Common Myths and Evidence in the Management of Distal Radius Fractures

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KEYWORDS

- Distal radius fracture • Radiocarpal joint
- Open reduction internal fixation • Distal radioulnar joint
- Evidence-based medicine

Distal radius fractures (DRFs) are common injuries that have a substantial impact on health care systems. They represent the most common fracture treated by physicians, with an incidence of greater than 640,000 cases annually in the United States alone.[1] The bimodal distribution of this injury shows two peaks, one representing high-energy injuries in the young and the other representing low-impact injuries in osteoporotic elderly individuals. This latter group is expanding because the modern-day elderly generation is more active than its predecessors, and life expectancies are increasing. Thus, with a 10% incidence of DRFs in Caucasian women older than 65 years, the number of these fractures can only increase as the baby boomers enter retirement age.[2] Consequently, physicians treating patients with this injury must have a complete understanding of the effectiveness, risks, and benefits of the different management options available.

DRFs have been a topic of discussion in the medical literature since Petit and Pouteau[3] brought them to light in the early 18th century. Before their work that established the entity of DRF, upper extremity deformities at the radiocarpal joint were believed to be caused by wrist dislocations and subluxations. However, because of poor dissemination of their works outside of France, Abraham Colles[4] and the medical community at large were unaware of their theories when Colles published his seminal work, "On the Fracture of the Carpal Extremity of the Radius," in 1814, and therefore he is most often rewarded with the eponym.[4] Great strides have been made over the past 2 centuries in better understanding the biomechanics of injury patterns and the kinematics and muscle forces that influence fracture stability. Device innovation has led to a wide array of options for percutaneous fixation, external fixation, and internal fixation. Although options have greatly increased, little definitive evidence exists regarding the superiority of one technique over the others.

In the 1990s, the *Journal of the American Medical Association* ushered in a revolutionary age in the practice of medicine with the concept of evidence-based medicine. The concept seems obvious enough: that clinical decision making should be basis on evidence from clinical research, thus removing emphasis from intuition and unsystematic clinical experience.[5] However, this paradigm shift has been more difficult to realize in the surgical specialties, where clinical questions often lack high-quality evidence, and randomized controlled trials are expensive and time-consuming. Several myths regarding the management of DRFs have been dogmatic in training programs and are pervasive among clinicians at large, and may affect the outcome of treatment and value of health care investment (**Table 1**).

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Table 1
Summary table of the best available evidence regarding common myths in DRF management

Common Myths of DRFs	Conclusions of Best Available Evidence
1. DRF classifications have practical value	Classification systems are complex and nonstandardized They lack intrarater and interrater reliability They lack prognostic information
2. Anatomic reduction is necessary for good outcomes	Most patients with DRFs have good functional outcomes, even with radiographic arthritis
3. Cast immobilization should include the elbow	Use of a sugar tong splint does not prevent displacement over a radial gutter splint
4. Osteoporotic DRFs require rigid fixation	Rigid fixation results in better radiographic outcomes but no significant functional benefit
5. Volar locking plates for DRF have superior outcomes to other rigid fixation	No significant benefit is seen at 1 year with volar locking plate over external fixation
6. Displaced ulnar styloid fractures require ORIF with DRF	Most displaced ulnar styloid fractures do not require ORIF, as long as the DRUJ is stable
7. Autologous bone grafting is superior to alternatives	No significant difference between autograft and substitutes except for complications at the donor site
8. Early mobilization results in better function	Early motion is safe after ORIF, but does not improve functional outcomes

Abbreviations: DRUJ, distal radioulnar joint; ORIF, open reduction internal fixation.

MYTH #1: DRF CLASSIFICATION SCHEMES HAVE PRACTICAL VALUE

The nomenclature used in the discussion of DRFs has gone through several reinventions over the past 200 years, but interestingly, the most archaic terms have withstood the test of time. The Colles eponym, which represents a metaphyseal fracture with dorsal displacement of the distal segment, represents the most commonly used extraarticular classification. Other eponyms, such as Barton and Smith fractures, are also often used, likely because of their historic significance, ease of remembering, and prevalent use. However, eponyms are not helpful in the management of fractures because they do not quantify the severity of the injury nor do they provide guidance on treatment. Furthermore, some eponyms are redundant or lack contemporary context. A prime example is the Chauffeur's fracture, which originated from the torsional injuries experienced by early chauffeurs when cars backfired as they were started with hand cranks in the early 20th century. The same fracture of the radial styloid may also be referred to as a backfire fracture or Hutchinson fracture. This redundancy in naming is confusing, and the reference to hand crank ignitions is only of historic interest.

DRF classification schemes have evolved over time from the eponymous to complex systems based on mechanism or anatomy. Some of the more commonly used schema include the Frykman, the Melone, the Mayo, and the AO classifications.[6–9] Each system has champions who tout its strengths, and detractors who point out its shortcomings, but all of the current classification schemes fail on multiple fronts. No standardized system exists, and one cannot translate easily from one system to another. Each of the classification systems lacks intrarater and interrater reliability because of its complexity.[10–12] Most importantly, these systems do not provide prognostic information or a treatment algorithm to follow when deciding management. For a DRF classification system to have great merit it should: (1) be widely adopted in the literature for research purposes, (2) describe patterns of injury with predictable outcomes, and (3) distinguish which patterns require which specific treatments to guide surgeons. Thus far, no classification system on DRFs satisfies these requirements.

MYTH #2: ANATOMIC REDUCTION IS NECESSARY FOR GOOD FUNCTIONAL OUTCOMES

Regardless of operative or nonoperative management of a fracture, anatomic reduction has been considered the goal to restore normal biomechanics to the preinjury state, particularly in intraarticular DRFs, for which the common belief is that