Recovery After Fracture of the Distal Radius

Arjan G.J. Bot, MD[a], David C. Ring, MD, PhD[b,*]

KEYWORDS

• Recovery • Distal radius fracture • Coaching • Exercises

DISABILITY AND IMPAIRMENT

Recovery from a fracture of the distal radius must address both impairment and disability. Impairment is measurable objective pathophysiology, such as limited motion or sensation. Disability, on the other hand, is the idea that one is incapable of an action. Patients with distal radius fractures often experience disability as inability to trust or depend on the hand. "It probably feels like you're not going to be able to rely on your hand the way you need to" is a statement that identifies the goal while communicating empathy regarding how difficult and counterintuitive recovery can be for the patient. During recovery from a fracture of the distal radius, as with most illnesses, symptom intensity and disability are determined more by mindset and circumstances than by pathophysiology or impairment.[1–4]

Impairment

Patients should expect slight to moderate impairment of motion after a fracture of the distal radius. Diaz-Garcia and colleagues'[5] review of published studies reported a mean arc of wrist flexion and extension of 116° to 133° and forearm rotation of 140° to 175° after recovery from a fracture of the distal radius in older patients, regardless of the treatment method. Six months after a conservatively treated distal radius fracture, the mean arc of flexion and extension and the forearm rotation were known to be 75% to 97% and 87% to 97%, respectively, compared with the uninjured side.[6–10] Six months after operative treatment the numbers were similar: mean flexion, 67% to 88%; extension, 72% to 93%; supination, 78% to 100%; and pronation, 87% to 100%.[6,8,11–17] Grip strength, which is partly volitional and therefore not strictly an objective impairment, averaged 53% to 86% after operative treatment[6–10] and 43% to 92% after nonoperative treatment, compared with the uninjured side 6 months after injury.[6,8,11–17]

Disability

Patients may have more influence over disability than impairment after fracture of the distal radius. In a study with 57 patients recovering from a wrist fracture and 13 from an ankle fracture, fear and catastrophic thinking were associated with pain intensity and recovery of muscle strength.[18] In another study of wrist, ankle, and hip fractures, pain intensity at baseline and postinjury anxiety were the most important predictors of pain intensity after the fracture.[2] Souer and colleagues[4] noted that at an average of 22 months after volar plate fixation, 71% of the variability in DASH scores (Disabilities of the Arm, Shoulder and Hand) was

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[a] Orthopaedic Hand and Upper Extremity Service, Massachusetts General Hospital, 55 Fruit Street, Boston, MA 02114, USA

[b] Orthopaedic Hand and Upper Extremity Service, Yawkey Center, Massachusetts General Hospital, Harvard Medical School, Suite 2100, 55 Fruit Street, Boston, MA 02114, USA

* Corresponding author.

E-mail address: dring@partners.org

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determined by pain and arc of forearm rotation, with 65% of this variability resulting from pain alone.

In a study of 120 patients recovering from a fracture of the distal radius, MacDermid and colleagues[3] found that 25% of the variation in the Patient-Related Wrist Evaluation (PRWE) score 6 months after injury was accounted for by workers compensation, education, and prereduction radial shortening, whereas 25% was accounted for by the arc of wrist flexion and extension, with the remaining 50% unaccounted for.

Grip strength is mainly influenced by depression, pain, and motivation.[19–24] Karnezis and Fragkiadakis found that 43% of the variation in PRWE 2 years after nonoperative treatment of a fracture of the distal radius was determined by grip strength, but motion was not significantly affected.[25] A study of 20 patients found that grip strength correlated with all tasks in the Jebsen Hand Test, but motion correlated only with lifting large objects.[26]

Chung and colleagues[1] assessed 49 patients 1 year after a distal radius fracture and found that only age and income were associated with disability, whereas radiographic outcomes had no association with disability. In a separate study, Chung and colleagues[17] found no significant differences in disability between younger and older patients 1 year after volar plate fixation of the distal radius using the Michigan Hand Questionnaire (MHQ). However, income and articular incongruities, but not motion, were found to be significant predictors of the MHQ in younger patients.[17]

In a study of 125 patients, Chung and Haas[27] plotted receiver operating characteristic (ROC) curves and identified the following thresholds for patient satisfaction: 65% of grip strength (sensitivity of 0.89, specificity of 0.63), 87% of pinch strength (sensitivity of 0.60, specificity of 0.86), and 95% of the arc of wrist flexion and extension (sensitivity of 0.47, specificity of 0.88).

Disproportionate Pain and Disability

Finger stiffness is one of the most common sequelae following a fracture of the distal radius. Patients with stiff fingers usually have greater pain intensity and disability than would normally be expected. This disproportionate pain and disability has many labels, some of which are cultural (eg, algodystrophy in Britain) and others historical (eg, causalgia, reflex sympathetic dystrophy). The International Association for the Study of Pain currently favors the label complex regional pain syndrome (CRPS) because implication of the sympathetic nervous system contributed to overutilization of costly and ineffective stellate ganglion blocks and other treatments.[28,29] Two Cochrane reviews on spinal cord stimulation and local anesthetic sympathetic blockade in the treatment of CRPS I concluded that there is not enough evidence to support the use of either treatment.[29,30] The diagnostic criteria currently available for CRPS are subjective and imprecise. The lack of a plausible explanation for the signs and symptoms associated with CRPS is one of the diagnostic criteria for this condition. Therefore, it can be argued that the diagnosis of CRPS is never appropriate after a fracture of the distal radius. A fracture of the distal radius is associated with ecchymosis and swelling in the hand that leads to stiffness and pain if the patient is too protective to exercise the hand and use it for daily activities.

The reported prevalence of disproportionate pain and disability among patients recovering from a fracture of the distal radius varies widely, between 1% and 37% in published series,[31–37] perhaps in part because it is poorly defined, subjective, and unverifiable. Along these lines, it is difficult to interpret the trials suggesting that vitamin C limits the occurrence of CRPS, given that the diagnosis is subjective and variably defined, and the only published trials were performed by advocates of vitamin C.[36,38] A recent trial by McQueen and colleagues[39] showed no benefit of vitamin C on patients with CRPS.

In general, physicians ascribe disproportionate pain and disability to a poorly understood pathophysiologic process currently labeled CRPS, whereas psychologists emphasize the importance of psychological factors (catastrophic thinking in particular) and illness behavior (eg, pain avoidance).[28] Use of the term CRPS places emphasis on an elusive and possibly mythical pathophysiologic process; leads to medical and surgical treatments that, to date, are at best wishful thinking and at worst harmful; and distracts the patient and the provider from effective treatments such as cognitive behavior therapy.[28] In our opinion, until we have a better understanding of this illness, it should be referred to descriptively as disproportionate pain and disability, rather than using specific biomedical terms, and should be treated with an evidence-based approach based on cognitive behavior therapy.

TECHNIQUES FOR REDUCING IMPAIRMENT

Edema

The most important preventive measure a patient can use to reduce swelling is to use the hand as normally as possible. Using the hand for light daily tasks (writing, typing, washing) is safe and should be encouraged. Patients often ask “should I squeeze a ball,” which we believe reflects the