Unstable Metacarpal Fractures Treated with Intramedullary Nail Fixation

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Background/Purpose: Fractures of the metacarpals account for nearly 36% of all hand fractures. While many metacarpal fractures can be treated through nonsurgical means, unstable metacarpal fractures that are subject to malrotation, displacement, foreshortening, and angulation require reduction and stable fixation. Flexible intramedullary nail (IMN) fixation of fractures has become the cornerstone of treatment of long bone fractures with the medullary cavity. It provides distinct advantages over other methods because it is minimally invasive with minimal soft-tissue dissection, stability of fixation, and enhancing bone healing by preventing distraction of the fracture site. This is a particularly great option for patients presenting multiple metacarpal fractures. This study evaluates outcomes in a case series of unstable metacarpal fractures treated with flexible IMN fixation.

Methods: This study includes 55 cases of fractures healed by clinical and radiographic assessment at an average of 12.7 weeks. The outcomes were assessed via a radiological study of longitudinal and angular collapse, and final functional outcome as measured by the Disabilities of the Arm, Shoulder and Hand (DASH), active wrist range of motion (AROM), and grip and pinch strength tests.

Results: Pins were removed in all cases at an average of 13.9 weeks. Patients regained full finger ROM at final follow-up and were capable of 72.4% of motion at 2 weeks postoperatively. Mean DASH score at final follow-up was 6.5. Complications included three cases of extensor tendon irritation that resolved without functional impairment and two cases of "backing out" that required reoperation to replace the pin. In one case, a bony exostosis formed on the affected metacarpal that led to tendon irritation and required operative excision.

Conclusion: This technique allowed for stabilization of fractures, early range of motion with early resumption of usual activities, reduced immobilization, and minimal complications. A removable orthosis, instead of a cast, allowed for mobilization of the proximal interphalangeal joint.

See pages 99 - 147 for financial disclosure information.