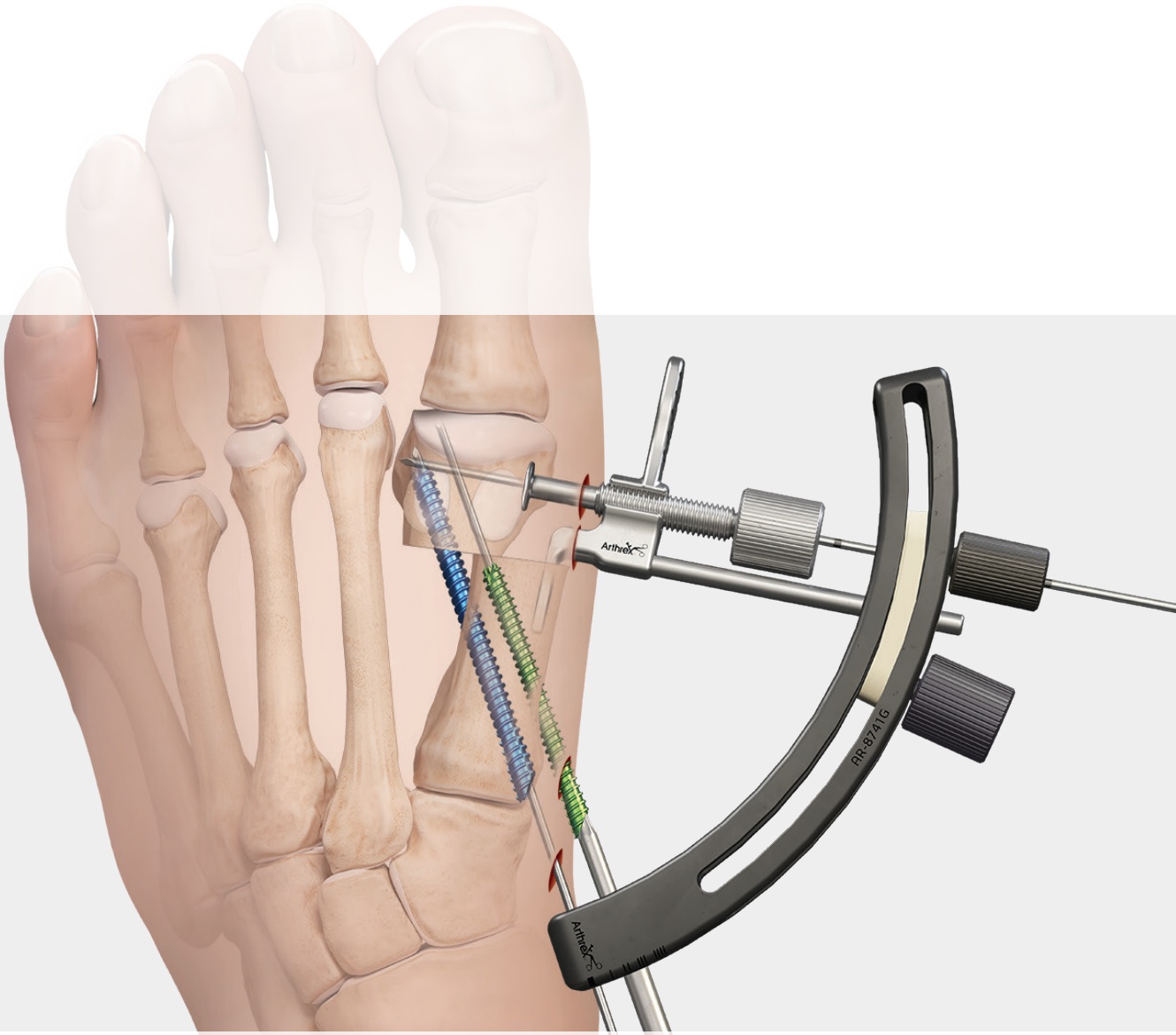
Arthrex Minimally Invasive Bunionectomy

Surgical Technique



Arthrex®

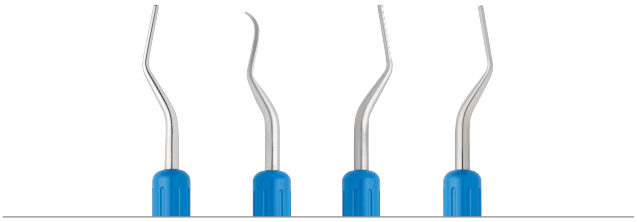
Minimally Invasive Bunionectomy System and Beveled FT Screws

Introduction

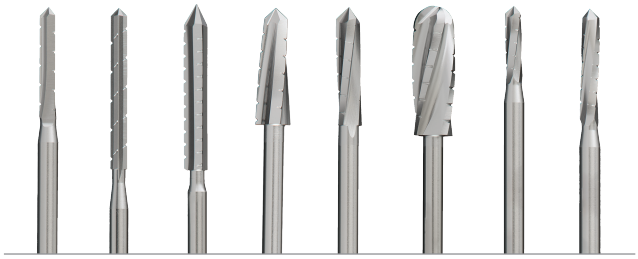
The Arthrex MIS product portfolio continues to grow with the introduction of the Minimally Invasive Bunionectomy System. This trajectory system helps achieve correction and fixation placement using a percutaneous approach. Designed specifically to work with the system, the Beveled FT screws are angled to provide zero-profile fixation.

MIS Instrumentation

- DrillSaw Highspeed 200™ Power System
- Rasps and Elevators
- Burrs



Rasps and Elevators



Percutaneous Burrs

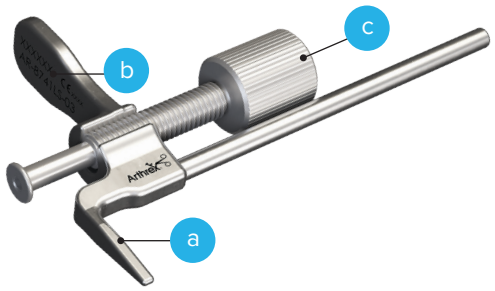
Arthrex Bunionectomy

Minimally Invasive Bunion Correction

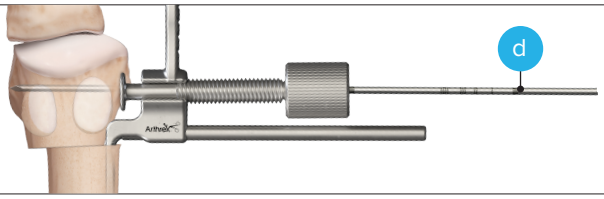
System Overview

Shifting device—shifts the capital fragment laterally; cannulation allows for maintaining the shift

- Intramedullary hook: slides into the intramedullary canal of the metatarsal **(a)**
- Thumb paddle: allows for leveraging of the first toe while applying lateral pressure **(b)**
- Capital fragment shifter: threads into the intramedullary hook to shift the capital fragment laterally **(c)**

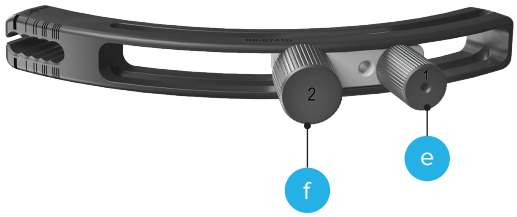


Capital fragment guidewire—secures the shifting device to the capital fragment and serves as a target for the trajectory guide **(d)**



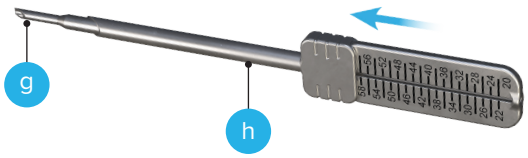
Trajectory guide—sets trajectory of the K-wires relative to the position of the capital fragment guidewire

- K-wire positioning knob: locks in position on capital fragment K-wire **(e)**
- Screw positioning knob: locks in the proximal-distal position of the guide relative to the capital fragment **(f)**



K-wire guides

- Depth device: clicks into the drill sleeve; provides pinpoint accuracy for K-wire placement **(g)**
- Drill sleeve: allows for drilling and screw placement through the trajectory guide to maintain positioning and correction **(h)**



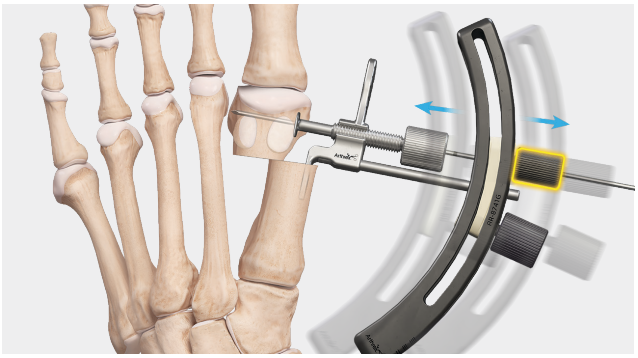
MIS parallel guides—provide preset angles to direct K-wires toward the capital fragment

- 30° and 25° options are available depending on anatomy and desired startpoint
- Five K-wire slots provide various options for K-wire placement

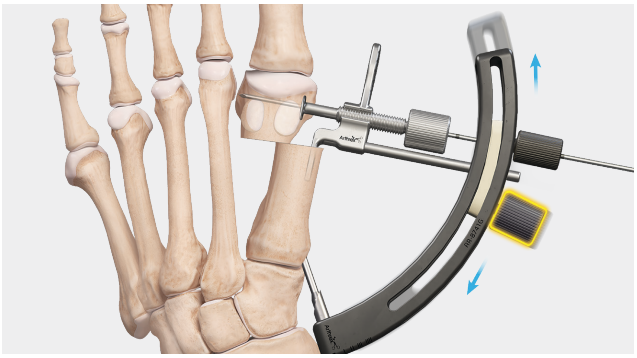
Assembly Steps

Trajectory Guide Assembly

Thread the K-wire positioning knob into the largest hole, furthest from the K-wire guide slots. Thread the screw positioning knob into the hole nearest to the K-wire guide slots.

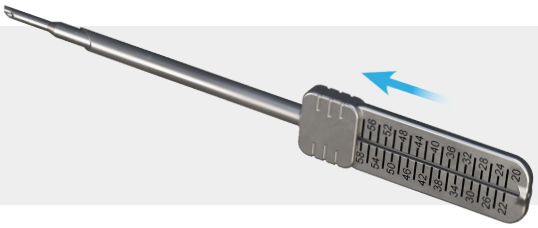


The **K-wire positioning knob** controls the medial-lateral placement of the trajectory guide. Final positioning is dictated by the laser lines of the capital fragment guidewire.



The **screw positioning knob** controls the distal-proximal placement of the K-wire guides.

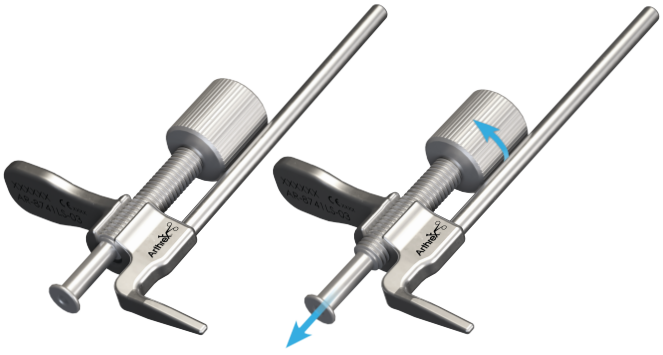
The depth device clicks into the drill sleeve to assemble the **K-wire guides**. These are placed into the K-wire guide slots.



Shifting Device Assembly

Thread the capital fragment shifter into the intramedullary hook. At the start of the procedure, the capital fragment shifter should only thread in two to three rotations such that the end of the device is just flush with the intramedullary hook.

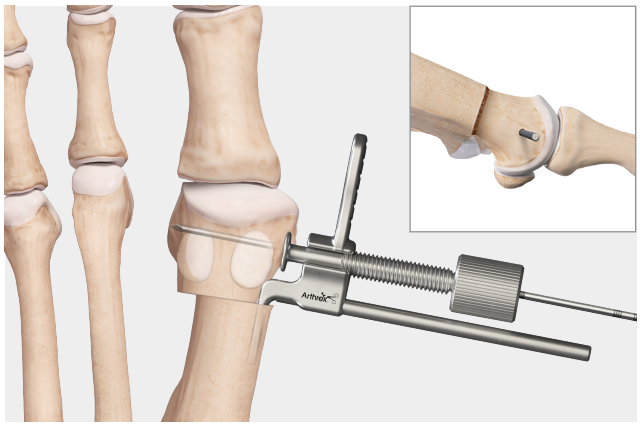
The capital fragment shifter is offered in two different sizes—small and large. The larger size provides more surface area to push against for patients with poor bone quality.

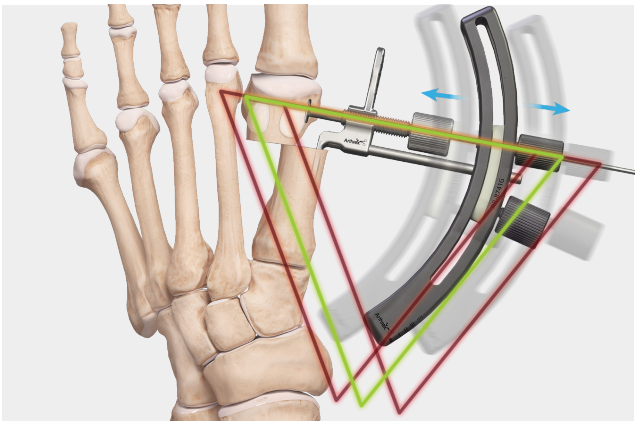


How It Works

A small and simple patent-pending shifting device applies and holds correction of the capital fragment. The threads on the capital fragment shifter allow users to precisely dial in the desired lateral shift depending on the patient's deformity.

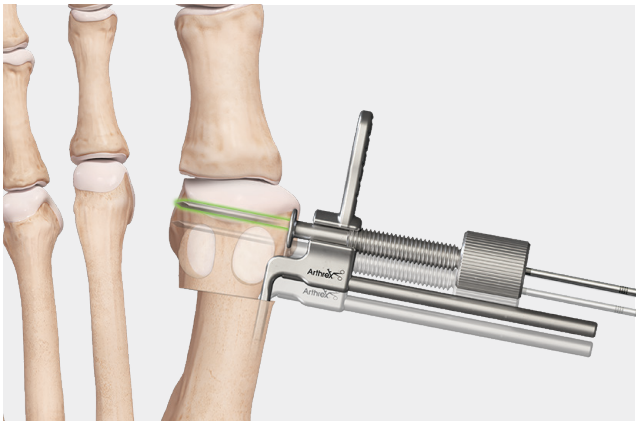
Prior to shifting the fragment, a K-wire is advanced through the shifting device, just to the lateral edge of the capital fragment. It is recommended to address any rotational correction prior to advancing this wire.





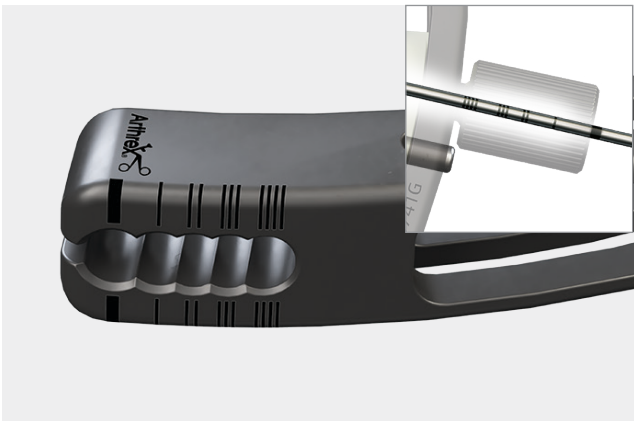
Used together, the entire system works like a triangle, with the tip of the capital fragment wire serving as the aiming point for the screw K-wires.

From this diagram, you can see that if the capital fragment wire or the trajectory guide is not placed appropriately, the entire triangular trajectory of the system can be affected.



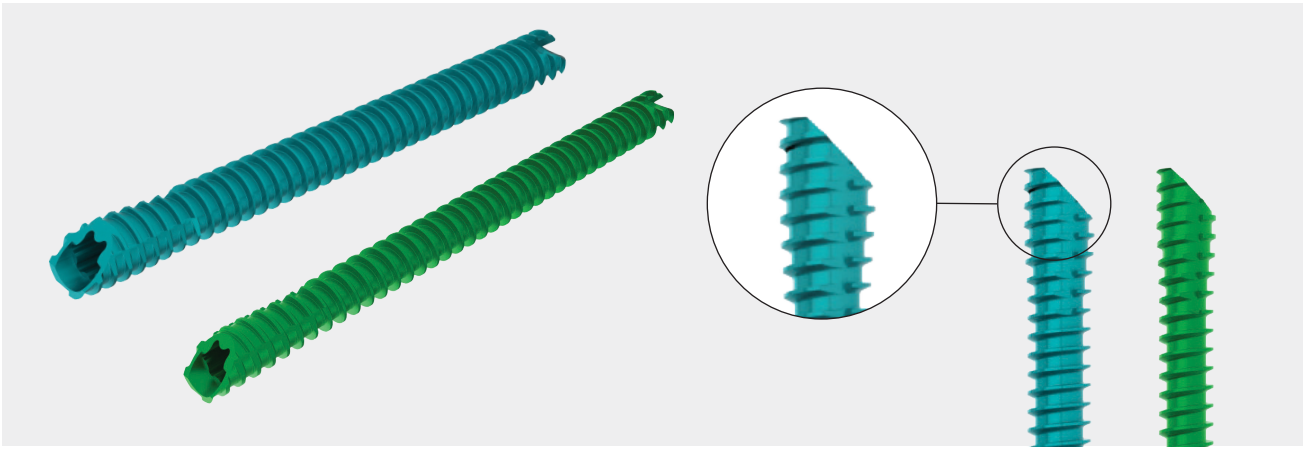
More distal placement of the capital fragment guidewire results in greater screw purchase in the capital fragment.

Note: The intramedullary hook must remain engaged in the canal of the metatarsal to hold correction.

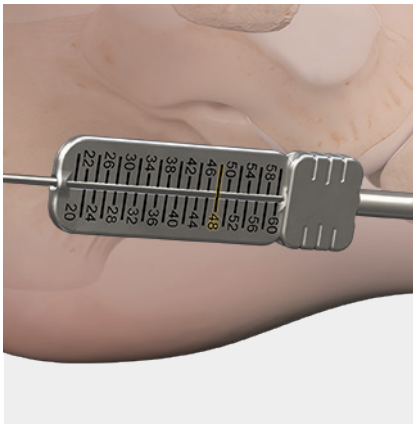


The trajectory guide is placed over the capital fragment guidewire and secured at the laser line.

Beveled FT Screws—4.0 mm and 3.5 mm



The Arthrex Minimally Invasive Bunionectomy System also includes Beveled FT screws designed specifically for minimally invasive bunion correction.



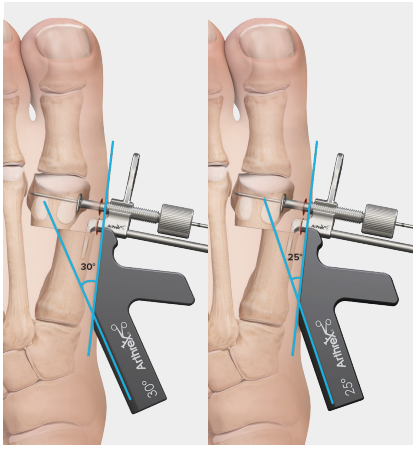
The 45° beveled head provides a zero-profile construct when fully inserted. The Beveled FT screws have a constant thread pitch compared to Compression FT screws as compression may result in tilting of the capital fragment.

The Beveled FT screws also have an increased cannulation. This allows for the use of more robust instrumentation. The increased diameter of the guidewires reduces cortical skiving and provides stability throughout the case. The laser-marked guidewires also allow for quick screw measurements from the depth devices used with the system.

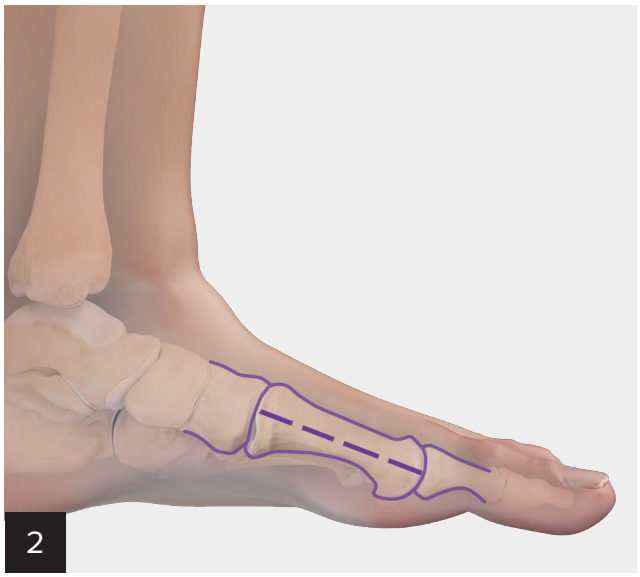
Screw Diameter	4.0 mm Beveled FT	3.5 mm Beveled FT
K-Wire Size	1.6 mm	1.4 mm
Drill Bit	3.6 mm	2.9 mm
Driver	T15 Hexalobe	T10 Hexalobe

MIS Parallel Guide

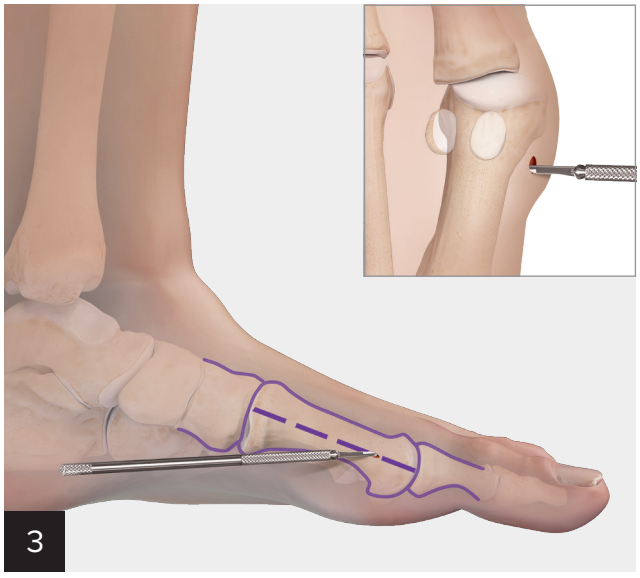
This simple, effective device helps with initial or secondary K-wire placement for the Beveled FT screws. These radiolucent parallel guides provide two different angles to advance the screw K-wires towards the capital fragment. The angle options are selected based on surgeon entry point preference, patient anatomy, and shift distance of the capital fragment. These guides allow for a percutaneous approach and can be used with the shifting device. The radiolucent material and ease of application assist with fluoroscopic imaging to confirm wire placement throughout the procedure.



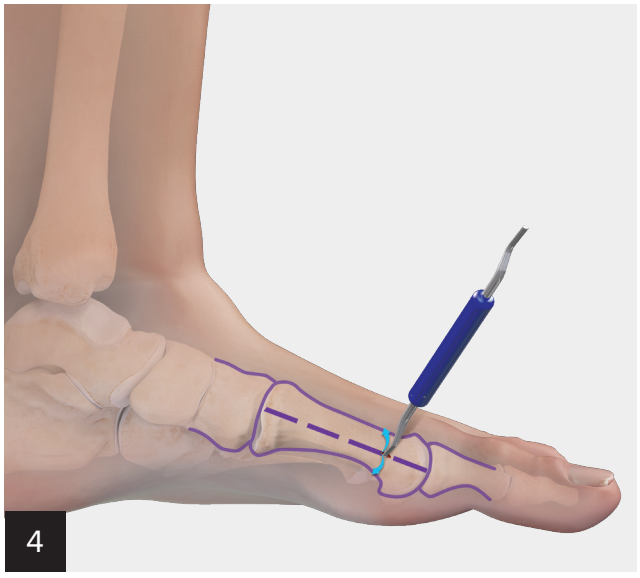
Outline the bony anatomy of the metatarsal, marking the TMT joint and the MTP joint.



Mark the midline of the metatarsal shaft.



Make a stab incision on the midline of the metatarsal, just proximal to the sesamoid complex at the metatarsal neck.



Free the soft tissue at the osteotomy site using the specialized periosteal elevator.

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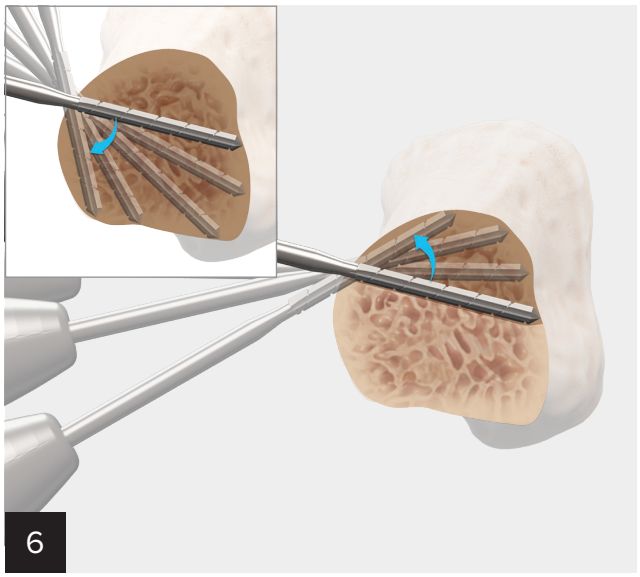

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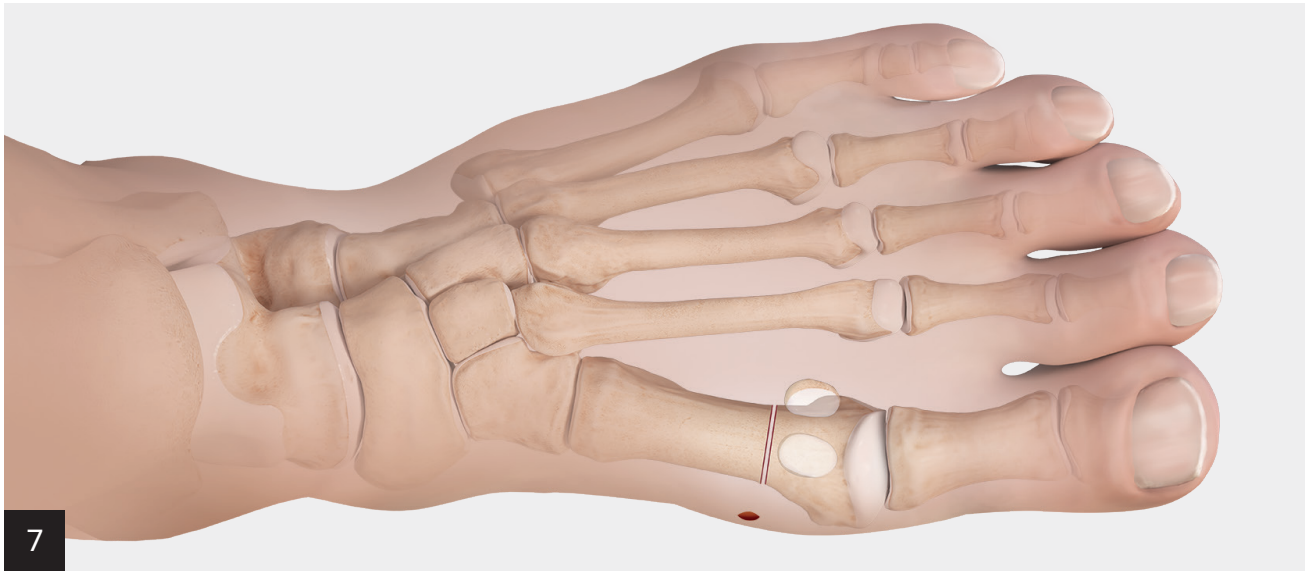
For a transverse osteotomy, introduce the burr at the apex of the osteotomy through both cortices, aiming in a slight plantar direction. First, perform the dorsal cut by rotating the hand plantar (burr moves dorsal). Next, perform the plantar cut by rotating the hand dorsal (burr moves plantar).



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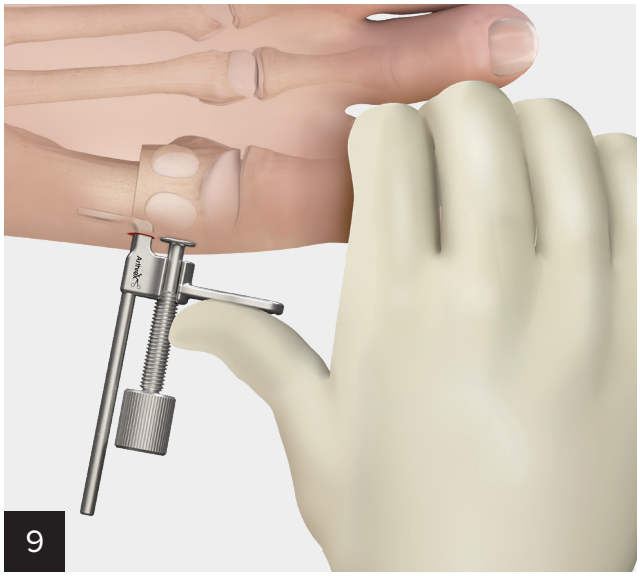
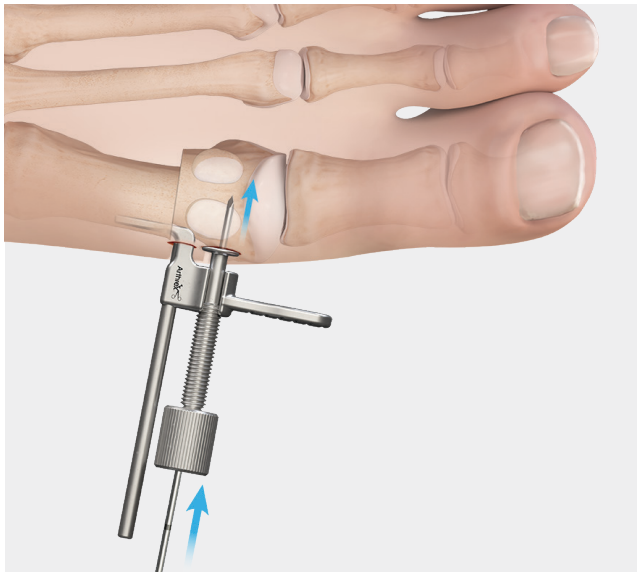
Use fluoroscopy to confirm that the osteotomy is complete.

Insert the hook into the intramedullary canal of the metatarsal. Make an incision where the capital fragment shifter contacts the head of the metatarsal and insert the end of the shifter through the skin onto the bone. Similarly, the initial incision can be extended to fit both the intermedullary hook and shifter.



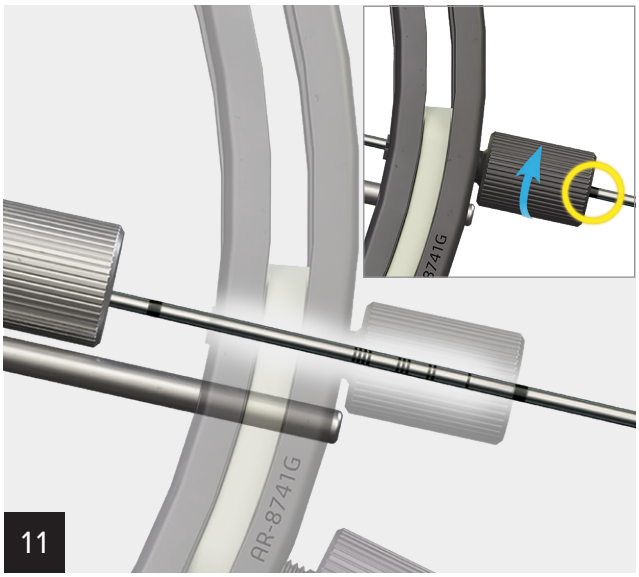
While pulling the toe into varus, confirm appropriate positioning of the shifting device under fluoroscopic imaging. Advance the capital fragment guidewire through the capital fragment shifter to the lateral cortex of the fragment.



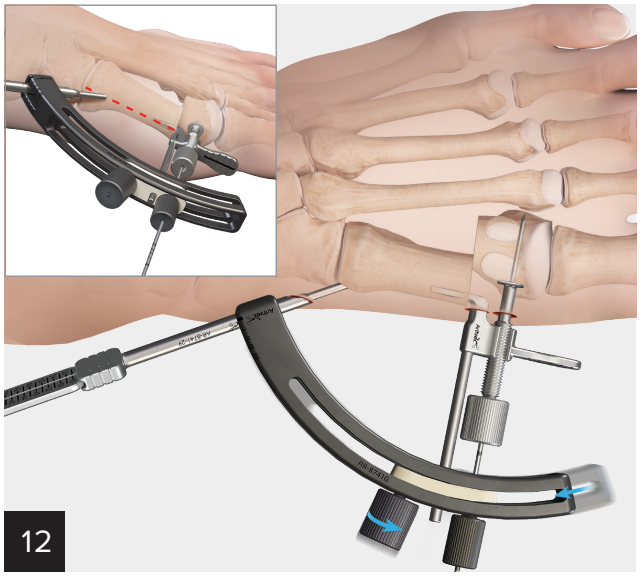
Capital fragment guidewire placement should be parallel to the articular surface and centered in the sagittal plane.

Note: For a bunion with a rotational deformity, apply rotational correction and properly align the sesamoid complex prior to inserting the K-wire into the capital fragment.

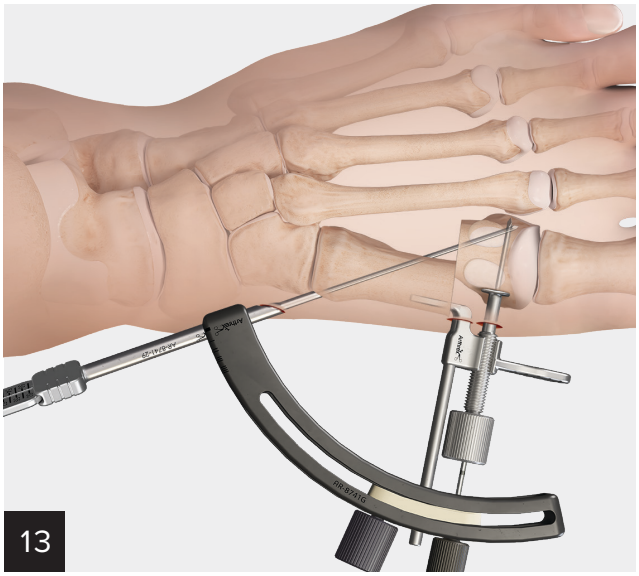
Turn the capital fragment shifter clockwise to shift the capital fragment laterally.



Slide the trajectory guide onto the capital fragment K-wire through the K-wire positioning knob. Tighten the K-wire positioning knob onto the capital fragment guidewire such that the thickest laser line of the guidewire is in line with the top of the knob.

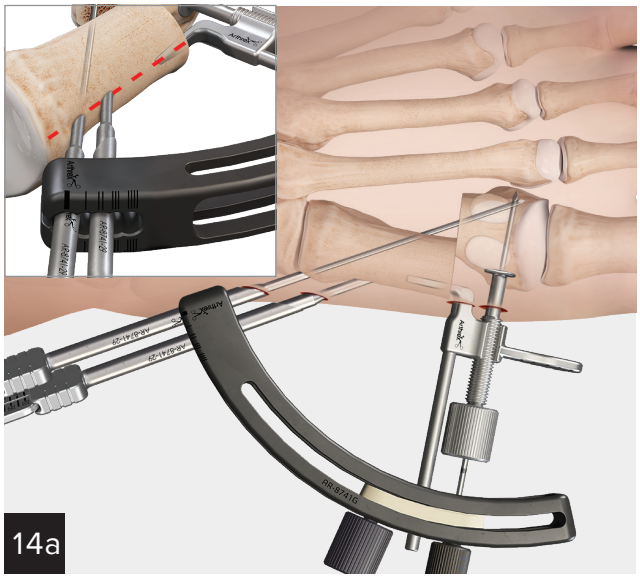


Turn the screw positioning knob clockwise to fix the proximal placement of the K-wire guide, close to the TMT joint. Ensure that the depth device contacts the metatarsal on the marked midline of the metatarsal shaft.



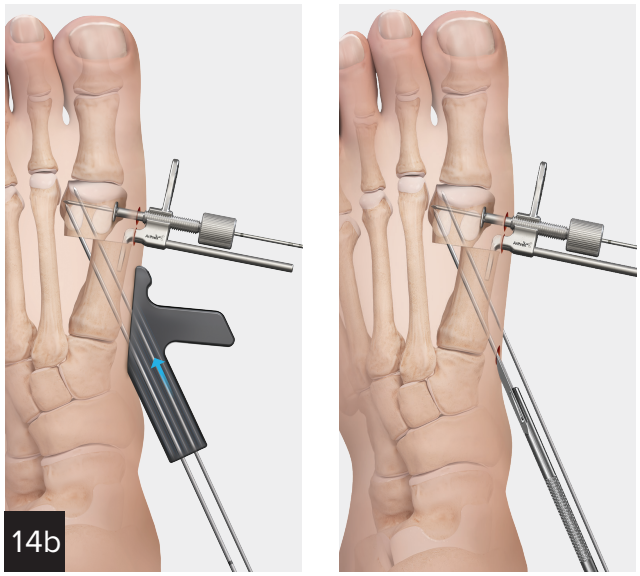
Advance the appropriately sized K-wire through the K-wire guide and into the metatarsal. Ideal placement of the K-wire for the most proximal screw traverses both cortices of the proximal metatarsal prior to penetrating the capital fragment.

- **4.0 mm screw—1.6 mm K-wire**
- **3.5 mm screw—1.4 mm K-wire**



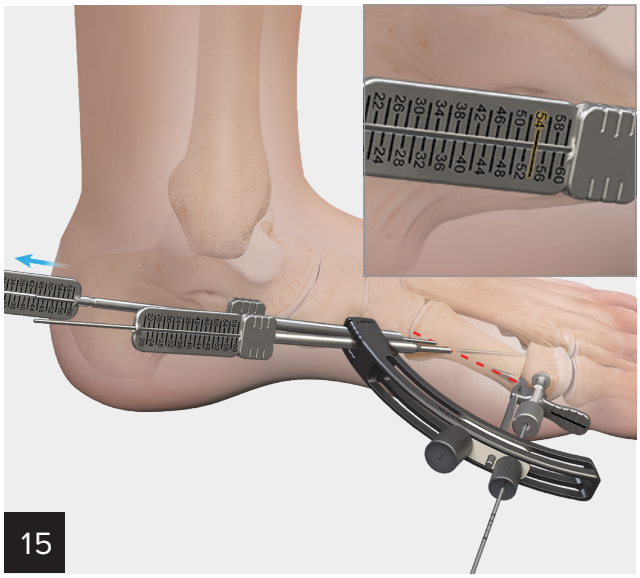
Insert the second K-wire guide distal to the first, being sure to skip one slot. Advance the appropriate diameter K-wire through the second K-wire guide.

Tip: Make an incision to ensure that the depth device is on bone and the bevel is aligned with the surface of the metatarsal.



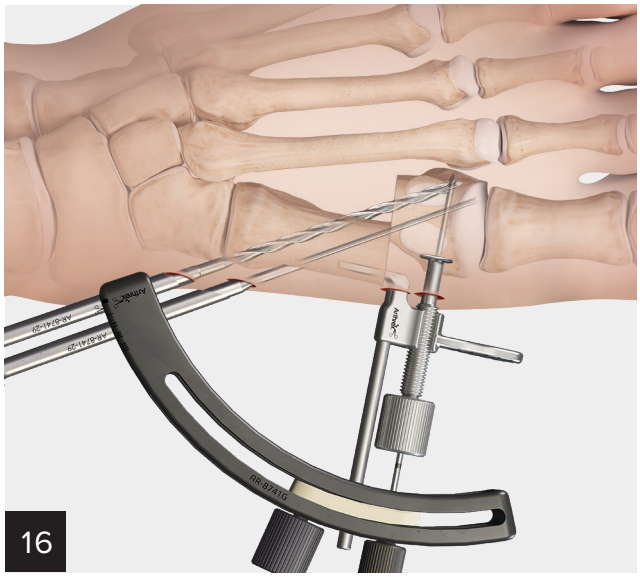
Additionally, the MIS parallel guide can also be used to place a wire distal to the first.

Tip: Use the cannulated knife handle to make an incision in line with the placed K-wires.



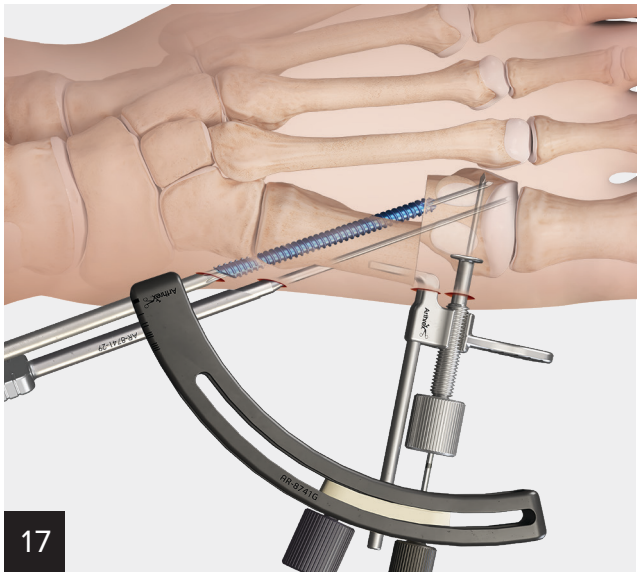
For the most proximal screw, measure the screw length from the laser line on the K-wire. Remove the depth device, leaving the drill sleeve in place.

Tip: At this stage, the guide can be removed. Steps 20-24, including measurement, drilling, and screw insertion can be completed over the placed K-wires without the guide. Shorter instrumentation is available for use outside of the guide.

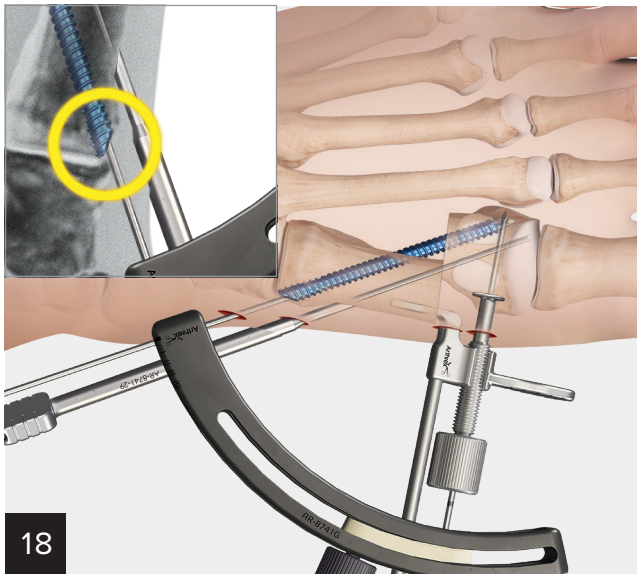


Drill the full length of the wire through the drill sleeve using the appropriately sized drill, leaving the K-wire in place.

- **4.0 mm screw—3.6 mm drill**
- **3.5 mm screw—2.9 mm drill**

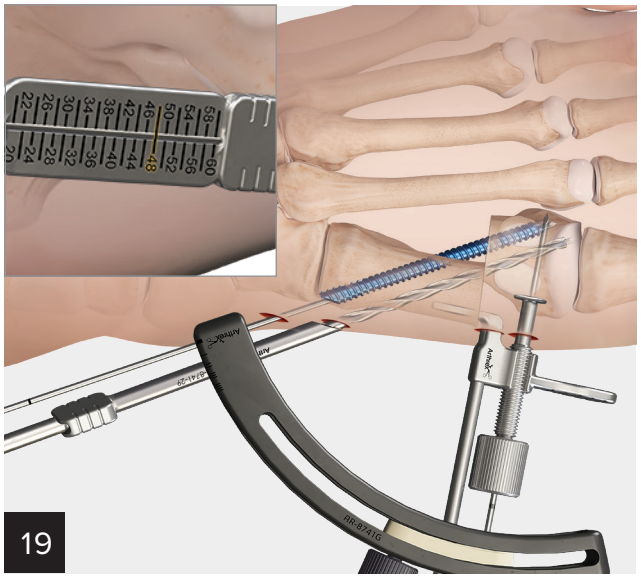


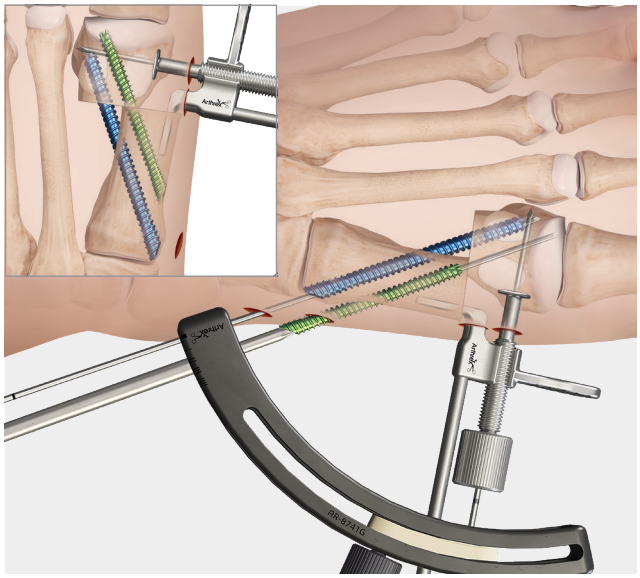
Remove the drill sleeve and insert the desired screw over the K-wire.



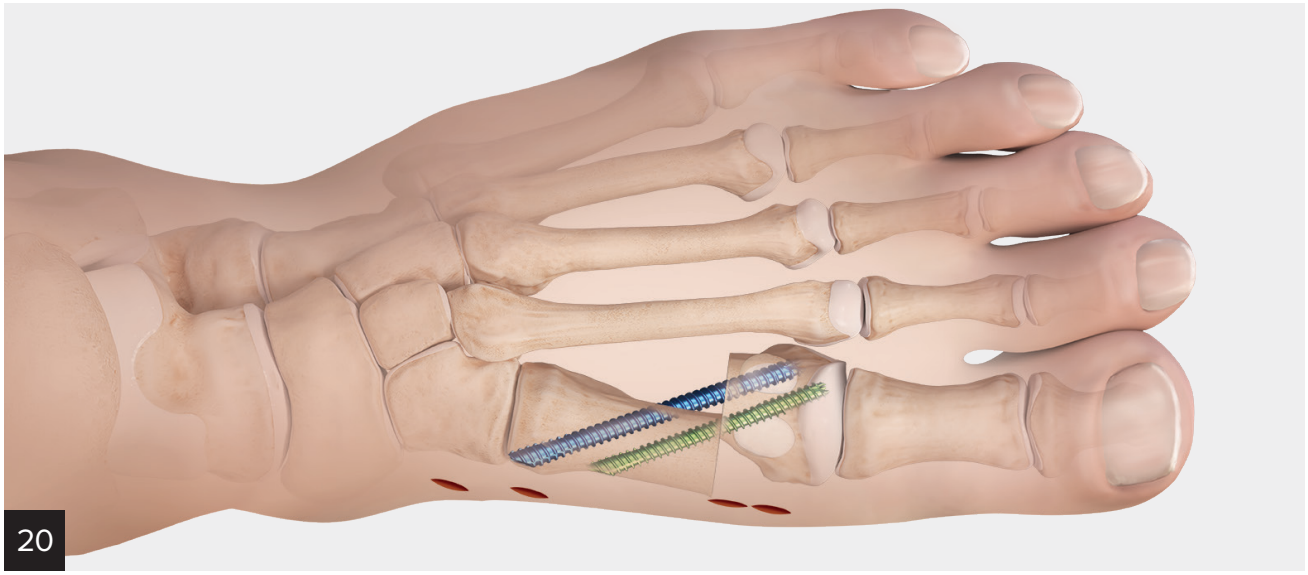
With fluoroscopic assistance, confirm that the bevel of the screw is properly aligned with the metatarsal.

- **4.0 mm screw—T15 hexalobe driver**
- **3.5 mm screw—T10 hexalobe driver**



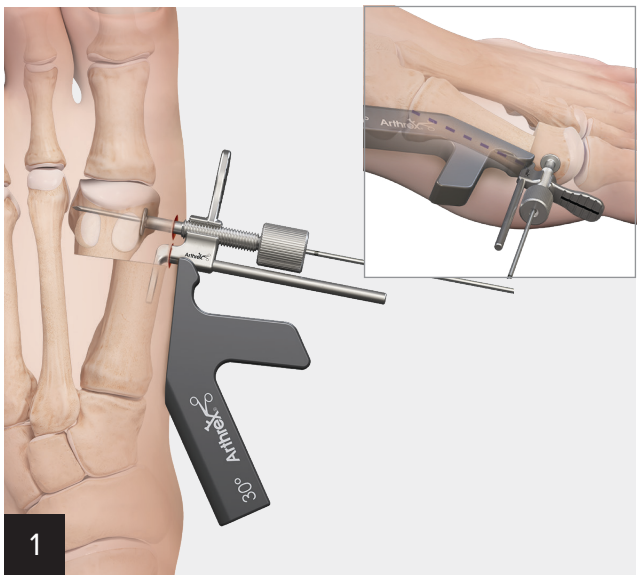


Repeat steps 15-18 for the second screw. Insert the screw over the K-wire and confirm that the bevel of the screw is properly aligned with the metatarsal.



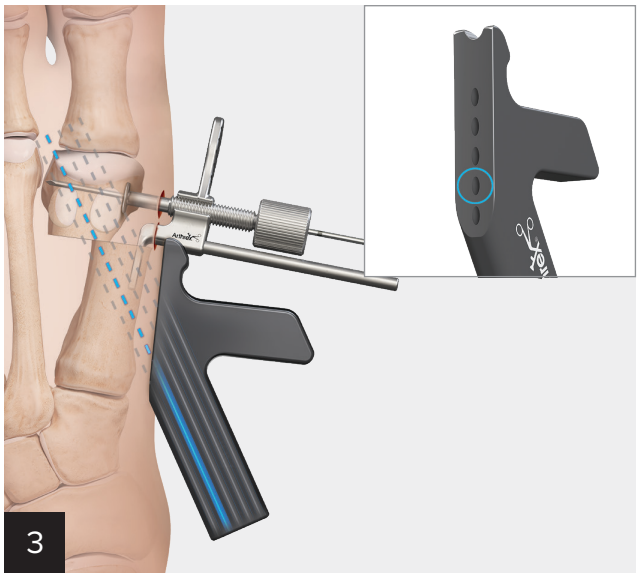
Once both screws have been placed, remove the trajectory guide, shifting device, and any remaining K-wires.

Minimally Invasive Bunionectomy Surgical Technique With the MIS Parallel Guide



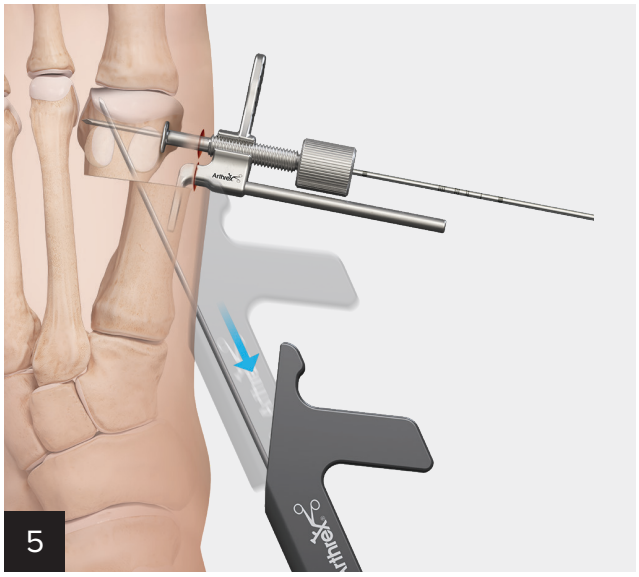
Once the shifting device has been fully placed and the capital fragment has been shifted, hold the parallel guide against the side of the foot. Parallel guide placement should match the declination of the metatarsal and the midline previously drawn.

The notch in the distal portion of the parallel guide can abut the post of the shifting device.



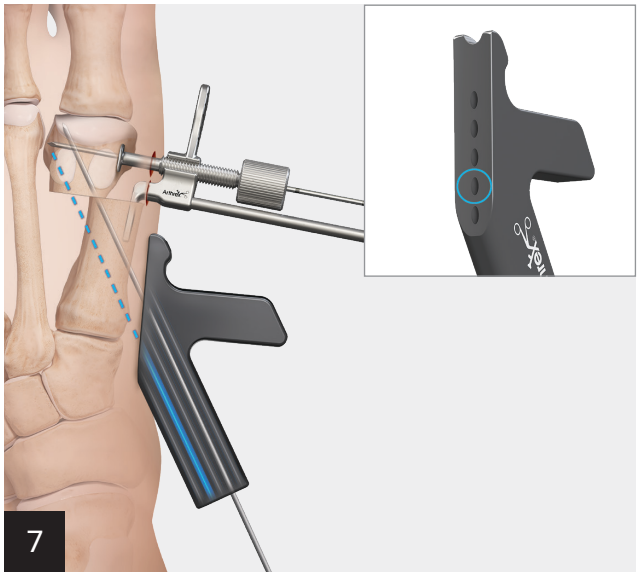
Insert a K-wire into a proximal slot of the parallel guide. Use fluoroscopy to confirm that the desired K-wire trajectory is achieved for the distal wire.

Once the proper slot has been identified, advance the K-wire to its desired end point in the capital fragment.

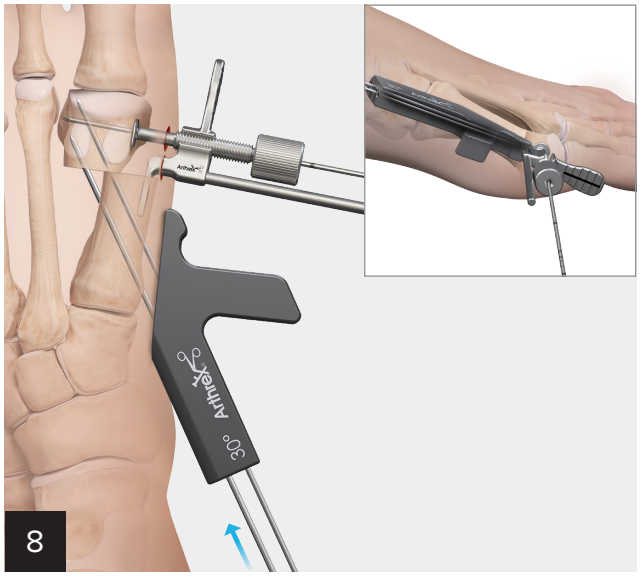


Leaving the K-wire in place, slide the parallel guide off the wire.

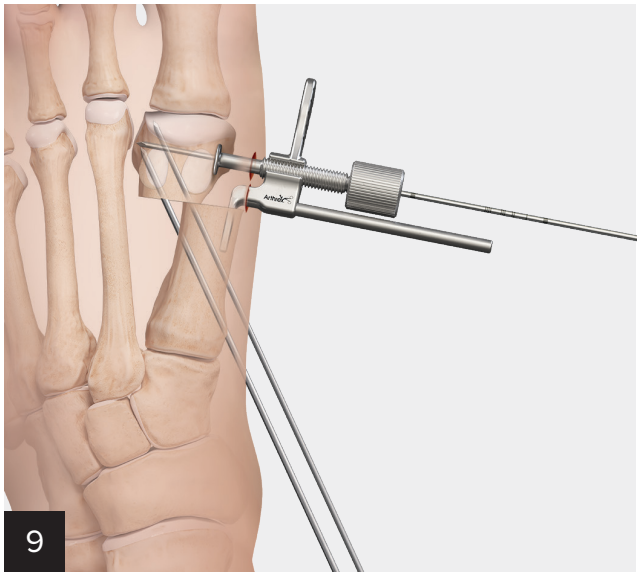
Insert the K-wire into a more distal slot on the parallel guide, moving the guide to a more proximal position on the foot.



Insert a K-wire into a proximal slot of the parallel guide. Use fluoroscopy to confirm that the desired K-wire trajectory is achieved for the proximal wire.

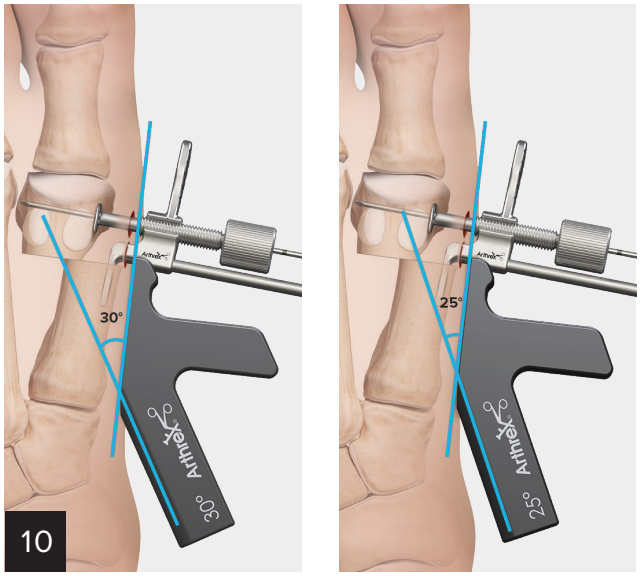


Once the proper slot has been identified, advance the K-wire. Ideal placement of the K-wire for the most proximal screw traverses both cortices of the proximal metatarsal prior to penetrating the capital fragment.



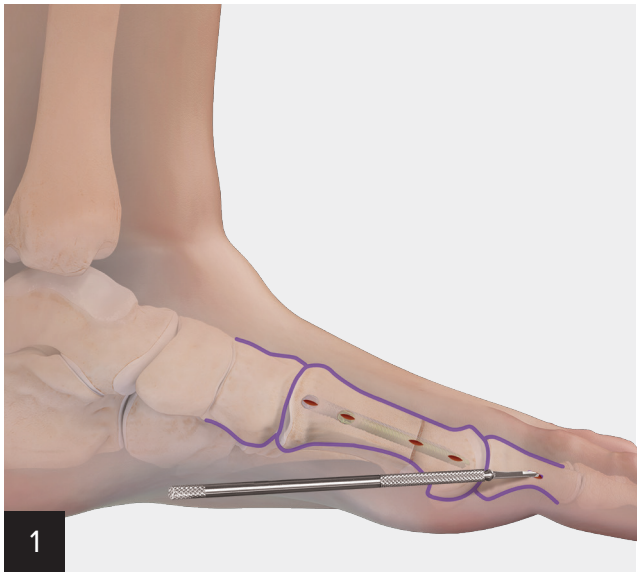
Once both K-wires have been properly placed, remove the parallel guide and proceed with depth measurement for screw insertion steps.

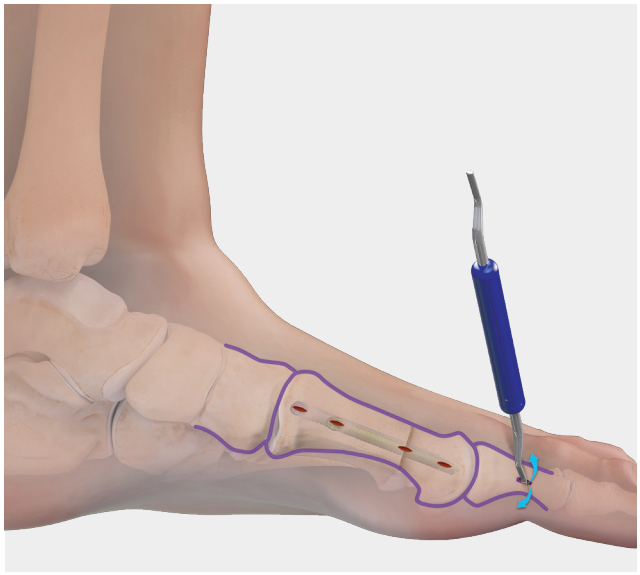
Note: For more proximal wire placement, the MIS parallel guide can be placed midline on the foot at the desired proximal position without abutting the shifting device.



Previous steps were shown with the 30° parallel guide. For more vertical wire placement, the 25° parallel guide option can be used.

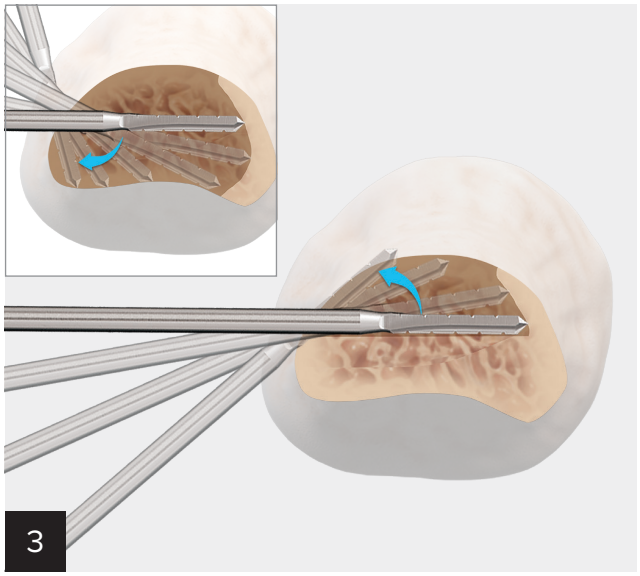
Minimally Invasive Akin Osteotomy Surgical Technique



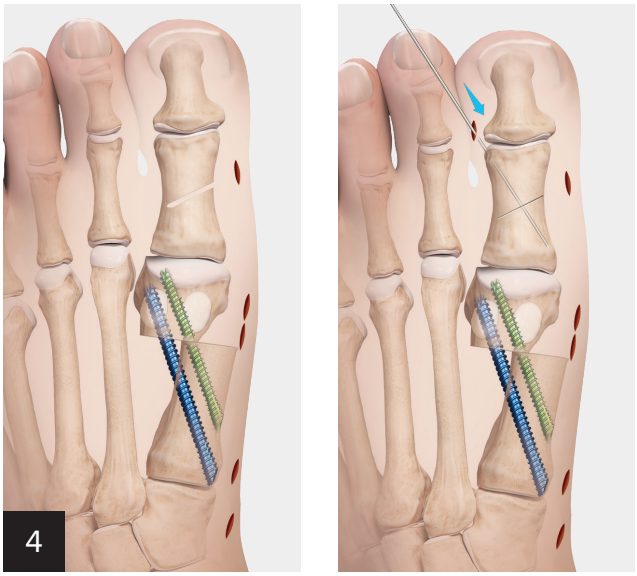


Make an incision midline at the proximal phalanx and use the periosteal elevator to elevate the soft tissue both dorsal and plantar.

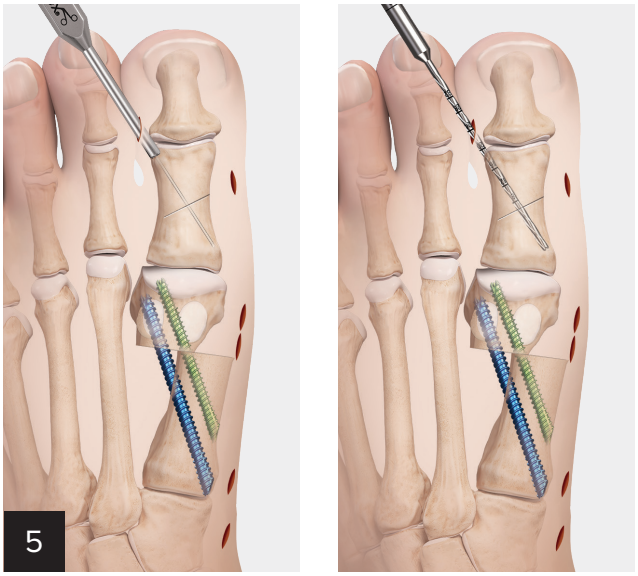
Insert the burr midline at the proximal phalanx and aimed 45° proximal toward the proximal lateral aspect of the proximal phalanx. Be careful not to advance the burr bicortically.



Next, rotate the burr dorsal and finally plantar, again ensuring not to violate the lateral cortex.

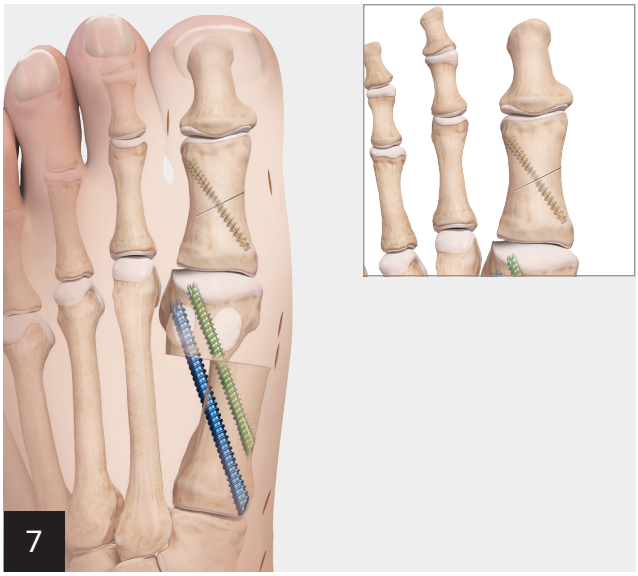


Use fluoroscopy to confirm an adequate osteotomy has been achieved. Manually reduce the osteotomy and insert a K-wire to prepare for definitive fixation.

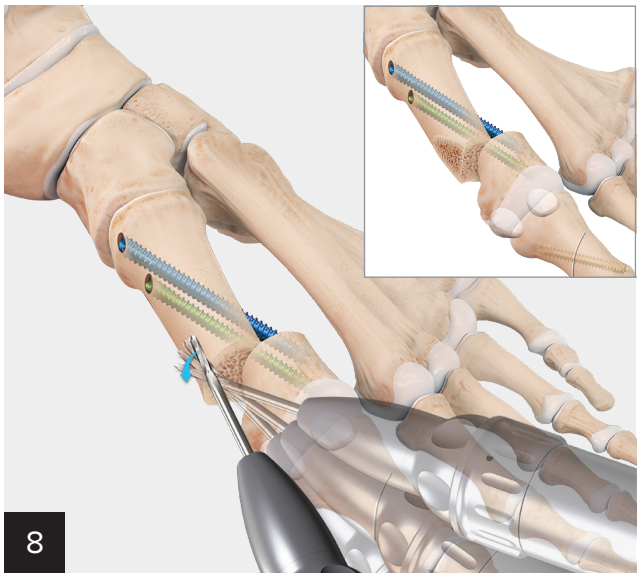


Use the beaver blade to create a small incision. Proceed to measure and drill for the Compression FT screw.

The optional profile drill can be used at this time.



Insert the Compression FT screw to complete the construct. **Optional:** The direction of the osteotomy can be altered based on the direction of definitive fixation desired.



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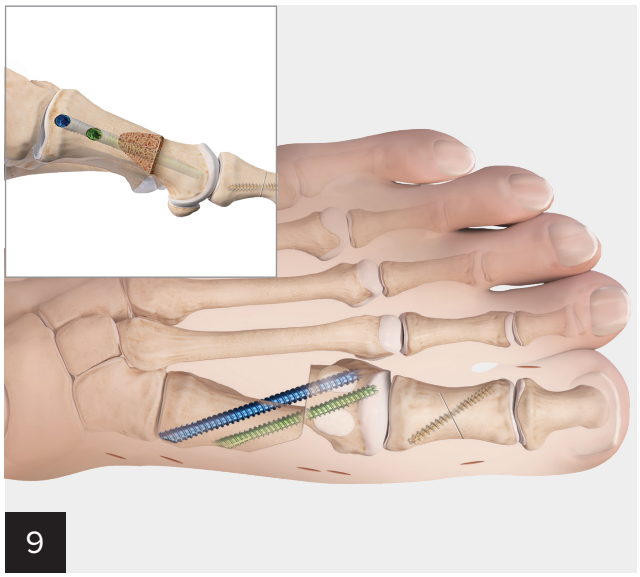
Insert the wedge burr through the initial medial incision and proceed to shave down the prominence until it is no longer palpable outside the skin.



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Final AP and lateral views of the construct.

Ordering Information

DrillSaw Highspeed 200™ Set (AR-200)

Product Description	Item Number
Instruments	
DrillSaw Highspeed 200 Set Console	AR-**200C**
Motor w/ Cable, 0-15,000 rpm	AR-**200M**
Irrigation Clip	AR-**200SP**
Foot Pedal	**OEM06202400**
IV Stand	**OEM04005900**
Motor Support	**OEM06177800**

Disposables, Sterile

Product Description	Item Number
Osteotomies for Lesser Toe Deformity Correction	
Burr, straight, sterile, 8 mm × 2 mm	AR-**300-B002**
Burr, straight, sterile, 12 mm × 2.2 mm	AR-**300-B003**
Osteotomies for Hallux Valgus Correction	
Burr, straight, sterile, 13 mm × 2 mm	AR-**300-B001**
Burr, straight, sterile, 19.5 mm × 2 mm	AR-**300-B201**
Bone Resection for Hallux Valgus/Hallux Rigidus Correction	
Burr, conical, sterile, 13 mm × 4.3 mm	AR-**300-B101**
Burr, straight, sterile, 13 mm × 2.9 mm	AR-**300-B102**
Burr, oval, sterile, 15 mm × 5 mm	AR-**300-B103**
Chevron Osteotomy for Calcaneal Displacement	
Burr, straight, sterile, 20 mm × 3.1 mm	AR-**300-B202**

Burr Attachment

Product Description	Item Number
MIS Burr Adapter, 2.35 mm	AR-**300B**

Optional Short Instrumentation (not included in AR-8741S)

Product Description	Item Number
Drill Bit, short, cannulated, 2.9 mm	AR-**8741-25S**
Drill Bit, short, cannulated, 3.6 mm	AR-**8741-32S**
Driver, short, T10 hexalobe, Beveled FT	AR-**8741-40S**
Driver, short T15 hexalobe, Beveled FT	AR-**8741-42S**
Profile Drill, short, Beveled FT, 3.5 mm	AR-**8741-36S**
Profile Drill, short, Beveled FT, 4.0 mm	AR-**8741-37S**

MIS Parallel Guides (ordered separately)

Product Description	Item Number
MIS Parallel Guide, 25°	AR-**8741G-25**
MIS Parallel Guide, 30°	AR-**8741G-30**

Minimally Invasive Bunion Correction System (AR-8741S)

Product Description	Item Number
Instruments	
Minimally Invasive Bunion Trajectory Guide	AR-**8741G**
K-Wire Positioning Knob, qty. 2	AR-**8741G-01**
Screw Positioning Knob, qty. 2	AR-**8741G-02**
Capital Fragment Shifter, small, qty. 2	AR-**8741LS-01**
Capital Fragment Shifter, large	AR-**8741LS-02**
Intramedullary Hook, qty. 2	AR-**8741LS-03**
Drill Sleeve, Beveled FT	AR-**8741-29**
Depth Device, Beveled FT	AR-**8741-28**
Profile Drill, 3.5 mm Beveled FT	AR-**8741-36**
Profile Drill, 4 mm Beveled FT	AR-**8741-37**
Driver, T10 hexalobe, Beveled FT	AR-**8741-40**
Driver, T15 hexalobe, Beveled FT	AR-**8741-42**
Handle, ratcheting, AO	AR-**8700RH**
Depth Device, 2.5 mm Compression FT	AR-**8737-51**
Driver Shaft, 1.5 mm hex, cannulated	AR-**8737-37**
Profile Drill, 2.5 mm Compression FT	AR-**8737-46**
Rasp and Blunt Elevator, small	AR-**8880-01**
Rasp and Blunt Elevator, medium	AR-**8880-02**
Combi Elevator, straight and curved ends, sharp	AR-**8880-03**
Sayre Elevator	AR-**8954-05**
Knife Handle, cannulated	AR-**8742KH**
Scalpel Handle, 13 cm	**3KL**
Minimally Invasive Bunion Correction System	AR-**8741C**
Minimally Invasive Bunion Screw Caddy	AR-**8741C-01**

Product Description	Item Number
Implants	
Beveled FT Screw, 3.5 mm × 20 mm-60 mm (2 mm increments)	AR-**8735BV-20-60**
Beveled FT Screw, 4.0 mm × 20 mm-60 mm (2 mm increments)	AR-**8740BV-20-60**
2.5 Micro Compression FT™ Screw, 2.5 mm × 14 mm-50 mm (2 mm increments)	AR-**8725-14H-50H**
Disposables	
Drill, cannulated, 2.0 mm	AR-**8737-34**
Drill, cannulated, hard bone, 2.2 mm	AR-**8737-58**
Guidewire, .86 mm	AR-**8737-39**
Guidewire, capital fragment , 1.6 mm	AR-**8741-16**
Guidewire, 1.4 mm, Beveled FT	AR-**8741-14**
Guidewire, 1.6 mm, Beveled FT	AR-**8741-15**
Drill Bit, cannulated, 2.9 mm	AR-**8741-25**
Drill Bit, cannulated, 3.6 mm	AR-**8741-32**

Optional Short Instrumentation

Product Description	Item Number
Drill Bit, short, 2.9 mm	AR-**8741-25S**
Drill Bit, short, 3.6 mm	AR-**8741-32S**
T10 Driver, short	AR-**8741-40S**
T15 Driver, short	AR-**8741-42S**

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