

## Case Study:

Use of the InFrame™ Intramedullary Threaded Micro Nail for Oblique, Comminuted Fractures of the 4th and 5th Proximal Phalanges

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## Case Presentation

This patient was a 35-year-old male who suffered proximal, oblique fractures with comminution of his fourth and fifth proximal phalanges from a dog leash injury. Both a minimally invasive approach without extramedullary hardware and rotational stability were desired to achieve immediate range of motion (ROM) and return to daily activities.

## Preop Plan

Dr. Yao initially considered K-wires to address the phalangeal fractures due to their minimally invasive approach, but this patient wanted to immediately mobilize to avoid complications such as stiffness. Headless compression screws were also considered, but the diameters were too wide to create a construct that would achieve rotational stability. Dr. Yao decided to proceed with the ExsoMed™ InFrame™ Intramedullary (IM) Threaded Micro Nail because its 2.0 mm diameter design and innovative dual diameter guidewire eliminated the need for reaming and allowed him to precisely place more than one implant to create a fracture-specific construct that would deliver rigid fixation with immediate rotational stability.

## Operative Findings and Approach

The patient suffered an ulnar deviation and extension deformity to his fourth and fifth proximal phalanges that needed to be addressed with anatomic reduction. Starting with the fourth proximal phalanx, once reduction was achieved, Dr. Yao inserted the dual diameter guidewire across the fracture site from the ulnar proximal cortex to the radial distal cortex under fluoroscopy to stabilize the fracture and accurately align the desired final implant position. Next, he used the depth gauge to determine that a 30 mm micro nail was needed. The larger diameter end of the guidewire was pushed distally until the smaller diameter end of the guidewire spanned across the fracture site. After threading InFrame over the smaller diameter end of the guidewire, he then inserted the cannulated implant until bicortical purchase was achieved at both the distal and proximal ends of the phalanx, thus correcting the ulnar deviation and extension deformity. Once he verified the final position of the first implant under fluoroscopy, Dr. Yao used the same methodology to place the second 30 mm InFrame micro nail in a different plane from the first implant, creating an “X” construct. He repeated these steps for fixation of the fifth proximal phalanx but used a “Y” construct based on the fracture pattern. The total surgery time was approximately 25 minutes.

## Preoperative



## Postoperative



## Follow-up

At the one week follow-up, the patient did not experience any pain and regained near full ROM but was advised not to lift anything greater than 5 lbs as a precaution. By the two week follow-up, the patient did so well that Dr. Yao allowed him to regain full daily activities without any restrictions.

## Discussion

With its 2.0 mm diameter design and extensive length offering, InFrame enabled Dr. Yao to create fracture-specific constructs, achieving rigid, bicortical fixation and rotational stability in just 25 minutes in the operating room. Additionally, the delivery mechanism was important to Dr. Yao because it eliminated the need for a dedicated reamer, thereby simplifying the placement while improving accuracy. The resulting stable and strong fixation and earlier ROM allowed his patient to minimize downtime and return to work and daily activities faster than other implants and surgical approaches, thus decreasing the risk of developing digital stiffness.



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