

Intrinsic Muscles of the Hand

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Overview

- The **intrinsic muscles** are those **confined entirely within the hand**, acting on digits for **fine motor control**.
- They allow **precision grip**, **opposition**, and **delicate movements** of the thumb and fingers.
- Classified into **five groups**:
 1. **Thenar muscles** (thumb)
 2. **Hypothenar muscles** (little finger)
 3. **Lumbricals**
 4. **Interossei** (palmar and dorsal)
 5. **Adductor pollicis**

1. Thenar Muscles

? **Mnemonic:** *“All Oppose, Flex, and Abduct the Thumb”*

A. Abductor Pollicis Brevis

- **Origin:** Flexor retinaculum, scaphoid, and trapezium.
 - **Insertion:** Base of proximal phalanx of thumb.
 - **Nerve Supply:** Recurrent branch of **median nerve** (C8, T1).
 - **Action:** Abducts thumb at CMC and MCP joints.
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B. Flexor Pollicis Brevis

- **Origin:** Flexor retinaculum and trapezium.
 - **Insertion:** Base of proximal phalanx of thumb.
 - **Nerve Supply:** Superficial head ? Median nerve; Deep head ? Ulnar nerve.
 - **Action:** Flexes thumb at MCP joint.
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C. Opponens Pollicis

- **Origin:** Flexor retinaculum and trapezium.
 - **Insertion:** Lateral border and shaft of 1st metacarpal.
 - **Nerve Supply:** Median nerve.
 - **Action:** **Opposition** of thumb – brings tip across to meet fingers.
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D. Adductor Pollicis

- **Origin:**

- Oblique head ? Bases of 2nd & 3rd metacarpals, capitate.
- Transverse head ? Shaft of 3rd metacarpal.
- **Insertion:** Medial base of proximal phalanx of thumb.
- **Nerve Supply:** Deep branch of ulnar nerve.
- **Action:** Adducts thumb toward palm.

2. Hypothenar Muscles

? **Mnemonic:** “All Little Fingers Act Opposite to Thumb”

A. Abductor Digiti Minimi

- **Origin:** Pisiform bone.
- **Insertion:** Base of proximal phalanx of little finger.
- **Nerve Supply:** Deep branch of ulnar nerve.
- **Action:** Abducts little finger.

B. Flexor Digiti Minimi Brevis

- **Origin:** Hook of hamate and flexor retinaculum.
- **Insertion:** Base of proximal phalanx of little finger.
- **Nerve Supply:** Deep branch of ulnar nerve.

- **Action:** Flexes little finger at MCP joint.
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C. Opponens Digiti Minimi

- **Origin:** Hook of hamate and flexor retinaculum.
 - **Insertion:** Medial border of 5th metacarpal.
 - **Nerve Supply:** Deep branch of ulnar nerve.
 - **Action:** Draws 5th metacarpal anteriorly ? opposes little finger toward thumb.
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3. Lumbricals

Origin

- From tendons of **flexor digitorum profundus**.
 - **Lateral two (1st and 2nd):** From lateral two tendons (unipennate).
 - **Medial two (3rd and 4th):** From medial two tendons (bipennate).

Insertion

- Lateral side of **extensor expansion** of corresponding fingers.

Nerve Supply

- 1st and 2nd ? Median nerve.
- 3rd and 4th ? Deep branch of ulnar nerve.

Action

- **Flex MCP joints** and **extend IP joints** of fingers (writing position).

4. Interossei

A. Palmar Interossei (3 muscles)

? **Mnemonic:** “*PAD – Palmar ADduct*”

- **Origin:** From shafts of 2nd, 4th, and 5th metacarpals.
- **Insertion:** Bases of proximal phalanges and extensor expansions of same digits.
- **Nerve Supply:** Deep branch of ulnar nerve.
- **Action:** Adduct fingers toward midline (3rd finger).

B. Dorsal Interossei (4 muscles)

? **Mnemonic:** “*DAB – Dorsal ABduct*”

- **Origin:** From adjacent sides of metacarpals.
- **Insertion:** Bases of proximal phalanges and extensor expansions of 2nd–4th digits.
- **Nerve Supply:** Deep branch of ulnar nerve.
- **Action:** Abduct fingers from midline (3rd finger).

Testing of Some Intrinsic Muscles

1. Abductor Pollicis Brevis

- Ask patient to lift thumb perpendicular to palm (as in hitchhiking).
 - Weakness ? **median nerve lesion (carpal tunnel)**.
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2. Adductor Pollicis

- Place a paper between thumb and index; patient asked to hold it while examiner pulls.
 - If thumb flexes at IP joint ? **Froment's sign positive** ? *ulnar nerve palsy*.
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3. Lumbricals

- Ask patient to flex MCP joints while keeping IP joints extended ("writing position").
 - Inability ? *ulnar or median nerve lesion*.
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4. Interossei

- **Palmar interossei test:** Ask to hold a paper between fingers ? slipping indicates paralysis.
 - **Dorsal interossei test:** Ask to spread fingers apart and resist pressure.
 - Weakness ? *ulnar nerve injury*.
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5. Opponens Pollicis

- Ask patient to touch thumb to little finger tip.
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- Inability ? *median nerve injury (ape-hand deformity)*.

Dissection of Intrinsic Muscles of Hand

Steps

1. Reflect the **palmar aponeurosis** after exposing flexor tendons.
2. Identify **thenar muscles** on radial side:
 - Abductor pollicis brevis (superficial)
 - Flexor pollicis brevis
 - Opponens pollicis (deep)
 - Adductor pollicis (deep, near 1st dorsal interosseous)
3. On ulnar side, identify **hypothenar muscles**:
 - Abductor digiti minimi (superficial)
 - Flexor digiti minimi brevis
 - Opponens digiti minimi (deep)
4. Expose **lumbricals** arising from FDP tendons and entering extensor expansions.
5. Deep to these, reveal **palmar and dorsal interossei** between metacarpals.
6. Preserve **ulnar and median nerves**, and **superficial/deep palmar arches**.