Case Study

Use of the INnate™ Intramedullary Threaded Nail for Spiral Oblique Fractures of the Third and Fourth Metacarpals

Dane N. Daley, MD

Medical University of South Carolina
Charleston, SC

Dr. Dane Daley earned his medical degree from East Tennessee State University College of Medicine and completed a hand fellowship at OrthoCarolina.

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Case Presentation

A 36-year-old male patient sustained spiral oblique fractures with slight comminution to the third and fourth metacarpals after a ground-level fall onto his left hand. After attempted nonoperative management for 10 days and limited function with reported 9/10 pain, the patient elected to proceed with surgery about 16 days after his injury.

Pre-op Plan

Dr. Daley chose closed reduction intramedullary fixation (CRIF) with INnate™ to treat both metacarpals. Reasoning is that this technique is minimally invasive with immediate stabilization and postoperative mobilization. It avoids significant periosteal stripping, incisions, and possible extensor tendon injuries or adhesions associated with an open reduction intramedullary fixation (ORIF). It also enables immediate range of motion (ROM) without pins or a splint that would require a secondary procedure at a later date.

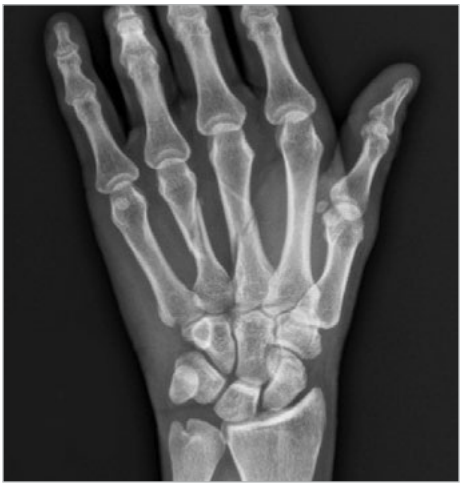
Operative Findings and Approach

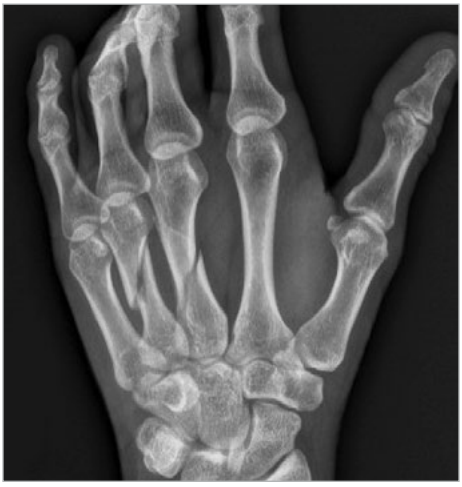
Dr. Daley used the provided depth gauge to determine that 4.5 mm diameter by 45 mm length INnate threaded nails were needed for both metacarpals. Starting with the third metacarpal, he made a 2 mm incision on the dorsal third of the metacarpal head and inserted the provided K-wire across the fracture site under fluoroscope. He then used the cannulated drill to drill over the guide wire, and then threaded the cannulated INnate nail over the guide wire. Using the cannulated driver, the INnate nail was driven until the head was beneath the articular cartilage, to achieve distal purchase in the subchondral bone. Proximal purchase was achieved at the isthmic level within the IM canal. The same steps were taken for the fourth metacarpal. Total surgery time was 25 minutes.

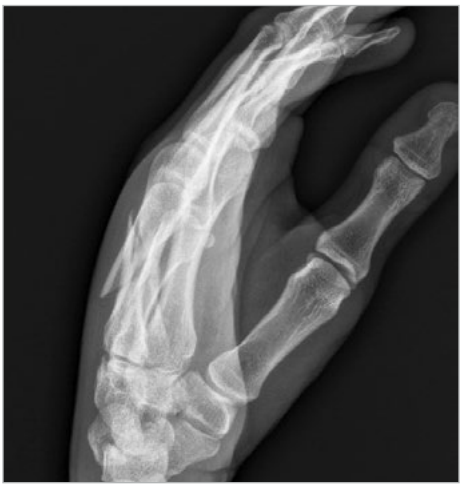
Benefits of this technique were immediate ROM, no splint, and immediate fracture stabilization for this fracture pattern. Other benefits included no tourniquet pain, a single nylon suture per metacarpal, and a small dressing.

Postoperative protocol featured no splint, immediate ROM, limited weight-bearing on the operative extremity, and no lifting greater than 1 lb for the first two weeks.

Preoperative







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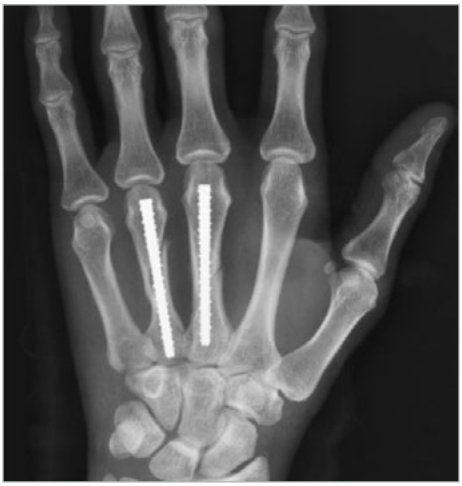
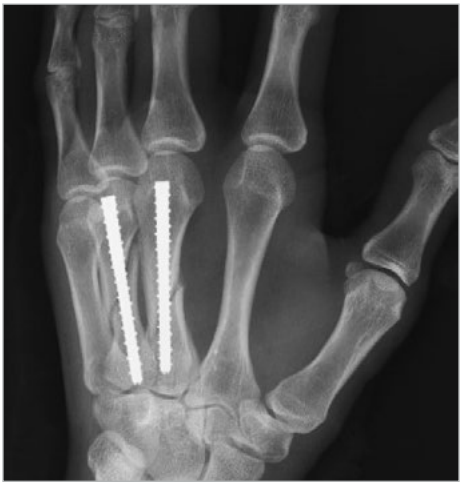
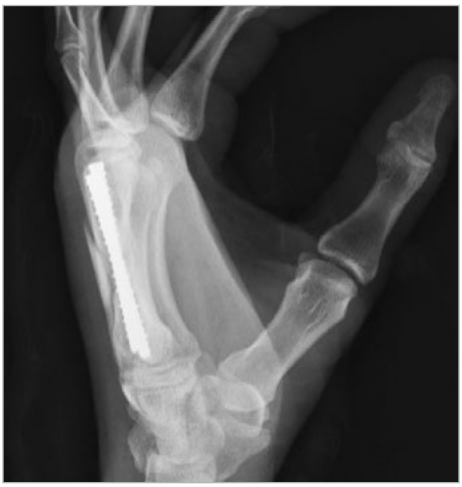
Postoperative







Follow-up

On postop day 5, the dressing was removed and the patient was able to shower, wash his hands, and apply a bandage over the suture site.

At the patient's two-week follow-up, he had near-complete range of motion and significant improvement in pain (9/10 preoperatively reduced to 4/10 at first postoperative visit). He had already returned to a semi-manual labor job with light-duty use of his operative hand. He neglected to return for any further follow up appointments. The patient was called and explained that he had returned to all work-related activities and hobbies without difficulty or pain and did not see the need for further follow-up appointments.

Discussion

For Dr. Daley, INnate™ is a game changer and is now his preferred method of treatment. In Dr. Daley's professional opinion, it is minimally invasive; does not compress the fracture; and does not require tourniquet use, postoperative casting, or splinting, and allows for immediate mobilization and rapid recovery. Additionally, with this technique, none of his patients to date have required postoperative therapy or secondary surgeries. Dr. Daley's professional opinion is that it is an efficient technique that is easy to learn and perform with high reproducibility.

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www.acumed.net

Acumed Oregon Campus
5885 NE Cornelius Pass Road
Hillsboro, OR 97124
+1.888.627.9957

Acumed Texas Campus
3885 Arapaho Road
Addison, TX 75001
+1.800.456.7779

Acumed Iberica Campus
C. Proción, 1
Edificio Oficor
28023 Madrid, Spain
+34.913.51.63.57