



GROSS ANATOMY: LE1 | TRANS 13

MUSCLES OF THE HAND

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OUTLINE

- I. Introduction
- II. Intrinsic Muscles of the Hand
 - A. Thenar Compartment
 - B. Adductor Compartment
 - C. Hypothenar Compartment
 - D. Central Compartment
 - E. Interosseous Compartment

LEARNING OBJECTIVES

At the end of the lecture, the student should be able to learn the anatomy of the muscles of the hand as to:

- ✓ Origin
- ✓ Insertion
- ✓ Action
- ✓ Innervation

INTRODUCTION

- highly mobile, functional, and strong
 - manual part of upper limb
 - rotate in space, the terms medial and lateral may be confusing
 - radial and ulnar are used
- abduction and adduction refer to moving of digits away from and toward the 3rd digit, respectively
- a major point of distinction between man non-human primates
 - essential for daily living, vocation, and recreation
 - adapt to read and speak
- palmar aspect refers to anterior surface of hand dorsal aspect refers to posterior surface

INTRINSIC MUSCLES OF THE HAND

- located in five compartments:
 - thenar compartment thenar muscles
 - adductor compartment adductor pollicis
 - hypothenar compartment hypothenar muscles
 - *central compartment*: short muscles of the hand (lumbricals) with the long flexor tendons
 - *interosseous compartments*: interossei between metacarpals

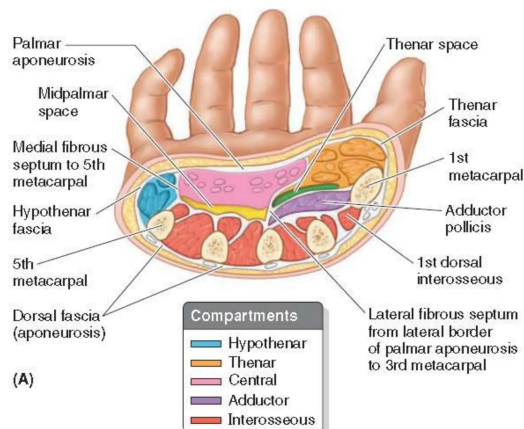


Figure 1. Hand Muscles

A. THENAR COMPARTMENT

- Form the thenar eminence; for opposition of the thumb
- From the volar radial surface of scaphoid and trapezium and flexor retinaculum
- Movement of thumb is important for precise activities
- High degree of range of motion
 - 1st metacarpal being independent
 - mobile joints at both ends
- extension, flexion, abduction and adduction occur at CMC and MCP joints
- opposition begins in the extended position
 - abduction and medial rotation at CMC joint of 1 metacarpal
 - flexion at the MCP joint
 - adductor pollicis and FPL reinforcement
 - increase the pressure exerted on the fingertips

OPPONENS POLLICIS

- quadrangular muscle deep to the APB and lateral to the FPB

ABDUCTOR POLLICIS BREVIS (APB)

- short abductor of thumb
- antero-lateral part of thenar eminence
- assists the opponens pollicis at start of opposition
 - rotates the proximal phalanx slightly medially

FLEXOR POLLICIS BREVIS (FPB)

- short flexor of thumb, medial to APB
- its two bellies are on opposite sides of FPL tendon
 - has a common tendon

CLINICAL SIGNIFICANCE

CARPAL TUNNEL SYNDROME

- Compression of the median nerve within the carpal tunnel leads to weakness, paresthesia, and eventual atrophy of the thenar muscles (particularly the opponens pollicis and abductor pollicis brevis).

RECURRENT BRANCH INJURY

- A superficial laceration to the base of the thenar eminence can cut the recurrent branch of the median nerve, resulting in loss of thumb opposition ("ape hand" deformity).

B. ADDUCTOR COMPARTMENT

ADDUCTOR POLLICIS

- fan-shaped; in the adductor compartment
- radial artery separates its two heads of origin as it enters the palm to form the deep palmar arch

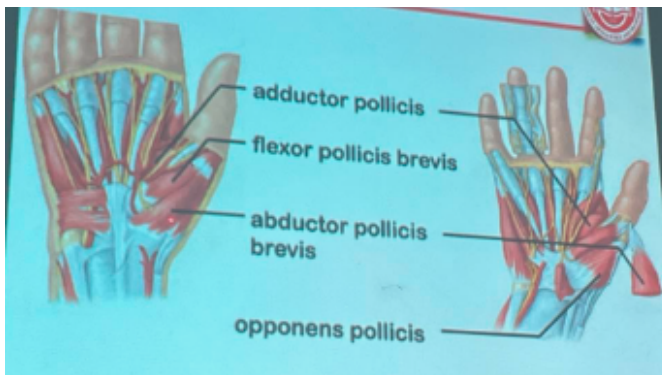


Figure 2. Thenar and Adductor Muscles

Table 1. MOINA				
MUSCLE	ORIGIN	INSERTION	INNERVAT ION	ACTION
THENAR MUSCLES				
Opponens pollicis	Flexor retinaculum and tubercles of scaphoid and trapezium	Lateral side of 1st metacarpal	Recurrent branch of median nerve (C8, T1)	Oppose thumb by drawing the 1st metacarpal medially to the center of palm and rotates it medially
Abductor pollicis brevis		Lateral side of base of proximal phalanx of thumb		Abducts thumb; helps oppose it
Flexor pollicis brevis				
Superficial head			Deep branch of ulnar nerve (C8, T1)	
Deep head				

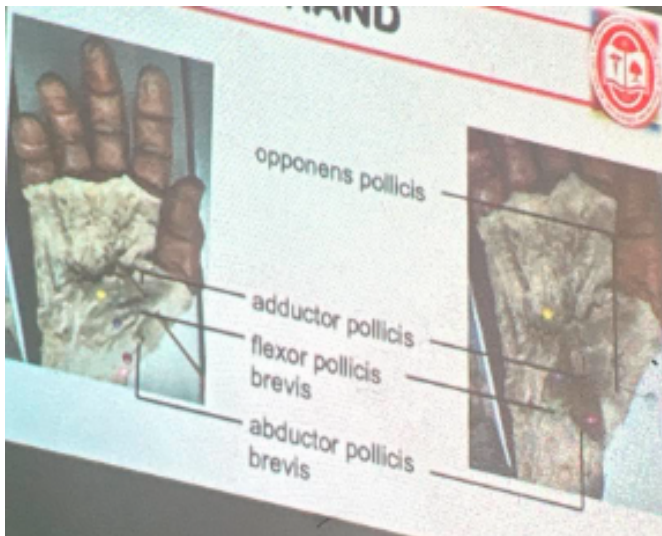


Figure 3. Thenar and Adductor Muscles

C. HYPOTHENAR MUSCLES

- form the medial hypothenar eminence
- moves the little finger
- the muscles are in the hypothenar compartment with the 5th metacarpal

ABDUCTOR DIGITI MINIMI

- the most superficial

FLEXOR DIGITI MINIMI

- lateral to abductor digiti minimi

OPPONENS DIGITI MINIMI

- acts exclusively at CMC joint
- quadrangular; deep to the abductor and flexor muscles of 5th digit

PALMARIS BREVIS

- not in the hypothenar compartment
- a small, thin muscle in the subcutaneous tissue
- wrinkles the skin of hypothenar eminence and deepens the hollow of the palm

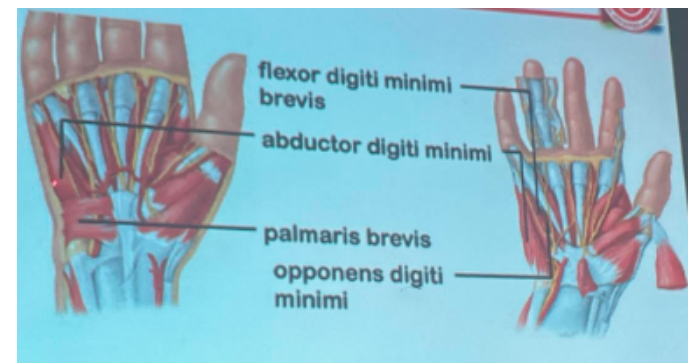


Figure 4. Hypothenar Muscles

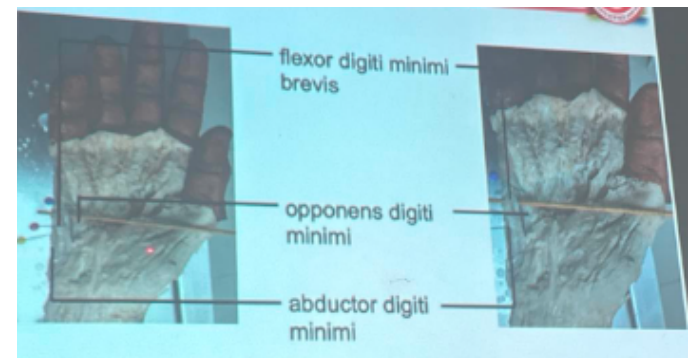


Figure 5. Hypothenar Muscles

D. CENTRAL COMPARTMENT

SHORT MUSCLES OF THE HAND

- lumbricals and interossei

LUMBRICALS

- four slender muscles named because of its worm-like form
 - originate from FDP tendon

E. INTEROSSEOUS COMPARTMENT

INTEROSSEI

- four dorsal interossei are between the metacarpals
- three palmar interossei on the palmar surfaces of metacarpals in the interosseous compartment

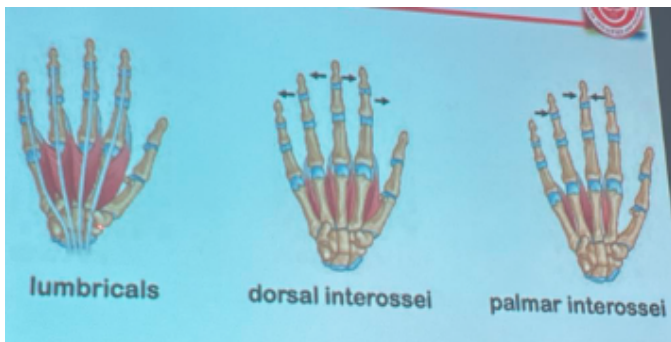


Figure 4. Central and Intertrousseous Compartment Muscles

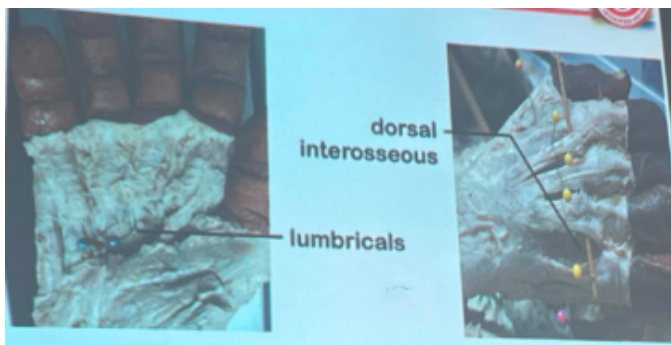


Figure 5. Central and Intertrousseous Compartment Muscles



Figure 6. RA of the Hand