

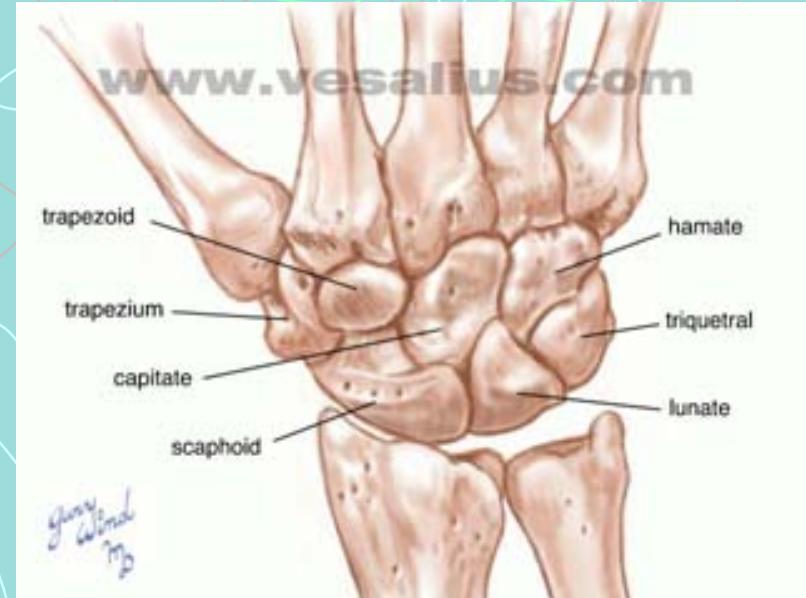
# Biomechanical Concepts of the Wrist and Hand

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**[www.fisioterapia.biz](http://www.fisioterapia.biz)**

# Wrist and Hand Bones

- Wrist
  - Scaphoid
  - Lunate
  - Triquetrum
  - Pisiform
  - Trapezium
  - Trapezoid
  - Capitate
  - Hamate





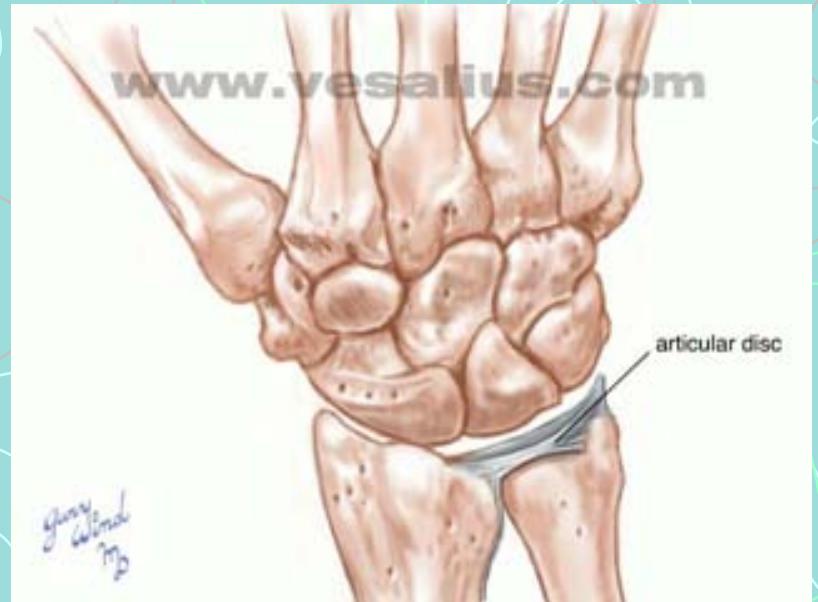
# Wrist and Hand Bones

- Hand
  - Metacarpals
  - Phalanges 2-5
    - Proximal
    - Middle
    - Distal
  - Phalange 1 (Thumb)
    - Proximal
    - Distal



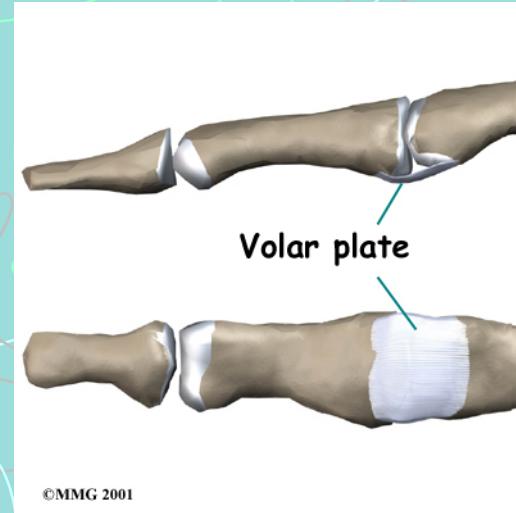


# Triangular Fibrocartilage Complex

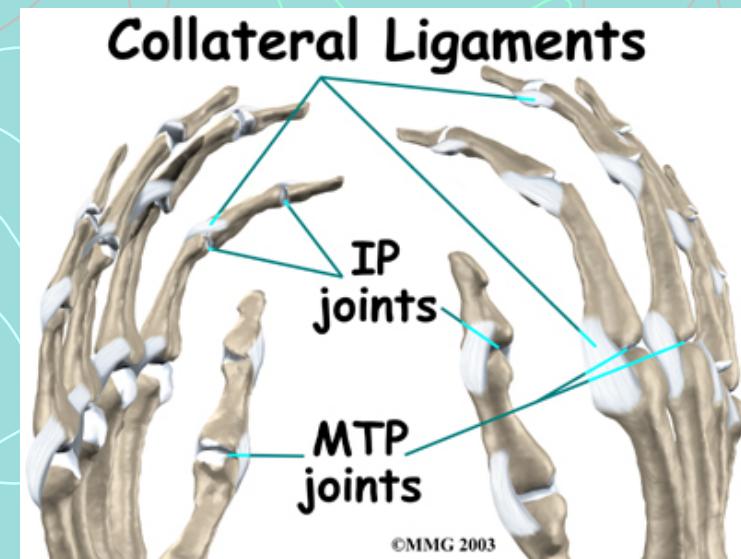


# Hand Ligaments

- Volar Plate
- Collateral Ligaments



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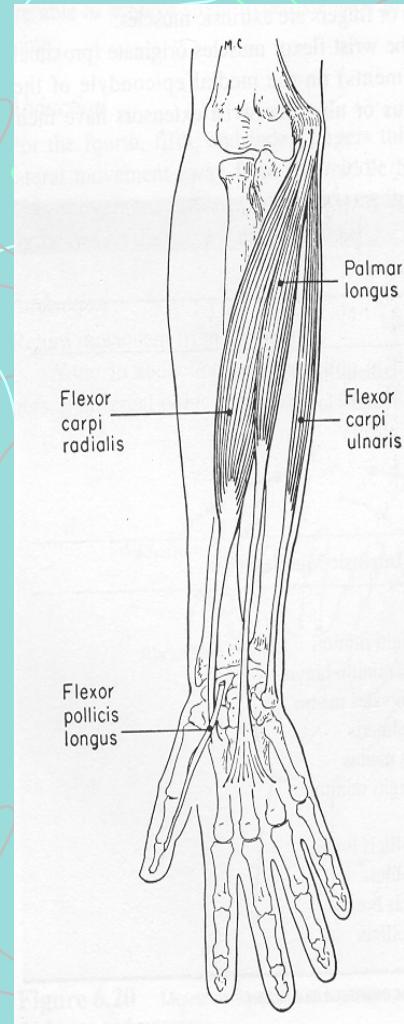


- CMC Joints
    - 2-5 glide
  - MCP Joints
    - 2 degrees of freedom
    - Index = 90
  - IP Joints
    - One degree of freedom
    - Index finger PIP = 100-110
    - 5<sup>th</sup> finger PIP = 135
- 5<sup>th</sup> finger = 110
- DIP = 80
- DIP = 90



# Wrist Musculature

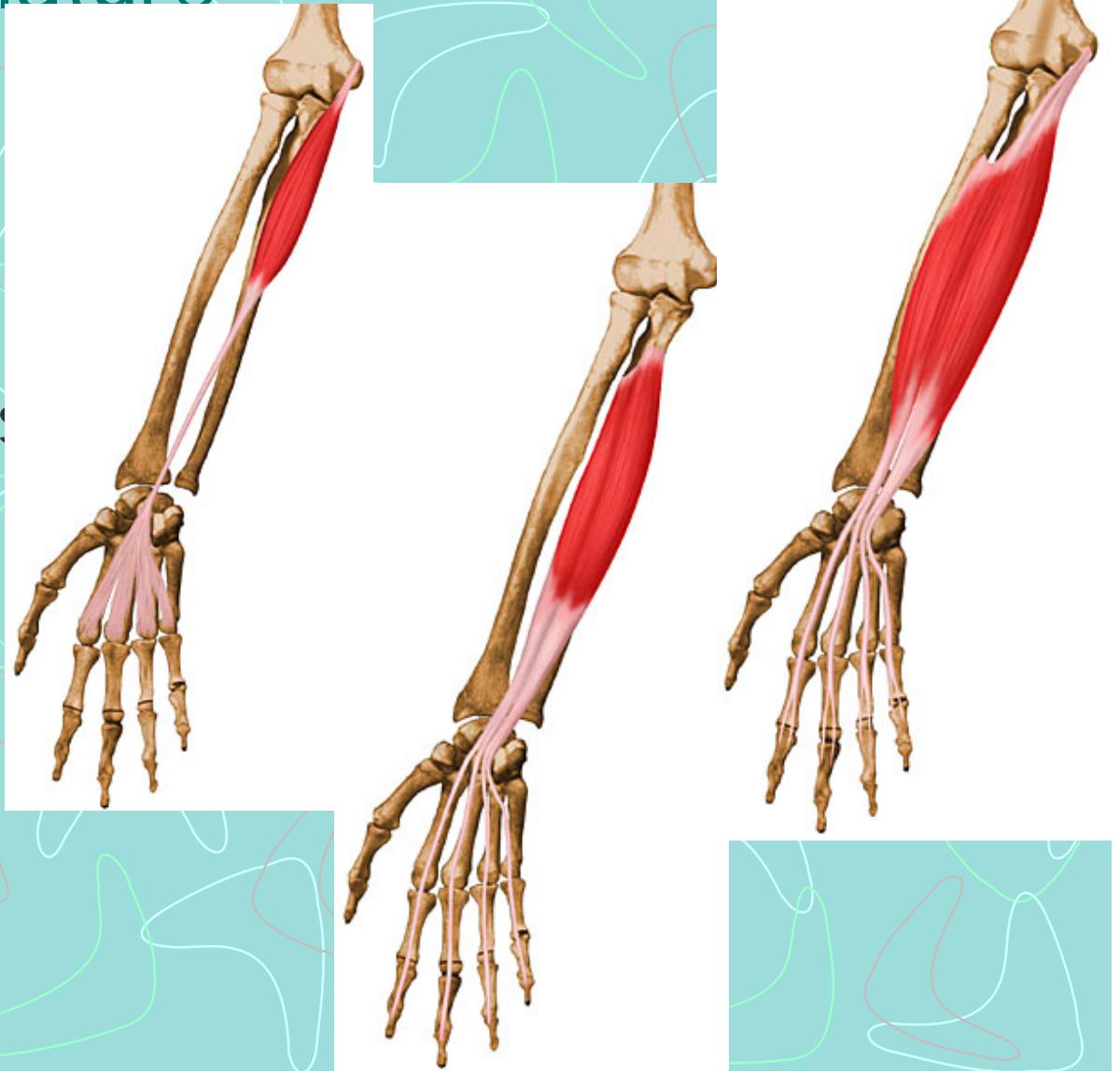
- Primary Wrist Flexors
  - Flexor Carpi Radialis
  - Flaxor Carpi Ulnaris
- Secondary Wrist Flexors
  - Palmaris Longus
  - Flexor Digitorum Profundus
  - Flexor Digitorum Profundus
  - Flexor Pollicus Longus





# Wrist Musculature

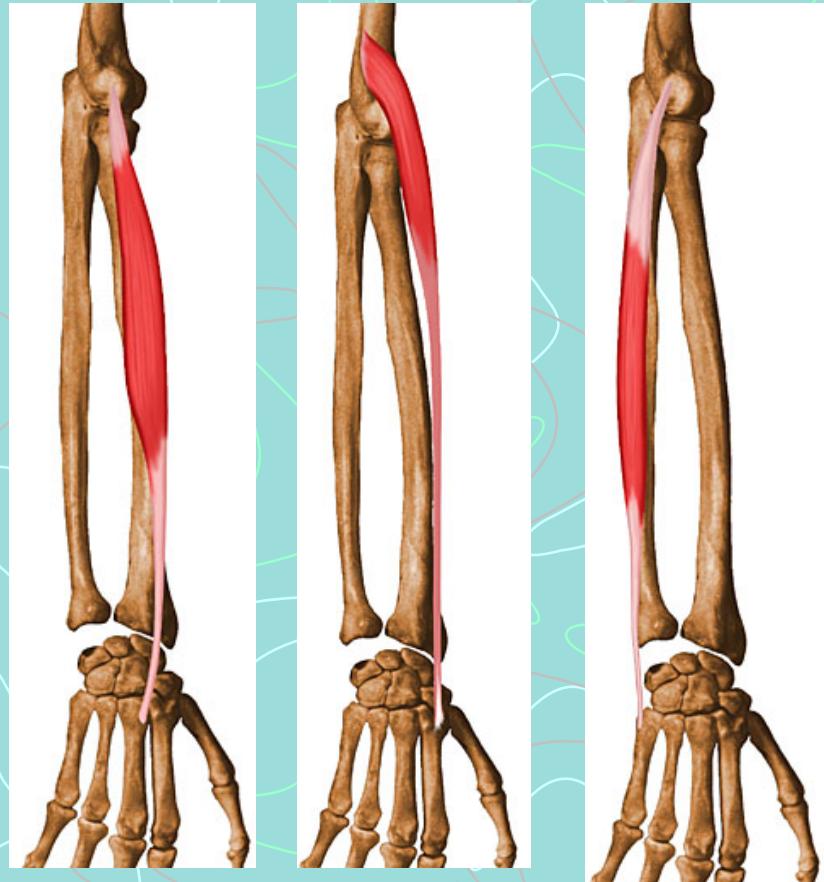
- Primary Wrist Flexors
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  - Flexor Pollicis Longus





# Wrist Musculature

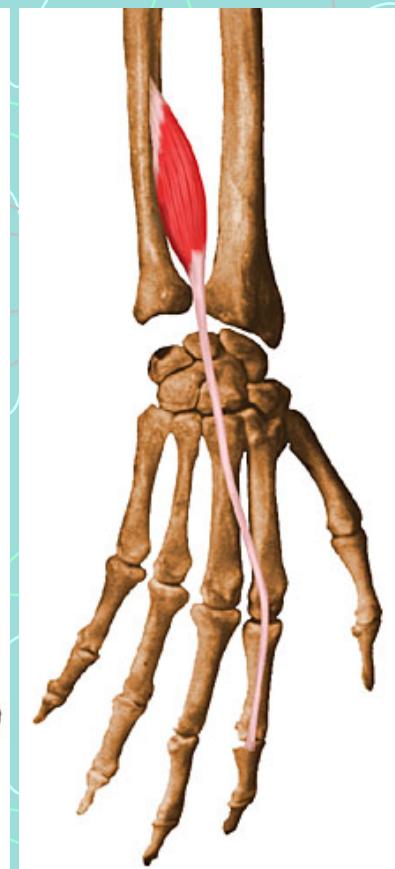
- Primary Wrist Extensors
  - Extensor Carpi Radialis Longus/Brevis
  - Extensor Carpi Ulnaris
- Secondary Wrist Extensors
  - Extensor Digitorum
  - Extensor Indicis
  - Extensor Digit Minimi





# Wrist Musculature

- Primary Wrist Extensors
  - Extensor Carpi Radialis Longus/Brevis
  - Extensor Carpi Ulnaris
- Secondary Wrist Extensors
  - Extensor Digitorum
  - Extensor Indicis
  - Extensor Digit Minimi





# Hand Musculature

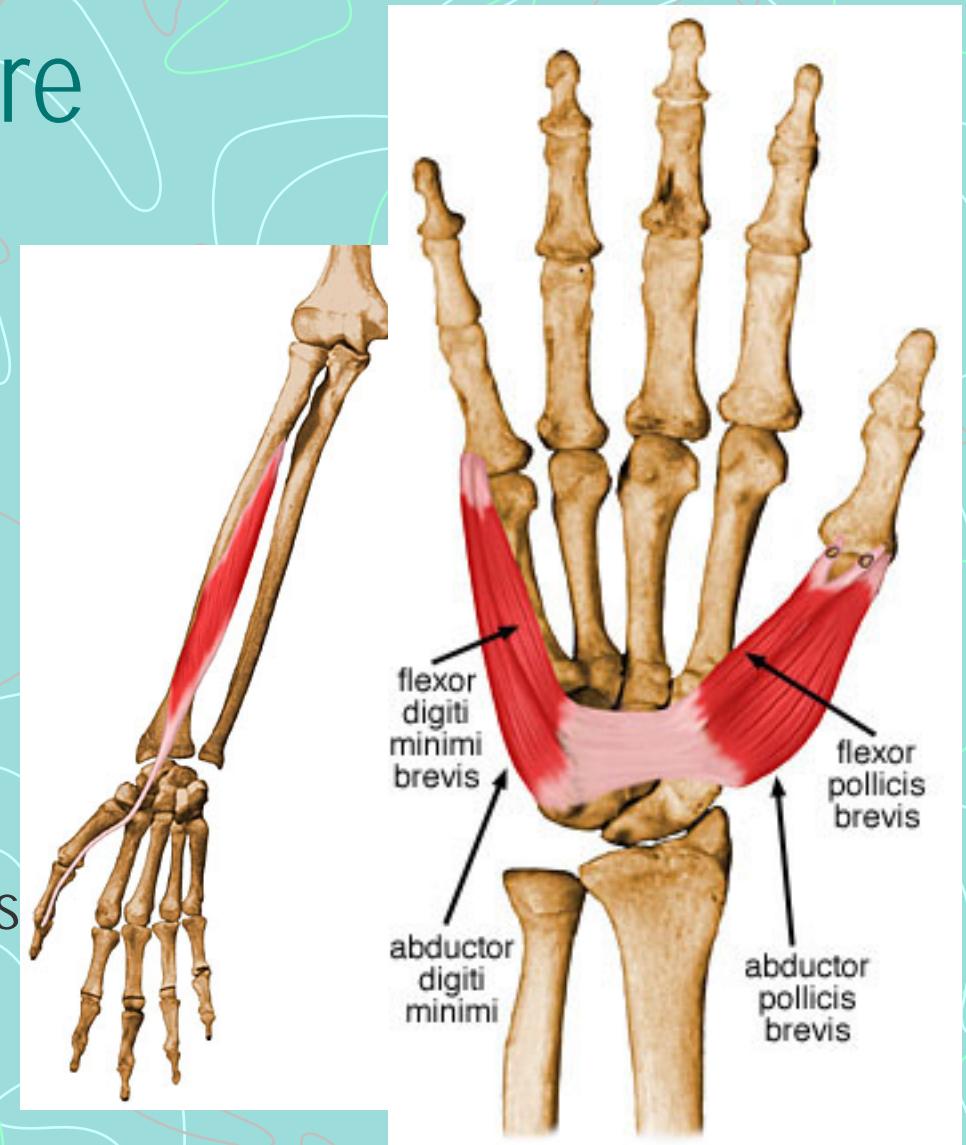
- Hand Flexors
  - Flexor Digitorum Profundus
  - Flexor Digitorum Superficialis
  - Flexor Pollicis Longus/Brevis
  - Flexor Digit Minimi Brevis
  - Lumbricales





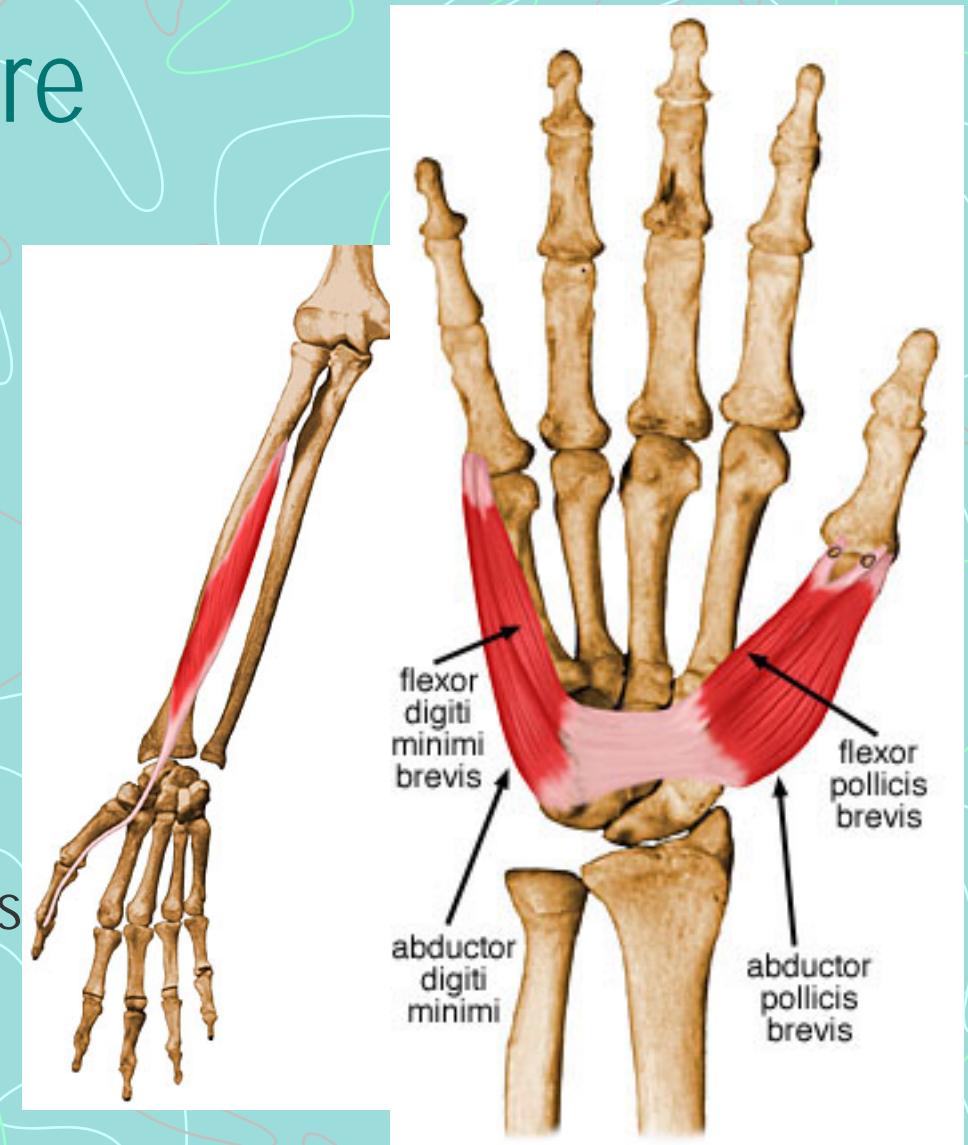
# Hand Musculature

- Hand Flexors
  - Flexor Digitorum Profundus
  - Flexor Digitorum Superficialis
  - Flexor Pollicis Longus/Brevis
  - Flexor Digit Minimi Brevis
  - Lumbricales



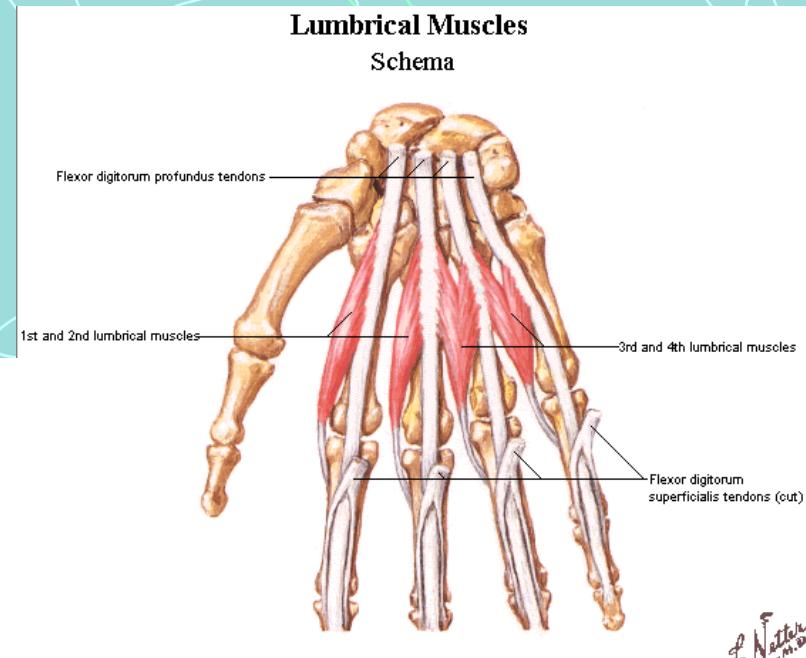
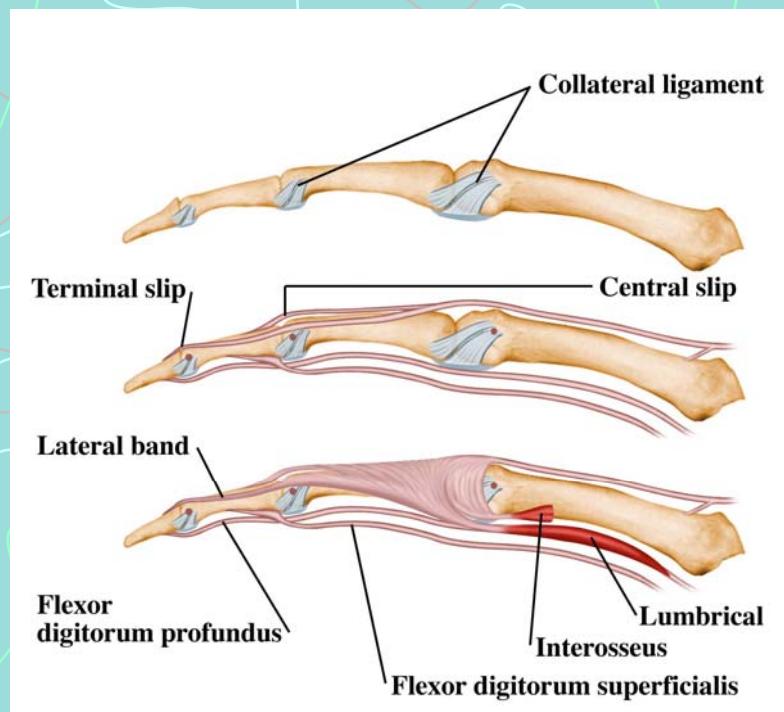
# Hand Musculature

- Hand Flexors
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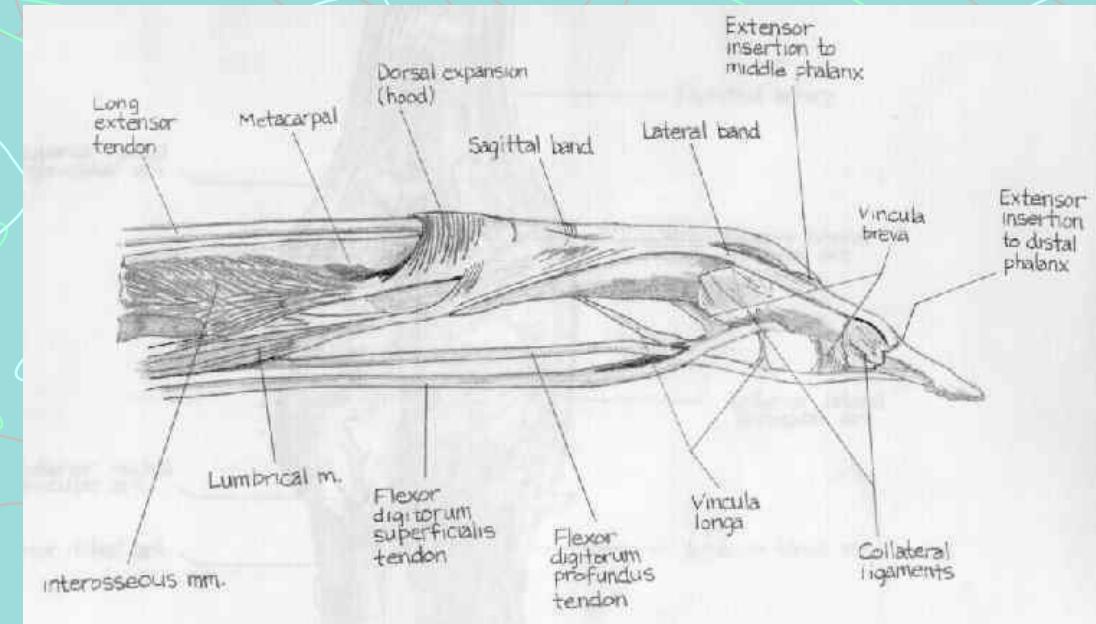
# Hand Muscles

- Hand Extensors
  - Lumbricales

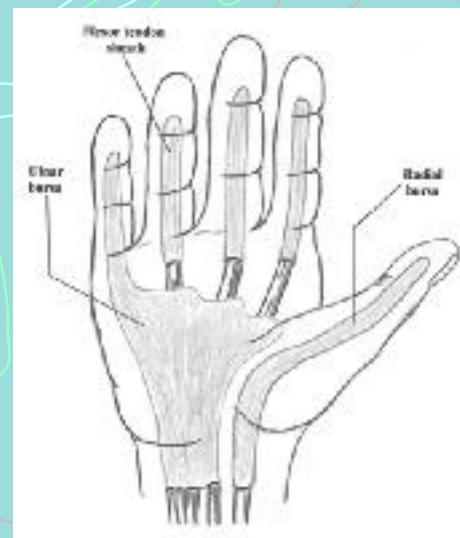
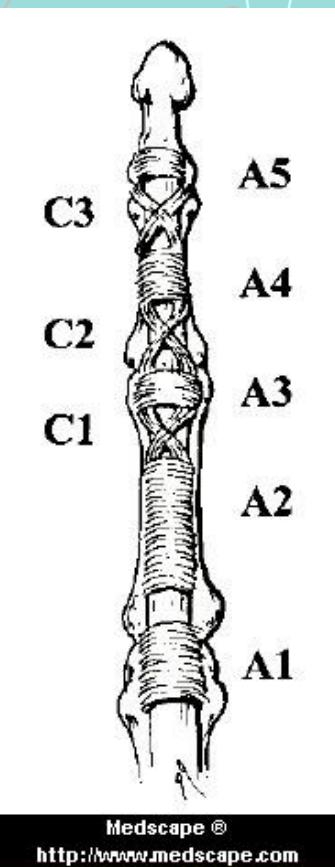


# Mechanism of Finger Extension

- Extensor Hood
  - EDC
  - Lumbricales
  - Interossei



# Mechanism of Finger Flexion

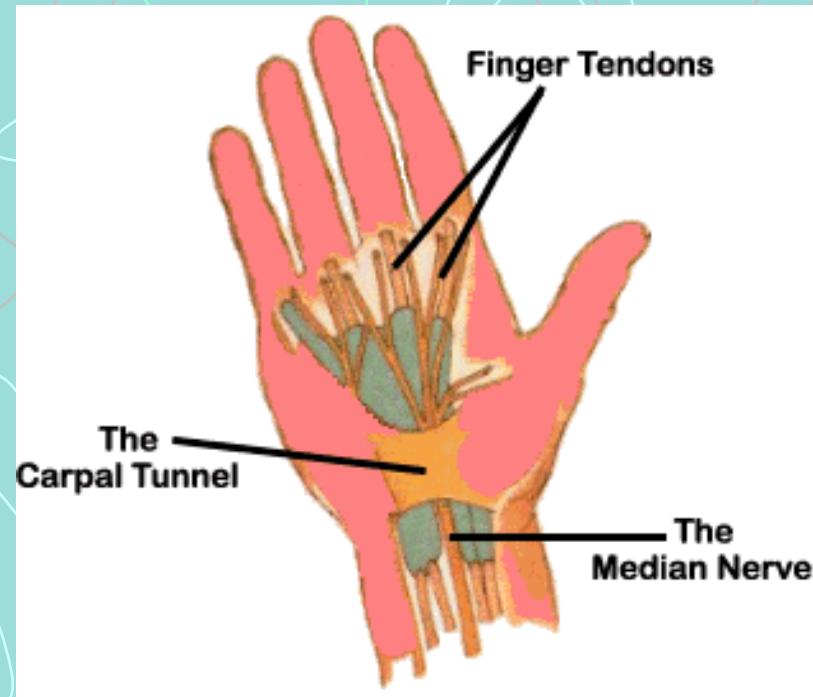


- Annular Pulleys
- Curvate Ligaments
- Tendon Sheath
- Function

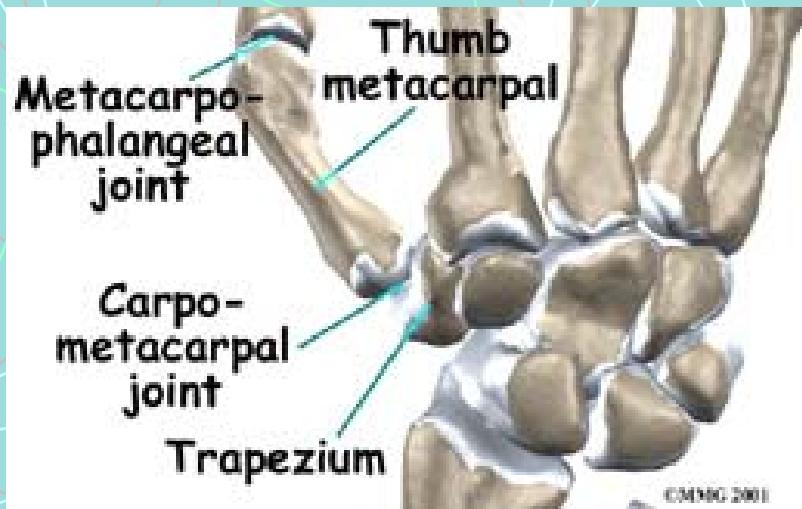


# Closer Look at the Carpal Tunnel

- Structures within Tunnel
  - FDS
  - FDP
  - FPL
  - Median Nerve



# Thumb



- CMC Joint
  - Saddle Joint
  - 2 degrees of freedom
    - 53 flexion/extension
    - 42 ADD/ABD
    - 17 rotation
  - Opposition
  - Capsule
    - Reinforced by volar, dorsal, radial and ulnar ligaments

