Auxein®

Surgical Technique

Suprapatellar Instrumentation for Expert Tibial Nail

www.auxein.com

about us

Auxein Medical is an integrated, research based, orthopaedic Implants & instruments manufacturing company, producing a wide range of quality, affordable generic implants, trusted by healthcare professionals and patients across geographies. It is the Company's constant endeavor to provide a wide basket of generic and our innovator products that exceed the highest expectations of customers in term of quality and safety. The company has world-class manufacturing unit established in india and serves customers in over 75 countries worldwide.

Our Achievements

Introduction

The Expert Tibial Nail enables the surgeon to further extend the spectrum of fractures eligible for intramedullary nailing. This nail is indicated for fractures of metaphyseal and certain intra articular fractures of tibial head and pilon tibial. Expert Tibia Nail enhances the stability of constructed bone-nail and reduces the risk for secondary misalignment. Multidirectional interlocking screws ensure that alignment can be well maintained and stability preserved in short proximal or distal tibial segments. The end cap achieves angular stability between the proximal oblique screw and nail.

Locking Options

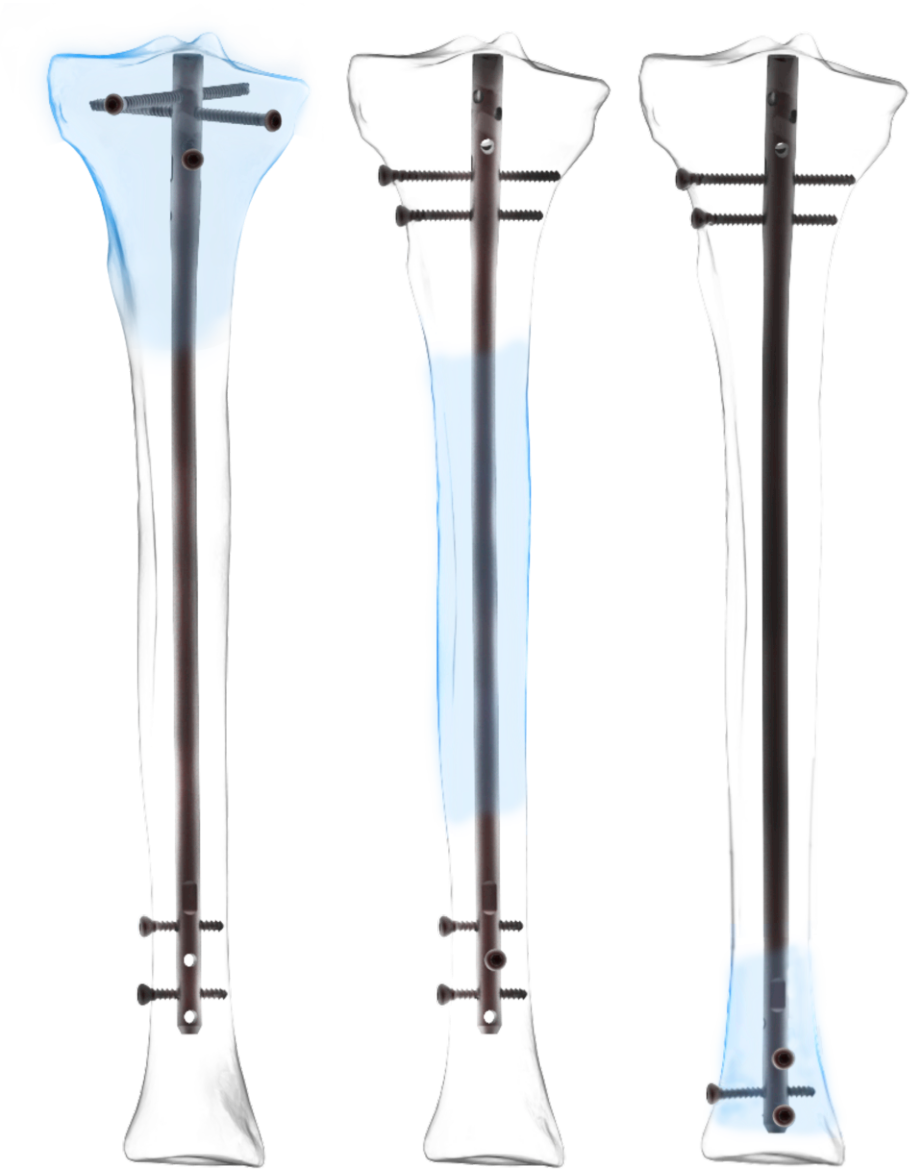
Proximal Segment Fractures For Proximal fractures, it is recommended to lock the nail with knee in extension. This neutralizes the deforming forces on proximal fragments caused by the quadriceps mechanism and relieves the pressure on soft tissue usually associated with tibial nail insertion instruments. This position also facilitates assessment of rotational alignment prior to locking.

It is recommended to lock distally first to allow intra-operative compression and reduction.

Indications

The Expert Tibia Nail is indicated for fractures in the tibial shaft as well as for metaphyseal and certain intra-articular fractures of the tibial head and the pilon tibial:

- 41-A2/A3 • All shaft fractures
- 43-A1/A2/A3
- Combinations of these fractures



Product Specifications

Expert Tibial Nail

Diameters:
Ø8mm, Ø9mm, Ø10mm, Ø11mm & Ø12mm

Length:
255mm - 375mm (With 15mm difference)

Available In:
Stainless Steel and Titanium

Color Coding *(only for Titanium)* :
Type-II For Expert Tibia Nail

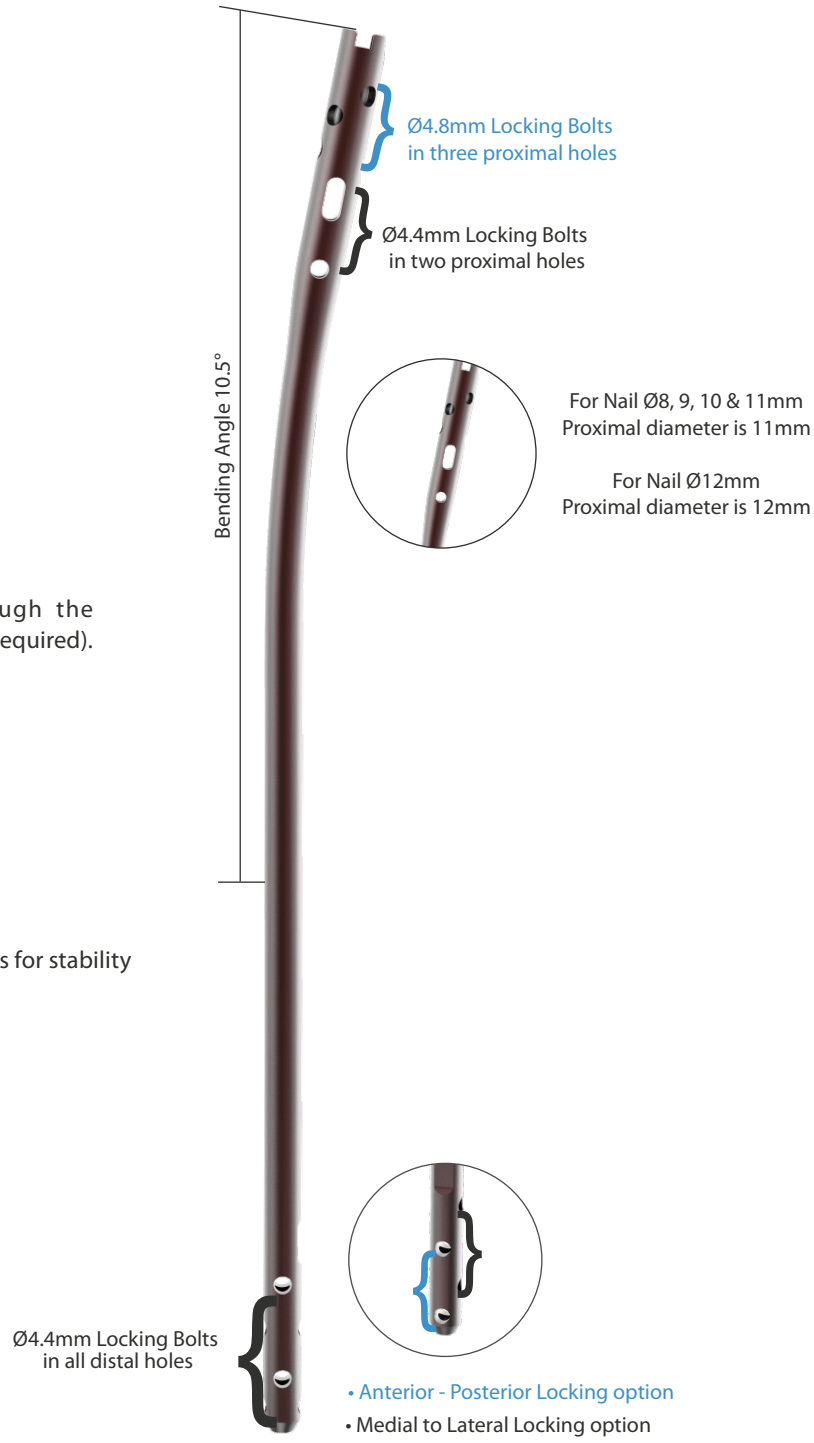
Cannulation:

All Expert Tibia Nails are cannulated which enables nail insertion over guide wire for reamed or unreamed techniques.

The ball tip guide wires may be removed through the nail and insertion handle assembly (no exchange tube required).

Advanced Nail Design:

- New Anatomic bend for ease of nail insertion.
- Two state of the art medio-lateral (ML) locking options enable primary compression or secondary controlled dynamization.
- Two ML and one anterior posterior (AP) locking options for stability of the distal fragment.



Important: Solid Nail for unreamed technique are also available on special request

End Cap For Expert Tibia Nail

Length:
0mm, 5mm, 10mm and 15mm

Available in:
Stainless Steel and Titanium

Color coding *(only for Titanium) :*
Type-II For End Cap

Features:
- End Cap prevents ingrowth of hard & soft tissue which facilitates nail extraction.
- 0 mm End Cap sits flush with nail.
- End Cap with different option of length can extend nail height if nail is over inserted.
- Securely lock the most proximal oblique locking screw to create a fixed-angle construct.
- Cannulated.

Ø4.8mm Locking Bolt, Self-Tapping, For Expert Tibia Nail

Length:
25mm - 90mm (With 5mm difference)

Available in:
Stainless Steel and Titanium

Color Coding *(only for Titanium) :*
Type-II For Ø4.8mm Locking Bolt

Ø4.4mm Locking Bolt, Self-Tapping, For Expert Tibia Nail

Length:
24mm - 88mm (With 2mm difference)

Available in:
Stainless Steel and Titanium

Color Coding *(only for Titanium) :*
Type-II For Ø4.4mm Locking Bolt

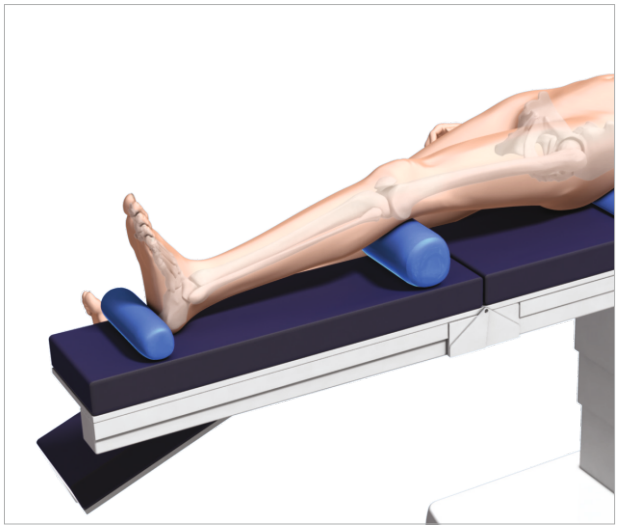
Features:
- Thread closer to screw head for better and improved stability
- Self Tapping
- Hex head
- Larger cross section for improved mechanical resistance.

Opening The Tibia

1. Position patient

Position the patient supine on the radiolucent table. Ensure that the knee of the injured leg can be flexed 10° – 20°. Position the image intensifier so that visualization of the tibia, including the articular surface proximally and distally, is possible in AP and lateral views.

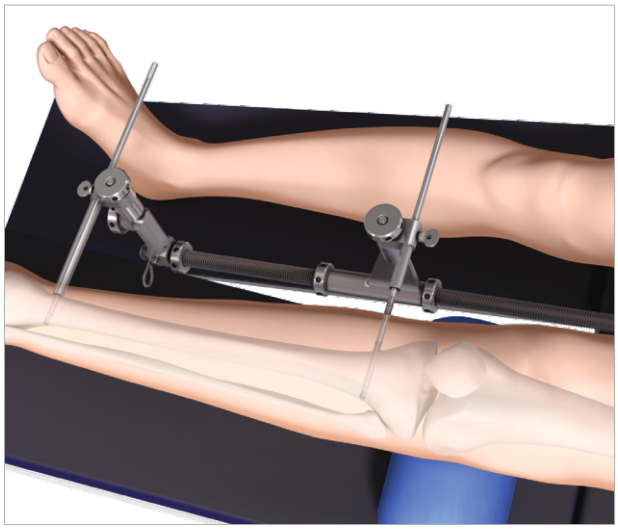
The knee roll can be placed under the lower part of the thigh if it obstructs the view of the tibial plateau in the AP view.



2. Reduce fracture

Perform closed reduction manually by axial traction under image intensifier. The use of the Large Distractor may be appropriate in certain circumstances where part of the thigh if it obstructs the view of the tibial plateau in the AP view.

Notes:
The reduction can be temporarily fixed with reduction clamps. In epiphyseal fractures, the condyles or the pilon are fixed first in order to enable the nail insertion.



3. Measuring Nail length and diameter:

The C-Arm is positioned in such a way to get AP view of the Distal Tibia. The Radiographic ruler **(7-112-24)** is held parallel to the Tibia bone. The ruler is adjusted until the distal end of ruler is aligned with the desired nail insertion depth.

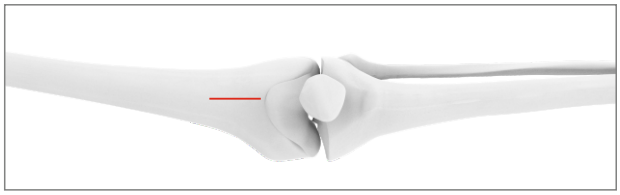
After finalizing the position of radiographic ruler, the C-Arm is moved to the Proximal Tibia to take an image in AP view. The length of the nail is determined from reading on the ruler pointing in level or just below the tibial plateau.

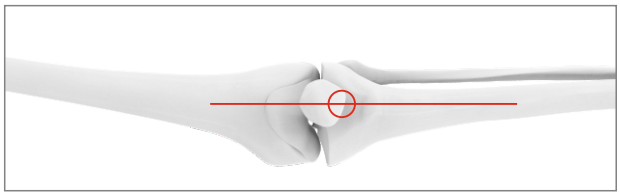
Under C-Arm, the diameter gauge part of the radiographic ruler is placed over the narrowest part of the Tibia medullary canal in either AP or lateral view. The reading on the diameter gauge coinciding with the canal width is chosen.

Note: All the readings are to be taken only after the compression of the bone has been achieved. As an alternative, these readings can be measured from the uninjured Tibia bone.

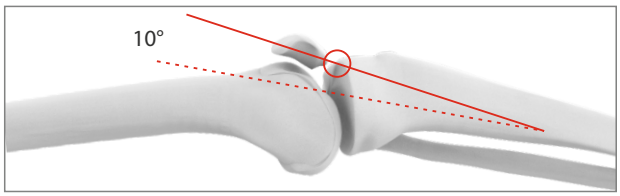
4. Entry Point

With the knee in full extension, make a 2–4 cm longitudinal skin incision 4 cm proximal to the superior pole of the patella. The deep incision, also longitudinal, splits the quadriceps tendon in its midsubstance, just above its insertion into the patella and enters the knee joint through the suprapatellar pouch. Blunt dissection can be used to loosen the patella in the suprapatellar pouch, allowing the patella to lift off. Displace the patella anteriorly.





The entry point defines the optimal position of the Expert Tibial Nail in the intramedullary canal. This is more
important for proximal and distal third fractures to prevent fragment displacement.

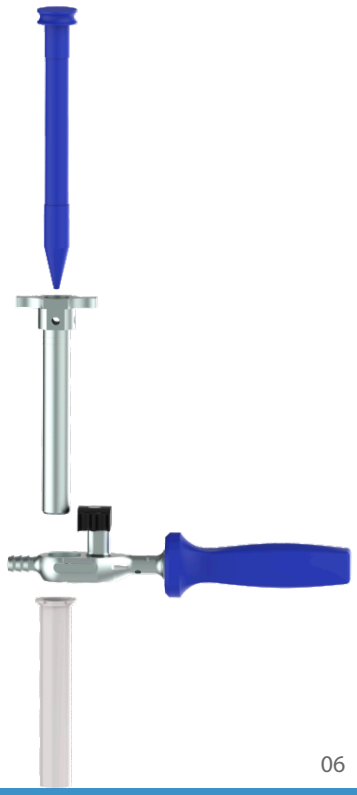


In anterior - posterior (AP) view the entry point is in line with the axis of the intra-medullary canal and with the lateral tubercle of the inter-condylar eminence.

In lateral view the entry point is at the ventral edge of the tibial plateau.

5. Insert protection sleeves

7-112-02	Protection Sleeve Handle for Expert Tibia Nail - Suprapatellar Insertion
7-112-03	Outer Protection Sleeve for Expert Tibia Nail - Suprapatellar Insertion
7-112-04	Protection Sleeve 16/14.5mm for Expert Tibia Nail - Suprapatellar Insertion
7-112-05	Trocar Ø14.5mm, PEEK, for Expert Tibia Nail - Suprapatellar Insertion

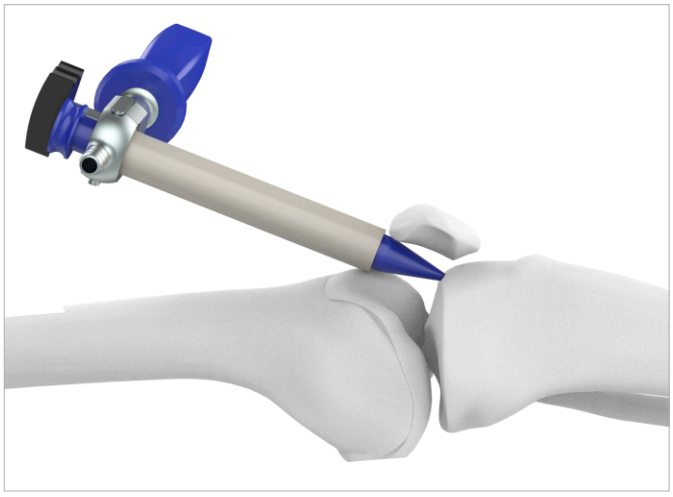


5. Insert protection sleeves

Assemble the handle, inner protection sleeve, outer protection sleeve, and trocar. Rotate the knob to lock the assembly into the handle during insertion.

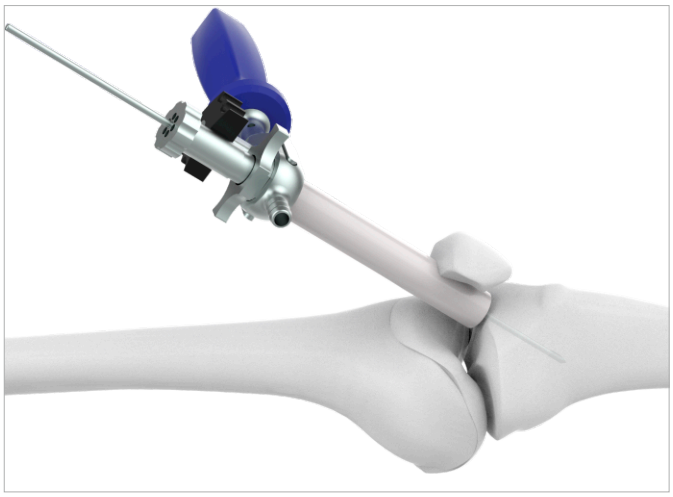
Insert the handle assembly through the incision into the knee joint, so that it glides between the articular surface of the patella and the trochlea of the distal femur and rests securely in this groove, while the patella is displaced anteriorly above the cannula. When the trocar reaches the surface of the tibia, rotate the knob on the handle to allow the trocar to slide out, as the cannula is advanced to the anterior surface of the proximal tibia. Remove the trocar.

Precaution: The knee must remain in extension once the handle assembly has been inserted.



6. Insert guide wire

After removal of the trocar, insert the centering sleeve **(7-112 06)** through the inner protection sleeve.
Advance to the anterior surface of the tibia.
Slight adjustment of the knee flexion (between 10° and 20°) will provide the ideal radiographic location for the starting point and insertion of a guide wire.
Insert the guide wire approximately 8cm – 10cm and check the position under imaging in the AP and lateral views.
Adjustments to the guide wire **(520-013)** location can be "dialed-in" by rotating the centering sleeve to place a second guide wire while the first guide wire remains in place.
After correct placement of the second guide wire, remove the initial guide wire and centering sleeve.



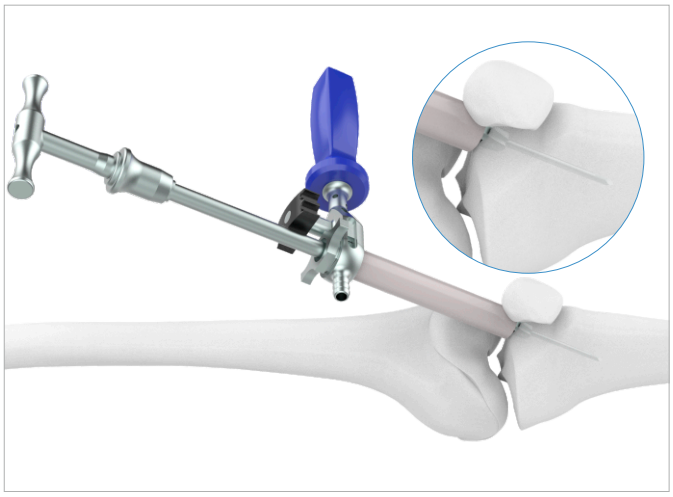
7. Anchor handle for protection sleeves

Use a 3.2 mm guide wire to anchor the handle assembly to the femoral condyles and maintain the position of the handle assembly during the procedure. This anchor prevents the cannula from backing out and off of the tibia.

8. Open medullary canal

Place the drill bit **(520-004)** Guide Wire With Threaded Tip Ø3.2mm x Thread Length 10mm x Length 300mmover the guide wire, through the inner protection sleeve, and down to the bone. Drill to a depth of approximately 8 –10 cm. The guide wire and drill bit should not reach the posterior cortex. Remove the drill bit and guide wire.

Precaution: Dispose of the guide wire. Do not reuse.



Reaming (optional)

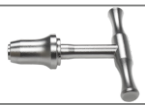
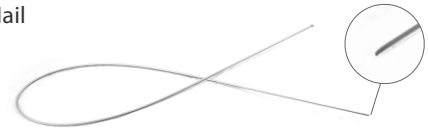
Precaution: Do not ream without the inner protection sleeve in place to protect the outer protection sleeve.

Inserting the reaming rod
Insert the 2.5 mm reaming rod with ball tip and extension into the medullary canal to the desired insertion depth.

Ream
Starting with the 8.5 mm diameter reaming head, ream to a diameter of 0.50 mm – 1.0 mm greater than the nail diameter. Ream in 0.5 mm increments and advance the reamer with steady, moderate pressure. Do not force the reamer. Partially retract the reamer often to clear debris from the medullary canal.

The reamer can catch on the edge of the inner protection sleeve because of the sharp angle entering the tibia (1). Stop reamer rotation and lift up on the drill to center the reamer shaft in the sleeve (2). Move the reamer in and out until the reamer comes out.

Instruments:

7-112-02	Protection Sleeve Handle for Expert Tibia Nail - Suprapatellar Insertion	
7-112-03	Outer Protection Sleeve for Expert Tibia Nail - Suprapatellar Insertion	
7-112-04	Protection Sleeve 16/14.5mm for Expert Tibia Nail - Suprapatellar Insertion	
7-112-26	Quick Coupling T Handle for Expert Tibia Nail - Suprapatellar Insertion	
7-112-30	Flexible Reamer Shaft (Jacob Connection) for Expert Tibia Nail - Suprapatellar Insertion	
7-112-40	Reamer Head	
520-058	Guide wire without Ball Tip Ø2.5mm x Length 1000mm - Nitinol, for Expert Tibia Nail	

Inserting the Nail

1. Assemble insertion instruments

Orient the insertion handle anteriorly, and match the tang on the handle to the notch in the nail.

Place the connecting screw into the insertion handle and thread it into the proximal nail end, using the rod pusher for reaming rod.

Verify the nail is oriented properly on the insertion handle; secure the assembly with the screwdriver

Alternatively. secure the assembly using the screwdriver.

Remove the inner protection sleeve from the handle for protection sleeves.

When removing the inner protection sleeve, lift or rotate handle to gain access to the lower lever lock. Depress both upper and lower lever locks and slide the inner protection sleeve out.

7-112-01	Insertion Handle for Expert Tibia Nail - Suprapatellar Insertion	
7-112-19	Nail Holding Bolt, Long, for Expert Tibia Nail - Suprapatellar Insertion	
7-112-46	Allen Key, Hex 5mm for Expert Tibia Nail (Suprapatellar Insertion)	

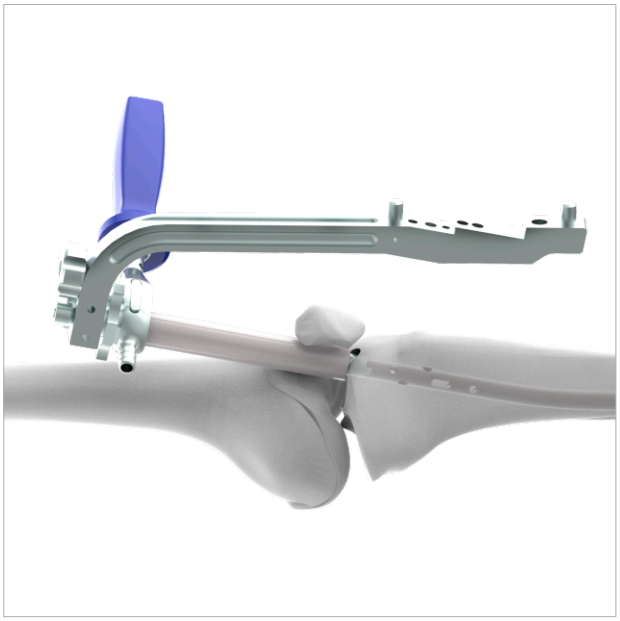
2. Insert nail

Ensure inner protection sleeve is removed.

Insert the nail into the intramedullary canal. Use a twisting motion to advance the nail.

- Monitor the nail passage across the fracture; control in two planes to avoid malalignment
- Insert the nail until it is at or below the tibial opening. Check final nail position in AP and lateral views.

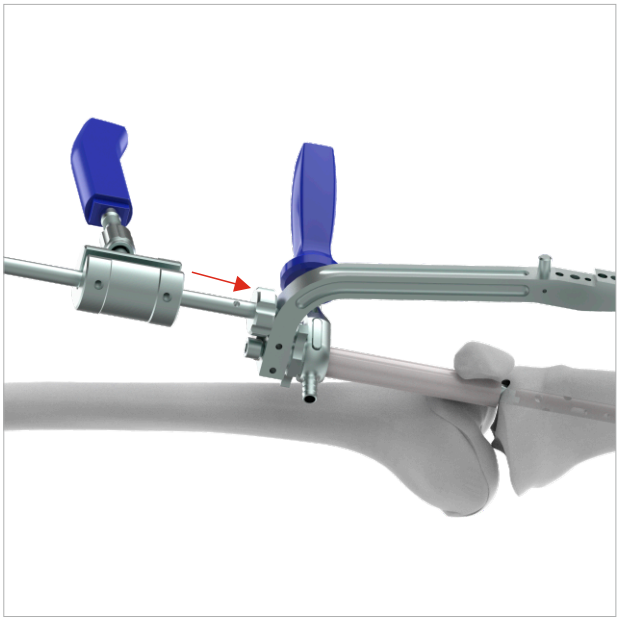
Note:
For proximal locking, mount the aiming arm only when the tibial nail has been completely inserted, otherwise the aiming arm may loosen during nail insertion.



Optional instruments

If needed, use light, controlled Sliding Hammer for Expert Tibia Nail - Suprapatellar Insertion **(7-112-21)** blows to seat the nail. Thread the Hammer Guide Shaft for Expert Tibia Nail - Suprapatellar Insertion **(7-112-22)** into the insertion handle along with the Nut for Hammer Guide Shaft **(7-112-23)** and secure it, using the 11 mm combination wrench. Lock the head of the hammer in place by tightening the nut onto the threads located below the hammer head, using the 4.5 mm pin wrench. Strike the connector directly.

Optionally, the hammer guide can be threaded into the connector and the hammer can be used as a slide hammer. The hammer guide helps to assure the driving cap is struck optimally. Loosen the nut from the threads located below the hammer head and secure onto the threads located above the handle.



3. Check proximal nail position

Attach the aiming arm and insert a 3.2 mm guide wire through the hole as shown in the illustration.

The tip of the guide wire indicates the exact proximal position of the tibial nail.

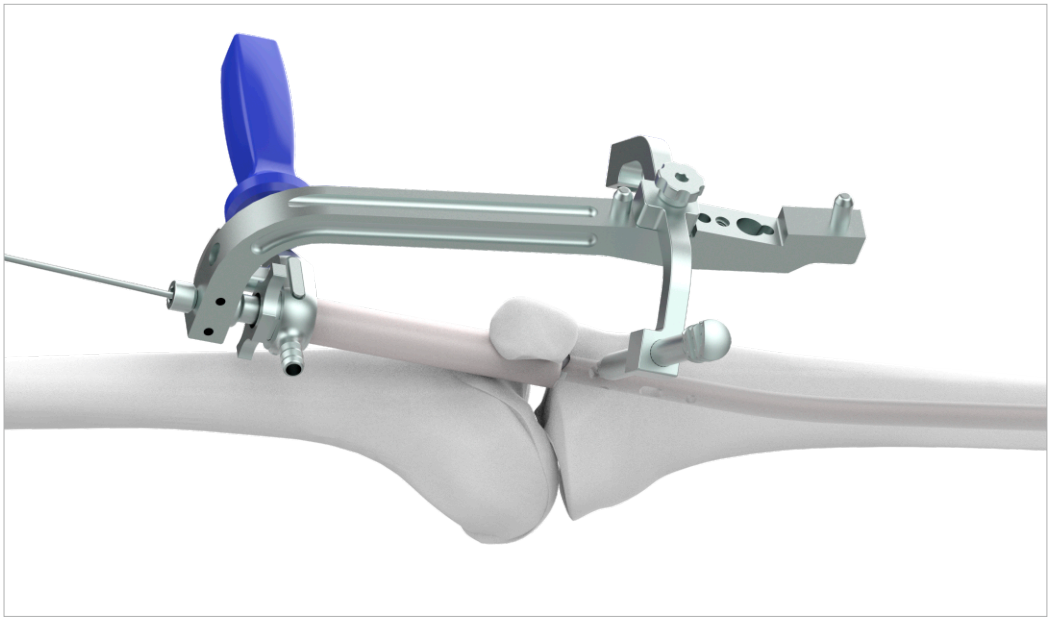
Remove the driving cap.

Remove the aiming arm, unless proximal locking is the next step.

- Check proximal nail position under image intensifier control in the lateral view.

Note:
The distance between the markings on the insertion handle is 5 mm and corresponds to the extensions of the end caps. This feature can be used for overinsertion of the nail or for correcting the nail location within the medullary canal.

If primary compression or secondary dynamization is planned, it is recommended to overinsert the nail by more than 7 mm, which corresponds to the maximum distance between the positions in static and dynamic modes.



4. Check distal nail position

Check final nail position under image intensifier control in AP and lateral views.

Remove the reaming rod.

Distal Locking

1. Determine instrumentation

Use the appropriate locking screws and drill bit for the nail diameter selected.

Locking of the tibial nail is usually performed from the medial side. The knee must be in extension during nail locking. This position helps counteract the forces exerted by the quadriceps muscle that would tend to deform the proximal fragment and also facilitates rotational control of the tibial axis before locking.

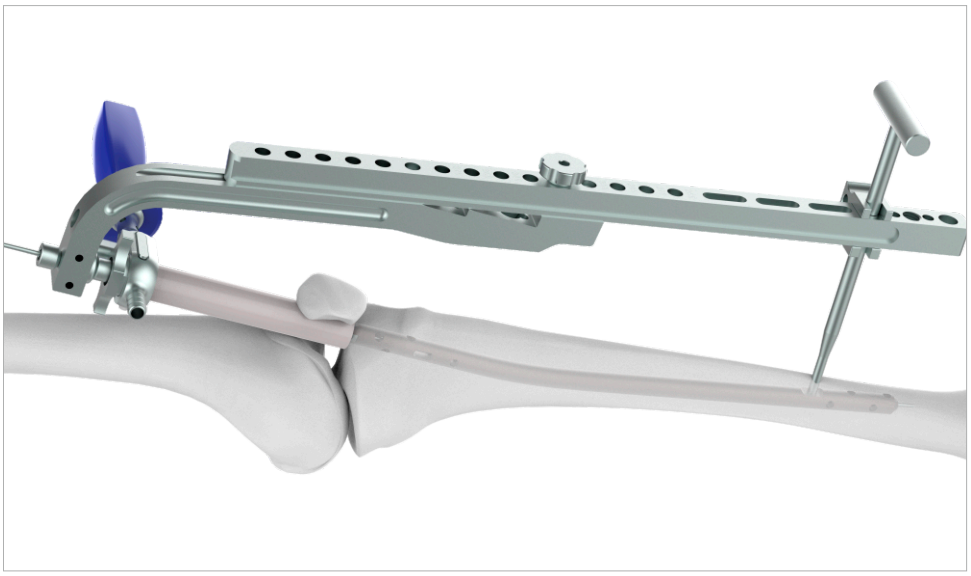
2. Align image

- Check the reduction, correct alignment of the fragments, and leg length before locking the nail.

- Align the C-arm with the hole in the nail closest to the fracture until a perfect circle is visible in the center of the screen. (Distal ML hole shown in illustration).

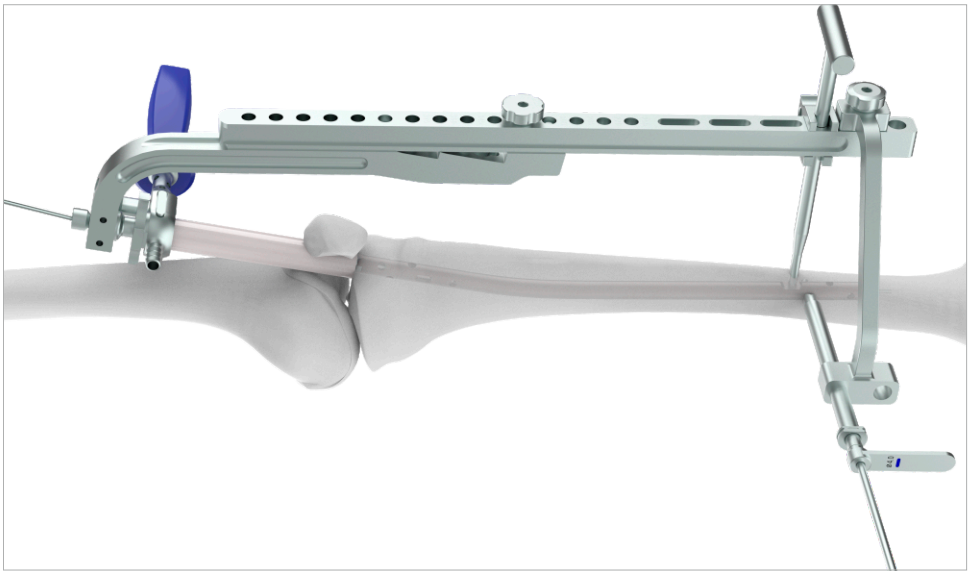
3. Determine incision point

Mount the Distal Aiming Device **(7-112-43)** over the insertion handle and secure it with Bolt for Distal Targeting Device **(7-112-13)**. Place a guide wire on the skin over the centre of the hole to mark the incision point and make a stab incision. Position the nail with the help of Positioning rod **(7-112-10)** . Mount and secure the Stabilizing device **(7-112-11)** over the Distal targeting arm to secure and lock the nail in-position.



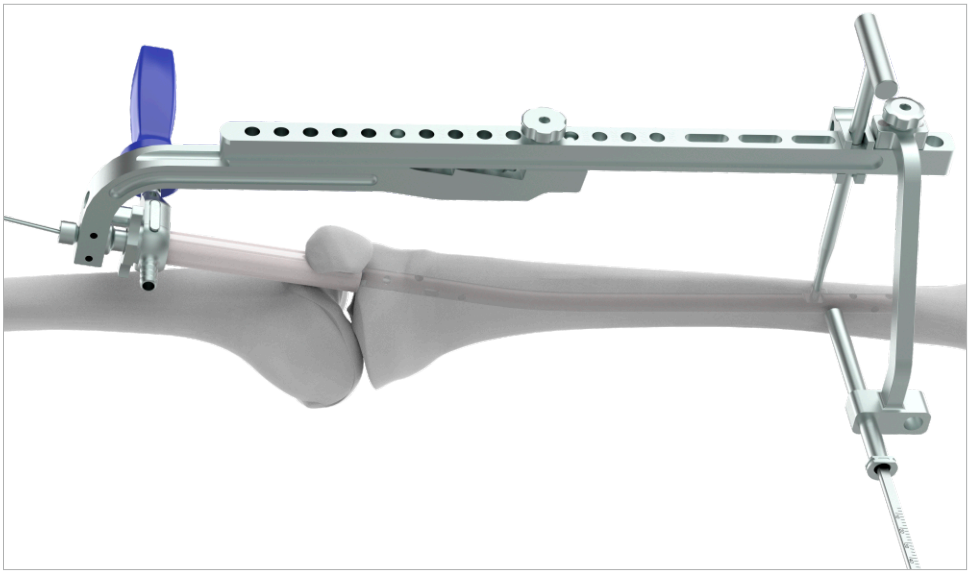
4. Drill

- Using the radiolucent drive under image intensifier. Mount the distal aming arm **(7-112-12)** over the mounted distal aiming device **(7-112-43)** and secure it with bolt for distal aiming device **(7-112-45)**.
- In place the protection sleeve **(7-112-49)** into the guide of the distal aming arm (7-112-12). Insert the drill sleeve **(7-112-51)** and drill bit **(7-112-52)** into the protection sleeve and drill drill through both cortices. The drill bit should almost completely fill the circle of the locking hole.



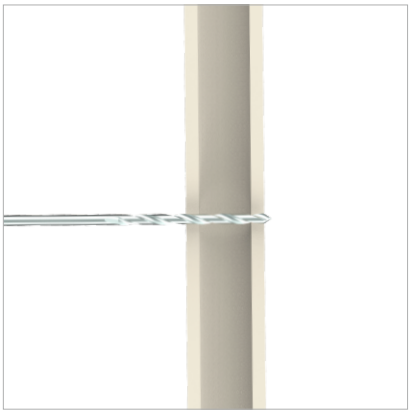
5. Determine locking screw length

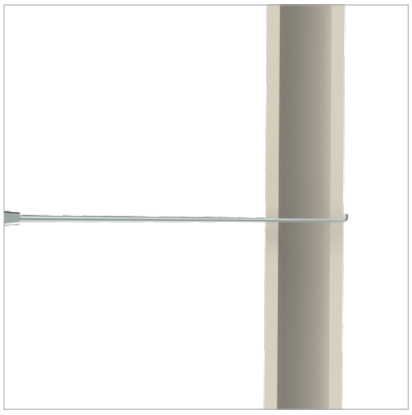
Stop drilling immediately after both cortices and disassemble the drill bit from the radiolucent drive.
Under image intensifier control, ensure the correct position of the drill bit beyond the far cortex.
Place the Depth Gauge measuring **(7-112-55)** onto the drill bit. Read the graduation of the measuring device at the end of the drill bit. This corresponds to the appropriate locking screw length.

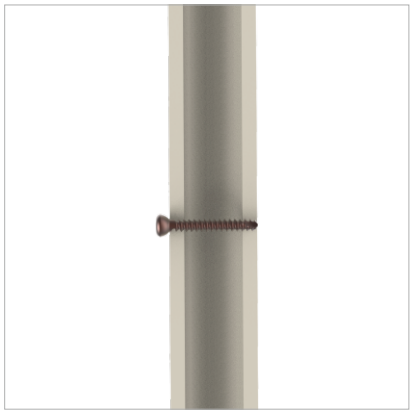


Measure the locking screw length using the depth gauge for locking screws. Ensure the outer sleeve is in contact with the bone and the hook grasps the far cortex.

Read the locking screw length directly from the depth gauge at the back of the outer sleeve.





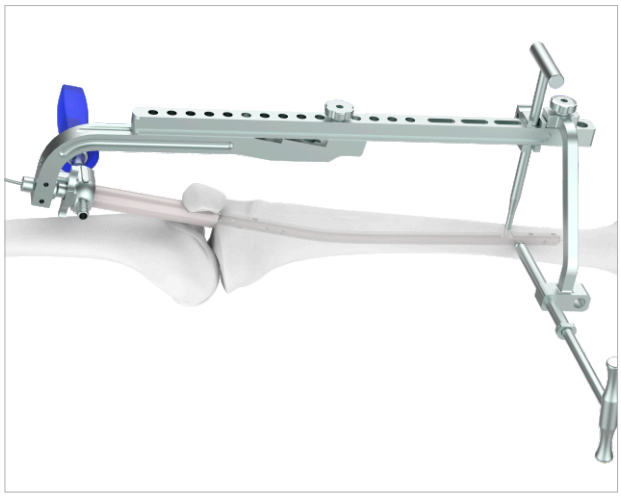


Insert Locking Screw

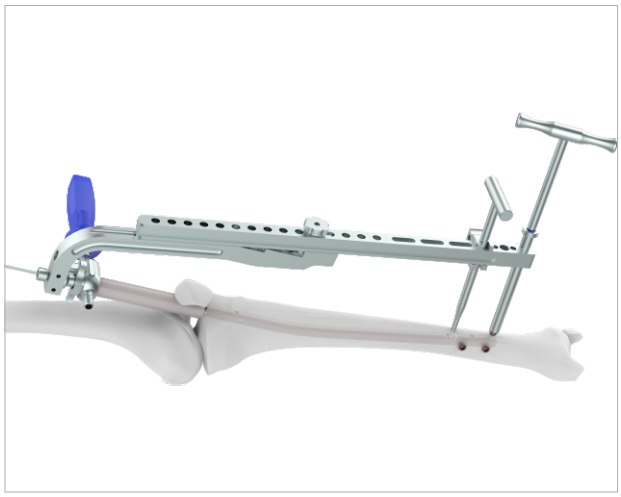
Insert the appropriate length locking screw using the Screwdriver with T-Handle **(7-112-56)** Screwdriver and the holding sleeve with locking device, if needed.

Verify locking screw length under image intensifier control. If needed, a second locking screw may be inserted using the same technique.

Note:
If compression is desired, the backstroke technique with the hammer guide attached to the connector and insertion handle, light reverse hammer blows may be used to compress the fracture; monitor reduction radiographically. If the nail is overinserted, secure the hammer guide to the driving cap and use the slide hammer. Do not strike directly on the bottom of the insertion handle as this will damage the handle. If using the backstroke technique, distal locking must be performed prior to proximal locking to prevent loss of reduction. Verify the nail has been inserted to the appropriate depth. can be used after insertion of the second distal locking screw. Alternatively, the compression device can be used (refer to section Insert compression device).



ANTERIOR - POSTERIOR DISTAL LOCKING



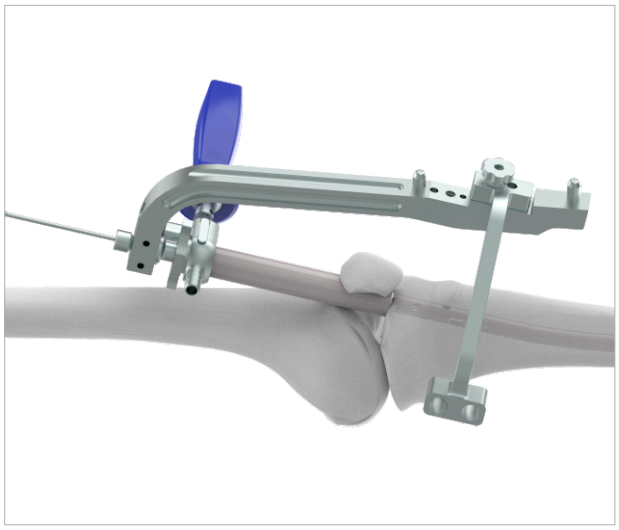
Repeat & follow the steps like drilling, measuring depth as followed in medial to lateral distal locking.

Proximal Locking – Diaphyseal and Distal Segment Fractures

1. Mount aiming arm

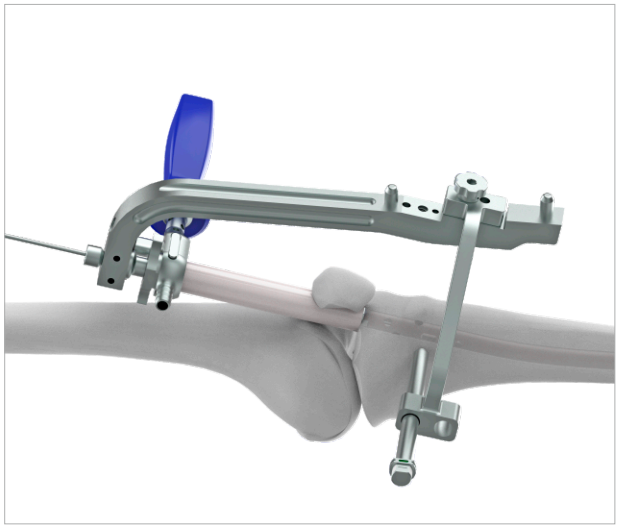
Confirm that the nail is securely connected to the insertion handle Mount the Proximal Aiming Device **(7-112-07)** for Ø4.4mm Locking Bolt & secure with Bolt for Proximal Aiming Device **(7-112-08)** to the insertion handle.

Note: Do not exert forces on the aiming arm, protection sleeve, drill sleeves and drill bits. These forces may prevent accurate targeting through the proximal locking holes and damage the drill bits.



2. Insert trocar assembly

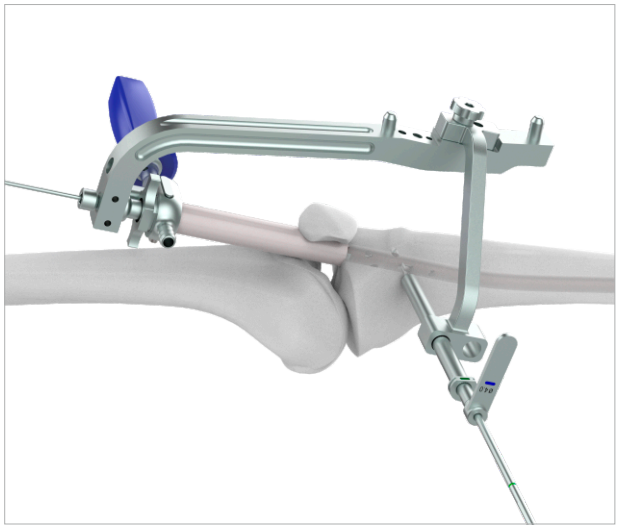
Insert the three-part trocar assembly Protection Drill Sleeve 10/8mm **(7-112-49)**, corresponding drill sleeve and Trocar Ø8mm **(7-112-50)** through the desired ML hole in the aiming arm, make a stab incision and insert the trocar to the bone. Remove the trocar.



3. Drill and determine locking screw length

Ensure that the Drill Sleeve 8/4mm for Ø4mm Drill Bit **(7-112-51)** is pressed firmly to the near cortex. Using the corresponding Drill Bit Plain Shank/Jacob Chuck End **(7-112-52)**, drill through both cortices until the tip of the drill bit penetrates the far cortex.

Confirm drill bit position.

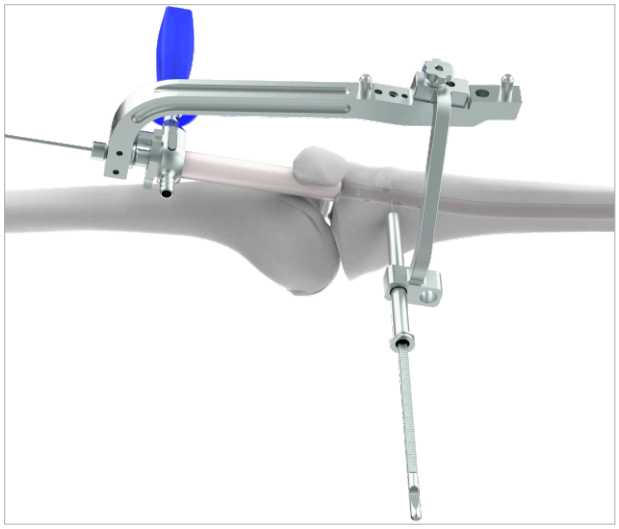


Ensure that the drill sleeve is pressed firmly to the near cortex and read the measurement from the calibrated drill bit at the back of the drill sleeve. This measurement corresponds to the appropriate length locking screw. Remove the drill bit and the drill sleeve.

After drilling both cortices, remove the drill bit and the drill sleeve.

Insert the Depth Gauge measuring upto 90mm **(520-041)** into the protection sleeve. Make sure that the hook grasps the far cortex and that the protection sleeve is on the bone.

Read the measurement from the back of the protection sleeve, which indicates the appropriate length locking screw.

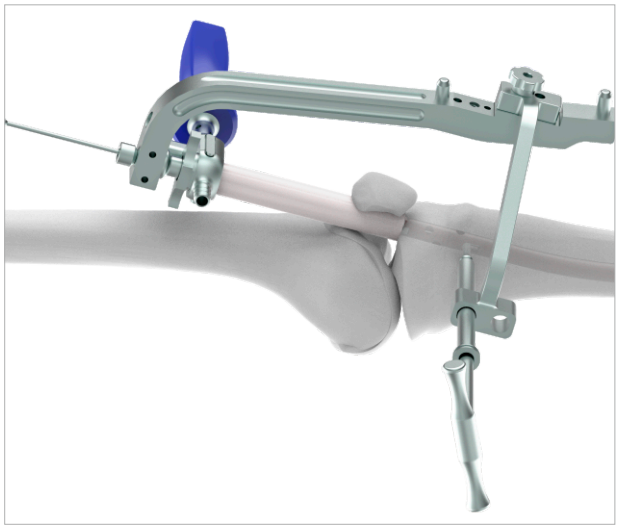


4. Insert locking screw

Insert the appropriate length locking screw through the protection sleeve using the Screwdriver with T-Handle, Hex 3.5mm **(7-112-56)** screwdriver. Verify locking screw length under image intensifier control. The tip of the locking screw should not project more than 1–2 mm beyond the far cortex.

Repeat the steps 3 to 5 for the second proximal ML locking screw.

Note: Additional cancellous bone locking screw can be added for proximal fractures and highly unstable fractures.



Proximal Locking – Compression Locking Mode (Optional)

1. Compression locking mode

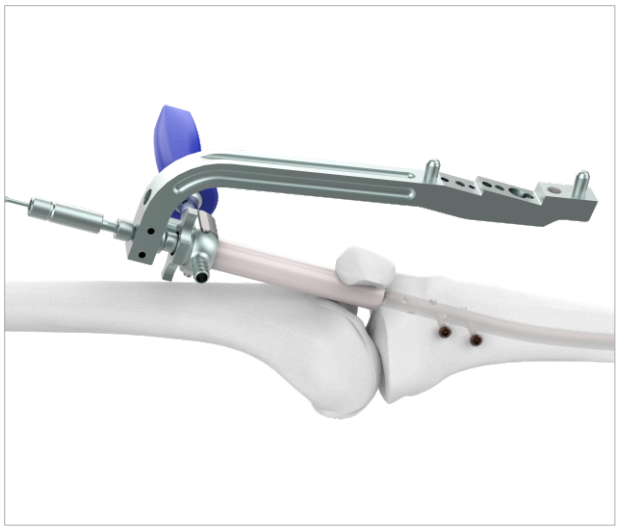
If the fracture gap needs compression after nail insertion, it can be accomplished without removing the insertion instruments.

The Expert Tibial Nail allows a maximum compression of 7 mm. If more compression of the fracture gap is needed, the conventional backstroke technique.

Distal locking is required prior to compression locking

Insert one proximal locking screw in the dynamic locking hole (DYNAM). For details on inserting this locking screw, refer to section Diaphyseal and Distal Segment Fractures.

2. Insert compression device



If the fracture gap needs compression after nail insertion, it can be accomplished without removing the insertion instruments.

The Expert Tibial Nail allows a maximum compression of 7 mm. If more compression of the fracture gap is needed, the conventional backstroke technique.

Note:
Backstroke technique: with the hammer guide attached to the connector and insertion handle, light reverse hammer blows may be used to compress the fracture; monitor reduction radiographically. If the nail is overinserted, secure the hammer guide to the driving cap and use the slide hammer. Do not strike directly on the bottom of the insertion handle as this will damage the handle. If using the backstroke technique, distal locking must be performed prior to proximal locking to prevent loss of reduction. Verify the nail has been inserted to the appropriate depth.

Distal locking is required prior to compression locking.

Insert the compression device **(7-112-16)** into the nail through the insertion handle and compress the screw from top to bottom in the nail slot.
Insert one proximal locking screw in the dynamic locking hole (DYNAM). For details on inserting this locking screw, refer to section Diaphyseal and Distal Segment Fractures.

3. Monitor fracture

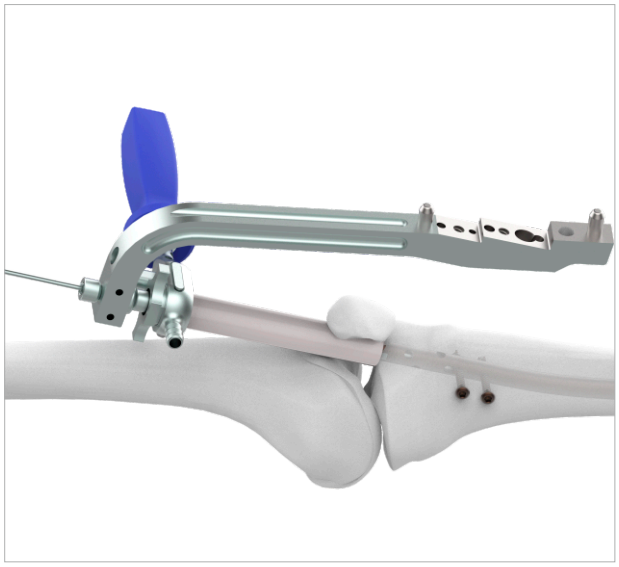
Control the fracture gap before, during, and after the compression procedure.

4. Insert static locking screw

Insert second proximal locking screw in the most distal hole of the proximal locking options (Static 1). Refer to section Diaphyseal and Distal Segment Fractures

Remove the compression device.

Additional oblique cancellous bone locking screw can be inserted if required. Refer to section Proximal Segment Fractures.



Proximal Locking – Proximal Segment Fractures

1. Oblique proximal locking

Proximal locking is performed with the knee in extension when using the suprapatellar technique. This neutralizes the deforming forces on proximal fragments caused by the quadriceps mechanism and relieves the pressure on the soft tissue usually associated with tibial nail insertion instruments. This position also facilitates assessment of rotational alignment prior to locking.

Note: When locking with the leg in full extension, it is recommended to use the insertion handle for Expert Tibial Nail and cannulated connecting screw to prevent impingement on the patella. These devices are not compatible with the compression device.

The aiming arm can target all three proximal oblique locking options:

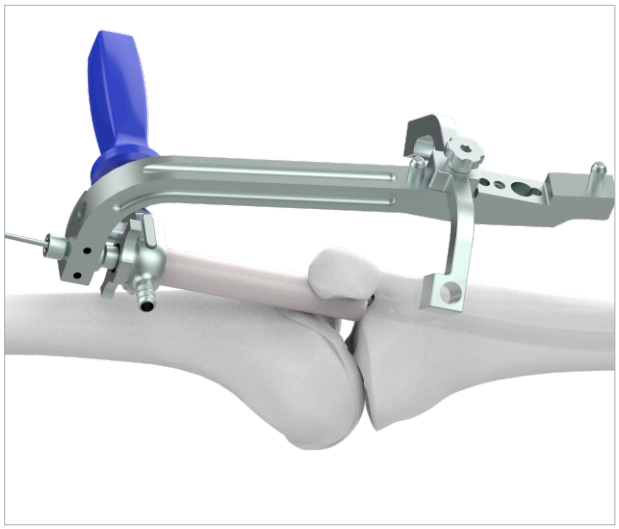
1 The oblique locking option (PROXIMAL OBLIQUE) corresponds to the most proximal locking position. Inserting a tibial nail end cap with this locking screw will create a fixed-angle construct.

2 The oblique locking option (DISTAL OBLIQUE) corresponds to the second proximal locking position.

3 The oblique locking option in anteroposterior direction (A/P) corresponds to the third proximal locking position.

2. Mount aiming arm

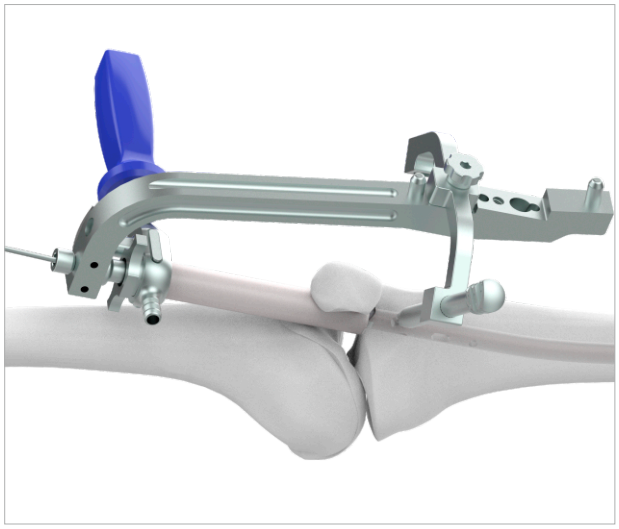
Confirm that the nail is securely connected to the insertion handle using the screwdriver. Mount the Proximal Aiming Device for Ø4.8mm Locking Bolt **(7-112-09)** to the insertion handle & secure it with the Bolt for Proximal Aiming Device **(7-112-08)** as shown in the illustration.



Note: Do not exert forces on the aiming arm, protection sleeve, drill sleeves and drill bits. These forces may prevent accurate targeting through the proximal locking holes and damage the drill bits.

3. Insert trocar assembly

Insert the three-part trocar assembly (Protection Sleeve 11/8.6mm **(7-112-57)**, Drill Sleeve 8.5/3.2mm for Ø3.2mm **(7-112-58)**, Trocar Ø3.2mm **(7-112-59)** through the desired hole for oblique locking options in the aiming arm, make a stab incision and insert the trocar to the bone. Remove the trocar.

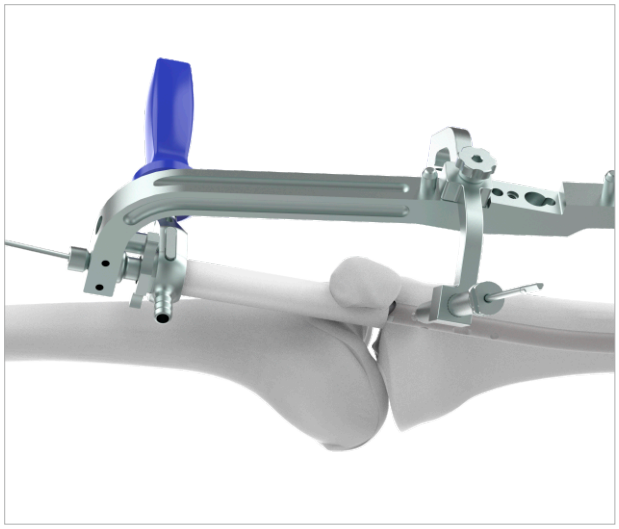


4. Drill and determine dual core locking screw length

Ensure that the drill sleeve is pressed firmly to the near cortex.

Insert the calibrated Drill Bit Plain Shank/Jacob Chuck End Ø3.2mm **(7-112-60)** and start drilling the near cortex.

Precaution: Stop drilling immediately after penetrating the near cortex.
DO NOT penetrate the far cortex.



Monitor the position of the drill bit with the image intensifier. This can be done by orienting the image intensifier perpendicular to the drill bit.

Drill to the desired depth. A long dual core locking screw will achieve better bone purchase than a shorter dual core locking screw.

Precaution: Do not perforate the far cortex with the drill bit. Do not damage the tibial plateau.

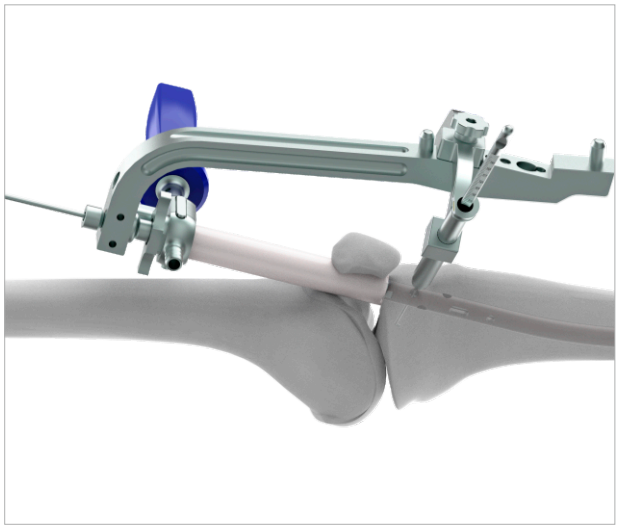
- Confirm drill bit position after drilling.

Ensure that the drill sleeve is pressed firmly to the bone and read the measurement from the Depth Gauge measuring **(520-041)** at the back of the drill sleeve.

This measurement indicates the appropriate length of the dual core locking screw.

Remove the drill bit and the drill sleeve.

Precaution: To avoid perforation of the far cortex with the dual core locking screw, a dual core locking screw 5 mm shorter than the measured length is recommended.



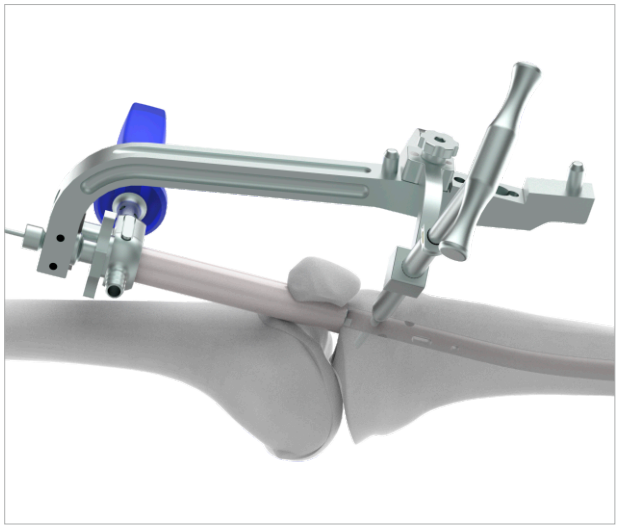
5. Insert cancellous bone locking screw

Insert the appropriate 4.8 mm dual core locking screw through the protection sleeve, using the Screwdriver with T-Handle, Hex 3.5mm **(7-112-56)** .

Do not overtighten.

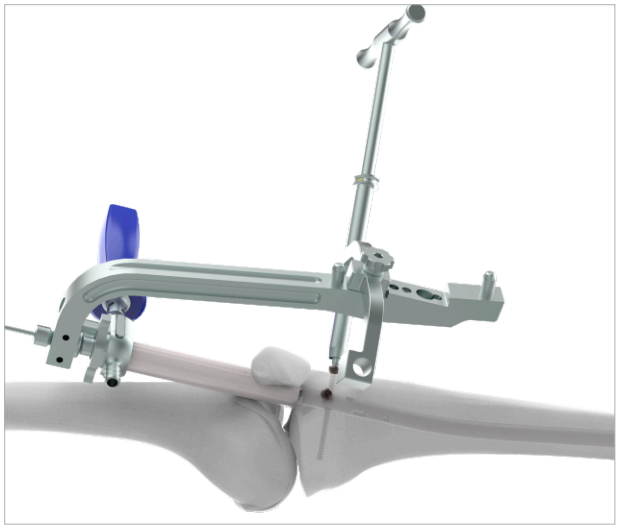
- Verify locking screw length under image intensifier control.

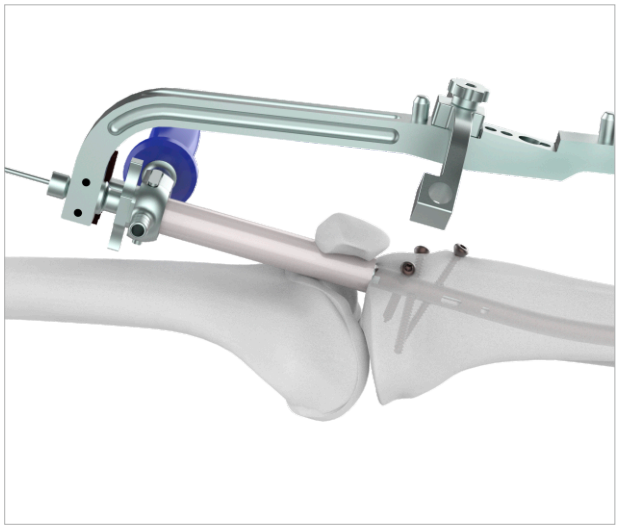
Repeat this procedure for the second dual core locking screw.



If required, repeat the steps described above for the third proximal dual core locking screw in the AP direction.

The position of the dual core locking screw should be controlled with the image intensifier to ensure a correct position of the AP dual core locking screw.





End Cap Insertion

End Cap insertion: In order to prevent tissue growth inside the nail, end cap insertion is required. The insertion handle is detached from the nail and using the Screwdriver with T-Handle, Hex 3.5mm **(7-112-56)** , advance the end cap into the nail.

All titanium end caps for Expert Tibial Nails are available in extension lengths of 0 mm, 5 mm, 10 mm, and 15 mm. They prevent bone ingrowth into the nail and they extend the nail height if it is overinserted. The gold end caps lock the proximal oblique screw providing a stable fixed-angle construct.

Remove the connecting screw. The insertion handle can remain in place to help align the end cap to the top of the nail.
The end cap fits through the barrel of the insertion handle.

Alternatively, remove the connecting screw and insertion handle. Reinsert the inner protection sleeve to open the cannula through the outer protection sleeve.

Alternative instruments

The end caps are cannulated and can be used over a guide wire with the cannulated screwdriver.

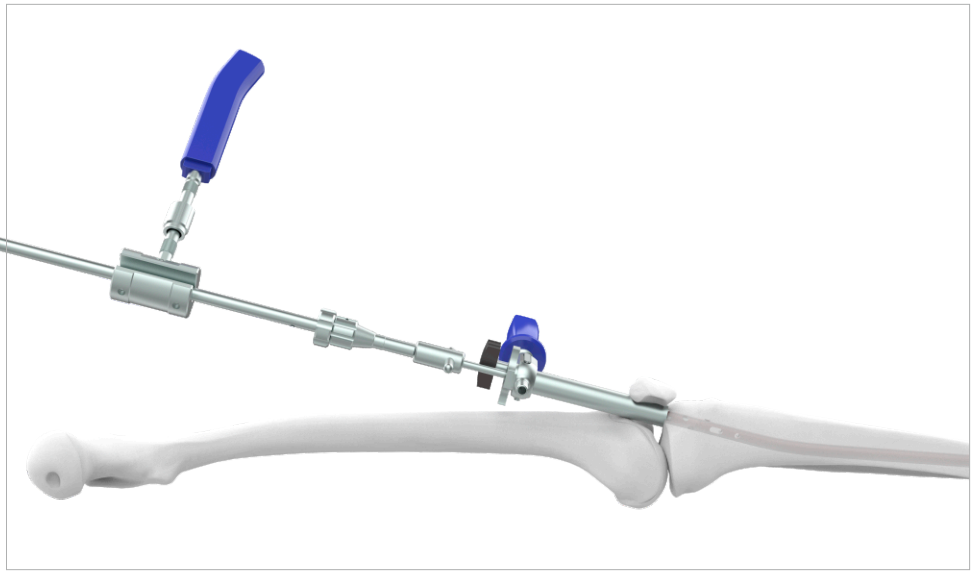
Engage the end cap with the cannulated screwdriver, inter-lock. To prevent cross threading, align the end cap with the nail axis and turn the end cap counterclockwise, until the thread of the end cap aligns with that of the nail.

Turn the end cap clockwise to thread the end cap into the nail. Remove the guide wire and screwdriver.

Implant Removal

In case of implant removal firstly remove the end cap with the help of 3.5mm Hex screwdriver. Proceed by removing both Ø4.4mm and Ø4.8mm Locking Bolt from the bone using 3.5mm Hex screwdriver. Attach the connecting shaft **(520-019)** to the open end of nail from where the end cap is removed.

On top of connecting shaft attach the Hammer guide shaft **(520-022)** followed by screwing the nut for hammer guide shaft **(520-023)** on top of hammer guide shaft. Unlock the nut on the sliding hammer **(520-024)** for its free movement during nail removal. Now, slide the Sliding Hammer into the hammer guide shaft. Strike the hammer in upward direction to remove the nail from the bone.



Note: It is highly recommended not to remove all the locking bolt as it may cause the nail rotation during attachment of the connecting shaft to the nail. Remove the remaining Locking bolt after the connecting shaft and the hammer guide shaft has been attached.

Expert Tibia

Nail Instrument Set (Suprapatellar Insertion)

7-112-01 Insertion Handle for Expert Tibia Nail - Suprapatellar Insertion

7-112-02 Protection Sleeve Handle for Expert Tibia Nail - Suprapatellar Insertion

7-112-03 Outer Protection Sleeve for Expert Tibia Nail - Suprapatellar Insertion

7-112-04 Protection Sleeve 16/14.5mm for Expert Tibia Nail - Suprapatellar Insertion

7-112-05 Trocar Ø14.5mm, PEEK, for Expert Tibia Nail - Suprapatellar Insertion

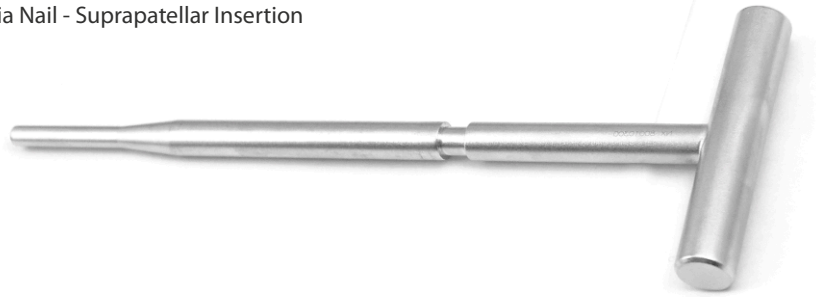
7-112-06 Centering Sleeve 14.5/3.2mm for Expert Tibia Nail - Suprapatellar Insertion

7-112-07 Proximal Aiming Device for Ø4.4mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)

7-112-08 Bolt for Proximal Aiming Device - Expert Tibia Nail (Suprapatellar Insertion)

7-112-09 Proximal Aiming Device for Ø4.8mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)

7-112-10 Positioning Rod For Expert Tibia Nail - Suprapatellar Insertion

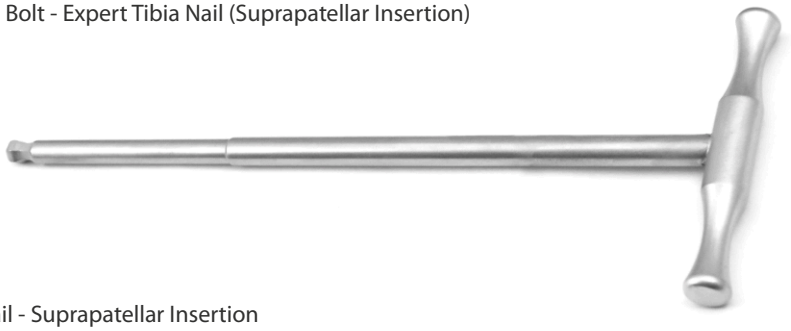


7-112-11 Stabilizing Device for Expert Tibia Nail - Suprapatellar Insertion

7-112-12 Distal Aiming Arm for Expert Tibia Nail - Suprapatellar Insertion

7-112-13 Bolt for Distal Targeting Device, for Expert Tibia Nail - Suprapatellar Insertion

7-112-14 Universal Driver for Nail Holding Bolt - Expert Tibia Nail (Suprapatellar Insertion)



7-112-15 Entry Reamer for Expert Tibia Nail - Suprapatellar Insertion

7-112-16 Compression Device for Expert Tibia Nail - Suprapatellar Insertion

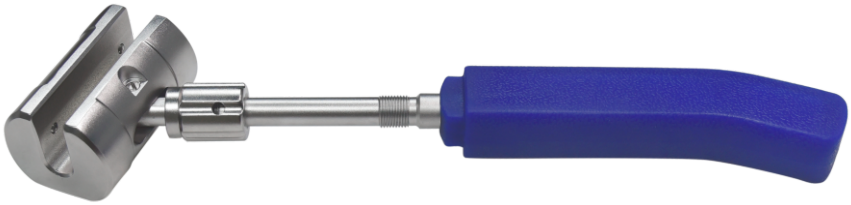
7-112-17 Extraction Screw for Expert Tibia Nail - Suprapatellar Insertion

7-112-18 Connecting Shaft for Expert Tibia Nail - Suprapatellar Insertion

7-112-19 Nail Holding Bolt, Long, for Expert Tibia Nail - Suprapatellar Insertion

7-112-20 Combination Wrench 11mm for Expert Tibia Nail - Suprapatellar Insertion

7-112-21 Sliding Hammer for Expert Tibia Nail - Suprapatellar Insertion



7-112-22 Hammer Guide Shaft for Expert Tibia Nail - Suprapatellar Insertion

7-112-23 Nut for Hammer Guide Shaft - Expert Tibia Nail - Suprapatellar Insertion

7-112-24 Radiographic Ruler for Expert Tibia Nail - Suprapatellar Insertion

520-004 Guide Wire With Threaded Tip Ø3.2mm x Thread Length 10mm x Length 300mm

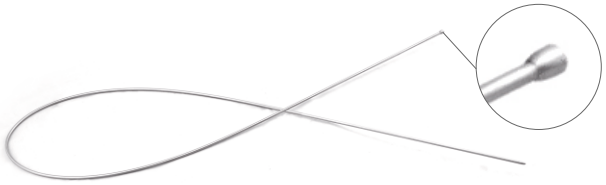
7-112-25 Entry Cutter for Expert Tibia Nail - Suprapatellar Insertion

7-112-26 Quick Coupling T Handle for Expert Tibia Nail - Suprapatellar Insertion

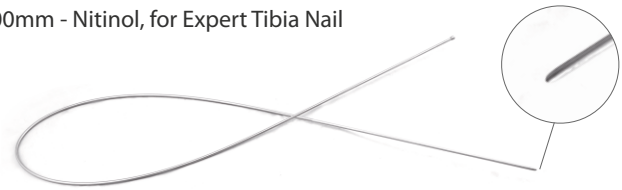
7-112-27 Cannulated Awl for Expert Tibia Nail - Suprapatellar Insertion

7-112-28 Reduction Device for Expert Tibia Nail - Suprapatellar Insertion

520-013 Guide wire with Ball Tip Ø2.5/3.65mm x Length 1000mm - Nitinol, for Expert Tibia Nail



520-058 Guide wire without Ball Tip Ø2.5mm x Length 1000mm - Nitinol, for Expert Tibia Nail



7-112-29 Guide Wire Holder for Expert Tibia Nail - Suprapatellar Insertion

7-112-30 Flexible Reamer Shaft (Jacob Connection) for Expert Tibia Nail - Suprapatellar Insertion

Reamer Head

Code	Dia	Code	Dia
7-112-31	Ø7.5mm	**7-112-37**	Ø10.5mm
7-112-32	Ø8mm	**7-112-38**	Ø11mm
7-112-33	Ø8.5mm	**7-112-39**	Ø11.5mm
7-112-34	Ø9mm	**7-112-40**	Ø12mm
7-112-35	Ø9.5mm	**7-112-41**	Ø12.5mm
7-112-36	Ø10mm	**7-112-42**	Ø13mm

7-112-43 Distal Aiming Device for Expert Tibia Nail - Suprapatellar Insertion

7-112-44 Ø5.2mm T-Handle Drill Bit with Flat End for Expert Tibia Nail - Suprapatellar Insertion

7-112-45 Bolt for Distal Aiming Arm - Expert Tibia Nail (Suprapatellar Insertion)

7-112-46 Allen Key, Hex 5mm for Expert Tibia Nail (Suprapatellar Insertion)

7-112-47 Drill Sleeve, Ø5.2mm for Positioning Rod - Expert Tibia Nail (Suprapatellar Insertion)

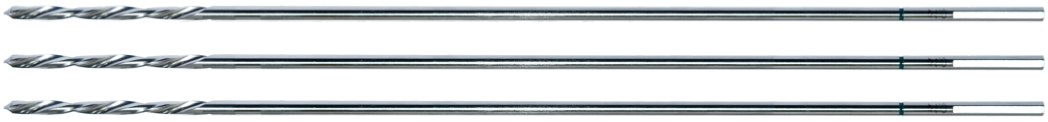
7-112-48 Drill Bit Plain Shank/ Jacob Chuck End Ø5.2mm x Length 250mm for Expert Tibia Nail (Suprapatellar Insertion)

7-112-49 Protection Drill Sleeve 10/8mm for Expert Tibia Nail (Suprapatellar Insertion)

7-112-50 Trocar Ø8mm for Expert Tibia Nail (Suprapatellar Insertion)

7-112-51 Drill Sleeve 8/4mm for Ø4mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)

7-112-52 Drill Bit Plain Shank/Jacob Chuck End Ø4.0mm x Length 300mm for Expert Tibia Nail (Suprapatellar Insertion)

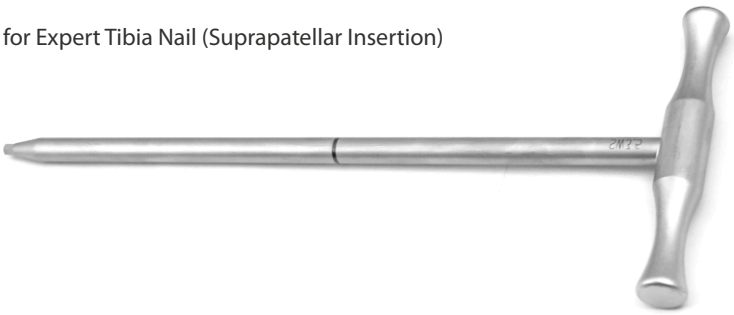


7-112-53 Stopper for Ø4.0mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)

7-112-54 Allen Key, Hex 3mm for Expert Tibia Nail (Suprapatellar Insertion)

7-112-55 Depth Gauge measuring upto 90mm for Expert Tibia Nail (Suprapatellar Insertion)

7-112-56 Screwdriver with T-Handle, Hex 3.5mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-57 Protection Sleeve 11/8.6mm for Ø4.8mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)

7-112-58 Drill Sleeve 8.5/3.2mm for Ø3.2mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)

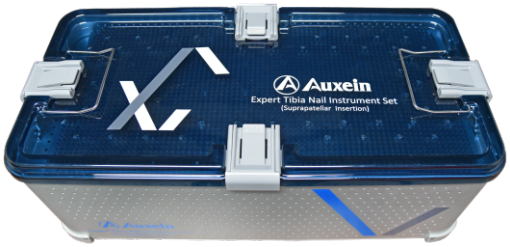
7-112-59 Trocar Ø3.2mm for Expert Tibia Nail (Suprapatellar Insertion)

7-112-60 Drill Bit Plain Shank/Jacob Chuck End Ø3.2mm x Length 250mm for Expert Tibia Nail (Suprapatellar Insertion)

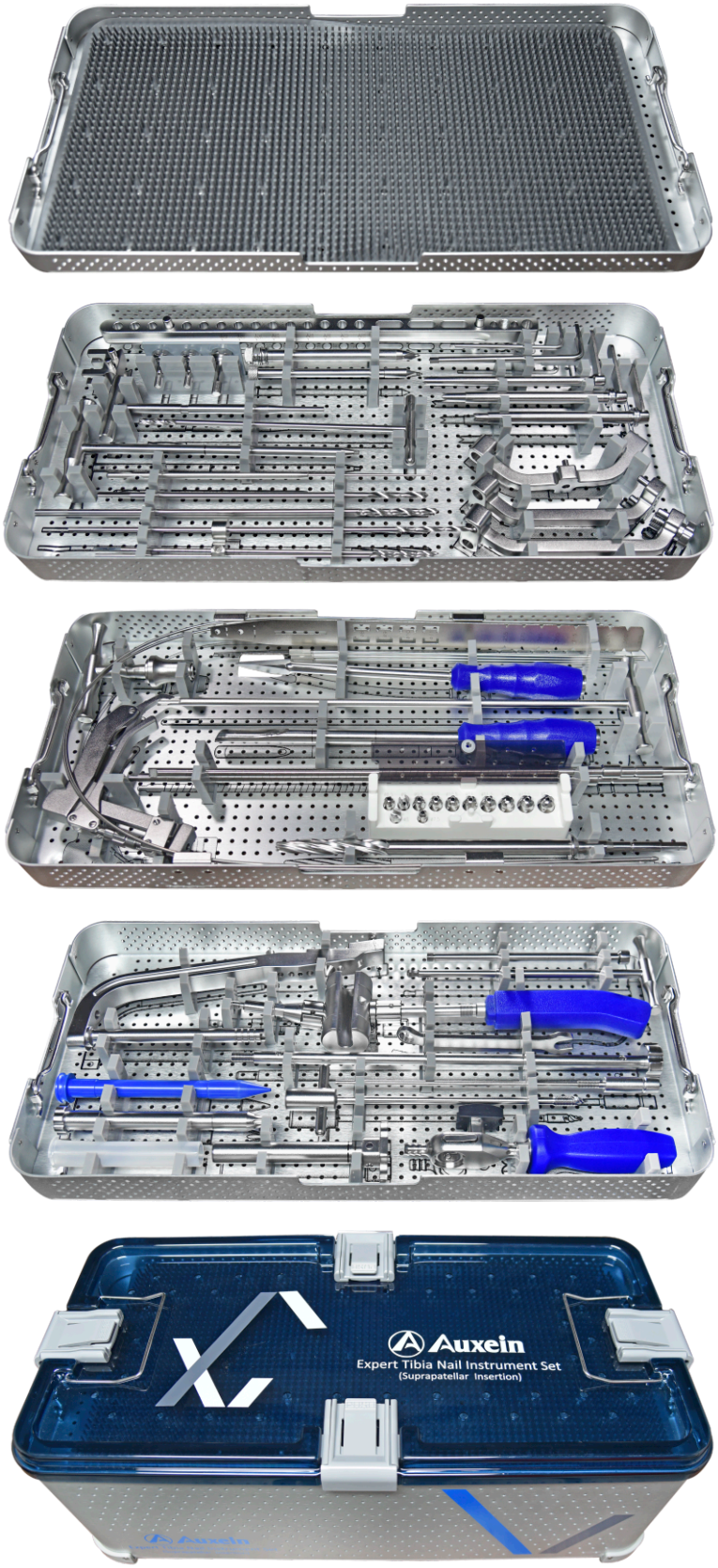
7-112-61 Stopper for Ø3.2mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)

7-112-62 Instrument Trays for Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)

7-112-63 Container with PPSU lid for Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)



7-112 Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)



7-112 Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)

Code	Set Consisting of	Units
7-112-01	Insertion Handle for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-02	Protection Sleeve Handle for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-03	Outer Protection Sleeve for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-04	Protection Sleeve 16/14.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-05	Trocar Ø14.5mm, PEEK, for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-06	Centering Sleeve 14.5/3.2mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-07	Proximal Aiming Device for Ø4.4mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-08	Bolt for Proximal Aiming Device - Expert Tibia Nail (Suprapatellar Insertion)	2
7-112-09	Proximal Aiming Device for Ø4.8mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-10	Positioning Rod For Expert Tibia Nail - Suprapatellar Insertion	1
7-112-11	Stabilizing Device for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-12	Distal Aiming Arm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-13	Bolt for Distal Targeting Device, for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-14	Universal Driver for Nail Holding Bolt - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-15	Entry Reamer for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-16	Compression Device for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-17	Extraction Screw for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-18	Connecting Shaft for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-19	Nail Holding Bolt, Long, for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-20	Combination Wrench 11mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-21	Sliding Hammer for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-22	Hammer Guide Shaft for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-23	Nut for Hammer Guide Shaft - Expert Tibia Nail - Suprapatellar Insertion	1
7-112-24	Radiographic Ruler for Expert Tibia Nail - Suprapatellar Insertion	1
520-004	Guide Wire With Threaded Tip Ø3.2mm x Thread Length 10mm x Length 300mm	3
7-112-25	Entry Cutter for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-26	Quick Coupling T Handle for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-27	Cannulated Awl for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-28	Reduction Device for Expert Tibia Nail - Suprapatellar Insertion	1
520-013	Guide wire with Ball Tip Ø2.5/3.65mm x Length 1000mm - Nitinol, for Expert Tibia Nail	1
520-058	Guide wire without Ball Tip Ø2.5mm x Length 1000mm - Nitinol, for Expert Tibia Nail	1
7-112-29	Guide Wire Holder for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-30	Flexible Reamer Shaft (Jacob Connection) for Expert Tibia Nail - Suprapatellar Insertion	2

Code	Set Consisting of	Units
7-112-31	Reamer Head, Ø7.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-32	Reamer Head, Ø8.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-33	Reamer Head, Ø8.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-34	Reamer Head, Ø9.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-35	Reamer Head, Ø9.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-36	Reamer Head, Ø10.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-37	Reamer Head, Ø10.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-38	Reamer Head, Ø11.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-39	Reamer Head, Ø11.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-40	Reamer Head, Ø12.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-41	Reamer Head, Ø12.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-42	Reamer Head, Ø13.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-43	Distal Aiming Device for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-44	Ø5.2mm T-Handle Drill Bit with Flat End for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-45	Bolt for Distal Aiming Arm - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-46	Allen Key, Hex 5mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-47	Drill Sleeve, Ø5.2mm for Positioning Rod - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-48	Drill Bit Plain Shank/ Jacob Chuck End Ø5.2mm x Length 250mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-49	Protection Drill Sleeve 10/8mm for Expert Tibia Nail (Suprapatellar Insertion)	2
7-112-50	Trocar Ø8mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-51	Drill Sleeve 8/4mm for Ø4mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)	2
7-112-52	Drill Bit Plain Shank/Jacob Chuck End Ø4.0mm x Length 300mm for Expert Tibia Nail (Suprapatellar Insertion)	3
7-112-53	Stopper for Ø4.0mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-54	Allen Key, Hex 3mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-55	Depth Gauge measuring upto 90mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-56	Screwdriver with T-Handle, Hex 3.5mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-57	Protection Sleeve 11/8.6mm for Ø4.8mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-58	Drill Sleeve 8.5/3.2mm for Ø3.2mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-59	Trocar Ø3.2mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-60	Drill Bit Plain Shank/Jacob Chuck End Ø3.2mm x Length 250mm for Expert Tibia Nail (Suprapatellar Insertion)	2
7-112-61	Stopper for Ø3.2mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-62	Instrument Trays for Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)	3
7-112-63	Container with PPSU lid for Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)	1

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