The Latest Innovations in Hand Surgery

Proximal Phalanx Fractures, Metacarpal Fractures, and Distal Interphalangeal (DIP) Joint Fusions

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INTRODUCTION

For too long, innovations in hand surgery have been few and far between. The standard of care must be advanced through the introduction of groundbreaking implants and surgical techniques that allow patients to mobilize immediately without common complications such as stiffness and infections. This booklet is intended to be a quick and simple resource to introduce the latest intramedullary (IM) implants that have demonstrated remarkable effectiveness in the treatment of proximal phalanx fractures, metacarpal fractures, and DIP joint fusions.

PROXIMAL PHALANX FRACTURES

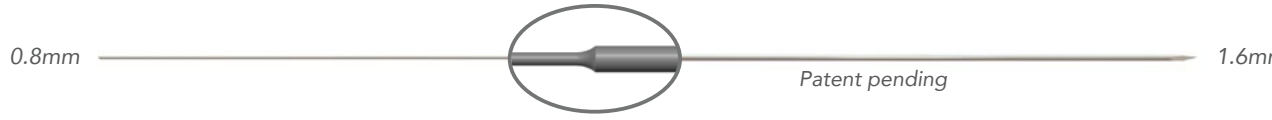
IM Fixation of Proximal Phalanx Fractures Using the InFrame™ Intramedullary Threaded Micro Nail

Illustration of the InFrame Intramedullary Threaded Micro Nail

Figure 1 – Non-Compressive, 2.0mm Diameter Micro Nail

Patent pending

Figure 2 – Dual Diameter Guidewire (1.6mm/0.8mm - Leading/Trailing)



Patent pending

Although IM fixation has been a promising, minimally invasive surgical approach for unstable proximal phalanx fractures, a single implant may not provide adequate fixation for specific fracture patterns[1] because multiple implants in various orientations[2] may be appropriate to maintain reduction and achieve immediate mobilization.

In any configuration, the operative goals would be to minimize adhesions, disruption to the extensor and flexor tendons, and damage to the periosteum. A dual antegrade IM fixation technique may achieve these goals by eliminating any metal to bone surface contact, minimizing significant friction to the tendon mechanisms, and avoiding insult to the articular surface of the metacarpal head via an intra-articular, intramedullary approach.[1]

ExsoMed's InFrame Intramedullary Threaded Micro Nail (Figure 1) achieves these goals and sets a new standard by offering a proximal phalanx-specific design that dramatically improves surgical outcomes. There are numerous reasons that the implant and approach have captured the attention of our limited market release (LMR) surgeons and have been advocated as a "game changer." First, InFrame's non-compression construct helps avoid inadvertent shortening in oblique and comminuted fractures. Second, the 2.0mm diameter design and robust length offering allow surgeons to personalize constructs specific to each patient's fracture pattern (Figure 3, 4), achieving optimal intramedullary fit to create rigid fixation and rotational stability.

Figure 3
InFrame "X" Construct

Figure 4
InFrame "V" Construct

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Third, the unique dual diameter guidewire has a 1.6mm leading end and a 0.8mm trailing end (Figure 2) that removes the need for a dedicated reamer and provides superior rigidity relative to standard K-wires, facilitating accurate placement and reducing surgical time compared to other techniques. Finally, surgeons are noticing faster union time and return to daily activities for their patients because immobilization is not required. In addition, biomechanical testing has demonstrated the superior bending and torsion strength of InFrame compared to K-wires, plates and screws, and headless compression screws (HCSs) (Table 1).

Table 1 - Apex Volar 4-Point Bending and Torsion Bench Test Data*

		K-Wires (2 x 0.045)	Dorsal Plates & Screws	Lateral Plates & Screws	Headless Compression Screws
BENDING STABILITY	InFrame X Construct	+97%	+473%	+91%	+48%
	InFrame V Construct	+14%	+232%	+11%	=
TORSION STABILITY	InFrame X Construct	+341%	+166%	+98%	+1533%
	InFrame V Construct	+368%	+182%	+110%	+1633%

*Based on internal bench testing.

Additional Thoughts

InFrame provides surgeons with a simple and efficient intramedullary fixation approach that can be performed in a minimally invasive fashion for all proximal phalanx fracture patterns. The immediate mobilization achieved with InFrame prevents stiffness that often occurs with other techniques and offers patients the ability to return to their daily activities faster. Unlike conventional approaches such as K-wire or plate and screw fixation, IM fixation with InFrame does not require immobilization or extensive surgical exposure that may lead to stiffness and soft tissue injuries, respectively.[3,4] Other approaches such as IM fixation with HCSs may have difficulty addressing oblique or comminuted fracture patterns due to complications such as shortening and questionable rotational stability. The next section of case studies will provide additional background.

Use of the InFrame™ Intramedullary Threaded Micro Nail for an Oblique Fracture of the 5th Proximal Phalanx

Marissa Matarrese, MD
University of Vermont Health Network Champlain Valley Physicians Hospital, Plattsburgh, NY

CASE PRESENTATION

Patient was a 59-year-old male who suffered a proximal, oblique fracture to the base of his 5th proximal phalanx when his power drill spun around and twisted his finger. A percutaneous approach providing stable fixation to allow for early mobilization was desired.

PRE-OP PLAN

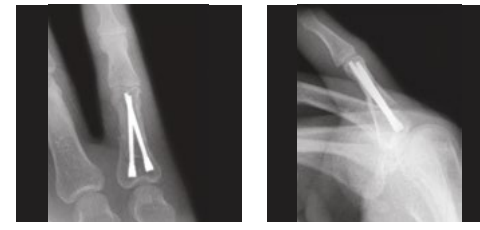
Dr. Matarrese considered headless compression screws (HCSs) due to the minimally invasive approach and early mobilization but was concerned that compression would cause angulation or shortening across the fracture site. She also considered lag screws but did not want to leave any extramedullary hardware behind. Dr. Matarrese proceeded with InFrame because the fully threaded micro nail allowed for an efficient, intramedullary placement without any hardware exposure. The InFrame implant has a 2.0mm diameter design with a robust length offering of 12mm-48mm, allowing various construct patterns to achieve rigid fixation and rotational stability. The unique dual diameter guidewire facilitated precise placement by removing the need for reaming and allowing InFrame to be inserted over the trailing end of the guidewire with ease. Biomechanical testing has demonstrated the superior rigidity with InFrame compared to K-wires, HCSs, and plates and screws, allowing earlier active range of motion (ROM) and reduced recovery time.

PRE-OP

OPERATIVE FINDINGS AND APPROACH

The patient suffered an oblique base fracture to his 5th proximal phalanx. Once anatomic reduction was achieved, Dr. Matarrese used a closed, percutaneous approach with InFrame. She inserted the dual diameter guidewire across the fracture site from the ulnar proximal cortex to the radial distal cortex using mini fluoroscopy to stabilize the fracture and accurately align the desired final implant position. Next, Dr. Matarrese used the depth gauge to determine that a 28mm micro nail was needed for the 5th proximal phalanx and threaded the micro nail until it was seated in the subchondral bone. Once she verified the final position of the first implant under fluoroscope, Dr. Matarrese used the same methodology to place the second InFrame micro nail but in a different plane from the first implant. She then inserted the second dual diameter guidewire from the radial proximal cortex to the ulnar distal cortex under fluoroscope and used another 28mm micro nail to create a "V" configuration with slight crossing at the distal end, resulting in stable fixation with no rotational deformity. Total surgery time was approximately 10 minutes.

POST-OP



FOLLOW-UP

At 1 week post-op, the patient demonstrated nearly full ROM with no complications and was expected to reach full ROM without any restrictions in 1-2 months.

DISCUSSION

InFrame allowed Dr. Matarrese to achieve her operative goal of stable fixation, rotational stability, and minimal to no soft tissue damage. The simple and straightforward placement of the InFrame micro nail enabled the surgery to be completed in only 10 minutes and under local anesthesia. The 2.0mm diameter design and robust length offering allowed Dr. Matarrese to create a "V" frame construct with no extramedullary hardware and zero complications. The innovative delivery mechanism for InFrame was also important because it simplified the implant placement by removing the need for a dedicated reamer. Her patient was satisfied with the results and experienced anatomic and functional restoration of his proximal phalanx.

Use of the InFrame™ Intramedullary Threaded Micro Nail for an Oblique, Comminuted Fracture of the 1st Proximal Phalanx

W. Brad Stephens, MD
Tallahassee Orthopedic Clinic, Tallahassee, FL

CASE PRESENTATION

Patient was a 17-year-old male who suffered a midshaft oblique fracture with comminution to his 1st proximal phalanx from a crush injury while lifting an engine. Rigid fixation with rotational stability was desired to allow immediate range of motion (ROM) and resumption of daily activities.

PRE-OP PLAN

Dr. Stephens normally considers two or three percutaneous perpendicular lag screws for oblique fracture patterns but wanted to achieve early ROM while avoiding complications such as stiffness. K-wires were also considered but avoided due to poor rotational stability and the need for immoblization. Headless compression screws (HCSs) were not a viable option due to the angular deformities that compression can cause during insertion.

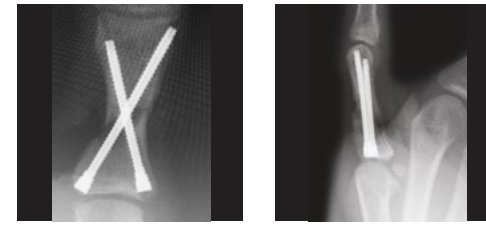
Dr. Stephens chose the InFrame Intramedullary Threaded Micro Nail that comes with a unique dual diameter guidewire that achieves accurate and efficient placement of the implant. The innovative guidewire removes the need for reaming and allows the micro nail to be inserted over the trailing end of the guidewire with ease. The 2.0mm diameter design allows various implantation constructs that achieve rotational stability via bi-cortical bone purchase.

PRE-OP

OPERATIVE FINDINGS AND APPROACH

The patient suffered an open fracture with bone loss from the ulnar side, requiring the extension of his traumatic wound to achieve anatomic reduction because it was very unstable. After reduction, Dr. Stephens inserted the dual diameter guidewire across the fracture site from the ulnar proximal cortex to the radial distal cortex under fluoroscope to stabilize the fracture and accurately align the desired final implant position. Next, he used the depth gauge to determine that a 28mm micro nail was needed for the 1st proximal phalanx. The larger diameter of the guidewire was used to drive the guidewire distally until the smaller diameter was across the fracture. He then threaded the cannulated InFrame micro nail until bi-cortical purchase was achieved at both the distal and proximal ends. Once he verified the final position of the first implant under fluoroscope, Dr. Stephens used the same methodology to place the second InFrame micro nail but in a different plane from the first implant. He inserted the second dual diameter guidewire, with at least a spacing of 0.5mm or more in all planes between the previously placed implant and the newly placed guidewire, from the radial proximal cortext to the ulnar distal cortex under fluoroscope and used a 34mm micro nail. The intramedullary space was large enough for Dr. Stephens to create an "X" configuration with the two InFrame implants, creating rotational stability. Total surgery time was approximately 25 minutes.

POST-OP



FOLLOW-UP

At two weeks, the patient did not experience any pain and was able to flex and extend his thumb. He had some stiffness, which is expected because of the open fracture, crush injury but is in therapy.

DISCUSSION

The use of InFrame allowed Dr. Stephens to address the proximal phalanx fracture with an "X" frame construct, providing cortex to cortex stability with rotational control, in only 25 minutes of total surgery time. InFrame had a robust length offering that allowed him to create an optimal construct configuration based on the specific fracture pattern to achieve bi-cortical, threaded fixation. This resulted in rotational stability and earlier ROM. The delivery mechanism for InFrame was also important because it simplified a more precise implant placement. The innovative dual diameter guidewire removed the need for a dedicated reamer and allowed the accurate placement along multiple vectors, personalizing the construct based on his patient's individual fracture pattern. The strong fixation and earlier ROM enabled his patient to minimize his downtime and return to work or daily activities faster than other implants and surgical approaches.

IM Fixation of Metacarpal Fractures Using the INnate™ Intramedullary Threaded Nail

Illustration of the INnate Intramedullary Threaded Nail

Figure 5 – Non-Compressive, Dual Diameter IM Nail

Although various options are available for the IM fixation approach, many fall short in providing a comprehensive solution, and run the risk of infections and shortening.[5,6] ExsoMed's INnate Intramedullary Threaded Nail provides a solution to these shortcomings, offering a metacarpal-specific design that results in radically improved surgical outcomes. There are a number of reasons that the implant and the approach have gained rapid market adoption in hand surgery practices. First, INnate's non-compressive design helps avoid inadvertent shortening in oblique and comminuted fractures. Second, the multiple length and diameter options allow for treatment of the various shapes, sizes, and fracture types encountered in metacarpals and small bones of the extremities. It is available in stepped 4.5/4.0mm and 3.6/3.2mm diameters; both sizes available in lengths of 35mm, 40mm, 45mm, 50mm, and 55mm. The 4.5/4.0mm diameter option is also available in lengths of 65mm and 75mm.

The robust length offering with differential diameters provides optimal fit within the intramedullary canal to create stable fixation and precise reduction. Third, surgeons are noticing faster time to union and return to activities for their patients. They are getting back to work, play, and everyday activities much quicker, with immobilization not required. Additionally, surgeons are reporting a reduction in post-op visits and a shortened cycle of care. This may be an important factor with telemedicine soon to become a bigger part of clinic. Finally, INnate is simple and efficient to use, with reduced surgical time compared to other procedures.

Additional Thoughts

IM fixation with INnate is a simple, minimally invasive approach that can address all types of metacarpal fracture patterns without complications due to early rehabilitation. This percutaneous approach offers great benefits to the growing active patient population that requires an earlier return to daily activities and the workforce. Unlike traditional approaches such as casting, K-wires, or plates and screws, IM fixation with INnate does not require a lengthy immobilization period that may lead to complications such as stiffness, infection, and tendon rupture.[7,8] In addition, INnate provides a superior approach to headless compression screws (HCSs) because HCSs run the risk of shortening, especially with comminuted fractures[6], due to their compressive design and the limited array of sizes (both in length and diameter) as they were not specifically developed to address metacarpal fractures. The next section of case studies will provide additional background.

Use of the INnate™ Intramedullary Threaded Nail for a Midshaft Spiral Fracture of the 5th Metacarpal During the COVID-19 Pandemic

Mark Rekant, MD, Associate Professor of Orthopaedic Surgery
Thomas Jefferson University and Philadelphia Hand to Shoulder Center, Philadelphia, PA

CASE PRESENTATION

Patient was a 70-year-old female who presented to clinic with a midshaft spiral fracture to the right small metacarpal suffered from a fall while walking her dog. Patient had acute complaints of pain, swelling, and stiffness with gross clinical malrotation. She desired repair with internal fixation to allow for improved function, but also desired hygiene and the ability for hand washing, given circumstances of the COVID-19 pandemic.

PRE-OP PLAN

As the pandemic required Dr. Rekant to use the Jefferson Navy Yard Surgical Center as an alternative facility, he did not have his usual access to the INnate intramedullary nail. This would have been his preferred option as the nails are long and wide enough in length and diameter to fill the canal, providing the necessary stable fixation that would restore alignment and allow for early range of motion.

PRE-OP

The alternative plan was to perform open incision with multiple 1.5mm lag screws fixation. However, the lag screw tray was found to be contaminated with no replacement readily available. As the INnate nail and its instrument set were both sterile-packed, Dr. Rekant decided to contact his ExsoMed rep to bring the product to the Jefferson Navy Yard Surgical Center.

OPERATIVE FINDINGS AND APPROACH

Once the ExsoMed rep arrived with the INnate system, the case was able to start quickly and without issue. Dr. Rekant first performed longitudinal traction to restore alignment and then used a percutaneously-applied pointed reduction clamp to maintain the reduction, until he placed the guidewire. He used a percutaneous approach with INnate to stabilize the metacarpal fracture and using the INnate depth gauge, determined that a 4.5mm x 45mm nail was needed for the metacarpal. He made a 2mm incision on the dorsal third of the metacarpal head of the small finger and inserted the provided guidewire across the fracture site under fluoroscope. He then used the cannulated drill to drill over the guidewire and threaded the cannulated INnate nail 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 intramedullary canal with a total surgery time of 16 minutes.

POST-OP

FOLLOW-UP

At patient's 2-week post-op visit, she had minimal pain and demonstrated full active digital ROM. As desired by the patient, she was able to regularly wash her hands without issue immediately after surgery. Dr. Rekant felt that the patient was doing very well and that post-op therapy was not necessary. Both the patient and surgeon were pleased with the results.

DISCUSSION

Given the positive outcome, Dr. Rekant made INnate his preferred choice in treating metacarpal fractures. The robust length and diameter offering enabled proper canal-fill and excellent fixation and rotational stability. His patient experienced immediate mobilization, accelerating her return to daily activities while minimizing her downtime and need for lengthy physical therapy relative to other implants and surgical approaches. Additionally, his patient was free from complications caused by wires and soft tissue incisions. From a global cost perspective, INnate had a positive impact on the practice as the surgery was easy, quick, and efficient without the need for sterilization. Both the implant and instrument set were sterile-packed. INnate proved to be a game changer for the patient, the surgeon, and the practice.

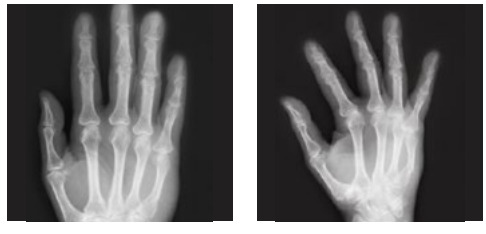
Use of INnate™ IM Threaded Nail for Midshaft Transverse Fracture of the 5th Metacarpal

Joseph Styron, MD, PhD
Cleveland Clinic, Cleveland, OH

CASE PRESENTATION

Patient was a 74-year-old left hand dominant male who sustained a midshaft, transverse fracture to his right 5th metacarpal when he fell from his electric bike while on vacation in Ireland. He was splinted in the emergency department and was told he would need surgery upon his return to the United States. The patient is a lifelong pianist and was extremely concerned about his ability to continue playing music after the accident. During his consultation in the United States 2.5 weeks later, he continued to suffer from pain and tenderness, had swelling over the 5th metacarpal, and had some overlap of the small and ring fingers when making a fist. Stable fixation, alignment restoration of the metacarpal, and early range of motion (ROM) were desired to ensure the patient had the best chance to play piano again.

PRE-OP



PRE-OP PLAN

Dr. Styron considered plates and screws but did not want to immobilize the patient or deal with complications such as tendon adhesions or stiffness. He also considered K-wires but desired stronger fixation without the risk of pin site infections. Dr. Styron chose to proceed with intramedullary fixation with INnate because the non-compressive design would prevent shortening and the canal-fill achieved by the implant would result in superior stability, allowing immediate to early ROM.

OPERATIVE FINDINGS AND APPROACH

Dr. Styron opted to perform this surgery in a minimally invasive approach. The guidewire was placed in the dorsal 1/3 of the metacarpal head while performing a reduction maneuver on the metacarpal shaft and the guide pin was passed in a retrograde fashion across the fracture. The cannulated drill was used once the pin placement and depth gauge were confirmed under fluoroscopy. Dr. Styron inserted a 4.5mm x 45mm INnate intramedullary nail, copiously irrigated the wound, and then closed in layers. Total surgery time was 16 minutes.

POST-OP

FOLLOW-UP

At the patient's very first post-op visit, 5 days after surgery, he experienced mild tenderness but no actual pain, and was almost at full functionality. He was amazed that the post-op wound was the size of an insect sting and played piano for about 50 minutes without any limitations or discomfort.

DISCUSSION

INnate had become the primary approach for metacarpal fracture fixation for Dr. Styron because of the excellent stability achieved and minimal disruption of soft tissues. This allowed for early ROM, decreased tendon adhesions and stiffness, and accelerated the patient's return to function. Placement of INnate was simple and straight-forward, thereby reducing operative time. The purpose-built design enabled immediate mobilization, minimized patient downtime and accelerated return to work or daily activities when compared to other implants and surgical approaches.

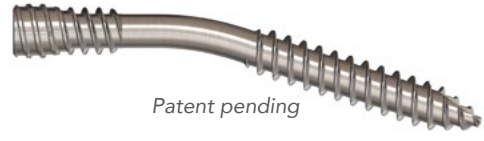
Functional Flexion DIP Fusion

Late-stage arthritis in phalangeal joints presents a variety of challenges for physicians. Although current treatment methods provide suitable outcomes from full extension fusions, research has shown that when a patient's DIP joint is fused in a functional position, finger dexterity and grip strength improve.[9,10] Physicians can achieve angled fusions by using K-wire fixation, however, there is a likelihood of inadvertently producing a straight fusion and the immobilization protocol can lead to several complications and varied results. While compression screws may provide reliable DIP fusions, they do not offer the additional benefit of functional flexion. To address this unmet need, ExsoMed has developed ArcPhix™: an innovative angled compression screw for controlled functional flexion DIP fusions.

Functional Fusion of DIP Joints Using the ArcPhix Angled Compression Screw

Illustration of the ArcPhix Angled Compression Screw

Figure 6 – 18° Angle



Patent pending

Straight fusion of DIP joints typically results in a 20-25% reduction in grip strength and diminished finger dexterity.[9,10] The ArcPhix Intramedullary Angled Compression Screw overcomes this clinical outcome and sets a new standard by offering a design that is specifically sized to optimally fit the anatomy of the distal and middle phalanges. There are numerous reasons the implant and approach have captured the attention of our early adopters. First, ArcPhix has an 18° angle to allow for fusion of the DIP joint in an optimal functional position. Second, the differential thread pitch facilitates compression across the DIP joint to create stability during bone fusion. Third, the tapered tip with a self-tapping cutting flute facilitates ease of insertion. Finally, the tapered tail design provides optimal fixation and minimizes implant volume in the distal phalanx. ArcPhix was designed with the efficiencies and simplicity of standard cannulated fusion techniques, while facilitating the benefits of angled fusion.

Additional Thoughts

The pre-bent design of ArcPhix simplifies the process of constructing a clinically appropriate angle for functional flexion DIP joint fusions. The early mobilization achieved with ArcPhix prevents stiffness that often occurs with other techniques and offers patients the ability to minimize recovery time. Unlike common techniques that utilize axial or crossed K-wires, intraosseous wires, or lateral mini plates, IM fixation with ArcPhix does not lead to complications such as pin tract infection, hardware prominence, and nonunion.[9] The next section of case studies will provide additional background.

Use of the ArcPhix™ Angled Compression Screw for Functional Fusion of the 3rd Distal Interphalangeal (DIP) Joint

Nikola Babovic, MD
Reno Orthopedic Center, Reno, NV

CASE PRESENTATION

Patient was a 63-year-old male who sustained an accidental, self-inflicted injury to his left middle finger while operating a circular saw. Radiographs revealed a fracture to his middle phalangeal head with approximately 3mm of longitudinal bone loss. Clinically, there was a volar-based wound which extended 270° circumferentially. Although the extensor tendon was intact, the flexor digitorum superficialis (FDS) and both neurovascular bundles were completely lacerated. There was perfusion to the fingertip. The decision was made to allow the soft tissue to heal before proceeding with a delayed DIP fusion. The patient was placed into a DIP extension splint for comfort and stability. A minimally invasive approach providing compression and stability was desired to achieve immediate mobilization and rapid recovery.

PRE-OP PLAN

Dr. Babovic normally considers intramedullary (IM) fixation with fully threaded headless compression screws due to satisfactory DIP fusion outcomes but proceeded with the ArcPhix angled compression screw due to the additional benefits of improved finger dexterity and grip strength achieved by functional flexion.

PRE-OP

OPERATIVE FINDINGS AND APPROACH

After six weeks, the patient's soft tissues reached a favorable condition, allowing Dr. Babovic to perform surgery. At that time, the patient still had significant pain at the DIP joint and dysfunction of the hand. A longitudinal dorsal incision was made in an attempt to preserve perfusion to the fingertip, given the significant initial soft tissue injury. Scar tissue was removed and the bone ends were decorticated in a manner that allowed for good apposition at the desired angle. The DIP joint was then aligned straight to allow for IM guidewire placement through both the distal and middle phalanges in a retrograde fashion. Afterwards, Dr. Babovic drilled by passing the cannulated drill over the guidewire to the desired depth of the implant, which was approximately 16mm into the middle phalanx. He removed the drill and guidewire to insert the ArcPhix angled compression screw into the drill hole at the tip of the distal phalanx. Dr. Babovic advanced the screw until the apex of the bend was across the DIP joint with the convex side of the screw facing dorsally. With ArcPhix, he achieved excellent compression across the DIP joint along with good rotational stability. Total surgery time was approximately 25 minutes.

POST-OP

FOLLOW-UP

At 10-days post-op, the patient had his sutures removed and was placed into a removable DIP splint. He had full range of motion (ROM) at both the metacarpal (MCP) and proximal interphalangeal (PIP) joints. At 6-weeks post-op, radiographs indicated that fusion was occurring, the patient was symptom free, and he was allowed to return to full activity without a splint.

DISCUSSION

Dr. Babovic was pleased with the ArcPhix angled compression screw. It was minimally invasive, provided excellent compression and stability, and allowed for immediate mobilization and rapid recovery. Most importantly, his patient was pleased with the functional flexion achieved with ArcPhix.

Use of the ArcPhix™ Angled Compression Screw for Functional Fusion of the 3rd Distal Interphalangeal (DIP) Joint

Lloyd Champagne, MD
Arizona Center for Hand to Shoulder Surgery, Phoenix, AZ

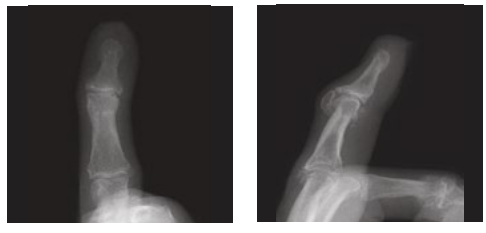
CASE PRESENTATION

Patient was a 55-year-old male who was scheduled for DIP joint fusion to his middle finger due to osteoarthritis. A percutaneous approach providing compression and stability was desired to achieve early mobilization and return to daily activities.

PRE-OP PLAN

Dr. Champagne normally considers intramedullary (IM) fixation with multiple K-wires but wanted to avoid extramedullary hardware due to the possibility of infections. K-wire fixation also results in unsatisfactory fixation and typically requires multiple follow ups. Dr. Champagne decided to proceed with the ArcPhix angled compression screw using a minimally invasive approach to achieve rigid fixation. The angled design allowed for a simple and reproducible implantation technique with the additional benefits of improved finger dexterity and grip strength achieved by functional flexion.

PRE-OP

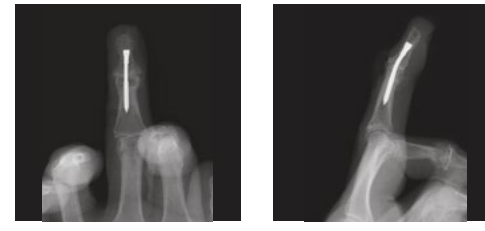


OPERATIVE FINDINGS AND APPROACH

Dr. Champagne used the cup and cone reamer technique to prepare the bones of the middle finger in a manner that allows for good apposition at the desired angle. He aligned the distal and middle phalanges, in a manner typical for standard IM K-wire placement, to insert the guidewire percutaneously into the distal phalanx. Dr. Champagne drilled by passing the cannulated drill over the guidewire to the desired depth of the implant, which was approximately 16mm into the middle phalanx. He removed the drill and guidewire to insert the ArcPhix angled compression screw into the drill hole at the tip of the distal phalanx.

Dr. Champagne advanced the screw until the apex of the bend was across the DIP joint with the convex side of the screw facing dorsally. With ArcPhix, Dr. Champagne achieved excellent compression across the DIP joint along with good rotational stability. Total surgery time was approximately 25 minutes.

POST-OP



FOLLOW-UP

At 1-week post-op, the patient was recovering well and had full range of motion (ROM) at both the metacarpal (MCP) and proximal interphalangeal (PIP) joints. At 3-weeks post-op, radiographs were satisfactory and the patient was allowed to return to his daily activities without any complications or restrictions.

DISCUSSION

Dr. Champagne was pleased with the ArcPhix angled compression screw because of the minimally invasive approach that allowed for immediate mobilization and excellent outcomes achieved by compression and stable fixation. Most importantly, his patient was pleased with the functional flexion achieved with the bent design of ArcPhix.

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