

# Hook Plate Fragment Specific Fixation for Volar and Dorsal Rim Distal Radius Fractures

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**Introduction:** Distal radius fractures are one of the most common orthopedic injuries. Several nonoperative and operative treatment options are available depending on the fracture pattern. For fractures that involve the articular surface, operative fixation is usually needed. The gold standard for operative treatment of these types of fractures is locking plate fixation. However, in the setting of unstable articular fracture segments distal to the watershed line, standard locking plates are not able to capture these fragments and can lead to loss of reduction and articular incongruity. This can eventually result in malunion, subluxation, dislocation, and instability of the wrist. To combat these complications, fixation using fragment specific implants such as hook plates, can be used. The hook plate is designed specifically to capture small articular fragments such as the volar and dorsal marginal rim. The plate can be placed distal to the watershed line, with the hook end through the fragment and the screws proximal to maintain reduction. The hook plate has been shown to lead to stable fixation and can be used in conjunction with other implants. However, studies examining radiographic and clinical outcomes of hook plates for both volar and dorsal rim DRF are limited. The purpose of our study is to determine effectiveness of volar and dorsal hook plates in patients with volar and dorsal rim DRF by evaluating clinical and radiographic outcomes. In addition, we will examine the complication profile and need for hardware removal of hook plates in these patients.



Figure 1: (a) left intra-articular dorsal shear distal radius fracture (b) dorsal hook plate fixation

**Results:** A total of 24 patients were identified in our initial chart review. A total of 4 patients were excluded due to lack of adequate follow-up. Our final series included 20 patients, 11 females and 9 males, with an average age of 50 and an average follow up of 7 months (range, 2-23 months). The most common mechanism of injury was a fall on outstretched hand. All patients healed their fractures and had maintenance of reduction at their final follow-up. No patients had hardware failure. Fourteen patients required adjunct plating. Seven of those patients required dorsal spanning plates which were all removed. Other adjunctive plates included: dorsal pin plates (3), and radial styloid pin plate (6). One patient required three hook plates (2 dorsal and one volar), and another required two volar hooks, and five patients required no additional fixation. Two patients had hook plate hardware related complications requiring removal of their hook plate hardware. One patient required removal of the volar hook plate due to pain. Another required removal of a dorsal hook plate due to pain and limited extensor pollicus longus function and wrist supination.

**Materials & Methods:** A retrospective chart review was performed of all patients that had a comminuted, intra-articular distal radius fracture requiring fixation with a hook plate (TriMed, Santa Claris, CA) between January 1, 2016 and April 1, 2021. This study was approved by the institutional review board and was performed at a single institution. Inclusion criteria were patients over 18 years of age with intra-articular distal radius fractures involving the volar and/or dorsal rim and treated with a volar and/or dorsal hook plate. Patients with adjunct plates were included. A minimum follow-up of two months from the date of surgery was required. Exclusion criteria were patients under 18 years of age with distal radius fractures not involving the dorsal and/or volar rim and not treated with a dorsal and/or volar hook plates, and less than two months of follow-up. Hook plate surgical technique was performed as has been previously described. Standard post-operative radiographs were reviewed for fracture union, maintenance of reduction, signs of hardware loosening, and hardware failure. Loss of fixation was defined as plate or screw loosening, carpal translation, or carpal collapse. Radiographs were additionally reviewed for the need for adjunctive plates. Hardware removal for any reason was also recorded.

**Conclusion:** Our study demonstrated that fragment specific plate fixation, specifically hook plates are an effective fixation method for distal radius fracture fragments distal to the watershed line. All patients achieved fracture union with maintenance of reduction. There were no hardware failures and a low hardware complication profile.



Figure 2: (a) left intra-articular volar shear distal radius fracture (b) volar hook plate fixation with adjunct plating