a patient who presented with hanging of the upper limb and loss of sensation on the lateral side of the arm? Axillary Nerve
- Which nerve innervates the Deltoid muscle? Axillary Nerve
- Which artery is likely to be injured by medial extension of a laceration that is 2cm medial to the tendon of Bicep Brachii? Brachial Artery
- What is potential nerve injury in fracture of the surgical neck of Humerus? Axillary Nerve
- Which nerve is likely injured in a person who has lost contour of his shoulder? Axillary Nerve

6. MUSCULOCUTANEOUS NERVE

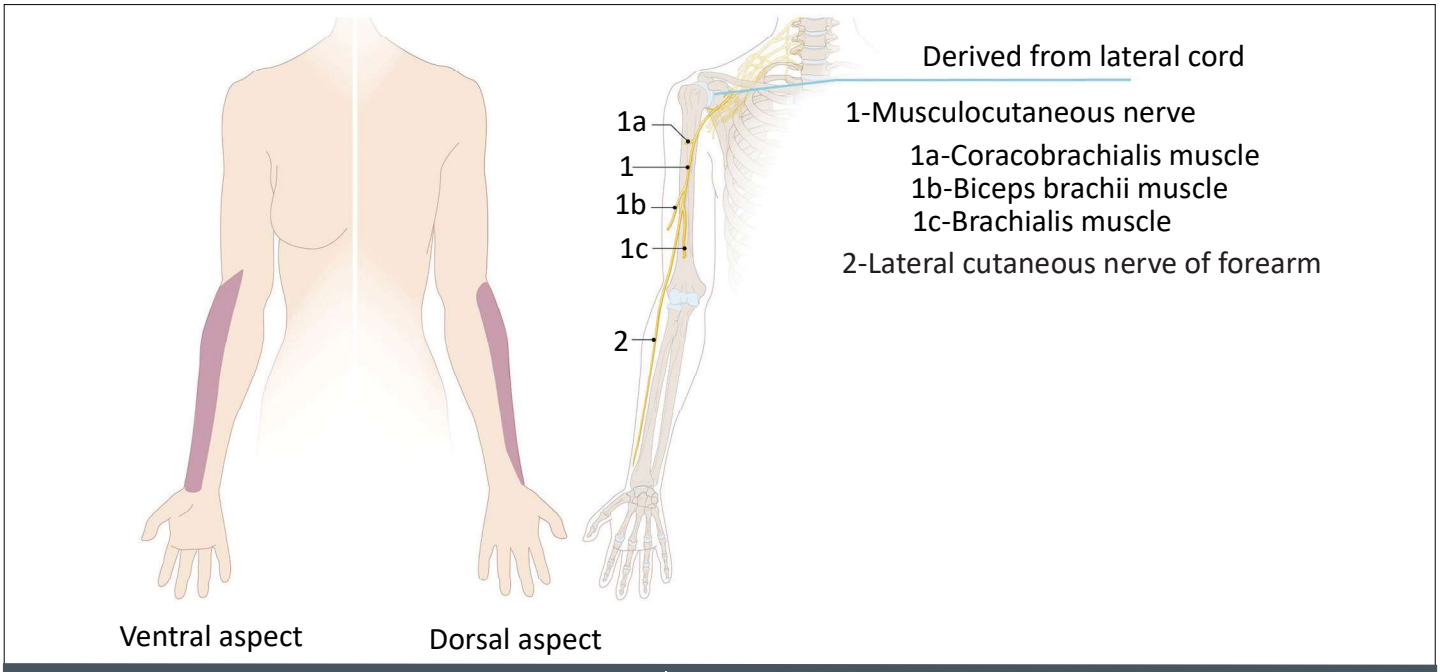
A 32-year-old patient presents to the clinic with complaints of weakness and altered sensation in the upper limb. Upon examination, you observe that the patient has difficulty flexing their elbow and forearm supination is impaired. There is also reduced sensation in the lateral forearm extending from the elbow to the base of the thumb. Additionally, the biceps reflex is diminished. What nerve is likely to be affected in this scenario?

A. Median nerve
B. Ulnar nerve
C. Axillary nerve
D. Musculocutaneous nerve ✓
E. Radial nerve

EXPLANATION:

MUSCULOCUTANEOUS NERVE

- Branch of lateral cord of brachial plexus **(C5–C7)**
- It penetrates the coracobrachialis muscle
- Passes obliquely between the biceps brachii and the brachialis to the lateral side of the arm
- Above the elbow it pierces the deep fascia lateral to the tendon of the biceps brachii
- Continues into the forearm as the lateral cutaneous nerve of the forearm and innervates: Coracobrachialis,Biceps brachii and Brachiallis



Musculocutaneous Nerve

MUSCULOCUTANEOUS NERVE NEUROPATHY

Causes:

- Trauma
- Upper trunk compression (e.g., Erb palsy)

Motor deficits:

- Paralysis of brachialis and coracobrachialis muscles → impaired elbow flexion
- Paralysis of biceps brachii → impaired forearm supination
- Reduced biceps reflex **(C5–C6)**

Sensory deficits:

- Lateral forearm, from the elbow to the base of the thumb
- The musculocutaneous nerve is responsible for elbow flexion, forearm supination, and sensation over the lateral, volar forearm.

PAST MCQS

- Which nerve is damaged if the patient is unable to flex his elbow and supinate his forearm after Axillary nerve injury? Musculocutaneous Nerve
- Which nerves are affected if the patient is unable to supinate his forearm? Musculocutaneous and Radial Nerve
- Which motor functions are typically associated with Musculocutaneous Nerve? Flexion at the elbow and Supination of the forearm

7. HUMERUS FRACTURES

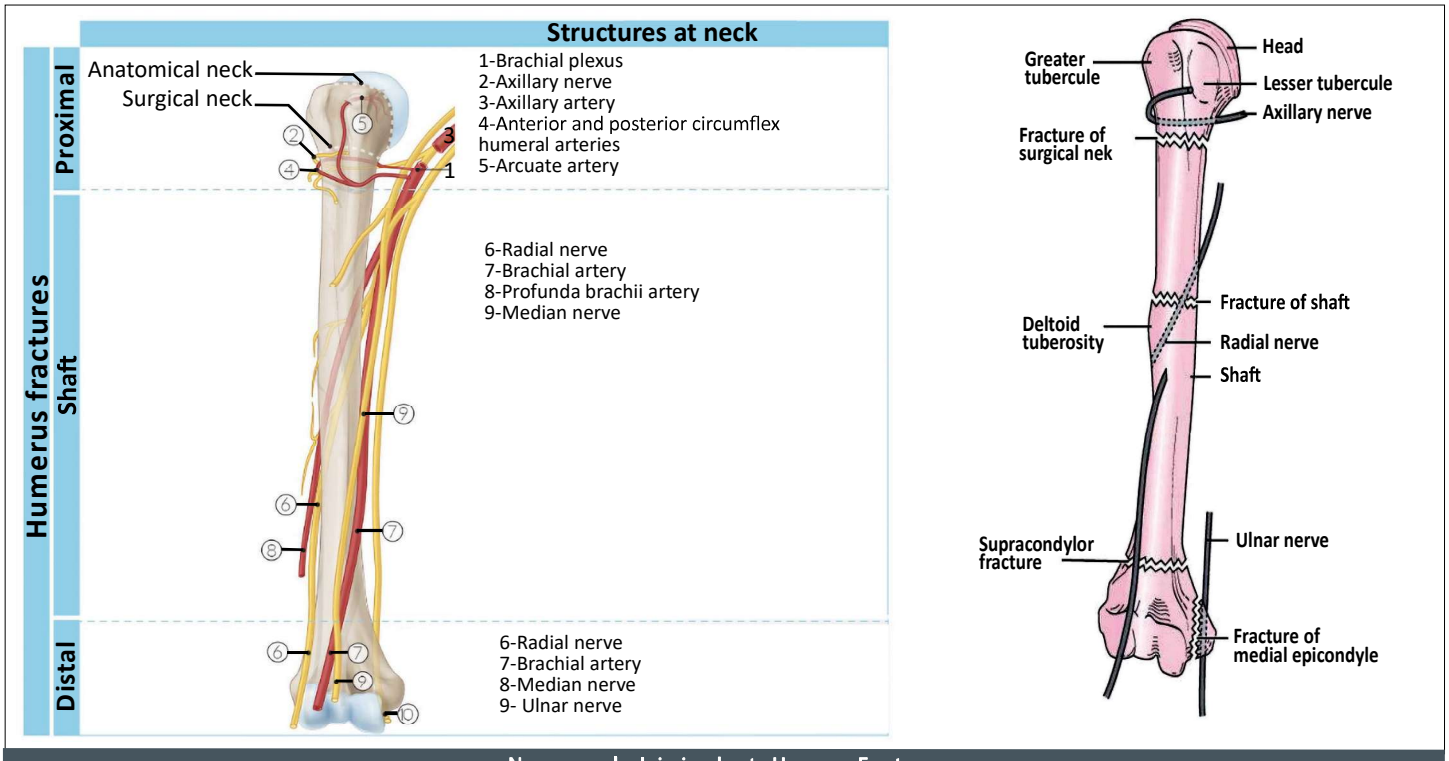
A 35-year-old male patient sustains a traumatic injury to his shoulder during a fall. He experiences severe pain and loss of function in the affected shoulder. Upon examination, there is tenderness and swelling over the shoulder's, and he has difficulty in initiating abduction and external rotation of the arm. An X-ray confirms a surgical neck fracture of the humerus. What is the most likely damaged structure in this scenario?

A. Median nerve and brachial artery
B. Radial nerve and profunda brachii artery
C. Axillary nerve and posterior humeral circumflex artery ✓
D. Ulnar nerve and ulnar artery
E. Median nerve and Profunda brachii artery

EXPLANATION:

Sites of potential injury to major nerves in fractures of the humerus:

- **Surgical neck:** Axillary nerve and posterior humeral circumflex artery
- **Midshaft:** Radial nerve and profunda brachii artery
- **Supracondylar:** Brachial artery and median nerve
- **Medial epicondyle:** Ulnar nerve



Neurovascular Injuries due to Humerus Fractures

PAST MCQS:

- Which nerve palsy is typically associated with a fracture of the shaft of the Humerus? High Radial Nerve Palsy
- Which artery is affected by fracture of the Shaft of the Humerus? Profunda Brachii Artery

- Which nerve is related to the medial epicondyle of the Humerus? Ulnar Nerve
- Which part of the Humerus is likely fractured when there is a loss of cutaneous sensation on the dorsum of the thumb? Mid-shaft of Humerus
- Which muscle is primarily affected by fracture of the medial epicondyle of Humerus? Adductor Pollicis
- Which artery is damaged in the fracture of the surgical neck of the Humerus? Posterior Circumflex Artery
- Which muscle lodge in the Bicipital groove of humerus? Long head of Bicep brachii
- Which nerve is likely damaged when medial epicondyle of humerus gets fractured? Ulnar nerve

8. FRACTURE OF DISTAL RADIUS

A 60-year-old female fell while walking on an icy sidewalk and extended her hand to break the fall. She now presents to the emergency department with pain and deformity in her right wrist. On examination, there is swelling and tenderness over the wrist. The wrist appears dorsally displaced and has the classic "dinner fork deformity." X-rays confirm a fracture of the distal radius. What is the most likely diagnosis?

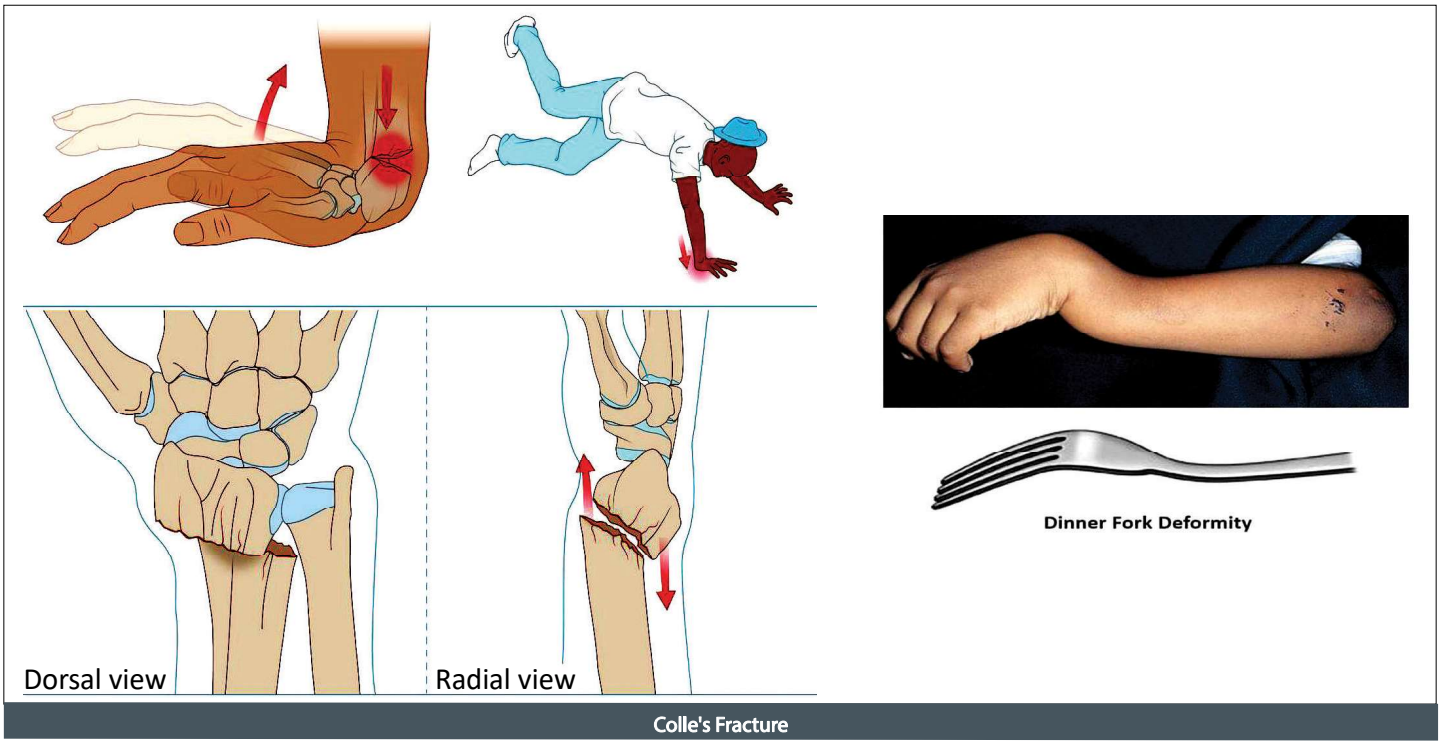
A. Colles' fracture ✓
B. Smith's fracture
C. Scaphoid fracture
D. Monteggia fracture
E. Hutchinson fracture

EXPLANATION:

Colle's and Smith fractures are the most common fractures of the forearm (after 50), which are transverse fracture within the distal 2 cm of the radius.

COLLES' FRACTURE:

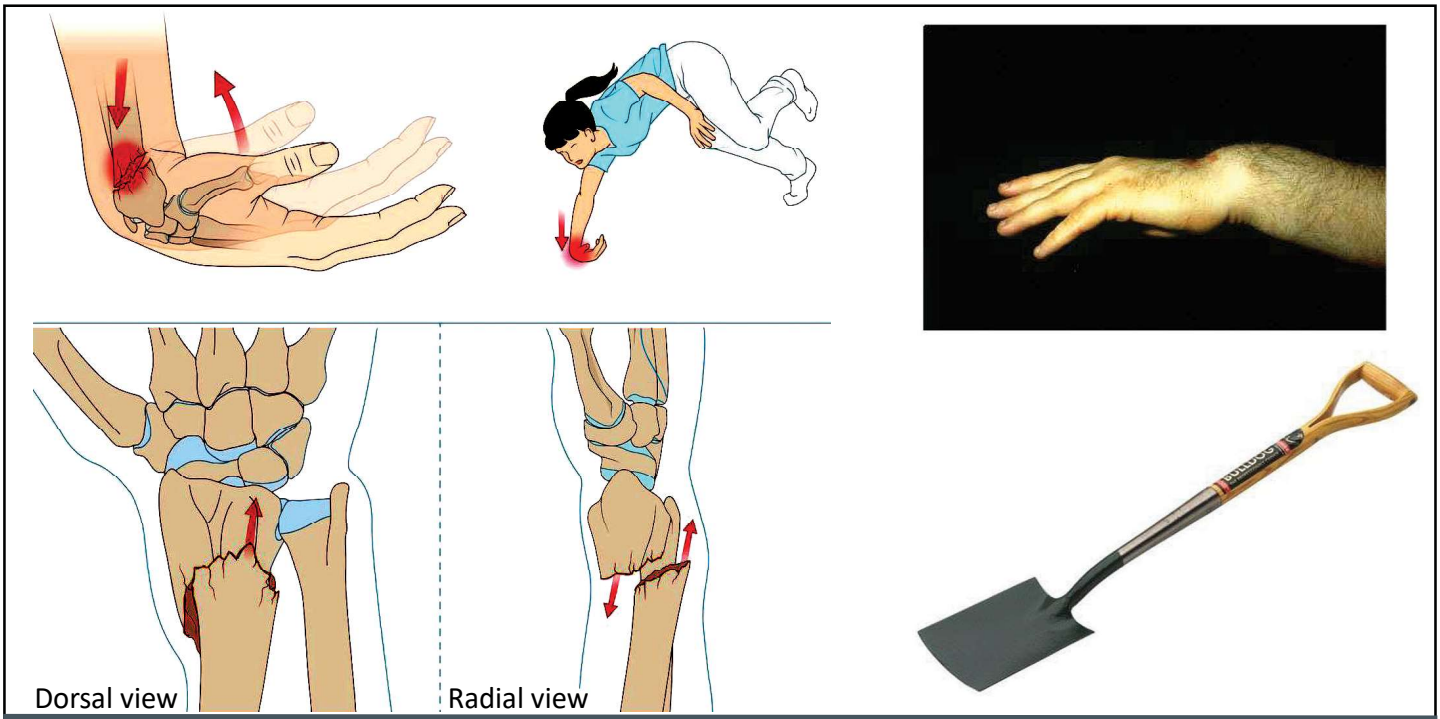
- It results from a fall or impact on the outstretched hand, causing forced extension of the hand.
- Distal fragment is displaced DORSALLY - dinner fork deformity.



Colle's Fracture

SMITH'S FRACTURE:

- It occurs due to a fall or blow on the dorsal (back) aspect of the flexed wrist, leading to a forced flexion of the wrist.
- Distal fragment is displaced ANTERIORLY - garden spade deformity.



Smith's Fracture

PAST MCQS:

- Which nerve is commonly damaged in Shoulder joint dislocation? Axillary Nerve
- Which nerve is likely to be injured in a fracture of the neck of Humerus? Axillary Nerve
- What is the specific motor and sensory deficit after the surgical neck of Humerus fracture? Loss of abduction and proximal upper arm lateral side sensation
- Which nerves are involved in the fracture of Humerus? Axillary Nerve, Radial Nerve, and Musculocutaneous Nerve
- Which nerve is damaged in the fracture of the medial epicondyle of the Humerus? Ulnar Nerve
- Which artery gets affected by a fracture of the surgical neck of the Humerus? Post Humeral Circumflex Artery
- Which artery gives rise to Anterior and Posterior Humeral Circumflex arteries? Axillary Artery
- Which artery is injured in the fracture of shaft Humerus? Profunda Brachii Artery

9. ABDUCTORS OF SHOULDER JOINT

A 50-year-old female underwent radical mastectomy as part of her breast cancer treatment. A few weeks after surgery, patient presents with a winged scapula and weakness in abduction of the arm above 90°. What is the most likely cause of the winged scapula and weakness in arm abduction observed in this patient several weeks after surgery?

A. Axillary nerve
B. Musculocutaneous nerve
C. Long thoracic nerve ✓
D. Thoracodorsal nerve
E. Radial nerve

EXPLANATION:

Radical Mastectomy is a more extensive procedure that involves the removal of the entire breast, underlying muscles, and lymph nodes. Modified Radical Mastectomy removes the breast tissue with lymph nodes but preserves the chest wall muscles, resulting in a better cosmetic outcome and preservation of chest wall function.

- Long thoracic nerve (serratus anterior muscle paralysis) resulting winging of scapula and weakness in abduction of the arm above 90°.
- The intercostobrachial nerve may also be damaged during mastectomy, resulting in numbness of the skin of the medial arm.

ABDUCTORS OF SHOULDER JOINT

- 0°-15°: Supraspinatus muscle (suprascapular nerve).
- 15°-110°: Deltoid muscle (axillary nerve).
- 110°-180°: Trapezius (accessory nerve CNXI) and Serratus anterior (long thoracic nerve).

MUSCLES CAUSING MOVEMENT OF SHOULDER JOINT

Medial rotators of shoulder joint	• Subscapularis • Teres major • Latissmusdorsi	**Lateral rotators of shoulder joint**	• Infraspinatous • Teres minor • Post fibers of deltoid
Adductors of shoulder joint	• Pectoralis major • Pectoralis minor • Teres major and minor	**Abductors of shoulder joint**	• Suprapinatous muscle • Muscles fiber of deltoid • Trapezius
Flexors of shoulder joint	• Anterior fibers of deltoid • Pectoralis major • Biceps brachii • Corachobrachialis	**Extensors of shoulder joint**	• Posterior fibers of deltoid • Latissmusdorsi • Teres minor

PAST MCQS:

- Which nerve injury during mastectomy can lead to winging scapula? Long Thoracic Nerve Injury
- Which nerve lesion is suspected when a girl is unable to comb her hair? Long Thoracic Nerve lesion
- Which muscle is paralyzed when a patient is unable to scratch his back? Latissimus dorsi
- Why a person with an injury to the Spinal Accessory Nerve is unable to abduct his arm above 90 degrees? Due to the forward movement of the Scapula
- What muscle is affected when a patient is unable to rotate his scapula forward?
- Which muscle paralysis causes winged scapula? Serratus Anterior
- Which muscle is affected when a person experiences a sudden fall of a fully abducted arm during a slow descent? Supraspinatus
- What is probable nerve injury in a patient who experiences difficulty in shrugging his shoulder? Spinal Accessory Nerve Injury
- Which muscle is affected in a boy who can abduct his arm beyond 30 degrees but is unable to abduct till 30 degrees? Supraspinatus
- Which nerve is likely to be damaged in the neck region and associated with weakness is raising the arm above the head? Spinal Accessory Nerve
- Which muscle is responsible for the rotation of the scapula? Serratus anterior

10. MUSCLES BONES AND JOINTS OF UPPER LIMB

A 23-year-old man is brought to the emergency department 30 minutes after being tackled while playing football. He has severe right shoulder pain and is unable to move the shoulder. He also reports nausea but has not vomited. There is no personal or family history of serious illness. His only medication is a multivitamin. On physical examination, the right upper extremity is externally rotated and slightly abducted. Palpation of the right shoulder joint shows tenderness and an empty glenoid fossa. The right humeral head is palpated below the coracoid process. The left upper extremity appears normal. Radial pulses are palpable bilaterally. An x-ray of the right shoulder is performed. The physician administers analgesia and obtains informed consent for closed reduction. This patient is at greatest risk for which of the following complications?

A. Paralysis of the wrist flexors and intrinsic hand muscles
B. Decreased sensation of the lateral upper arm ✓
C. Inability to flex the thumb, index, and middle fingers
D. Decreased sensation of the lateral lower arm
E. Inability to flex his forearm

EXPLANATION:

SHOULDER JOINT

- Shallow synovial ball and socket type of joint.

- Stability is provided by muscles of the rotator cuff.
- Two defects in the fibrous capsule; superiorly for the tendon of biceps. Anteriorly there is a defect beneath the subscapularis tendon.
- The inferior extension of the capsule is closely related to the axillary nerve at the surgical neck and this nerve is at risk in anteroinferior dislocations.

Important anatomical relations:

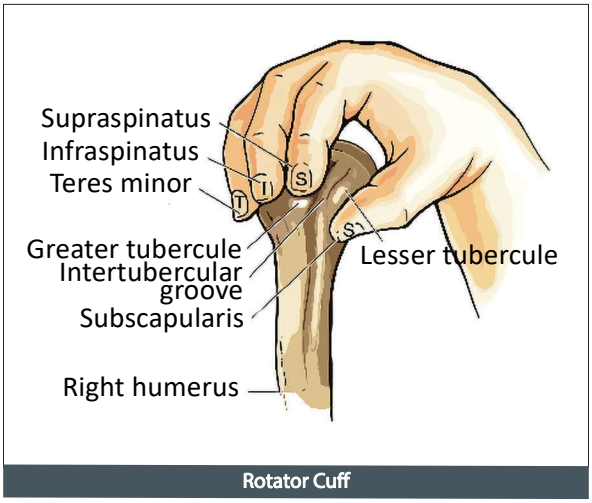
- **Anteriorly:** Brachial plexus, Axillary artery and vein
- **Posterior:** Suprascapular nerve, Suprascapular vessels
- **Inferior:** Axillary nerve, Circumflex humeral vessels

Rotator cuff muscles –SITS:

- Support the shoulder joint by forming a musculotendinous rotator cuff around it.
- Rotator cuff muscles are (SITS) Supraspinatus, Infraspinatus, Teres minor, Subscapularis
- Rotator cuff that pass from the scapula to insert in the greater tuberosity (all except sub scapularis-lesser tuberosity).
- Reinforces joint on all sides except inferiorly, where dislocation is most likely

Shoulder Joint dislocation:

- Anterior shoulder dislocation is the most common type of shoulder dislocation.
- Axillary nerve injury (ANI) is the most common nerve injury in shoulder dislocation because of the close proximity of the axillary nerve to the humeral head.
- Typical manifestations of ANI include decreased sensation over the lateral shoulder and impaired abduction and external rotation of the arm.
- In shoulder dislocation, impaired abduction and external rotation may occur because of mechanical reasons and are not necessarily a sign of ANI.



Rotator Cuff

Epicondylitis:

- Medial (golfer's elbow) epicondylitis
- Inflammation of the common flexor tendon of the wrist where it originates on the medial epicondyle of the humerus
- Lateral (tennis elbow) epicondylitis
- Repeated forceful flexion and extension of the wrist resulting strain in attachment of common extensor tendon and inflammation of periosteum of lateral epicondyle. Pain felt over lateral epicondyle and radiates down posterior aspect of forearm. Pain often felt when opening a door or lifting a glass

Joints of Upper limb:

- **Shoulder joint** - synovial ball and socket joint
- **Elbow joint** - synovial hinge joint
- **Superior and inferior radioulnar**- synovial pivot joint
- **Wrist joint** - synovial condyloid joint
- **Carpometacarpal joint** - synovial saddle joint
- **Metacarpophalangeal joint** - synovial condyloid joint
- **Interphalangeal** - synovial hinge joint

Upper limb Muscles:

- **Pronation** - Median nerve
- **Supination** - Musculocutaneous and radial
- **1st and 2nd lumbricals** - median nerve
- **3rd and 4th lumbricals** - deep branch of ulnar nerve
- Median nerve supply lateral half of flexor digitorumprofundus muscle
- Ulnar nerve supply medial half of flexor digitorumprofundus muscle
- Supinators of forearm at superior and inferior radioulnar joint = Biceps brachii (Musculocutaneous) and Supinator (Radial nerve)

- Pronators of forearm at superior and inferior radioulnar join = Pronator teres (median nerve) and Pronator quadratus (AIN-Median)
- Test of the proximal and distal interphalangeal joints
  - PIP = FDS
  - DID = FDP

PAST MCQS:

- Which ligament transmits the weight of the upper limb to the axial skeleton? Costoclavicular ligament
- Which structure is involved when a child experiences loss of sensation over the little finger after a blow which leads to elbow joint displacement? Ulnar Collateral ligament
- Which tendons in the anatomical snuff box allow palpation of radial pulse? Abductor Pollicis Longus and Extensor Pollicis Brevis Tendons
- Which is the most commonly fractured bone of the upper limb? Clavicle
- Where does the first lumbricle get attached? Extensor Expansion of Proximal Phalanx of Index finger
- Which muscle is attached at the inferior facet of the greater tuberosity of the Humerus? Teres Minor
- Which muscle is responsible for the supination of the forearm after the Supinator muscle is paralyzed? Bicep brachii
- Which muscle with Radial Nerve innervation is involved in the flexion of the elbow? Brachioradialis
- Which muscles are involved in Rotator cuff formation? Supraspinatus, Infraspinatus, Teres Minor and Subscapularis
- What is the underlying cause of the extension of the elbow on picking up stone from the ground? Active lengthening of Flexors
- Which muscle will not be affected after injury to C5 and C6 in road accident patient? Croacobrachialiis
- Which muscle has the same innervation as the Pronator quadratus? Flexor Pollicis Longus

11. LYMPHATICS OF UPPER LIMB

A patient present with a swollen and painful lesion on their index finger. Upon examination, you suspect an infection in the finger. Which lymph node is most likely to be the draining lymph node for this area in the upper limb?

A. Cubital lymph node
B. Supratrochlear lymph node ✓
C. Deltopectoral lymph node
D. Axillary lymph node
E. Supraclavicular lymph nodes

EXPLANATION:

SUPRATROCHLEAR (CUBITAL) LYMPH NODES

The supratrochlear lymph node lies in the superficial fascia over the upper part of the fossa, above the trochlea. It receives afferent lymph vessels from the third, fourth, and fifth fingers; the medial part of the hand; and the medial side of the forearm. The efferent lymph vessels pass up to the axilla and enter the lateral axillary group of nodes.

LYMPH NODES OF THE AXILLA

The axillary lymph nodes (20 to 30 in number) drain lymph vessels from the lateral quadrants of the breast, the superficial lymph vessels from the thoracoabdominal walls above the level of the umbilicus, and the vessels from the upper limb.

The lymph nodes are arranged in six groups:

I. **Anterior (pectoral) group:** These nodes receive lymph vessels from the lateral quadrants of the breast and superficial vessels from the anterolateral abdominal wall above the level of the umbilicus.
II. **Posterior (subscapular) group:** These nodes receive superficial lymph vessels from the back, down as far as the level of the iliac crests.
III. **Lateral group:** These nodes receives afferent lymph vessels from the third, fourth, and fifth fingers; the medial part of the hand; and the medial side of the forearm via supratrochlear lymph nodes.
IV. **Central group:** These nodes receive lymph from the above three groups.
V. **Infraclavicular (deltopectoral) group:** These nodes are not strictly axillary nodes because they are located outside the axilla. They lie in the groove between the deltoid and pectoralis major muscles and receive superficial lymph vessels from the lateral side of the hand, forearm, and arm.
VI. **Apical group:** These nodes receive the efferent lymph vessels from all the other axillary nodes. The apical nodes

drain into the subclavian lymph trunk.
On the left side, this trunk drains into the thoracic duct; on the right side, it drains into the right lymph trunk. Alternatively, the lymph trunks may drain directly into subclavian veins at the root of the neck.

PAST MCQS:

- Where the most of the lymph from the lateral breast quadrants drain? Axillary Lymph Nodes
- Which lymphatic nodes receive most of the lymph from the medial breast quadrants? Internal Mammary Lymph Nodes
- Where does the lymph from the Nipple of the breast drain? Anterior Axillary Lymph Nodes
- What is the drainage site for lymph from the Tail of the breast? Posterior (Scapular) Lymph Nodes
- Where does the lymph drain in case of web space infection following a laceration of the right thumb? Infraclavicular Lymph Nodes

12. BLOOD SUPPLY OF UPPER LIMB

A 30-year-old patient arrives at the emergency room with a deep laceration on their hand that is bleeding profusely. The laceration runs parallel to the transverse crease of the hand and is located on the palm side. The patient is in significant distress due to the bleeding. Where should compression be applied to stop the bleeding?

A. At the wrist, just above the hand laceration
B. At the level of the metacarpals near the injury site
C. At the level of the brachial artery against the humerus ✓
D. At the elbow, proxwimal to the injury site
E. At the forearm,proximal to the injury site

EXPLANATION:

ARTERIAL SUPPLY

AXILLARY ARTERY:

The axillary artery begins at the lateral border of the 1st rib as a continuation of the subclavian and ends at the lower border of the teres major muscle, where it continues as the brachial artery. Throughout its course, the artery is closely related to the cords of the brachial plexus and their branches and is enclosed with them in a connective tissue sheath called the axillary sheath. If this sheath is traced upward into the root of the neck, it is seen to be continuous with the prevertebral fascia (deep cervical fascia). Because the axillary sheath encloses the axillary vessels and the brachial plexus, a brachial plexus nerve block can easily be obtained. The pectoralis minor muscle crosses in front of the axillary artery and divides it into three parts:

1st part:

- Superior Thoracic artery

2nd part:

- Thoracoacromial artery (Four branches APCD: acromial, pectoralis, clavicular and deltoid)
- Lateral thoracic artery

3rd part:

- Subscapular artery (largest branch): Two branches - Thoracodorsal and circumflex scapular
- Anterior humeral circumflex artery: Blood supply to humeral head: arcuate artery lateral to bicipital groove
- Posterior humeral circumflex artery: Branch in the quadrangular space accompanying the axillary nerve
- Brachial Artery

BRACHIAL ARTERY:

The brachial artery begins at the lower border of teres major as a continuation of the axillary artery. It descends through the anterior compartment of the arm on the brachialis muscle, The brachial artery is superficial and is overlapped from the lateral side by the coracobrachialis and the biceps. Profunda artery, which is a large branch that follows the radial nerve into the posterior compartment of the arm (in the spiral groove). It ends at the level of the neck of the radius in the cubital fossa by dividing into the radial and the ulnar arteries.

Radial Artery:

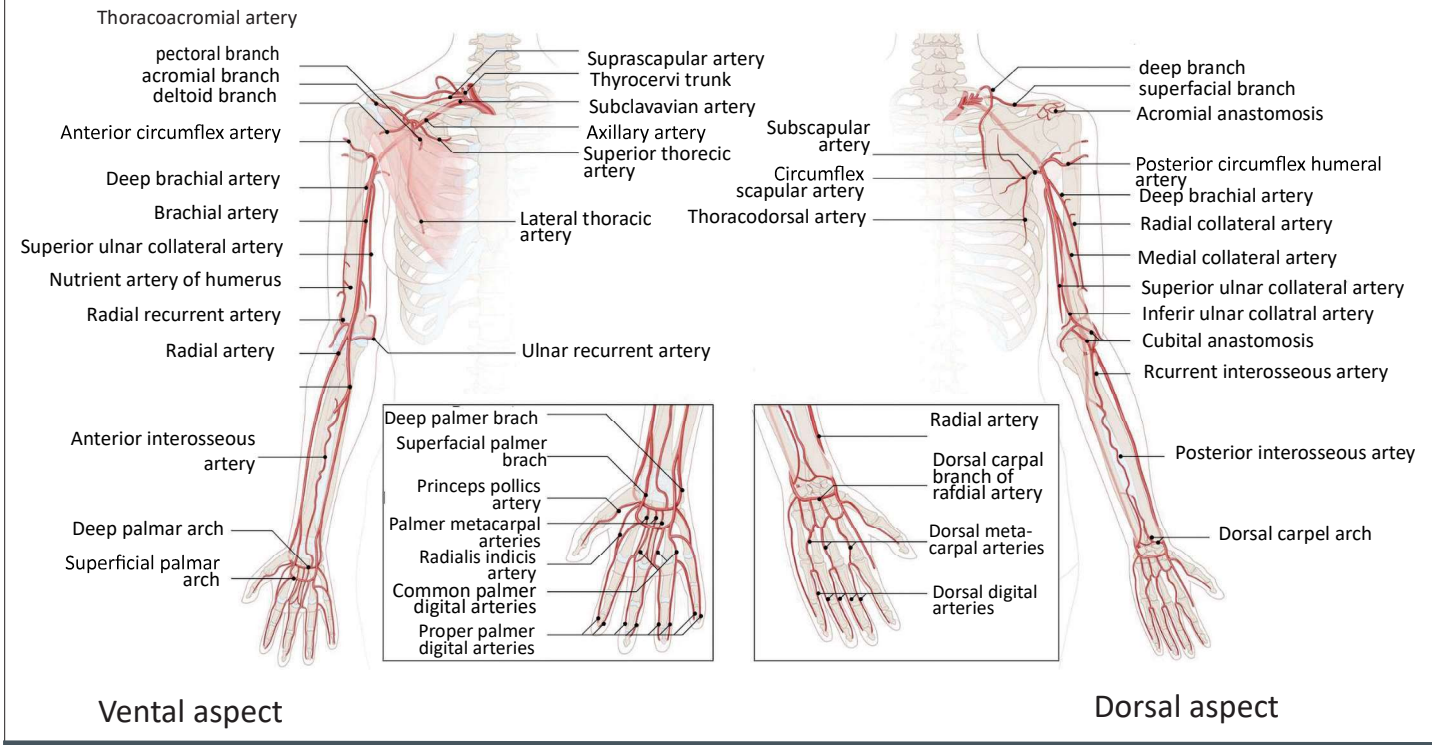
- The radial artery is the smaller of the two terminal branches of the brachial artery. It descends through the anterior and the lateral compartments of the forearm and lies superficially throughout most of its course. In the middle third of its course, the radial nerve lies on its lateral side. At the wrist, the artery winds backward around the lateral side of the carpus to the proximal end of the space between the first and second metacarpal bones, where it passes

anteriorly into the palm between the two heads of the first dorsal interosseous muscle and joins the deep branch of the ulnar artery, thus forming the deep palmar arch. Superficial palmar branch, which arises just above the wrist, enters the palm, and frequently joins the ulnar artery to form the superficial palmar arch.

- In the lower part of the forearm, the radial artery lies on the anterior surface of the radius and is covered only by skin and fascia. Here, the artery has the tendon of the bra-chioradialis on its lateral side and the tendon of the flexor carpi radialis on its medial side (the site for taking a radial pulse).

Ulnar Artery:

- The ulnar artery is the larger of the two terminal branches of the brachial artery. It descends through the anterior compartment of the forearm and enters the palm in front of the flexor retinaculum in company with the ulnar nerve. It ends by forming the superficial palmar arch, often anastomosing with the superficial palmar branch of the radial artery
- In the upper part of its course, the ulnar artery lies deep to the flexor muscles. Below, it becomes superficial and lies between the tendons of the flexor carpi ulnaris and the tendons of the flexor digitorum superficialis. In front of the flexor retinaculum, it lies just lateral to the pisiform bone and is covered only by skin and fascia (the site for taking an ulnar pulse).
- Common interosseous artery, which arises from the upper part of the ulnar artery and divides into the anterior and the posterior interosseous arteries. These arteries descend on the anterior and the posterior surfaces of the interosseous membrane, respectively.



Blood Supply of Upper Limb

SUPERFICIAL PALMAR ARCH:

- The superficial palmar arch lies just beneath the palmar aponeurosis on the long flexor tendons (Fig.1.18). It is a continuation of the ulnarartery, and it is often completed on the lateral side by the superficial palmar branch of the radial artery.

DEEP PALMAR ARCH:

- The deep palmar arch is deeply placed in the palm, and it extends from the proximal end of the space between the first and second metacarpal bones to the base of the fifth metacarpal bone. It is formed as a continuation of the radial artery, and it terminates by anastomosing with the deep branch of the ulnar artery.

VENOUS DRAINAGE