

Sequential Radiographic Evaluation During Nonoperative Treatment of Distal Radius Fracture

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Purpose: Nonoperative treatment by closed reduction and immobilization is a standard of care in adequately reduced stable type distal radius fractures. The AAOS recommends weekly serial radiographs for 3 weeks to identify early loss of reduction that may alter treatment. The purpose of this study is to test the null hypothesis that there is no significant change in radiographic parameters, which determines an acceptable reduction, beyond 3 weeks in nonoperatively treated distal radius fractures.

Methods: We analyzed a prospectively gathered registry of nonoperatively treated distal radius fractures using radiographic measurements by 2 investigators including radial inclination, radial height, ulnar variance, tilt, teardrop angle, AP distance, intra-articular gap, and step-off. Acceptable reduction was defined as radial shortening <3 mm, dorsal tilt <10°, or fracture with intra-articular displacement or step-off <2 mm. We compared post-reduction radiographic parameters within 2 weeks, the third week, at cessation of immobilization, and performed interobserver reliability test.

Results: There was a statistically significant difference between radiographic measurements, which determined an acceptable reduction between radiographs performed within 2 weeks versus the third week. Radial inclination and ulnar variance were statistically different at the third week versus the time of cessation of immobilization. 77% of patients who had an acceptable reduction after 2 weeks maintained acceptable alignment at cessation of immobilization. 85% of patients who had an acceptable reduction after 3 weeks maintained an acceptable alignment at cessation of immobilization. Radial shortening >1.8 mm at the third week predicts an unacceptable radiographic outcome at cessation of immobilization (sensitivity 94.5% and specificity 90%). There is a high interobserver agreement for all measurements except intra-articular gap and intra-articular step-off. The reliability test of AP distance, teardrop angle, and tilt of post-reduction within 2 weeks was moderate.

Conclusion: Radiographic parameters that determine acceptable reduction for nonoperative treatment of distal radius fracture minimally change after 3 weeks post-reduction. Radial shortening at the third week can be used as a predictor for unacceptable radiographic outcome.