

# Comparison of Outcomes of Fixation of Extra-Articular Metacarpal Fractures with Intramedullary Headless Compression Screws or Dorsal Plate Fixation.

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## INTRODUCTION:

Metacarpal fractures are the most common hand injuries encountered after routine trauma. Two primary techniques exist for stabilizing extra-articular fractures: percutaneous intramedullary headless compression screws (IMHCS), which provide relative stability through a minimally invasive approach, and open reduction with dorsal plate fixation (ORIF), which achieves rigid, absolute stability. While biomechanical analyses confirm superior construct stiffness with dorsal plating, intramedullary fixation has been shown to accelerate radiographic healing and reduce soft-tissue dissection. The objective of this study is to directly compare patient-reported outcomes, rate of functional recovery, and complication profiles between IMHCS and ORIF in the management of extra-articular metacarpal fractures. We hypothesize that patients treated with IMHCS will report higher overall satisfaction, that functional outcomes will be comparable between the two groups, and that complication rates will not differ significantly between fixation methods.

## METHODS: **Methods**

A single-institution, two-surgeon retrospective cohort study was conducted from 2021 to 2023. Inclusion criteria were patients aged 18–99 years with extra-articular metacarpal fractures; exclusions were patients <18 years, those with intra-articular fractures, and those lacking adequate follow-up. Collected data included demographics, injury/fracture characteristics, surgical technique, and complications. All patients completed pre- and post-operative QuickDASH surveys. Time to return to work and any ongoing functional limitations were recorded and compared between the IMHCS and ORIF groups.

**RESULTS:** Baseline demographic and fracture profiles were comparable between the IMHCS and ORIF cohorts, though fractures treated with ORIF were more frequently accompanied by additional injuries. In the IMHCS group, mean QuickDASH scores improved by 29.9 points post-operatively ( $p = 0.0044$ ), indicating a significant functional gain. Conversely, the ORIF group showed no statistically meaningful change in QuickDASH scores, with nearly 50% of patients reporting worse hand function than at baseline. Return-to-work timelines averaged 37 days for IMHCS versus 52 days for ORIF; this difference did not reach statistical significance. Overall complication rates were slightly elevated in the ORIF cohort, predominantly due to hardware-related issues, two patients required secondary procedures for plate or screw removal.

## DISCUSSION AND CONCLUSION:

### **Discussion**

This study demonstrates that both IMHCS and ORIF offer effective stabilization for extra-articular metacarpal fractures, each with unique benefits: IMHCS provides a percutaneous, tissue-sparing approach that facilitates early motion, whereas ORIF delivers absolute, rigid fixation. Although return-to-work intervals favored IMHCS (mean 37 days) over ORIF (mean 52 days), this difference did not achieve statistical significance, suggesting comparable overall recovery timelines. However, patient-reported outcomes diverged substantially: the IMHCS cohort experienced a mean QuickDASH improvement of 29.9 points ( $p = 0.0044$ ), reflecting meaningful functional gains, while the ORIF group showed no significant score change and nearly half of patients reported worsened function post-operatively. Furthermore, hardware-related complications were more frequent following dorsal plating, with two cases necessitating reoperation for implant removal. These findings underscore the minimally invasive nature and patient-centered advantages of intramedullary fixation, particularly in terms of subjective satisfaction and functional recovery.

### **Conclusion**

Intramedullary headless compression screws yield higher patient satisfaction, significantly improved functional outcomes, and a trend toward faster return to baseline activity compared to dorsal plate fixation for extra-articular metacarpal fractures. Given the lower incidence of hardware complications and superior patient-reported gains, IMHCS should be strongly considered as a first-line technique in appropriately selected fractures.