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Distal Radius Fractures in the Not-So-Young Population: Some Observations and a Brief Commentary

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Abstract

Distal radius fractures are common. Distal radius fractures in the elderly are becoming more prevalent as the proportion of the older population increases. Treatment for distal radius fractures in younger individuals often includes surgery, particularly for displaced fractures. We present a narrative commentary, reviewing pertinent articles which compare operative versus nonoperative treatment in the "not so young" age group, an admittedly ambiguous phrase as will be discussed. Despite the lack of agreement as to who is old, much of the literature provides support for nonoperative treatment of distal radius fractures in older patients.

Keywords

Distal Radius Fracture, Geriatric Fracture, Wrist Fracture, Fracture Treatment, Older Adults

"*The more I learn, the more I realize how much I don't know.*"
—Albert Einstein

1. Introduction

The literature on distal radius fractures is vast, and no attempt is made to achieve a complete summary or systematic review. Rather, we (S.H.K., D.A.K.) present a narrative commentary based on articles we have selected, which we believe will provide the interested reader with information designed to engage, inform, enlighten, and provoke thought so that we may better serve our patients.

Distal radius fractures are common. In fact, Saving *et al.* reported that they are the "most common fractures encountered in healthcare." [1] Distal radius frac-

tures that are nondisplaced can be treated nonoperatively with splint or cast immobilization. Distal radius fractures that are displaced and fractures that are unstable are often treated surgically, frequently with a volar locking plate [2]. At least, this is true in younger patients. What about patients who are not so young? Should we treat them as we do younger patients? What impact, if any, should the age of the patient have on our decision-making? Does the age of the patient influence outcome?

Who are the "not so young"? The phrase "not so young" is ambiguous. It is ambiguous because—as will be seen—terms such as "old" or "older", "elderly" and "geriatric" are used without a precisely agreed upon definition in the orthopedic and hand surgery [3]-[42]. There is no universally agreed-upon age that defines one as no longer young. A patient may be old enough to be "old" or "elderly" in one study and in another study young enough to avoid being considered "elderly" or "geriatric". This can create difficulty when interpreting results of studies, when comparing one study to another, and, ultimately, when one is face-to-face with a patient who has a distal radius fracture.

The purpose of this brief commentary is to review some aspects of the treatment of distal radius fractures in "the not-so-young age group".

2. Who Are the Not So Young?

The answer to this question is: it depends. It depends on the authors' definitions of old, older, elderly, and geriatric. It depends on the age cut-off chosen for research purposes.

Examples abound.

Reports of treatment for distal radius fractures may include in their titles "older patients" or "older adults" without further elaboration [3]-[11]. Who is "older"? The title of the article may not reveal at what age one is determined to be "old".

The term "older patient" lacks uniformity in the medical literature. There is no agreed-upon definition for what constitutes an "older" patient. One must often delve into the article to find the answer to this question. In one study, 55 years old was old enough to be considered an "older patient" [11]. In other studies, reaching one's 60th birthday was enough to be old, or at least older [4]. In another study, one could wait to be 65 years old before becoming older [3].

Many studies refer to "the elderly" or "elderly patients" or "elderly population" in the article title [12]-[33]. Who is "elderly"? At what age does one become "elderly"? The answer is not always in the title of the article and sometimes not even in the abstract. Sometimes one must read beyond the abstract to discover at what age one becomes "elderly" [20] [25] [28]. In some studies, 50 years of age makes one elderly [12]. Li *et al.*, in their systematic review and meta-analysis of surgical versus non-operative treatment of distal radius fractures in the elderly, used, as part of their inclusion criteria, participants aged above 50 years [25]. In others, 65 is the threshold [14]. For Saving *et al.*, "elderly" was reserved for those over the age of 70 years [1]. In another study, the title calls attention to distal radius frac-

tures in the "super elderly", defined in the paper as greater than 80 years old [16].

Luokkala *et al.*, in their review entitled "Distal radius fractures in the elderly population", reported on 6 randomized controlled trials [26]. The mean, not the minimum, age of patients in these studies varied between 59 and 80 years. Clearly, a wide age range, which highlights the lack of specificity of "elderly".

One systematic review that reported outcome and complications of treating distal radius fractures in the "elderly" included 21 papers with a mean patient age of 60 or over [18]. The authors acknowledged that this meant that not all patients would be over the age of 60.

Other studies use the word "geriatric" in their title [34]-[42]. There is no numerical value assigned to this word [35]. Age 60 is geriatric for some [38] [42]. In one study, reaching 65 renders one geriatric [41], and in another, one must wait until age 70 before being labeled geriatric [36]. In another study, a distinction is made between "early-geriatric" (aged 60 to 72 years) and "late-geriatric" (older than 77). Interestingly, patients aged 73 - 76 years were excluded from the study [37].

In some articles, the age for inclusion in the study is specifically noted in the article title [43]-[57]. Often 60 or 65, sometimes 55 or 50, sometimes 70. In 1 study, over 80 ("Octogenarian" and "nonagenarians") [53]. Here, at least, one doesn't have to go beyond the title (or abstract) to know the age group under review.

In a review article in the Journal of the American Academy of Orthopedic Surgeons, Levin *et al.* noted that in most studies, the elderly are patients aged 50 to 75 years [24]. Such a wide range in the age of patients may make it difficult to compare the results of different studies.

Titles of published studies often lack clarity. What is clear is that there is no agreed-upon definition of who is old or older, who is elderly, or who is geriatric. Authors use different age cut-offs when selecting study populations. Therefore, one must be aware when reviewing reports on the treatment of distal radius fractures in older, elderly, and geriatric patients that the subject population is not uniform.

3. What Are the Results of Surgical vs Non-Surgical Treatment of Distal Radius Fractures in the Not-So-Young Patient?

Many authors report favorable outcomes with nonoperative treatment of distal radius fractures in the "not so young" patient, as noted by Zhuang *et al.* [58], who, in 2025, reported that a "growing body of evidence accumulated over the past decade that surgical treatment of older adult distal radius fractures may not lead to improved long-term patient-reported outcomes." They noted that "[s]everal large, randomized, controlled trials have shown that surgical treatment of distal radius fractures in the older adult population (often patients ≥ 60 years) does not lead to differences in patient-reported outcomes at 12 or 24 months after treatment".

Arora, Gabl, Gschwentner *et al.* [43] compared nonoperative treatment versus volar locking plate for unstable Colle's fracture in patients over 70 years and con-

cluded that the subjective and functional outcomes were not different between the 2 groups. They stated that "non-operative treatment may be the preferred method of treatment in this age group". They did report that radiographic results were significantly better in patients treated surgically but "unsatisfactory radiographic outcome in older patients does not necessarily translate into unsatisfactory functional outcome."

In a study published in JAMA Surgery in 2021 comparing surgical plating versus closed reduction in older patients (mean age 71.2 years), the authors reported "no between-group differences in improvement in wrist pain or function at 12 months." [8] The authors reported that their findings "support those of other recent studies that found that VLP [volar locking plate] fixation offered no clinically important advantage over CR [closed reduction] in the treatment of wrist fracture in older patients at 12 months."

Luokkala *et al.* [26] reviewed six randomized controlled trials published between 2011 and 2019, which compared locking plate surgery with non-operative treatment with mean age varying between 59 and 80 years. The authors of this review "found no clear evidence of the clinical superiority of distal radius fracture surgery among older patients at one year". They did report that surgery might result in faster recovery, but they nonetheless stated that in elderly patients, non-operative treatment "can be considered to be the gold standard".

Hassellund *et al.* [49] performed a randomized clinical trial comparing cast immobilization to volar plate fixation in patients aged 65 years and older with distal radius fractures and concluded that nonoperative treatment was "non-inferior to operative treatment based on QuickDASH [used to measure physical function and symptoms in the upper extremity] after one year". They did note that patients who underwent surgery recovered faster. However, they concluded that "most elderly patients may be treated nonoperatively".

In 2025, Bell *et al.* [3] published a review of randomized controlled trials comparing operative and nonoperative management of patients with dorsally displaced distal radius fractures. In older patients (aged greater than 65 years), there were no significant or clinically relevant differences in functional outcome. The authors concluded that "in older adults, there was no significant or clinically meaningful benefit of surgery."

Egol *et al.* compared operative with nonoperative treatment in patients over the age of 65 and noted "minor" limitations in range of wrist motion and diminished grip strength in the non-operative patients but these "do not seem to limit functional recovery at one year." [19] They found no difference in DASH (disabilities, arm, shoulder, hand) scores and pain scores between the groups.

Chen *et al.* [15] performed a systematic review and meta-analysis of operative vs nonoperative management of distal radius fractures in the elderly, defined as 60 years and older. They found grip strength significantly greater in the operative group and radiographic outcomes were significantly better in the operative group. However, they noted a significantly higher incidence of complications requiring

surgery in the operative group. They did not detect statistically significant differences in pain level or function between operative and nonoperative groups. They concluded that the "current literature does not support the theory that operative management can provide better clinical outcome for patients with distal radius fractures".

Diaz-Garcia *et al.*, in a systematic review of 21 papers with mean patient age 60 and over, reported that for patients treated with cast immobilization, functional outcomes were no different than surgically treated patients [18]. This is despite worse radiographic outcomes in patients treated with cast immobilization.

Yang *et al.* [33] reported a meta-analysis comparing volar locking plates and cast immobilization for distal radius fractures in the elderly (aged 60 years or older). At 2-year follow-up they found no significant long-term clinical advantage of surgical treatment over casting.

Li, Ke *et al.*, in a study published in 2020, performed a systematic review and meta-analysis comparing volar locking plate fixation versus nonoperative treatment for "elderly patients" (participants aged above 50 years). They reported no significant differences in disabilities of arm, shoulder, and hand (DASH) scores, complications, or range of motion [25].

Surgery for distal radius fracture may provide better grip strength, better looking radiographs, perhaps a faster recovery, but numerous studies report no long-term advantage with surgical treatment in older patients. However, it is clear that many older patients do undergo surgery. Zhuang *et al.* analyzed the proportion of patients (aged 18 or older) who underwent open reduction internal fixation of distal radius fractures between 2012 and 2020. They found that the "proportion of distal radius ORIF [open reduction internal fixation] including in older adult populations is increasing." [58]

Is surgery in the older patient all for naught? Not necessarily. Some reports do document a more favorable, or potentially more favorable outcome in the older population.

Martinez-Mendez *et al.* [27] performed a randomized prospective study of intra-articular distal radius fracture compared open reduction internal fixation with volar plate versus closed reduction and cast immobilization in patients older than 60 years. They reported better functional and quality of life scores (and better radiographs) in the surgery group.

Südow *et al.* [56] in a randomized control trial comparing nonoperative treatment with volar locking plate fixation for displaced distal radius fractures in patients over 70 years reported better outcomes in the surgically treated patients. "Surgery with volar locking plate gave less long-term disability compared to nonoperative treatment for severely displaced radius fractures in patients aged ≥70 years."

Shen *et al.*, in a systematic review and meta-analysis of patients 60 years and over with distal radius fractures, found volar plate fixation provided greater grip-strength and fewer complications compared with nonoperative treatment [54].

They concluded that volar locking plate fixation "may provide meaningful benefits in patients aged 60 - 80."

ter Meulen *et al.* [31] in their randomized controlled non-inferiority trial comparing cast versus surgery for displaced intra-articular distal radius fractures could not conclude that casting was non-inferior to surgery, findings which in their opinion "possibly further strengthen the case for surgical intervention". It should be noted that the mean age of their patients was 76 years.

Saving *et al.* [1] compared nonoperative treatment with volar locking plate fixation for dorsally displaced distal radius fractures in a randomized control trial involving elderly patients. They found better PRWE (patient-rated wrist evaluation) scores, better DASH scores, and better grip strength for the surgically treated group compared with the nonoperative group at 3 and 12 months. Complication rates were similar. The authors stated that their results "imply" that there is a "benefit" with surgical treatment. The commentary which followed this article felt that the result "encourages more aggressive management" for distal radius fractures in elderly patients [59].

Jayaram, Wood *et al.* [5] performed a network meta-analysis of randomized controlled trials comparing casting with surgical treatment (ORIF, Ext-Fix, etc.) and found surgery provided clinically significant improvement at one year end point compared with casting. Perhaps of some importance is that while the title of the article refers to "older adults" the mean age of patients in the randomized controlled studies was 50 years or older.

Just as the literature on distal radius fractures is vast, so too is the literature on distal radius fractures in older patients. In such a vast arena, it is possible to find literature supporting surgical or non-surgical treatment for this injury. While the majority of the literature is supportive of non-operative management, it should be noted that most studies comparing operative versus nonoperative treatment show faster recovery in patients treated surgically and better grip strength. Despite this, and despite improved radiographic appearance with surgical treatment, most studies show that clinical outcomes are not improved by surgery and that by one year after injury, limitation in range of motion and diminished grip strength do not adversely affect function in the non-surgically treated population.

4. Activity Level

Patient age is frequently used as a parameter for decision-making when determining whether to operate on patients with distal radius fractures. The American Academy of Orthopedic Surgeons (AAOS) published an evidence based clinical practice guideline for management of distal radius fractures (2020) [60] in which they stated that "strong evidence suggests that operative treatment for geriatric patients (most commonly defined in studies as 65 years of age and older) does not lead to improved long-term patient reported outcomes compared to nonoperative treatment". They did note that age is often used as a proxy for functional demand and that "a high functioning patient with high functional demands, despite having

an age greater than 65 may benefit from operative fixation."

Not only is there a lack of agreement as to who is old or older, who is elderly, and who is geriatric, but there is also no agreement as to who is "active". Patients older than 70 can be very different from patients between the ages of 60 and 70 [35]. Jayaram *et al.* [6] noted that elderly patients with the same age can differ significantly in activity level and frailty. In recognition of this, attempts have been made to use patient activity level as a factor when considering surgical intervention for distal radius fracture. For example, Medda *et al.* state that operative intervention should be considered in the "active geriatric patient" [39].

However, determining who is active and who is not active is difficult. Assessing a patient's activity level is often subjective and may be time-consuming. It's not uncommon for a surgeon to conclude that their 80- or 75-year-old patients are "active" as a rationale for surgical intervention. Patients may like to believe that they are "active". Harper *et al.* [61] asked whether surgeons could accurately predict the level of activity in patients with distal radius fractures. The mean age of the study population was 58.5 years. The authors reported that the surgeons' assessment of patient activity level did not have strong agreement with the patients' assessment of their activity level and that surgeons overestimated patient activity level. Grandizio *et al.* [62] found that "surgeons demonstrated difficulty assessing their patients' self-reported functional status...and levels of self-efficacy during initial consultations".

It is certainly true that elderly patients with the same chronological age can vary greatly in activity level and frailty. Of course, the same might be said of young patients.

If surgery is performed on older adults identified as "highly active", do we get better outcomes compared to other highly active adults who are treated nonoperatively? Nelson, Stepan *et al.* [10] concluded that "even among highly active older adults, distal radius malunion does not impact functional outcomes". In their patient population, aged greater than 60 years, surgical management allowed earlier wrist motion and improved appearance but was unlikely to change functional outcome and was associated with a greater risk of complication.

Larouche *et al.* [51] found that "even in high-functioning adults older than 55 years, there was no difference in patient-reported outcomes at 1 year in the open reduction group as compared with the closed reduction group".

Activity level is sometimes used as a substitute for chronological age when considering surgical intervention in the not-so-young patient. The AAOS guidelines, while acknowledging that a high-functioning patient with high functional demands over 65 might benefit from surgery, also recommended a "patient-centered discussion understanding an individual patient's values and preferences". These discussions take time, require careful listening, and should be informed by an understanding of medical literature. Successful surgery can improve x-ray appearances and can avoid cosmetic displeasing appearances at the distal forearm (something not to be discounted, especially in thin patients).

5. What about Radiographs?

Latypov *et al.* [63] reported the results of their systematic review and meta-analysis of randomized controlled trials comparing volar locking plates versus closed reduction and immobilization for distal radius fractures in patients 60 years or older and found that, despite demonstrating better radiologic results, surgical treatment does not provide clinically relevant benefits compared with closed reduction and immobilization at 12-month follow-up.

In their comprehensive review, Aponte-Reyes *et al.* [13] posed the question, "Does radiographic alignment predict functional outcomes in elderly patients with distal radius fractures?" They concluded that radiographic alignment alone was an inconsistent prediction of functional recovery.

Arora *et al.* [43], in a comparative study of clinical and radiologic outcomes of unstable Colles' type distal radius fractures in patients older than 70 years who underwent either nonoperative or volar locking plate fixation, noted significantly better radiographic results in the surgically treated patients, but at mean follow-up 4 years 7 months, there was no difference between subjective and functional outcomes for surgical and nonsurgical treatments. The authors noted that "unsatisfactory radiographic outcome in older patients does not necessarily translate into unsatisfactory functional outcome".

Chung *et al.* [4] assessed the association between radiographic measures of reduction and functional and patient-reported outcomes. Their results "suggest that precise restoration of wrist anatomy is not associated with better patient outcomes for older adults" (60 years or older) with distal radius fractures 12 months following treatment.

Lawson *et al.* [9] noted that in patients aged 60 years and older treated with wrist fractures, final radiographic alignment did not correlate with patient-reported function at 12 months.

Clement *et al.* [16] reported/found that in the "super-elderly" patients (greater than 80 years old), radiographic malunion of the distal radius does not influence functional outcomes of independent super elderly patients.

Synn *et al.* [11] similarly noted no relationship between radiographic outcomes and subjective or objective functional outcomes in their older patient group.

Egol *et al.* [19] reported "superior" radiographic results with operative treatment of unstable distal radius fractures compared with nonoperative treatment in patients greater than 65 years of age, but no difference in functional status or reported pain.

6. Complications

Regardless of the age of the patient, there is a risk of complications when treating distal radius fractures with surgery. Is the risk of complication higher in the older/"not so young" patient?

Chen *et al.* [15], in a systematic review and meta-analysis of safety and efficacy of operative versus nonsurgical management of distal radius fractures in the el-

derly (patients aged 60 years or older) found that while surgery can provide better radiographic outcomes and grip strength than nonsurgical treatment, "the risk of complications requiring surgical treatment is greater".

Diaz-Garcia *et al.* [18] performed a systematic review of outcomes and complications of treating unstable distal radius fractures in the elderly (mean age of 60 and older). They reported that cast immobilization had the lowest rate of complications and volar locking plate surgery had "significantly more major complications requiring additional surgical intervention".

Lutz *et al.* [52] in a study that matched fracture severity, sex, age, and energy of injury in patients older than 65 years found that elderly patients who underwent surgery had higher complication rates than those treated nonsurgically.

In contrast, Shen *et al.* [54] in a systematic review and network analysis, which compared functional outcomes and complications between nonoperative treatment and surgery for distal radius fractures in patients 60 years and older reported that volar locking plate resulted in fewer complications (and better grip strength).

Jayaram *et al.* [5] in a review of randomized clinical trials including patients with a mean age of 50 years or older found no increase in 1-year complication rates in those patients who underwent open reduction internal fixation compared with casting.

Saving *et al.* [1] in a randomized controlled trial compared nonoperative treatment with volar locking plate fixation for dorsally displaced fractures in the elderly (70 years and older). They reported 11% complications in the nonoperative group compared with 14% in the surgically treated group. Minor complications were 11% in the nonoperative group and 20% in the surgical group. Despite the differences, the authors described complication rates as "similar".

The lack of standardization as to what constitutes a complication and the lack of agreement regarding the classification of complications limit our ability to compare studies of complications following distal radius fracture beyond acknowledging the preponderance of evidence, which suggests a lower complication rate in those treated nonoperatively.

7. Limitations

A limitation of the commentary is that, as noted in the introduction, there is no agreed-upon definition as to who is "not so young". "Old" and "older", "geriatric" and "elderly" are included in titles of the articles cited but age thresholds vary from study to study and patients therefore are a heterogeneous group. Also, fracture patterns may vary from study to study. Some studies are retrospective only, others are systematic literature reviews. Outcome measures are often not specified and terms such as "function" and "activity level" are not precisely defined. Length of follow-up varies from study to study. Nonetheless, a clear majority of studies note that fractures of the distal radius in the not-so-young age group, regardless of the nature of the fracture, fracture pattern, displacement or activity level of the patient, do well with nonoperative management.

Also, the reports do not always characterize the distal radius fracture pattern, whether intra-articular or not, the amount of displacement, the severity of the injury and the stability of reduction in patients treated nonoperatively.

Comparing studies is difficult for several reasons. Age of patients varied considerably from one study to another. For example, Jayaram *et al.* [5] included randomized controlled trial in which the mean age (not the minimum age) was 50. Saving evaluated patients over 70 years. More important was the lack of a standardized definition of what constitutes a complication. Lutz *et al.* [52] divided complications as minor, moderate, or severe with severe reserved for patients requiring reoperation. Diaz-Garcia categorized complications into 3 groups: minor, major not requiring surgery, and major requiring surgery. For Saving *et al.*, "life-threatening events" or complications requiring surgical events were considered major. All other complications were considered minor. While Shen *et al.* reported fewer complications in patients undergoing volar locking plate surgery, they did provide some context. They stated that interpretation of complications is "nuanced" [54].

In some studies, malunion is considered a complication despite the fact that radiographic alignment does not predict outcome.

8. Summary

The literature on distal radius fractures in the "not-so-young patient" is extensive. It is clear that there is a lack of unanimity of findings—and opinions—regarding treatment of distal radius fractures in the "not so young". It is easy to look at an X-ray, see the fracture of the distal radius, and decide to operate on the basis of X-ray findings alone. The hard part—and the necessary part—is to look not just at the X-ray but to look at the patient, too. Looking at the patient means discussing the nature of the injury, discussing options for treatment—surgical and nonsurgical—and answering questions. Not only answering the patients' questions, but also answering our own questions about what is best. We must acknowledge our own limitations, too. Knowing that there is probably no single answer for all is part of the process. Shared decision making is more than a stock phrase. Faidley and London, noting that "[t]here is no single best option for treatment of distal radius fractures across all domains", also stated that this "allows" physicians to engage in shared decision making. A better assessment is that this mandates that we proceed with shared decision-making, for the benefit of our patients.

"*It's what you learn after you know it all that counts.*"

—attributed to John Wooden, legendary basketball coach

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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