



GHADIALI

General Surgery

P R E S E N T S

Dr. Mufa T. Ghadiali is skilled in all aspects of General Surgery.
His General Surgery Services include:

- General Surgery
- Advanced Laparoscopic Surgery
- Surgical Oncology
- Gastrointestinal Surgery
- Hernia Surgery
- Endoscopy

Normal Hand Anatomy

Multimedia Health Education

Disclaimer

This movie is an educational resource only and should not be used to manage Orthopaedic Health. All decisions about management of the elbow must be made in conjunction with your Physician or a licensed healthcare provider.

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GHADIALI

MULTIMEDIA HEALTH EDUCATION MANUAL

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Introduction

The hand in the human body is made up of the wrist, palm, and fingers. The most flexible part of the human skeleton, the hand enables us to perform many of our daily activities. When our hand and wrist are not functioning properly, daily activities such as driving a car, bathing, and cooking can become impossible.

(Refer fig.1)



(Fig.1)

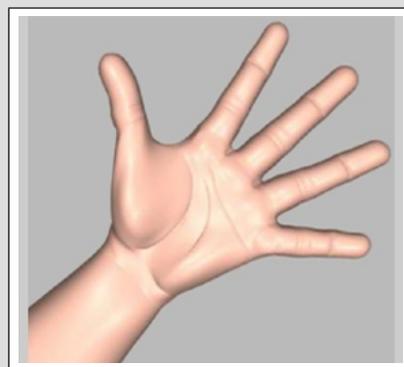
The hand's complex anatomy consists of

- 27 bones
- 27 joints
- 34 Muscles
- Over 100 ligaments and tendons
- Numerous Blood vessels, nerves, and soft tissue

It is important to understand the normal anatomy of the hand in order to learn about diseases and conditions that can affect our hands.

Normal Hand

(Refer fig. 2)



(Fig.2)

Unit 1: Anatomy of the Hand Introduction

27 bones
(Refer fig. 3)



(Fig. 3)

27 joints
(Refer fig. 4)



(Fig. 4)

34 Muscles
(Refer fig. 5)



(Fig. 5)

Over 100 ligaments and tendons
(Refer fig. 6)



(Fig. 6)

Unit 1: Anatomy of the Hand Introduction

Numerous Blood vessels, nerves,
and soft tissue

(Refer fig. 7)

Skeletal Anatomy

The wrist is comprised of 8 bones called carpal bones. These wrist bones connect to 5 metacarpal bones that form the palm of the hand. Each metacarpal bone connects to one finger or a thumb at a joint called the metacarpophalangeal joint, or MCP joint. This joint is commonly referred to as the knuckle joint.

(Refer fig. 8)

The bones in our fingers and thumb are called phalanges. Each finger has 3 phalanges separated by two joints.

The first joint, closest to the knuckle joint, is the proximal interphalangeal joint or PIP joint. The second joint nearer the end of the finger is called the distal interphalangeal joint, or DIP joint.

The thumb in the human body only has 2 phalanges and one interphalangeal joint.

(Refer fig. 9 &10)



(Fig. 7)



(Fig. 8)



(Fig. 9)



(Fig. 10)

Soft Tissue Anatomy

Our hand and wrist bones are held in place and supported by various soft tissues.

These include

Cartilage

Shiny and smooth, cartilage allows smooth movement where two bones come in contact with each other.

(Refer fig. 11)

Tendons

Tendons are soft tissue that connects muscles to bones to provide support. Extensor tendons enable each finger to straighten.

(Refer fig. 12)

Ligaments

Ligaments are strong rope like tissue that connects bones to other bones and help hold tendons in place providing stability to the joints. The volar plate is the strongest ligament in the hand and prevents hyperextension of the PIP joint.

(Refer fig. 13)



(Fig. 11)



(Fig. 12)



(Fig. 13)

Muscles

Muscles are fibrous tissue capable of contracting to cause body movement. Interestingly, the fingers contain no muscles. Small muscles originating from the carpal bones of the wrist are connected to the finger bones with tendons.



(Fig. 13)

These muscles are responsible for movement of the thumb and littlefinger enabling the hand to hold and grip items by allowing the thumb to move across the palm, a movement referred to as Thumb Opposition. The smallest muscles of the wrist and hand are responsible for fine motor movement of the fingers.

(Refer fig. 13)

Nerves

Nerves are responsible for carrying signals back and forth from the brain to muscles in our body, enabling movement and sensation such as touch, pain, and hot or cold.

The three main nerves responsible for hand and wrist movement all originate at the shoulder area and include the following



(Fig. 14)

(Refer fig. 14)

Radial: The radial nerve runs down the thumb side of the forearm and provides sensation to the back of the hand from the thumb to the third finger.

Median: The median nerve travels through the wrist tunnel, also called carpal tunnel, providing sensation to the thumb, index finger, long finger, and part of the ring finger.

Ulnar: The ulnar nerve travels through a tunnel in the wrist called Guyon's tunnel formed by two carpal bones and the ligament that connects them together. The ulnar nerve supplies feeling to the little finger and half of the ring finger.

Blood Vessels

The two main vessels of the hand and wrist are

Radial Artery: The radial artery is the largest artery supplying the hand and wrist area. Traveling across the front of the wrist, nearest the thumb, it is this artery that is palpated when a pulse is counted at the wrist.

Ulnar Artery: The ulnar artery travels next to the ulnar nerve through Guyon's canal in the wrist. It supplies blood flow to the front of the hand, fingers and thumb.

(Refer fig. 15)

Bursae

Bursae are small fluid filled sacs that decrease friction between tendons and bone or skin. Bursae contain special cells called synovial cells that secrete a lubricating fluid. When this fluid becomes infected, a common painful condition known as Bursitis can develop.

(Refer fig. 16)



(Fig. 15)



(Fig. 16)

Normal Movement

Biomechanics is a term to describe movement of the body. Metacarpophalangeal joint (MCP) or knuckle joint The fingers of the hand permit the following movements at the metacarpophalangeal joint (MCP) or knuckle joint

Metacarpophalangeal joint (MCP) or knuckle joint The fingers of the hand permit the following movements at the metacarpophalangeal joint (MCP) or knuckle joint

Flexion

Moving the base of the finger towards the palm.

(Refer fig. 17)



(Fig. 17)

Extension

Moving the base of the fingers away from the palm.

(Refer fig. 18)



(Fig. 18)

Adduction

Moving the fingers toward the middle finger.

(Refer fig. 19)



(Fig. 19)

Abduction

Moving the fingers away from the middle finger.

(Refer fig. 20)



(Fig. 20)

Flexion

Moving the last two segments of the finger towards the base of the fingers.

(Refer fig. 21)



(Fig. 21)

Extension

Moving the last two segments of the finger away from the base of the fingers.

(Refer fig. 22)



(Fig. 22)

Biomechanics of the wrist include the following

Flexion

Moving the palm of the hand towards the front of the forearm.

(Refer fig. 23)



(Fig. 23)

Extension

Moving the back of the hand towards the back of the forearm.

(Refer fig. 24)

Adduction

Moving the pinky side of the hand toward the outer aspect of the forearm.

(Refer fig. 25)

Abduction

Moving the thumb side of the hand toward the inner aspect of the forearm.

(Refer fig. 26)



(Fig. 24)



(Fig. 25)



(Fig. 26)

The thumb performs different movements at three separate joints. The carpometacarpal joint is where the wrist bones, carpals, meet the metacarpals, the bones in the palm of the hand. At this articulation, the following movements can be performed

Abduction

Moving the bone below the thumb towards the palm of the hand.

(Refer fig. 27)



(Fig. 27)

Extension

Moving the bone below the thumb away from the hand.

(Refer fig. 28)

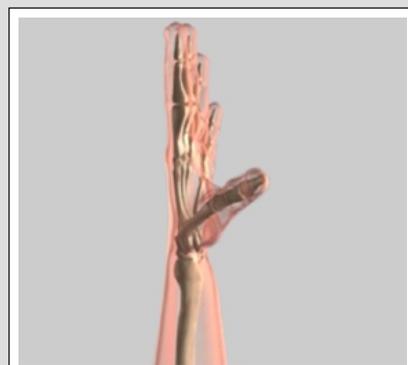


(Fig. 28)

Adduction

Moving the bone below the thumb towards the back of the wrist.

(Refer fig. 29)



(Fig. 29)

Abduction

Moving the bone below the thumb towards the front of the wrist.

(Refer fig. 30)



(Fig. 30)

Opposition

Moving the thumb across the palm of the hand touching the other fingers.

(Refer fig. 31)



(Fig. 31)

The following movements occur at the metacarpophalangeal joint or MCP joint at the base of the thumb

Flexion

Moving the joint at the base of the thumb towards the heel of the hand.

(Refer fig. 32)



(Fig. 32)

Extension

Moving the joint at the base of the thumb away from the heel of the hand.

(Refer fig. 33)



(Fig. 33)

Adduction

Movement of the thumb base towards the back of the hand.

(Refer fig. 34)



(Fig. 34)

Abduction

Movement of the thumb base away from the back of the hand.

(Refer fig. 35)



(Fig. 35)

At the interphalangeal joint of the thumb or IP joint, the following movements can be performed:

Flexion

Bending the top of the thumb towards the base of the thumb.

(Refer fig. 36)



(Fig. 36)

Extension hyperextension

Moving the top of the thumb away from the base of the thumb.

(Refer fig. 37)



(Fig. 37)

Disclaimer

Although every effort is made to educate you on normal anatomy of the Hand, there will be specific information that will not be discussed. Talk to your doctor or health care provider about any questions you may have.

YOUR SURGERY DATE

READ YOUR BOOK AND MATERIAL

VIEW YOUR VIDEO /CD / DVD / WEBSITE

PRE - HABILITATION

ARRANGE FOR BLOOD

MEDICAL CHECK UP

ADVANCE MEDICAL DIRECTIVE

PRE - ADMISSION TESTING

FAMILY SUPPORT REVIEW

Physician's Name : _____

Patient's Name : _____

Physician's Signature: _____

Patient's Signature: _____

Date : _____

Date : _____