

# SPIDER MONKEY TTT

## SURGICAL TECHNIQUE GUIDE

Spider Monkey™ Bone Transport System

Paragon<sup>20</sup>®

a  ZIMMER BIOMET company



## PRODUCT DESCRIPTION:

The Paragon 28® Spider Monkey™ Bone Transport System provides instrumentation designed to help with templating and guiding a tibial corticotomy. It also includes a Transporter that allows for distraction or compression in ¼ mm increments up to a maximum of 14 mm of distraction.

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# SYSTEM COMPONENTS AND FEATURES:



**Bone Transporter:**

Clamps onto Pins in bone segment, compatible with parallel and converging Pin orientation. Features posts for Combination Clamp attachment to Pins outside of bone segment. Can also be connected to a Monkey Rings™ construct via M6 Connection Bolts.



**Combination Clamp:**

Connects to the Bone Transporter and Pins placed outside of corticotomy. Allows for Pin-to-Bar and Bar-to-Bar fixation with 360 degrees of freedom.



**1 mm End Cap:**

Threads into the end of the bars of the Bone Transporter.



**25 mm Extender:**

Threads into the end of the bars of the Bone Transporter to give additional length if necessary for appropriate Clamp placement. Used when transporter is used with Monkey Rings™ construct.



**Corticotomy Drill:**

Used with Corticotomy Guide



**Corticotomy Stencil:**

Used to locate corticotomy on tibia and mark suggested incision and pin placement locations.



**Parallel Corticotomy Guide:**

Used to guide parallel Pins in Transport segment and guide corticotomy of Transport segment.



**Converging Corticotomy Guide:**

Used to guide converging Pins in Transport segment and guide corticotomy of Transport segment.

# SYSTEM COMPONENTS AND FEATURES:

Half Pins:		Pin Drills	
			
Half Pin Diameter:	Thread Length:	Pin Drill Diameter:	Drill Length:
Ø3.0 mm	20 mm	Ø2.4 mm	140 mm
Ø4.0 mm	20 mm	Ø3.2 mm	165 mm
Ø5.0 mm	35 mm	Ø4.0 mm	160 mm
	45 mm		
	55 mm		

Ø1.6 mm x 100 mm K-wire



Tissue Protector Trocar



Tissue Protector Sleeve



Tissue Protector with Handle



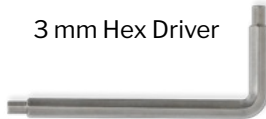
Saw Blade



5 mm Pin Cap



3 mm Hex Driver



10 mm Wrench



T-Wrench/Pin Driver



6 mm Osteotome



12 mm Osteotome



**INCISION:**

Place the Corticotomy Stencil on the skin and center it over the medial face of the proximal tibia. Ensure the stencil and eventual corticotomy is sufficiently distal from the tibial tubercle.

Corticotomy Stencil:



Medial view

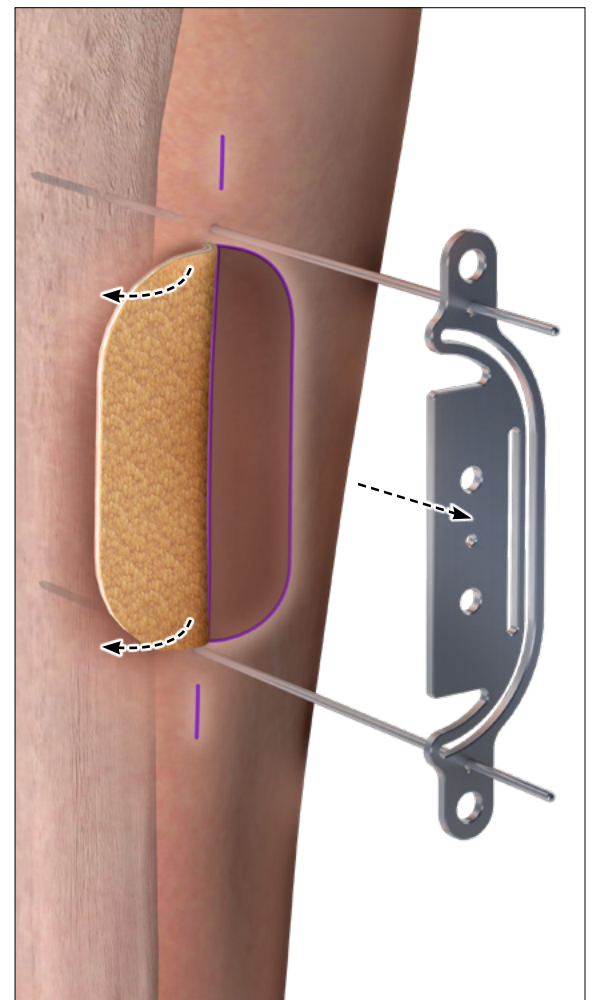
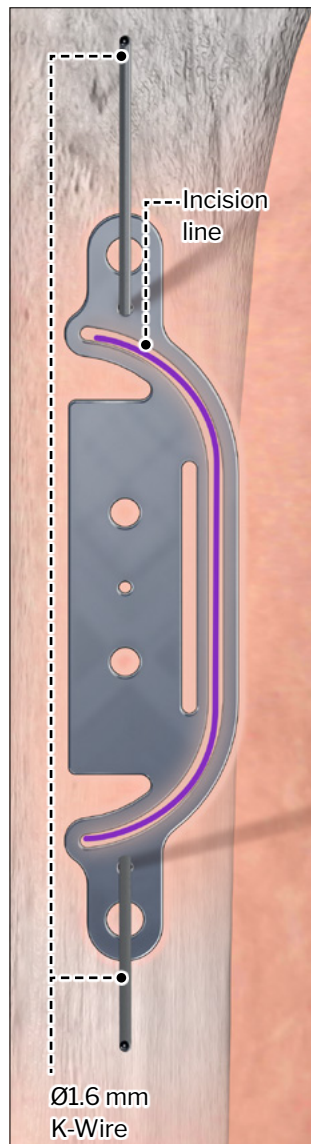
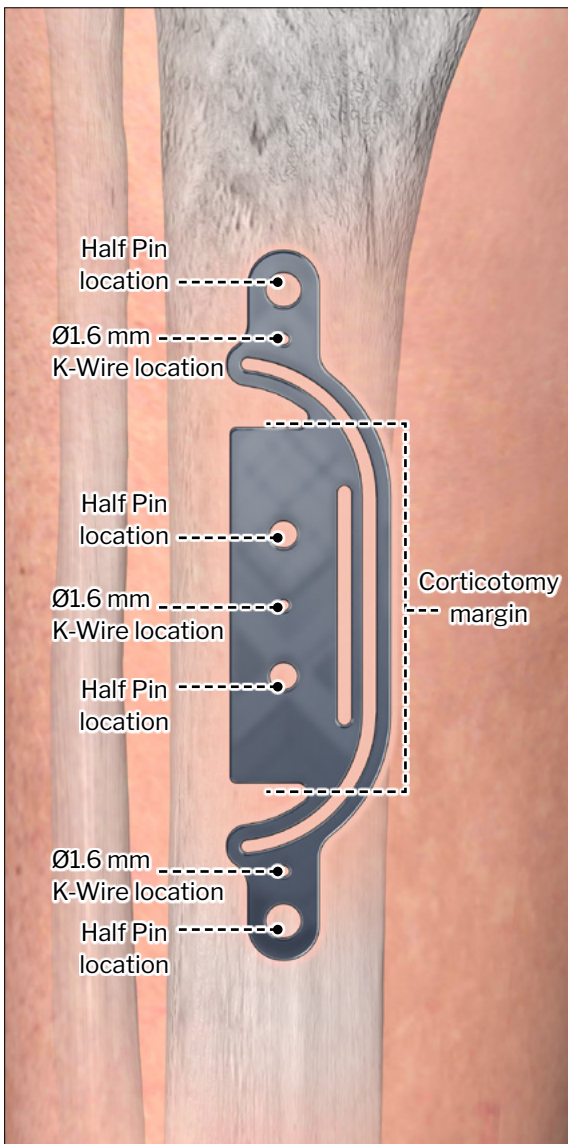
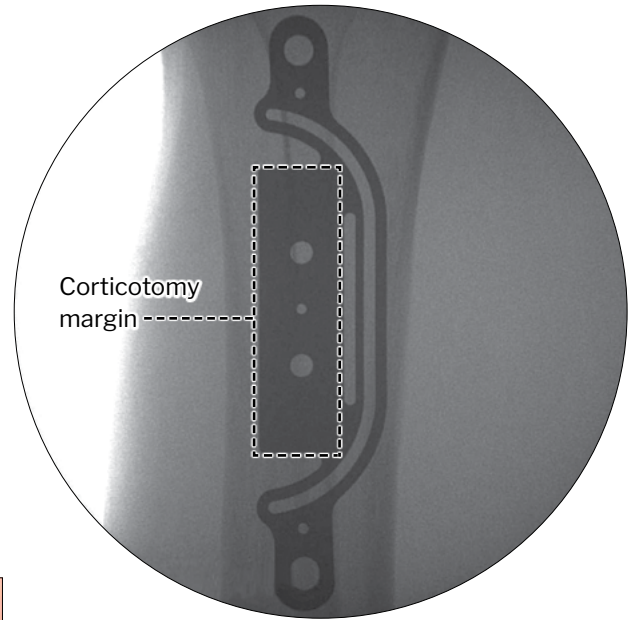


# INCISION:

Fluoroscopy can be used with the stencil to visualize the margins of the planned corticotomy. Once the stencil is positioned appropriately, place Ø1.6 mm K-wires bicortical in the proximal and distal K-wire holes. Use a surgical marker to mark the incision and intended Pin locations. Remove the Stencil and confirm appropriate intended Pin and incision placement.



Ø1.6 mm x 100 mm K-wire



After confirming appropriate placement, make a stab incision at the most proximal and distal Pin locations and make an incision along the marked incision path. Retract the skin flap anteriorly and elevate any remaining soft tissue.

# TEMPLATE PLACEMENT:

Parallel Corticotomy Guide

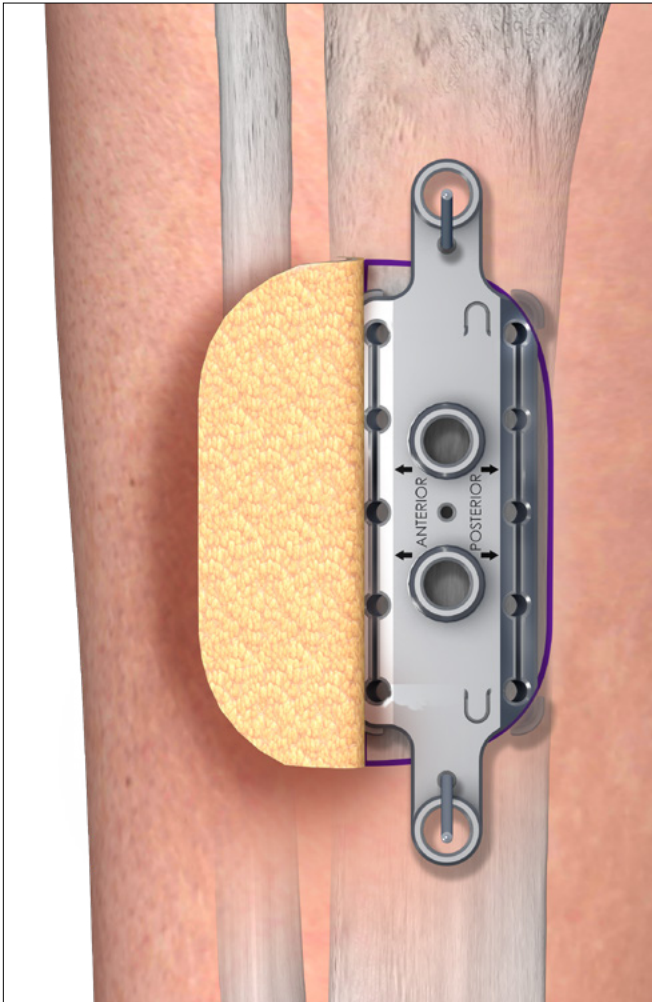


Converging Corticotomy Guide

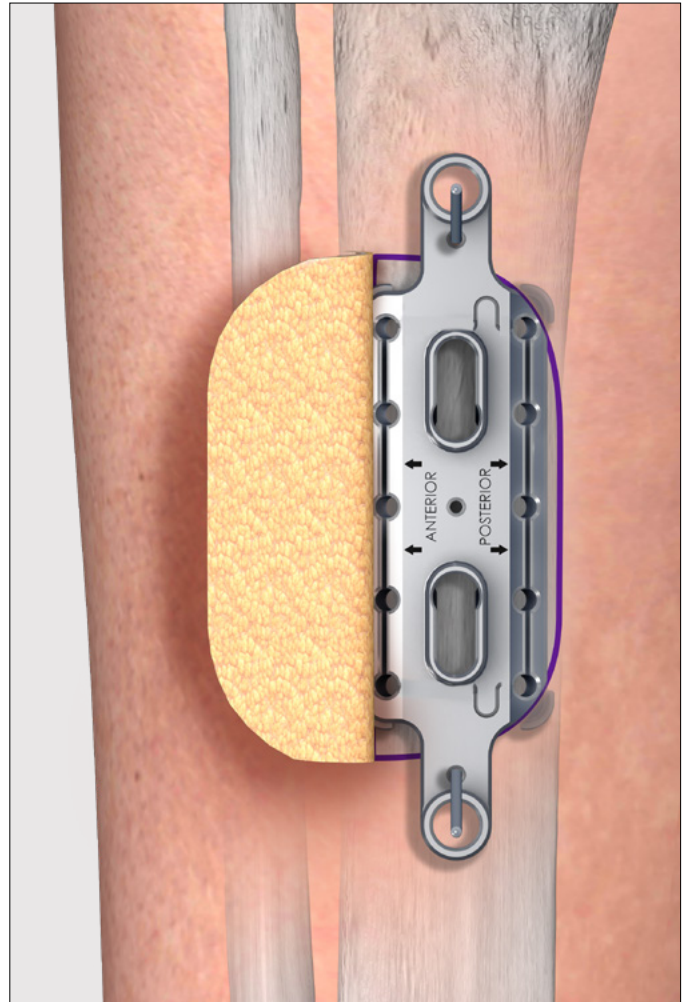


After retracting the soft tissues, slide the appropriate Corticotomy Guide down the wires and into the incision. Verify the guide is oriented in the correct anterior/posterior orientation. Ensure the anterior feet of the guide are under the soft tissues before placing the posterior feet. A freer can be used to help elevate the soft tissues while placing the guide. Ensure the guide is fully seated on the bone and soft tissues are not trapped under the guide.

Parallel

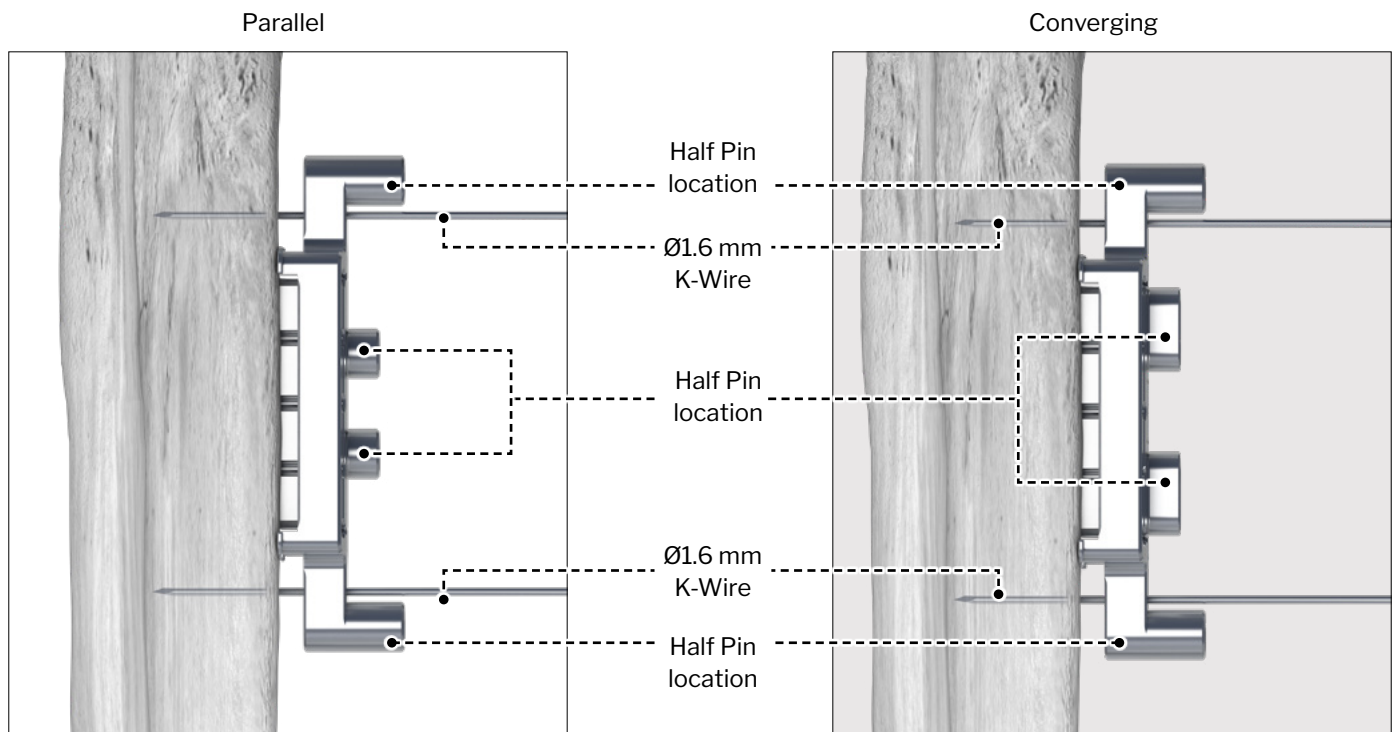
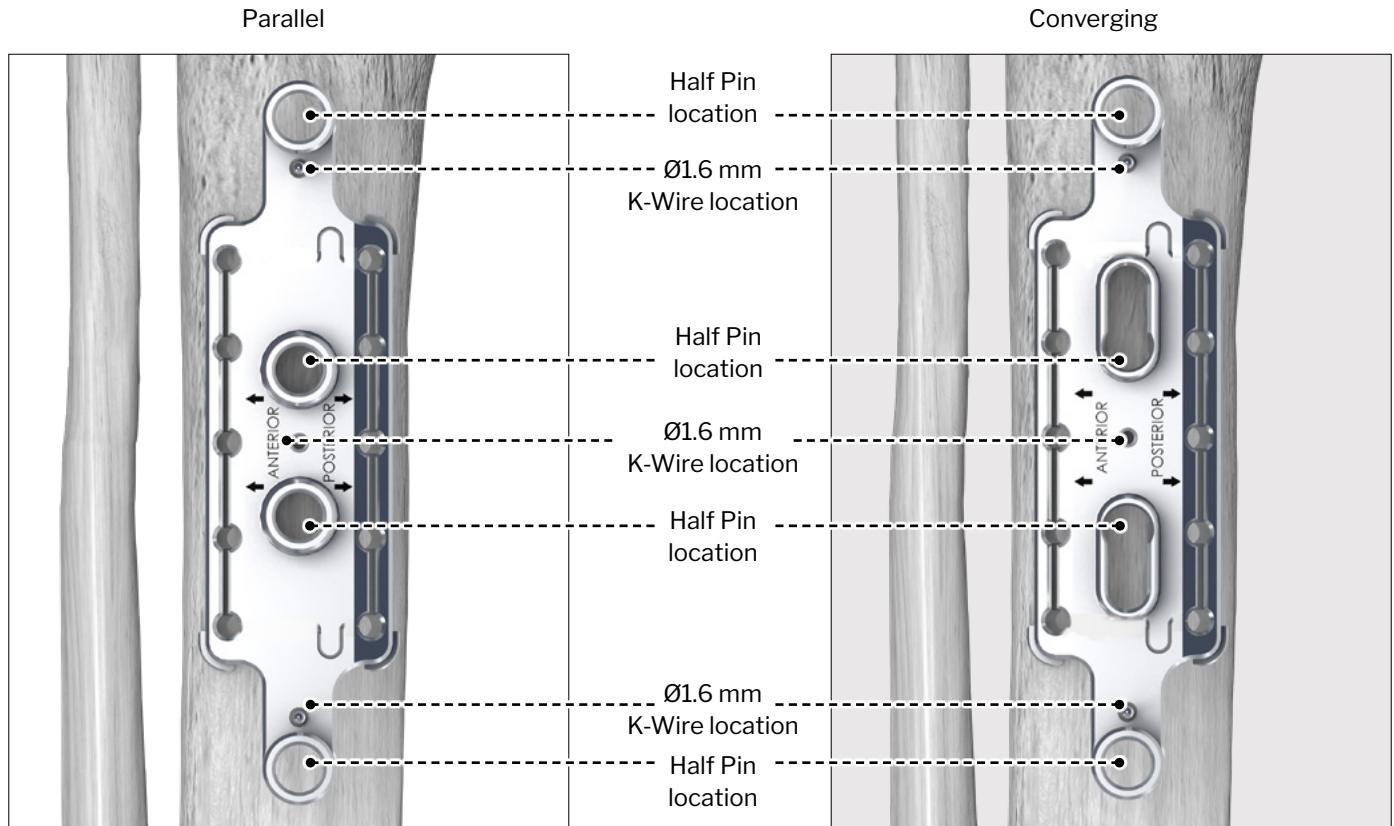


Converging



# TEMPLATE PLACEMENT:

The proximal and distal Pin holes in the Template should align with the marked Pin locations from the stencil.

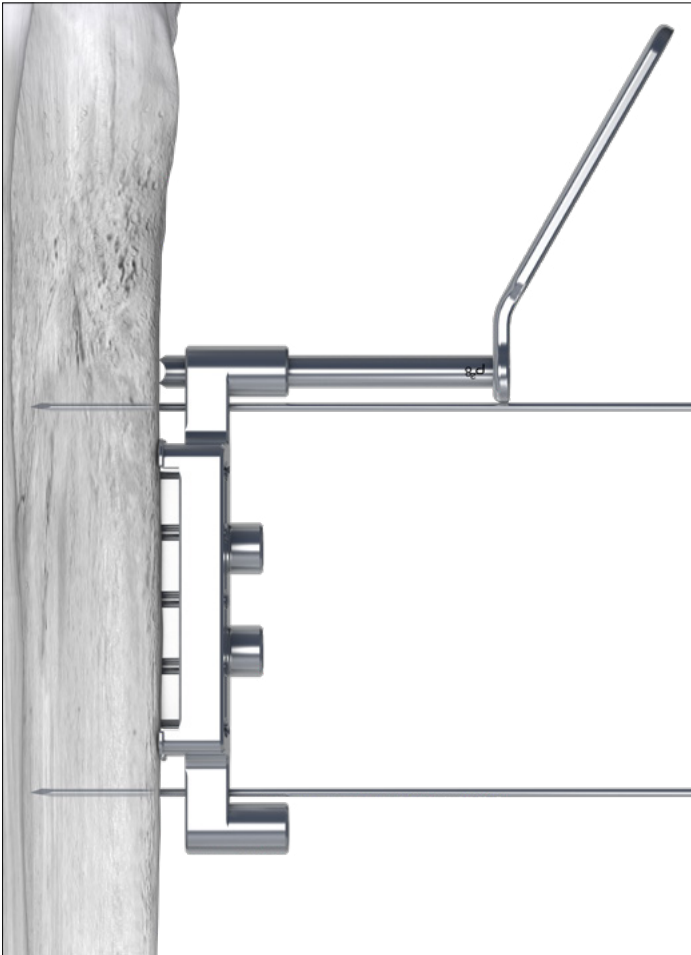


## PIN PLACEMENT:

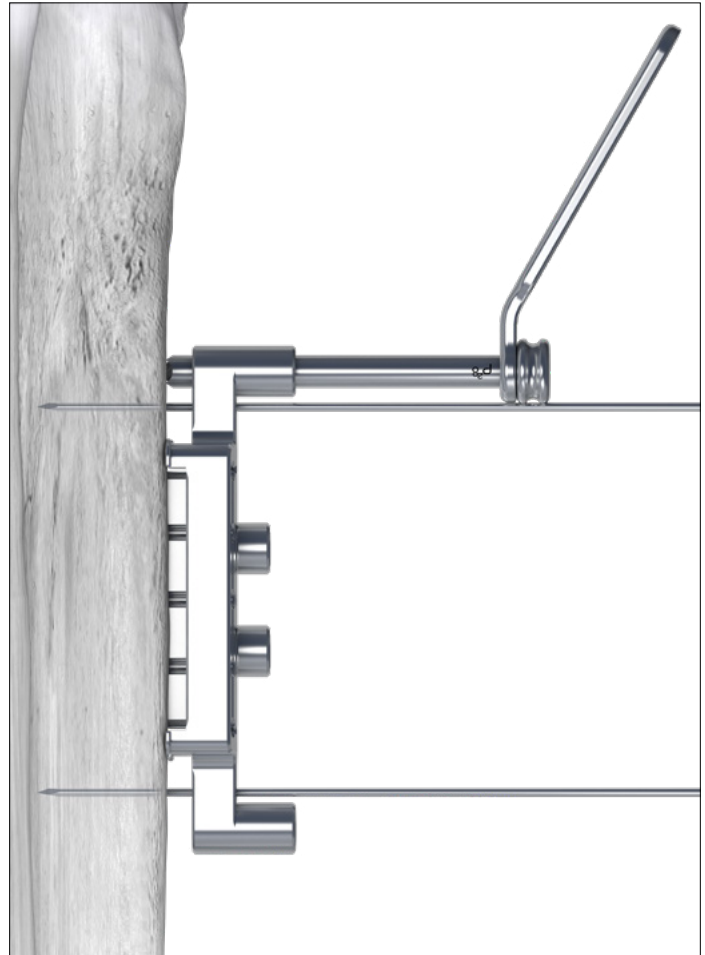
Tissue Protector with Handle



Tissue Protector Trocar

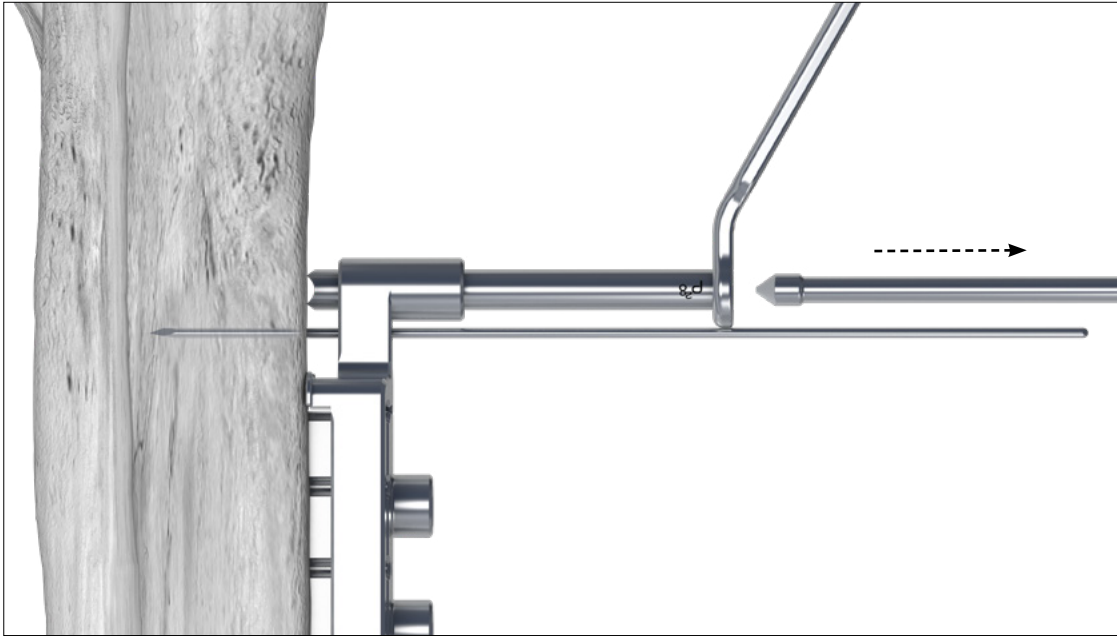


To place the most proximal Pin through the Guide, place the handled Tissue Protector in the proximal Pin location and down to the bone through the already placed stab incision.



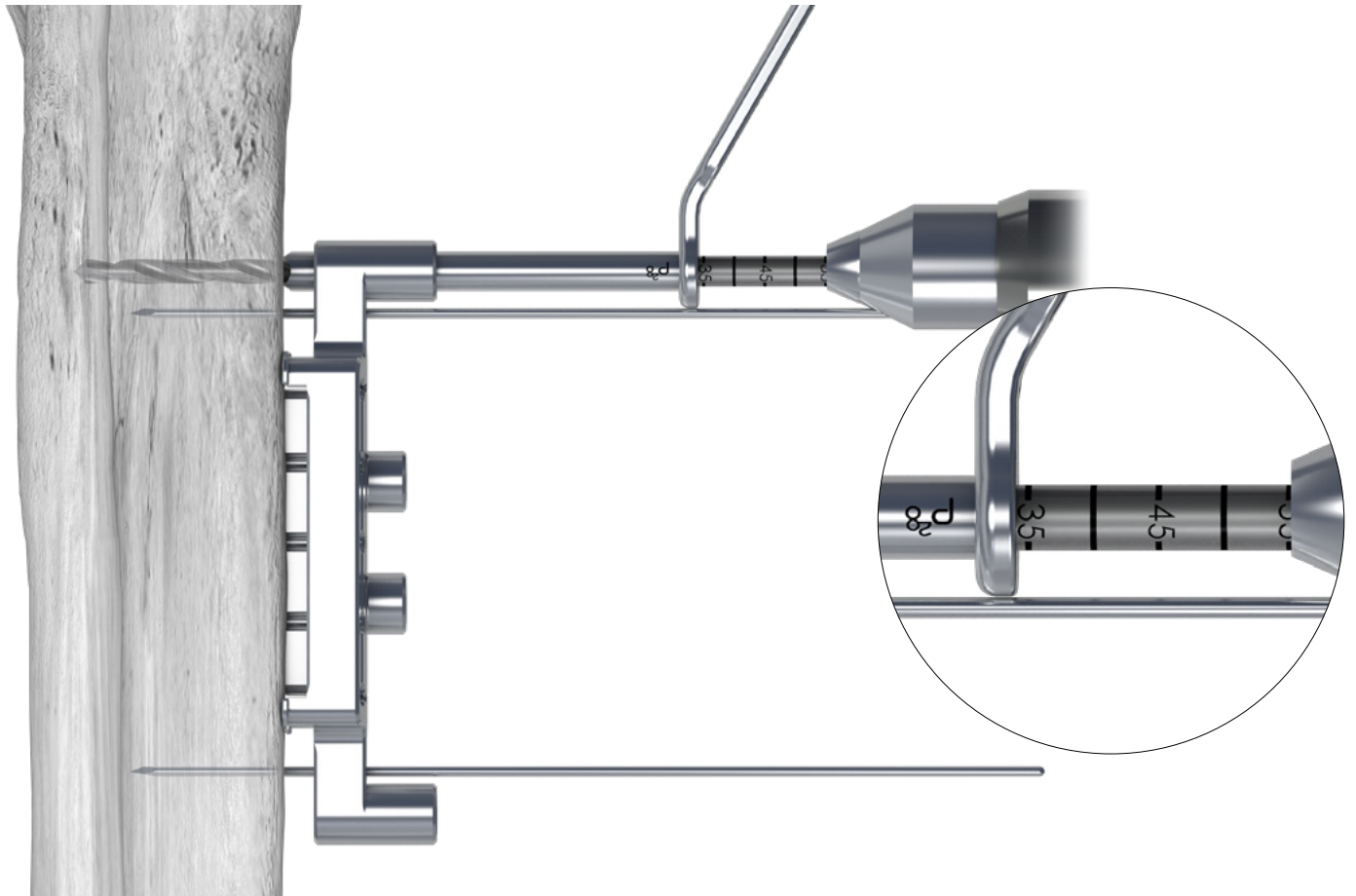
Place the Trocar through the Tissue Protector in the most proximal Pin location in the Guide.

# PIN PLACEMENT:



Remove the Trocar and drill for placement of a  $\text{\O}5.0$  Pin using the  $\text{\O}5.0$  mm Pin Drill. Measure off the drill for the appropriate thread length Pin to be used.

Pin Drill

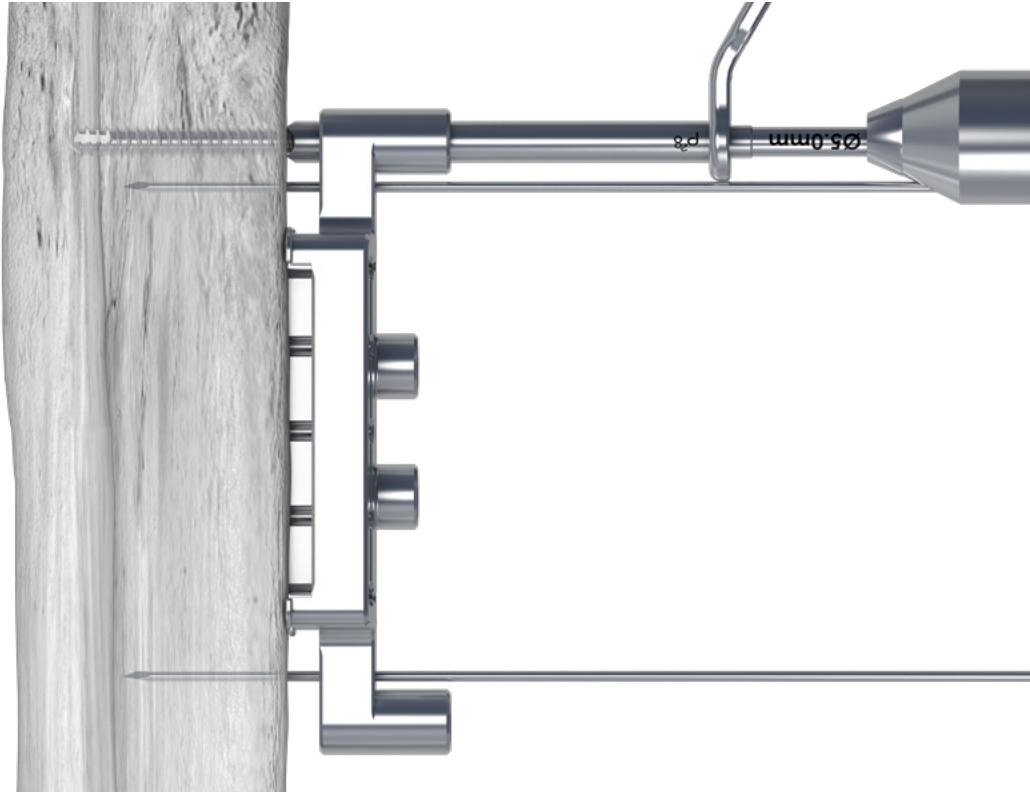


**PIN PLACEMENT:**

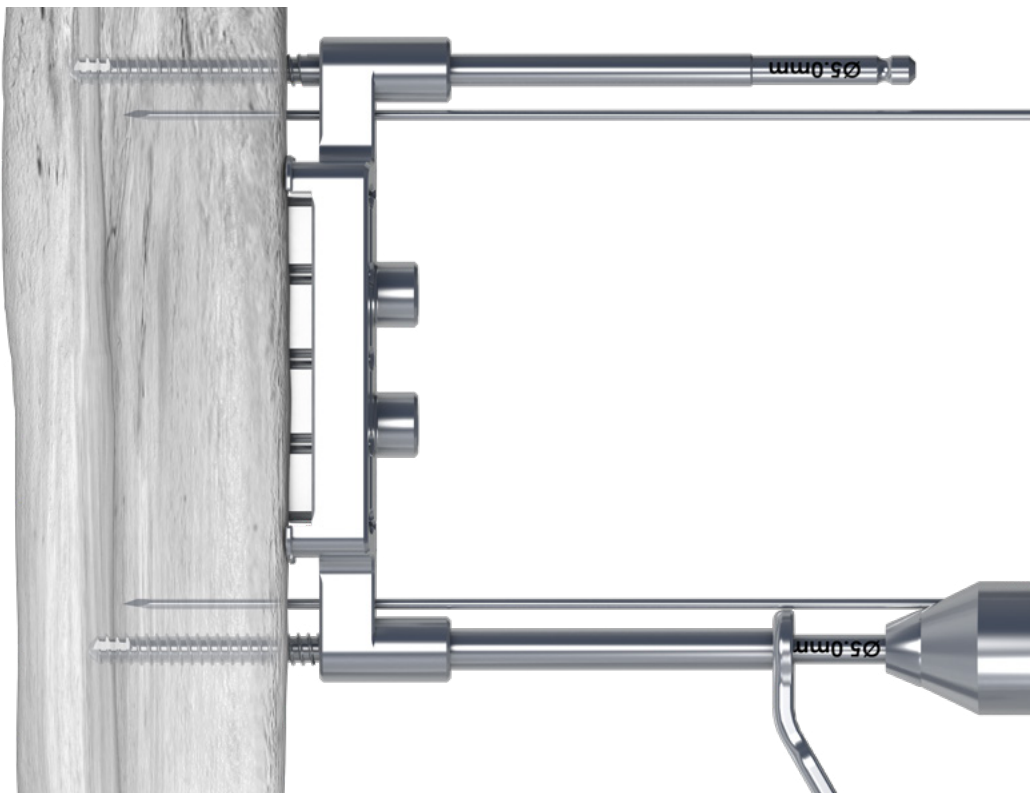
Half Pin



Place the appropriate length Ø5.0 Pin through the Tissue Protector and into the bone until bicortical.



Repeat the previous steps for placement of the distal Ø5.0 Pin. Confirm both Pins are bicortical before continuing.



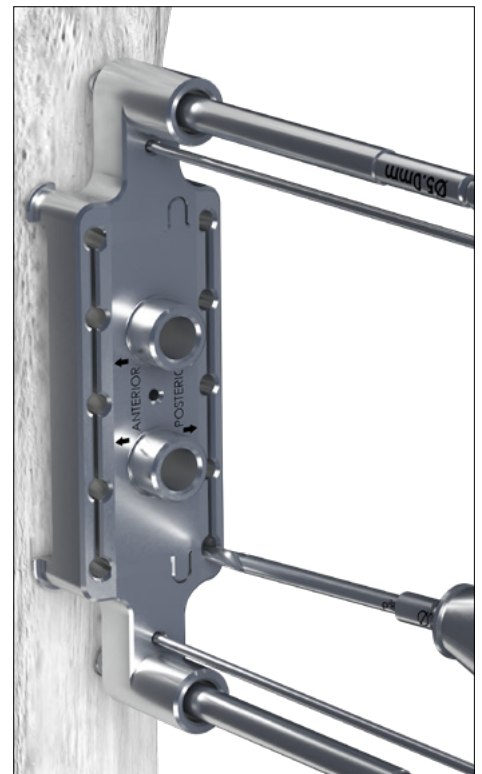
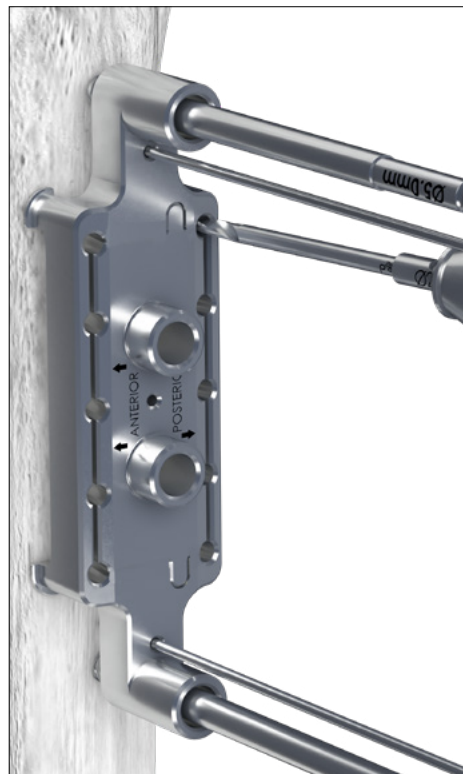
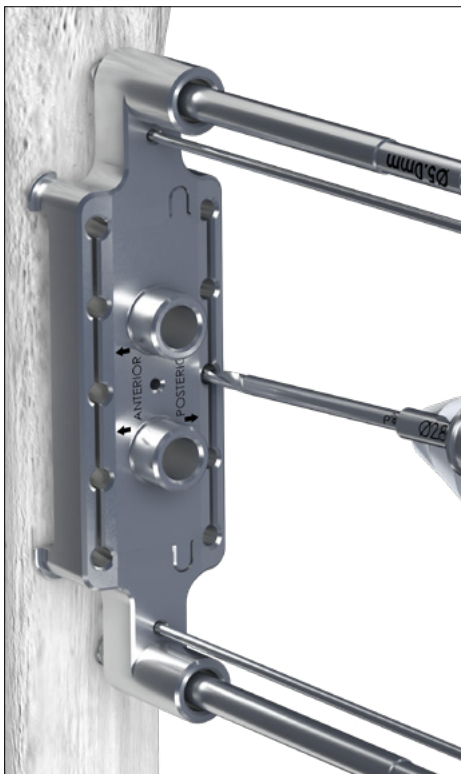
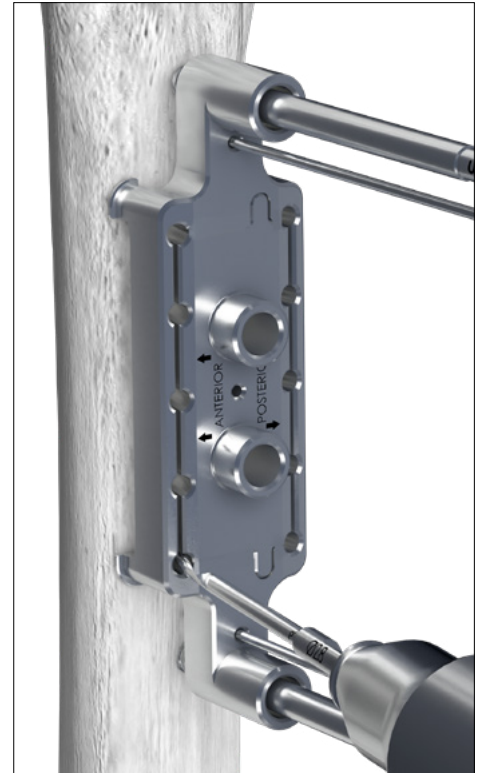
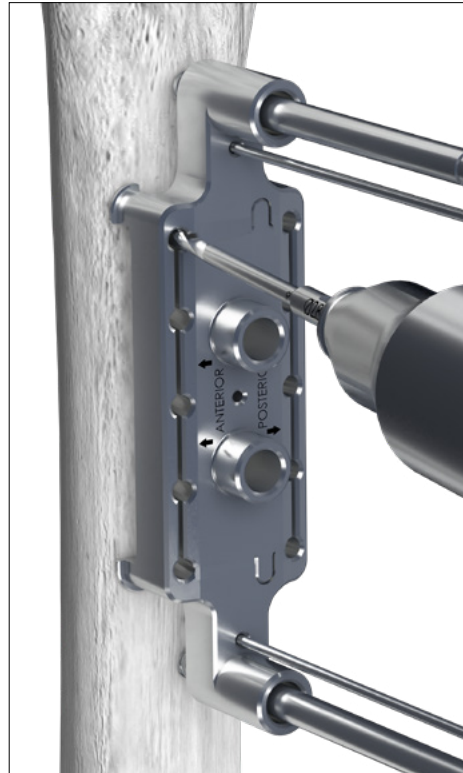
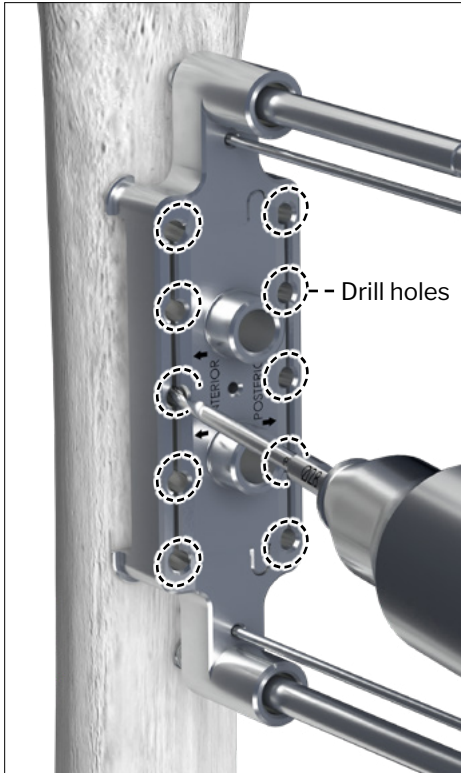
## BEGIN CORTICOTOMY:

Corticotomy Drill



Begin the corticotomy for the Transport segment by drilling unicortical through the holes along the anterior and posterior slots of the Guide. Take care to preserve the proximal and distal bone segments.

**Do not fully cut the segment now. Utilize cold sterile saline irrigation during corticotomy preparation.**



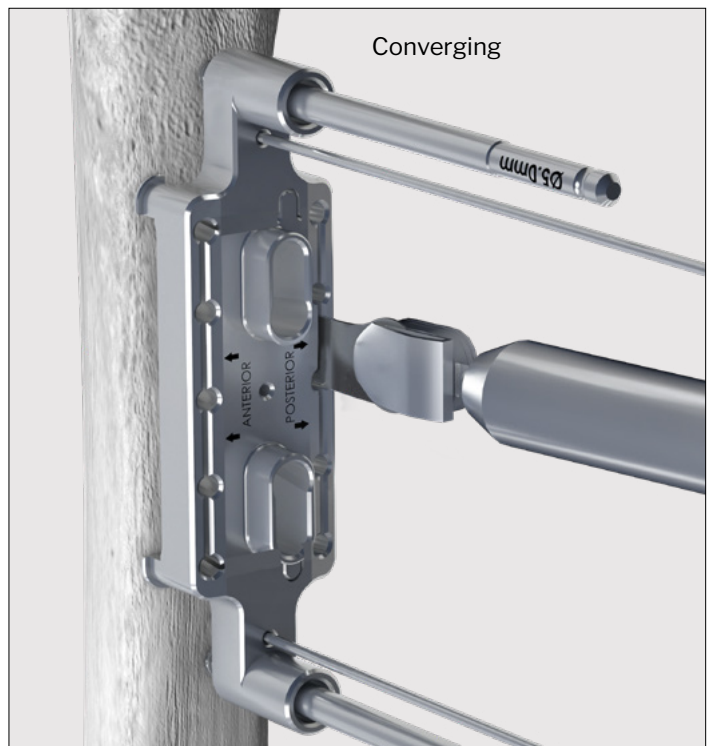
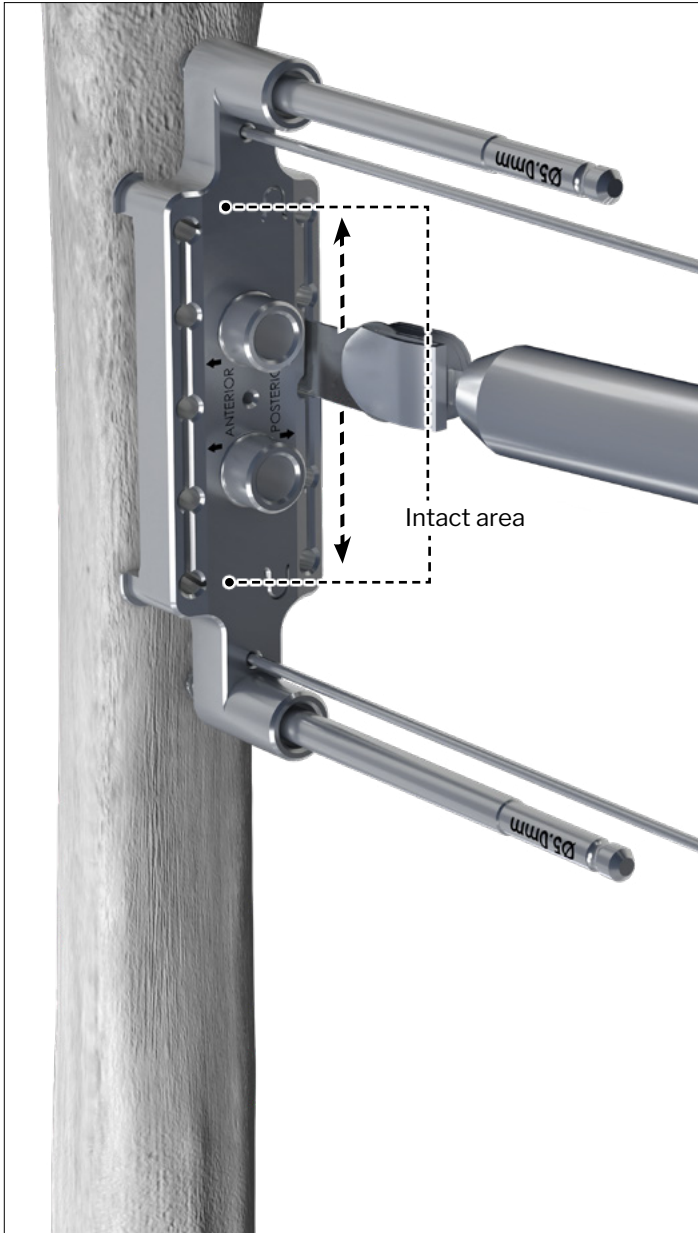
## BEGIN CORTICOTOMY:

Insert the saw blade through the cut slots in the guide and utilize a sweeping motion to connect the drilled holes. Take care to preserve the proximal and distal bone segments. If hard cortical bone is encountered, complete the corticotomy with the drill and osteotomes as needed.

Saw Blade



**Do not fully cut the segment now. Utilize cold sterile saline irrigation during corticotomy preparation.**



## SEGMENT PIN PLACEMENT:

After beginning but not completing the corticotomy, place the two Pins into the Transport segment by elevating the guide, re-approximating the skin margins, and sliding the Template back down along the wires/pins and seating on top of the soft tissue. Mark the skin for the segment pin locations. Elevate the Guide and make incisions at the marked pin locations. Bring the guide back down to sit on the skin.

Parallel



Converging

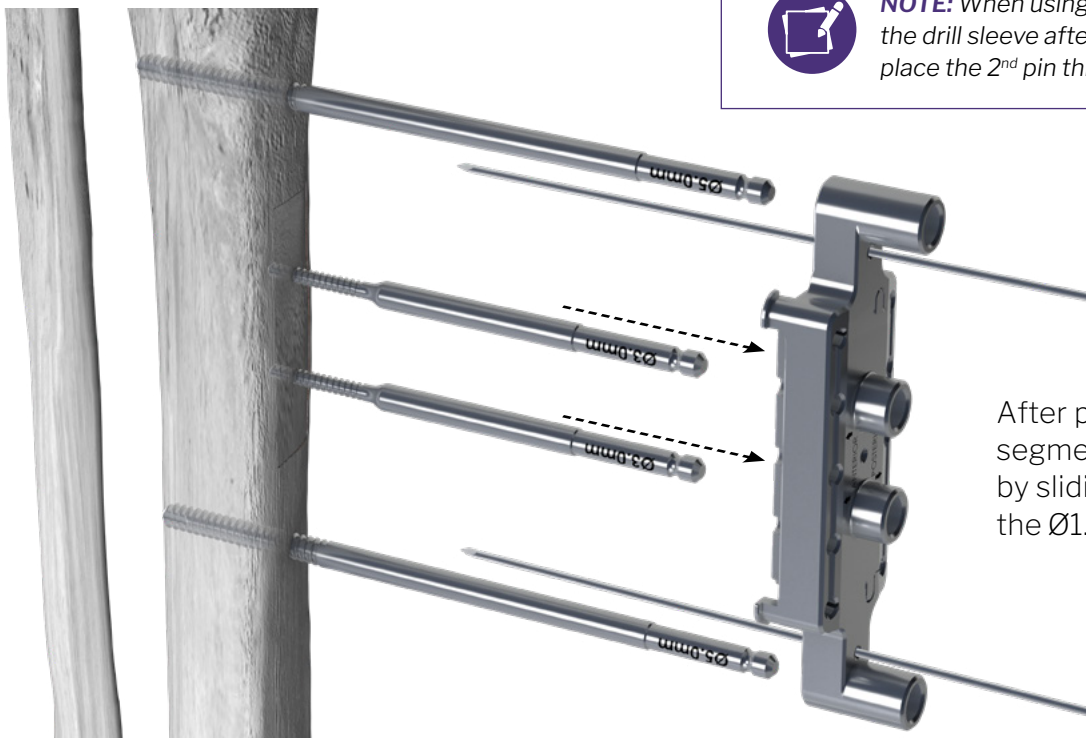
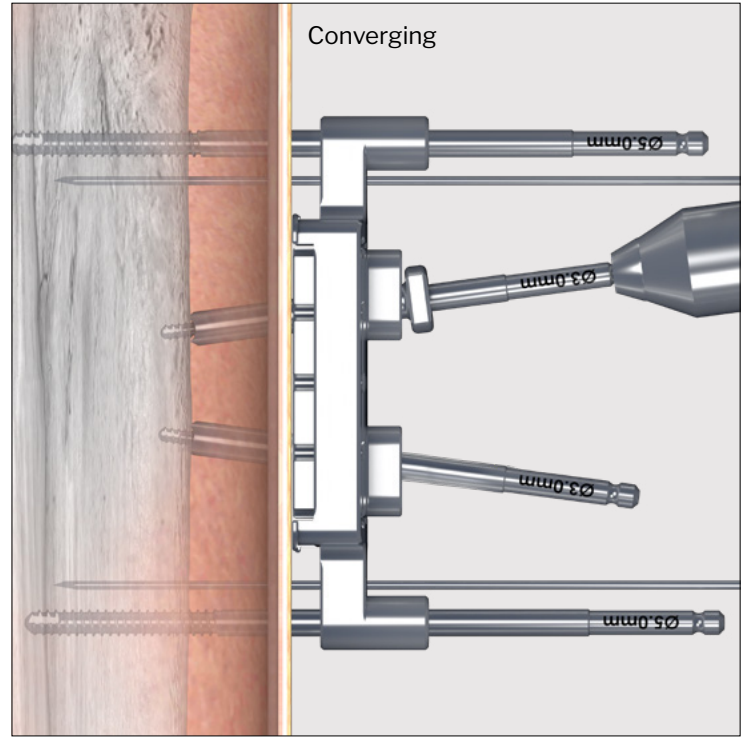
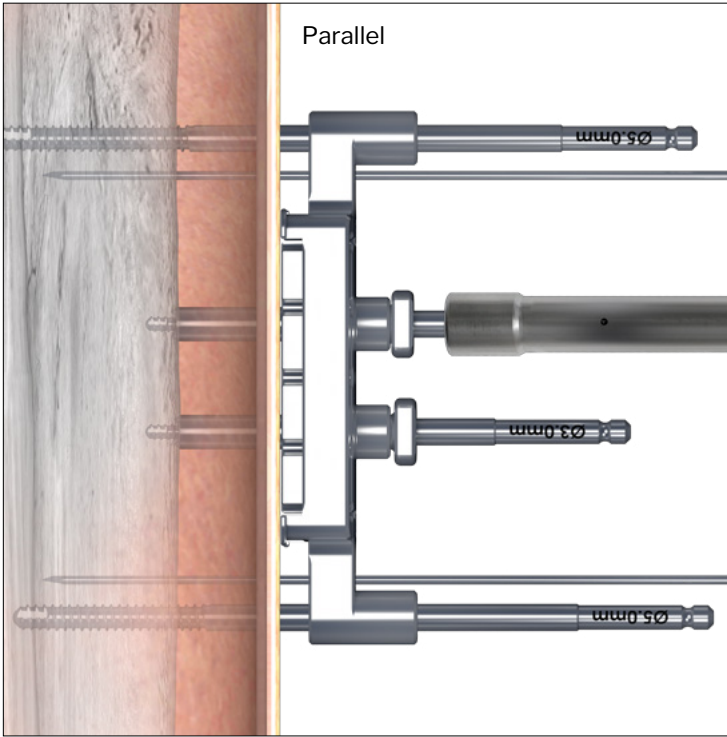


**NOTE:** The skin flap can be held back in place with 1 to 2 staples or stitches. Ensure you still have sufficient access to complete the corticotomy.

## SEGMENT PIN PLACEMENT:

Place a short Drill Sleeve into both Transport Half Pin locations and bring down to bone through the soft tissue. It is recommended to use either the Ø3.0 mm or Ø4.0 mm Half Pins. Drill unicortical with the appropriate drill for the intended Half Pin. Using the T-Handle, place the Half Pin by hand through the stab incision and into the bone unicortically. Repeat the steps for the other segment Half Pin. Confirm with fluoroscopy that the segment Pins are unicortical.

Tissue Protector Sleeve



**NOTE:** When using the converging guide, remove the drill sleeve after placing the first pin. Drill and place the 2<sup>nd</sup> pin through a sleeve.

After placing the Pins in the segment, remove the Template by sliding it off the Pins. Remove the Ø1.6 mm K-wires.

## FINISH CORTICOTOMY:

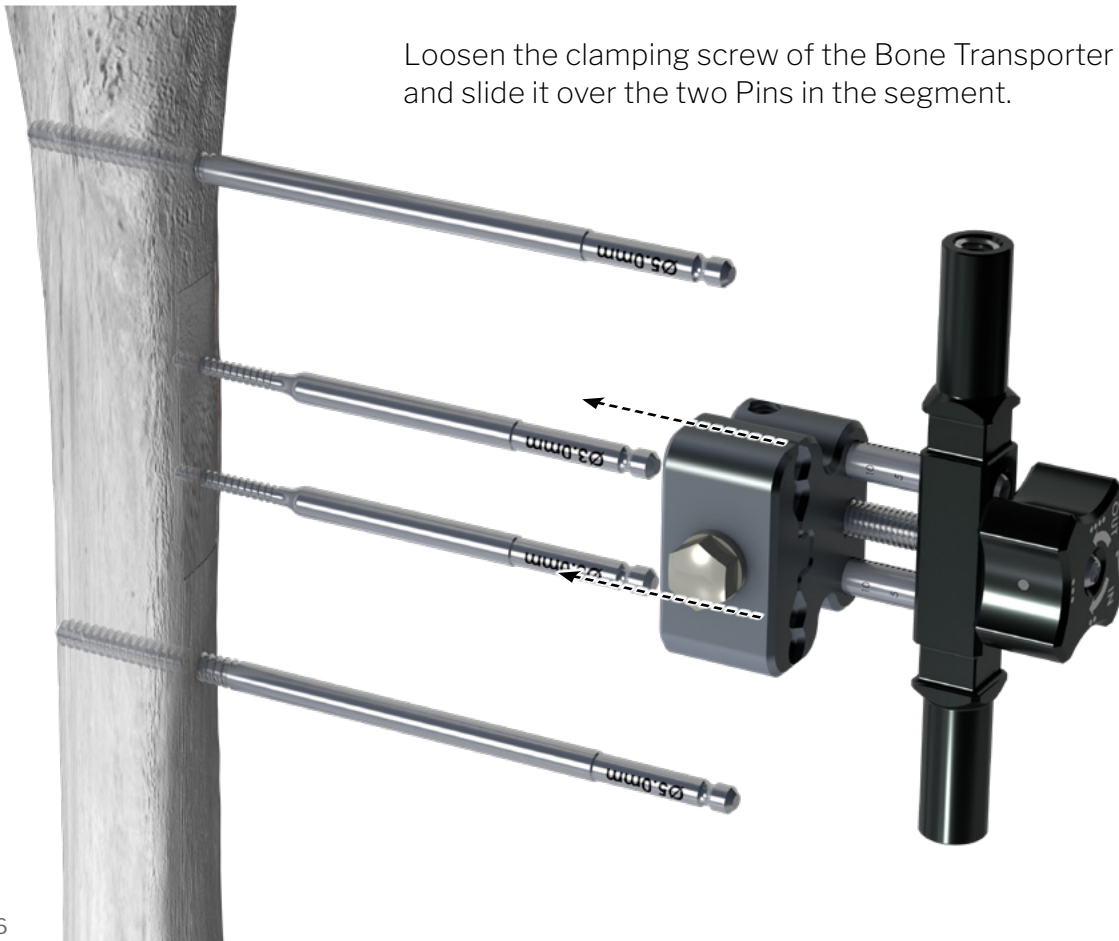


Complete the corticotomy freehand by cutting through the proximal and distal bone that is still intact in the Transporter segment using a saw. Ensure the corticotomy segment is mobile.

## TRANSPORTER PLACEMENT:

Loosen the clamping screw of the Bone Transporter and slide it over the two Pins in the segment.

Bone Transporter



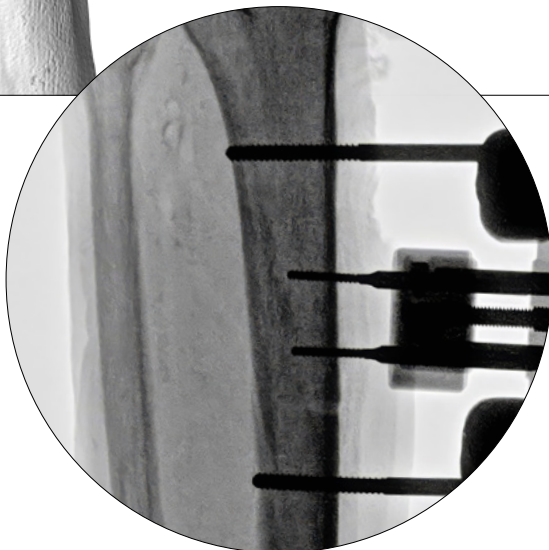
## TRANSPORTER PLACEMENT:

Place the Transporter at least 2 cm away from the soft tissue. If using converging Pin orientation, the Transporter has a set placement along the Pins to ensure appropriate capture.

Parallel



Converging



**NOTE:** Pin clamp can be rotated out to help with placement on converging pins and rotated back after aligning.



## TRANSPORTER PLACEMENT:

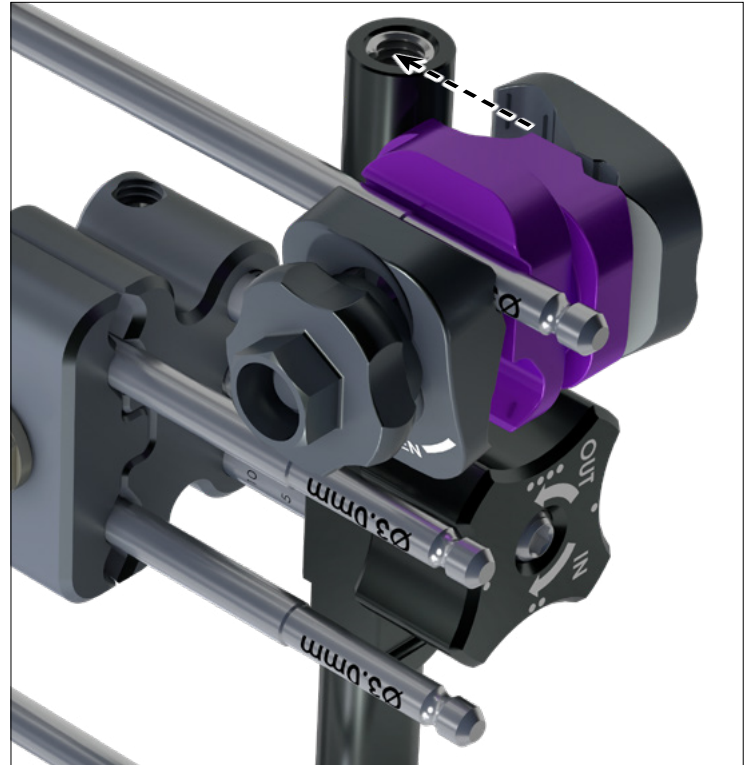
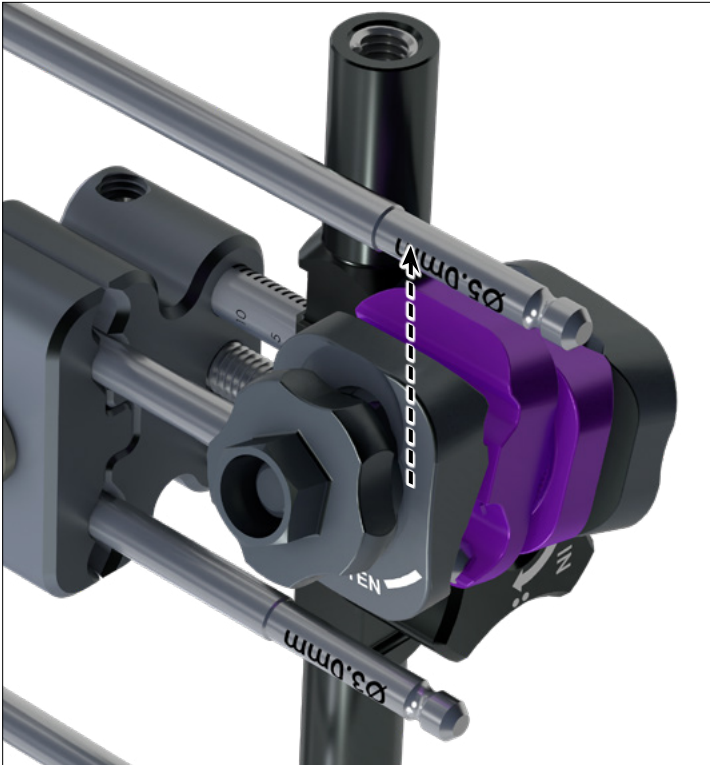
When the Transporter is appropriately positioned, secure it to the Pins in the Transport segment by tightening the bolt on the Transporter using the T-Handle and turning clockwise until the Transporter is secure around the Pins.



## TRANSPORTER PLACEMENT:

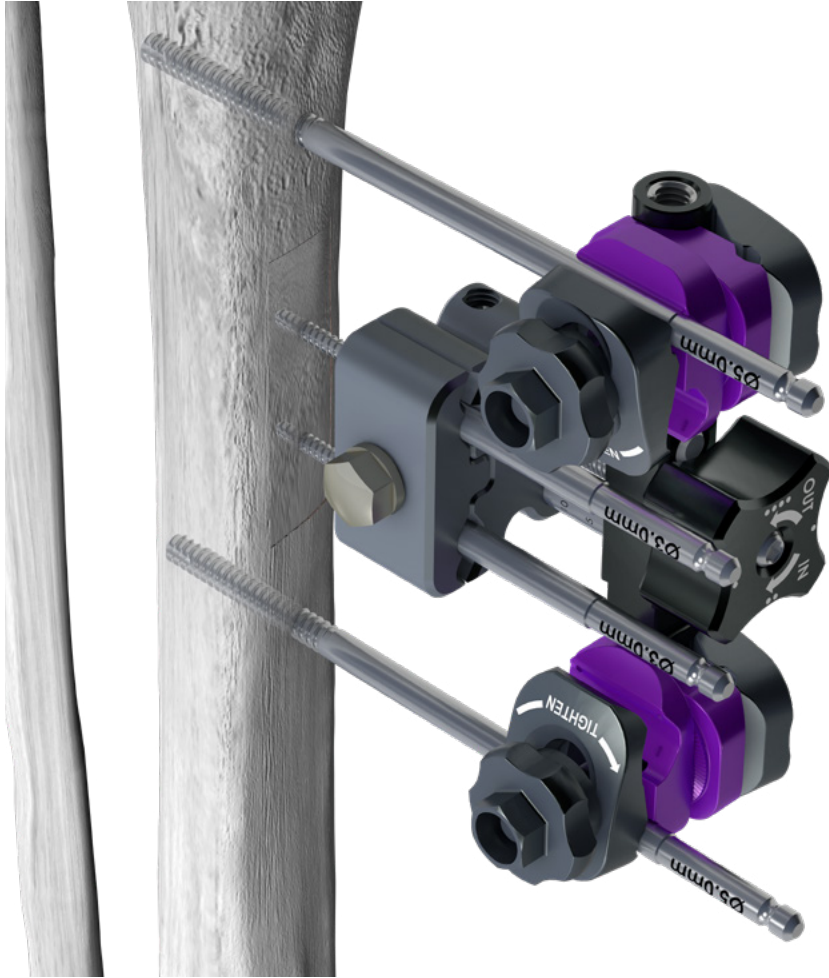
Secure the Transporter to the bicortical Pins outside of the Transport segment by connecting the Combination Clamps to the proximal and distal Pins and connecting the other half of the Clamp to the respective proximal and distal Bars of the Transporter.

Combination Clamp:



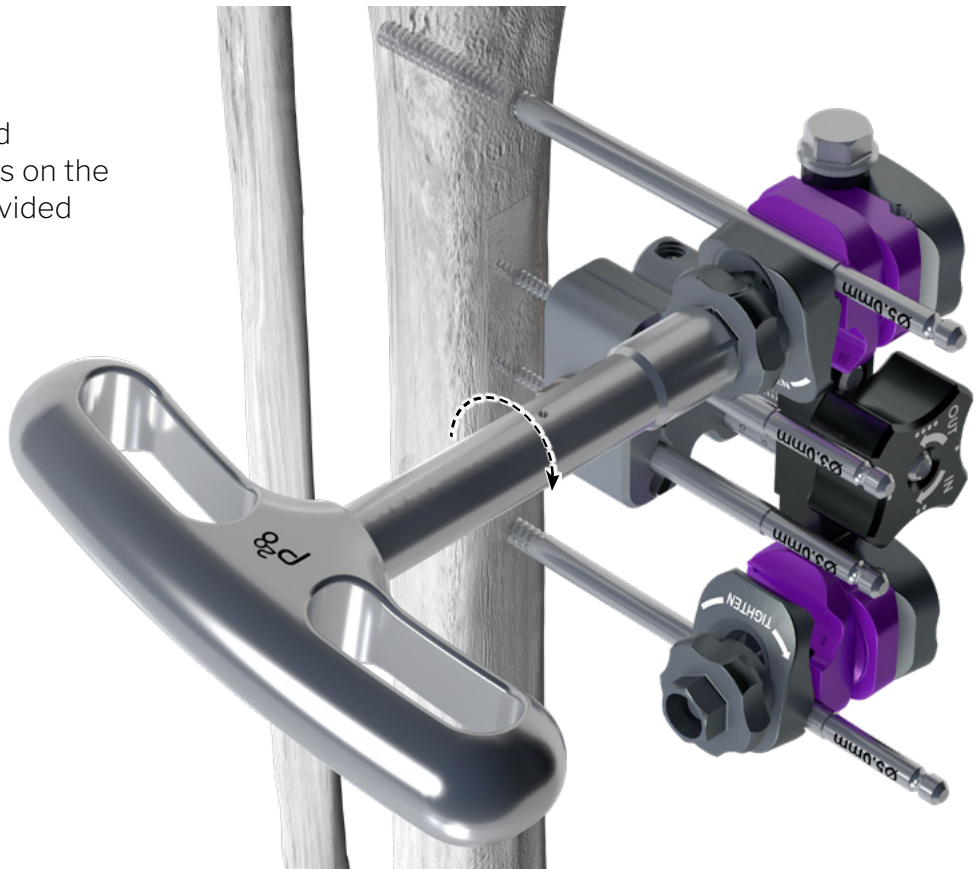
**NOTE:** The Combination Clamp can be placed on the proximal and distal Bar of the Transporter in various orientations to accommodate space.

## TRANSPORTER PLACEMENT:



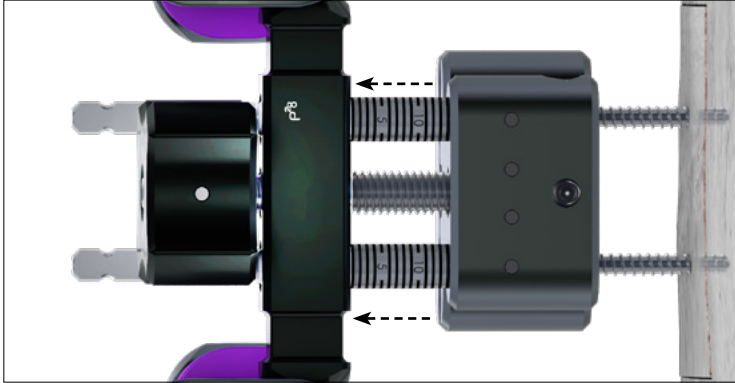
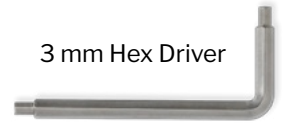
When the Combination Clamps are appropriately positioned, confirm the Transporter is still positioned sufficiently away from the soft tissue.

Secure the Clamps to the Pins and Transporter by tightening the bolts on the Combination Clamps with the provided Wrench or T-Handle.

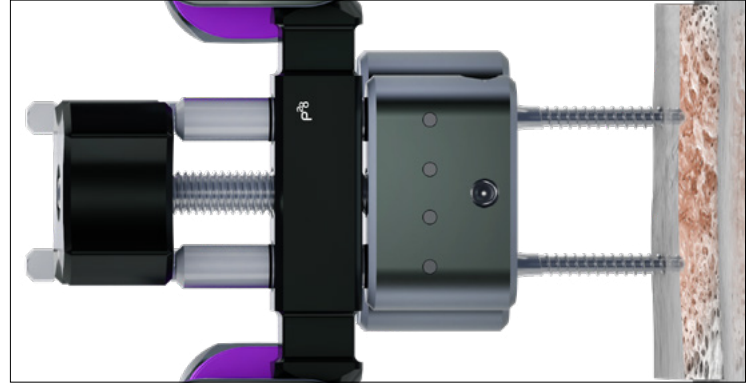


## BONE TRANSPORT:

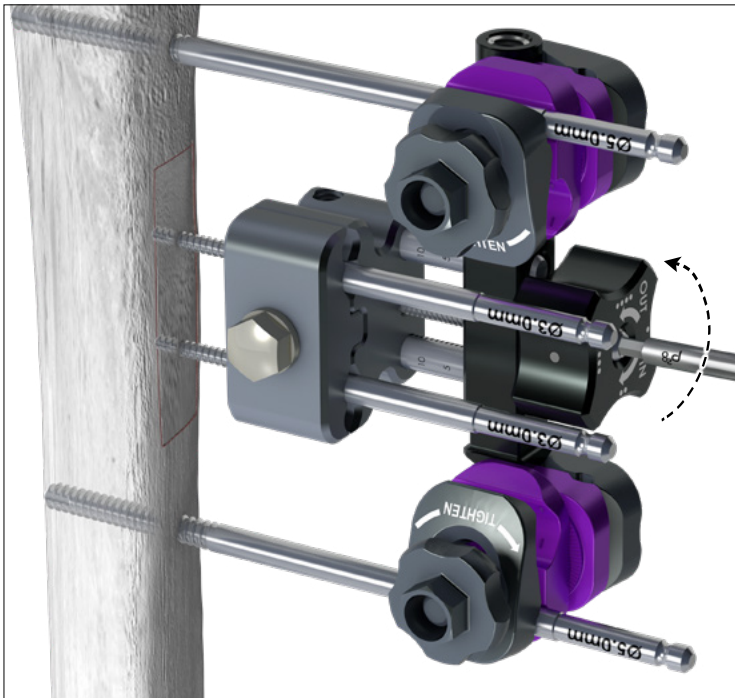
Confirm the segment is free to travel with the Transporter by turning the knob on the Transporter counter-clockwise by hand or with a 3 mm Hex Driver (**OUT** direction) a few turns until it is confirmed that the segment is mobile. Each 90 degree turn will be accompanied with an audible click and is 0.25 mm of travel.



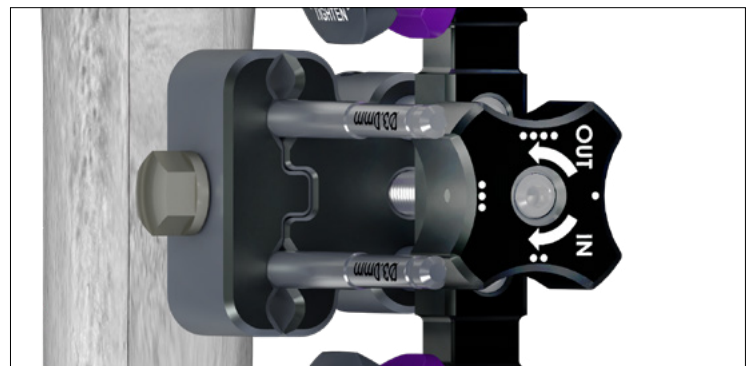
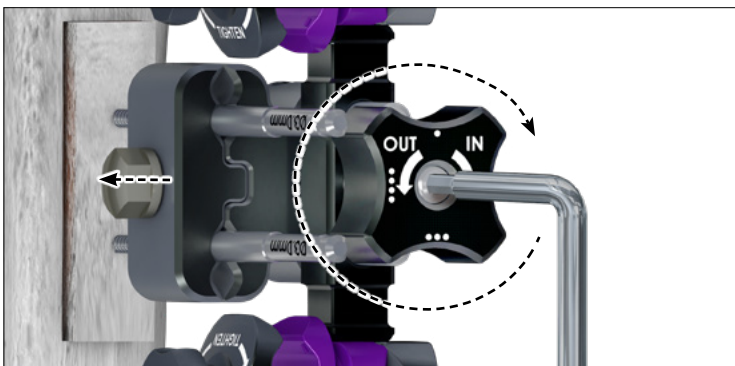
Back view of Transporter



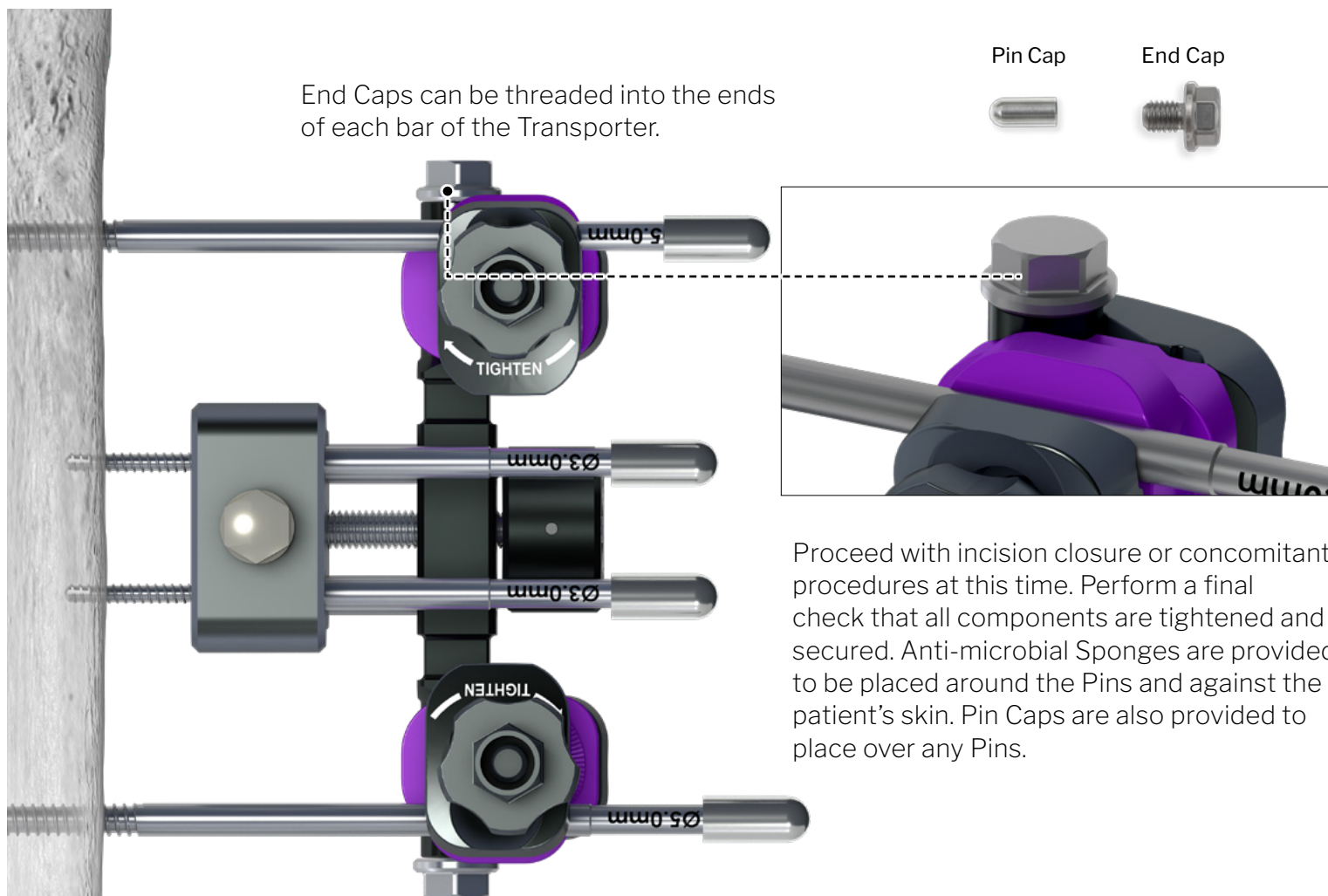
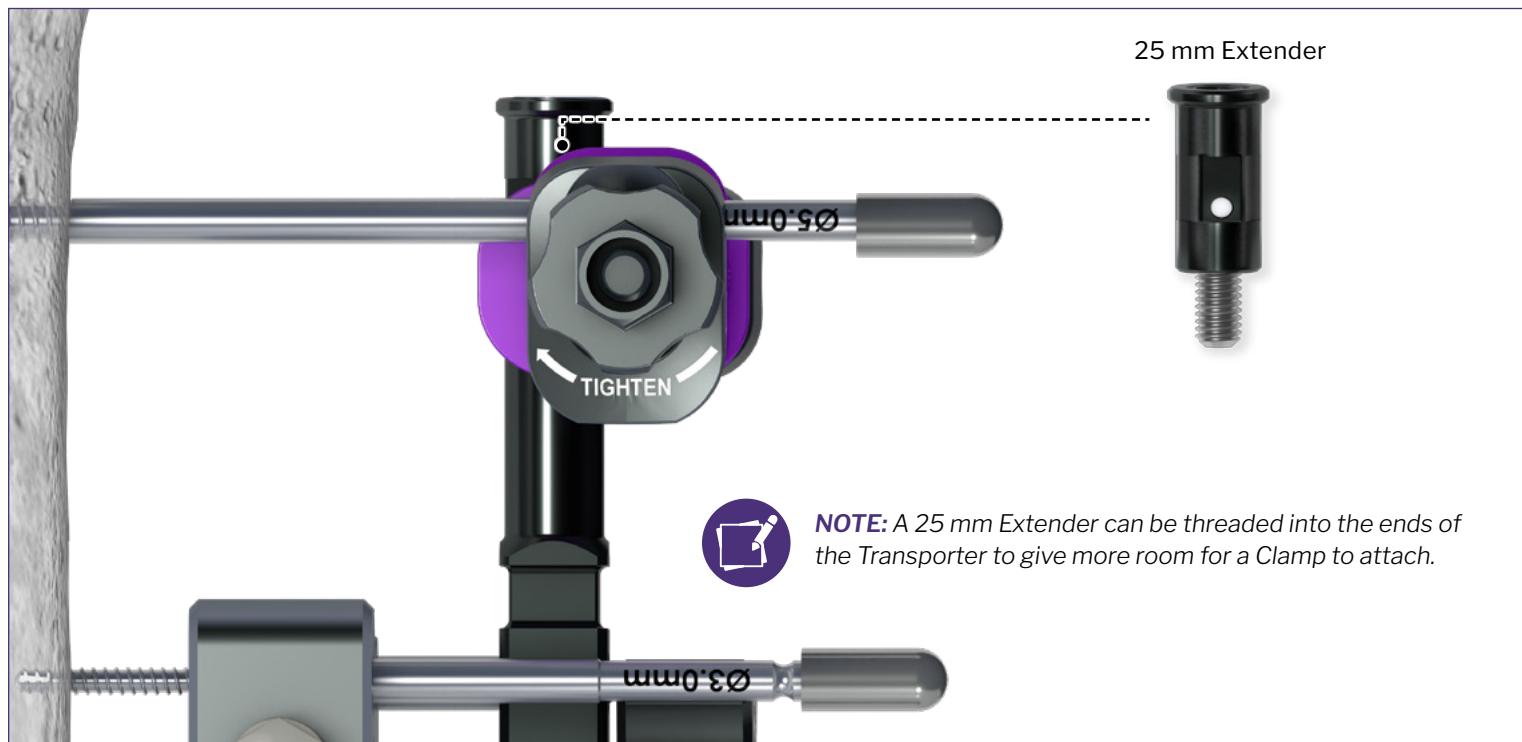
Back view of Transporter



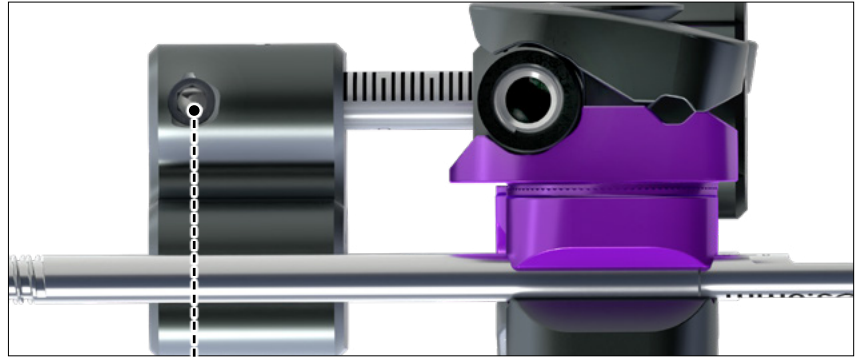
Return the bone back to the original location by turning the knob clockwise (**IN** direction) until it returns to "0". Each 90 degree turn will be accompanied with an audible click and is 0.25 mm of travel.



# CLOSURE:



**CLOSURE:**



Adjustment of the transporter can be locked by tightening the set screw on the transporter with the provided 3mm hex driver. This will prevent any OUT/IN movement of the transporter until that set screw is unlocked.

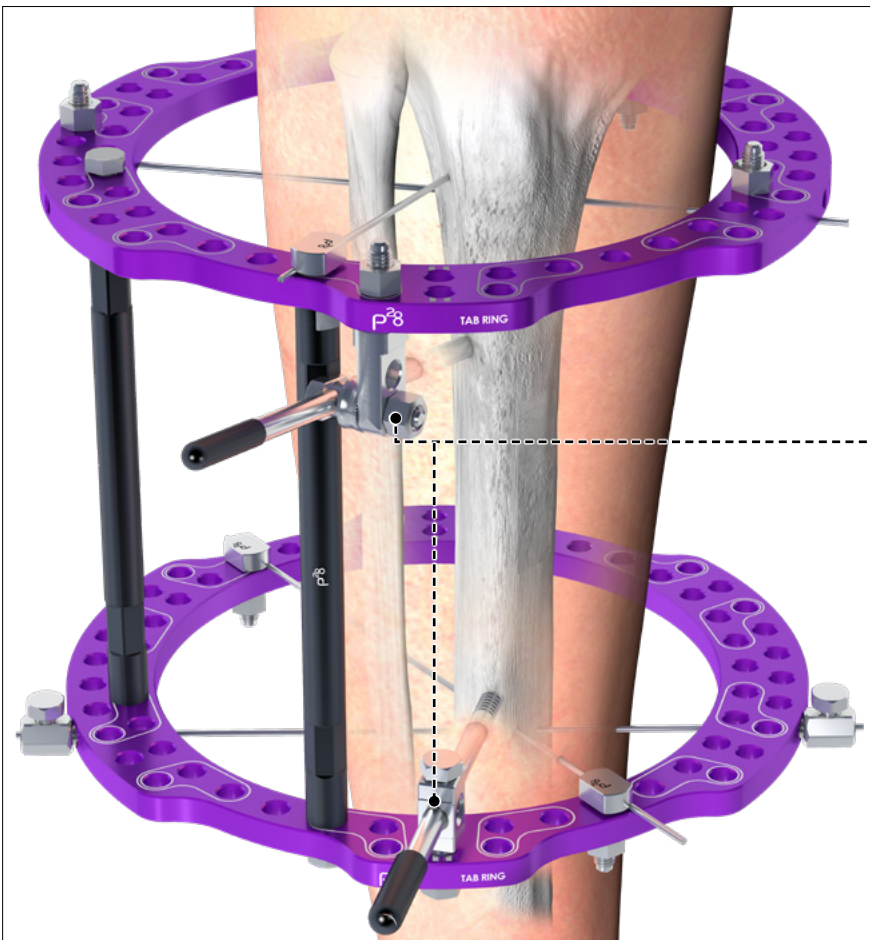
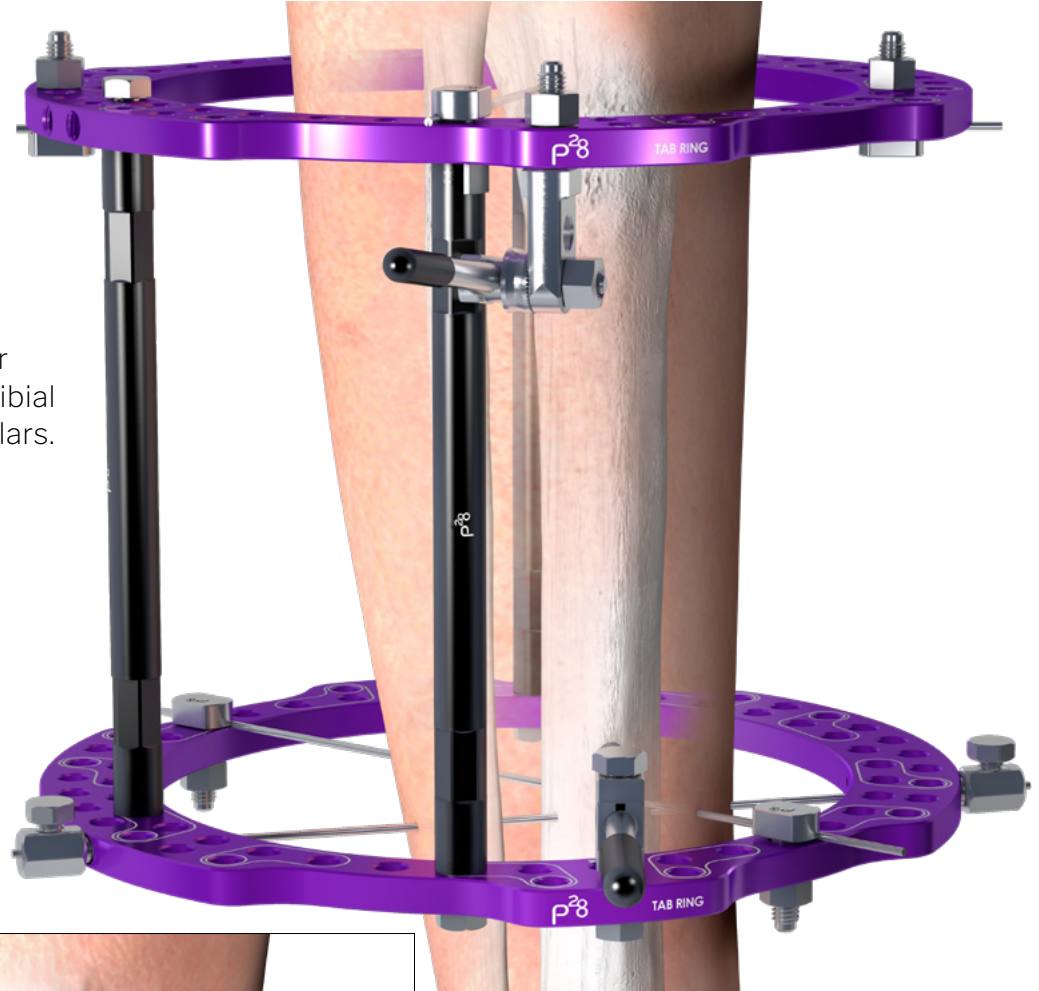
**REMOVAL:**

To remove, loosen all knobs on the Combination Clamps and Transporter, remove Transporter and Combination Clamps and then remove any remaining Half Pins.



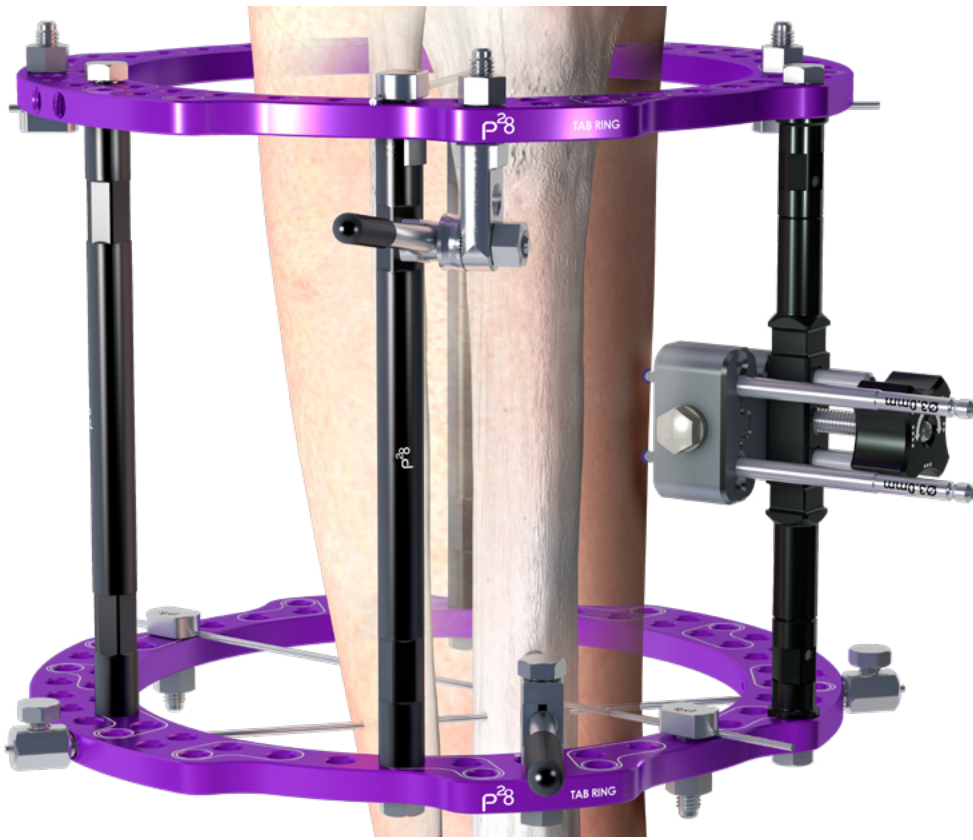
## MONKEY RINGS™ PLACEMENT:

The Bone Transport Construct can be added to a Monkey Rings Circular External Fixation by constructing a tibial ring block with 150 mm threaded pillars.

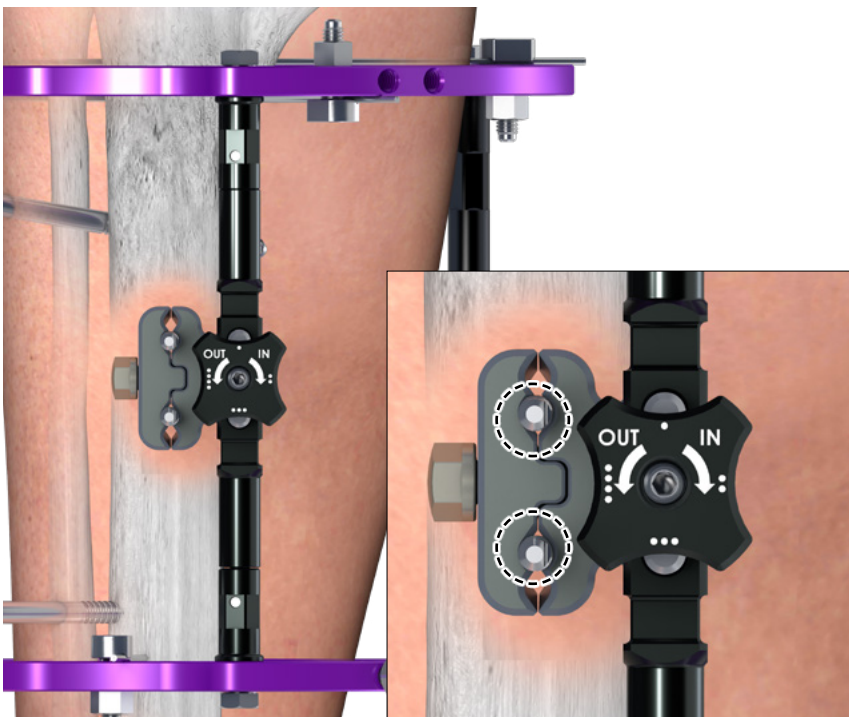


Secure the block to the tibia according to surgeon preference.

# MONKEY RINGS™ PLACEMENT:



Thread the 25 mm Extenders into both ends of the Transporter and attach to the ring at the location for the planned corticotomy using Connection Bolts. Place the Transport Pins in the Transporter and bring down to skin to make sure the Pins will be appropriately positioned in the anatomy.



Mark the locations of where the Pins contact the skin with a surgical marker.

## CORTICOTOMY CUT:

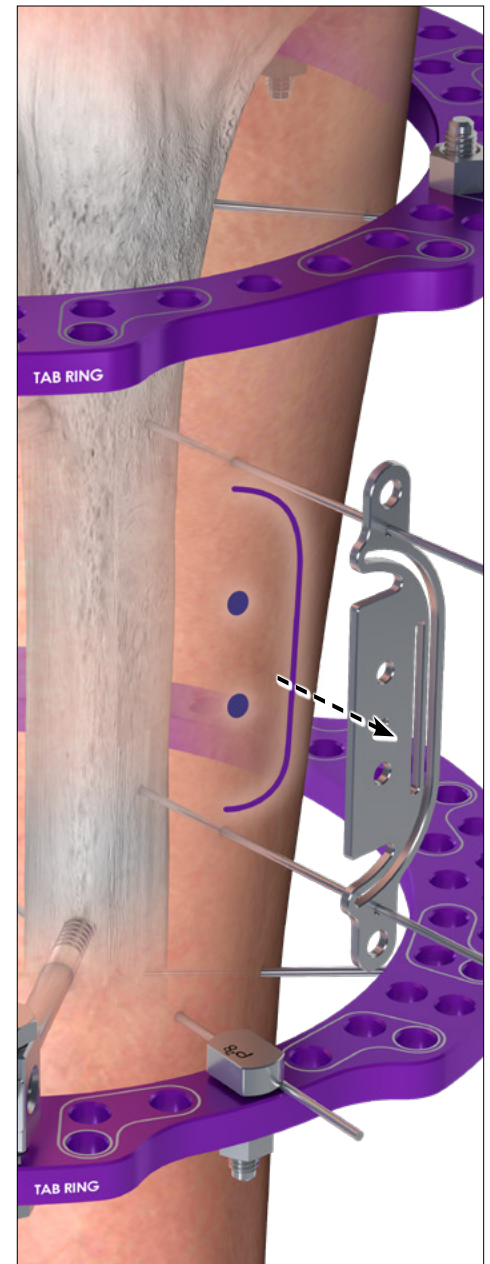
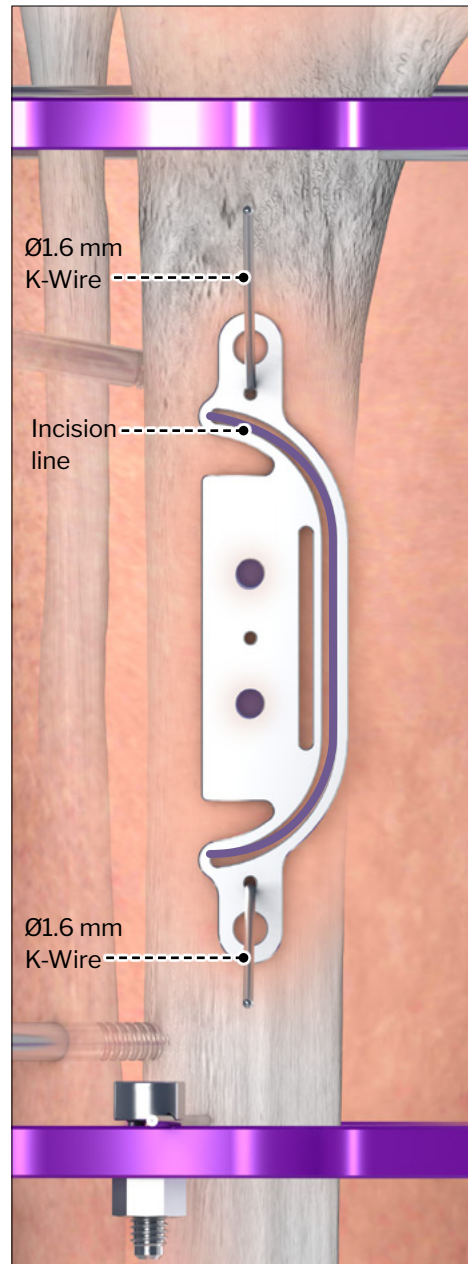
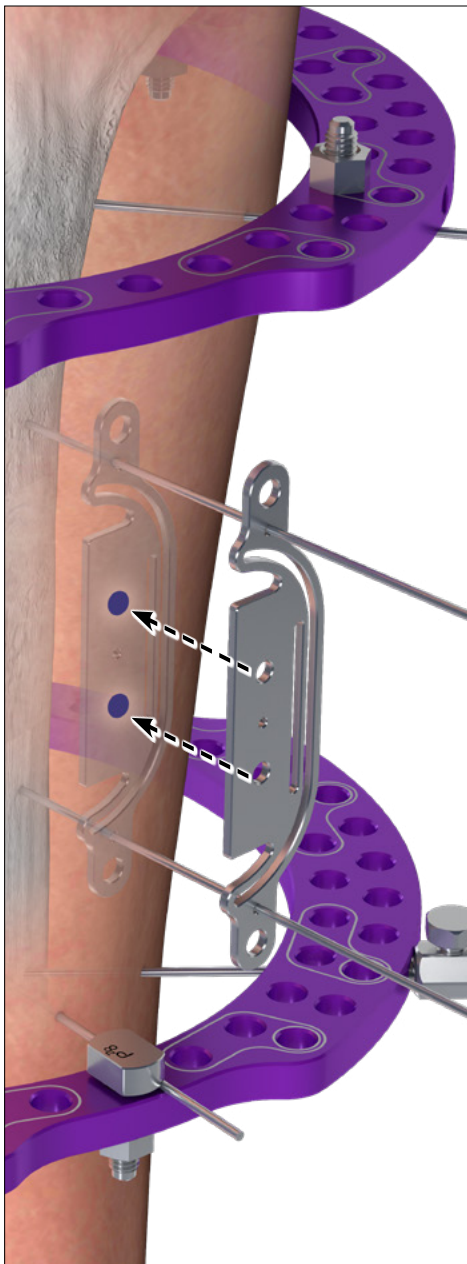
Ø1.6 mm x 150 mm K-wire



Corticotomy Stencil



After marking the Transport Pin locations, unthread and remove the Transporter from the rings construct. Place the Corticotomy Stencil on the skin and align with marked Pin locations for the corticotomy. Confirm the corticotomy outline is centered on the medial face of the tibia using fluoroscopy. Place the Ø1.6 mm K-wires in the Template. If adjustment of the stencil is needed, reconfirm alignment of the Transporter with the circular ring holes and the stencil before proceeding. Use a surgical marker to mark the incision. Slide the stencil off the wires and make an incision along the marked incision path.



## BEGIN CORTICOTOMY:

Parallel Corticotomy Guide

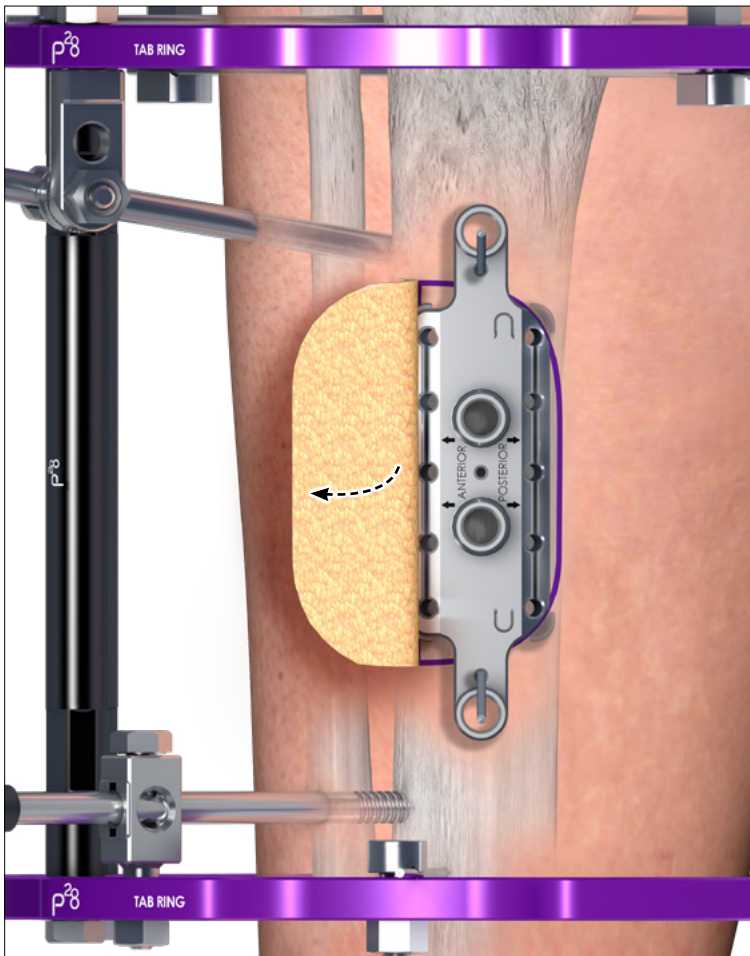


Converging Corticotomy Guide

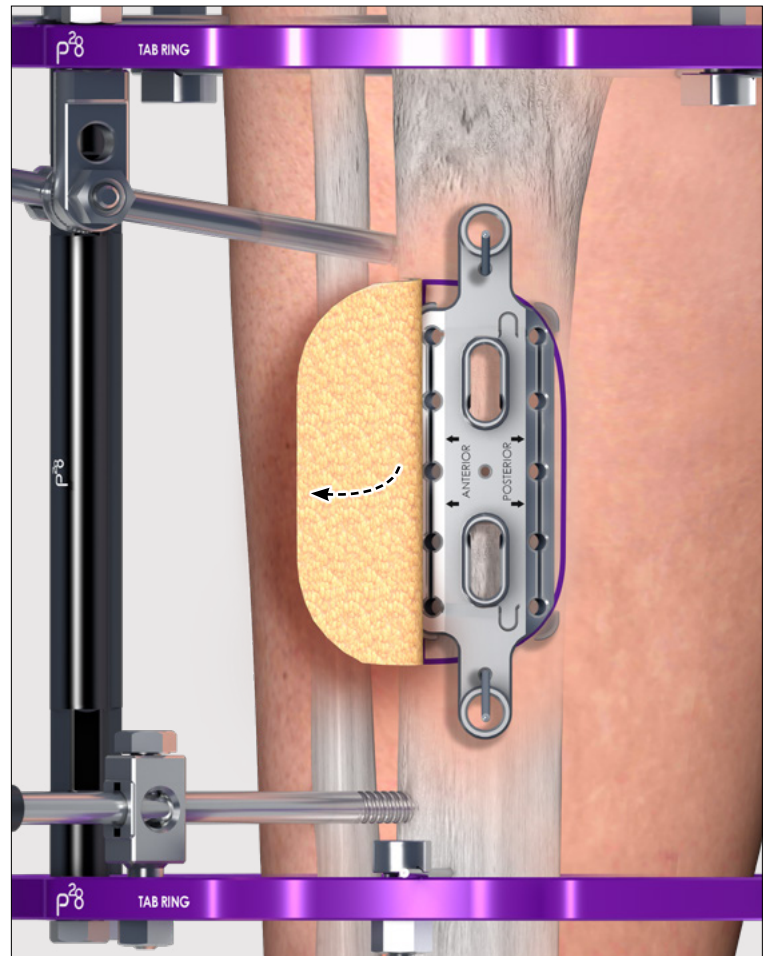


Retract the soft tissues anterior and posterior. After retracting the soft tissues, slide the appropriate Corticotomy Guide down the wires and into the incision. Verify the guide is oriented in the correct anterior/posterior orientation. Ensure the anterior feet of the guide are under the soft tissues before placing the posterior feet. A freer can be used to help elevate the soft tissues while placing the guide. Ensure the guide is fully seated on the bone and soft tissues are not trapped under the guide.

Parallel



Converging



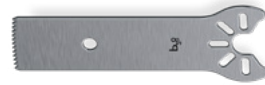
**NOTE:** The Parallel Corticotomy Guide is recommended when attaching the transporter to Monkey Rings for ease of direct attachment through the circular rings.

# BEGIN CORTICOTOMY:

Corticotomy Drill



Saw Blade



Refer to pages 12-14 for preparing the corticotomy and placing parallel Pins in the Transport segment.



# SEGMENT PIN PLACEMENT:

Tissue Protector Sleeve



Pin Drill

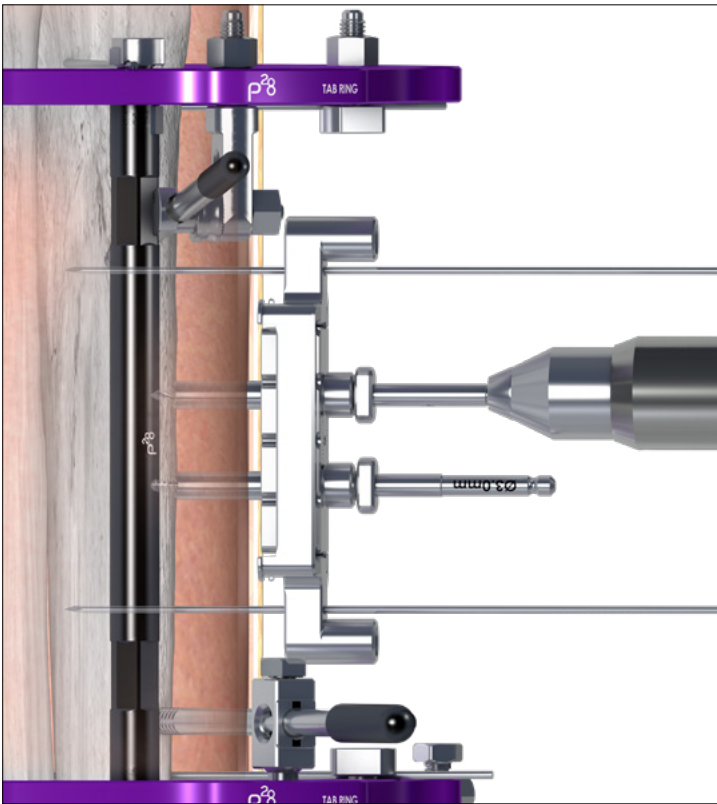


Half Pin

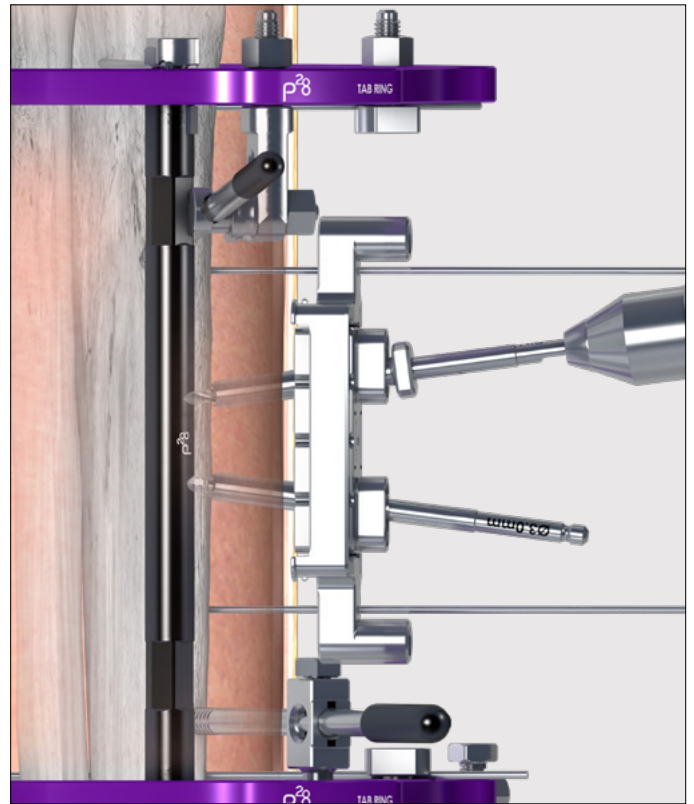


Refer to pages 12-14 for preparing the corticotomy and placing parallel Pins in the Transport segment.

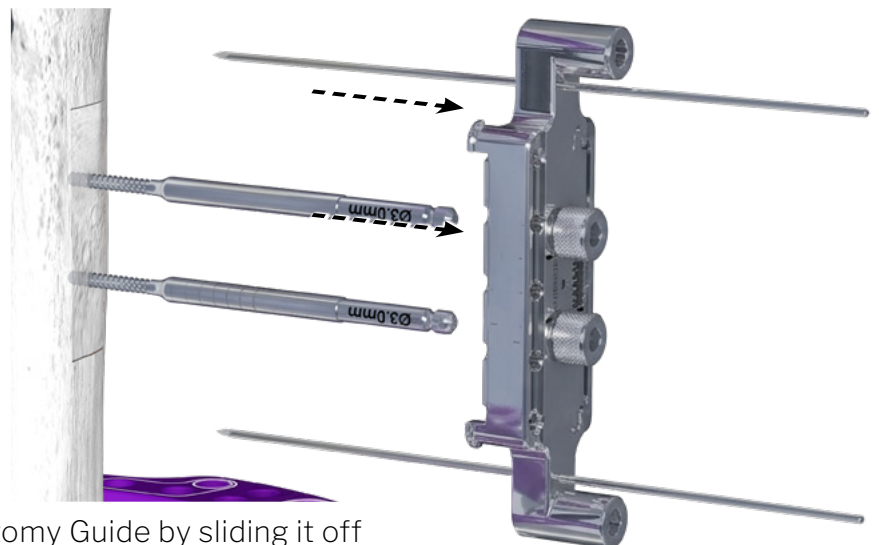
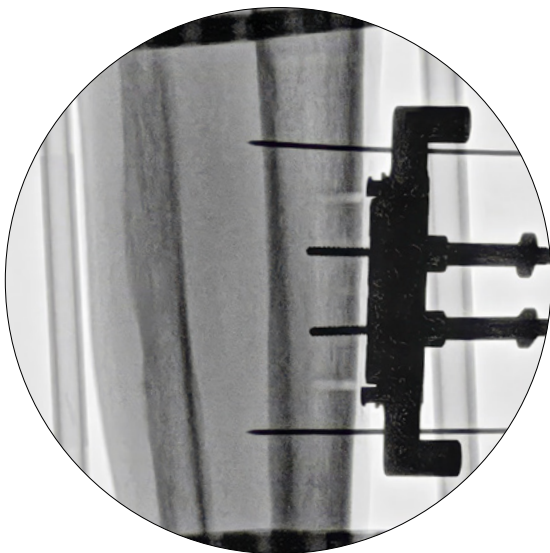
Parallel



Converging



**NOTE:** When using the converging guide, remove the drill sleeve after placing the first pin. Drill and place the 2<sup>nd</sup> pin through a sleeve.



Remove the wires and remove the Corticotomy Guide by sliding it off the Pins.

## FINISH CORTICOTOMY:

Confirm that all connections to the rings and the Pins are secure. Complete the corticotomy freehand by cutting through the proximal and distal bone that is still intact in the Transport segment using either a saw or osteotome. Ensure the corticotomy segment is mobile.



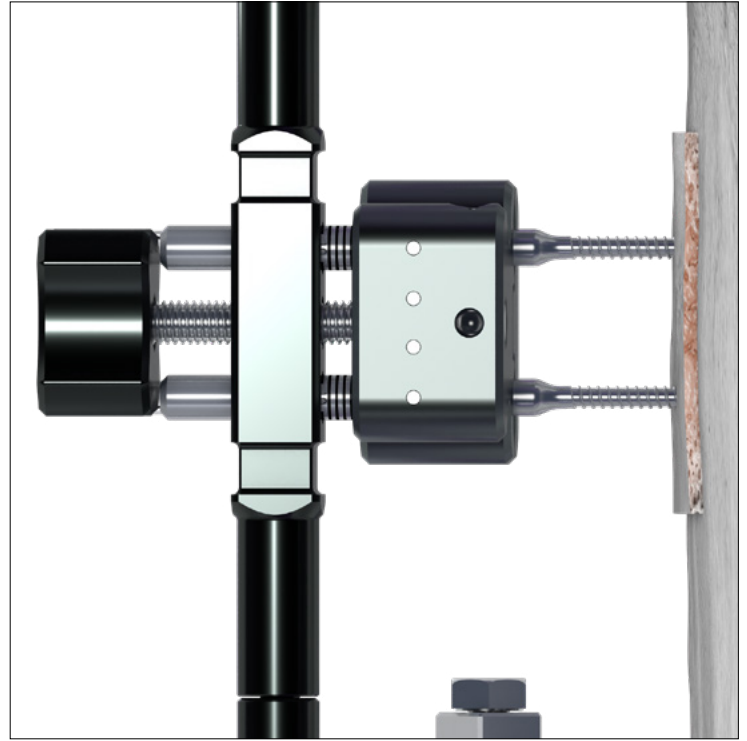
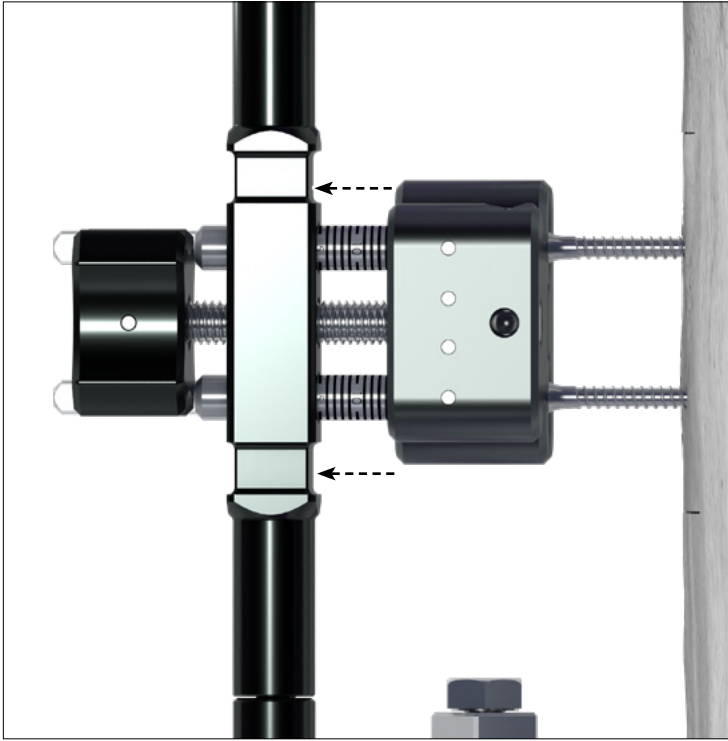
## TRANSPORTER PLACEMENT:

Slide the Bone Transporter over the two Pins in the segment. Secure the Transporter to the rings construct by connecting it to the rings with Connection Bolts. Secure the Transporter to the Pins by tightening the bolt.



## BONE TRANSPORT:

Confirm the segment is free to travel with the Transporter by turning the knob on the Transporter counter-clockwise by hand or with a 3 mm Hex Driver (**OUT** direction) a few turns until it is confirmed that the segment is mobile. Each 90 degree turn will be accompanied with an audible click and is 0.25 mm of travel.



Return the bone back to the original location by turning the knob clockwise (**IN** direction) until it returns to "0". Each 90 degree turn will be accompanied with an audible click and is 0.25 mm of travel.



## CLOSURE:

Proceed with incision closure or concomitant procedures at this time.

Perform a final check that all components are tightened and secured. Anti-microbial Sponges are provided to be placed around the Pins and against the patient's skin. Pin Caps are also provided to place over any Pins.



## REMOVAL:

To remove, loosen the knob on the transporter and loosen the bolts connecting to the transporter to the rings. Remove the transporter and then remove remaining half pins.

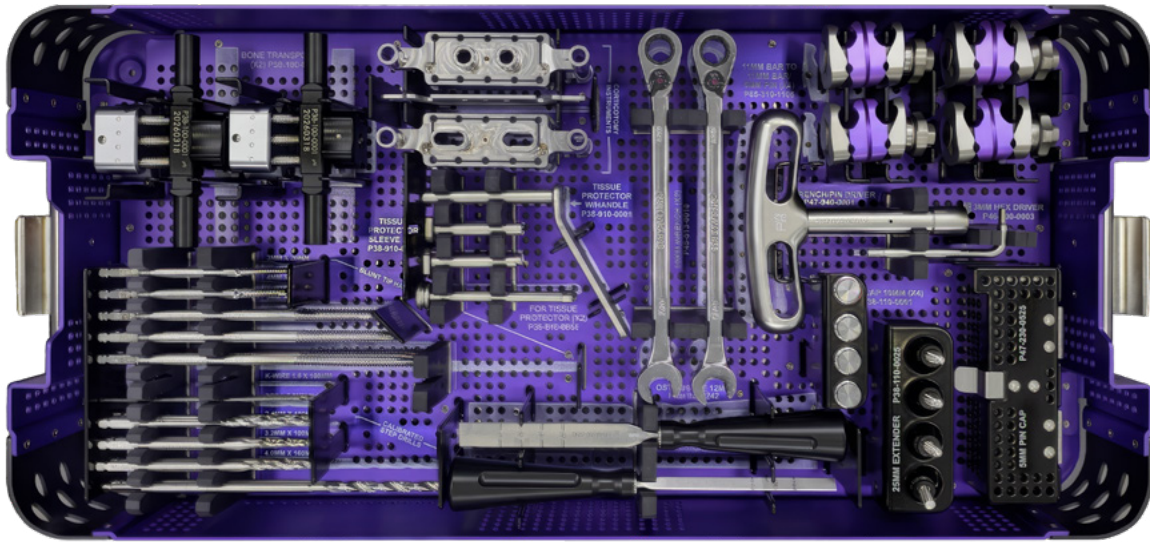
## SPIDER MONKEY™ CONTENTS:

Part #	Description	Use
P38-100-0001	Bone Transporter	Single-use
P38-110-0001	End Cap 1 mm	Single-use
P38-110-0025	25 mm Extender	Single-use
P38-210-320B	Ø3.0 mm x 20 mm Half Pin (BLUNT TIPPED)	Single-use
P38-210-420B	Ø4.0 mm x 20 mm Half Pin (BLUNT TIPPED)	Single-use
P38-210-535B	Ø5.0 mm x 35 mm Half Pin, 115 mm Length (BLUNT TIPPED)	Single-use
P38-210-545B	Ø5.0 mm x 45 mm Half Pin, 125 mm Length (BLUNT TIPPED)	Single-use
P38-210-555B	Ø5.0 mm x 55 mm Half Pin, 135 mm Length (BLUNT TIPPED)	Single-use
P38-300-2810	Ø2.8 mm x 100 mm Solid Drill	Single-use
P38-300-2410	Ø2.4 mm x 140 mm Calibrated Step Drill	Single-use
P38-300-3210	Ø3.2 mm x 165 mm Calibrated Step Drill	Single-use
P38-300-4016	Ø4.0 mm x 200 mm Calibrated Step Drill	Single-use
P38-900-0001	Corticotomy Guide - PARALLEL	Reusable
P38-900-0002	Corticotomy Stencil	Reusable
P38-900-0003	Corticotomy Guide - CONVERGING	Reusable
P38-910-0001	Tissue Protector with Handle	Reusable
P38-910-0002	Tissue Protector Sleeve	Reusable
P38-910-0003	Trocar for Tissue Protector	Reusable
P47-230-0525	5 mm Pin Cap (10 Pack)	Single-use
P85-310-1105	11 mm bar to 11 mm bar/5 mm Pin	Single-use
P47-940-0001	T-Wrench/Pin Driver	Reusable
P99-150-0240	6 mm Osteotome	Reusable
P99-150-0242	12 mm Osteotome	Reusable
P46-900-0003	3 mm Hex Driver	Reusable
P45-513-0005	10 mm Wrench	Reusable

## BLACK BOX CONTENTS:

Part #	Description	Use
P99-151-P38S-S	Saw Blade	Single-use
P45-600-1000-S	Sponges	Single-use
P46-900-0003	3mm Hex Driver	Single-use

# SPIDER MONKEY™ TTT SYSTEM CASE



## SPIDER MONKEY™ TTT SYSTEM CASE

Spider Monkey™ TTT System Case contains the bone transporters, corticotomy guides, corticotomy drill, half pins, half pin drills, drill sleeves, pin caps, end caps, extenders, wrenches, combination clamps, osteotomes, and a T-handle.


Refer to [www.paragon28.com/ifus](http://www.paragon28.com/ifus) for the complete and most current instructions for use document.

Indications, Contraindications, Warnings and Precautions relevant to the Spider Monkey Bone Transport System are contained in the Instructions for Use document of the Spider Monkey Bone Transport System P38-IFU-0001.

#### MR SAFETY INFORMATION:

The Spider Monkey™ Bone Transport System has not been evaluated for safety in the MR environment. It has not been tested for heating or unwanted movement in the MR environment. The safety of the Spider Monkey™ Bone Transport System in the MR environment is unknown. Performing an MR exam on a person who has this medical device may result in injury or device malfunction.

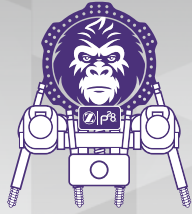
The Monkey Rings™ External Fixation System has not been evaluated for safety in the MR environment. It has not been tested for heating or unwanted movement in the MR environment. The safety of the Monkey Rings™ External Fixation System in the MR environment is unknown. Performing an MR exam on a person who has this medical device may result in injury or device malfunction.

<b>MRI SAFETY INFORMATION</b> 	
<p>A patient with the Monkey Bars Pin to Bar External Fixation System, with the device to remain outside the RF body coil, specifically, the edge of the device must be &gt;40 from the landmarked iso-center, may be safely scanned under the following conditions. Failure to follow these conditions may result in injury to the patient.</p>	
Name/Identification of device	Monkey Bars Pin to Bar External Fixation System
Additional instructions for information essential for safe use in the MR environment	Device must remain outside of RF body coil. Specifically, the edge of the device must be >40 cm from the landmarked iso-center.
Nominal value(s) of Static Magnetic Field [T]	1.5T or 3.0T
Maximum Spatial Field Gradient [T/m and gauss/cm]	30 T/m (3,000 gauss/cm)
RF Excitation	Circularly Polarized (CP)
RF Transmit Coil Type	Whole body transmit coil, Head RF transmit-receive coil
Maximum Whole Body SAR [W/kg]	2 W/kg (Normal Operating Mode)
Maximum Head SAR [W/kg]	3.2 W/kg (Normal Operating Mode)
Limits on Scan Duration	2.0 W/kg whole-body average SAR for 60 minutes of continuous RF (a sequence or back to back series/scan without breaks.
MR Image Artifact	The presence of this implant may produce an image artifact.
If information about a specific parameter is not included, there are no conditions associated with that parameter.	









# SPIDER MONKEY TTT

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