

# Ortholoc<sup>®</sup> 2

## Jones Fracture System

### Operative technique



# Ortholoc™ 2

## Jones Fracture System

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Proper surgical procedures and techniques are the responsibility of the medical professional. The following guidelines are furnished for information purposes only. Each surgeon must evaluate the appropriateness of the procedures based on his or her personal medical training and experience. Prior to use of the system, the surgeon should refer to the product package insert for complete warnings, precautions, indications, contraindications and adverse effects. Package inserts are also available by contacting the manufacturer. Contact information can be found on the back of this operative technique and the package insert is available on the website listed.

#### **Acknowledgments:**

The Ortholoc 2 Jones Fracture System was developed in conjunction with Robert Anderson, MD, (Green Bay, WI) and Andrew Murphey, MD (Memphis, TN).

# Introduction

## System description

Treatment for Jones fractures has been a challenge for the foot and ankle specialist managing the athletically minded individuals. The Ortholoc 2 Jones Fracture System is specifically designed to effectively and efficiently correct Jones fractures of the 5th metatarsal. The instrumented and reproducible technique focuses on addressing the fracture fixation through (1) solid core, fatigue resistant compression implants, (2) targeted and guided instruments, and (3) multiple options for varying anatomies.

## Implants

The Ortholoc 2 Jones Fracture Screws are available in 2 types (chamfered and headless), 3 diameters (4.5mm, 5.5mm, and 6.5mm), and multiple lengths (35mm-60mm, in 5mm increments). All screws have a solid core and cortical threads, and are manufactured from titanium alloy. In addition, the screws are type II anodized for increased material fatigue strength superior to color anodized titanium alloy and stainless steel. Data on file.

The headed screws have a chamfer head to avoid cuboid impingement, while the headless screws have a differential proximal to distal thread pitch for compression.

## Instruments

The Ortholoc 2 Jones Fracture System includes a 5th metatarsal specific targeting guide designed to help visualize implant trajectory and reduce alignment time.

## Bone grafting

Mini Ignite Power Mix (4cc) is available to graft the fracture site for bone fracture callus formation. If bony voids or gaps are noted, a bone graft substitute such as Mini Ignite Power Mix may be injected or digitally packed into bone voids that are not intrinsic to the stability of the bony structure. The use of Ignite Power Mix is optional and not required.



# Indications and contraindications

## Indications

The Ortholoc 2 Jones Fracture System is indicated for fixation of bone fractures or for bone reconstruction of the 5th metatarsal.

Examples included:

- Fixation of malunions and non-unions.
- Acute fracture
- Avulsion fractures
- Repetitive stress fractures
- Jones fractures
- Malleolar fractures
- Talus fractures
- Greater tuberosity fractures

## Contraindications

- Infection
- Physiologically or psychologically inadequate patient
- Inadequate skin, bone, or neurovascular status
- Irreparable tendon system
- Possibility for conservative treatment
- Growing patients with open epiphyses
- Patients with high levels of activity

## Operative technique

### Patient positioning

Position the patient in the lazy lateral position with an exaggerated bump under the ipsilateral hip so that the body is rotated toward the side of the non-operative foot. Place the foot at the extreme end of the table and elevate on blankets for improved fluoroscopic imaging. Ensure the ipsilateral knee can be bent to place the foot in a plantigrade at the edge of the table or the sterile operating room fluoroscopy unit.



56021420  
1.4/2.0mm stepped k-wire

### 5th metatarsal alignment with targeting guide

Percutaneously insert a 1.4/2.0mm stepped k-wire (56021420) into the head of the 5th metatarsal. Orient the k-wire perpendicular to the long axis of the bone and angle 5° to 10° distally.

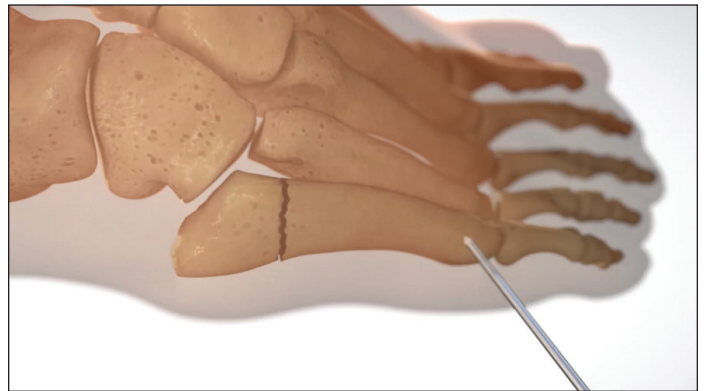


Figure 1

Assemble the lateral arm of the targeting guide base (56020000) onto the stepped k-wire. Under fluoroscopy, orient the c-arm to an oblique view. Correct for the parallax by adjusting the c-arm until the “pin-in-circle” is in the correct position.

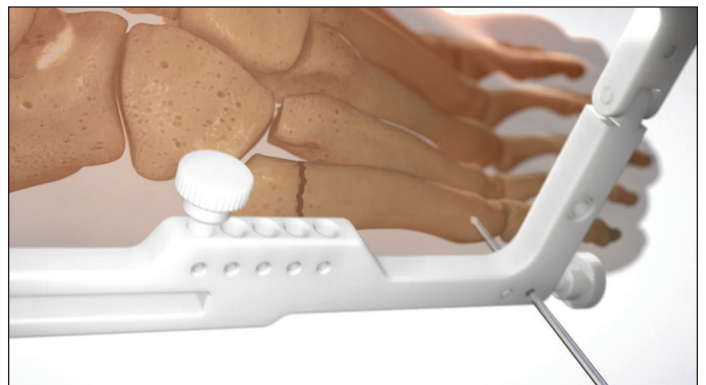





Figure 2

Once the “pin-in-circle” alignment feature is correct, orient the targeting guide such that the horizontal reference line is parallel to the long axis of the 5th metatarsal. Mark the skin, through the targeting guide, approximately 2cm proximal to the base of the metatarsal.

-  Correct
-  Incorrect:  
“tilt” c-arm to  
adjust
-  Incorrect:  
“rainbow” c-arm  
to adjust

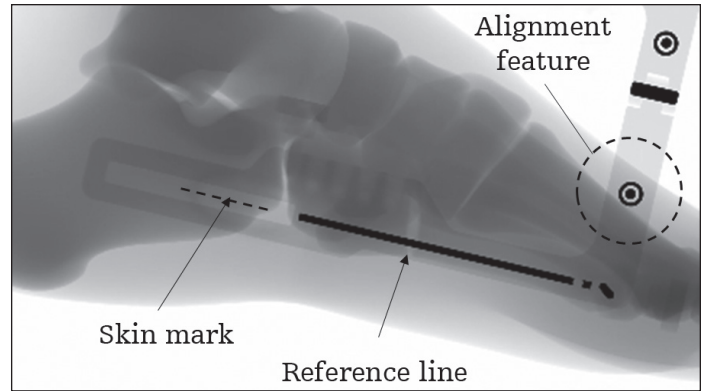


Figure 3

Make a 1cm percutaneous incision at the skin mark and bluntly dissect to the base of the 5th metatarsal. Take care to identify and protect the sural nerve.

Insert the targeting wire guide and reference the base of the 5th metatarsal. Assemble the wire guide to the lateral arm of the targeting guide with a knob.

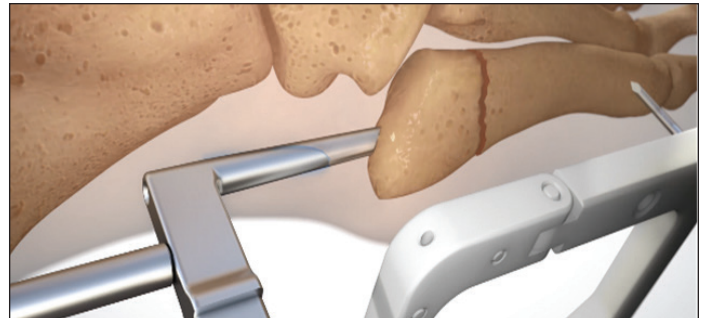


Figure 4



56020000

5th metatarsal targeting guide

Under fluoroscopy, in the anterior-posterior (AP) view, align the reference line along the long axis of the 5th metatarsal. Eliminate any parallax by ensuring the “pin-in-circle” is correct.

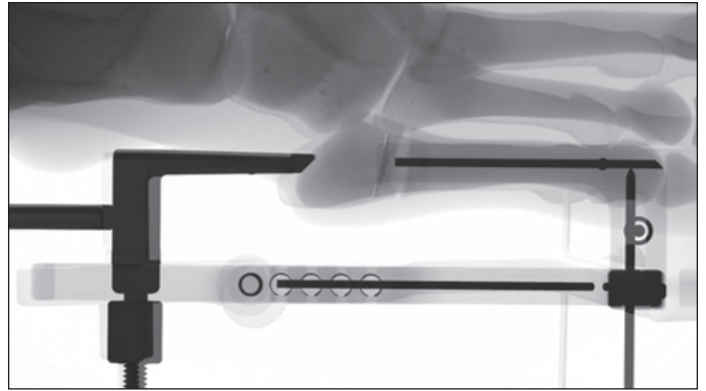


Figure 5

Once the appropriate position is achieved, lock down the targeting guide onto the k-wire with the knob. For additional stability, a second k-wire could be placed in the midfoot.

Insert the 2.0mm k-wire (56010228) through the wire guide and into the intermedullary canal of the 5th metatarsal, half the length of the shaft or a point distal to the fracture line. The k-wire should be opposed to the lateral aspect of the cuboid.

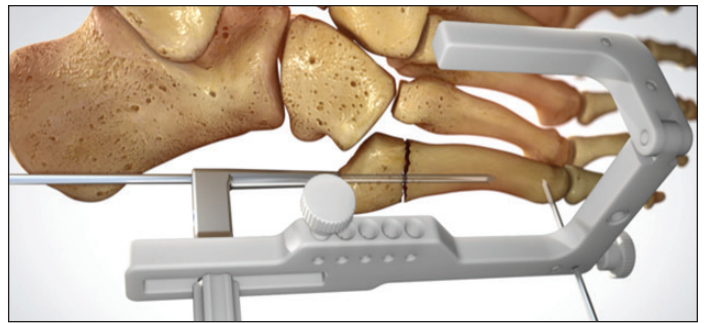


Figure 6

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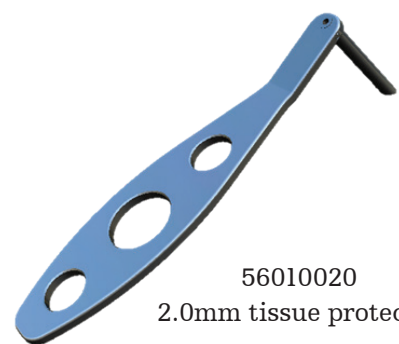
56010228  
k-wire

**Alternative alignment technique**

Create a 1cm percutaneous incision approximately 2cm proximal to the base of the 5th metatarsal. Bluntly dissect to the base of the 5th metatarsal. Take care to avoid the branches of the sural nerve.

Utilize the 2mm tissue protector (56010020) to insert the 2.0mm k-wire “high and inside” on the base of the 5th metatarsal. The k-wire will be opposed to the lateral aspect of the cuboid.

Under fluoroscopy, advance the k-wire half the length of the metatarsal shaft or an appropriate distance distal to fracture site.



56010020  
2.0mm tissue protector

## 5th metatarsal bone preparation

Replace the targeting guide construct with 4.5mm tissue protector (56010045) and under fluoroscopy, prepare the bone with the 3.2mm cannulated drill (56013200).



Figure 7

### NOTICE

To avoid penetration of the metatarsal cortex: The tissue protector reduces the likelihood of damage to the sural nerve.

### Alternative drilling technique

Use the solid 3.2mm (56013201) drill to prepare the 5th metatarsal bone to reduce the risk of cortical perforation or correct the alignment into the mid-diaphysis.

Use the cannulated drill and k-wire to prepare the proximal metatarsal only. Replace the cannulated drill and k-wire with the solid 3.2mm drill. Under fluoroscopy, drill to the appropriate depth.



56013201  
3.2mm solid drill

Select the appropriate combination of tissue protector and cannulated tap to prepare the metatarsal bone. The taps are adapted to the screw diameters available in the system.

Screw diameter	Tap	Tissue protector
4.5mm	4.5mm (56014500)	4.5mm/drill (56010045)
5.5mm	5.5mm (56015500)	5.5mm (56010055)
6.5mm	6.5mm (56016500)	6.5mm/universal (56010056)

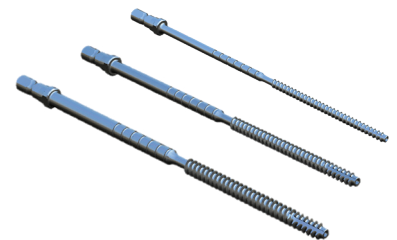
Table 1



56013200  
3.2mm cannulated drill



56010045  
56010055  
56010056  
tissue protectors



56014500  
56015500  
56016500  
cannulated taps



Advance the tap through the straight portion of the distal fragment in the AP and lateral views. Care should be taken to prevent tapping into the distal, curved portion of the metatarsal, which could distract/malreduce the fracture.

The tap could be referenced as the screw trial and should feel snug within the intramedullary canal. If the tap diameter is undersized, prepare the bone with the next size tap.

With the tap in the desired position, reference the grooves on the tap to determine the screw length. The first groove is equivalent to a 40mm screw length. If the first groove is inside the guide, than the measured screw length is 35mm.

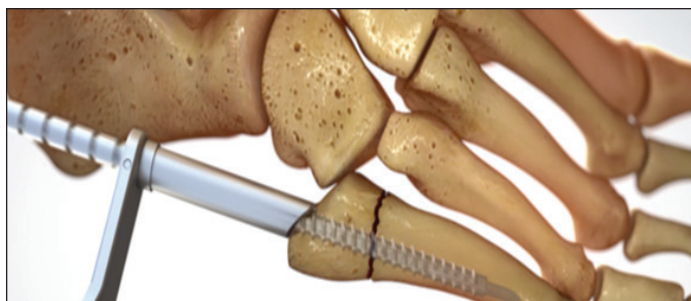


Figure 8

### Alternative alignment technique

The 2.0mm k-wire may be used to measure the screw length.

Advance the 2.0mm k-wire into the 5th metatarsal such that the tip approximates the location of the planned screw. Assemble the depth gauge (56010002) over the k-wire to determine the screw length.



56010002  
depth gauge

## Implantation

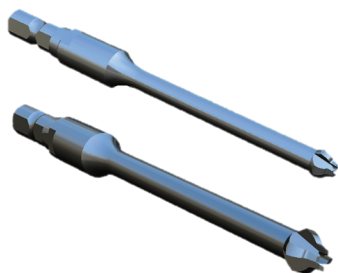
Select the appropriate type of screw for the Jones fracture: Headed or headless.

### Chamfered screw implantation

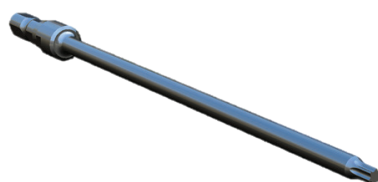
If desired, select the appropriate size countersink and tissue protector to prepare the proximal base of the 5th metatarsal. The countersink (56036500 or 56034500) is intended to reduce the screw head prominence.

Screw diameter	Countersink	Tissue protector
4.5mm	4.5/5.5mm (56034500)	6.5mm/universal (56010056)
5.5mm	4.5/5.5mm (56034500)	6.5mm/universal (56010056)
6.5mm	6.5mm (56036500)	6.5mm/universal (56010056)

Table 2



56036500  
56034500  
countersinks



SB090015  
star 15 driver

Assemble the countersink over the 2.0mm k-wire and manually prepare the bone. Continue to advance the countersink until the head of the countersink is fully inserted into the bone.

Remove the 2.0mm k-wire and assemble the appropriate size diameter and length screw onto the star 15 driver (SB090015). Position the driver onto the screw head such that the laser marking line is oriented to the chamfer head.

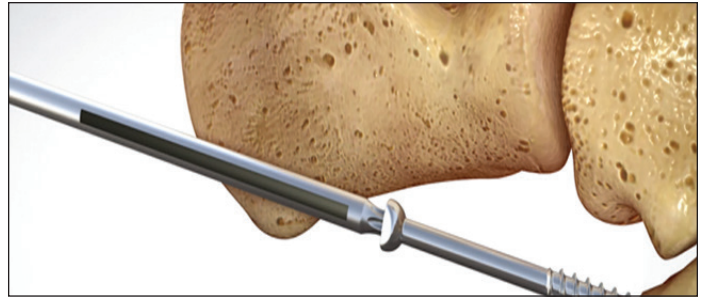


Figure 9

Insert the screw under fluoroscopy until the screw threads are past the fracture site. An excessively long screw may engage the distal curved portion of the metatarsal and create gapping/distraction/malreduction.

AP and lateral radiographs should be taken to ensure the screw head is flush with the bone and avoiding cuboid impingement.

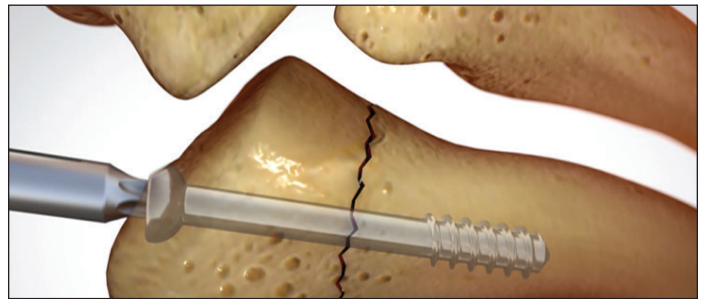


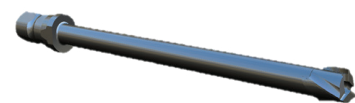
Figure 10

## Headless screw implantation

Select the appropriate size countersink and tissue protector to prepare the proximal base of the 5th metatarsal. The countersink is intended to reduce the screw head prominence.

Screw diameter	Countersink	Tissue protector
4.5mm	N/A	6.5mm/universal (56010056)
5.5mm	5.5/6.5mm (56035500)	6.5mm/universal (56010056)
6.5mm	5.5/6.5mm (56035500)	6.5mm/universal (56010056)

Table 3



56035500  
countersink

Assemble the countersink over the 2.0mm k-wire and manually prepare the bone. Continue to advance the countersink until the head of the countersink is fully inserted into the bone.

Remove the 2.0mm k-wire and assemble the appropriate size diameter and length screw onto the headless compression sleeve (56020045 or 56055565). Assemble the star 30 (MT5670AC) driver to the compression sleeve for easier insertion of the screw.

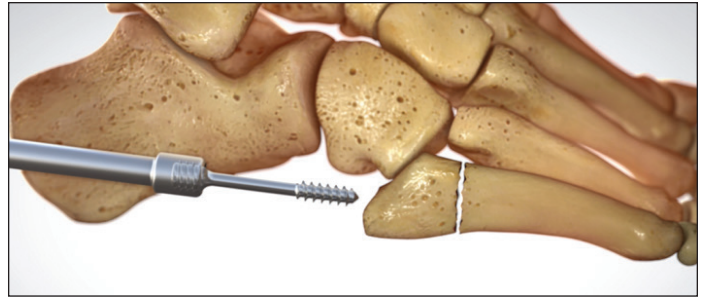
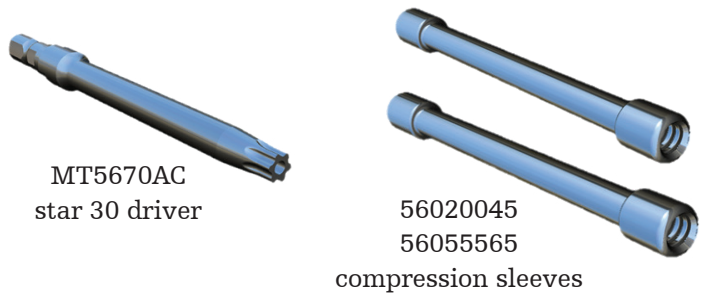


Figure 11

Screw diameter	Compression sleeve
4.5mm	4.5/5.5mm (56020045)
5.5mm	5.5/6.5mm (56055565)
6.5mm	5.5/6.5mm (56055565)

Table 4



Assemble the star 30 driver (MT5670AC) on to the compression sleeve and insert the screw under fluoroscopy until the screw threads are past the fracture site and appropriate compression is achieved. An excessively long screw may engage the distal curved portion of metatarsal and create gapping/distraction/malreduction.



Figure 12

Assemble the star 15 driver through the cannula of the headless screw inserter to complete implantation. Manually advance the screw until the proximal threads have been advanced into the metatarsal tuberosity.

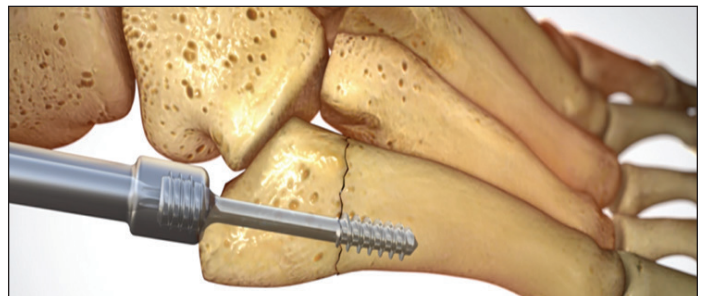


Figure 13

AP and lateral radiographs should be taken to ensure the appropriate implant placement.

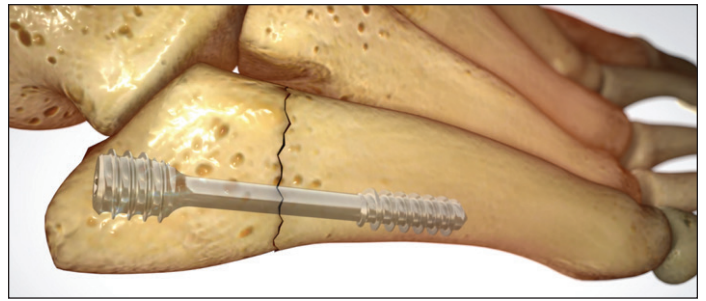


Figure 14

## Explant information

Implant removal should be completed using the star 15 straight driver (SB090015).

If the removal of the implant is due to revision or failure of the device, the surgeon should contact the manufacturer to receive instructions for returning the explanted device to the manufacturer for investigation.

## Postoperative management

Postoperative care is the responsibility of the medical professional.

# Ignite Power Mix bone void filler

Remove the 2.0mm k-wire and assemble the appropriate size diameter and length screw onto the headless compression sleeve (56020045 or 56055565). Assemble the star 30 (MT5670AC) driver to the compression sleeve for easier insertion of the screw.

If bony voids or gaps are noted, a bone graft substitute such as Mini Ignite Power Mix may be injected or digitally packed into bone voids that are not intrinsic to the stability of the bony structure. Ignite Power Mix combines demineralized bone matrix (DBM) with aspirated bone marrow (BMA) to provide a graft with osteoconductive, osteoinductive, and osteogenic capacity to support Jones fracture healing.

## NOTICE

The use of Ignite Power Mix is optional and not required.

Utilize a canal graft approach to inject the Ignite Power Mix into the 5th metatarsal canal when access to the fracture site is possible. Alternatively, the subperiosteal graft should be utilized. Refer to the Ignite Power Mix operative technique for additional information.

Aspirate the appropriate volume of bone marrow from the harvest site (iliac crest, proximal tibia, distal tibia, and/or calcaneus) and mix according to the preparation instructions.

Use the delivery needle and access the tapped/ or drilled canal of the 5th metatarsal. Attach the prepared graft syringe to the preplaced delivery needle and advance past the distal fracture site.



Ignite Power Mix

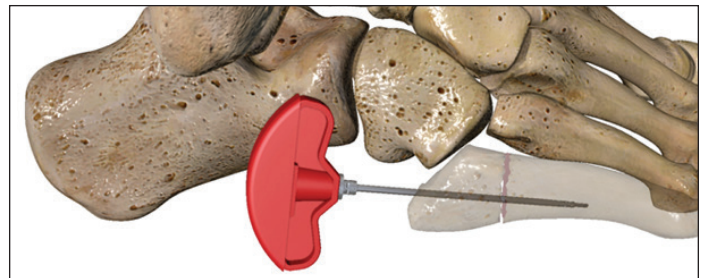


Figure 15

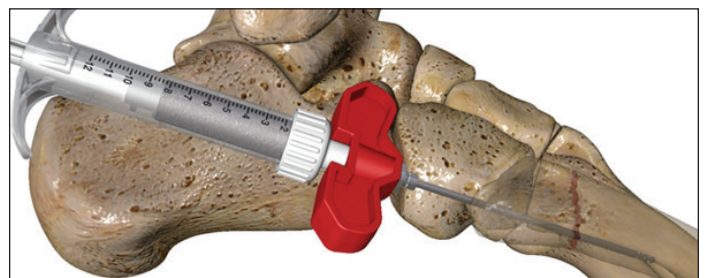


Figure 16

Slowly inject the Ignite Power Mix while withdrawing the needle. Continue with hardware insertion per the operative technique.



Figure 17



Figure 18

For additional circumferential grafting of the Jones fracture site, follow the subperiosteal grafting technique.

Following injection, maintain needle placement for 3-5 minutes to allow the material to coagulate and minimize back flow.

**NOTICE**

Bone marrow aspiration should be completed after site preparation. See mixing instructions for more details.

## Ordering information

### Ortholoc 2 Chamfered Screws

Part number	Description
56024535	4.5mm x 35mm
56024540	4.5mm x 40mm
56024545	4.5mm x 45mm
56024550	4.5mm x 50mm
56024555	4.5mm x 55mm
56024560	4.5mm x 60mm
56025535	5.5mm x 35mm
56025540	5.5mm x 40mm
56025545	5.5mm x 45mm
56025550	5.5mm x 50mm
56025555	5.5mm x 55mm
56025560	5.5mm x 60mm
56026535	6.5mm x 35mm
56026540	6.5mm x 40mm
56026545	6.5mm x 45mm
56026550	6.5mm x 50mm
56026555	6.5mm x 55mm
56026560	6.5mm x 60mm



### Ortholoc 2 Headless Screws

Part number	Description
56034535	4.5mm x 35mm
56034540	4.5mm x 40mm
56034545	4.5mm x 45mm
56034550	4.5mm x 50mm
56034555	4.5mm x 55mm
56034560	4.5mm x 60mm
56035535	5.5mm x 35mm
56035540	5.5mm x 40mm
56035545	5.5mm x 45mm
56035550	5.5mm x 50mm
56035555	5.5mm x 55mm
56035560	5.5mm x 60mm
56036535	6.5mm x 35mm
56036540	6.5mm x 40mm
56036545	6.5mm x 45mm
56036550	6.5mm x 50mm
56036555	6.5mm x 55mm
56036560	6.5mm x 60mm



### Instruments

Part number	Description
56020000	5th metatarsal targeting guide
56020045	4.5mm headless compression sleeve
56055565	5.5/6.5mm headless compression sleeve
56013200	3.2mm cannulated drill
56013201	3.2mm solid drill
56014500	4.5mm cannulated tap
56015500	5.5mm cannulated tap
56016500	5.5mm cannulated tap
56010020	2.0mm k-wire tissue protector
56010045	4.5mm drill tissue protector
56010055	5.5mm tissue protector
56010065	6.5mm universal tissue protector
SB090015	Star 15 driver
MT5670AC	Star 30/hexstar driver
44180025	Quick connect handle
56021420	1.4/2.0mm stepped k-wire
56010228	2.0mm k-wire
56034500	4.5mm/5.5mm chamfer head counter sink
56036500	6.5mm chamfer head counter sink
56035500	5.5mm/6.5mm headless counter sink
56010002	Jones depth gauge

### Ignite Power Mix

Part number	Description
867P0400	4cc Mini Ignite Power Mix

## Foot & Ankle

This document is intended solely for the use of healthcare professionals. A surgeon must always rely on his or her own professional clinical judgment when deciding whether to use a particular product when treating a particular patient. Stryker does not dispense medical advice and recommends that surgeons be trained in the use of any particular product before using it in surgery.

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