The Hand and Forearm

The human skeleton contains more than 200 bones. The largest proportion of them are in the hands. Each hand contains 27 bones.

The forearm starts just below the elbow where the two bones, the radius and ulna, connect to the humerus. The radius is on the thumb side and the ulna is on the little finger side of the forearm. Both bones extend from elbow to wrist. Turning of the lower arm so we can have our palms either facing up or down, is possible thanks to the radius pivoting around the ulna. There are two joints needed for this movement and these are located at either end of the ulna and radius. The proximal radioulnar joint at the elbow end and the distal radioulnar joint at the wrist end.

- Proximal means nearer the trunk or midline of the body.
- Distal means further away from the trunk or body's midline.
- Radioulnar is the combined name made up of the two bones (Radius and Ulna) which form the joint. This is a standard in anatomy and physiology.
- Pronation and supination refer to the pivoting action of the forearm and also the feet.

The hand consists of three sections:

- The wrist or carpus
- The metacarpus
- The fingers

The carpus, or wrist, consists of eight irregularly shaped pebble sized bones called carpals. These form two rows of four bones that form the wrist joint. The wrist joint is located at the distal end of the crease at the wrist. The carpals are accessible from all sides – palmar (palm side), dorsal (back of the hand), radial and ulnar. In many movements, the wrist joint works with the elbow joint.

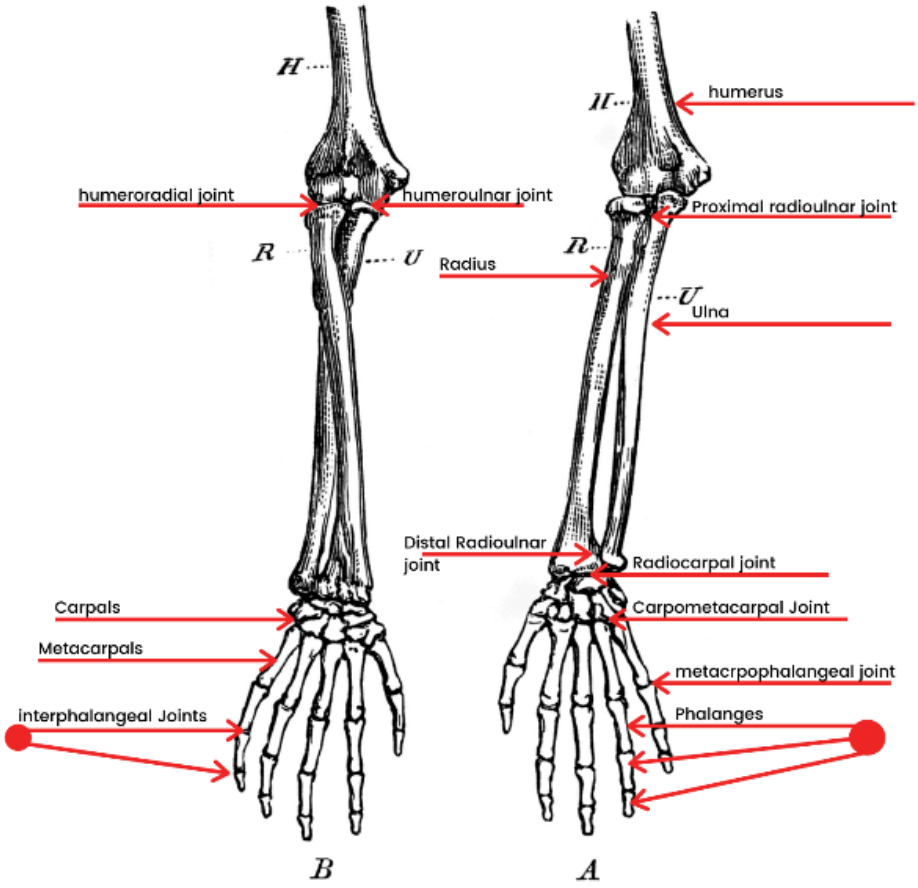
The metacarpus consists of five metacarpal bones. These form the basis for the fingers and span the palm of the hand.

The base of the metacarpals is the proximal end, which together with the carpals form the carpometacarpal joints. The metacarpals form a series of joints called the intermetacarpal joints.

The midsection of the metacarpals is the shaft and the distal end is the head. The metacarpals are easy to locate on the back of the hand (the dorsal surface) and are located under the muscles of the palm.

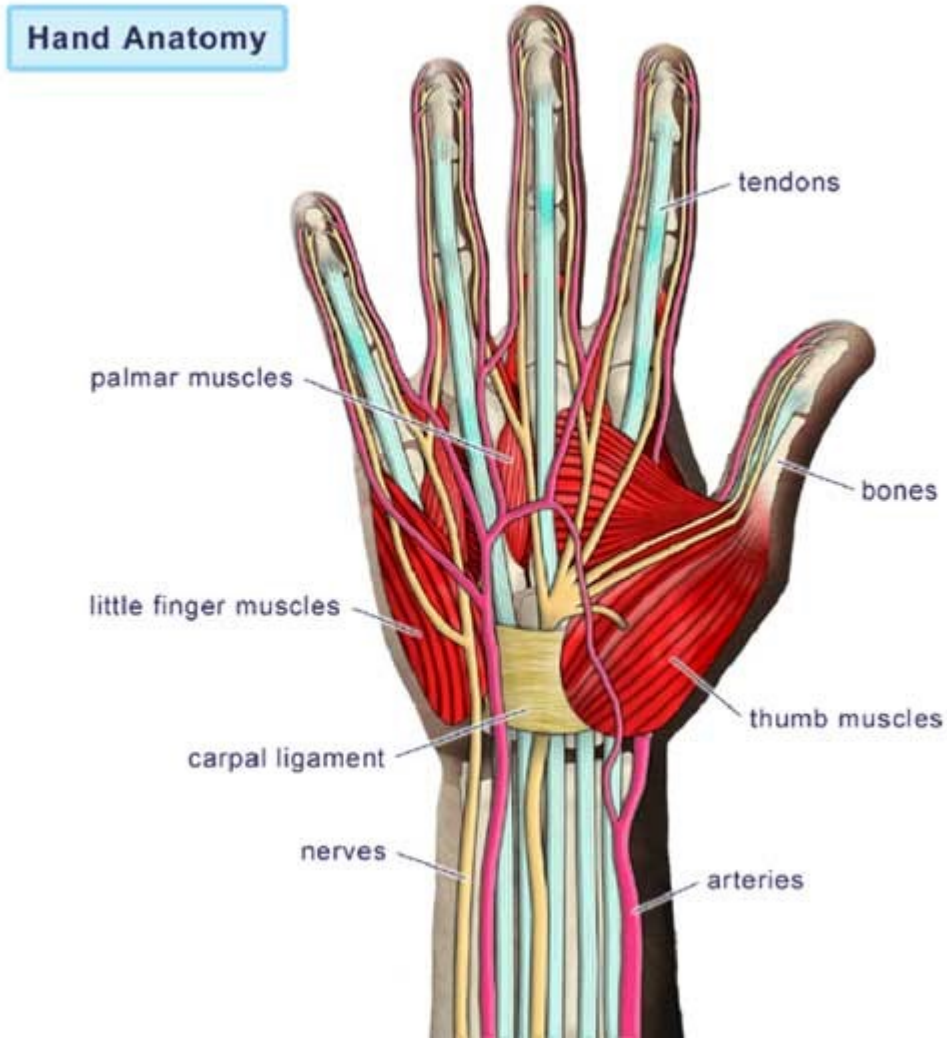
The joints at the distal end of the metacarpals are the metacarpophalangeal joints leading to the phalanges. These are the finger bones and there are 3 bones in each finger, 2 in the thumbs. These are proximal, middle and distal. The thumbs are missing the middle phalanges.

The metacarpal bones barely move, except for the bone which forms the base of the thumb. The thumb joint is a ball joint that makes the rotating movement of the thumb possible. Each finger has three phalanxes. The thumb has only two phalanxes. The joints between the phalanxes move in one direction only and are therefore known as hinge joints.



Muscles of the Hand

Hand movement is activated by the muscles. These muscles are found in the hand and lower arm, where they form an intricate network. In the lower arm there are 20 muscles, 15 of which are for the movement of the fingers. The back of the hand contains the ligaments of the muscles located in the lower arm, that stretch and bend the fingers. They are clearly visible on the back of the hand, just under the skin. The palm side of the hand houses muscles, such as the small muscles that move the little finger and thumb. The thumb is very flexible – our ability to move the thumb to the little finger is unique to humans and is one of the differences between us and the apes.



This diagram shows the main muscles in the hand. The transverse carpal ligament is also visible. If this is swollen, carpal tunnel syndrome can develop, which is a common issue in nail techs.