

The Wrist Complex

by Tracy Anderson

The wrist complex is very intricate, almost as intricate as the Rotator Cuff. This article will serve to explain the basic components including, muscles, tendons, ligaments and functions. The wrist joint, as we think of it, is known as the Radiocarpal Joint. The Radiocarpal Joint consists of the bottom end (distal) of the Radius, the Radioulnar Disk and bones of the hand, (scaphoid, lunate and triquetrum). Because an articular disk is located between the Ulna and the top (proximal) row of carpals, the Ulna is not considered part of this joint. The articular disk acts as a shock absorber and also acts as a filler between the bottom end (distal) of the Ulna and its adjacent carpal bones. The Radiocarpal Joint is a synovial joint and is classified as a condyloid joint and a biaxial joint, because it allows motion on two different axes. The motions of the wrist joint are flexion, extension, radial deviation and ulnar deviation. Deviation is simply bending your hand to one side. For example, moving your wrist toward the thumb side, it would be radial deviation, and towards the pinky, it would be called ulnar deviation. The combination of all four motions is called circumduction.. Clinically there is much more to the wrist than this simple joint, but that is beyond the scope of this article.

There are basically four ligaments of the Radiocarpal Joint that provide the majority of the support. As a side note, there are numerous other smaller ligaments supporting the wrist and the meaty portion of the hand. The four ligaments are the Radial Collateral, Ulnar Collateral, Palmar Radiocarpal and the Dorsal Radiocarpal. The word ‘collateral’ should tell you that they are located on the sides of the wrist, and the word ‘palmar’ and ‘dorsal’ should indicate to you that these are located on the palm and top side, respectively. The Radial Collateral connects a bony process (styloid) of the Radius to two bones on the thumb side of the hand (scaphoid and trapezium). The Ulnar Collateral Ligament connects a bony process of the Ulna to two bones of the hand (pisiform and triquetrum) on the pinky side. The Palmar Radiocarpal ligament is a thick, tough ligament that limits the wrist extension. It is a broad band that connects the front (anterior) surface of the Radius and Ulna to the bones of the hand (scaphoid, lunate, triquetrum) on the palm side. This particular ligament is more apt to injury more than its opposite, the Dorsal Radiocarpal, because most forces causing injury extend the wrist. When someone falls, they usually land with an open hand, causing it to be bent backwards. The Dorsal Radiocarpal ligament connects the back (posterior) surface of the Radius to the bones of the hand (scaphoid, lunate, triquetrum). This ligament limits the amount of flexion at the wrist, and is not as prone to injury as the previous ligament, so it is not as strong.

There are six muscles concerning the Radiocarpal Joint. The muscles on the front or palm (anterior) side of the wrist include the Flexor Carpi Ulnaris, Flexor Carpi Radialis and Palmaris Longus. The muscles concerning the back side of the wrist (posterior) include the Extensor Carpi Radialis Longus and Brevis, and the Extensor Carpi Ulnaris. I know the names of these muscles sound funny, but please bare with me and try to visualize where the muscle are located and there function, instead of trying to remember it all.

The Flexor Carpi Ulnaris and Flexor Carpi Radialis, both start (originate) from the inside of the upper arm bone (humerus) toward the bottom. The Ulnaris muscle ends (inserts) on the base of the pinky (5th metacarpal and Pisiform), and the Radialis muscle ends (inserts) at the base of the second and third fingers (2nd and 3rd metacarpals). Both act in flexing the wrist, but the Ulnaris helps to bend the wrist towards the thumb side (ulnar deviation), and the Radialis bends the wrist to the pinky side (radial deviation). The other muscle that acts to flex the wrist is the Palmaris Longus. This muscle starts (originates) at the same place as the previous two muscles (medial epicondyle), but this muscle attaches (inserts) to the Palmar Fascia. The Palmar Fascia is a very thick, triangular shaped fascia located in the palm of the hand. Interestingly this muscle is absent in about 21 percent of us, either on one side or both. This muscle is rather small, and is only assistive in flexing the wrist.

Now to the three muscles that extend the wrist. The Extensor Carpi Radialis Longus muscle begins (originates) on a ridge (supracondylar) on the upper arm bone (humerus), and then ends (inserts) at the base of the second finger (metacarpal). The function of this muscle is to extend the wrist, but also helps bend the wrist to the thumb side (ulnar deviation). The Extensor Carpi Radialis Brevis muscle begins (originates) on the outside, bottom portion (lateral epicondyle) of the upper arm bone (humerus). It then ends (inserts) at the base of the third finger (metacarpal). Because of where it ends, this muscle only assists in wrist extension, and has no action on bending the wrist to either side. The last muscle, Extensor Carpi Ulnaris muscle begins (originates) at the same point as the previous muscle, but ends (inserts) at the base of the pinky (5th metacarpal). This muscle assists in wrist flexion, but because of where it ends, it also assists in bending the wrist towards the pinky (ulnar deviation).

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Hopefully you have noticed that all the muscles I have covered cross the elbow joint. I have come across many people that believe they have hurt their elbow. But after testing them and asking them about how they hold a bar or dumbbell during workouts, or how they carry things, I usually find that it is a wrist muscle that is injured. During movements where your wrist is likely to be bent, either flexed or extended, it is important to maintain a solid grip, and try keeping your wrist straight. When your wrist is bent, especially when you have weight in your hands, there may be a strain on the tendon of one of these muscles, and the pain could be felt around the elbow. The wrist joint will also be stronger when you squeeze the object, like a barbell, and less likely to be injured.

Any injury to a tendon will take time to heal. As you may have read in my previous articles, tendons have a very low blood supply, and take awhile to heal. If you feel that you may have injured your elbow or wrist muscles, please consult a physician or therapist, so somebody experienced can help you heal in a timely manner.

For more information about Tracy Anderson, please visit his site at www.LFNOnline.com.