MEDICAL EDUCATION RESOURCE

Arteries of the Hand

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Overview

- The hand is richly supplied by **two main arteries**:
    1. **Ulnar artery** – forms the **superficial palmar arch** (main contributor).
    2. **Radial artery** – forms the **deep palmar arch** (main contributor).
- These arteries ensure a **rich collateral circulation**, providing constant blood flow during gripping or finger movements.

1. Ulnar Artery

Course

- Enters the hand **anterior to the flexor retinaculum**, **lateral to pisiform bone**, within the **ulnar (Guyon's) canal**.
- Curves laterally across the palm, **deep to palmar aponeurosis but superficial to flexor tendons**, forming the **superficial palmar arch**.
- Terminates by anastomosing with the **superficial palmar branch of the radial artery**.

Branches

A. Superficial Palmar Arch

- Main terminal branch of ulnar artery.
- Curves across the palm, **convex toward fingers**.
- Gives off **three common palmar digital arteries**, which divide into **proper digital arteries** supplying adjacent sides of medial four fingers.
- Each proper digital artery runs along the side of a finger to the tip.

B. Deep Branch

- Pierces the hypothenar muscles ? joins **deep palmar arch** (branch of radial artery).

C. Muscular Branches

- Supply hypothenar muscles and palmar fascia.

D. Palmar Digital Branch (of Ulnar Artery)

- Supplies **medial side of little finger** directly.

Relations

- **Superficial:** Palmaris brevis, palmar aponeurosis.

- **Deep:** Flexor tendons and lumbricals.
- **Lateral:** Hook of hamate.
- **Medial:** Ulnar nerve (in Guyon's canal).

Clinical Anatomy – Ulnar Artery

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1. Superficial Palmar Arch Variation

- In 1/3 cases, arch is **incomplete** ? radial artery fails to join ? danger in surgical procedures.
- Always confirm hand circulation with **Allen's test** before cannulation or grafting.

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2. Ulnar Artery Thrombosis (Hypothenar Hammer Syndrome)

- Seen in manual laborers using palm to strike objects (hammering).
- Leads to **ischemia of digits** due to arterial trauma and thrombosis.

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3. Ulnar Pulse

- Felt **lateral to pisiform bone** in wrist region (though weaker than radial pulse).

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4. Surgical Note

- In vascular reconstructive procedures (e.g., coronary bypass), **radial artery** is preferred over ulnar because ulnar is dominant in palmar circulation.

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2. Radial Artery

Course

1. Winds around the **lateral aspect of wrist** ? through **anatomical snuffbox**.
2. Pierces the **first dorsal interosseous muscle** to enter the palm.
3. Turns medially between the **oblique and transverse heads of adductor pollicis**, forming the **deep palmar arch** with the **deep branch of the ulnar artery**.

Branches

A. Superficial Palmar Branch

- Arises before the artery passes to dorsum; joins the **ulnar artery** to complete the **superficial palmar arch**.

B. Dorsal Carpal Branch

- Contributes to **dorsal carpal arch**, supplying dorsum of hand.

C. Dorsal Digital Artery of Thumb

- Small artery to dorsal surface of thumb.

D. Princeps Pollicis Artery

- Major artery to the thumb; runs along its palmar aspect to the tip.

E. Radialis Indicis Artery

- Supplies **lateral side of index finger**.

F. Deep Palmar Arch

- Continuation of radial artery ? curves medially across palm.
- Lies **deep to long flexor tendons**, resting on bases of metacarpals and interossei.
- Gives **palmar metacarpal arteries** that join common palmar digital arteries of superficial arch.

Relations

- **In anatomical snuffbox:** lies on scaphoid and trapezium bones.
- **In palm:** deep to adductor pollicis; accompanied by deep branch of ulnar nerve.
- **Superficial branch** communicates with ulnar artery.

Clinical Anatomy – Radial Artery

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1. Radial Pulse

- Felt at the wrist **lateral to flexor carpi radialis tendon** — routine site for pulse measurement.

2. Radial Artery Cannulation

- Common site for **arterial blood gas sampling** and **hemodynamic monitoring**.
- **Allen's test** performed to confirm collateral ulnar supply before cannulation.

3. Scaphoid Fracture

- The **radial artery** crosses the **scaphoid bone** ? fracture may cause **avascular necrosis** of proximal fragment.

4. Deep Palmar Arch Laceration

- Severe bleeding in deep hand wounds; must be controlled by **compressing radial artery** in anatomical snuffbox.

5. Radial Artery Graft

- Frequently harvested for **coronary artery bypass surgery** — strong and muscular wall.

Dissection of Arteries of Hand

Steps

1. Reflect the **palmar aponeurosis** to reveal superficial structures.
2. Identify **ulnar artery** entering the palm lateral to pisiform ? trace its superficial arch across palm.
    - Observe **common and proper digital branches**.
3. Locate **radial artery** in **anatomical snuffbox** ? follow it through first dorsal interosseous into palm.

4. Deeply, identify **deep palmar arch** and its **palmar metacarpal branches**.

5. Preserve associated **ulnar and radial nerves**, as they accompany the arches.

6. Demonstrate **anastomosis** between superficial and deep arches.