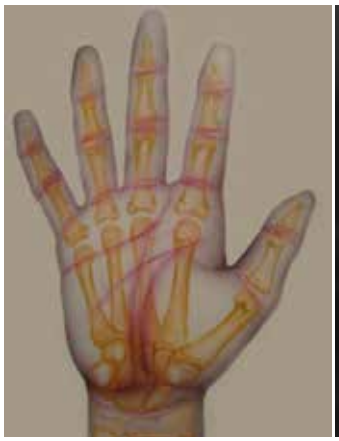
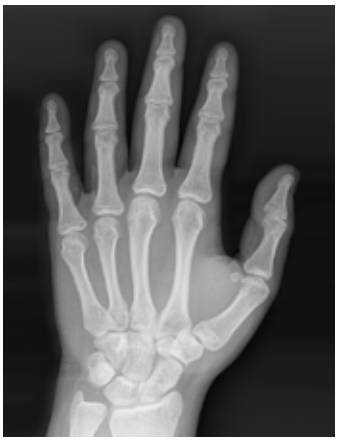
The Hand and Wrist

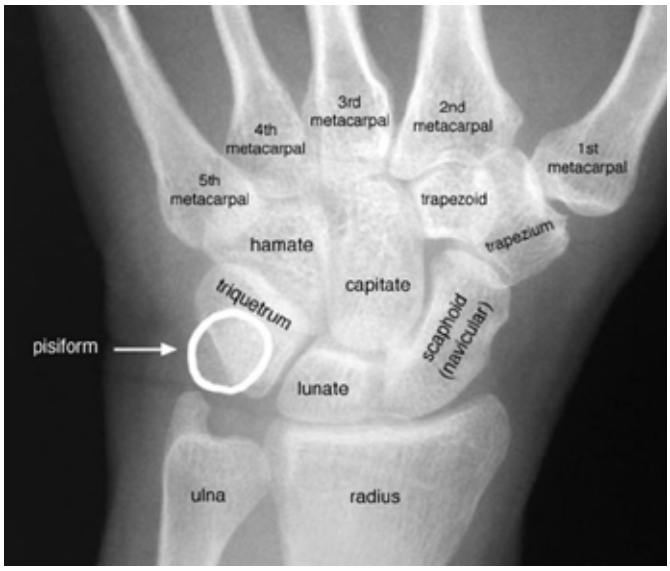
A functional hand and fingers are something most of us take for granted, that is, until it becomes affected by injury or disease. The hand is a complex structure that requires both precision for fine motor tasks and power for grip and lifting. It is also a sensory organ with touch being an integral part of its function. The wrist provides a stable platform on which the hand functions. Any of the components that make up the hand and wrist can be affected by disease processes or injury and the problems can be inter-related.

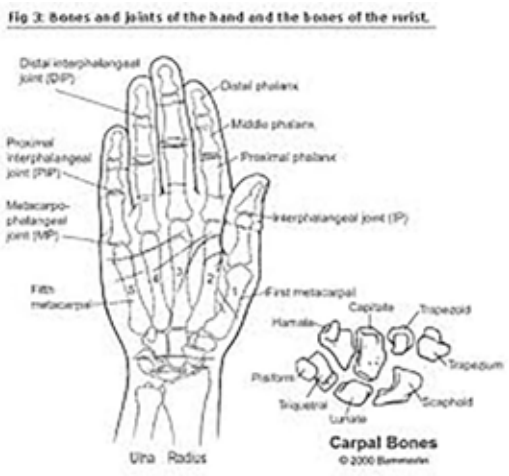


(Hand Surface Anatomy)



(Hand X-ray)





BONES AND JOINTS

There are 27 bones that make up the wrist and hand:

- The wrist is a particularly complex joint. It is formed by the forearm bones, the radius (thumb side) and ulna (little finger side) and 8 carpal bones that form 2 rows.
- The interplay and movement between this complex arrangement allows the wrist a large degree of freedom to be able to place the hand in space.
- The hand itself is made up of 5 metacarpal bones, one for the thumb and each of the fingers and 14 phalanges. The thumb has 2 phalanges and each of the fingers 3.
- By convention and to avoid confusion, each digit is referred to by its common name (thumb, index, long, ring, and small) rather than by number.

Joint stability is provided by the bones themselves, the ligaments between the bones and by the muscles/tendons that cross the joints.

The wrist bones then articulate with the metacarpals at the carpometacarpal (CMC) joints. The second and third CMC joints form a fixed unit. The 4th and 5th help power grip while the first CMC at the base of the thumb forms a very mobile joint, prone to arthritis.

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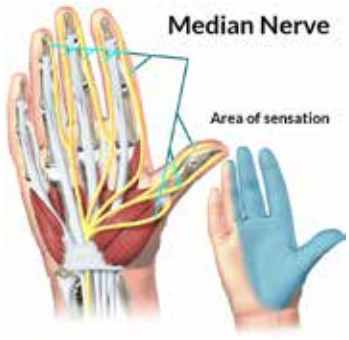
NERVES

There are 3 nerves that innervate the hand. Each has sensory and motor components.

MEDIAN NERVE

Innervates the muscles used in fine precision and pinch function of the hand. It provides sensation to the thumb, index, long, and half of the ring finger. The median nerve is the nerve that is compressed in carpal tunnel syndrome.

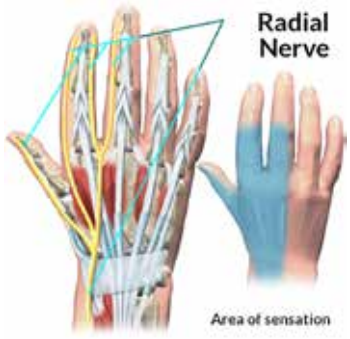


ULNA

Innervates the muscles involved in power grip function of the hand. It provides sensation to the little finger and half of the ring finger and also a portion of the back of the hand. The ulnar nerve is the nerve that is compressed in cubital tunnel syndrome at the elbow and at the wrist in Guyon's canal.

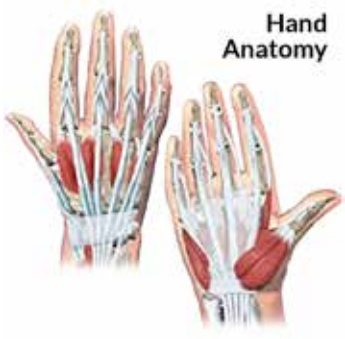
RADIAL

Innervates the muscles that extend the wrist to control and stabilise the position of the hand. It provides sensation to the thumb side of the back of the hand, including the back of the thumb, index finger, middle finger, and half of the ring finger.



MUSCLES

The muscles of the hand are divided into intrinsic and extrinsic groups. All of these muscles have tendons where the muscle inserts onto bone. The intrinsic muscles are located within the hand itself, whereas the extrinsic muscles are located in the forearm and insert to the hand and wrist bones by long tendons.



COMPLAINTS

The main symptoms that people present with are pain, loss of function and deformity and the location of these symptoms and the activities and position of the hand when they occur are important factors in determining the cause.

On your initial consultation a history will be taken to try and ascertain the cause of your problem. This will usually include when the problem started, what you were doing at the time you first noticed the problem, what makes it better, what makes it worse and what treatment you have had thus far.

In general, conditions fall into one of a few different categories:

TRAUMA

- Fracture (Finger fx's, Metacarpal fx's, Scaphoid, Wrist).
- Ligament Injuries (Finger dislocation, Skiers thumb, Scapholunate).
- Tendon Injuries (Mallet, Boutonniere, Tendon Lacerations / Avulsions).
- Soft Tissue (Nerve, Artery, Skin) Injuries.

DEGENERATIVE

- Arthritis (Rheumatoid / Osteoarthritis) (Fingers, Thumb).
- Overuse / Tendinitis (DD trigger, De Quervain's Disease).

OTHER

- Ganglions / Lumps and Bumps (Finger, Hand).
- Carpal Tunnel Syndrome and Other Nerve Compressions.
- Dupuytren's Disease.

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