

Review Article

Operative Versus Non-Operative Management of Distal Radius Fractures in Patients Over Sixty-Five

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Received: 12 March 2026; Accepted: 1 June 2026; Published: 26 August 2026; DOI: 10.5281/zenodo.22328064

Citation of this article: Perrin J, Butkute M, Iliev E (2026) Operative Versus Non-Operative Management of Distal Radius Fractures in Patients Over Sixty-Five. Int J Orthop, 7(1): 01-06.

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Abstract

Background: Distal radius fractures are among the most common fragility fractures in older adults, and the choice between surgical fixation and closed reduction with casting remains contested.

Objective: To synthesise randomised evidence on operative versus non-operative management of distal radius fractures in patients over sixty-five.

Methods: Narrative review of randomised trials, secondary trial analyses, systematic reviews, and economic evaluations.

Findings: Trials including WRIST, Saving et al., Hassellund et al., DRIFT, and DART show surgery restores earlier grip strength and alignment, but twelve-month patient-reported wrist differences are frequently small, often below the minimal clinically important difference. Radiographic malalignment does not reliably predict poor function. Economic analyses show comparable or higher cost with surgery.

Conclusions: Operative fixation benefits selected physiologically robust or high-demand patients, while casting remains a reasonable default for most patients over sixty-five.

Keywords: Distal radius fracture; Volar locking plate; Non-operative treatment; Geriatric orthopaedics; Patient-rated wrist evaluation

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Introduction

Distal radius fracture is one of the most frequent fractures encountered in orthopaedic practice, with an incidence pattern that peaks in children and again, more steeply, in women after the sixth decade as bone mineral density declines [1]. In patients over sixty-five, the fracture is frequently the sentinel event that brings an osteoporotic, often multimorbid patient to orthopaedic attention, and the treatment decision must weigh functional demand, bone quality, cognitive status, and surgical risk against the modest but real advantages of anatomical reduction. Options span the non-operative pathway of closed reduction and cast immobilisation and a spectrum of

operative techniques — percutaneous Kirschner-wire fixation, volar locking plate osteosynthesis, and external fixation — each with distinct trade-offs in invasiveness, cost, and recovery trajectory.

For younger, high-demand patients the case for anatomical restoration via volar locking plate fixation is well established: precise reduction of the radiocarpal joint, restoration of radial length and inclination, and correction of dorsal tilt are widely taught as prerequisites for a good functional outcome. Whether the same logic extends to patients over sixty-five, in whom functional tolerance of residual deformity is often greater, bone quality poorer, and surgical and anaesthetic risk higher, has been the subject of a substantial and maturing randomised-trial literature over the past fifteen years. The clinical stakes are considerable: an ageing population means the absolute number of these fractures in patients over sixty-five continues to rise, and the treatment choice affects not only wrist function but also independence in activities of daily living, fall risk during immobilisation, and downstream healthcare cost. This review synthesises that evidence, from early single-centre trials through the large multicentre Wrist and Radius Injury Surgical Trial (WRIST) and the more recent DRIFT, DRAFFT2, and DART trials, together with radiographic, complication, and cost-effectiveness data, to characterise where operative and non-operative management each perform best in this population.

Landmark Randomised Trials

Early evidence came from single-centre randomised trials. Egol and colleagues randomised elderly patients with displaced distal radius fractures to operative or non-operative care and found no significant difference in validated functional outcome scores at one year, despite better early radiographic parameters with surgery [2]. Arora et al. similarly randomised patients sixty-five and older with displaced, unstable fractures to volar locking

plate fixation or cast treatment, reporting superior early Disabilities of the Arm, Shoulder and Hand (DASH) and grip-strength outcomes with surgery, narrowing over the first year [3]. Martinez-Mendez et al. randomised older patients with intra-articular fractures specifically to volar plating or casting and found that surgical plating produced significantly better Patient-Rated Wrist Evaluation (PRWE), DASH, and quality-of-life outcomes, with one-quarter of casted patients experiencing secondary loss of reduction [4]. A more recent Austrian trial similarly compared surgical and conservative therapy in older patients, again reporting a functional advantage for surgery in appropriately selected patients [5].

Table 1: Selected randomised controlled trials of operative versus non-operative management of distal radius fractures in patients over sixty-five [2,3,4,5,6,8,9,10,11].				
Trial	Comparison	Population	Follow-up	Key finding
Egol 2010	Operative vs non-operative	Displaced DRF, elderly	1 year	No difference in validated functional score
Arora 2011	Volar locking plate vs cast	Age ≥65, unstable DRF	1 year	Early DASH/grip advantage for surgery, narrowing by 1 year
Martinez-Mendez 2018	Volar plating vs cast	Elderly, intra-articular DRF	2 years	Better PRWE/DASH with surgery; 25% cast loss of reduction
Haslhofer 2024	Surgery vs conservative	Older patients, DRF	1 year	Functional advantage for surgery in selected patients
Saving 2019	Non-operative vs volar locking plate	Age >65, dorsally displaced DRF	1 year	Non-operative treatment not clinically inferior
Hassellund 2021	Cast vs volar locking plate	Age ≥65, displaced DRF	1 year	Cast non-inferior on QuickDASH; surgery better early PRWE
DRIFT 2025	Non-operative vs volar locking plate	Age ≥65, malaligned DRF	1 year	PRWE favours surgery, below MCID threshold
DART 2025	Cast vs surgery	Elderly, intra-articular DRF	1 year	Crude ITT inconclusive; adjusted analysis non-inferior for cast

Trial	Comparison	Population	Follow-up	Key finding
WRIST 2020	Internal fixation, external fixation, pinning, cast	Age ≥60, DRF	12 and 24 months	No difference in primary functional outcome

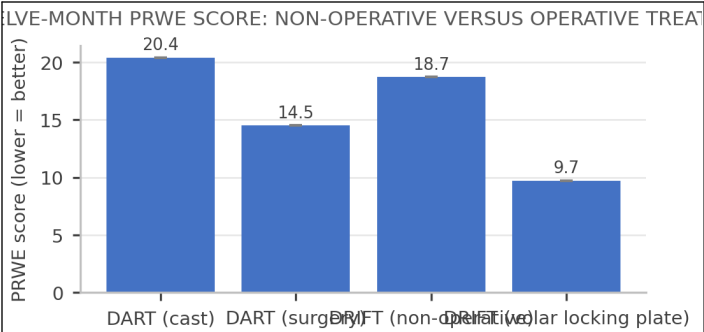


Figure 1: Mean Patient-Rated Wrist Evaluation (PRWE) score at twelve months, non-operative versus operative treatment, in the DART trial (cast versus surgery, substantially displaced intra-articular fractures) and the DRIFT trial (non-operative versus volar locking plate, primarily malaligned fractures) [10,9].

Larger and more recent trials have tempered this picture. Saving et al. randomised patients over sixty-five with dorsally displaced fractures to non-operative treatment or volar locking plate fixation, finding that non-operative treatment did not produce clinically inferior patient-reported outcomes at one year, a finding that a three-year follow-up in patients over seventy from the same group confirmed remained durable [6,7]. Hassellund et al. found cast immobilisation non-inferior to volar locking plates on the QuickDASH at one year in patients aged sixty-five and older, although the operative group reported better wrist-specific scores and greater satisfaction at three and six months [8]. The Distal Radius Intervention For The elderly Trial (DRIFT) randomised patients sixty-five and older with malaligned fractures and found that volar locking plating produced significantly better twelve-month PRWE scores than non-operative treatment among primarily malaligned fractures (mean PRWE 9.7 versus 18.7; difference -9.6, 95% CI -17.4 to -1.7), though the difference was smaller than the

pre-specified minimal clinically important difference of eleven points, and was not statistically significant among fractures that lost alignment only after initial reduction (Figure 1) [9]. The Dutch DART trial, a multicentre non-inferiority trial in patients with substantially displaced intra-articular fractures, found a twelve-month PRWE of 20.4 with casting versus 14.5 with surgery in intention-to-treat analysis (Figure 1) — a difference the authors deemed inconclusive for non-inferiority in the crude analysis, though adjusted and as-treated analyses supported non-inferiority of casting, with surgery associated with more reoperations for hardware removal (Table 1) [10].

The largest trial to date, WRIST, randomised adults sixty and older across international centres to internal fixation, external fixation, percutaneous pinning, or casting. At twelve months there was no significant difference by treatment group in the primary Michigan Hand Outcomes Questionnaire score, although internal fixation produced faster early recovery and better radiographic alignment; nearly half of casted patients developed a malunion yet still achieved satisfactory function [11]. Twenty-four-month follow-up confirmed durable equivalence in patient-reported outcome across groups [12]. A WRIST secondary analysis of complications among adults sixty and older found that complication profiles differed by treatment type without translating into a clear functional advantage for any single approach [13], and a further secondary analysis found that radiographic parameters of anatomic restoration were not associated with functional or patient-reported outcomes at twelve months, suggesting that precise anatomic reduction may have limited prognostic value in this age group [14]. Hand-therapy utilisation, rather than treatment modality alone, was independently associated with better long-term recovery across the WRIST cohort [15]. A subsequent WRIST analysis stratifying by physiological

rather than chronological age found that frailty, not age alone, better predicted differential benefit from surgery [16].

Operative-Technique Comparisons

Because "operative management" spans several techniques, trials comparing operative options inform which fixation strategy to select when surgery is chosen. The UK DRAFFT trial randomised adults with dorsally displaced fractures to percutaneous Kirschner-wire fixation or volar locking plate fixation and found no clinically relevant difference in PRWE at three, six, or twelve months (difference at twelve months -1.3 , 95% CI -4.5 to 1.8), with five-year follow-up confirming durable equivalence [17,18]. Grewal et al. randomised patients with unstable fractures to open reduction with dorsal plating or percutaneous fixation with external fixation, again finding broadly comparable functional recovery [19,20]. Most directly relevant here, the DRAFFT2 trial randomised adults with dorsally displaced fractures to plaster casting or Kirschner-wire fixation: PRWE at twelve months was statistically indistinguishable between casting (mean 21.2) and surgery (20.7), though 13% of casted patients required subsequent surgical fixation for early loss of position compared with under 1% of the surgical group (Figure 2) [21].

Radiographic Alignment and Complications

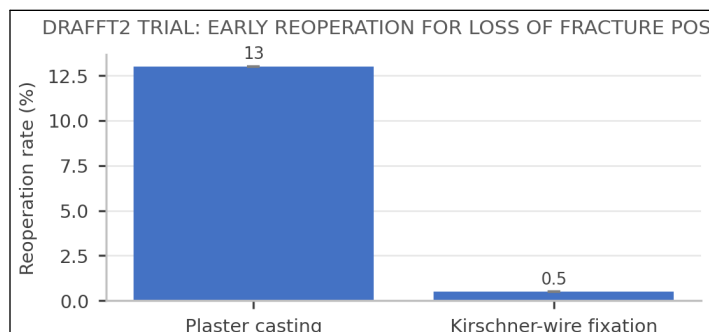


Figure 2: Proportion of patients requiring reoperation within six weeks for early loss of fracture position, plaster casting versus Kirschner-wire fixation, in the DRAFFT2 trial [21].

A recurring theme across this literature is the weak correlation between radiographic alignment and patient-reported function in older adults. Diaz-Garcia and colleagues' systematic review of unstable distal radius fractures in the elderly found that malunion was common after non-operative treatment but was frequently well tolerated functionally, complicating simple recommendations based on radiographic criteria alone [22]. A 2023 systematic review and network meta-analysis of functional outcomes and complications in patients sixty and older across volar locked plating, Kirschner-wire fixation, external fixation, and conservative treatment found no clearly superior modality for long-term function, while complication profiles varied by technique [23].

Cost and Cost-Effectiveness

Economic evidence has increasingly informed this debate. A cost analysis nested within a European randomised trial found operative treatment approximately \$291 more costly per patient than casting on average, though the difference was not statistically significant and surgery became cost-saving for employed patients returning to work sooner [24]. A separate Norwegian economic evaluation concluded that surgical treatment was not cost-effective compared with non-operative treatment in patients sixty-five and older [25]. A trial-based economic evaluation alongside the DART study found a small non-significant societal cost difference favouring casting, but modelled cost-effectiveness modestly favoured surgery once quality-adjusted life-years were incorporated (Table 2) [26].

Table 2: Economic evaluations comparing operative and non-operative treatment of distal radius fractures in older adults [24,25,26].			
Study	Comparison	Cost outcome	Conclusion
Selles 2021	Volar plate vs plaster cast	Mean cost +\$291 with surgery (95% CI -\$1286 to \$1572)	Not significantly different; surgery cost-saving if employed

Study	Comparison	Cost outcome	Conclusion
Hassellund 2021 (cost)	Surgery vs non-operative, age ≥65	Higher surgical cost without offsetting benefit	Surgery not cost-effective
ter Meulen 2026 (DART)	Cast vs surgery, elderly intra-articular DRF	Societal cost difference – 81 favouring cast (95% CI – 3936 to 3773)	Low probability cast is cost-effective; surgery modestly favoured

Synthesis and Clinical Implications

Taken together, this body of evidence resists a single blanket recommendation. Trials that enrolled younger-elderly, more active cohorts or restricted entry to substantially displaced intra-articular fractures — Arora, Martinez-Mendez, DRIFT's primarily malaligned subgroup, and Haslhofer's cohort — tend to show a functional advantage for surgery that persists to one year. Trials with broader inclusion criteria and more physiologically heterogeneous, frailer populations — WRIST, Saving, Hassellund, and DART — tend to show convergence of functional outcomes by six to twelve months regardless of treatment, even when early recovery and radiographic alignment favour surgery. This pattern suggests that the population enrolled, not merely the intervention tested, drives much of the apparent heterogeneity across trials, and argues against extrapolating results from one elderly subgroup to the full spectrum of patients over sixty-five. Shared decision-making that incorporates baseline hand dominance, occupational and recreational demand, cognitive capacity to tolerate a cast, fall risk, and patient tolerance for a second procedure to remove hardware is therefore central to individualising treatment, rather than relying on chronological age or radiographic displacement thresholds alone.

Conclusion

Fifteen years of accumulating randomised evidence show

a consistent pattern: operative fixation of distal radius fractures in patients over sixty-five reliably restores earlier grip strength and radiographic alignment, but translates into a clinically meaningful patient-reported functional advantage only inconsistently, and rarely beyond the first six months. Malalignment after non-operative treatment is common yet often functionally well tolerated, complication profiles differ by technique rather than clearly favouring one approach, and cost-effectiveness data do not uniformly favour surgery. Physiological reserve, hand dominance, functional demand, and patient preference — more than chronological age or radiographic criteria alone — should guide the choice between cast immobilisation and operative fixation in this growing population, and future trials would benefit from pre-specified frailty-stratified analyses to clarify which patients over sixty-five stand to gain the most from surgery.

References

1. Nellans, K.W., Kowalski, E., Chung, K.C. (2012) The epidemiology of distal radius fractures. *Hand Clinics*, 28(2): 113-125.
2. Egol, K.A., Walsh, M., Romo-Cardoso, S., Dorsky, S., Paksima, N. (2010) Distal radial fractures in the elderly: operative compared with nonoperative treatment. *Journal of Bone and Joint Surgery (American)*, 92(9): 1851-1857.
3. Arora, R., Lutz, M., Deml, C., Krappinger, D., Haug, L., Gabl, M. (2011) A prospective randomized trial comparing nonoperative treatment with volar locking plate fixation for displaced and unstable distal radial fractures in patients sixty-five years of age and older. *Journal of Bone and Joint Surgery (American)*, 93(23): 2146-2153.
4. Martinez-Mendez, D., Lizaur-Utrilla, A., de-Juan-Herrero, J. (2018) Intra-articular distal radius fractures in elderly patients: a randomized prospective study of casting versus volar plating. *Journal of Hand Surgery (European Volume)*, 43(2): 142-147.
5. Haslhofer, D.J., Froschauer, S.M., Gotterbarm, T., Schmidt, M., Kwasny, O., Holzbauer, M. (2024) Comparison of surgical and conservative therapy in older patients with distal radius fracture: a prospective randomized clinical trial. *Journal of Orthopaedics and Traumatology*, 25(1): 46.
6. Saving, J., Severin Wahlgren, S., Olsson, K., Enocson, A., Ponzer, S., Sköldenberg, O., Wilcke, M., Mellstrand Navarro, C. (2019) Nonoperative treatment compared with volar locking plate fixation for dorsally displaced distal radial fractures in the elderly. *Journal of Bone and Joint Surgery (American)*, 101(11): 961-969.
7. Südwow, H., Severin, S., Wilcke, M., Saving, J., Sköldenberg, O., Mellstrand Navarro, C. (2022) Non-operative treatment or volar locking plate fixation for dorsally displaced distal radius fractures in patients over 70 years - a three year follow-up of a randomized controlled trial. *BMC Musculoskeletal Disorders*, 23(1): 447.
8. Hassellund, S.S., Williksen, J.H., Laane, M.M., Pripp, A., Rosales, C.P., Karlsen, Ø., Madsen, J.E., Frihagen, F. (2021) Cast immobilization is non-inferior to volar locking plates in relation to QuickDASH after one year in patients aged 65 years and older: a randomized controlled trial of displaced distal radius fractures. *Bone & Joint Journal*, 103-B(2): 247-255.
9. Hevonkorpi, T.P., Launonen, A.P., Reito, A., Schandorff Skjærbæk, M., Li, Y., Luukkala, T., et al. (2025) Nonoperative treatment versus volar locking plating for distal radius fracture in patients aged 65 years or older (DRIFT trial): a randomized controlled trial. *PLOS Medicine*, 22(9): e1004728.
10. ter Meulen, D.P., Selles, C.A., Kret, E.J., et al. (2025) Cast versus surgery for displaced intra-articular distal radius fractures in the elderly: a randomized clinical noninferiority trial (the DART study). *JBJS Open Access*, e25.00060.

11. Chung, K.C., Kim, H.M., Malay, S., Shauver, M.J.; Wrist and Radius Injury Surgical Trial Group. (2020) The Wrist and Radius Injury Surgical Trial: 12-month outcomes from a multicenter international randomized clinical trial. *Plastic and Reconstructive Surgery*, 145(6): 1054e-1066e.
12. Chung, K.C., Kim, H.M., Malay, S., Shauver, M.J.; Wrist and Radius Injury Surgical Trial Group. (2021) Comparison of 24-month outcomes after treatment for distal radius fracture: the WRIST randomized clinical trial. *JAMA Network Open*, 4(6): e2112710.
13. Chung, K.C., Malay, S., Shauver, M.J., Kim, H.M.; Wrist and Radius Injury Surgical Trial Group. (2019) Assessment of distal radius fracture complications among adults 60 years or older: a secondary analysis of the WRIST randomized clinical trial. *JAMA Network Open*, 2(1): e187053.
14. Chung, K.C., Cho, H.E., Kim, Y., Kim, H.M., Shauver, M.J.; Wrist and Radius Injury Surgical Trial Group. (2020) Assessment of anatomic restoration of distal radius fractures among older adults: a secondary analysis of a randomized clinical trial. *JAMA Network Open*, 3(1): e1919433.
15. Chung, K.C., Malay, S., Shauver, M.J. (2019) The relationship between hand therapy and long-term outcomes after distal radius fracture in older adults: evidence from the randomized Wrist and Radius Injury Surgical Trial. *Plastic and Reconstructive Surgery*, 144(2): 230e-237e.
16. Jayaram, M., Wu, H., Yoon, A.P., Kane, R.L., Wang, L., Chung, K.C. (2023) Comparison of distal radius fracture outcomes in older adults stratified by chronologic vs physiologic age managed with casting vs surgery. *JAMA Network Open*, 6(2): e2255786.
17. Costa, M.L., Achten, J., Parsons, N.R., Rangan, A., Griffin, D., Tubeuf, S., Lamb, S.E.; DRAFFT Study Group. (2014) Percutaneous fixation with Kirschner wires versus volar locking plate fixation in adults with dorsally displaced fracture of distal radius: randomised controlled trial. *BMJ*, 349: g4807.
18. Costa, M.L., Achten, J., Rangan, A., Lamb, S.E., Parsons, N.R. (2019) Percutaneous fixation with Kirschner wires versus volar locking-plate fixation in adults with dorsally displaced fracture of distal radius: five-year follow-up of a randomized controlled trial. *Bone & Joint Journal*, 101-B(8): 978-983.
19. Grewal, R., Perey, B., Wilmsink, M., Stothers, K. (2005) A randomized prospective study on the treatment of intra-articular distal radius fractures: open reduction and internal fixation with dorsal plating versus mini open reduction, percutaneous fixation, and external fixation. *Journal of Hand Surgery (American)*, 30(4): 764-772.
20. Grewal, R., MacDermid, J.C., King, G.J.W., Faber, K.J. (2011) Open reduction internal fixation versus percutaneous pinning with external fixation of distal radius fractures: a prospective, randomized clinical trial. *Journal of Hand Surgery (American)*, 36(12): 1899-1906.
21. Costa, M.L., Achten, J., Ooms, A., Png, M.E., Cook, J.A., Lamb, S.E., Hedley, H., Dias, J. (2022) Surgical fixation with K-wires versus casting in adults with fracture of distal radius: DRAFFT2 multicentre randomised clinical trial. *BMJ*, 376: e068041.
22. Diaz-Garcia, R.J., Oda, T., Shauver, M.J., Chung, K.C. (2011) A systematic review of outcomes and complications of treating unstable distal radius fractures in the elderly. *Journal of Hand Surgery (American)*, 36(5): 824-835.
23. Shen, O., Chen, C-T., Jupiter, J.B., Chen, N.C., Liu, W-C. (2023) Functional outcomes and complications after treatment of distal radius fracture in patients sixty years and over: a systematic review and network meta-analysis. *Injury*, 54(7): 110767.
24. Selles, C.A., Mulders, M.A.M., van Dieren, S., Goslings, J.C., Schep, N.W.L.; VIPAR Collaborators. (2021) Cost analysis of volar plate fixation versus plaster cast immobilization for intra-articular distal radial fractures. *Journal of Bone and Joint Surgery (American)*, 103(21): 1970-1976.

25. Hassellund, S.S., Zolic-Karlsson, Z., Williksen, J.H., Husby, T., Madsen, J.E., Frihagen, F. (2021) Surgical treatment is not cost-effective compared to nonoperative treatment for displaced distal radius fractures in patients 65 years and over. *Bone & Joint Open*, 2(12): 1027-1034.
26. ter Meulen, D.P., van Dongen, J.M., Kleinlugtenbelt, Y.V., Kraan, G.A., Goslings, J.C., Schep, N.W.L., Willigenburg, N.W., Poolman, R.W.; DART Study Group. (2026) Cost-effectiveness of cast treatment vs. surgery in elderly patients with substantially displaced intra-articular distal radius fractures: a trial-based economic evaluation. *PLOS ONE*, 21(1): e0339489.