

## Surgical Technique — Metatarsals



Acumed® is a global leader of innovative orthopaedic and medical solutions.



We are dedicated to developing products, service methods, and approaches that improve patient care.



## ExsoMed™ INnate™ Intramedullary Threaded Nail System

The ExsoMed INnate System introduces an intramedullary (IM) threaded nail for metatarsal fractures to provide surgeons with a reliable solution through a simple approach. The robust length offering with a differential diameter design is intended to accurately fit the intramedullary canal and to create stable fixation and precise reduction for nearly all types of metatarsal fractures.

### Anatomic Reduction

- ▶ Noncompressive implant design allows for precise, anatomic reduction for multiple metatarsal fracture types, including oblique and comminuted fractures

### Stable Fixation

- ▶ Various lengths appropriately sized, allow optimal stability and bone purchase for nearly all fracture locations

### Less Traumatic

- ▶ Percutaneous technique with an intramedullary implant designed to minimize soft tissue, cartilage, and vascular damage upon insertion

## Indications For Use

The ExsoMed INnate System is intended for fixation of intraarticular and extraarticular fractures and nonunions of small bones and small bone fragments; arthrodesis of small joints; bunionectomies and osteotomies, including scaphoid and other carpal bones, metacarpals, tarsals, metatarsals, patella, ulnar styloid, capitellum, radial head and radial styloid.

The ExsoMed INnate System is provided sterile. The implant is manufactured from stainless steel and is offered in 3.6 mm and 4.5 mm diameters. The implants are provided with a separate disposable instrument kit specific to the implant diameter.

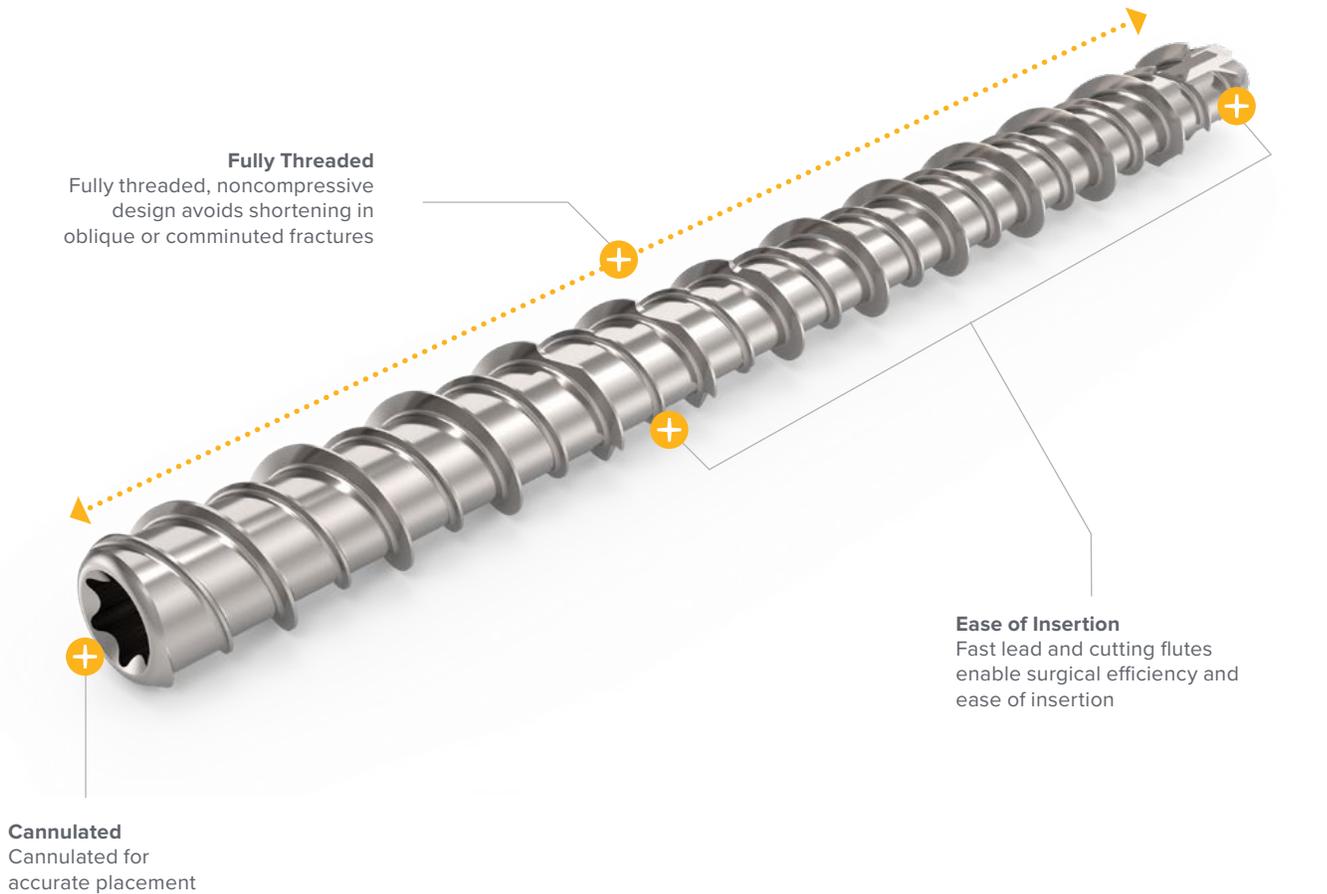


# System Features

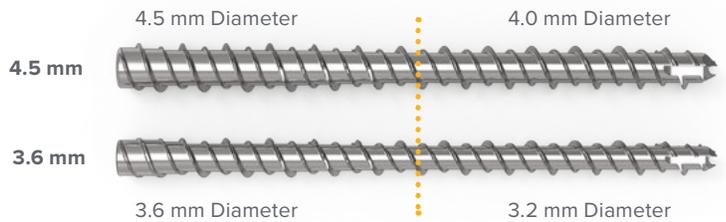
## Multiple Lengths

for treatment of various shapes and sizes of small bones

- ▶ **3.6 mm Diameter:** 25 mm, 30 mm, 35 mm, 40 mm, 45 mm, 50 mm, 55 mm Lengths
- ▶ **4.5 mm Diameter:** 35 mm, 40 mm, 45 mm, 50 mm, 55 mm, 65 mm, 75 mm Lengths



**T-10 Hexalobe design for high torque resistance**



**Smaller diameter leading end design allows passage through isthmus  
Larger diameter trailing end helps gain purchase within the IM canal**

# Metatarsal Surgical Technique

Surgical technique is based on surgeon preference. Either a plantar or dorsal approach may be used depending on several considerations:

- ▶ Average range of motion (ROM) of the affected metatarsophalangeal (MTP) joint
  - Sometimes a plantar approach may be easier for more medial metatarsals and conversely, a dorsal approach could be more accessible for lateral metatarsals
- ▶ Some fracture patterns may benefit from a dorsal approach, particularly when the fracture reduces with plantar flexion of the toe
- ▶ A vertical incision around the guidewire down to the metatarsal head minimizes potential damage to the flexor or extensor tendons with either approach.

## 1 Patient Positioning

A. Secure the patient in a supine position. A radiolucent operating table is unnecessary.

**Tip:** Placing the patient's foot at the end of the table allows it to be held off the edge for fluoroscopic imaging.

B. Prepare and drape the patient's foot in the usual sterile manner.

**Note:** Mini C-arm fluoroscopy more easily enables both anterior/posterior (A/P) and medial/lateral (M/L) fluoroscopic views. Occasionally oblique views can be helpful.

## 2 Reduce Fracture and Insert Guidewire

### Approach Options for Fracture Reduction

**Plantar:** Anatomically reduce the fracture fragment under fluoroscopy using longitudinal traction and maximum dorsiflexion of the toe.

**Dorsal:** Anatomically reduce the fracture fragment under fluoroscopy using longitudinal traction and maximum plantar flexion of the toe.

- Insert the guidewire percutaneously in a retrograde fashion through the distal fracture fragment, targeting the center of the intramedullary canal under multiplanar fluoroscopy. (Figure 1a, Plantar Approach; Figure 1b, Dorsal Approach)
- Fully advance the guidewire retrograde through the metatarsal shaft across the fracture, until the trocar tip reaches the desired final implant position near the proximal cortex. (Figure 2)
- Then make a vertical stab incision through skin and down to bone at the point of guidewire insertion to facilitate reamer access and avoid tendon damage.

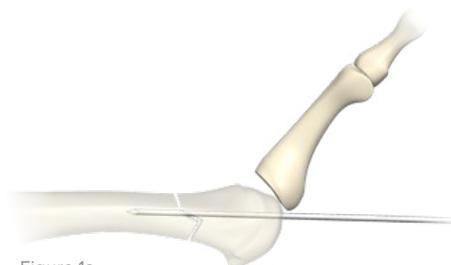


Figure 1a

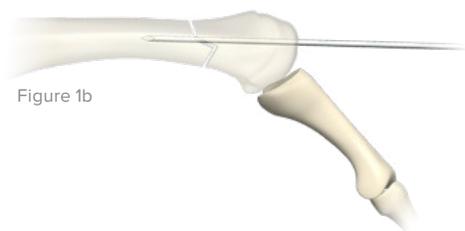


Figure 1b



Figure 2

## Metatarsal Surgical Technique [continued]

### 3 Measure and Select Implant Length & Diameter

#### Measure Implant Length (Option 1)

The edge of the INnate depth gauge may be used to measure the length of the metatarsal directly for determining implant length.

- A. To determine the length of the implant, hold the depth gauge against the plantar side of the foot with the measurement edge aligned with the guidewire. (Figure 3)
- B. Under fluoroscopy use the marked square notches (ie, the 7th square notch will be for a length of 55 mm) along the edge of the depth gauge to select the desired implant length. The measurement will be to the left of the notch. (Figure 3)

**Tip:** To ensure subchondral placement of the implant on either proximal or distal ends, sometimes it may be helpful to size down from the depth gauge reading if measuring from the proximal to distal cortex.

#### Measure Implant Length (Option 2)

Alternatively, the wider end of the INnate depth gauge may be used to measure the length of the metatarsal for determining implant length via the guidewire.

- A. Insert the depth gauge via the stab incision and, under fluoroscopy, confirm the tip of the depth gauge is against the metatarsal head. (Figure 4)
- B. Ensuring the guidewire extends well past the fracture site, measure the exposed length of the guidewire against the markings to select the appropriate implant length (ie, the Figure 4 will be for a length of 55 mm).

**Tip:** This measurement indicates the length of the metatarsal. To ensure subchondral placement of the implant on either proximal or distal ends, sometimes it may be helpful to size down from the depth gauge reading.

#### Measure Implant Diameter

- A. To determine the implant diameter, while under fluoroscopy, hold the depth gauge against the foot with the edges of the annotated measurement markings aligned with the narrowest part of the intramedullary canal. (Figure 5)



Figure 3

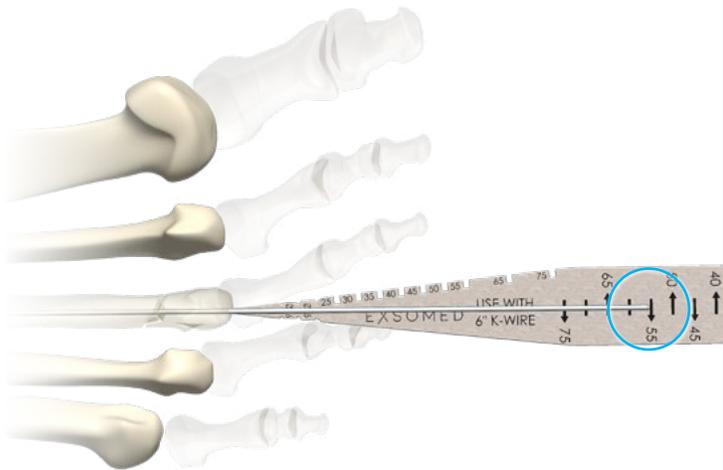


Figure 4

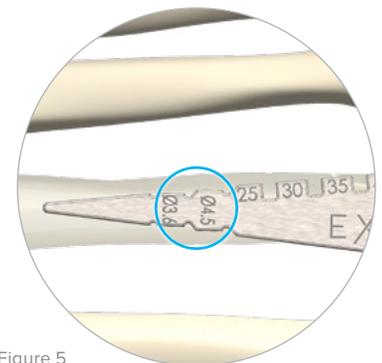


Figure 5

## Metatarsal Surgical Technique [continued]

### 4 Drill

A. Drill by passing the cannulated reamer over the guidewire to the desired depth. Depth markings on the reamer and fluoroscopy can be used to monitor drill depth. (Figure 6)

**Tip:** Prior to drilling, advance the guidewire into the base of the metatarsal to anchor it and reduce the chances of dislodging the guidewire when the reamer is later removed.

B. Drill the entire length of intended implantation.

C. Remove the reamer carefully while maintaining the guidewire position. Do not remove the guidewire.

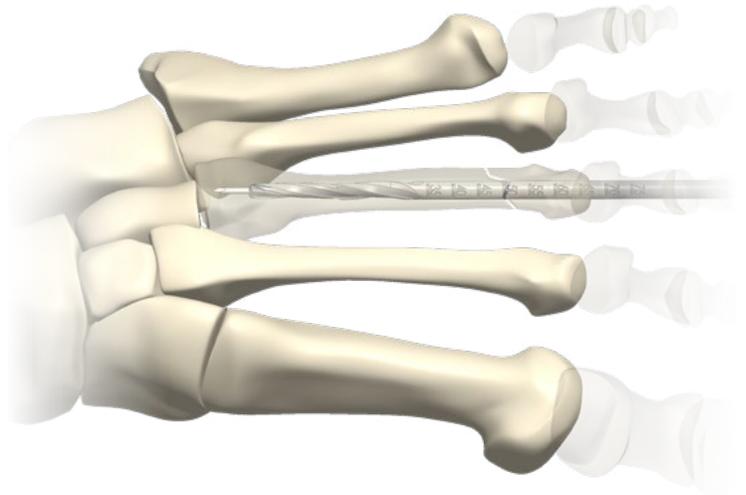


Figure 6

### 5 Insert Implant and Confirm Placement

A. Insert selected implant over the guidewire.

B. Advance the implant into the bone to the desired depth.

C. Manually hold reduction as the implant traverses the fracture site and engages the proximal fragment to prevent distraction at the fracture site.

**Tip:** If excessive resistance is encountered, avoid applying extreme force upon the driver and implant. Slightly retract the implant before advancing. Repeat as necessary until the nail is fully implanted.

D. Once desired depth is achieved, disengage the driver. (Figure 7)

E. Verify placement and proper reduction with multiplanar radiographic imaging. The trailing end of the implant should be buried below the articular surface and not prominent on the metatarsal head. (Figure 8)

F. Remove the guidewire.

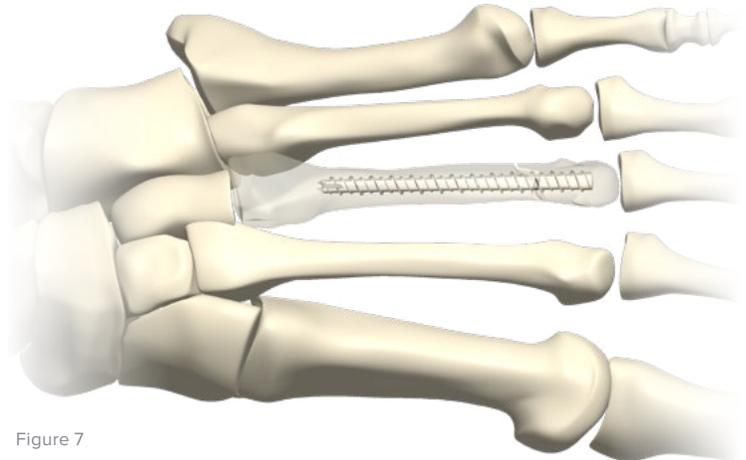


Figure 7

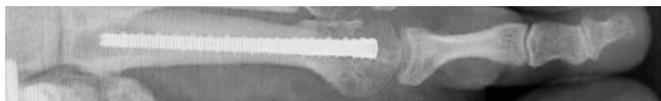


Figure 8

# Ordering Information

## INnate Implants

### Sterile Implants, 3.6 mm

INnate Implant, 3.6 x 25 mm	EXINN923625	
INnate Implant, 3.6 x 30 mm	EXINN923630	
INnate Implant, 3.6 x 35 mm	EXINN923635	
INnate Implant, 3.6 x 40 mm	EXINN923640	
INnate Implant, 3.6 x 45 mm	EXINN923645	
INnate Implant, 3.6 x 50 mm	EXINN923650	
INnate Implant, 3.6 x 55 mm	EXINN923655	

### Sterile Implants, 4.5 mm

INnate Implant, 4.5 x 35 mm	EXINN924535	
INnate Implant, 4.5 x 40 mm	EXINN924540	
INnate Implant, 4.5 x 45 mm	EXINN924545	
INnate Implant, 4.5 x 50 mm	EXINN924550	
INnate Implant, 4.5 x 55 mm	EXINN924555	
INnate Implant, 4.5 x 65 mm	EXINN924565	
INnate Implant, 4.5 x 75 mm	EXINN924575	

## Disposable Instrument Kit

<b>3.6 mm INnate Instrument Kit</b> 1 – 0.045" x 6" Single Trocar Guidewire 1 – 0.045" x 6" Double Trocar Guidewire 1 – Depth Gauge 1 – Cannulated Reamer, 2.9 mm 1 – Cannulated Driver, T-10	EXINN913600
<b>4.5 mm INnate Instrument Kit</b> 1 – 0.045" x 6" Single Trocar Guidewire 1 – 0.045" x 6" Double Trocar Guidewire 1 – Depth Gauge 1 – Cannulated Reamer, 3.6 mm 1 – Cannulated Driver, T-10	EXINN914500



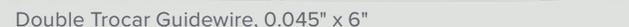
Cannulated Driver, T-10



Cannulated Reamer



Single Trocar Guidewire, 0.045" x 6"



Double Trocar Guidewire, 0.045" x 6"



Depth Gauge



[www.acumed.net](http://www.acumed.net)

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

OsteoMed USA Campus  
3885 Arapaho Road  
Addison, TX 75001  
+1.800.456.7779

Acumed Iberica Campus  
C. de Álvaro Caballero, 14,  
28023 Madrid, Spain  
+34.913.51.63.57

**HNW10-18-A** | Effective: 2023/04 | © 2023 Acumed® LLC

These materials contain information about products that may or may not be available in any particular country or may be available under different trademarks in different countries. The products may be approved or cleared by governmental regulatory organizations for sale or use with different indications or restrictions in different countries. Products may not be approved for use in all countries. Nothing contained in these materials should be construed as a promotion or solicitation for any product or for the use of any product in a particular way that is not authorized under the laws and regulations of the country where the reader is located. Nothing in these materials should be construed as a representation or warranty as to the efficacy or quality of any product, nor the appropriateness of any product to treat any specific condition. Physicians may direct questions about the availability and use of the products described in these materials to their authorized Acumed distributor. Specific questions patients may have about the use of the products described in these materials or the appropriateness for their own conditions should be directed to their own physician.

Refer to the provided instructions for use for the complete indications, contraindications, warnings, and instructions for use.

OsteoMed® LLC is a wholly owned subsidiary of Acumed LLC.  
OsteoMed is a registered trademark of OsteoMed LLC.

ExsoMed™ Corporation is a wholly owned subsidiary of Acumed LLC.  
ExsoMed and INnate™ are trademarks of ExsoMed Corporation.

Acumed® is a registered trademark of Acumed LLC.