

Wrist Fractures

By Christopher R. Sforzo, M.D.

Board Certified – Fellowship Trained Orthopaedic Surgeon

A broken wrist is among the most common broken bones. In fact, wrist fractures are the most commonly broken bone in patients under 65 years of age (after that age, hip fractures become the most common broken bone).

The wrist is made up of eight small bones, called carpal bones, and the two forearm bones, the radius and ulna (see Figure 1). The distal radius (i.e. the end of the radius) is the bone on the thumb side of the forearm, and the ulna is the outer bone of the forearm located on the side of the pinky. The shape of the bones allows the wrist to bend and straighten, move side-to-side, and rotate, as in twisting the palm up or down. A fracture may occur in any of these bones when enough force is applied, such as when falling down onto an outstretched hand. Severe injuries may occur from a more forceful injury, such as a car accident or a fall off a roof or ladder. Osteoporosis, a common condition in which the bone becomes more brittle, may make one more susceptible to getting a wrist fracture. Many people think that a fracture is different from a break, but they are the same.

Fracture of the End of the Radius

The most commonly broken bone of the wrist is the end part of the radius (also called the distal radius - see Figure 1). When the distal radius is broken, there is pain, swelling, bruising, and decreased use of the hand and wrist. However, children with these fractures may have only a small amount of swelling and deformity. Often, the wrist appears crooked and deformed. Fractures may be *simple*; this means the bone pieces are aligned and **stable**. Other fractures are more *complex*, or **unstable**, and the bone fragments tend to displace or shift, in which case the wrist is more likely to appear crooked. Some fractures break the normally smooth, ball bearing-like joint surface; others will be near the joint but leave the joint surface intact. Sometimes the bone is shattered into many pieces, which usually makes it unstable. An open (compound) fracture occurs when a bone fragment breaks through the skin. There is an increased risk of infection with compound fractures.

Evaluation of the Distal Radius

After an injury to the wrist, a thorough examination is performed and the entire arm, paying particular attention to the elbow, wrist, and hand. X-rays are always needed so that your doctor can tell if there is a fracture and to help determine the treatment. Sometimes a CT scan or MRI may be used to get better detail of the fracture fragments and associated injuries. In addition to the bone, ligaments (the structures that hold the bones together), tendons, muscles, and nerves may be injured as well when the wrist is broken. These injuries may need to be treated in addition to the fracture. Also, nerves and be compressed or pinched after a wrist fracture, causing numbness and tingling in the

hand and fingers. For example, acute carpal tunnel syndrome can occur, which may need to be treated with surgery in addition to the fracture.

Treatment of a Distal Radius Fracture

The pattern of the fracture, whether it is displaced or non-displaced, and whether it is stable or unstable are all factors in determining the treatment. Other important considerations include your age, overall health, hand dominance, work and leisure activities, the presence of any prior injury or arthritis, and any associated injuries. It is difficult to say which distal radius fractures can be treated with a cast and which need surgery; this must be addressed on a case by case basis. Even on an individual basis, orthopedists may differ on their opinion of optimal treatment for a given fracture.

A splint or cast may be used to treat a fracture that is not displaced (or is well-aligned), or to protect a fracture that has been set. Other fractures may need surgery to properly set the bone and/or to stabilize it. Fractures may be stabilized with pins, screws, plates, rods, or external fixation (see Figure 2).

Most often, broken wrists can be treated in a cast. The wrist is one area of your body that is very amenable to cast treatment. If the bones are out of proper position, then some light sedation or local anesthesia may be used so your doctor can reset the fracture. This is called 'reducing' a wrist fracture, and by performing specific maneuvers, your doctor may be able to realign the broken wrist.

External fixation is a method in which a frame outside the body is attached to pins which have been placed in the bone above and below the fracture site, in effect keeping it in traction until the bone heals. This was used in the past to treat most if not all wrist fractures. However, today, external fixators are typically reserved for severely broken wrists, or wrist fractures that are open to the air (compound fractures).

Most hand surgeons would agree that plates and screws are a much better option for surgical intervention. These state-of-the-art plates (Figure 3) are custom made to fit wrists of all shapes and sizes, are very strong and allow most patients to begin moving their wrists right away after surgery. This greatly improves the overall function of the wrist and increases the motion of the wrist and hand, which equates to a better outcome. In fact, many of my patients after surgery never need a cast at all, just a removable splint, and can get their arm and hand wet in one week's time (once the incision heals). Typically you are allowed to use the hand for simple tasks such as brushing your teeth or combing your hair right after surgery. The surgery is outpatient surgery and can last between thirty minutes to one hour. Also, the plates are so low profile that they rarely, if ever, need to be removed.

Scaphoid Fractures

It is the second most common wrist fracture and occurs most commonly in active young adults. The scaphoid bone (also called the navicular bone) is one of the eight carpal

(wrist) bones. The carpal bones fit between the forearm and hand bones. The scaphoid sits below the thumb, and is shaped something like a kidney bean.

The interesting thing about the scaphoid bone (Figure 1) is that it has a delicate blood supply. The pattern of blood supply in the scaphoid presents a problem when you sustain a scaphoid fracture. Because of the tenuous blood supply, a scaphoid fracture can sever this blood flow and stop the delivery of necessary oxygen and nutrients to the bone cells. When this occurs, healing can be slow, and the scaphoid fracture may not heal at all.

Evaluation of a Scaphoid Fracture

The symptoms of a scaphoid fracture are pain on the thumb side of the wrist, swelling in that area, and difficulty gripping objects. . Fractures of the small wrist bones, such as the scaphoid, are unlikely to appear deformed. Many patients are diagnosed with a wrist sprain when in actuality they have a broken scaphoid bone. The diagnosis is difficult because x-rays taken right after the injury may show no abnormality. A scaphoid fracture that is not displaced may only show up on x-ray after healing has begun, which can be two to four weeks after the injury. Because of this, it is not uncommon to treat a wrist injury with immobilization (as though it were a scaphoid fracture) for a week or two and then repeat x-rays to see if the bone is broken. An MRI or bone scan is also a possible means to diagnose this injury, especially if pain persists after 2-3 weeks and the x-rays continue to appear normal.

Problems with Scaphoid Fracture Healing

When a scaphoid fracture heals slowly (delayed union), or does not heal at all (non-union), the injury may remain painful, and deformity and arthritis of the bone may result. The risk of developing a non-union of the scaphoid depends most importantly on the location of the fracture in the bone. Other factors that can contribute to non-union are failure to treat the fracture in a timely matter, smoking, certain medications, and infections.

Treatment of Scaphoid Fractures

There are two general approaches for treatment of a scaphoid fracture. Often, orthopedists will initially treat the injury in a cast. So long as the scaphoid fracture is not badly displaced (out of position), this is an excellent approach. By obtaining repeat x-rays over several weeks and months, your doctor can look for signs of healing. Healing of this fracture usually takes 10 to 12 weeks. If it does not heal, surgery can be considered. However, even if the bones are well-aligned, surgical intervention can be performed. A small screw (Figure 4) can be inserted through a tiny incision into the scaphoid bone, which will not only stabilize the fracture but also quicken the healing process. This may be a good option for someone who does not desire a cast for 3 to 6 months or an athlete who needs to return to his or her sport as quickly as possible.

If the scaphoid fracture is displaced, the risk of nonunion is higher, and your doctor may recommend initial surgery to reposition the bones, and fix them into place. Or if the fracture does not heal with cast treatment (immobilization), surgery will be recommended. As before, the surgery involves using either a screw or small pins to hold the bone together in the proper position. A bone graft may also be used to promote healing at the scaphoid fracture site. The surgical incision will be between two and five centimeters, depending on the dissection necessary to properly position the fracture and place bone graft (if needed). After surgery, a cast is used to immobilize the scaphoid bone and allow for healing.

Recovery and Outcomes

While the wrist fracture is healing, it is very important to keep the fingers flexible, provided that there are no other injuries that would require that the fingers be immobilized. Otherwise, the fingers will become stiff, hindering the recovery of hand function. Once the wrist has enough stability, motion exercises may be started for the wrist itself. Your hand surgeon will determine the appropriate timing for these exercises. Hand therapy is often used to help recover flexibility, strength, and function.

Most patients with distal radius fractures do very well, and regain most of their pre-injury motion. This, of course, depends on the severity of the initial injury, the ability to “put the bones back” in their proper position, and the implementation of an early hand therapy program to maximize hand and wrist function. A full recovery typically takes approximately 3-4 months. Patients with scaphoid fractures vary widely in their outcome because of the extreme variability of the fracture type and treatment. Full recovery after treatment of a scaphoid fracture, no matter how it is treated, can take up to 6-9 months. Some patients may have residual stiffness or aching. If the surface of the joint was badly injured or the bones do not heal, arthritis may develop. On occasion, additional treatment or reconstructive surgery may be needed.

For more information on wrist fractures, other orthopaedic problems, or Dr. Sforzo’s practice, please visit www.orthocenterflorida.com or call 941.378.5100.

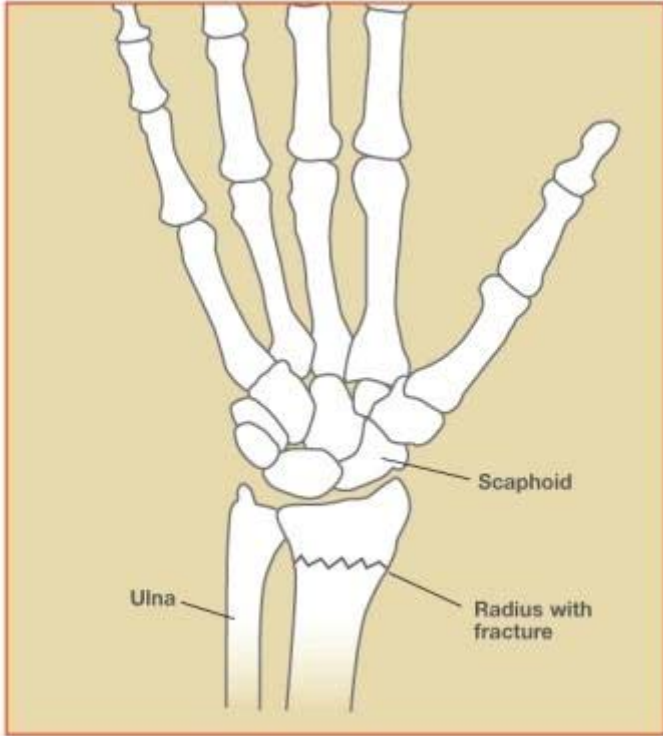


Figure 1

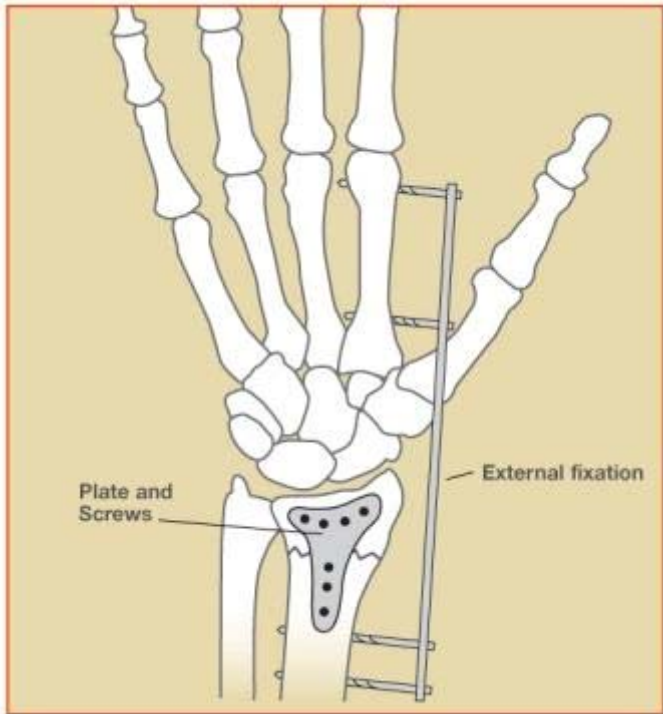


Figure 2



Figure 3



Figure 4