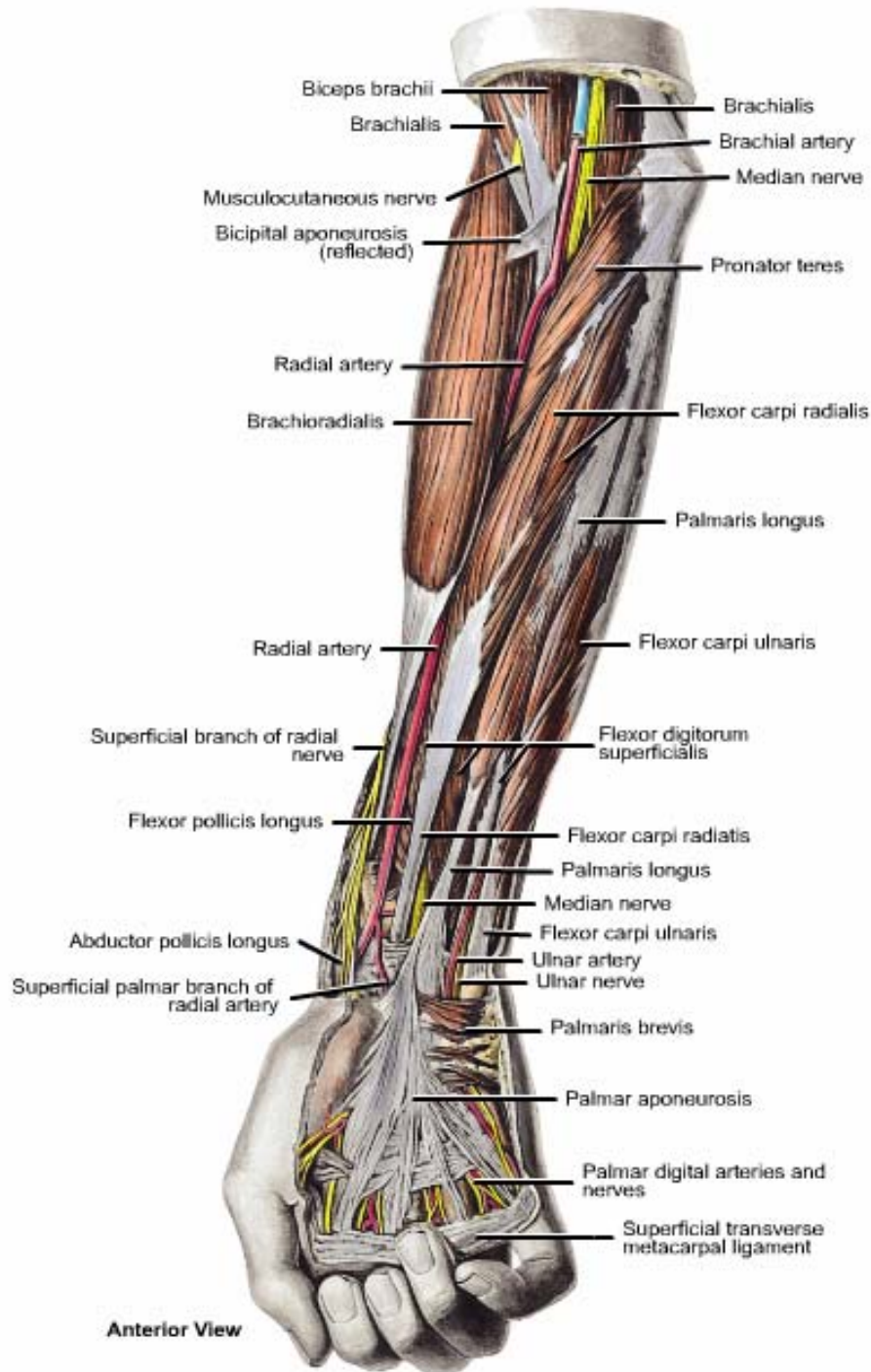


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FOREARM



Anterior View

Objectives

- **Cutaneous innervation.**
- **Superficial veins.**
- **Fascial compartments:**
 - Anterior (flexor) compartment and its contents (muscles, vessels and nerves).
 - Posterior (extensor) compartment and its contents (muscles, vessels and nerves).

Cutaneous innervation

- **Lateral cutaneous nerve of the forearm**
the continuation of the musculocutaneous nerve, supplies the lateral side of the forearm.
- **Medial Cutaneous nerve of the forearm**
from the medial cord of brachial plexus and supplies the medial side of the forearm.
- **Posterior cutaneous nerve of the forearm**
from the radial nerve and supplies the posterior aspect of the forearm.

Superficial veins of the forearm

1. **Cephalic vein**: arises from the lateral side of the dorsal venous arch on the back of the hand. As it ascends, it turns to the anterior aspect of the forearm till it reach the roof of the cubital fossa. It ascends on the lateral side of the arm and ends by piercing the clavipectoral fascia to join the axillary vein.
2. **Basilic vein**: arises from the medial side of the dorsal venous arch on the back of the hand. As it ascends, it turns to the anterior aspect of the forearm till it reach the roof of the cubital fossa and runs on the medial side of the arm till its middle then pierces the deep fascia to join the 2 venae comitantes of the brachial artery to form the axillary artery.
3. **Medial cubital vein**: communicates the cephalic and basilic veins on the roof of the cubital fossa. It is separated from the brachial artery and median nerve by the bicipital aponeurosis.

ANTERIOR (FLEXOR)

COMPARTMENT

Contents

1. Muscles:

A. *Superficial Layer:* (1) Pronator teres, (2) flexor carpi radialis, (3) palmaris longus, (4) flexor digitorum superficialis and (5) flexor carpi ulnaris.

B. *Deep Layer:* (1) Flexor pollicis longus, (2) flexor digitorum profundus and (3) pronator quadratus.

2. Nerves: Median and ulnar nerves and their branches.

3. Blood vessels: Ulnar and radial arteries and their venae comitantes.

Pronator teres

➤ Origin:

1. Humeral head: from the medial epicondyle of the humerus (common flexor origin).
2. Ulnar head: from the medial border of the coronoid process of the ulna.

➤ Insertion:

- Into the **pronator tuberosity** on the lateral surface of the middle part of the shaft of the radius.

➤ Nerve Supply:

From the median nerve.

➤ Action:

1. Pronation of the forearm at the radio-ulnar joints.
2. Flexion of the forearm at the elbow joint.

Flexor carpi radialis

➤ Origin:

- From the medial epicondyle of the humerus (common flexor origin).

➤ Insertion:

- Into palmar surface of the **bases** of the 2nd and 3rd metacarpal bones.

➤ Nerve Supply:

From the median nerve.

➤ Action:

1. Flexion of the hand at the wrist joint.
2. Abduction of the hand at the wrist joint.

Palmaris longus

➤ Origin:

- From the medial epicondyle of the humerus (common flexor origin).

➤ Insertion:

- Into the palmar aponeurosis and flexor retinaculum.

➤ Nerve Supply:

- From the median nerve.

➤ Action:

- Flexion of the hand at the wrist joint.

Flexor digitorum superficialis

➤ Origin:

1. Humero-ulnar head: from the medial epicondyle of the humerus (common flexor origin) and from the medial border of the coronoid process of the ulna.
2. Radial head: from the oblique line on the anterior surface of the shaft of the radius.

➤ Insertion:

- Its tendon divides into 4 tendons which are inserted into the sides of the middle phalanges of the medial 4 fingers.

➤ Nerve Supply:

- From the median nerve.

➤ Action:

1. Flexion of the proximal interphalangeal joints and metacarpophalangeal joints of the medial 4 fingers.
2. Helps of flexion of the hand at the wrist joint.

Flexor carpi ulnaris

➤ Origin:

1. Humeral head: from the medial epicondyle of the humerus (common flexor origin).
2. Ulnar head: from the medial aspect of the olecranon process and form the posterior border of the shaft of the ulna.

➤ Insertion:

- Into the pisiform, hook of hamate and base of the 5th metacarpal bone.

➤ Nerve Supply:

- From the **ULNAR** nerve.

➤ Action:

1. Flexion of the hand at the wrist joint.
2. Adduction of the hand at the wrist joint.

Flexor pollicis longus

➤ Origin:

- From the anterior surface of the middle of the shaft of the radius and adjoining part of the interosseus membrane.

➤ Insertion:

- Into the palmar surface of the base of the distal phalanx of the thumb.

➤ Nerve Supply:

- From the anterior interosseus nerve (branch of the median nerve).

➤ Action:

- Flexion of the thumb.

Flexor digitorum profundus

➤ Origin:

- From the upper $\frac{3}{4}$ of the anterior surface of the shaft of the ulna and adjoining part of the interosseus membrane.

➤ Insertion:

- The muscle divides into 4 tendons which pierce the tendons of the flexor digitorum superficialis and are inserted into the bases of the distal phalanges of the medial 4 fingers.

➤ Nerve Supply:

- **Its lateral half:** from the anterior interosseus nerve (branch of the median nerve).
- **Its medial half:** from the ulnar nerve.

➤ Action:

1. Flexion of the distal interphalangeal joints of the medial 4 fingers.
2. Helps in flexion of the proximal interphalangeal joints and metacarpophalangeal joints of the medial 4 fingers.
3. Helps of flexion of the hand at the wrist joint.

Pronator quadratus

➤ Origin:

- From the lower $\frac{1}{4}$ of the anterior surface of the shaft of the ulna.

➤ Insertion:

- Into the lower $\frac{1}{4}$ of the anterior surface of the shaft of the radius.

➤ Nerve Supply:

- From the anterior interosseus nerve (branch of the median nerve).

➤ Action:

- Pronation of the forearm at the radio-ulnar joints.

Ulnar artery

- **Beginning:** in the cubital fossa, at the level of the neck of the radius, as the larger of the 2 terminal branches of the brachial artery.
- **Course:**
 - ✓ The upper 1/3 descends downward and medially between the superficial and deep muscle layers.
 - ✓ The middle 1/3 descends vertically behind the flexor carpi ulnaris.
 - ✓ The lower 1/3 descends vertically covered by skin and fascia only, between tendons of flexor carpi ulnaris and flexor digitorum superficialis.
 - ✓ It enters the hand superficial to the flexor retinaculum, lateral to the pisiform bone.
- **End:** in the hand forming the superficial palmar arch.

Branches of the ulnar artery

1. **Muscular branches** to the surrounding muscles.
2. **Anterior ulnar recurrent** (anastomosis around elbow).
3. **Posterior ulnar recurrent** (anastomosis around elbow).
4. **Common interosseus artery** arises near the origin of the ulnar artery, and divides into:
 - A. **Anterior interosseus artery** supplies the deep flexor muscles, gives nutrient arteries to radius and ulna. It shares in anastomosis around wrist joint. Before the pronator quadratus, it pierces the interosseus membrane and continues in the extensor compartment.
 - B. **Posterior interosseus artery** gives **interosseus recurrent branch**, supplies the deep extensor muscles and shares in anastomosis around wrist jt.

Radial artery

- **Beginning:** in the cubital fossa, at the level of the neck of the radius, as the smaller of the 2 terminal branches of the brachial artery.
- **Course:**
 - ✓ The upper 1/3 descends downward and laterally behind the brachioradialis muscle.
 - ✓ The middle 1/3 descends vertically with the radial nerve on its lateral side.
 - ✓ The lower 1/3 descends vertically resting on the radius and covered by skin and fascia only, between tendons of brachioradialis (laterally) and flexor carpi radialis (medially).
- **End:** It enters the hand by winding around the wrist joint to enter the anatomical snuff box.

Branches of the radial artery

1. **Muscular branches** to the surrounding muscles.
2. **Radial recurrent artery** (anastomosis around elbow).
3. **Anastomosing branches** (around the wrist joint).
4. **Superficial palmar branch** arises just above the wrist and joint the end of the ulnar artery to form the superficial palmar arch.

Median nerve

➤ Course:

- In the cubital fossa, it runs on the medial side of the brachial artery.
- It descends between the 2 head of pronator teres and runs between flexor digitorum superficialis and profundus.
- It lower part, emerges from the lateral side of the flexor digitorum superficialis and becomes superficial (or covered by palmaris longus tendon).
- It enters the hand deep to the flexor retinaculum.

Median nerve

➤ Branches:

- 1. Muscular branches:** to pronator teres, flexor carpi radialis, palmaris longus and flexor digitorum superficialis.
- 2. Articular branches:** to the elbow joint.
- 3. Anterior interosseous nerve.**
- 4. Palmar cutaneous branches:** passes superficial to the flexor retinaculum and supplies skin of the lateral 2/3 of the palm.

Anterior interosseus nerve

- **Origin:** from the median nerve as it emerges between the 2 heads of the pronator teres.
- **Course:** It descends on the interosseus membrane (with the anterior interosseus artery) between the flexor pollicis longus and flexor digitorum profundus.
- **End:** the nerve ends on the anterior surface of the carpal bones.
- **Branches:**
 1. **Muscular branches** to flexor pollicis longus, pronator quadratus and the lateral half of flexor digitorum profundus.
 2. **Articular branches** to wrist, inferior radio-ulnar and intercarpal joints.

Ulnar nerve

➤ Course:

- It passes behind the medial epicondyle of the humerus, then crosses the medial collateral ligament of the elbow joint.
- It enters the anterior compartment of the forearm by passing between the 2 heads of flexor carpi ulnaris.
- It then descends vertically between the flexor carpi ulnaris and flexor digitorum profundus.
- It runs on the medial side of the ulnar artery.
- At the wrist, it becomes superficial, between the tendons of flexor carpi ulnaris and flexor digitorum superficialis.
- It enters the hand by passing superficial to the flexor retinaculum, between the pisiform (medially) and ulnar artery (laterally).

Ulnar nerve

➤ Branches:

- 1. Muscular branches:** to flexor carpi ulnaris and medial half of flexor digitorum profundus muscles.
- 2. Articular branches:** to the elbow joint.
- 3. Palmar cutaneous branches:** passes superficial to the flexor retinaculum and supplies skin of the medial 1/3 of the palm.
- 4. Dorsal cutaneous branches:** it supplies the skin of the medial 1/3 of the dorsal surface of the hand and the dorsal surface of the medial 1.5 fingers (except nail beds).

THANK YOU