

A Prospective Randomized Controlled Trial Comparing Open Reduction and Internal Fixation, Non-Spanning External Fixation, and Closed Reduction with Percutaneous Fixation for Dorsally Displaced Distal Radius Fractures

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Purpose: Displaced distal radius fractures that have failed nonoperative treatment with casting have traditionally been managed with additional fixation using either percutaneous pin fixation, internal fixation, or external fixation. However, the introduction of volar locking plates has resulted in increasing trends in the use of internal fixation and more aggressive fracture fixation without strong evidence to support their superiority over other, less costly, surgical procedures. The primary objective of our study was to compare the functional outcomes of patients with dorsally displaced distal radius fractures treated with (1) closed reduction and percutaneous pinning (CRPP), (2) non-spanning external fixation (NSEF), or (3) open reduction and internal fixation with volar locking plate (ORIF).

Methods: We performed a multicenter randomized controlled trial comparing 3 different surgical procedures in adult patients 18 years and older with dorsally displaced extra-articular and simple intra-articular (<2 mm articular displacement) distal radius fractures that failed closed treatment with casting. The primary outcome measures included the Patient-Rated Wrist Evaluation (PRWE), the Disabilities of the Arm, Shoulder and Hand (DASH) score, and the Short Musculoskeletal Functional Assessment (SMFA). Secondary outcome measures consisted of range of motion (ROM), grip strength, and postoperative complications. Patients were evaluated at 6 weeks and 3, 6, and 12 months.

Results: A total of 201 patients were randomized to either CRPP (n = 66), NSEF (n = 63), or ORIF (n = 72) from 8 different trauma centers. The 3 groups had similar preoperative baseline characteristics. At 1-year follow-up, all 3 groups showed a significant improvement in functional outcome scores although there were no significant differences in any of the primary outcome measures between each group. The secondary outcome measures were also similar between groups at final follow-up.

Conclusion: In adult patients with dorsally displaced distal radius fractures, there was no difference in functional outcome between the 3 surgical interventions at 1-year follow-up. Despite a steady increase in the use of volar locking plates, the choice of fixation for these fractures should be based on cost given the equal effectiveness.