Case Study

Use of INnate™ Intramedullary Threaded Nail for Fourth and Fifth Metacarpal Fractures from Motor Vehicle Crash

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Dr. Wilson is an orthopedist at Fort Sam Houston Texas and is affiliated with Brooke Army Medical Center. He received his degree from Uniformed Services University of the Health Sciences F Edward Herbert School of Medicine and has been in practice for over 15 years. His subspecialties include elbow and hand surgery.

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Case Presentation

Patient was a 22-year-old male who suffered a crush injury to his metacarpals during a motor vehicle crash. He had a base oblique fracture and a midshaft transverse fracture to his fourth and fifth metacarpals, respectively. Rotational alignment and stable fixation were desired to allow the patient to return to duty as quickly as possible.

Preop Plan

Dr. Wilson considered K-wire fixation to avoid soft tissue dissection but was concerned that the lack of rigidity would lead to rotational deformity. He also considered headless compression screws but the implants were not appropriately sized to fit the narrow isthmus and achieve bicortical purchase at both the distal and proximal ends. Dr. Wilson decided to use a percutaneous approach with the INnate™ threaded nails for intramedullary fixation because the nails were long and wide enough in length and diameter to fill the canal, providing stable fixation for early range of motion.

Operative Findings and Approach

Dr. Wilson used a percutaneous approach to achieve and maintain fracture reduction for each metacarpal fracture. Once reduction was achieved, he made a small stab incision on the dorsal third of each metacarpal head and inserted the provided guide wire across the fracture site under fluoroscope. Dr. Wilson then used the INnate depth gauge to determine that a 3.6 mm diameter threaded nail was needed for the fourth metacarpal due to the narrower isthmus, and a 4.5 mm diameter threaded nail was needed for the fifth metacarpal. He again used the depth gauge to determine that a 50 mm nail was needed for the fourth metacarpal and a 45 mm nail was needed for the fifth metacarpal. Dr. Wilson proceeded to use the cannulated drill to drill over the guide wire and implant the cannulated INnate nail until the trailing end was beneath the articular cartilage, to achieve distal purchase in the subchondral bone. Proximal purchase was achieved at the isthmic level within the intramedullary canal. Total surgery time was 20 minutes.

Preoperative

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Postoperative

Follow-up

Immediately after surgery, soft dressing was applied to the patient's hand and he was allowed full active range of motion with weight-bearing restrictions of five pounds. At 10 weeks post-op, radiographic evidence of union and anatomic restoration across all fracture sites were achieved with the patient returning to full duty without any restrictions.

Discussion

INnate™ allowed Dr. Wilson to use a percutaneous, intramedullary approach with appropriately sized implants to achieve three points of fixation. Unlike k-wires and hand fragment plates, the INnate intramedullary nail allows for immediate to early range of motion thanks to it's stability. In Dr. Wilson's opinion, this allows patients to minimize their downtime and return to work or daily activities faster than with other implants and surgical approaches.

HNW70-82-A

Effective: 2024/07

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