

Proximal Plate Positioning Does Not Impact Early Peri-Implant Fracture Risk in Dual Plate Fixation of Distal Humerus Fractures

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INTRODUCTION:

The purpose of this study was to determine whether the distance between proximal plate termination position is associated with peri-implant fracture rate in patients undergoing of dual plate operative fixation of both column distal humerus fractures.

METHODS: All patients who underwent open reduction and internal fixation (ORIF) for distal humerus fractures at a single institution over a 10-year period were reviewed. The difference in proximal plate termination position between plates (Δ PP) was measured on post-operative radiographs and patients were divided into 2 groups: same level plating (SL) with Δ PP < 1cm versus different level plating (DL) with Δ PP \geq 1cm. Rates of peri-implant humerus fractures and other complications (e.g. hardware failure, nonunion, fracture-related infection, post-operative neuropathy), rates of radiographic union, and range of motion were compared between groups.

RESULTS: A total of 201 patients who sustained both column distal humerus fractures were included with a mean follow-up time of 12.8 ± 18.1 months. There were 74 patients in the SL group and 127 in the DL group. Mean Δ PP for the SL and DL groups was 5.1 ± 2.3 mm and 26.9 ± 19.1 mm, respectively ($p < 0.0001$). The groups did not differ with respect to age, sex, BMI, American Society of Anesthesiologists (ASA) status, fracture pattern, open/closed fracture, or duration of follow-up ($p > 0.05$). A single peri-implant humeral shaft fracture occurred in the DL group, while none occurred in the SL group. There were more cases of post-operative neuropathy (15.7% vs. 4.1%, $p = 0.022$) in the DL group, and more cases of fracture-related infection (5.4% vs. 0%, $p = 0.034$) in the SL group. The overall post-operative complication rate between groups was not significantly different (33.1% vs. 24.3%, $p = 0.251$). There were no significant differences observed in elbow range of motion, functional outcomes, and rates of radiographic union ($p > 0.05$).

DISCUSSION AND CONCLUSION: The results of this retrospective cohort study challenge the conventional wisdom that dual plates should terminate at different levels proximally to avoid creating a stress raiser that increases the risk of peri-implant fractures following distal humerus ORIF.