ORTHOPÆDICS

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Wrist Fractures: Treatment for Patients of All Ages

Chances are you know a family member or friend who has had a wrist fracture, either as a child or adult. This type of fracture, technically called a distal radius fracture (DRF), is the most common fracture in the upper extremity, and accounts for more than 1/6 of all fractures treated in emergency rooms. DRFs occur in people of all ages, from toddlers to the elderly.

Types of Distal Radius Fractures

There are two major types of DRFs: extra-articular, which means the fracture line does not extend into the wrist joint itself; or intra-articular, which means that it does. Comminuted fractures are those in which the bone is broken into many small pieces. Physeal fractures are fractures which involve the growth plate in children. If the fractured bone breaks the skin, it is called an open fracture, and carries a risk of bone infection. The term "displaced" indicates that the fracture fragments are in an abnormally translated or angulated position.

The majority of DRFs are extra-articular, or minimally displaced intra-articular, low-energy injuries. The most serious type of fracture is the comminuted intra-articular pattern, which represents approximately 30% of all DRFs. Fractures with significant displacement or angulation should be referred to an orthopaedic or hand surgeon. Immediate medical attention is also necessary for patients with open fractures, or those with evidence of severe numbness or tingling of the fingers.

Many classification systems have been described for DRFs to help surgeons decide on appropriate treatment, and to give an idea of anticipated long-term functional results. Many people may have heard of the term "Colles fracture." A Colles fracture denotes an extra-articular, dorsally displaced fracture of the distal radius. Other common eponyms include Smith's and Barton's fractures. Despite these common names, most surgeons use descriptive terms in evaluating two major components of the fracture: the extension into the joint (or growth plate in children), and the amount of displacement of the fracture fragments.

Mechanism of Injury

DRFs commonly result from an impact to the outstretched hand during an attempt to break a fall. High-energy injuries are the result of falls from a significant height (e.g., falling off a six-foot ladder or playground/monkey-bars), and often result in markedly displaced fractures in children and intra-articular fractures in young adults. Low-energy injuries occur from falls from a standing height and are more commonly seen in older people with weaker bones, but can result in equally complex fracture patterns. Symptoms of DRFs usually include pain, swelling, and stiffness of the wrist. If the fracture is severe, there may be a visible deformity in the shape of the wrist, or numbness and tingling of the fingers.

Patient Evaluation

When evaluating the patient with a DRF, the physician must pay attention to age, hand dominance, and occupation, as well as the mechanism of the injury. The physician will look for swelling, deformity, lacerations, and abrasions. The physician then conducts a careful neurovascular exam, which consists of tests for sensation and movements of the fingers and an evaluation of the pulses at the wrist.

Most DRFs are diagnosed by x-rays, which should include at least a front and side view of the wrist. Computed tomography (CT) is used to evaluate more complex intra-articular fractures and to guide surgical planning. Mag-

netic resonance imaging (MRI) is not routinely used in the initial evaluation of DRFs, but can be useful in assessing suspected ligamentous and other soft tissue injuries. Occasionally, wrist arthroscopy facilitates treatment by allowing direct joint visualization; removal of small, free intra-articular fragments; and recognizing early treatment of wrist ligament injuries, particularly those not seen on x-ray evaluation.

Treating the Fracture

Treatment options are varied, largely depending on the patient's age, activity level, and the actual fracture pattern. For the majority of nondisplaced DRFs, cast or splint immobilization is the treatment of choice. Simple displaced DRFs are usually treated with a closed reduction -- pushing the bones into place without making a surgical incision, then protected in a cast or splint. This treatment usually requires some form of sedation or anesthesia. Most children, even with markedly displaced fractures, can be managed without formal surgery; and because their bones are still growing, such fractures have potential for correcting mild translational and angular deformities. Nonsurgical management of displaced fractures does require weekly follow-up visits (and x-rays) with the surgeon during the first few weeks. Patients treated with casting can expect to wear the cast for four weeks (young children) to six weeks (adults)—the typical amount of time it takes for a bone to heal.

Surgical treatment is recommended for the following situations: children and adults in which a closed reduction fails to adequately restore appropriate alignment of the bones; fractures which have redisplaced after a successful closed reduction; open fractures; and patients with severe, persistent numbness or tingling of the fingers after having a closed reduction. Adults with displaced intra-articular fractures usually require surgery to restore a smooth joint surface which helps minimize the risk of developing future post-traumatic wrist arthritis.

Significant advances in plate and screw implants, specifically designed for DRFs, have revolutionized the surgical treatment of these injuries. These new, anatomically-designed implants, with locking interfaces between the plate and screws, allow surgeons to obtain rigid, secure fixation in many of the more complex intra-articular fractures. After surgery, this enables early motion rehabilitation of the wrist and minimizes the amount of post-injury stiffness. Other surgical options which are widely accepted, but less commonly used, include percutaneous pin fixation and external fixation. Complications of surgical treatment can include infection, wound healing problems, neurovascular injury, scarring, stiffness, nonunion, and hardware-related tendon irritation.

Rehabilitation

Most children do not require formal therapy and regain normal use/function soon after cast removal. Adults should expect a formal rehabilitation period of approximately six weeks to three months, depending on the severity of the injury and type of treatment chosen. Extra-articular fractures have better outcomes than intra-articular fractures. After cast removal or surgical fixation, the wrist is expectedly stiff. Supervised hand therapy is recommended to restore the motions of not only wrist flexion and extension but also forearm rotation. After motion has been adequately restored, a strengthening program is initiated to maximize function of the affected arm.

Outcomes

Most adults can expect some loss of motion of the wrist and forearm compared to the uninjured arm, but reasonable expectations should include full-finger range of motion, a strong grip without significant pain, and a functional range of motion of the wrist and forearm that should not limit activity. Although complete recovery may take up to a year, patients can often resume vigorous physical activity three to six months post-injury. Most patients return to normal recreation and work activities without permanent pain. Older patients may tolerate greater degrees of residual deformity because of their more limited functional demands. Young adults with active lifestyles or people performing heavy manual labor jobs are often the patients who have the most severe fractures, and may face challenges in returning to full pre-injury function. Due to the many recent advances in DRF care, even the most complex fractures can be effectively treated with the expectation of good to excellent functional outcomes.

OAD is a multi-subspecialty orthopaedic group with convenient office locations in Warrenville, Wheaton, Carol Stream, Naperville, Bartlett, and Winfield. Since 1981, OAD has provided its premier conservative and surgical care, treatment and services for shoulder, hip, knee, spine/neck, hand and upper extremity, foot and ankle/podiatry, musculoskeletal, sports and work-related injuries/conditions. OAD MRI is available in Warrenville, with physical, occupational, industrial and specialized hand therapy services offered at multiple OAD locations. For appointments and information, call (630) 225-BONE (2663) and visit online at www.OADortho.com.

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