

Minimally Displaced Dorsally Tilted Distal Radius Fractures in Older Patients Collapse in Both Volar and Dorsal Angulation Over Time

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INTRODUCTION: Elderly patients with minimally displaced (MD) distal radius fractures (DRF) are effectively treated nonsurgically, particularly if the carpus is aligned. We hypothesized that elderly patients with minimally displaced fractures may displace during union. The purpose of this study was to evaluate the final radiographic position at union versus the presentation and post-reduction position in minimally displaced fractures treated with closed reduction and casting (CRC).

METHODS: We studied patients aged ≥ 65 presenting with a DRF with ≤ 10 degrees of dorsal tilt treated nonsurgically. We excluded open fractures, associated ulnar metaphyseal fractures, partial articular injuries, and volarly tilted DRFs. CRC was performed in the ER and patients were seen every 2-3 weeks until union by attending surgeons. Recasting was performed for a shift on the lateral radiograph or cast loosening. Measurements of radial height, radial inclination, and dorsal tilt were made on the PA and lateral radiographs at presentation, after initial CRC, and at union. Carpal alignment as per McQueen was determined at presentation, post reduction, and at union.

RESULTS: We studied a consecutive series of 73 patients (19M: 54F) ≥ 65 years old (avg 75; range: 65-96). All patients presented with $\leq 10^\circ$ of dorsal tilt. At presentation, the average dorsal tilt was $2 \pm 7^\circ$, radial inclination $17 \pm 5^\circ$, radial height 8 ± 2 mm. Carpal malalignment was present in 28 (38%) at presentation. Post-reduction tilt averaged $6 \pm 6^\circ$ volar tilt, radial inclination $19 \pm 4^\circ$, and radial height 10 ± 2 mm. At union, the final dorsal tilt averaged $1 \pm 10^\circ$, radial inclination $16 \pm 5^\circ$ and radial height 8 ± 2 mm. Angular drift occurred in both dorsal and volar directions between reduction and union. Seventeen (23%) patients tilted volarly during healing averaging $6^\circ \pm 5$ and 12(16%) were in a position greater than the normal 11° of volar tilt. Fifty-three (73%) patients tilted dorsally during healing, averaging $10^\circ \pm 6^\circ$. Post-reduction, only 11 (15%; 2 dorsal, 9 volar) had mild carpal malalignment that rose to 25 (34%) at union (15 dorsal, 10 volar). These shifts occurred despite an average of 2 cast changes in clinic for cast loosening.

DISCUSSION AND CONCLUSION: Despite all patients starting with minimal dorsal tilt ($\leq 10^\circ$), elderly patients with minimally displaced DRFs must be watched closely for both dorsal and volar shift during healing. Reductions should be performed with limited force as half of those who healed with more than physiologic volar tilt were over-reduced initially.