

Distal Radius Fractures Emergency Department Evaluation and Management



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KEYWORDS

• Distal radius fracture • Emergency department • Hematoma block • Splinting

KEY POINTS

- Diagnosis of a distal radius fracture can be made readily with plain radiographs and does not routinely require advanced imaging with computed tomography or MRI.
- Findings that may warrant urgent surgical management include an open fracture, vascular injury, or acute carpal tunnel syndrome.
- Indications for emergency department reduction include significant deformity, joint dislocation or subluxation, and radiographic parameters that include more than 20 degrees of dorsal tilt.
- On reduction, casting should be avoided and ace compression wrapping over the splint should be applied loosely allowing for early and free finger motion.
- Outpatient surgical indications are based on a variety of factors including patient demographics, age, concomitant injuries, fracture alignment, and fracture stability.

INTRODUCTION

Musculoskeletal injuries, such as distal radius fractures of the wrist, are a common presentation to an emergency department (ED). In the United States, these injuries are second only to respiratory illnesses in frequency of ED visits, accounting for 20% of chief complaints.¹⁻³ However, despite the frequency of presentation, education in musculoskeletal injuries is often considered deficient in medical education.⁴⁻⁸ The volume of orthopedic presentations to an ED prompted further study of musculoskeletal education in emergency medicine training.³ Comer and colleagues³ provided a validated 25-question orthopedic examination published in 1998 by Freedman and Bernstein to emergency medicine residents and attendings at all levels of training. The results found a 61% overall passing rate (65% for residents and 57% for attendings). As a result of the frequency of musculoskeletal injuries, it is important for all practitioners who evaluate or

treat patients in the ED to be well-educated in these injuries.

Distal radius fractures are the most common upper extremity fracture affecting all patient populations, but are particularly prevalent in the young and elderly.⁹ Among patients older than 65 years of age, distal radius fractures account for 18% of all fractures.¹⁰ This injury is seen by orthopedic surgeons with an incidence of 195.2 per 100,000 patients per year.¹¹ The active elderly are disproportionately affected because the common mechanism of the fracture is a standing level fall onto an outstretched hand. The health burden of this injury pattern is substantial because there were 640,000 reported distal radius fractures in the United States in 2001.^{12,13} There is also a significant economic burden because distal radius fractures contribute significantly to the approximate \$1.1 billion cost of osteoporotic fractures in the Medicare population.^{14,15} Furthermore, the incidence of this injury pattern has been on the rise in the United States and internationally, with a

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disproportionate increase in patients 65 years and older.^{13,16–20} As life expectancy continues to rise and people remain active later in life, distal radius fractures will be an increasingly significant clinical problem.^{21,22}

This article provides an evidence-based guide of early management of distal radius fractures. This is intended for practitioners who would treat this injury in an ED. We discuss the typical presentation of distal radius fractures, radiographic findings, and early management strategies, and focus on what emergent situations require immediate orthopedic intervention.

HISTORY AND PHYSICAL EXAMINATION

When assessing the patient who sustains a wrist injury, history and physical examination are an important diagnostic tool. The classic presentation of distal radius fractures is the elderly female with a fall onto an outstretched hand.^{23–30} However, unlike these relatively low-energy injuries that typically occur from falling from a standing level, higher-energy injuries can also result in distal radius fractures with a higher prevalence in younger populations. A full trauma assessment of these patients is often necessary because the wrist fracture may not be an isolated injury.

The first step in physical examination is assessment for any obvious deformity. Most displaced fractures present with a wrist that is swollen and potentially deformed and angulated (**Fig. 1**). Concurrently, the skin and soft tissue should be examined for any defects that could generate concern for an open fracture (**Fig. 2**). Patients

with an open fracture should also be treated with tetanus prophylaxis (based on patient's immunization status) and intravenous antibiotics immediately.^{31–33}

Vascular examination is the next component of the examination. The hand and wrist is well perfused with robust vascular anatomy. Capillary refill of the finger tips is a common technique used to evaluate blood flow of the hand but has low sensitivity in confirming perfusion. Moreover, it is commonly delayed because of swelling and deformity, but radial and ulnar pulses should be palpable. If pulses are not palpable, the deformity can be improved and the vascular examination can be repeated. Alternatively, consider using a Doppler ultrasound. If pulses are still not present and/or if there is concern for a vascular injury, such as ischemic changes to the hand, rapidly enlarging hematoma, or the presence of arterial bleeding, consider emergent evaluation by an orthopedic surgeon or a vascular surgeon.

Neurologic examination is often difficult to assess in the setting of an acute fracture because of pain. Moreover, patient discrimination between subjective pain, numbness, and paresthesia may be highly variable. Nonetheless, a thorough examination of the hand with careful assessment of sensory and motor function of the radial, median, and ulnar nerves is critical. The radial nerve can be tested for sensation on the dorsal aspect of the first webspace of the hand, whereas motor function is assessed by thumb and finger extension testing. Sensation in the ulnar nerve can be tested on the palmar aspect of the small finger and motor innervation is tested by assessing finger

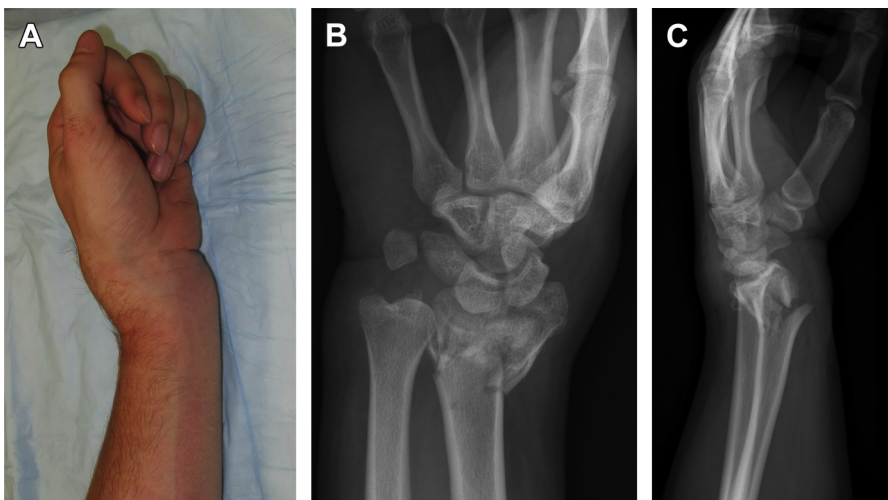


Fig. 1. (A) Typical deformity of a distal radius fracture with dorsal angulation and swelling. Note the associated distal radius fracture on (B) posteroanterior and (C) lateral views.

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