

Does Malunion in Multiple Planes Predict Worse Functional Outcomes in Distal Radius Fractures?

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Background/Purpose: Studies correlating radiographic deformity of the distal radius to clinical or functional outcomes have demonstrated no relationship to date. However, the majority of these studies analyzed only a single anatomic parameter, while few, if any, analyzed multiple parameters occurring in combination. The objective of this study was to investigate whether the total number of radiographic radial malalignments following fracture was associated with poor clinical outcomes.

Methods: Over a 7-year period, 382 patients who sustained a distal radius fracture were enrolled in a prospectively collected database and met our inclusion criteria. Patients were followed for a mean of 11 months. Radiographs were measured and the following parameters recorded: palmar (volar) tilt, radial inclination, radial length, ulnar variance, intra-articular step-off, and osteoarthritis index after initial reduction and at follow-up intervals. Patients were divided in three groups: those with normal radiographic alignment (group 1), those with one abnormal measurement (group 2), and those with two or more abnormal measurements (group 3). Each patient was assessed for the Disabilities of the Arm, Shoulder and Hand (DASH) and Short Form-36 (SF-36) clinical outcome scores, along with functional parameters such as grip strength and range of motion (ROM) during their long-term follow-up visit (between 6 months and 1 year). Clinical outcomes and wrist ROM measurements of the groups were compared using Mann Whitney *U* test and individual radiographic measurements plus the total number of abnormal measurements was correlated with clinical outcome scores and functional parameters using Spearman's correlation coefficient.

Results: 34% of patients had at least one abnormal radiographic measurement after initial reduction (IR), 21% at short-term (ST) and 24% at long-term (LT) follow-ups. The most commonly observed deformity was loss of radial inclination. Nevertheless, the long-term DASH was low (18.17 for group 2 and 12.12 for group 3) and the SF-36 was correspondingly high (77.36 for group 2 and 80.45 for group 3). The only positive finding was a significantly lower percentage of grip strength recovery in group 2 (62%) as compared to group 1 (79%). No individual radiographic measurement of wrist deformity or a combination of these was significantly correlated to any of the clinical outcome scores or functional parameters.

Conclusion: Our data confirm reports from previous studies that no single radiographic measurement was correlated with clinical or functional outcomes. Moreover, if analyzed in combination, malalignment in multiple planes did not result in a higher association with worse outcomes. These data lead us to question the importance of detailed analysis of distal radius radiographic parameters.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.