Tibial Nail System

Surgical Technique

Arthrex®

Introduction

Indications

The Tibial Nail System is intended to provide temporary stabilization of various types of fractures, malunions, and nonunions of the tibia. This tibial nail system is indicated for long bone fracture fixation of tibial fractures, which may include the following:

- Transverse, oblique, spiral, segmental, and comminuted fractures
- Fractures with bone loss and bone transport
- Open and closed fractures, pathologic fractures
- Corrective osteotomies
- Pseudarthrosis of the tibial shaft
- Nonunions, malunions, and metaphyseal and epiphyseal fractures

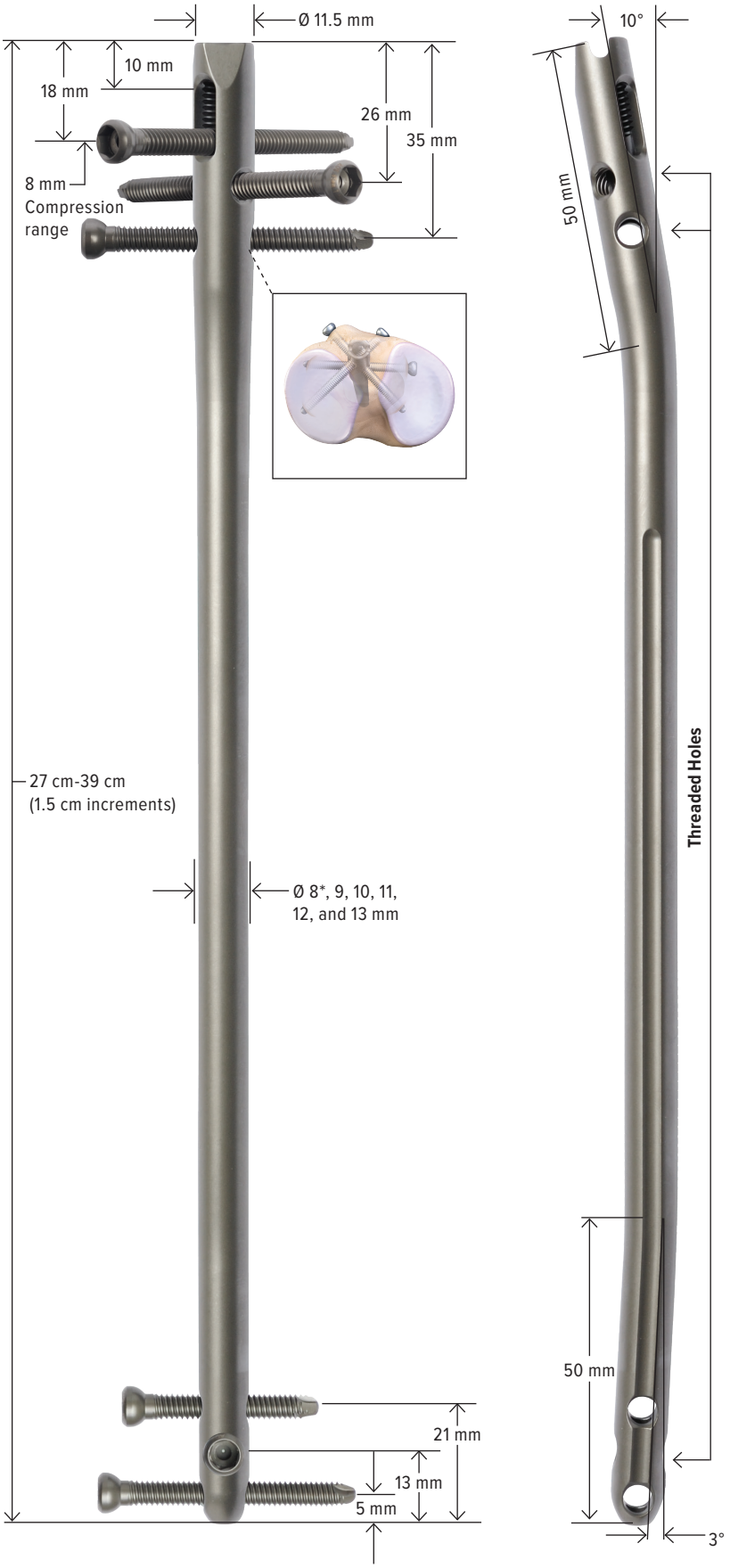
System Overview

The system contains a single instrumentation tray that can be used for either a parapatellar approach or a suprapatellar approach. The distal screw configuration is the most distal combination of screws that features a threaded locking option available on the market today. This maximizes the working length of the nail and stretches the indications for tibial nailing.

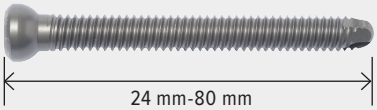
The Tibial Nail System features the following:

- Three distal screws at 5 mm, 13 mm, and 21 mm from the end of the nail
- Three proximal screw options, including a dynamic slot for compression or static positioning
- Threaded screw holes to maintain screw position in the two proximal static holes and the distal AP hole
- Up to 8 mm of intraoperative compression
- Flexible suprapatellar sheath to minimize pressure on the patella
- Diameters: 8 mm-13 mm in 1 mm increments
- Lengths: 27 cm-39 cm in 1.5 cm increments
- 10° proximal Herzog bend and 3° distal bend to facilitate implantation

Implant Features

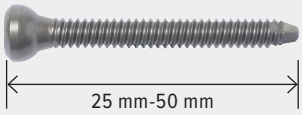


5.0 mm Captured Cortical Screw



5.0 mm Cannulated Blocking Screw

4.2 mm Captured Cortical Screw*



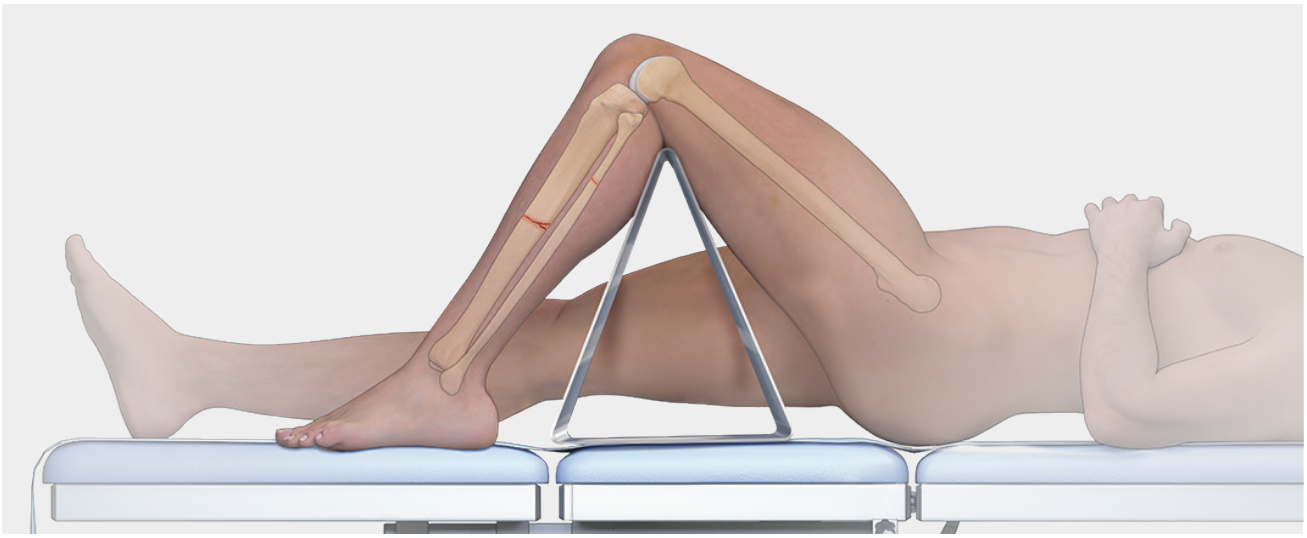
Spacer, Static Locking

End Caps

*8 mm nails require 4.2 mm captured cortical screws for distal locking.

Tibial Nail System–Standard Approach

Patient Positioning

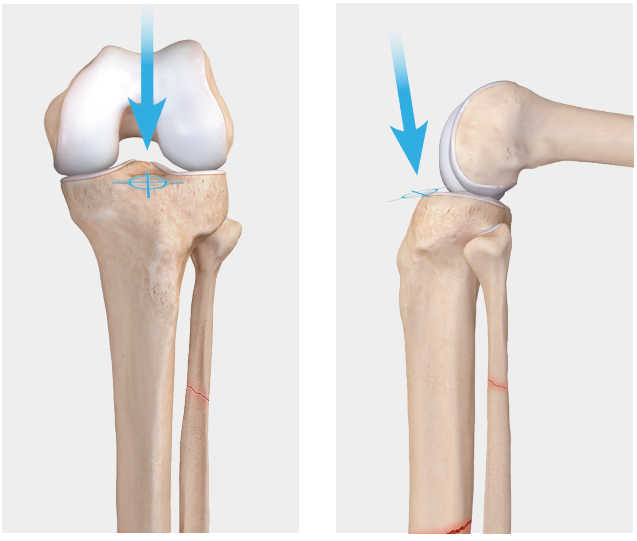


Position the patient supine on a radiolucent table. Knee flexion will assist with the identification of the anatomic landmarks to allow accurate incision placement. For ease of distal locking from the medial direction, it is helpful to place the C-arm on the opposite side of the injured limb.

Note: To confirm adequate visualization and reduction capabilities, take preliminary radiographic images before the patient is fully prepped and completely draped.

Incision and Entry Point

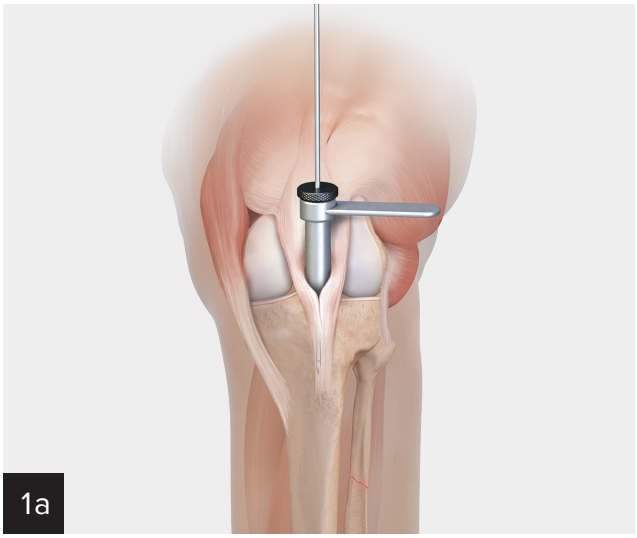
Make a patellar splitting or parapatellar incision, 1.5 cm to 3 cm in length, in line with the intramedullary canal.

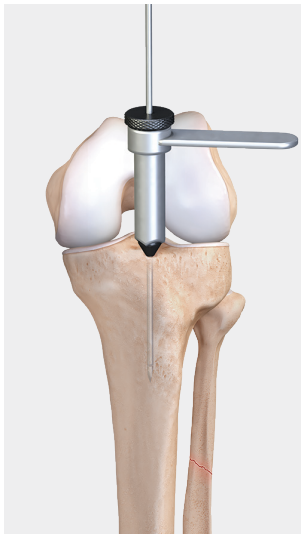


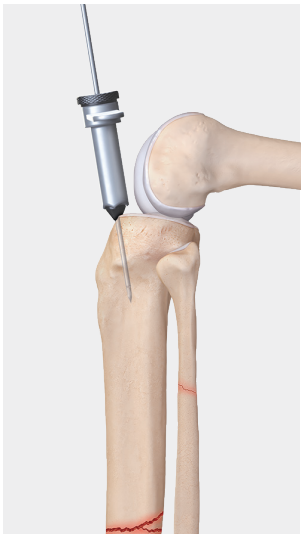
Locate the entry point into the tibial intramedullary canal just medial to the lateral tibial eminence in the AP view, and in line with the anterior cortex of the intramedullary canal in the lateral view.

Based on surgeon preference, an entry point is made with one of the following two options:

Entry Option A







The 3.2 mm guide pin may be placed using the entry tube and 3.2 mm pin guide. Orient the entry tube and pin guide into the proper position and insert the guide pin into the metaphysis 1.5 cm to 3 cm.

Use AP and lateral fluoroscopic views to confirm accurate placement of the guide pin.

Note: For mid-shaft and distal tibia fractures, a central starting point in the AP view is adequate. However, a slight lateral starting point is recommended for more proximal fractures to avoid proximal fragment malalignment.

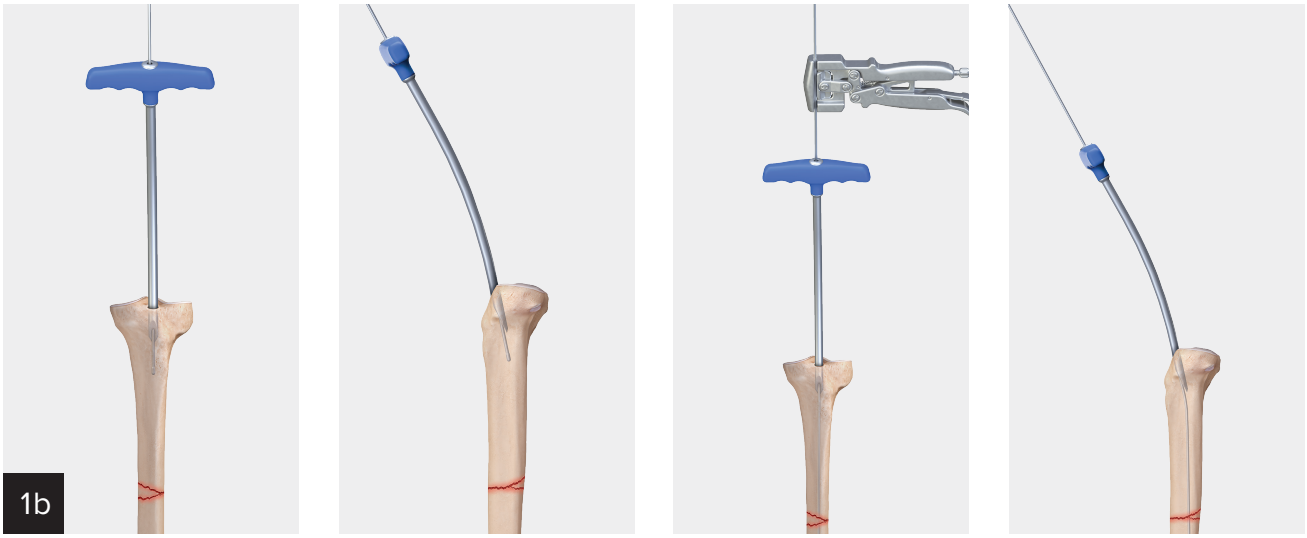
Remove the pin guide from the entry tube and use the 12 mm cannulated entry reamer through the entry tube to open the proximal tibia.

When used with the entry tube, the markings on the reamer correspond to 0 mm, 5 mm, and 10 mm of countersunk depth for the proximal portion of the nail.

Once access to the tibial canal has been gained, place the 3.0 mm ball nose guidewire through the opening.

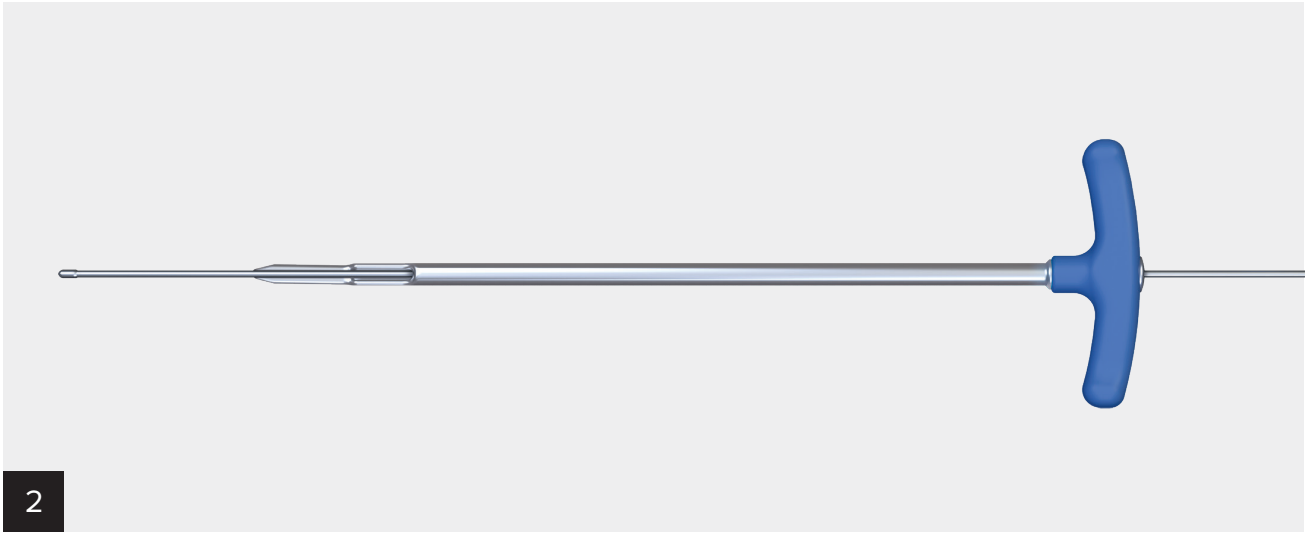
Note: The tibial nail compression range is 8 mm.

Entry Option B



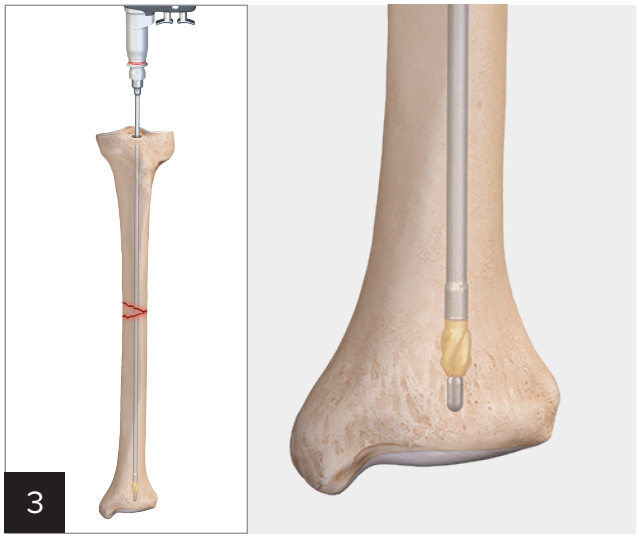
Use fluoroscopy to verify the entry point and direction in both the AP and lateral views, then advance the 9.5 mm curved cannulated awl in line with the tibial canal.

Once access to the tibial canal has been gained, place the 3.0 mm ball nose guidewire through the curved cannulated awl into the entry site using the 2.0/3.0 mm guidewire gripper.

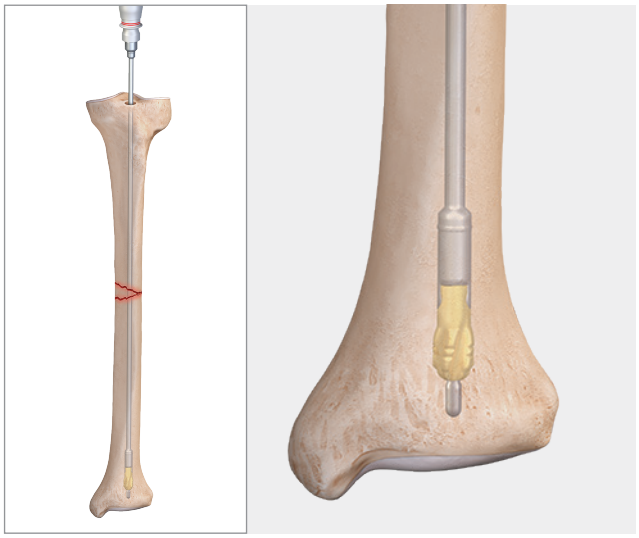


Obtain appropriate anatomic reduction in order to restore length, alignment, and rotation of the injured limb. To aid in manipulating the fracture fragments and passing the ball nose guidewire, a 9.5 mm reduction tool is available.

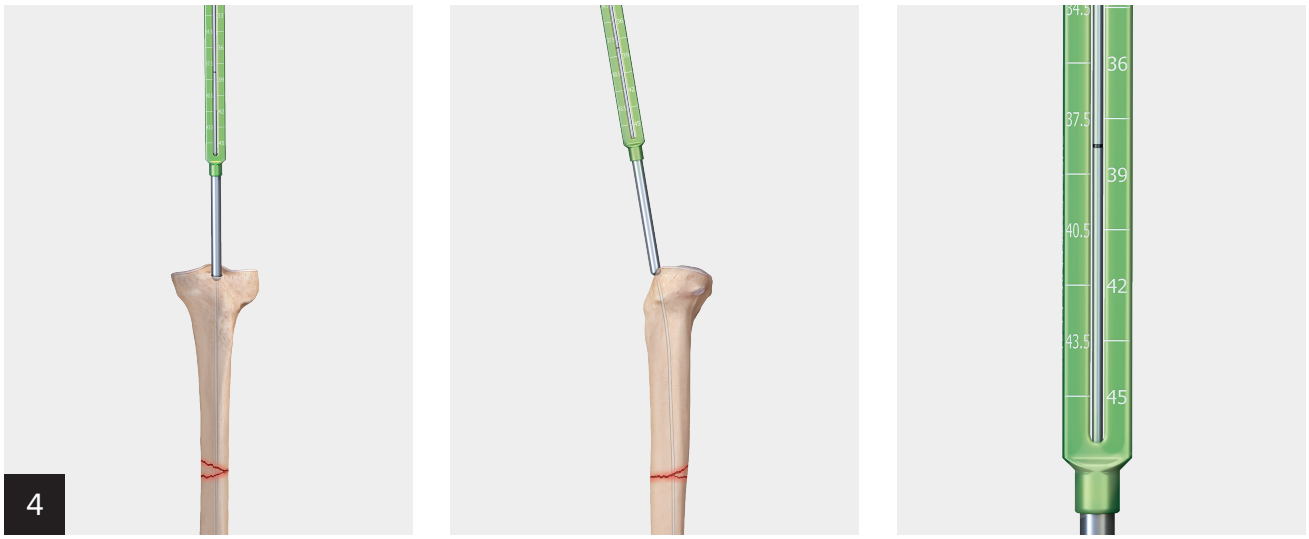
Insert the reduction tool into the canal and use the curved tip to direct the ball nose guidewire past the fracture, into the region of the center distal epiphyseal scar, on both the AP and lateral view. Once the ball nose guidewire is at the desired depth, detach the guidewire gripper and remove.



Achieve proper alignment of the injured limb prior to reaming and maintain it throughout the reaming process to avoid eccentric reaming. Begin reaming with the 8 mm monobloc reamer over the ball nose guidewire.



Ream the canal in 0.5 mm increments using the 9.0 mm to 12.5 mm reamer heads and the flexible modular shaft until cortical chatter is achieved. It is recommended to ream to a size 1.0 mm to 1.5 mm larger than the selected nail. Monitor the reaming procedure to avoid eccentric or excessive cortex reaming.



Note: Generally, a nail diameter 1 mm less than the final reamer diameter is chosen. When treating distal tibia fractures with a tibial nail, stresses are increased on the nail's distal portion. For distal tibia fractures, it is recommended that the surgeon use the largest nail diameter that will fit in the canal without excessive thinning of the cortex.

Slide the guidewire depth gauge onto the ball nose guidewire until it contacts the bone. Read the measurement that lines up with the etch mark on the guidewire to determine the nail length.

Note: If the mark on the ball nose guidewire is in between sizes, it is recommended to select the smaller of the two sizes.

5

After selecting the desired nail, attach the nail to the insertion guide with the connection bolt and the ball hex driver on the T-handle. Ensure proper orientation by aligning the beveled surfaces on the nail and insertion guide.

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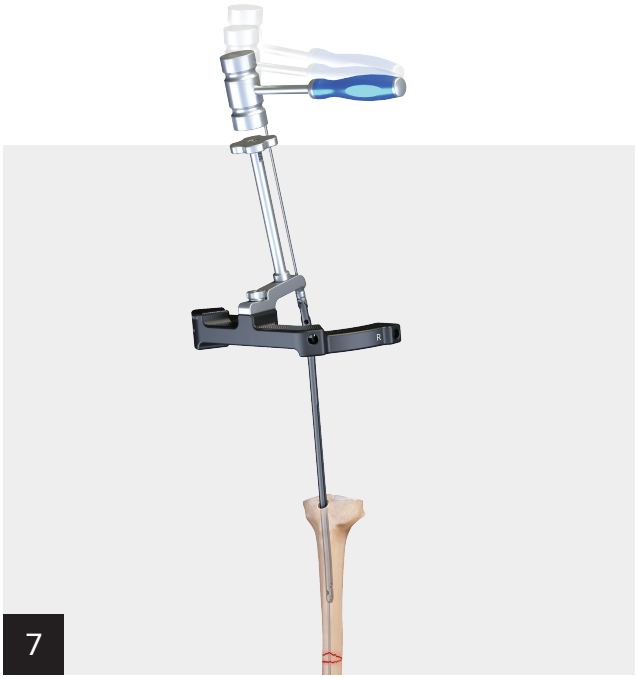
Place the tibial nail-targeting module on the selected insertion guide. Insert the locking bolt and tighten it in a clockwise direction using the ball hex driver connected to the T-handle. The impactor pad should be used if impaction is necessary.



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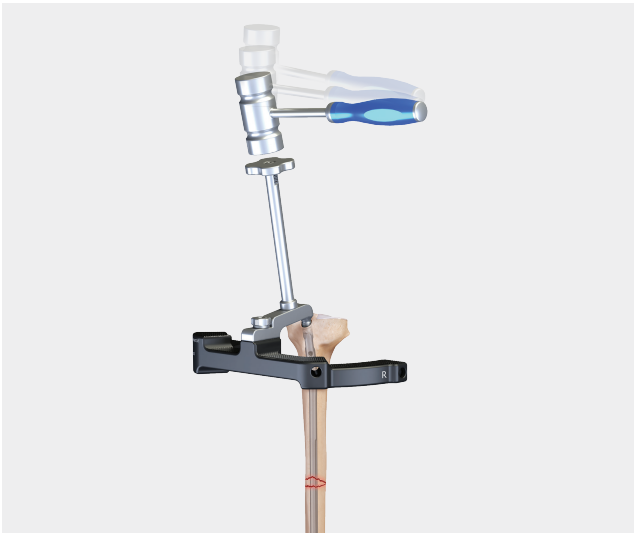


Insert the nail over the ball nose guidewire and into the canal. If the nail does not enter easily, use a slotted mallet to strike against the impactor pad surface.

Caution: Take care not to strike the targeting module with the slotted mallet. Avoid excessive force when inserting the nail. If the nail jams in the canal while inserting, extract it and choose the next-smaller diameter nail or prepare the canal appropriately.

8

Confirm fracture reduction and ensure appropriate nail insertion depth proximally and distally with mediolateral and AP fluoroscopy. Verify the nail position to ensure that it has not rotated during insertion. The bevel on the nail's proximal end should be centered on the tibia.

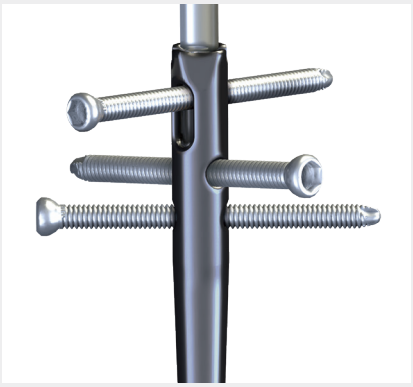
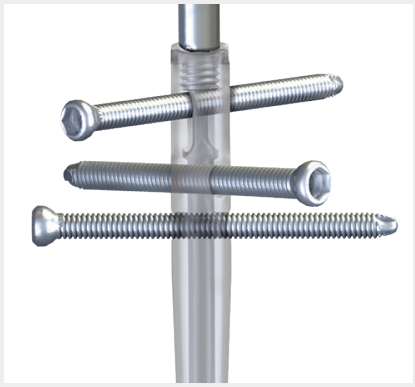
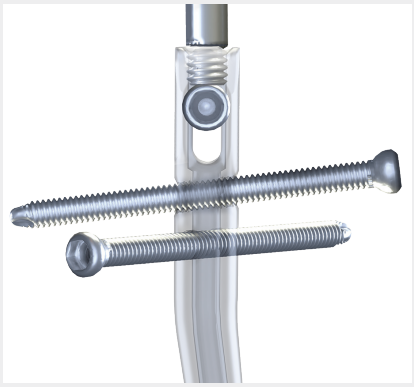
Note: If fracture dynamization or compression is desired, countersink the nail to avoid impingement in the knee joint. The jig is marked by two grooves to indicate static and dynamic compression placement. Seat the nail to the proximal groove for dynamic locking or to the distal groove for static locking. The distal groove represents 5 mm of countersink, and the proximal groove represents 13 mm of countersink to account for up to 8 mm of dynamic compression.

Proximal Screw Options

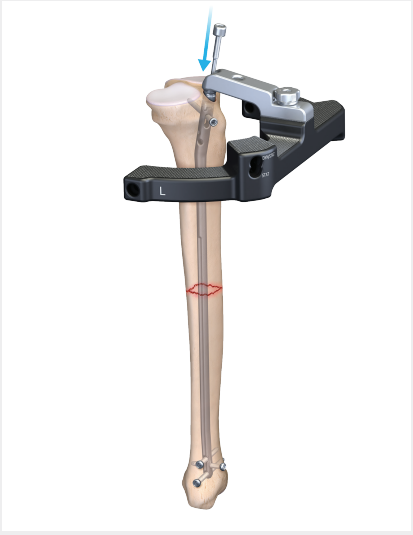
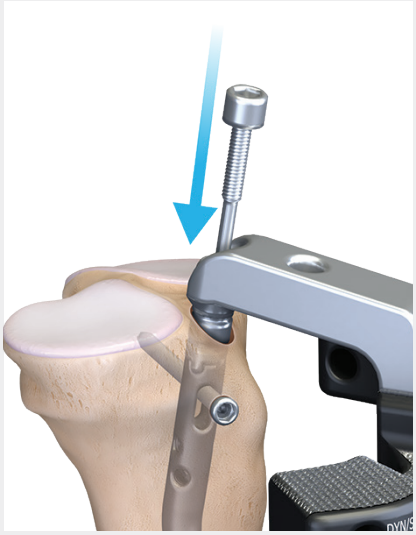
Proximal locking includes two statically locked threaded holes and one slot that allows for fracture dynamization, apposition, or compression.

A proximal dynamic slot has been incorporated in the nail with an 8 mm range of controlled compression. If using compression, countersink the nail by at least 10 mm to avoid backing out into the joint. The jig is marked by two grooves to indicate static and dynamic or compression placement. Seat the nail to the proximal groove for dynamic locking or to the distal groove for static locking. The distal groove represents 5 mm of countersink and the proximal groove represents 13 mm of countersink to account for up to 8 mm of compression.

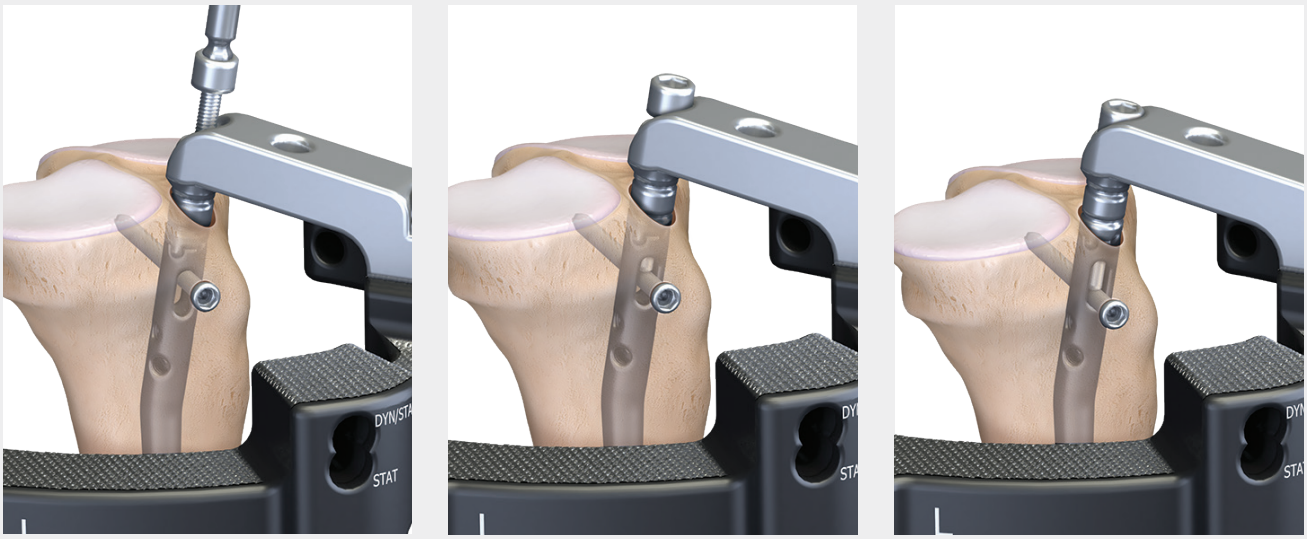
Proximal Screw Slot Options

Compression Locking Option A
If compression is required, it is achieved intraoperatively. Conduct proximal locking in the dynamic mode within the slot and then perform distal locking.

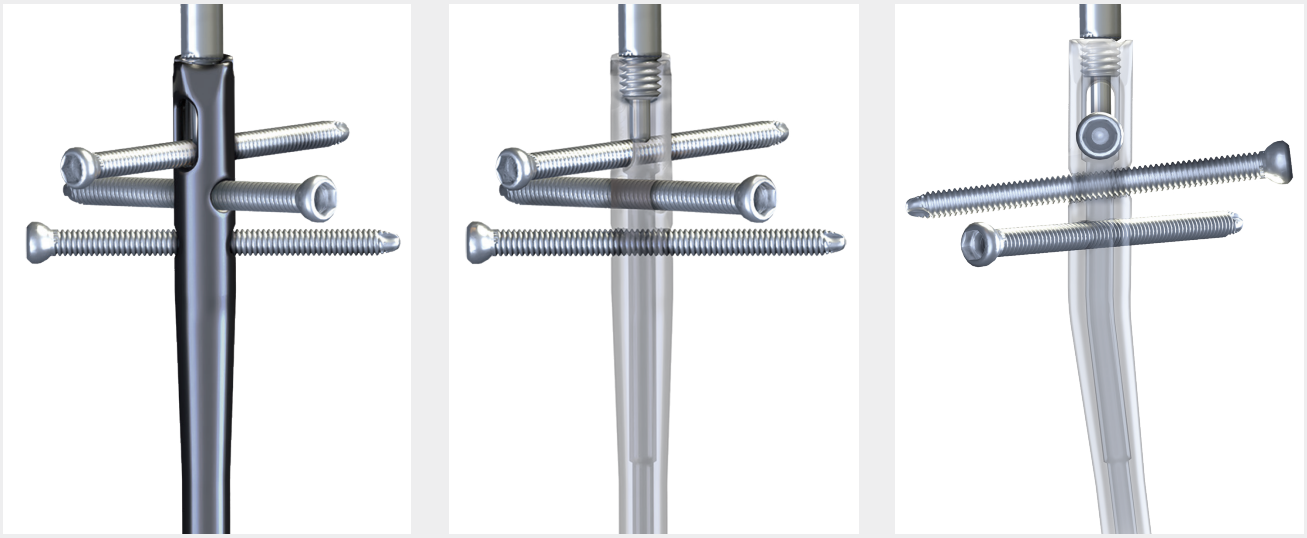




Use the compression bolt threaded into the locking bolt of the insertion guide and turn clockwise to push against the proximal screw within the slot.

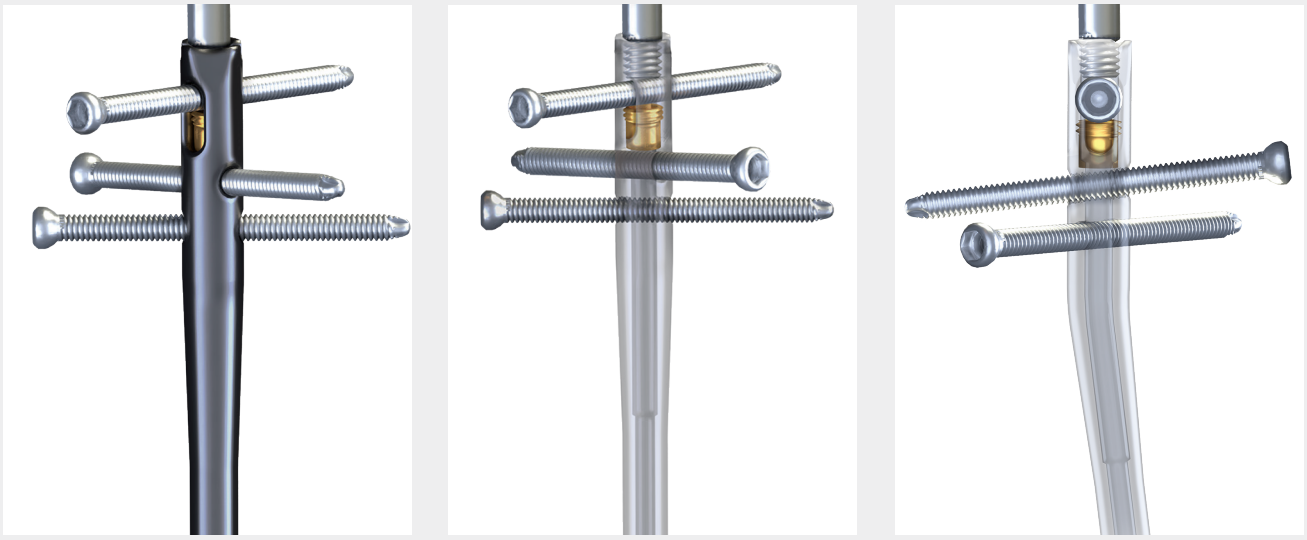


Using the compression bolt will pull the distal fragment toward the fracture site, compressing the fracture.

Alternatively, the flush/compression end cap may be used for compression after removal of the insertion guide when only one proximal screw is used. It is attached to the captured screwdriver and threaded into the top of the nail until it begins to push on the screw with the same effect.

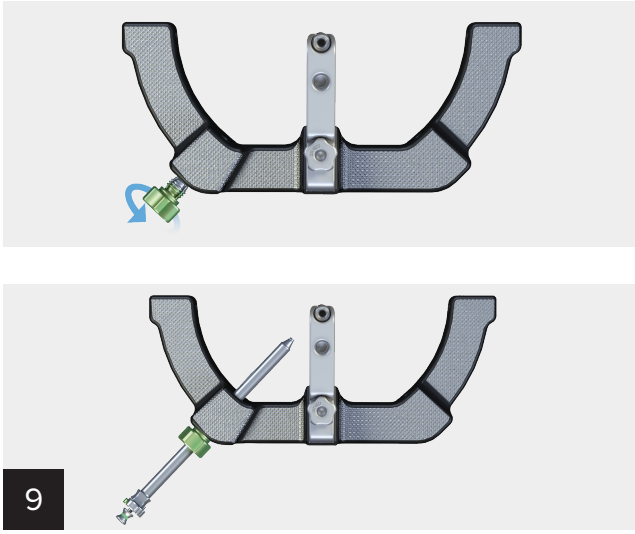


Proximal Locking Option B
If static locking is required in the dynamic slot, conduct proximal locking in the static mode, marked accordingly on the nail-targeting guide.



Proximal Locking Option C
If static locking is required in the superior aspect of the dynamic slot, conduct proximal locking in the static mode using the gold static spacer and targeting the screw through the hole marked "dynamic" on the nail-targeting guide.

Note: The gold static space must be inserted into the nail prior to attaching the nail to the jig.



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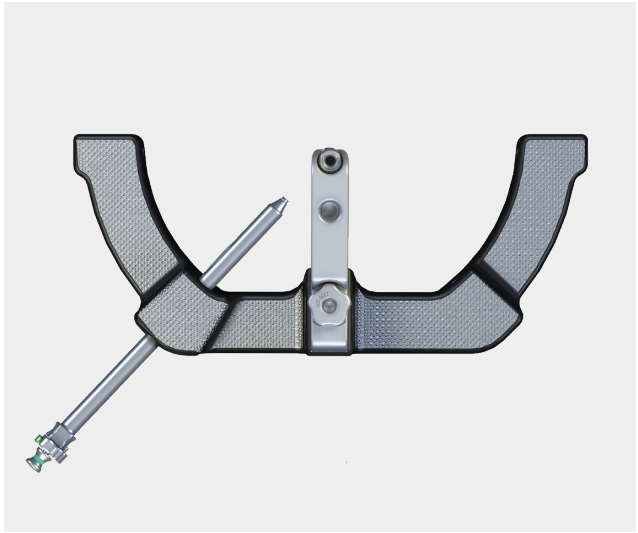
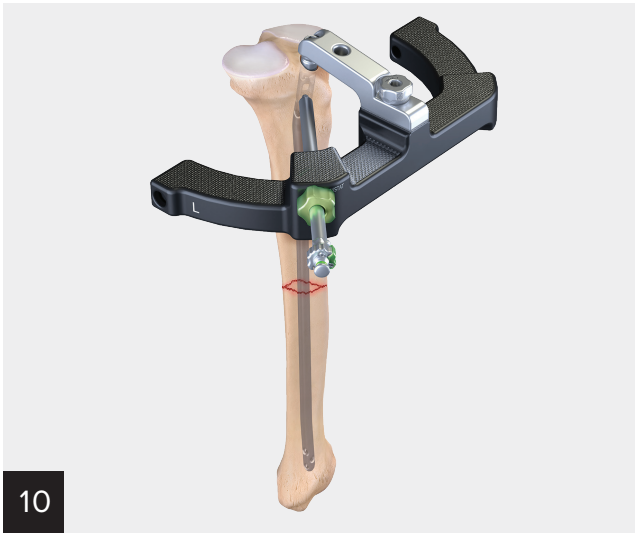
Insert the green locking collet into the locking hole in the targeting module and thread in until the clear anodized portion is placed within the targeting module locking hole. The locking collet is now free to place the sheath and trocar. After positioning the sheath and trocar, turn the locking collet clockwise to lock.



Alternatively, the sheath and trocar may be used freely without the locking collet.

Note: The targeting module is marked to indicate which hole should be used for dynamic or static locking and left or right.



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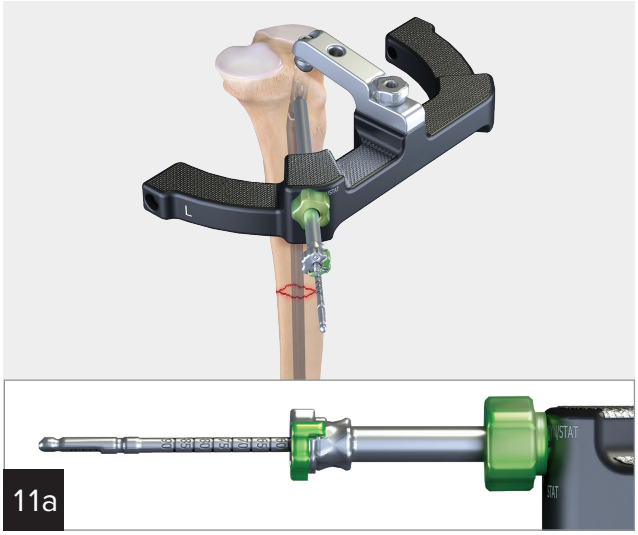
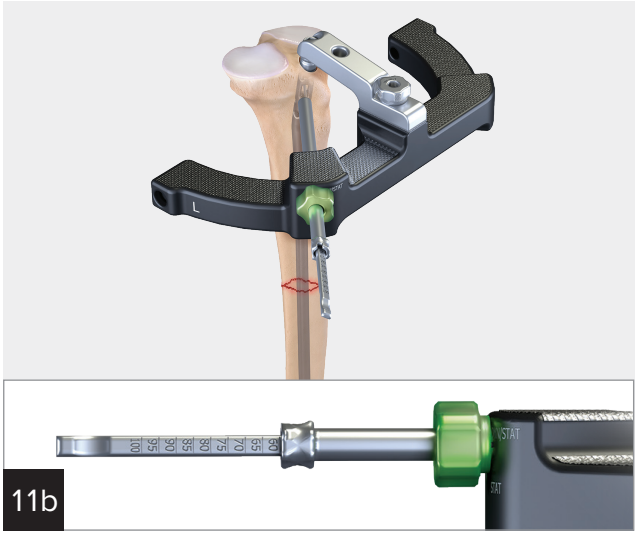
Place the protective distal sheath, 4.0 mm distal drill guide, and obturator through the appropriate locking hole with a locking collet in the targeting module. Make a stab incision and bluntly dissect to the bone. When the trocar is placed against the bone cortex, lock the sheath and trocar by turning the green locking collet in a clockwise direction until tight. Remove the trocar.

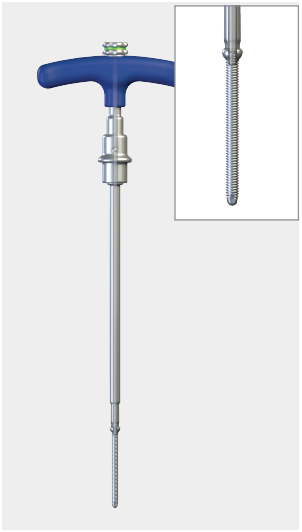
Note: The drill guide extends past the screw sheath to allow a smaller incision and a more percutaneous approach. When the drill guide is assembled in the screw sheath, the drill guide will sit on bone; the sheath will not.



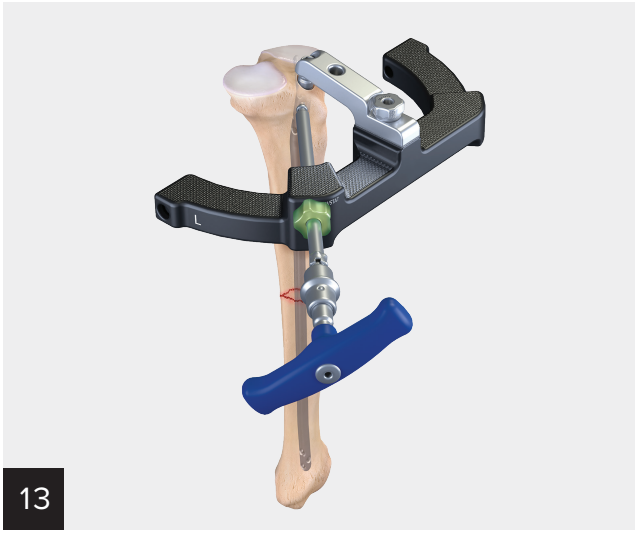
Drill the bone using the 4.0 mm calibrated drill through the drill guide and sheath, across the tibial canal until the far cortex is penetrated. Read the calibration line on the drill bit that lines up with the drill guide to determine screw length. Verify fluoroscopically to assure the proper screw length selection and remove the calibrated drill and drill guide.



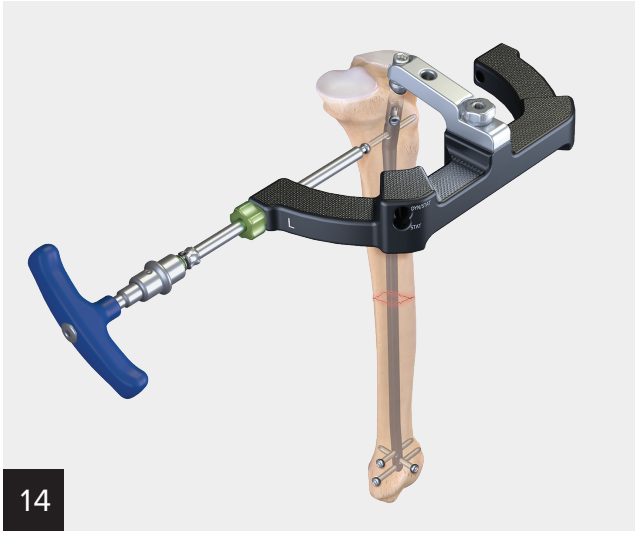
Alternatively, screw length may be determined using the proximal hook-tip depth gauge. Read the calibration line on the hook-tip depth gauge that lines up with the screw sheath.

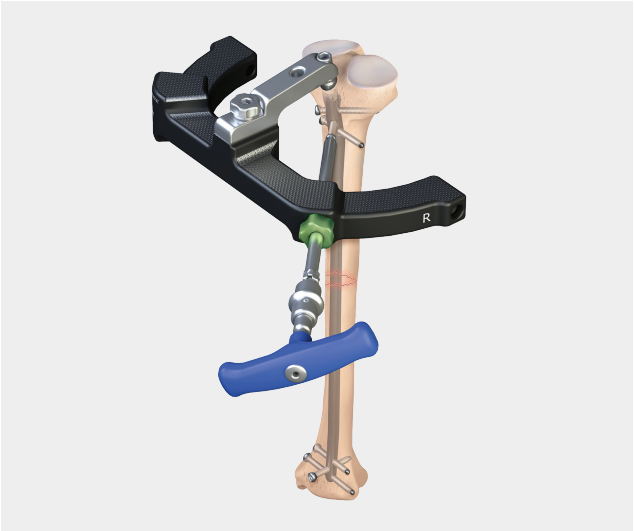


Using the 5.0 mm cannulated hex driver, screw-capturing rod, and T-handle, attach the screw to the driver. Capture the screw by threading the capturing rod into the head of the screw.



Insert the 5.0 mm captured cortical screw through the sheath. The cannulated hex driver is etched with two laser lines. When the lines align with the end of the sheath, the screw head is seated against bone.





Once compression, if desired, is complete, additional proximal screws can be added where appropriate to maintain fixation and compression.

Note: To activate compression, use the dynamic screw hole first, then insert the distal tibial screws to secure the distal fragment.

Distal Screw Technique

Distal locking includes two mediolateral holes and one threaded AP hole. Use the 5.0 mm captured cortical screw for tibial nails 9 mm to 11 mm in diameter.

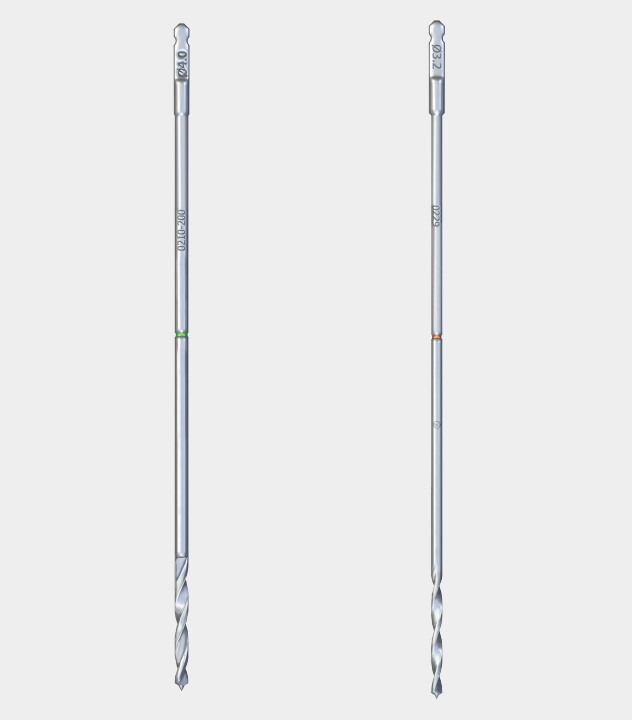
Note: For the 8 mm tibial nail diameter, use the 4.2 mm captured cortical screw.

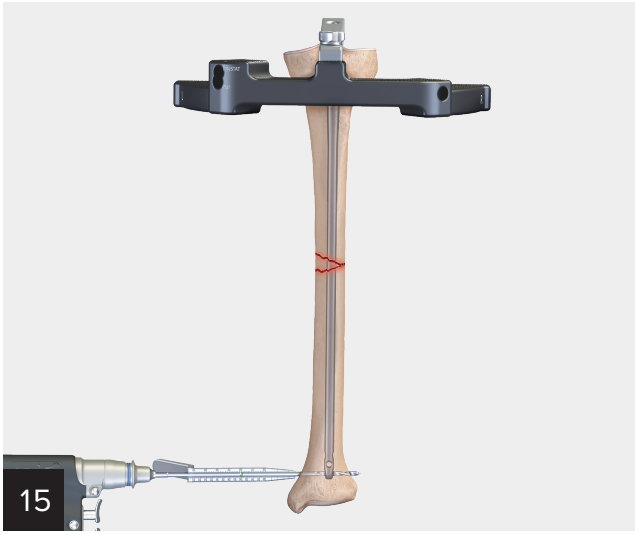
Distal locking is typically approached from the medial side. Use fluoroscopy to conduct distal locking with a standard free-hand technique.

Note: Accurate C-arm position is confirmed when the distal nail hole appears to be a perfect circle.

Once correct placement has been verified fluoroscopically, make a stab wound in direct alignment with the distal hole.

For 5.0 mm captured cortical screws, use the 4.0 mm drill with green color band. For 4.2 mm captured cortical screws, use the 3.2 mm drill with red color band.





Drill until the far cortex is penetrated. Verify the drill bit position fluoroscopically prior to taking any measurements. Place the distal depth gauge onto the drill bit and advance down to the bone. Read the colored calibration line on the drill bit that corresponds to the calibrations indicated on the distal depth gauge.

Remove the drill bit and advance the selected screw using the cannulated hex driver, screw-capturing rod, and T-handle used for the proximal screws.

Repeat the steps above for additional screw placement.

Tibial Nail System–Standard Approach Surgical Technique (cont.)

Once all desired screws have been inserted, remove the jig using the ball hex driver.

Optional End Cap Placement: Flush, 5 mm, and 10 mm end caps are provided in the system to prevent bony in-growth and add length when needed. The flush end cap may also be used for compression by pushing against the most proximal screw within the dynamic slot.

Note: End cap placement is made easier using the 5.0 mm cannulated hex driver, screw-capturing rod, and T-handle to capture the selected end cap during insertion.

Nail Removal

If the surgeon deems it appropriate to remove the nail, an easy-out extractor is used with the impactor rod to aid in nail extraction.

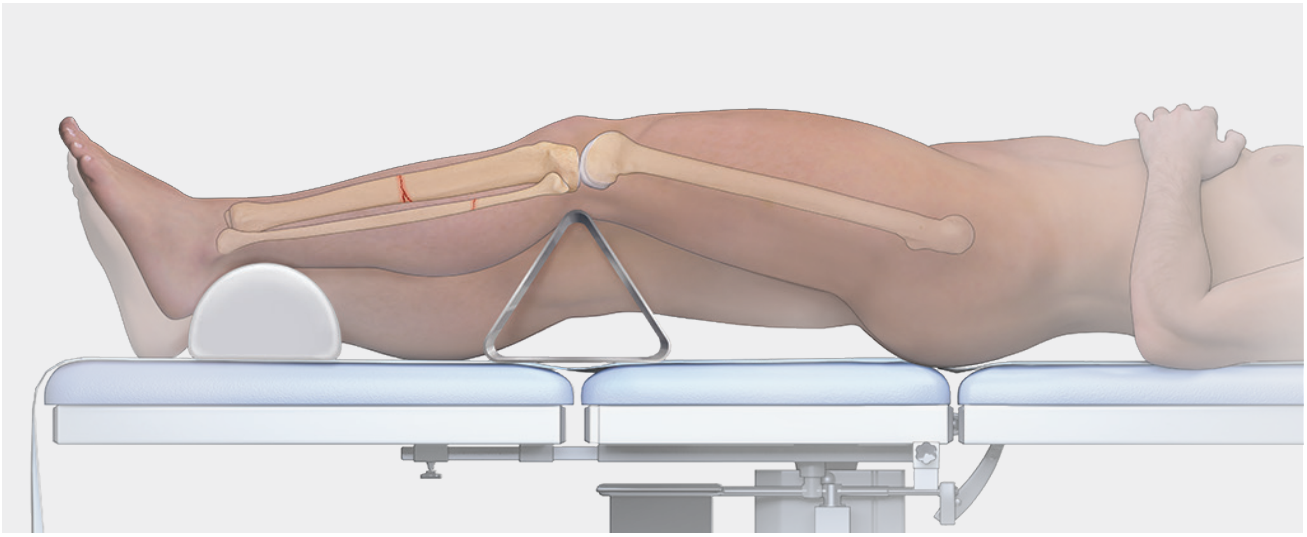
Locate the top of the nail through an appropriate incision. Remove the end cap using the 5.0 mm cannulated hex driver.

Make the appropriate incisions and remove all locking screws. Remove all overgrown bone around the nail's proximal aspect to avoid iatrogenic fracture during nail extraction. Once locking screws are removed, attach the easy-out extractor to the impactor rod and use the conical thread to engage the nail threads and cannula. Use the slotted mallet to remove the nail.

Note: Leaving in one locking screw prior to removal can help to securely fasten the easy-out extractor to the nail.

Tibial Nail System–Suprapatellar Approach

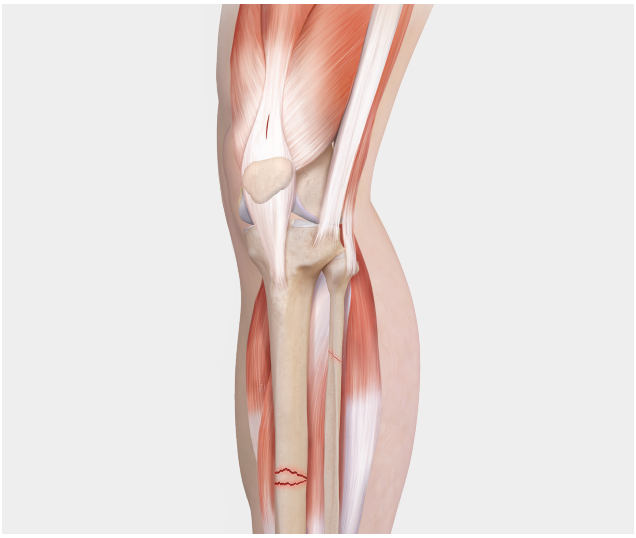
Patient Positioning



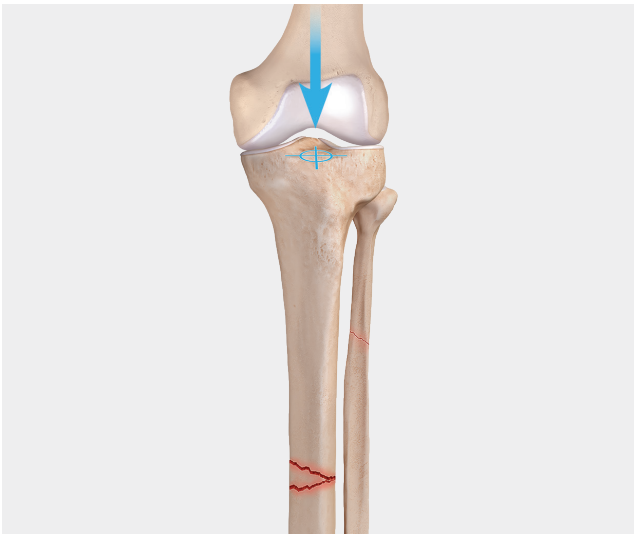
The patient is positioned in the supine position on a radiolucent table with the unaffected limb extended away from the affected limb. Using the semi-extended technique, the affected limb should be in 10° to 20° of flexion and positioned to permit visualization of the fracture with radiography.

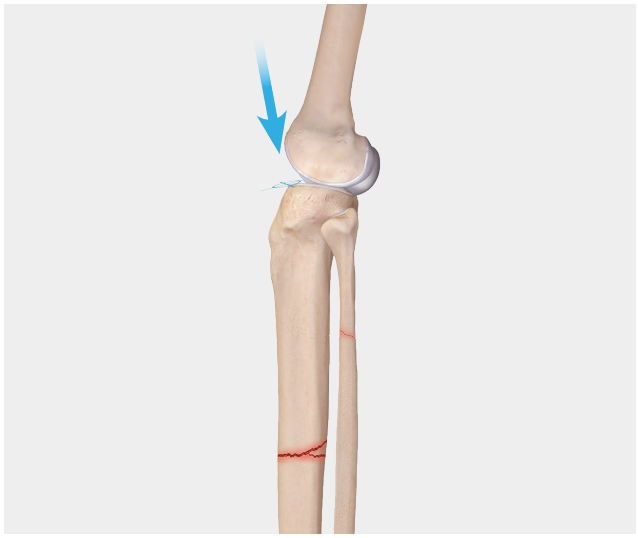
Note: To confirm adequate visualization and reduction capabilities, take preliminary radiographic images before the patient is fully prepped and completely draped.

Incision and Entry Point



Make a midline skin incision approximately 1.5 inches in length from the upper pole of the patella to the middle of the patella. Make a second deep incision medial to the patella, cutting the superior two-thirds of the medial retinaculum but leaving the cuff intact. Extend the incision 1 cm to 2 cm into the quadriceps tendon. The incision is through the medial one-third of the quadriceps tendon. Sublux the patella laterally.

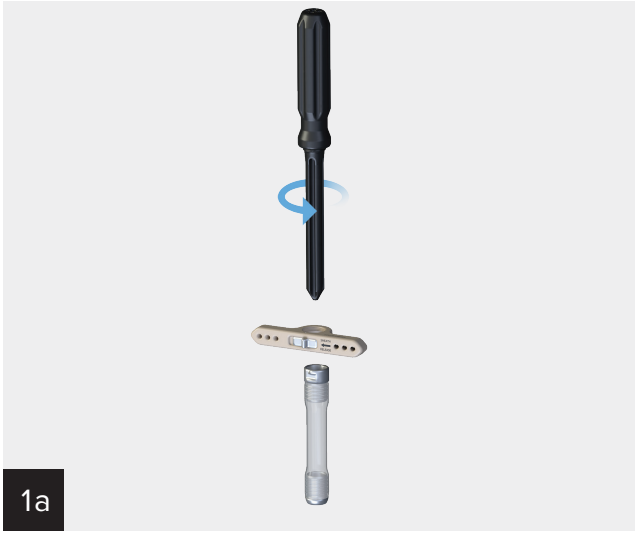


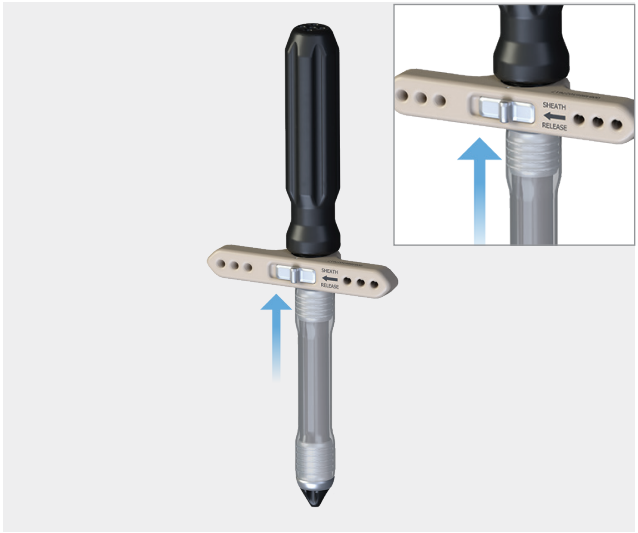


Locate the entry point into the tibial intramedullary canal just medial to the lateral tibial eminence in the AP view and in line with the anterior cortex in the intramedullary canal in the lateral view.

Tibial Nail System–Suprapatellar Approach Surgical Technique

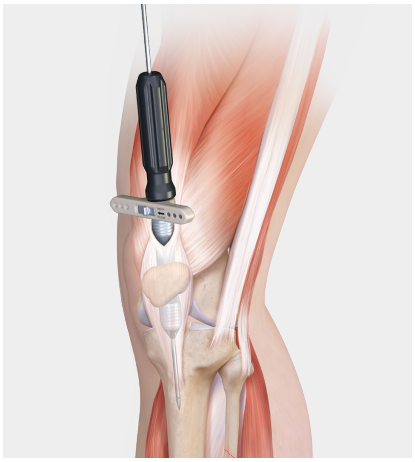
Based on surgeon preference, an entry point is made with one of the following two options:
Entry Option A

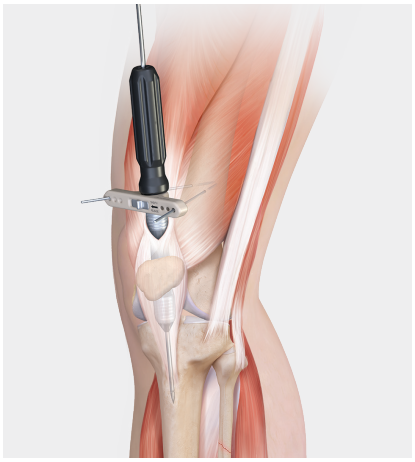


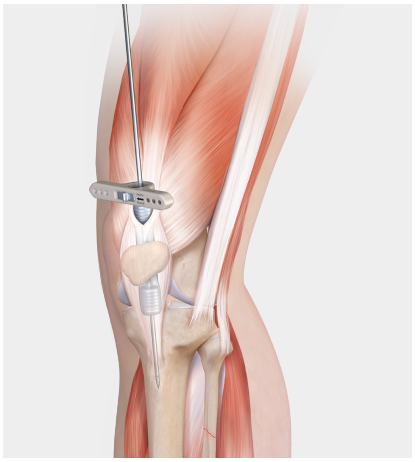


Assemble the pin guide, sheath handle assembly, and suprapatellar entry sheath.

Entry Option A (cont)





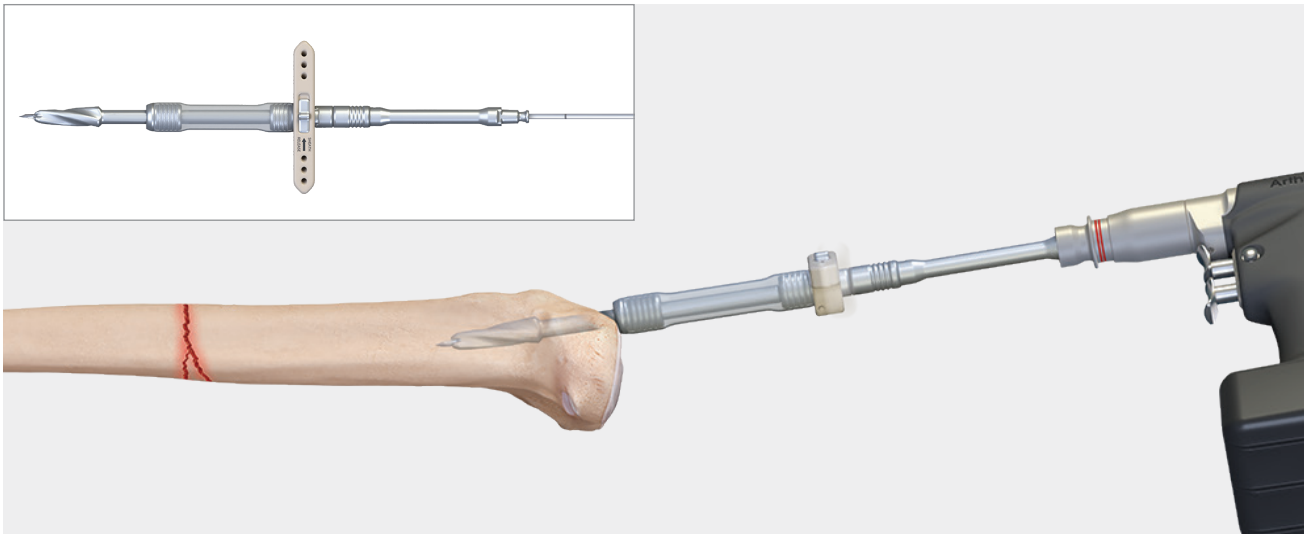


Place the sheath handle assembly in the proper position over the tibia canal entry point and insert the 3.2 mm guide pin through the cannula of the pin guide. Orient the guide pin to the proper position and insert into the tibial metaphysis 1.5 cm to 3 cm.

Use AP and lateral fluoroscopic views to confirm accurate placement of the guide pin. If using an off-center guidewire hole, unthread the sheath handle prior to placing the wire to facilitate removal.

If additional stability is desired or needed, the sheath handle assembly can be secured to the femur with pins placed in the selected holes. With the guide pin in position and secure, remove the pin guide from the entry tube by rotating the handle counterclockwise until the threads are disengaged. Then pull the pin guide from the sheath handle assembly and entry sheath.

Note: For mid-shaft and distal tibia fractures, a central starting point in the AP view is adequate. For more proximal fractures, however, a slight lateral starting point is recommended to avoid proximal fragment malalignment.



Once the pin guide is removed from the suprapatellar entry sheath, use the 12 mm cannulated entry reamer through the suprapatellar entry sheath to open the proximal tibia.

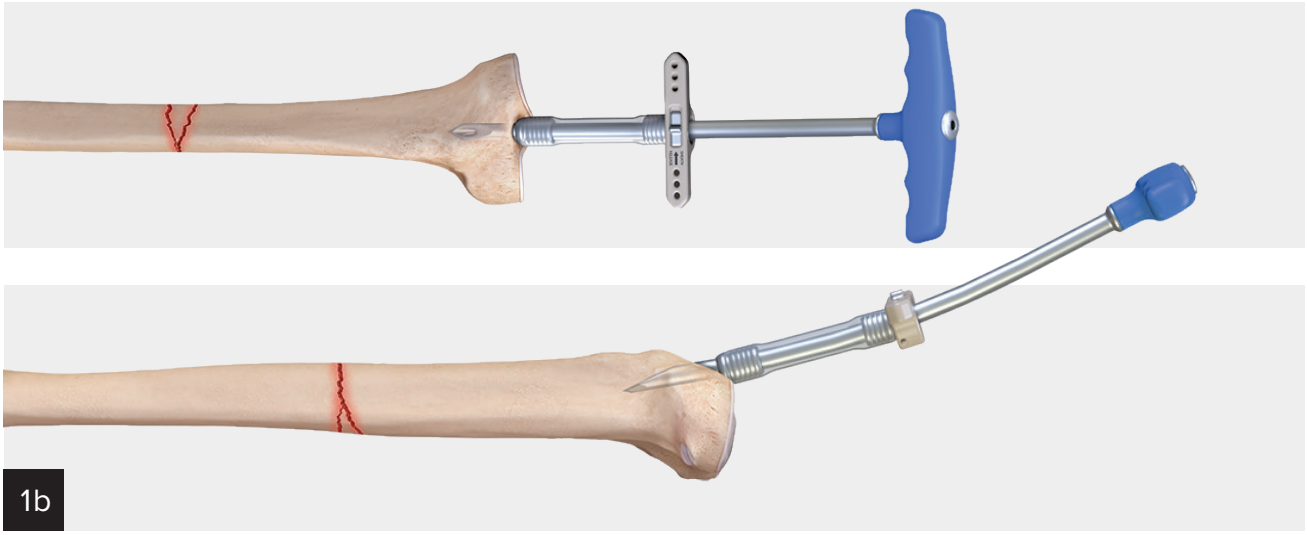
Note: The entry reamer is marked to identify the correct reaming depth depending on whether compression will be used.

Fluoroscopically verify the entry point and direction in both the AP and lateral views. Once access to the tibial canal has been gained, remove the guide pin and place the 3.0 mm ball nose guidewire into the entry site using the 2.0/3.0 mm guidewire gripper.

The reamer extension can be used for longer nails.

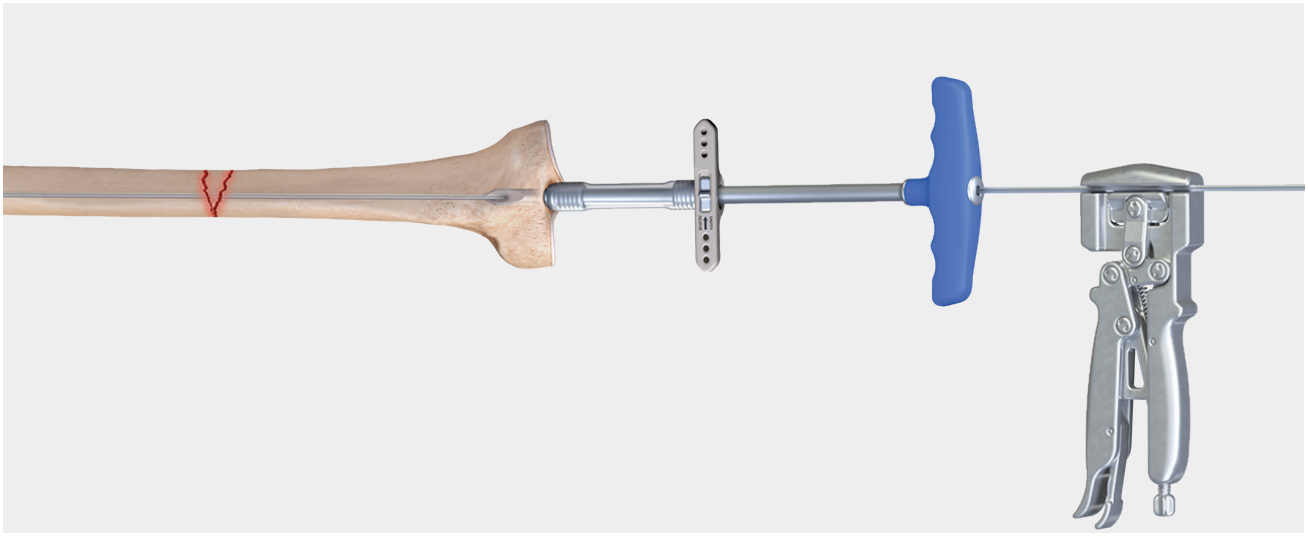
Note: The tibial nail compression range is 8 mm.

Entry Option B

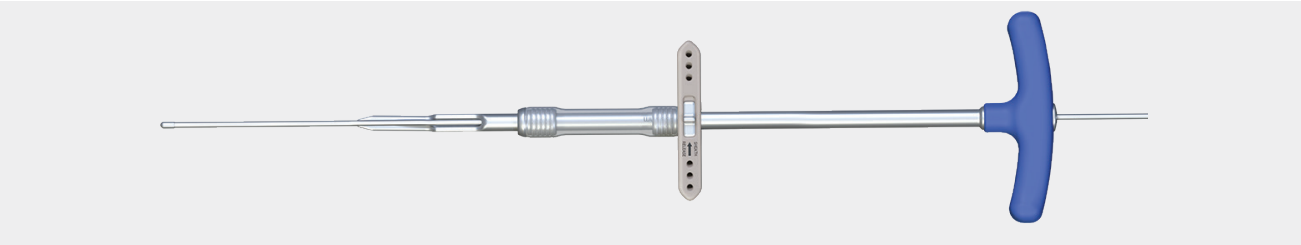


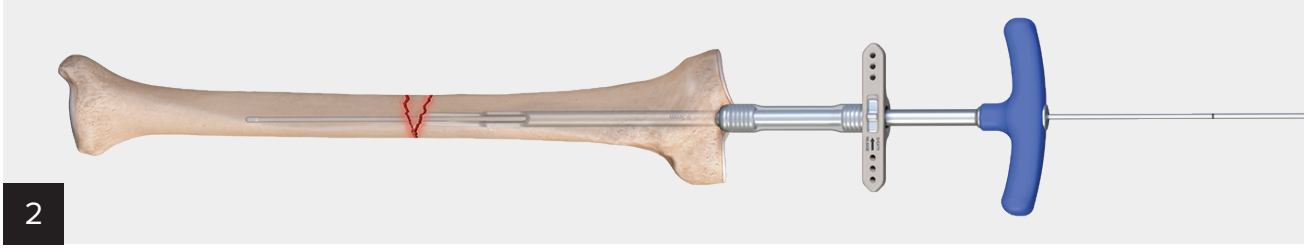
1b

Fluoroscopically verify the entry point and direction in both the AP and lateral views, then advance the 9.5 mm curved cannulated awl through the suprapatellar entry sheath and in line with the tibial canal.



Once access to the tibial canal has been gained, place the 3.0 mm ball nose guidewire through the curved cannulated awl into the entry site using the 2.0/3.0 mm guidewire gripper.

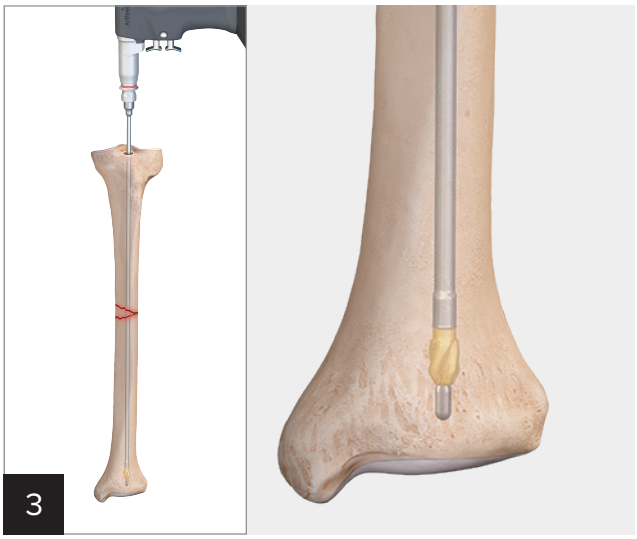




2

Obtain appropriate anatomic reduction to restore length, alignment, and rotation of the injured limb. To aid in manipulating the fracture fragments and passing the ball nose guidewire, a 9.5 mm reduction tool is available.

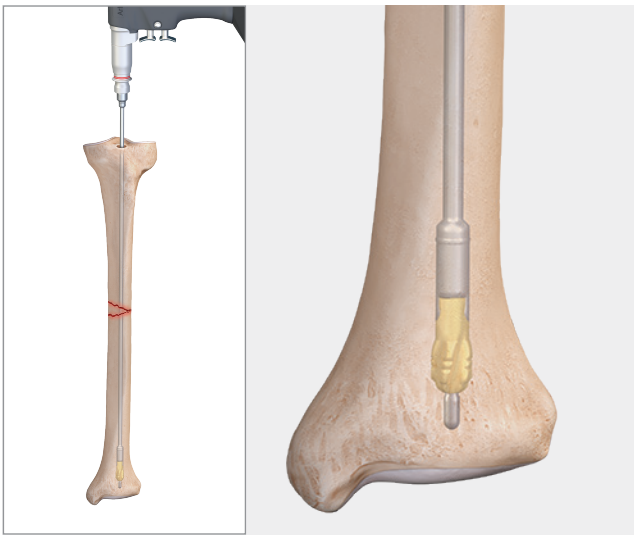
Insert the reduction tool into the canal and use the curved tip to direct the ball nose guidewire past the fracture, into the region of the center distal epiphyseal scar, on both the AP and lateral view. Once the ball nose guidewire is at the desired depth, detach the guidewire gripper and remove.



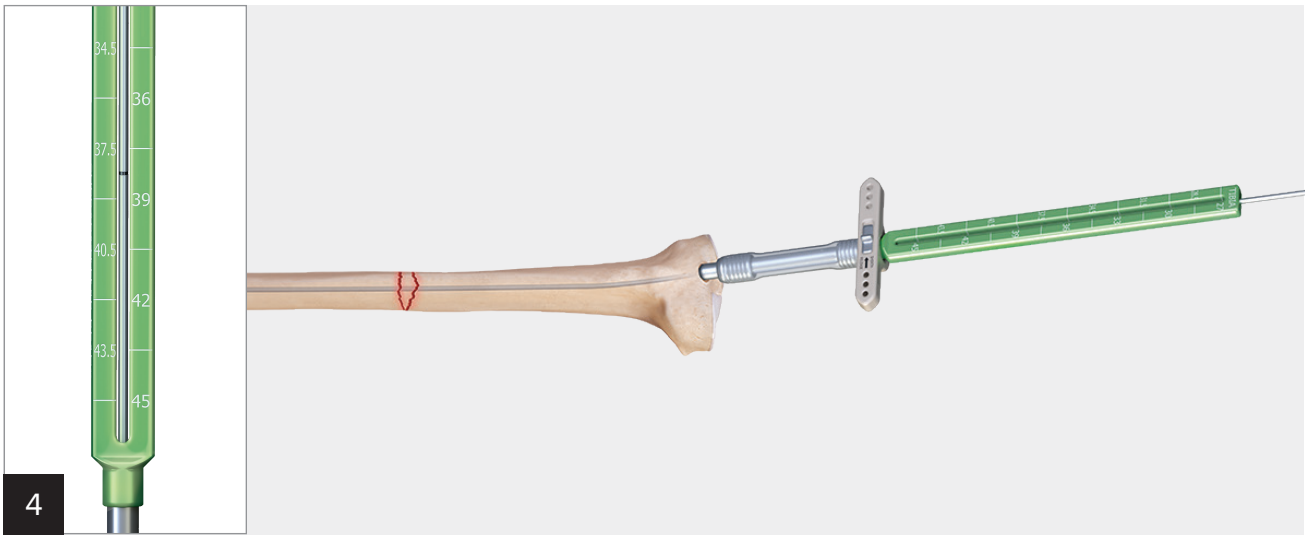
3

Achieve proper alignment of the injured limb prior to reaming and maintain it throughout the reaming process to avoid eccentric reaming. Begin reaming with the 8 mm monobloc reamer over the ball nose guidewire.

Note: The reamer extension can be used if additional length is required.



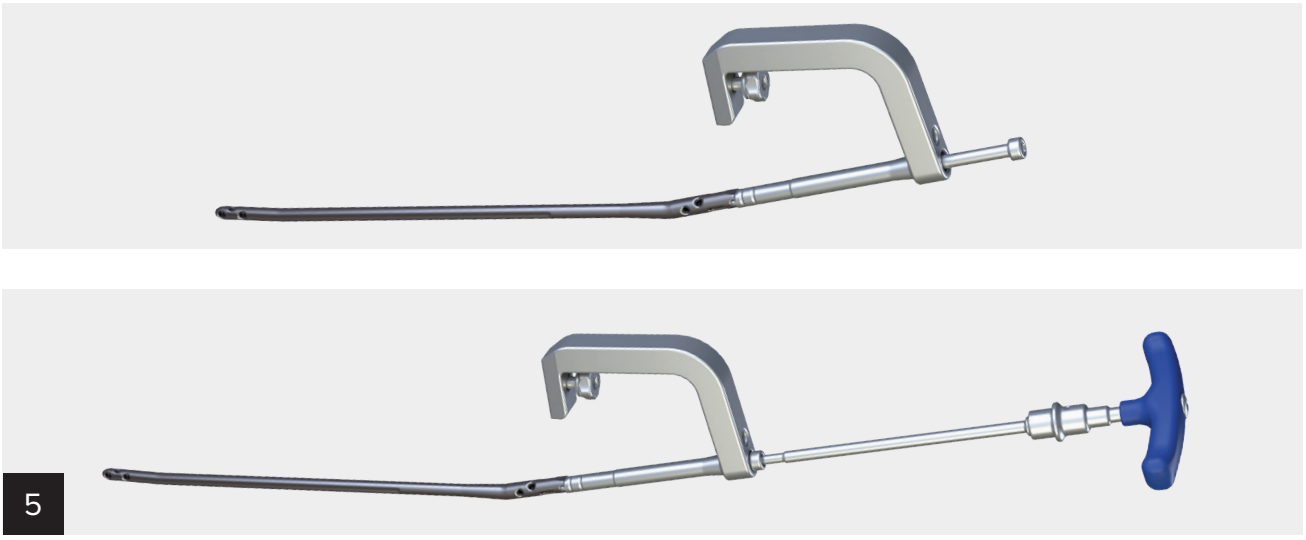
Ream the canal in 0.5 mm increments using the 9.0 mm to 12.5 mm reamer heads and the flexible modular shaft until cortical chatter is achieved. It is recommended to ream to a size 1.0 mm to 1.5 mm larger than the selected nail. Monitor the reaming procedure to avoid eccentric or excessive cortex reaming.



Note: Generally, a nail diameter 1 mm less than the final reamer diameter is chosen. When treating distal tibia fractures with a tibial nail, stresses are increased on the nail's distal portion. For distal tibia fractures, it is recommended that the surgeon use the largest nail diameter that will fit in the canal without excessive thinning of the cortex.

Slide the guidewire depth gauge onto the ball nose guidewire until it contacts the bone. Read the measurement that lines up with the etch mark on the guidewire to determine the nail length.

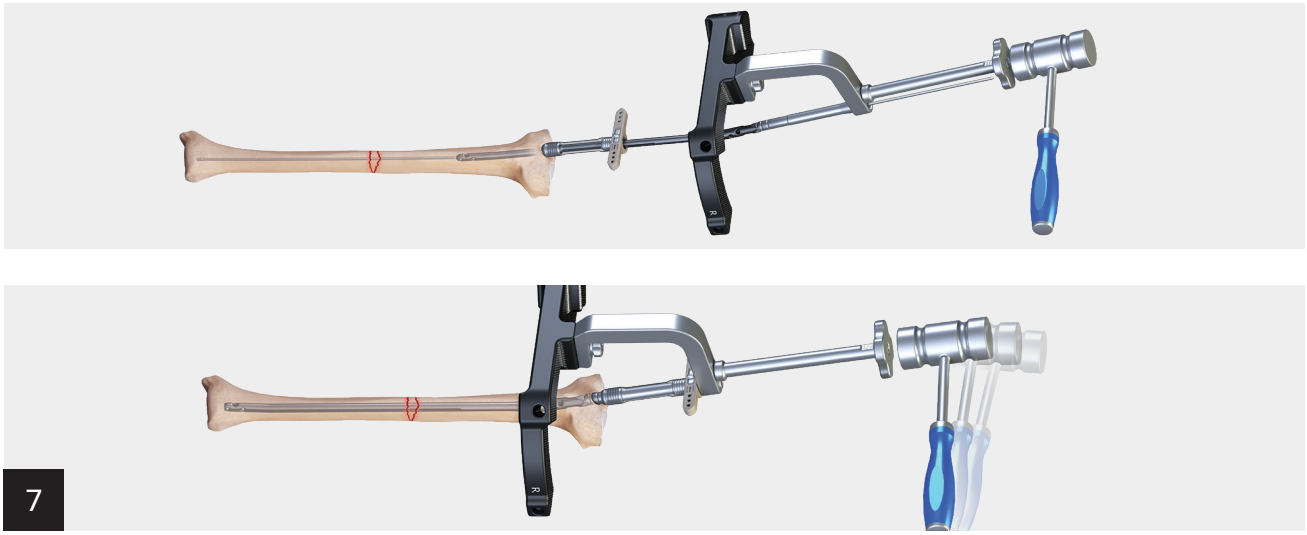
Note: If the mark on the ball nose guidewire is in between sizes, it is recommended to select the smaller of the two sizes.



After selecting the desired nail, attach the nail to the insertion guide with the connection bolt and the ball hex driver on the T-handle. The suprapatellar extended insertion guide offers an increased jig length and must be used when performing this procedure via the suprapatellar approach. Ensure proper orientation by aligning the beveled surfaces on the nail and insertion guide.

6

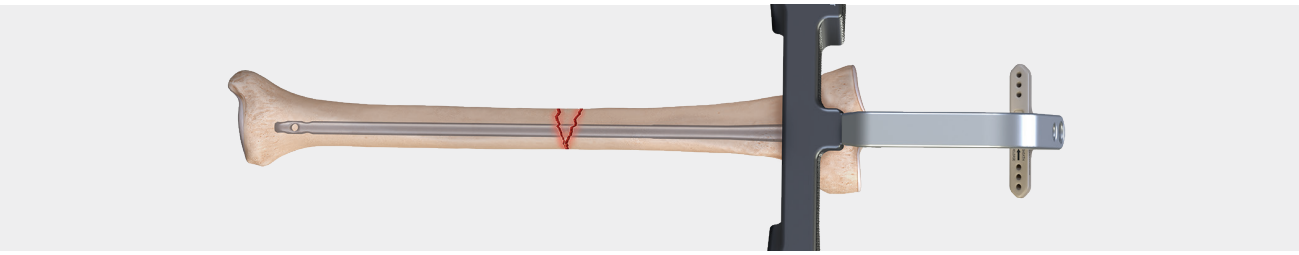
Place the tibial nail-targeting module on the selected insertion guide. Insert the locking bolt and tighten in a clockwise direction using the ball hex driver connected to the T-handle. The impactor pad should be used if impaction is necessary.



7

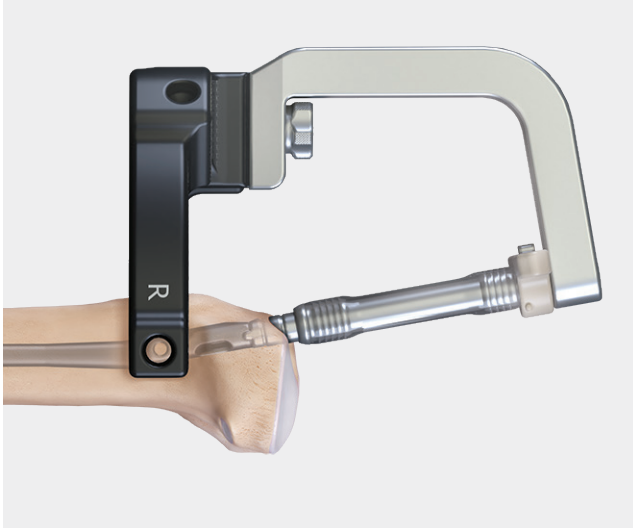
Insert the nail over the ball nose guidewire and into the canal. If the nail does not enter the tibia easily, use a slotted mallet to strike against the impactor pad surface.

Caution: Take care not to strike the targeting module with the slotted mallet. Avoid excessive force when inserting the nail. If the nail jams in the canal while inserting, extract it and choose the next-smaller diameter nail or prepare the canal appropriately.



8

Confirm fracture reduction and ensure appropriate nail insertion depth proximally and distally with mediolateral and AP fluoroscopy. Verify nail position to ensure that it has not rotated during insertion. The bevel on the nail's proximal end should be centered on the tibia.



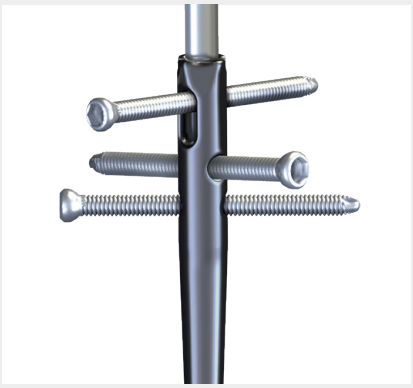
Note: If fracture dynamization or compression is desired, countersink the nail to avoid impingement in the knee joint. The jig is marked by two grooves to indicate static and dynamic or compression placement. Seat the nail to the proximal groove for dynamic locking or to the distal groove for static locking. The distal groove represents 5 mm of countersink and the proximal groove represents 13 mm of countersink to account for up to 8 mm of dynamic compression.

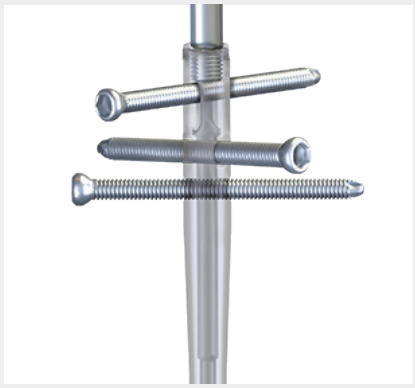
Proximal Screw Options

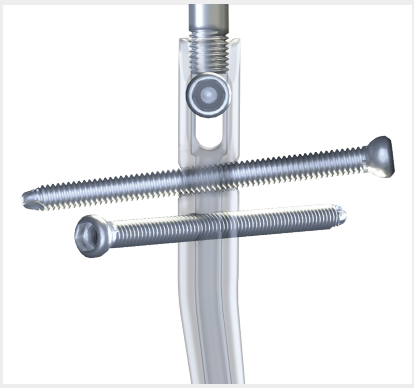
Proximal locking includes two statically locked threaded holes and one slot that allows for fracture dynamization, apposition, or compression.

A proximal dynamic slot has been incorporated in the nail with an 8 mm range of controlled compression. If using compression, countersink the nail by at least 10 mm to avoid backing out into the joint. The jig is marked by two grooves to indicate static and dynamic or compression placement. Seat the nail to the proximal groove for dynamic locking or to the distal groove for static locking. The distal groove represents 5 mm of countersink, and the proximal groove represents 13 mm of countersink to account for up to 8 mm of compression.

Proximal Screw Slot Options







Compression Locking Option A
If compression is required, it is achieved intraoperatively. Conduct proximal locking in the dynamic mode within the slot and then perform distal locking.

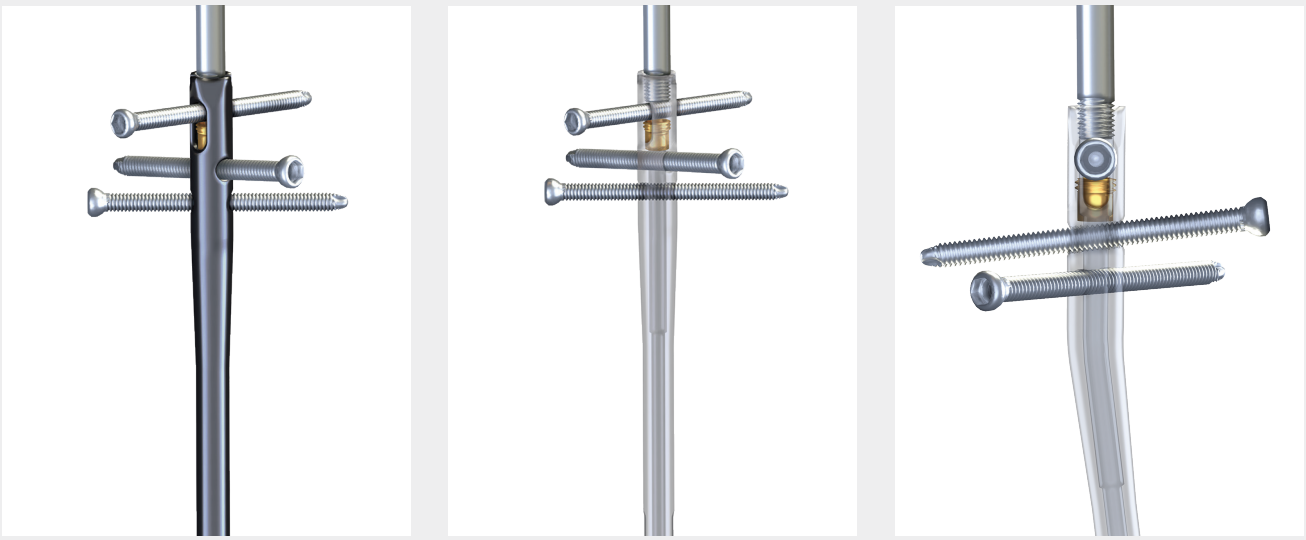
Use the **compression bolt** threaded into the **locking bolt** of the **insertion guide** and turn clockwise to push against the proximal screw within the slot.

The **compression bolt** will pull the distal fragment towards the fracture site, compressing the fracture.

Alternatively, the flush/compression end cap may be used for compression after removal of the insertion guide when only one proximal screw is used. It is attached to the captured screwdriver and threaded into the top of the nail until it begins to push on the screw with the same effect.

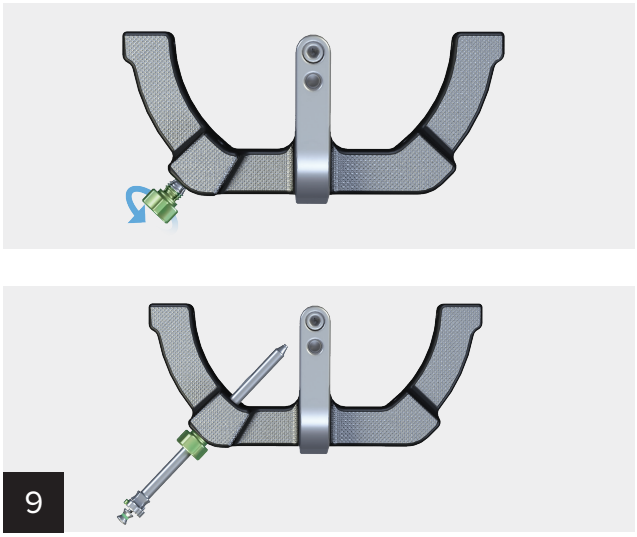
Proximal Screw Slot Options

Proximal Locking Option B
If static locking is required in the dynamic slot, conduct proximal locking in the static mode, marked accordingly on the nail-targeting guide.



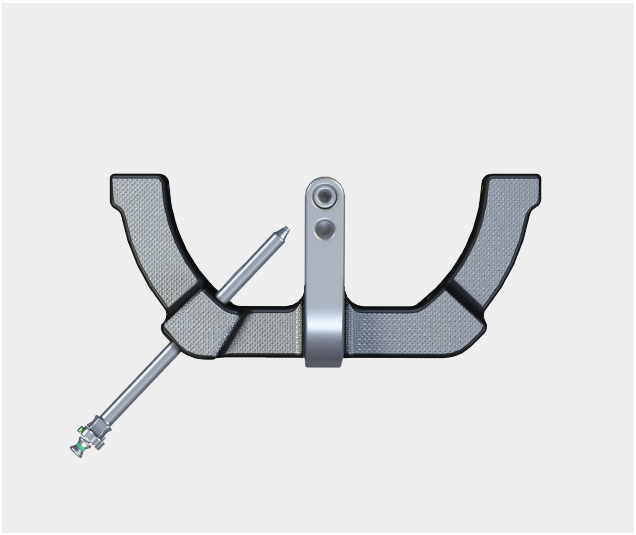
Proximal Locking Option C
If static locking is required in the superior aspect of the dynamic slot, conduct proximal locking in the static mode using the gold static spacer and targeting the screw through the hole marked "dynamic" on the nail-targeting guide.

Note: The gold static space must be inserted into the nail prior to attaching the nail to the jig.



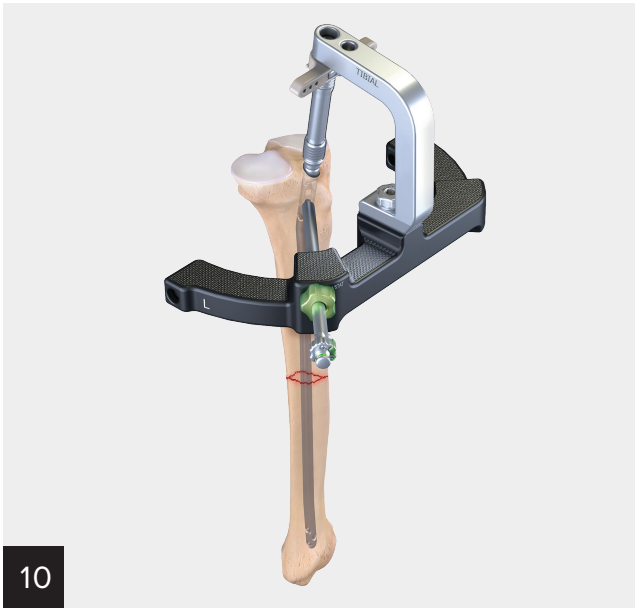
9

Insert the green locking collet into the locking hole in the targeting module and thread in until the clear anodized portion is placed within the targeting module locking hole. The locking collet is now free to place the sheath and trocar. After positioning the sheath and trocar, turn the locking collet clockwise to lock.



Alternatively, the sheath and trocar may be used freely without using the locking collet.

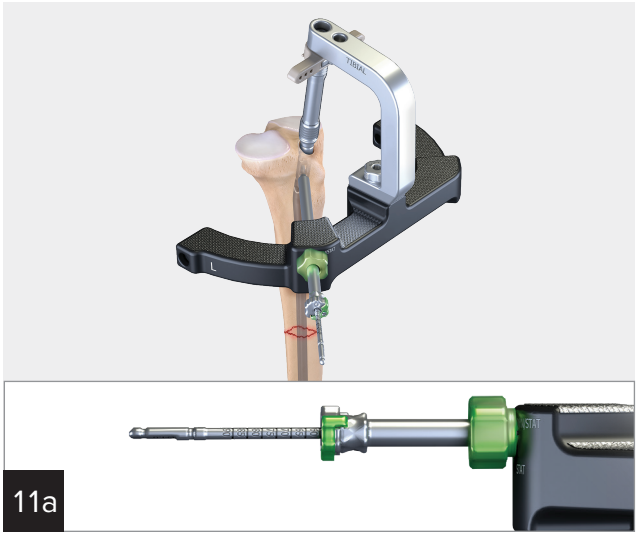
Note: The targeting module is marked to indicate which hole should be used for dynamic or static locking and left or right.



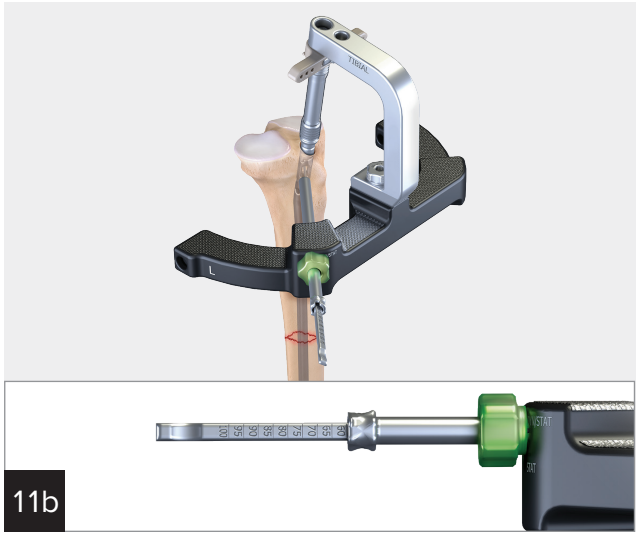
10

Place the protective distal sheath, 4.0 mm distal drill guide, and obturator through the appropriate locking hole with locking collet in the targeting module. Make a stab incision and bluntly dissect to the bone. When the trocar is placed against the bone cortex, lock the sheath and trocar by turning the green locking collet in a clockwise direction until tight. Remove the trocar.

Note: The drill guide extends past the screw sheath to allow a smaller incision and a more percutaneous approach. When the drill guide is assembled in the screw sheath, the drill guide will sit on bone; the sheath will not.

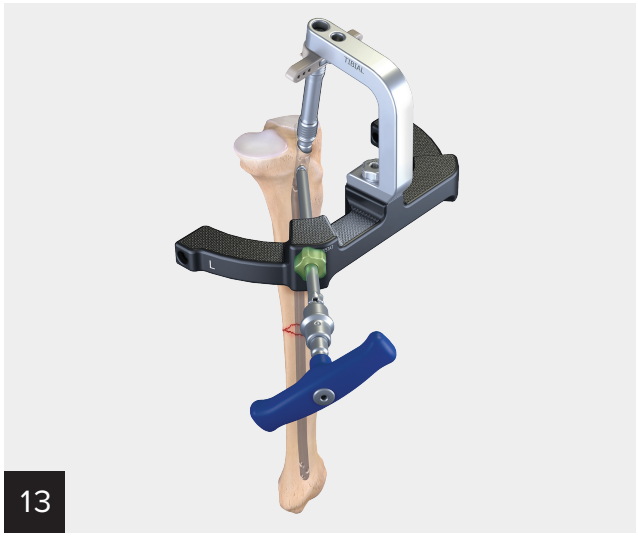


Drill the bone using the 4.0 mm calibrated drill through the drill guide and sheath across the tibial canal until the far cortex is penetrated. Read the calibration line on the drill bit that lines up with the drill guide to determine screw length. Verify fluoroscopically to assure the proper screw length selection and remove the calibrated drill and drill guide.

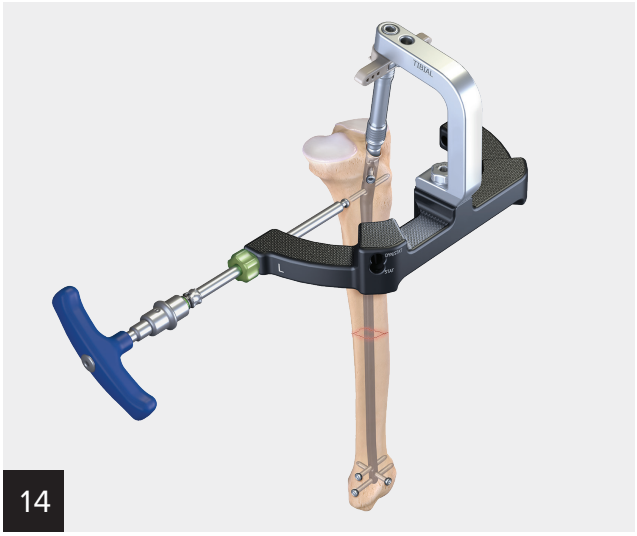


Alternatively, screw length may be determined using the proximal hook-tip depth gauge. Read the calibration line on the hook-tip depth gauge that lines up with the screw sheath.

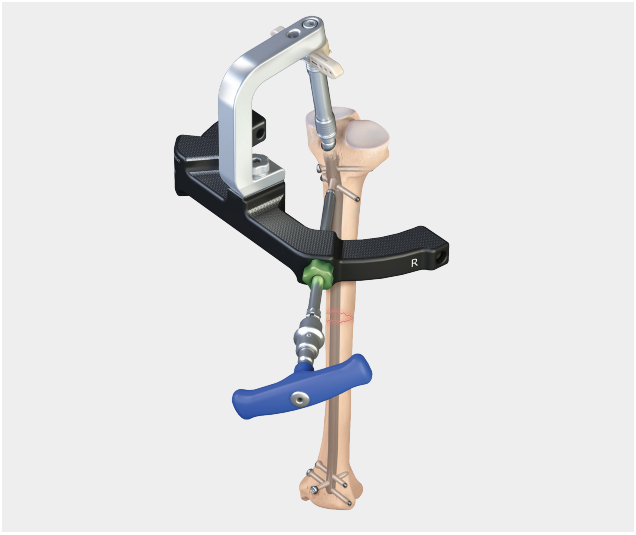
Using the **5.0 mm cannulated hex driver**, **screw capturing rod** and T-handle, attach the screw to the driver. The screw is captured by threading the capturing rod into the head of the screw.



Insert the 5.0 mm captured cortical screw through the sheath. The cannulated hex driver is etched with two laser lines. When these lines align with the end of the sheath, the screw head is seated against bone.



14



Once compression, if desired, is complete, additional proximal screws can be added where appropriate to maintain fixation and compression.

Note: To activate compression, use the dynamic screw hole first then insert the distal tibial screws to secure the distal fragment.

Distal Screw Technique

Distal locking includes two mediolateral holes and one threaded AP hole. Use the 5.0 mm captured cortical screw for tibial nails 9 mm to 11 mm in diameter.

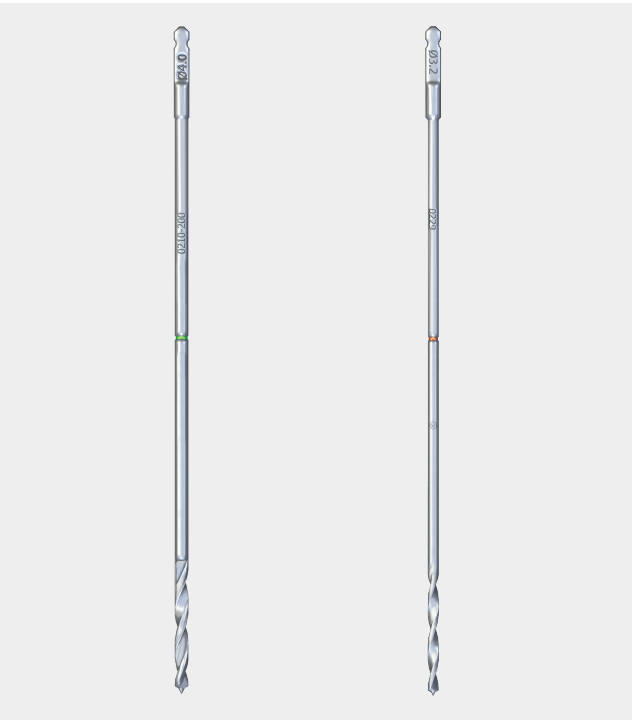
For the 8 mm tibial nail diameter, use the 4.2 mm captured cortical screw.

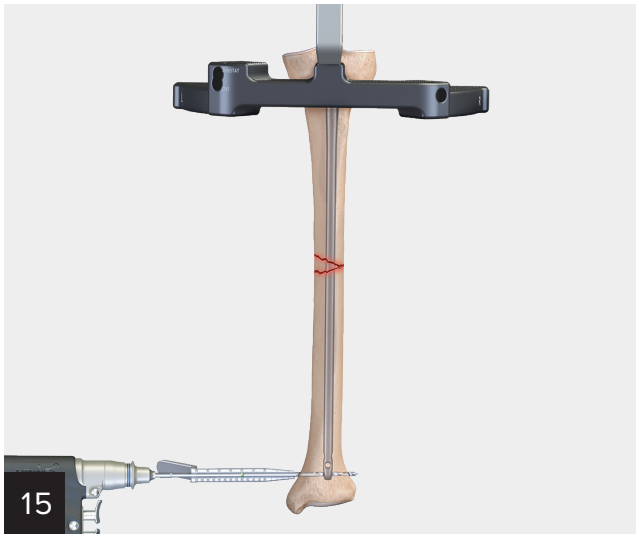
Distal locking is typically approached from the medial side. Use fluoroscopy to conduct distal locking with the standard free-hand technique.

Note: Accurate C-arm position is confirmed when the distal nail hole appears to be a perfect circle.

Once correct placement has been verified fluoroscopically, make a stab wound in direct alignment with the distal hole.

For 5.0 mm captured cortical screws, use the 4.0 mm drill with green color band. For 4.2 mm captured cortical screws, use the 3.2 mm drill with red color band.





Drill until the far cortex is penetrated. Verify the drill bit position fluoroscopically prior to taking any measurements. Place the distal depth gauge onto the drill bit and advance down to the bone. Read the colored calibration line on the drill bit that corresponds to the calibrations indicated on the distal depth gauge.

Remove the drill bit and advance the selected screw using the cannulated hex driver, screw-capturing rod, and T-handle used for the proximal screws.

Repeat the steps above for additional screw placement.

Tibial Nail System–Suprapatellar Approach Surgical Technique (cont.)

Once all desired screws have been inserted, remove the jig using the ball hex driver.

Optional End Cap Placement: Flush, 5 mm, and 10 mm end caps are provided in the system to prevent bony in-growth and add length when needed. The flush end cap may also be used for compression by pushing against the most proximal screw within the dynamic slot.

Note: End cap placement is made easier using the 5.0 mm cannulated hex driver, screw-capturing rod, and T-handle to capture the selected end cap during insertion.

Nail Removal

If the surgeon deems it appropriate to remove the nail, an easy-out extractor is used with the impactor rod to aid in nail extraction.

Locate the top of the nail through an appropriate incision. Remove the end cap using the 5.0 mm cannulated hex driver.

Make the appropriate incisions and remove all locking screws. Remove all overgrown bone around the nail's proximal aspect to avoid iatrogenic fracture during nail extraction. Once locking screws are removed, attach the easy-out extractor to the impactor rod and use the conical thread to engage the nail threads and cannula. Use the slotted mallet to remove the nail.

Note: Leaving in one locking screw prior to removal can help to securely fasten easy-out extractor to the nail.

Ordering Information

Tibial Nail System

Product Description	Item Number
Instruments	
T-handle, curved awl, silicone blue, cannulated	**0256-200**
Obturator, 3.6 mm	**0273-000**
Pin guide, entry tube, 3.2 mm	**0310-000**
Distal drill guide, locking assembly, 4.0 mm, qty. 2	**0315-100**
Pin guide, suprapatellar	**0346-100**
T-handle, cannulated, Hudson female/J-Hall connect	**0468-100**
Screw capturing rod, short	**0476-000**
Guidewire gripper	**0481-100**
Ball hex driver, cannulated	**0494-000**
Depth gauge, calibrated shaft, proximal hook tip	**0507-100**
Depth gauge, distal	**0514-200**
Guidewire depth gauge	**0520-100**
Depth gauge, hook tip, assembly, short	**0525-000**
Entry tube, 13 mm	**0612-100**
Anti-rotation and distal sheath, locking, qty. 2	**0621-100**
Obturator drill guide, 4 mm	**0622-000**
Soft tissue protector	**0634-100**
Sheath handle assembly, suprapatellar	**0641-000**
Impactor pad	**0837-000**
Reduction tool, tibial nail	**0838-000**
Insertion guide, low profile, tibial nail	**1235-100**
Insertion guide locking bolt, tibial nail, qty. 2	**1236-000**
Reduction bolt, insertion guide, tibial nail	**1237-000**
Targeting module, tibial nail	**1238-100**
Locking knob, insertion guide, tibial nail, qty. 2	**1239-100**
Locking collet, targeting module, tibial nail, qty. 3	**1242-100**

Product Description	Item Number
Tibial insertion guide, extended	**1255-300**
Locking bolt, tibial insertion guide, extended, qty. 2	**1256-100**
Reduction bolt, extended insertion guide, tibia nail	**1257-100**
Reamer shaft extension, large Hudson	**4012-100**
Tibial nail case assembly	**9974-000**
Tibial nail screw case assembly	**9975-000**
Tibial nail instrument case assembly	**9920-000**
Tibial nail case, 12 mm-13 mm	**9967-000**
Nails	
Tibial nail, 8 mm × 27 cm	**1108-270**
Tibial nail, 8 mm × 28.5 cm	**1108-285**
Tibial nail, 8 mm × 30 cm	**1108-300**
Tibial nail, 8 mm × 31.5 cm	**1108-315**
Tibial nail, 8 mm × 33 cm	**1108-330**
Tibial nail, 8 mm × 34.5 cm	**1108-345**
Tibial nail, 8 mm × 36 cm	**1108-360**
Tibial nail, 8 mm × 37.5 cm	**1108-375**
Tibial nail, 8 mm × 39 cm	**1108-390**
Tibial nail, 9 mm × 27 cm	**1109-270**
Tibial nail, 9 mm × 28.5 cm	**1109-285**
Tibial nail, 9 mm × 30 cm	**1109-300**
Tibial nail, 9 mm × 31.5 cm	**1109-315**
Tibial nail, 9 mm × 33 cm	**1109-330**
Tibial nail, 9 mm × 34.5 cm	**1109-345**
Tibial nail, 9 mm × 36 cm	**1109-360**
Tibial nail, 9 mm × 37.5 cm	**1109-375**
Tibial nail, 9 mm × 39 cm	**1109-390**

Product Description	Item Number
Nails (cont.)	
Tibial nail, 10 mm × 27 cm	**1110-270**
Tibial nail, 10 mm × 28.5 cm	**1110-285**
Tibial nail, 10 mm × 30 cm	**1110-300**
Tibial nail, 10 mm × 31.5 cm	**1110-315**
Tibial nail, 10 mm × 33 cm	**1110-330**
Tibial nail, 10 mm × 34.5 cm	**1110-345**
Tibial nail, 10 mm × 36 cm	**1110-360**
Tibial nail, 10 mm × 37.5 cm	**1110-375**
Tibial nail, 10 mm × 39 cm	**1110-390**
Tibial nail, 11 mm × 27 cm	**1111-270**
Tibial nail, 11 mm × 28.5 cm	**1111-285**
Tibial nail, 11 mm × 30 cm	**1111-300**
Tibial nail, 11 mm × 31.5 cm	**1111-315**
Tibial nail, 11 mm × 33 cm	**1111-330**
Tibial nail, 11 mm × 34.5 cm	**1111-345**
Tibial nail, 11 mm × 36 cm	**1111-360**
Tibial nail, 11 mm × 37.5 cm	**1111-375**
Tibial nail, 11 mm × 39 cm	**1111-390**
Tibial nail, 12 mm × 27 cm	**1112-270**
Tibial nail, 12 mm × 28.5 cm	**1112-285**
Tibial nail, 12 mm × 30 cm	**1112-300**
Tibial nail, 12 mm × 31.5 cm	**1112-315**
Tibial nail, 12 mm × 33 cm	**1112-330**
Tibial nail, 12 mm × 34.5 cm	**1112-345**
Tibial nail, 12 mm × 36 cm	**1112-360**
Tibial nail, 12 mm × 37.5 cm	**1112-375**
Tibial nail, 12 mm × 39 cm	**1112-390**
Tibial nail, 13 mm × 27 cm	**1113-270**
Tibial nail, 13 mm × 28.5 cm	**1113-285**

Product Description	Item Number
Tibial nail, 13 mm × 30 cm	**1113-300**
Tibial nail, 13 mm × 31.5 cm	**1113-315**
Tibial nail, 13 mm × 33 cm	**1113-330**
Tibial nail, 13 mm × 34.5 cm	**1113-345**
Tibial nail, 13 mm × 36 cm	**1113-360**
Tibial nail, 13 mm × 37.5 cm	**1113-375**
Tibial nail, 13 mm × 39 cm	**1113-390**
Screws	
Captured cortical screw, 5 mm × 24 mm-50 mm, (2 mm increments)	**8001-024-050**
Captured cortical screw, 5 mm × 55 mm-80 mm, (5 mm increments)	**8001-055-080**
Captured cortical screw, 4.2 mm × 25 mm-50 mm, (5 mm increments)	**8002-025-050**
End Caps and Accessories (Tibial Nail)	
End cap, 5 mm	**1115-050**
End cap, 10 mm	**1115-100**
End cap, compression	**1116-000**
Spacer, static locking	**1117-000**
Disposables	
Guidewire w/ trocar tip, 2 mm × 300 mm	**0102-300**
Entry reamer, tibial nail, cannulated, 12 mm	**0228-100**
Suprapatellar tibial entry sheath	**0642-000**
Guide Ppin, 3.2 mm × 330 mm, sterile	**S0100-000**
Drill, AO, 4 mm × 165 mm, sterile	**S0210-200**
Drill, calibrated, AO, 4 mm × 280 mm, sterile	**S0219-100**
Drill, AO, 3.2 mm × 165 mm, sterile	**S0229-000**
Guidewire, ball nose, sterile, 3 mm	**0101-900S**
Screwdriver, hex, cannulated, 5 mm	**0472-000**
Extractor, easy-out	**0812-100**

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Arthrex manufacturer, authorized representative, and importer information (Arthrex eIFUs)

US patent information

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