NEEDLE
ELECTROMYOGRAPHIC
TESTING

UPPER EXTREMITY
Median and Ulnar Innervated Muscles

Sequencing of the EMG Exam

• Prepare the patient with:
  – A verbal explanation
  – Skin preparation
  – Placement of surface electrodes

• Prepare yourself:
  – Plan your exam and muscle testing sequence
  – Wear gloves and eyeware
  – Be careful of the EMG needle
Things to Think About

• Location of muscle
• Action of muscle
• What action will you resist
• Isometric contraction
• Other muscles in the area
• Hazards
• Patient comfort

Median Motor Innervation

- Pronator teres C6-7
- Flexor carpi radialis C6-7
- Palmaris longus C7-T1
- Flex. digit. sup. C7-T1
- Flex. digit. prof. C7-8
- Flex. pol. longus C7-8
- Pronator quadratus C7-8
- Flex. pol. brevis C8-T1
- Opponens pol. C8-T1
- Abd. pol. brevis C8-T1
- I lumbrical C8-T1
- II lumbrical C8-T1
PRONATOR TERES

Origin of humeral head: Immediately above medial epicondyle of humerus, common flexor tendon, and deep antebrachial fascia.

Origin of ulnar head: Medial side of coronoid process of ulna.

Insertion: Middle of lateral surface of radius.

Action: Pronates the forearm and assists in flexing the elbow joint.

Nerve: Median, C6, 7.
**Origin:** Medial side, anterior surface of distal one-fourth of ulna.

**Insertion:** Lateral side, anterior surface of distal one-fourth of radius.

**Action:** Pronates the forearm.

**Nerve:** Median, C7, 8, T1.
**Flexor Carpi Radialis**

*Origin:* Common flexor tendon from medial epicondyle of humerus, and deep antebrachial fascia. (Fascia indicated by parallel lines.)

*Insertion:* Base of second metacarpal bone and a slip to base of third metacarpal bone.

*Action:* Flexes and abducts the wrist, and may assist in pronation of the forearm and flexion of the elbow.

*Nerve:* Median, C6, 7, 8.
**Abductor Pollicis Brevis**

**Origin:** Flexor retinaculum, tubercle of trapezium bone, and tubercle of scaphoid bone.

**Insertion:** Base of proximal phalanx of thumb, radial side, and extensor expansion.

**Action:** Abducts the carpometacarpal and metacarpophalangeal joints of the thumb in a ventral direction perpendicular to the plane of the palm. By virtue of its attachment into the dorsal extensor expansion, extends the interphalangeal joint of the thumb. Assists in opposition, and may assist in flexion and medial rotation of the metacarpophalangeal joint.
Ulnar Motor Innervation

- Flex carpi ulnaris C8-T1
- Flex digit profund C8-T1
- Palmaris brevis C8-T1
- Abd digit min C8-T1
- Opp digit min C8-T1
- Lumbrical IV C8-T1
- Lumbrical III C8-T1
- Palmar interossei C8-T1
- Dorsal interossei C8-T1
- Flex pol brev (dh) C8-T1
- Add pol brev C8-T1
Abductor Digiti Minimi

Origin: Tendon of Flexor carpi ulnaris and pisiform bone.

Insertion: By two slips, one into base of proximal phalanx of little finger, ulnar side; the second, into the ulnar border of the extensor expansion.

Action: Abducts, assists in opposition, and may assist in flexion of the metacarpophalangeal joint of the little finger; and, by virtue of insertion into the extensor expansion, may assist in extension of interphalangeal joints.

Nerve: Ulnar, C(7), 8, T1.
Dorsal Interossei

Origins
First, lateral head: Proximal one-half of ulnar border of first metacarpal bone.
First, medial head: Radial border of second metacarpal bone.
Second, third, and fourth: Adjacent sides of metacarpal bones in each interspace.

Insertions
Into extensor expansion and to base of proximal phalanx as follows:
First: Radial side of index finger, chiefly to base of proximal phalanx.
Second: Radial side of middle finger.
Third: Ulnar side of middle finger, chiefly into extensor expansion.
Fourth: Ulnar side of ring finger.

Action: Abduct the index, middle, and ring fingers from the axial line through the third digit. Assist in flexion of metacarpophalangeal joints and extension of interphalangeal joints of the same fingers. The first assists in adduction of the thumb.

Nerve: Ulnar, C8, T1.
Flexor Digitorum Profundus

**Origin:** Anterior and medial surfaces of proximal three-fourths of ulna, interosseous membrane, and deep antebrachial fascia.

**Insertion:** By four tendons into bases of distal phalanges, anterior surface.

**Action:** Flexes distal interphalangeal joints of index, middle, ring, and little fingers, and assists in flexion of proximal interphalangeal and metacarpophalangeal joints; may assist in flexion of the wrist.

**Nerve to profundus I and II:** Median, C7, 8, T1.

**Nerve to profundus III and IV:** Ulnar, C7, 8, T1.
Flexor Carpi Ulnaris

**Origin of the humeral head:** Common flexor tendon from medial epicondyle of humerus.

**Origin of ulnar head:** By aponeurosis from the medial margin of olecranon, proximal two-thirds of posteri border of ulna, and from the deep antebrachial fascia.

**Insertion:** Pisiform bone and, by ligaments, to hamate and fifth metacarpal bones.

**Action:** Flexes and adducts the wrist, and may assist in flexion of the elbow.

**Nerve:** Ulnar, C7, 8, T1.