

Is There a Correlation Between Functional Results and Radiographic Findings in Patients with Distal Radius Fractures AO Type A3 Treated with a Volar Locking Plate or an External Fixator?

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Purpose: Volar locking plates (VLPs) and external fixation (EF) are the most commonly used methods for treating distal radius fractures. The goal of the operation is to restore normal anatomy and improve function. The aim of this study was to assess the correlation between functional results and radiographic findings in patients with extra-articular distal radius fractures treated with VLPs or EF after 1 year.

Methods: A multicenter, randomized controlled trial was initiated in 2013 and was completed in 2018. 156 patients with dislocated distal radius fractures, AO type A3, age 18-70 years, were included. 142 patients (91%) completed 1-year follow-up, among whom 69 were allocated to VLPs and 73 to EF. 128 patients (90%) were women. The mean age was 56 years. The primary functional outcome was the Patient-Rated Wrist and Hand Evaluation (PRWHE) score. Radiographically we assessed volar tilt, radial inclination, radial length, and ulnar variance. An additional ulna fracture, if present, was also registered. The Pearson correlation analysis was used to estimate correlations between parameters.

Results: At 1-year follow-up the mean difference in radiographic findings compared to uninjured side (minimum, maximum) was: volar tilt 5.3° (-15°, 25°), radial inclination 2.3° (-6°, 12°), radial length 1.3 mm (-4 mm, 7 mm), and ulnar variance -0.5 mm (-6 mm, 3 mm). Overall, we found no correlation between radiographic parameters and the PRWHE at 1-year follow-up within the whole group, regardless of which treatment was chosen (volar tilt $P = 0.95$, radial inclination $P = 0.34$, radial length $P = 0.62$, and ulnar variance $P = 0.43$). We found no significant difference in radiographic parameters between the 2 surgical methods considering volar tilt (MD [mean difference] = 0.908, $P = 0.34$), radial inclination (MD = -0.97, $P = 0.10$), and radial length (MD = 0.468, $P = 0.30$). However, the ulnar variance was significantly smaller in the VLP group (MD = -0.819, $P = 0.01$). At the time of injury 52.6% ($N = 80$) had sustained an additional fracture of the styloid ulna. After 1 year the fracture was still radiographically present in 30.9% ($N = 43$) of the patients. No correlation between PRWHE score and the presence of an ulna fracture at 1-year follow-up (MD = 2.24, $P = 0.37$) was found.

Conclusion: In this study we found no correlation between functional outcome (PRWHE) and radiographic findings (volar tilt, radial inclination, radial length, ulnar variance, or ulna styloid fracture) after 1 year in patients with AO type A3 distal radius fractures operated with a VLP or EF.