Radiographic and Functional Outcomes following Headless Non-Compression Intramedullary Screw Fixation of Metacarpal Fractures

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INTRODUCTION: Intramedullary screw fixation has emerged as a popular approach for the treatment of displaced metacarpal fractures. The purpose of this study is to investigate functional and radiographic outcomes of a newly designed, fully non-compressive threaded intramedullary nail (t-IMN) for the treatment of metacarpal fractures.

METHODS:

A retrospective chart review was performed on 49 consecutive patients (58 metacarpals) who were treated with t-IMN by three hand surgery fellowship-trained orthopaedic surgeons from October 2018 to September 2021 at a single institution. Patient-reported functional outcomes included *quick* Disabilities for the Arm, Shoulder and Hand (*quick*DASH) questionnaires, visual analog pain scores (VAS; 0-10), return to work/activity time, and overall satisfaction (1-5). Radiographic outcomes included time to radiographic union, change in angulation, and change in metacarpal length/shortening. All postoperative complications were recorded.

RESULTS:

A 50% response rate was achieved (n=24). Overall, patient satisfaction was 4.8 out of 5 at minimum 1-year follow up. Most patients (90%) reported being able to return to work at the same level by an average of 8.4±11.6 weeks postoperatively. Among those who participated in physical activity or sport, 100% returned to their activity at the same level by a mean of 7.8±6.5 weeks. Average *quick*DASH scores were 4.13±11.9 at minimum 1-year follow up. Median radiographic healing time was 5.4 weeks (range, 1.1 to 88.9 weeks). Mean change in metacarpal length from initial to final radiographic follow up was -1.3±1.8mm. Across oblique fractures (N=25), mean change in metacarpal length was -1.6±1.3mm (p=0.412). Mean preoperative, initial postoperative, and final angulation measurements (AP/lateral) were 12.8º/30.2º, 5.1º/7.4º, and 5.8º/7.3º respectively. Five complications were reported: three cases of persistent stiffness, one of which required formal hand therapy; one case of persistent pain; and one malunion/union. No patients required revision surgery nor experienced hardware failure or infection.

DISCUSSION AND CONCLUSION:

Our findings suggest that t-IMN is a safe and effective method for the treatment of surgically indicated metacarpal fractures. t-IMN allows for an overall fast return to work and physical activity, high patient satisfaction, low complication rate, and minimal shortening or change in angulation at final radiographic follow up. Further long-term investigations are warranted that explore clinical outcomes of t-IMN compared to alternate fixation methods.