stryker

T2 Alpha®
Femur Retrograde Nailing System

Operative technique

T2 Alpha

Femur Retrograde Nailing System

Contents

This publication sets forth detailed recommended procedures for using Stryker devices and instruments. It offers guidance that you should heed, but, as with any such technical guide, each surgeon must consider the particular needs of each patient and make appropriate adjustments when and as required. A workshop training is recommended prior to performing your first surgery.

Please remember that the compatibility* of different product systems has not been tested unless specified otherwise in the product labeling.

*The terms "all Stryker IM Systems" / "all titanium-made Stryker IM Nailing Systems" are defined as T2 Alpha Femur Retrograde Nailing Systems.

⚠WARNING

Follow the instructions provided in our cleaning and sterilization guide (OT-RG-1). All non-strile devices must be cleaned and sterilized before use.

Consult Instructions for Use (www.ifu.stryker.com) for a complete list of potential adverse effects and adverse events, contraindications, warnings and precautions.

⚠WARNING

Multi-component instruments must be disassembled for cleaning.

Please refer to the corresponding assembly / disassembly instructions.

The surgeon must discuss all relevant risks including the finite lifetime of the device with the patient when necessary.

⚠WARNING

The surgeon must advise patients of surgical risks, and make them aware of adverse effects and alternative treatments.

⚠WARNING

The patient should be advised that the device cannot and does not replicate a normal healthy bone, that the device can break or become damaged as a result of strenuous activity or trauma and that the device has a finite expected service life.

Removal or revision of the device may be required sometime in the future due to medical reasons.

⚠CAUTION

Use instruments / implants as described in this operative technique to avoid damage to instruments / implants or bone and soft tissue.

Indications and contraindications

Intended use

The T2 Alpha Femur Retrograde Nailing System is intended for temporary stabilization of bone segments or fragments until bone consolidation has been achieved.

Indications for use (US and Canada)

The indications for use of these internal fixation devices include:

- Open and closed femoral fractures.
- Pseudoarthrosis and correction osteotomy.
- Pathologic fractures, impending pathologic fractures and tumor resections.
- Supracondylar fractures, including those with intra-articular extension.
- Fractures involving osteopenic and osteoporotic bone.
- Fractures distal to a total hip prosthesis.
- Periprosthetic fractures.
- Nonunions and malunions.

Contraindications

The physician's education, training and professional judgement must be relied upon to choose the most appropriate device and treatment.

Conditions presenting an increased risk of failure include:

- Any active or suspected latent infection or marked local inflammation in or about the affected area.
- Compromised vascularity that would inhibit adequate blood supply to the fracture or the operative site.
- Bone stock compromised by disease, infection or prior implantation that cannot provide adequate support and /or fixation of the devices.
- Material sensitivity documented or suspected.
- Obesity. An overweight or obese patient can produce loads on the implant that can lead to failure of the fixation of the device or to failure of the device itself.
- Patients having inadequate tissue coverage over the operative site.
- Implant utilization that would interfere with anatomical structures or physiological performance.
- Any mental or neuromuscular disorder which would create an unacceptable risk of fixation failure or complications in postoperative care.
- Other medical or surgical conditions which would preclude the potential benefit of surgery.

IMN Screws System Intended Use

The IMN screws system is intended to stabilize the intramedullary nail-bone construct for temporary stabilization.

IMN Instruments System Intended Use

The IMN instruments system is intended to enable the implantation and extraction of intramedullary nail and screw.

⚠ WARNING

The T2 Alpha Femoral Nail Retrograde is not intended for full weight bearing in patients with complex unstable fractures until bone consolidation is confirmed in the follow-up X-rays.

⚠ WARNING

The T2 Alpha Femoral Nail Retrograde is designed for temporary implantation until bone consolidation occurs. If bone consolidation does not occur or if the consolidation is insufficient, the implant may break. The aim of post-operative care must be to ensure the promotion of bone consolidation.

MRI safety information

Non-clinical testing has demonstrated that the T2 Alpha Retrograde Femur Nailing System and IMN screws system are MR conditional. A patient with this device can be safely scanned in an MR system meeting the following conditions:

- Static magnetic field of 1.5 T or 3.0 T.
- Maximum spatial field gradient of 3,000 gauss / cm (30 T / m).
- Maximum MR system reported, whole body averaged specific absorption rate (SAR) of 2W / kg (Normal Operating Mode).

Under the scan conditions defined above, the T2 Alpha Retrograde Nailing System and IMN screws system are expected to produce a maximum temperature rise of less than 2.1°C* after 15 minutes of continuous scanning.

In non-clinical testing, the image artifact caused by the device extends approximately 27mm from the T2 Alpha Retrograde Nailing System and IMN screws system when imaged with a spin echo or gradient echo pulse sequence and a 3.0 T MRI system.

⚠CAUTION

The MRI safety information provided is based on testing which did not include supplementary devices. If there are supplementary devices (i.e. plates, screws, wires, etc.) present in proximity to the T2 Alpha Femur Retrograde Nailing System and IMN Screws System, this could result in additional MRI effects and the information provided above may not apply.

*Δ1°C = 1.8° F
Δ2.1° C = 3.78° F

Additional Information

T2 Alpha Femur Retrograde Nailing System

Nail diameter
Ø9mm–Ø14mm[1]

Driving end diameter
Driving end diameter of the 9–11mm nails is Ø11.5mm;
nail sizes 12–14mm have a constant diameter

Nail length
Femoral Nail Retrograde, Short: 170mm and 200mm
Femoral Nail Retrograde: 220mm– 480mm in 20mm increments

Locking Screw[2,3]
Ø5mm, 25mm–120mm length
25mm–60mm in 2.5mm increments
60mm–120mm in 5mm increments

Advanced Locking Screws[4]
Ø5mm, 30mm–100mm length
30mm–60mm in 2.5mm increments
60mm–100mm in 5mm increments

Condyle Screws and Condyle Nut[4]
Ø5mm, 40mm –120mm length
in 5mm increments

Compression Screw Femur[5]

End Cap SCN[4]

Drills[6]
4.2mm – green
5.5mm – green (counterbore drill)

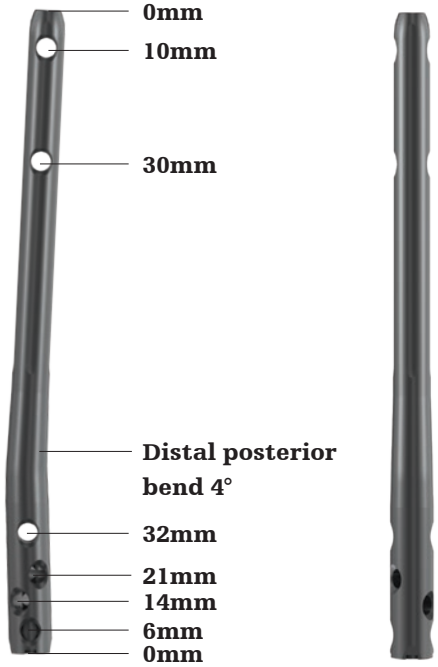
1. Check with local representative regarding availability of implant sizes
2. Screw length measures from top of head to tip
3. Product from IMN Screws System
4. Product from T2 SCN
5. Product from T2 Alpha Femur Antegrade GT/PF Nailing System
6. Product from IMN Instruments System

Femoral Nail Retrograde, short

Femoral Nail Retrograde

Additional Information

T2 Alpha Femur Retrograde Nailing Length



Additional Information

T2 Alpha Femur Retrograde Nailing System Locking Options

Static locking

Static locking

Dynamic mode
(proximal dynamization)

Internal compression

External compression

Short nail, static

Note: Distal locking option is patient and fracture dependent. Surgeon my choose to utilize any combination of the distal locking options.

Additional information

Packaging

The implants in the T2 Alpha Femur Retrograde Nailing and IMN Screws systems include packaging that minimizes user contact with the implant prior to implantation. After the pouch is opened, all implants include a sheath that is introduced into the sterile field.

Example 1: Nail is removed from pouch, sheath is opened and attached to the Nail Adapter Femur Retrograde (fig. 1, 2, 3).

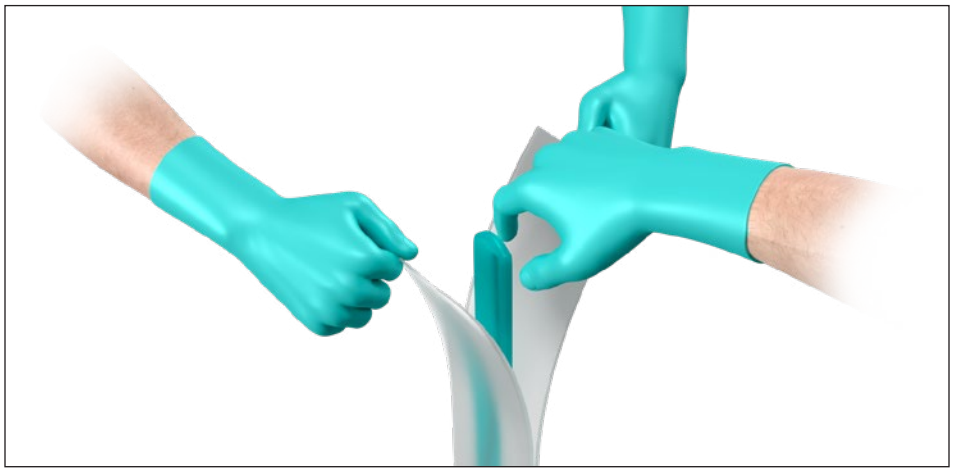


Fig. 1

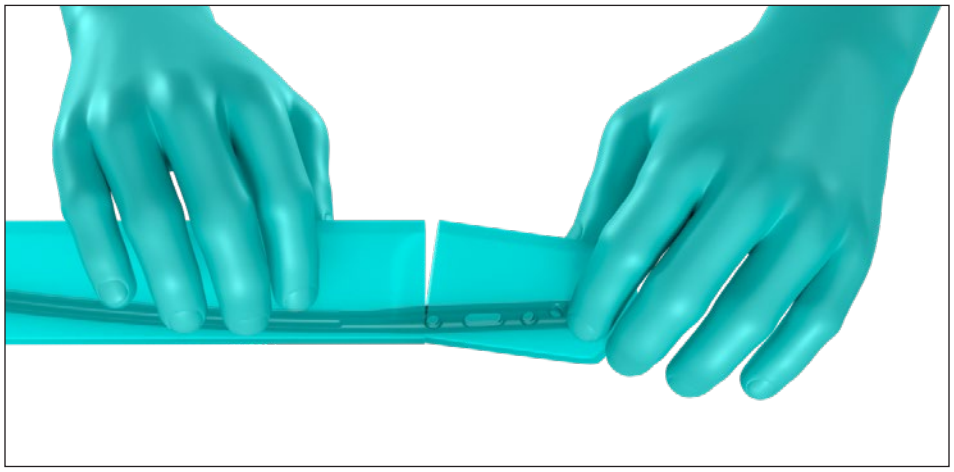


Fig. 2

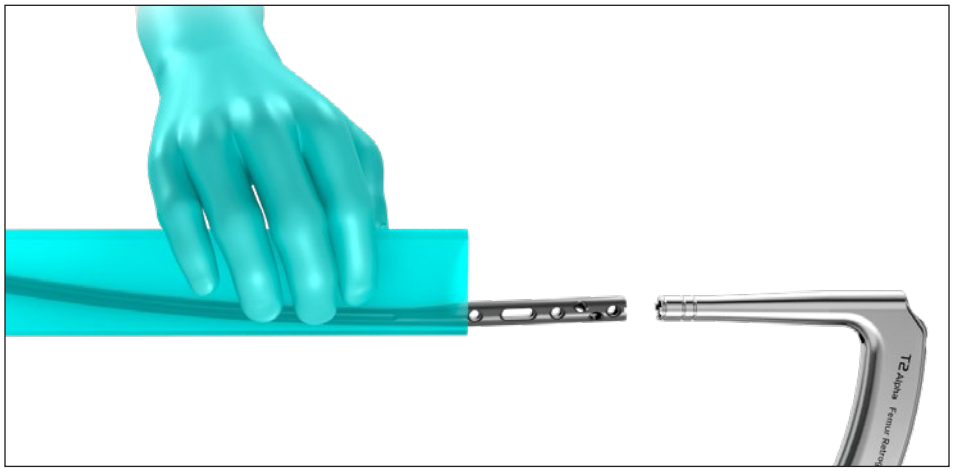


Fig. 3

Additional Information
Packaging

Example 2: After removal from pouch, screw (fig. 4, 5) or other implant (fig. 6, 7) is attached to the corresponding screwdriver.

⚠ WARNING

Do not touch sharp edges of drill bits, reamer heads and cutting tools with surgical gloves. Take care when handling sharp edges of packaging and instruments.

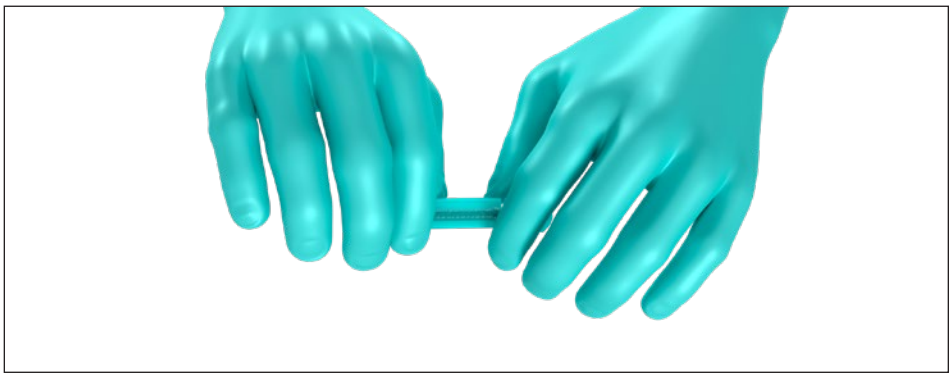


Fig. 4

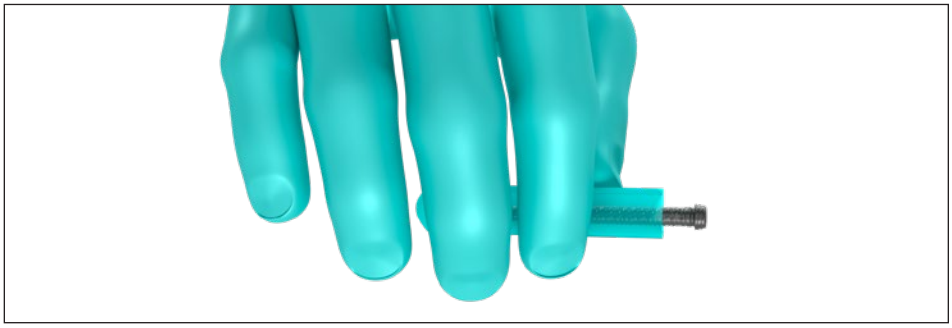


Fig. 5

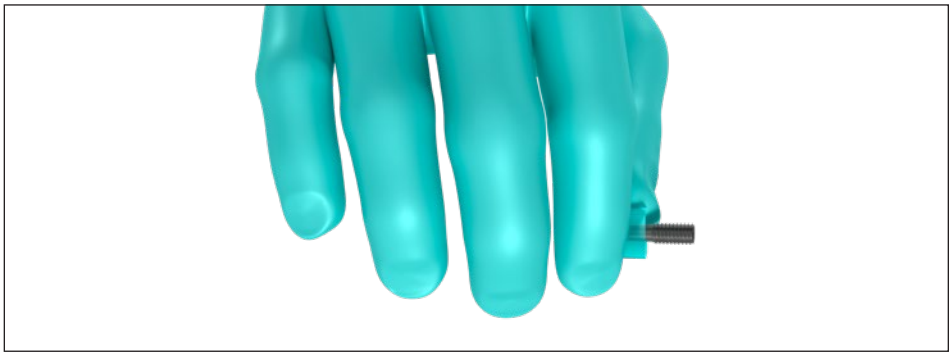


Fig. 6

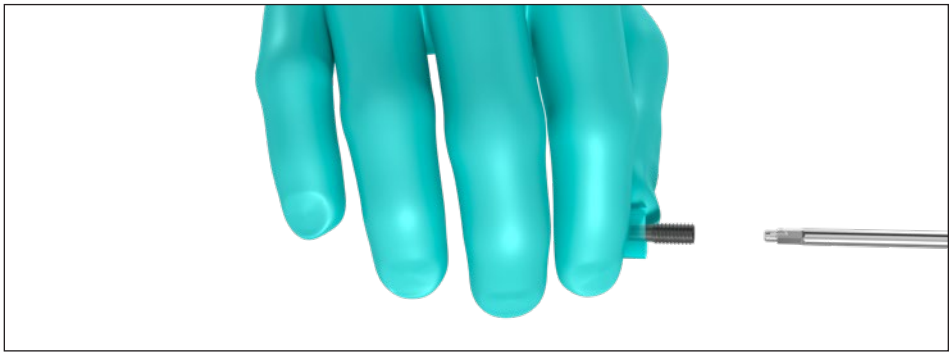


Fig. 7

Operative technique

Pre-operative planning

Patient positioning and reduction

Retrograde nail insertion is performed with the patient supine on a radiolucent table. The affected lower extremity and hip region are freely draped, and the knee is placed over a sterile bolster to allow for knee flexion (fig.8). Manual traction through a flexed knee or a distraction device may be used to facilitate reduction for most femoral fractures.

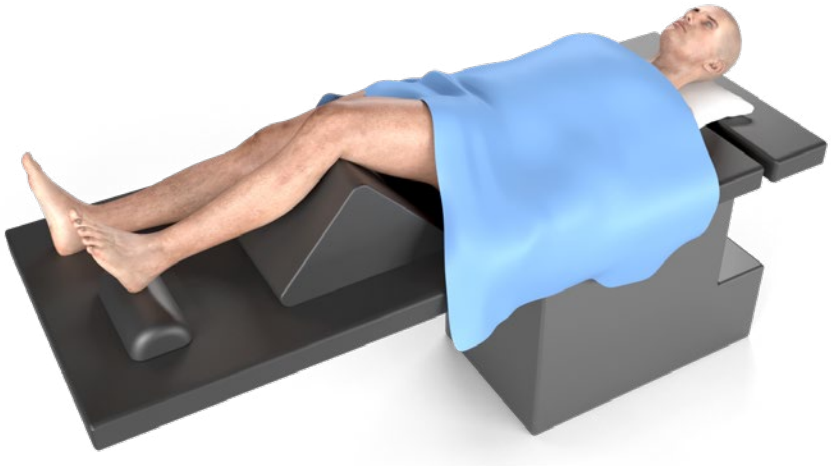


Fig. 8

Incision

Make a longitudinal 5cm, or an appropriate sized incision, just distal to the inferior pole, over the midline of the patellar tendon (fig. 9). Spread the tissues medial to the patellar tendon and retract the patellar tendon gently to allow for guide-wire insertion. Alternatively, a patellar tendon split may be performed. In some instances (e.g. fractures with intra-articular extensions requiring fixation of the condyles) larger incision may be necessary. Distal femoral fractures are often complicated by intra-articular fracture line extension. These fractures should be anatomically reduced and secured. Titanium Asnis III cannulated screws may be used with a combination of bone holding clamps to secure the intracondylar region for nail insertion. Consider placement of the cannulated screws to avoid interference with the nail during nail insertion.

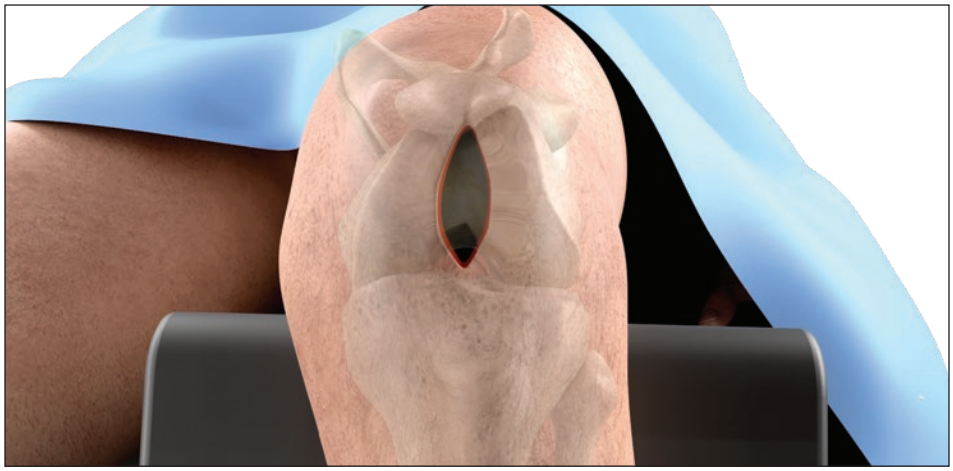


Fig. 9

An alternative is to reduce and maintain reduction of the femoral condyles with pointed reduction forceps and only utilize the cross locking screws for definitive fixation.

Operative technique

Entry point

The medullary canal is opened through the intercondylar notch anterior to Blumensaat's line on the ML radiograph (fig. 10). Find the entry point by palpating a distinct ridge slightly anterior and lateral respectively at the posterior cruciate ligament. Radiographic confirmation of this area is essential to prevent damage to the intraarticular surface during opening and nail insertion.

If a total knee replacement is present, ensure that the femoral box is open and will accommodate the nail; the entry point may have to be adjusted to allow for entry through the box.

The opening should be directed with a central orientation in relation to the medullary canal. Insert the 3 x 285mm K-wire at the identified entry point and into the medullary canal. Assemble the Opening Reamer Handle and Opening Reamer Sleeve Ø11.5mm, and together with the Opening Trocar Ø11.5mm (fig. 11a), guide the assembly over the K-wire until the Opening Reamer Trocar is fully seated on the bone. The scallop of the Opening Reamer Sleeve is designed to sit in the intercondylar notch.

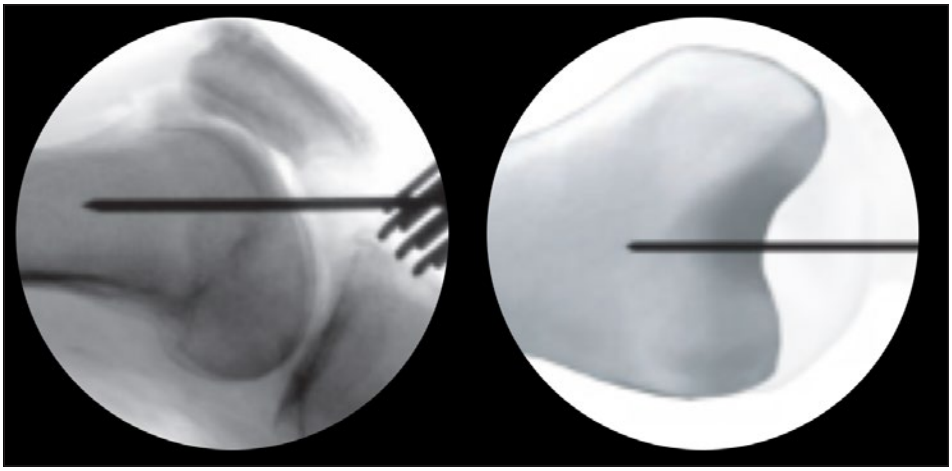


Fig. 10

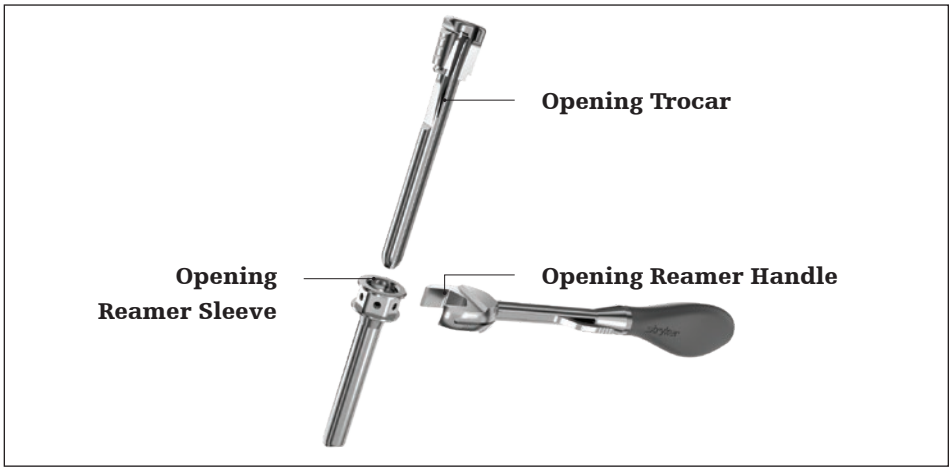


Fig. 11a

NOTICE

Do not use a bent K-wire for entry point definition.

⚠ CAUTION

Verify correct entry point prior to opening the cortex.

Operative technique

Entry point

If the initial K-wire is not optimally positioned, the off-center trocar holes can be used to correct the entry point by inserting a second K-wire. To utilize, rotate the trocar into the desired position and place a second K-wire 3 x 285mm through one of the off-center holes. The distance from the center hole is 4mm (fig. 11b). Once the second K-wire is positioned as desired, remove the initial K-wire and the trocar.

If more than 4mm of correction is required, 8mm of correction can be achieved by removing the sleeve and trocar assembly from the initial K-wire and reinserting the assembly over the K-wire through one of the off-center holes of the trocar (fig. 11c). Then, insert a second K-wire through the remaining off-center hole. Once the second K-wire is positioned as desired, remove the initial K-wire and trocar.

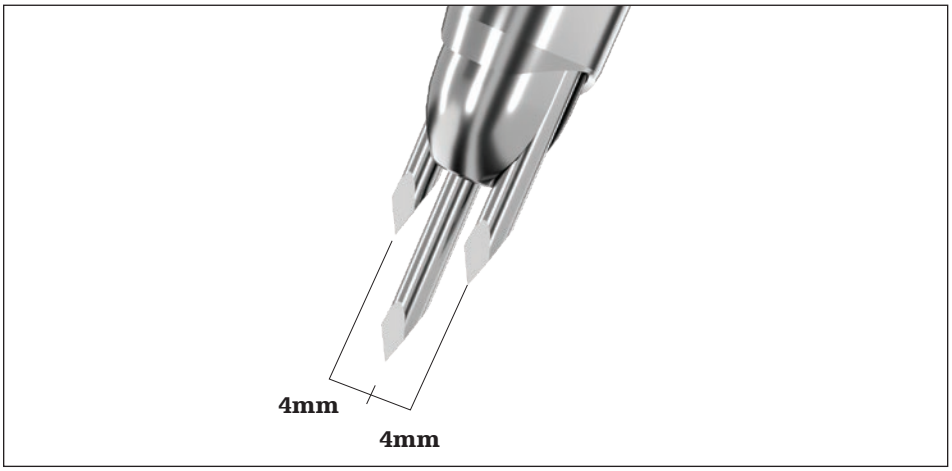


Fig. 11b

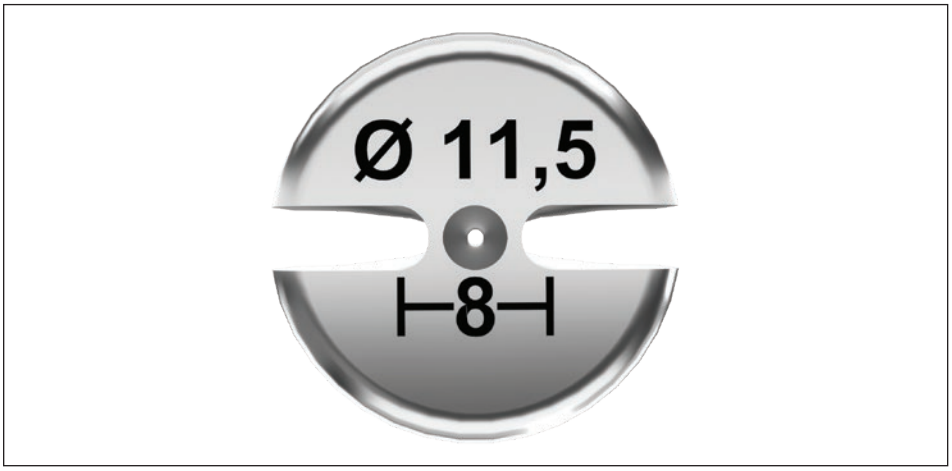


Fig. 11c

NOTICE

The drill sleeve can be engaged on the modular handle every 90 degrees to suit surgeon preference.

⚠CAUTION

Proceed with caution to not cause harm to patella, intercondular notch and surrounding tissue.

NOTICE

If the initial K-wire is not optimally positioned, the off-center holes of the Opening Trocar can be used to correct the entry point by inserting a second K-wire.

⚠CAUTION

Use of the Opening Reamer Sleeve is recommended. The Opening Reamer Sleeve may reduce the risk of hetreotrophic ossification.

Operative technique

After verifying that the Opening Reamer Sleeve is fully seated on the bone (fig. 12), advance the Opening Reamer over the K-wire to open the medullary canal. To avoid damage to the cartilage, advance on power only after the Opening Reamer fully passes through the sleeve. If hand reaming is preferred, attach the Opening Reamer to the Quick-Lock Delta Handle and rotate the reamer assembly to open the medullary canal. Remove the K-wire. As an alternative, the cortex can be opened with the Curved Awl.

The driving end diameter of the 9–11mm nails is Ø11.5mm; nail sizes 12–14mm have a constant diameter. Ream far enough to accommodate the distal section of the nail. Use X-ray to confirm depth.

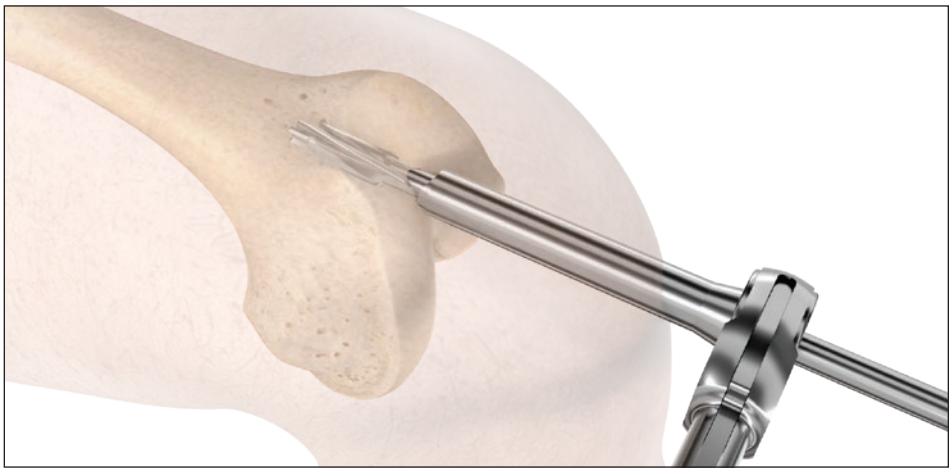


Fig. 12

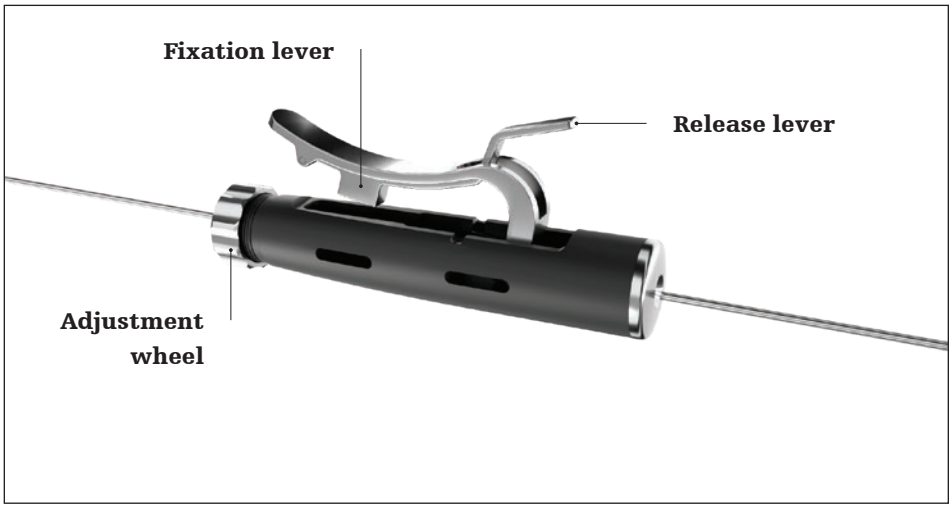


Fig. 13

Guide wire insertion

Insert the Ball Tip Guide Wire 3 x 1000mm through the Guide Wire Handle (fig. 13). Adjust the handle as desired and lock the assembly by closing the fixation lever. The Guide Wire Handle can accommodate guide wires and K-wires with diameters from 1.8mm–4mm. If necessary, loosen or tighten the adjustment wheel to increase or decrease the diameter of the insertion hole. Advance the Ball Tip Guide Wire through the fracture site and to the desired insertion depth. The guide wire should lie in the center of the metaphysis and the diaphysis in both the AP and lateral views to avoid offset positioning of nail.

NOTICE

Do not use bent guide wires.

⚠CAUTION

Confirm correct position of Ball Tip Guide Wire prior to reaming.

⚠CAUTION

The Opening Reamer is a front and side cutting instrument and should be used with care to ensure that the sharp edges of the reamer do not inadvertently damage bone or soft tissue. Use of the Opening Reamer Sleeve is recommended.

Operative technique

The reduction rod and Quick-Lock Delta Handle assembly may be used as a fracture reduction tool to facilitate guide wire insertion through the fracture site (fig. 14).

Reaming

Commence reaming in 0.5mm increments until the desired diameter has been achieved. To help maintain the position of the guide wire during reamer shaft extraction, press the funnel tip end of the guide wire pusher at the end of the wire while extracting the reamer from the medullary canal (fig.15).

NOTICE

The diameter of the selected T2 Alpha Femoral Nail Retrograde must be 1–1.5mm smaller than that of the last reamer used.

The diameter of the selected Femoral Nail Retrograde should be 1–1.5mm smaller than that of the last reamer used. Additionally, the diameter of the nail may be determined by using the X-ray ruler fluoroscopy before or after guide wire insertion. To determine diameter, use the ruler at the smallest diameter of the medullary canal (fig. 16).

⚠ CAUTION

Excessive heat generation during reaming/drilling can cause soft tissue or bone damage.

⚠ WARNING

Care must be taken to ensure that the entry portal is not extended during reaming. This could lead to an offset position for the nail and a risk of shaft fracture.

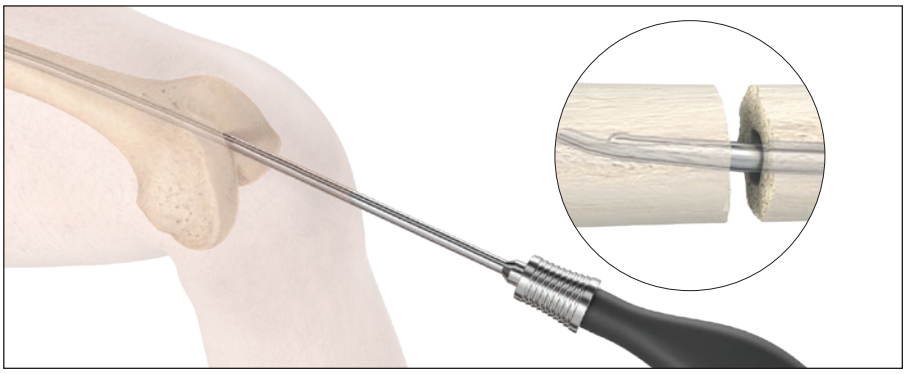


Fig. 14

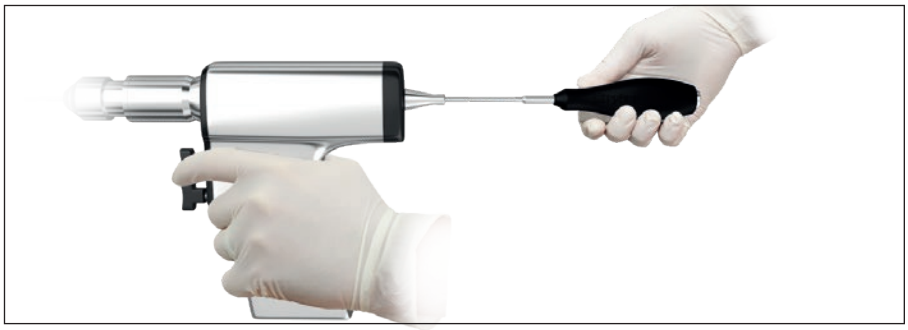


Fig. 15

NOTICE

To ensure proper positioning of the guide wire tip during reaming, the Guide Wire Pusher may be replaced with any other Stryker 3mm guide wire.

NOTICE

The smallest diameter nail available is 9mm. The diaphyseal bone must be large enough to allow for reaming of the medullary canal up to at least 10mm.

⚠ CAUTION

The connection diameter of the 9mm–11mm diameter nails is 11.5mm. Additional metaphyseal reaming may be required to facilitate nail insertion. Nail size 12–14mm have a constant diameter.

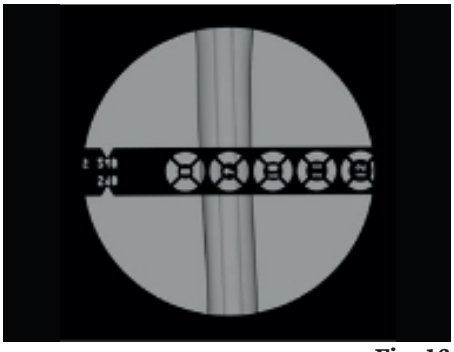


Fig. 16

NOTICE

The ball tip at the end of the guide wire will stop the reamer head.

Operative technique
Nail selection

Length

Determine appropriate nail length by measuring the remaining length of the Ball Tip Guide Wire (fig. 17). Place the Guide Wire Ruler on the Ball Tip Guide Wire and read the correct nail length at the end of the Ball Tip Guide Wire on the Guide Wire Ruler (fig 18). Ensure that the tip of the Guide Wire Ruler is fully seated on the bone prior to determining measurement.

If the measurement is between markings, use of the shorter nail is recommended. If using a short nail (170mm or 200mm), always consider the shortest nail first (170mm) and move to a longer nail if applicable for fracture.

If apposition / compression is planned, the selected nail should be at least 10mm shorter than the measured length.

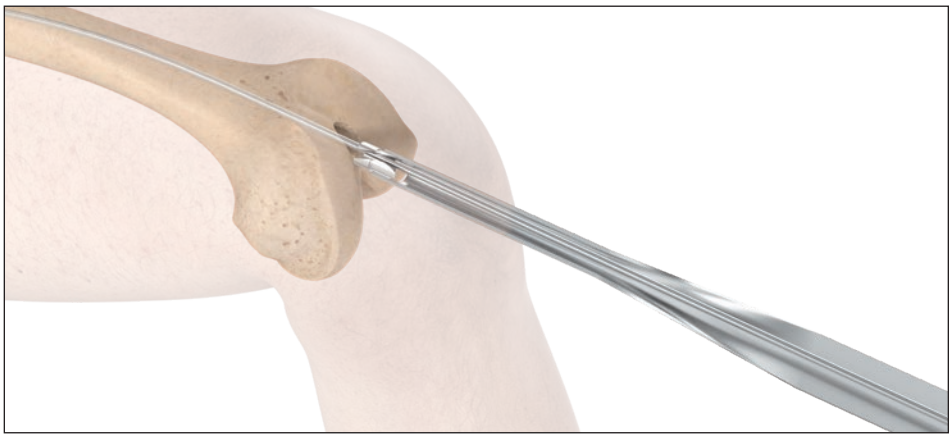


Fig. 17

Fig. 18

⚠ CAUTION

Use fluoroscopy to ensure that the Ball Tip Guide Wire and Guide Wire Ruler are correctly positioned and verify nail length measurement prior to nail insertion.

⚠ CAUTION

If the fracture is suitable for apposition / compression the implant selected should be at least 10mm shorter than measured to help avoid migration of the nail beyond the insertion site.

NOTICE

The end of the Guide Wire Ruler should align with the distal end of the nail once inserted.

⚠ CAUTION

The Guide Wire Ruler is calibrated for 800mm and 1000mm guide wires.

Operative technique
Nail insertion

The selected nail is assembled onto the Nail Adapter Femur Retrograde with the Nail Holding Screw Femur Retrograde. Pre-tighten the screw to the nail by hand and then use the Ball Tip Screwdriver to tighten the assembly (fig.19). Preoperative assembly of the distal targeting device is recommended prior to nail insertion. Attach the distal targeting device to the Nail Adapter Femur Retrograde, ensure that the knob on the Nail Adapter Femur Retrograde is in the open position and slide the arm up the shaft of the Nail Adapter Femur Retrograde until it hits the stop. Turn knob to lock (fig. 19). Insert the Tissue Protection Sleeve, long, together with the Drill Sleeve, long, into one of the holes of the Distal Targeting Arm Femur Retrograde and confirm that the device has been assembled properly. If guided proximal locking is to be performed, follow the pre-operative assembly instructions as described in this operative technique. Remove Targeting Arm Femur Retrograde from the nail adapter prior to inserting the nail. Insert the nail by hand over the Ball Tip Guide Wire and into the entry site of the distal femur. Advance the nail past the fracture site. Using Blumensaat's line as a reference, insert the nail so that it is countersunk below the subchondral bone. Do not leave the nail proud as this could damage the patella cartilage. Remove the guide wire once the nail is appropriately positioned. If dense bone is encountered, first confirm that sufficient reaming has been achieved. If hammering is desired, thread the Strike Plate into the Nail Adapter Femur Retrograde and deliver light blows with the Slotted Hammer to advance the nail further (fig. 20).

NOTICE

Do not hit the Nail Adapter Femur Retrograde with the Slotted Hammer; only hit the Strike Plate.

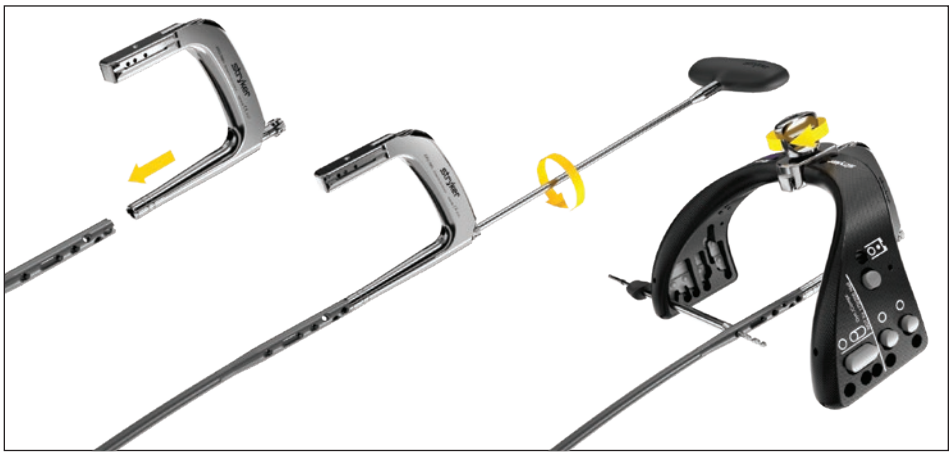


Fig. 19

Fig. 20

⚠ CAUTION

Ensure by fluoroscopy that curvature, length and diameter of selected nail fit the patient's anatomy.

⚠ CAUTION

Prior to nail insertion, ensure that the following measures are taken:

1. Verify that the nail is tightly secured to the Nail Adapter Femur Retrograde.
2. Ensure that both the head of the Nail Holding Screw Femur Retrograde and the driving end of the nail completely align with the appropriate nail adapter.
3. Verify correct alignment by inserting a drill through the sleeve and targeting arm assembly. The drill must pass through the holes of the nail.
4. If guided proximal locking is to be performed, follow the pre-operative assembly instructions as described in this operative technique.

Operative technique
Nail insertion

If the nail has been inserted too far, reposition as needed. Repositioning of the nail should be carried out either by hand or by using the universal rod.

Backslapping may be performed using the Slotted Hammer to extract the assembly.

A chamfer is located on the distal end of the nail to help identify the junction of the nail and insertion post under fluoroscopy. Three circumferential grooves are located on the insertion post of the target device assembly at 1mm, 10mm and 15mm from the driving end of the nail (fig. 21, 22). Depth of insertion may be visualized with the aid of fluoroscopy. When apposition/compression is desired, the recommended depth of insertion is at least 10mm to avoid protrusion of the nail.

To attach the Targeting Arm Femur Retrograde to the Nail Adapter Femur Retrograde, ensure that the knob on the Targeting Arm Femur Retrograde is in the unlocked position and slide the arm up the shaft of the Nail Adapter Femur Retrograde until it hits the stop. Turn knob to lock (fig. 23). Do not insert nail with the Targeting Arm Femur Retrograde attached to the Nail Adapter Femur Retrograde.

⚠CAUTION

Final implant position must be confirmed by X-ray.

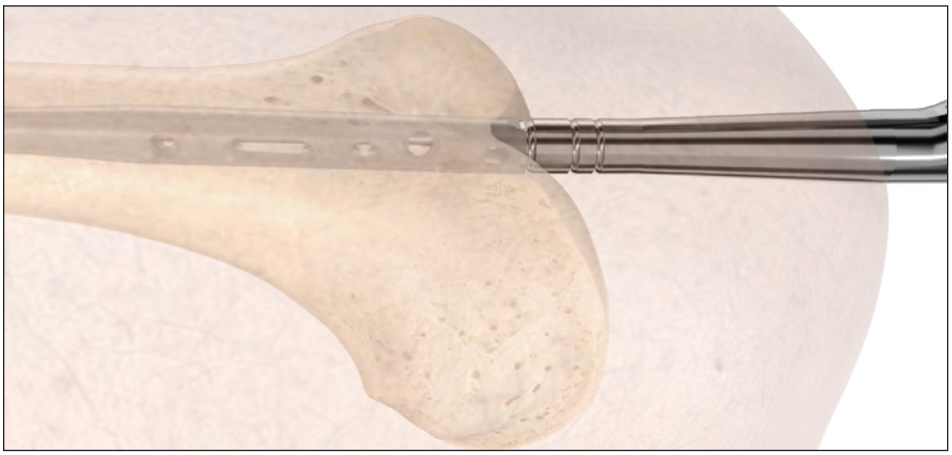


Fig. 21

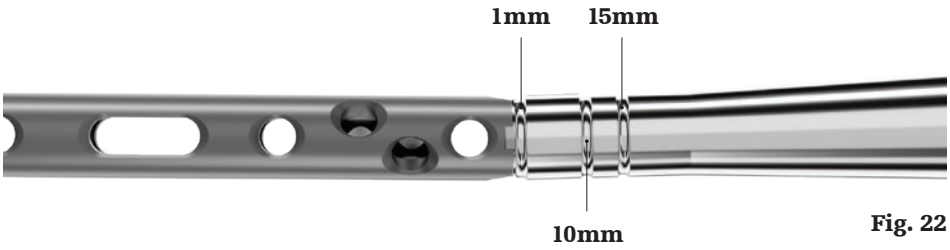


Fig. 22

Fig. 23

⚠CAUTION

Do not impact or backslap the nail with the Targeting Arm, Femur Retrograde Attached to the Nail Adapter Femur Retrograde.

⚠WARNING

Do not apply excessive force during reaming and nail insertion. If severe resistance is encountered, removal of the nail and additional reaming or selection of a nail with a smaller diameter is recommended.

Operative technique
Guided distal locking

Prior to locking the nail distally, verify that the Nail Holding Screw Femur Retrograde is securely tightened and that the Targeting Arm Femur Retrograde is properly attached to the Nail Adapter Femur Retrograde.

The T2 Alpha Femoral Nail Retrograde, long, have 7 options for distal locking.

1. Static locking (Femoral Nail Retrograde).

Any combination of the static locking holes may be used (fig. 24,25,26).

1. ML static
2. Oblique static
3. Oblique static
4. ML static
5. ML static
6. ML static
7. Dynamic/Compression

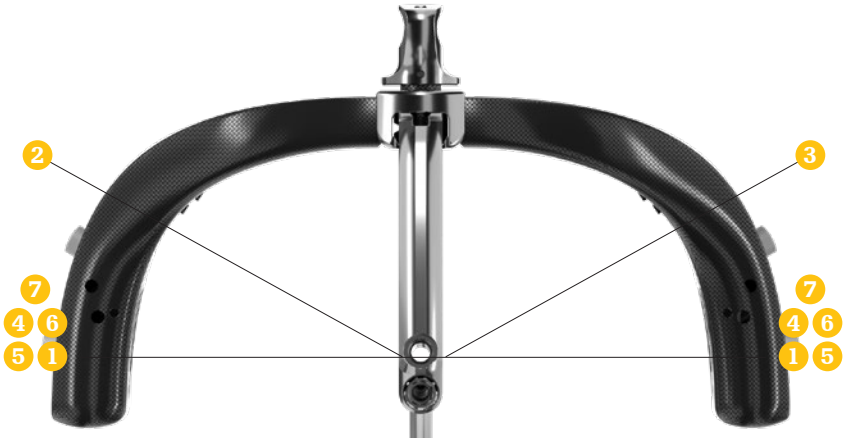


Fig. 24

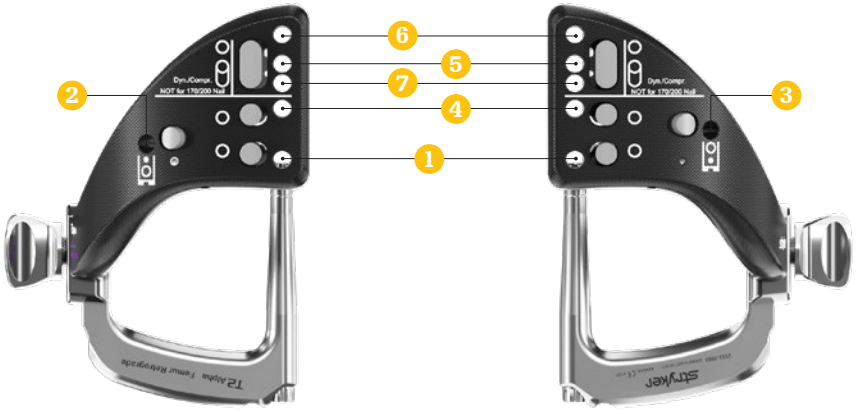


Fig. 25

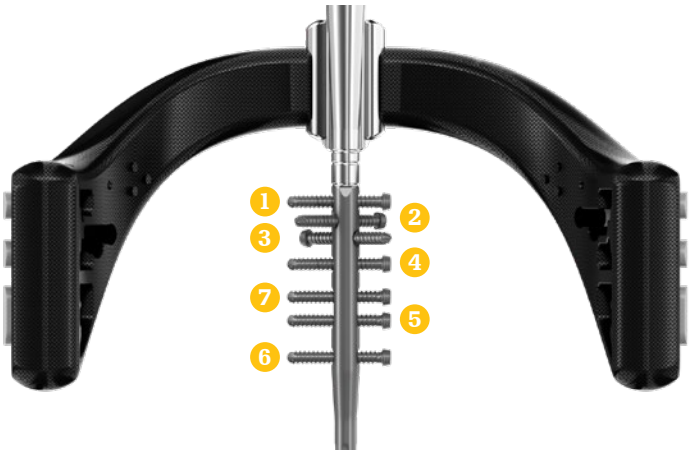


Fig. 26

NOTICE

Numeric markings are for illustration only. The targeting device is not marked with numbers. All circles marked on targeting device indicate potential locking options. Dynamic/compression locking options are marked accordingly.

NOTICE

5.0mm Locking Screws and Advanced Locking Screws require the 4.2mm drill (green color-coded drill).

Operative technique
Guided distal locking

The T2 Alpha Femoral Nail Retrograde, short, includes 4 options for distal locking (fig. 27).

2. Distal static locking.

1. ML static
2. Oblique static
3. Oblique static
4. ML static

3. Distal locking (Femoral Nail Retrograde, short).

Any combination of the static locking holes may be used (fig. 27).

1. ML static
2. Oblique static
3. Oblique static
4. ML static

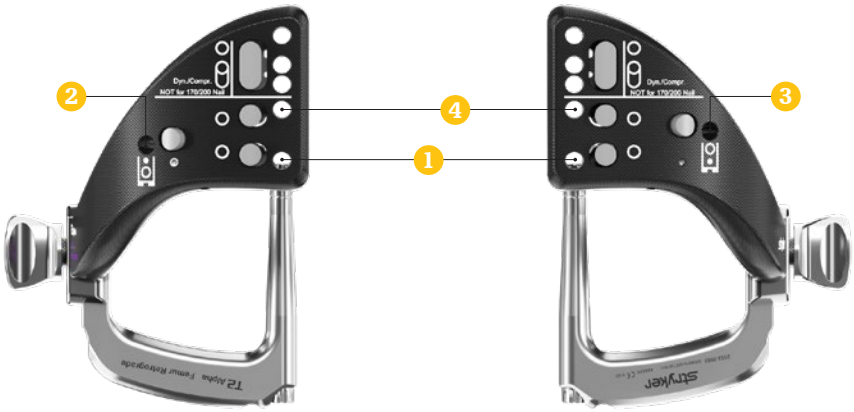


Fig. 27

The Femoral Nail Retrograde allows for active compression using a compression screw (internal compression) or an external compression device (external compression).

4. Internal apposition / compression (Femoral Nail Retrograde (fig. 28)).

In the internal apposition / compression mode, use of the dynamic hole is required. The use of the second distal screw is recommended.

7. Dynamic/compression
6. ML static (recommended)

Fig. 28

5. External apposition / compression (Femoral Nail Retrograde (fig. 29)).

In the external apposition / compression mode, use of the dynamic hole is required. Use of the most proximal of the distal screws (#6) is required.

7. Dynamic/compression
6. ML static (required)

Fig. 29

Operative technique
Guided distal locking

After the nail has been inserted and positioning has been verified under X-ray, the bone must be prepared for screw insertion. The T2 Alpha Femur Retrograde System includes 3 options for screw insertion: the IMN Locking Screws, Advanced Locking Screws and Condyle Screws.

Distal screw insertion of the IMN Locking Screws

Assemble the Locking Trocar, Long, Locking Drill Sleeve, Long, and Locking Tissue Protection Sleeve, Long (fig. 30). Insert the assembly through the appropriate hole of the Targeting Arm Femur Retrograde (fig. 31).

Make a small skin incision at the sleeve entry point.

Ensure that the paddle tip of the Tissue Protection Sleeve, long, is positioned along the muscle fibers. Advance the sleeve assembly through the incision until it is in contact with the cortex. Fully seat the Tissue Protection Sleeve, Long, on the cortex. This will drive the head of the Locking Trocar, Long, from the sleeve assembly (fig. 32). Fully seat the Tissue Protection Sleeve on the bone and remove the Locking Trocar, Long.

⚠ CAUTION

Remove Ball Tip Guide Wire prior to drilling.

Fig. 30

Fig. 31

Fig. 32

Operative technique
Guided distal locking

Advance the locking drill, 4.2 x 360mm, through the Locking Drill Sleeve, Long, and onto the cortex. Drill both cortices (fig. 33). Position the drill tip at the desired final position of the screw tip. Determine screw measurement by rotating the grip of the Locking Drill Sleeve, Long, pulling the sleeve towards the drill attachment until the sleeve hits the stop (fig. 34). Read the measurement on the Locking Drill Sleeve, long, at the junction of the Tissue Protection Sleeve, Long. Alternatively, the Guided Depth Gauge can be used through the Tissue Protection Sleeve, Long, to read off the length at the end of the sleeve (fig. 35). Advance the screw through both cortices until the screw is fully seated.

⚠ WARNING

Drilling past the far cortex may damage soft tissue.

⚠ WARNING

Damage of the nail during drilling may reduce the fatigue strength of the implant which could cause the nail to fail.

⚠ CAUTION

Applying excessive force may result in breakage of the drill which could require recovery. Recovery could result in an iatrogenic fracture and/or bone damage may occur.

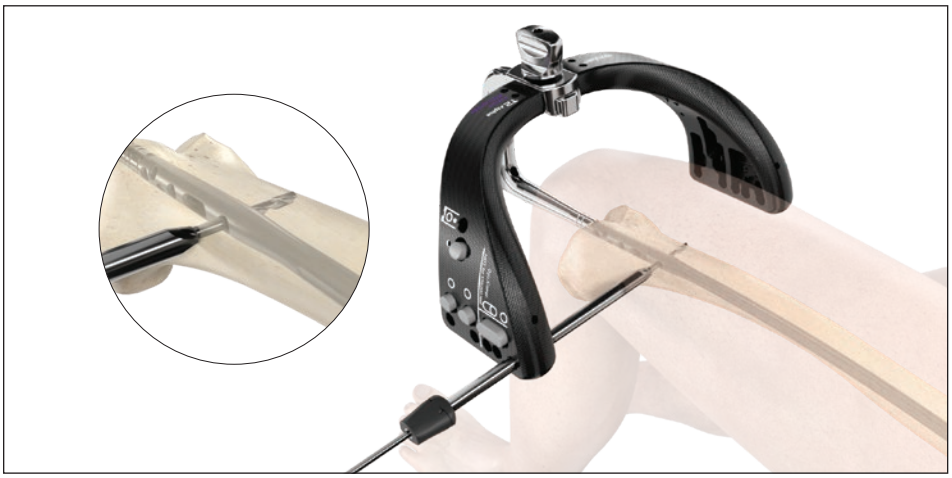


Fig. 33

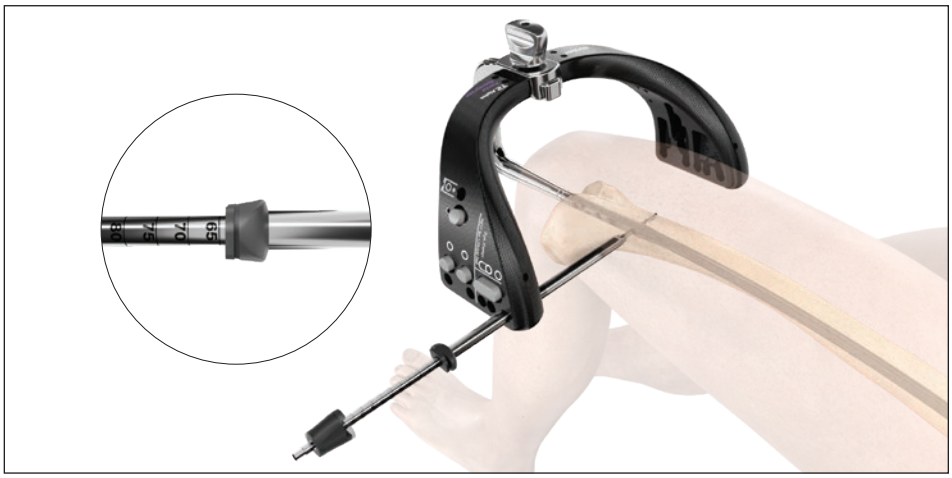


Fig. 34

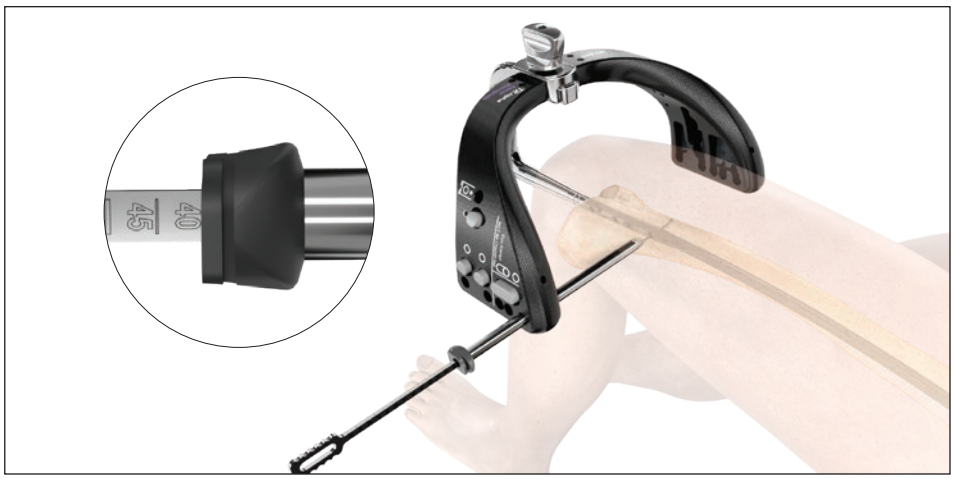


Fig. 35

Operative technique
Guided distal locking

Remove the Locking Drill and Locking Drill Sleeve, Long, and insert the selected Locking Screw through the Tissue Protection Sleeve, Long, using the Screwdriver Bit, Long, and Quick-Lock Delta Handle (fig. 36).

⚠CAUTION

Ensure sleeve assembly is seated on bone prior to drilling and screw length measuring. Verify correct position of sleeve under imaging prior to drilling. The gray friction lock mechanism is designed to maintain the position of the drill sleeves.

To remove the sleeve assembly from the Targeting Arm, press the gray mechanism while pulling the sleeves and trocar.

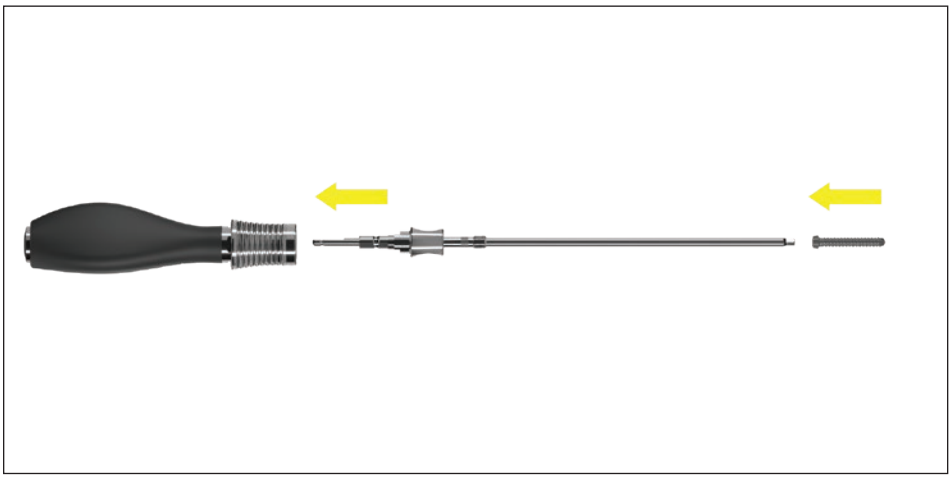


Fig. 36

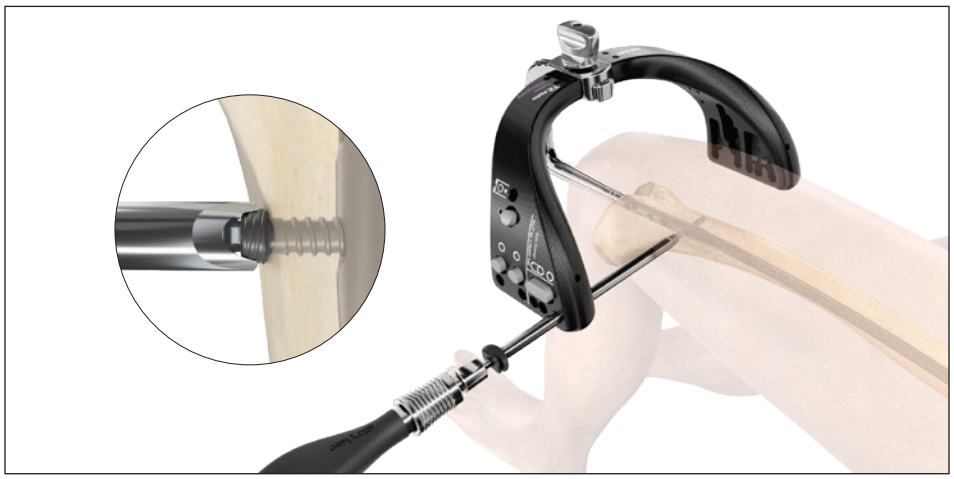


Fig. 37

When the marking on the screwdriver nears the head of the Tissue Protection Sleeve, Long, the screw is close to its final position (fig. 37). Use imaging to confirm placement of the screw. The paddle tip of the Tissue Protection Sleeve, Long, allows the user to visually verify that the screw head is seated on the bone under X-ray without retracting the sleeve from the bone.

Alternatively, the sleeve can be pulled away from the bone to verify that the screw is fully seated. Repeat the locking procedure for the second oblique screw and / or the static or dynamic ML screws as appropriate.

Operative technique
Guided distal locking

Dynamic locking mode

When the fracture profile permits, controlled dynamic locking may be utilized for transverse or axially stable fractures. While dynamic locking can be performed at either end of the nail, routine retrograde dynamic locking should utilize the oblong hole at the proximal end of the nail as this reduces the potential for nail migration into the joint.

See the guided proximal locking or freehand locking sections of this operative technique for proximal screw insertion techniques. Retrograde dynamization is performed by statically locking the nail distally via the Targeting Arm Femur Retrograde.

A screw is then placed in the dynamic position of the proximal oblong hole.

This allows the nail to move and the fracture to settle while torsional stability is maintained. Either a freehand or guided technique may be used.

⚠CAUTION

Dynamic locking might be associated with bone shortening during the healing period. Simultaneous utilization of distal and proximal dynamization option could lead to unintended bone shortening.

Operative technique
Compression

Internal apposition / compression mode (long nail only)

In transverse, axially stable fracture patterns, active mechanical apposition / compression may be desired.

The Compression Screw Femur can be used to apply apposition / compression. When compressing the nail, the implant must be inserted at a safe distance from the entry point to accommodate for the 10mm of active compression.

The three grooves on the insertion post help attain accurate insertion depth of the implant. After inserting two proximal Locking Screws, insert a Locking Screw distally in the dynamic position of the oblong hole.

To apply compression, attach the Compression Screw Femur to the Compression Screwdriver and Quick-lock Delta Handle assembly. Insert the Compression Screwdriver through the Nail Holding Screw Femur Retrograde and apply apposition / compression (fig. 38, 39).

Once apposition / compression has been applied, the compression screw driver may be removed. Insertion of the subsequent distal ML screw is recommended (fig. 40).

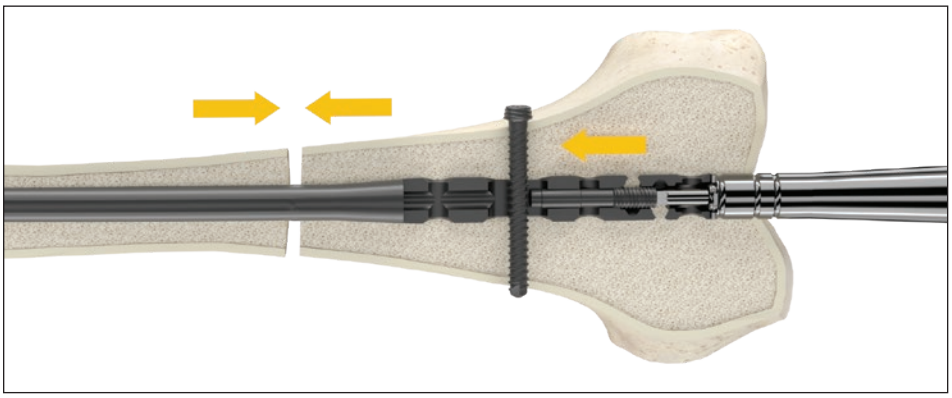


Fig. 38

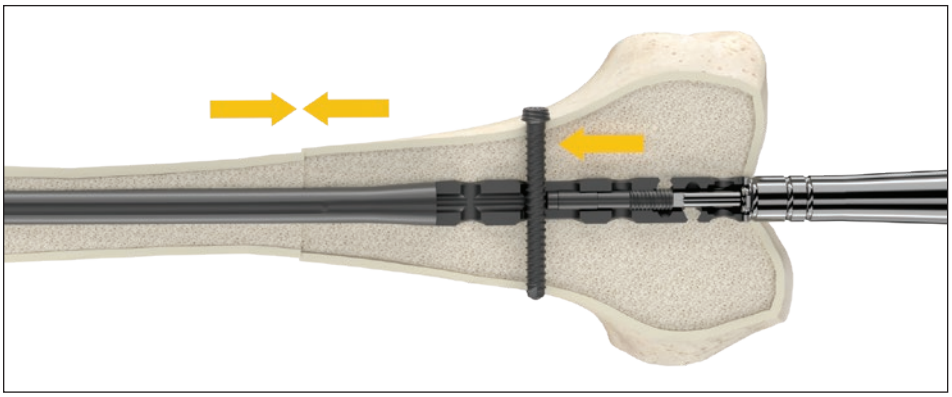


Fig. 39

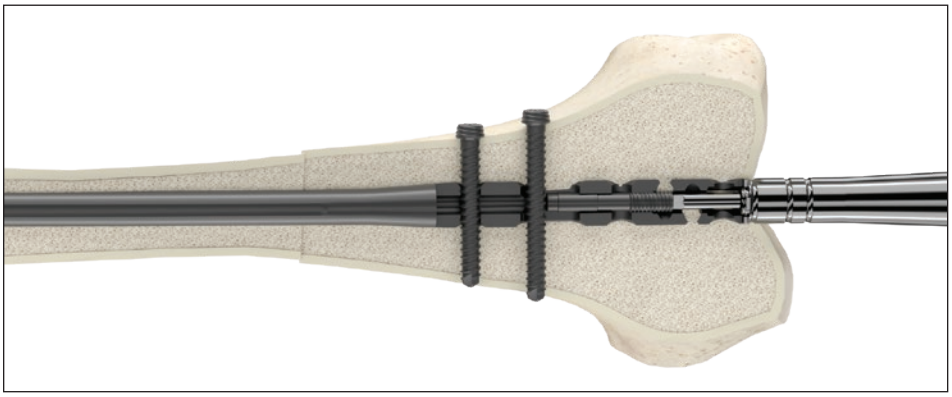


Fig. 40

⚠ CAUTION

Apposition / compression must be carried out under X-ray control. Over-compression may cause the nail or screw to fail.

⚠ CAUTION

The Compression Screw Femur must be screwed in correctly and with reasonable forces to provide desired function and to avoid damage of implants / instruments. Excessive deformation of the Locking Screw may indicate unreasonable force.

NOTICE

Once initial signs of bending of the Locking Screw is observed, further compression should be limited to one additional turn of the Compression Screw Femur.

Operative technique
Compression

External apposition / compression mode (long nail only)

As an alternative to internal compression, the External Compression Device Femur (fig. 41) can be used to apply apposition / compression. When compressing the nail, the implant must be inserted at a safe distance from the entry point to accommodate for the 10mm of active compression.

Fig. 41

The three grooves on the insertion post help attain accurate insertion depth of the implant. After insertion of two proximal Locking Screws, insert a Locking Screw in the dynamic position of the distal oblong hole. To apply compression, attach the External Compression Device to the Quick-Lock Delta Handle and insert the External Compression Device through the Nail Holding Screw Femur Retrograde to engage the internal threads of the nail. Rotate to apply compression (fig. 42,43).

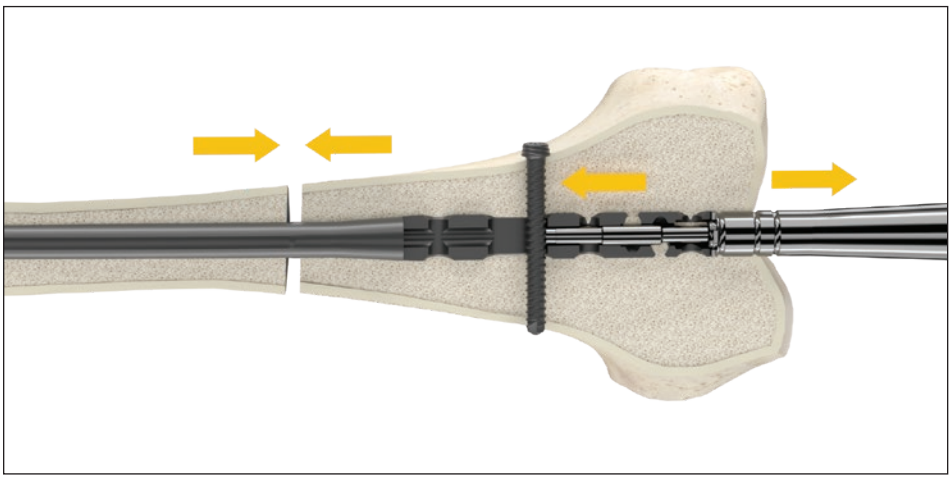


Fig. 42

Once apposition / compression has been applied, insert the most proximal of the distal ML screws. Once the second screw has been inserted, the External Compression Device Femur can be detached.

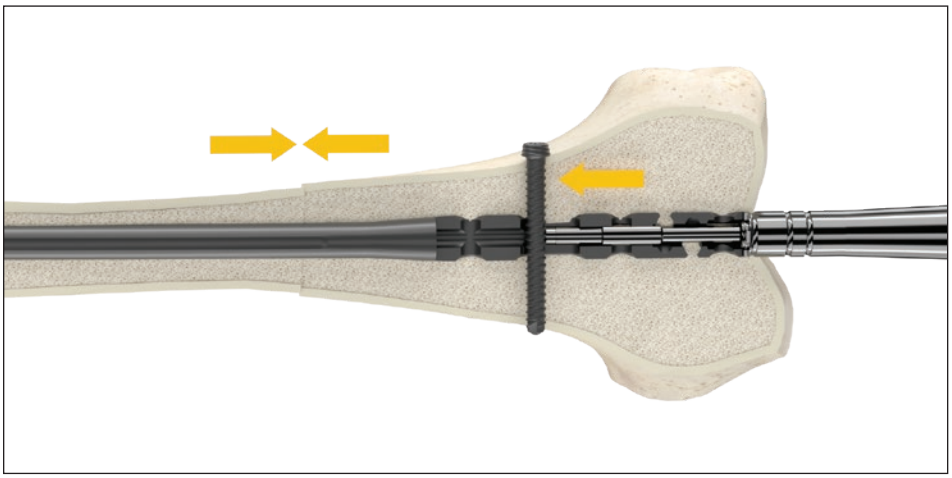


Fig. 43

NOTICE

Once initial signs of bending of the locking screw is observed, further compression should be limited to one additional turn of the Compression Screw Femur.

Operative technique
Guided proximal locking

Guided proximal locking – long nail

Use of the Proximal Targeting Device Femur Retrograde is recommended when performing proximal locking of the AP screws. The proximal ML screws require freehand distal locking. Preoperative assembly is recommended prior to nail insertion. Preoperative assembly steps are as follows:

1. Attach the Adapter Tibia / Femur Retrograde to the Proximal Targeting Device Femur Retrograde. The length of the selected nail determines the attachment point. Insert the center pin of the Adapter Tibia /Femur Retrograde into the hole of the Proximal Targeting Arm Femur Retrograde that corresponds with the selected nail. Turn knob to secure (fig. 44, 45).

Fig. 44

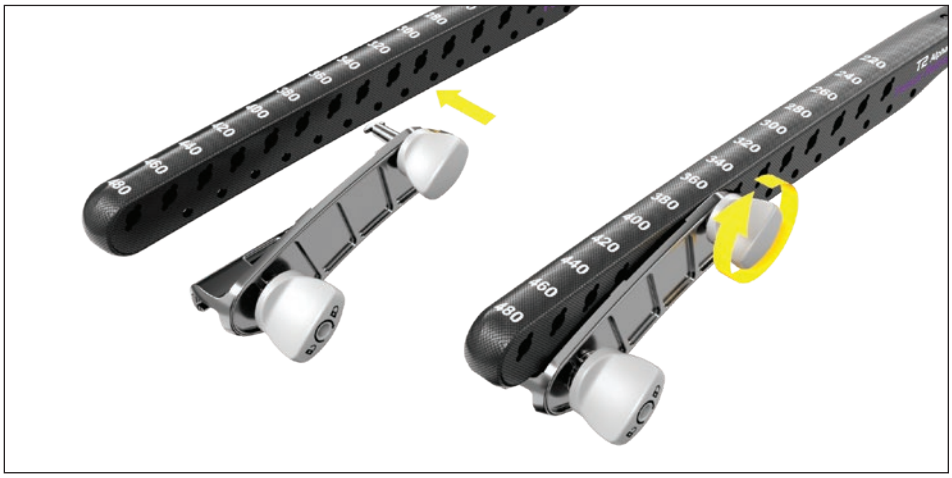


Fig. 45

Operative technique
Guided proximal locking

2. Attach the proximal targeting arm assembly to the Nail Adapter Femur Retrograde. Turn knob to secure (fig. 46, 47).
3. Insert the Tissue Protection Sleeve, Long, into one of the holes of the Proximal Targeting Arm Femur Retrograde and confirm that the device has been assembled to accommodate the selected nail length (using a drill) (fig 48).

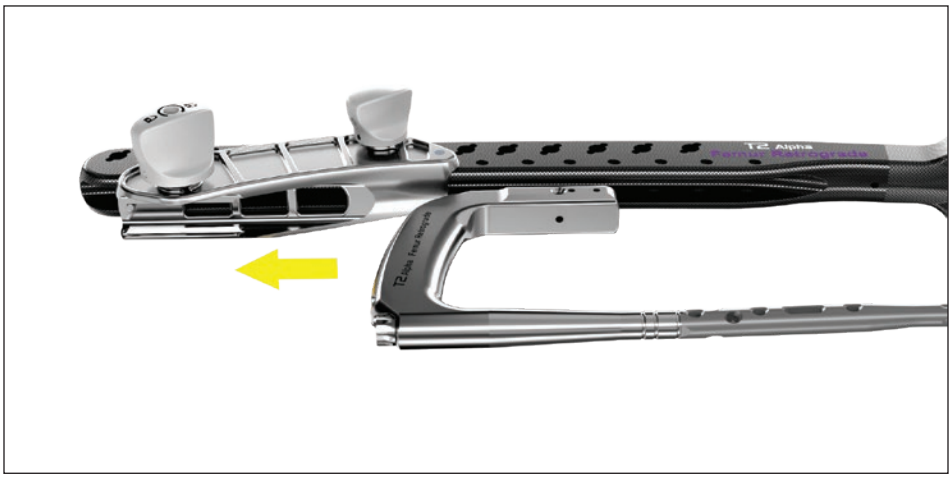


Fig. 46

If the sleeve is properly positioned, remove the sleeve and disassemble the proximal targeting assembly from the Nail Adapter Femur Retrograde and place on the back table. Do not disassemble construct. Proceed with nail and distal screw insertion as described in this operative technique. Depending on the preferred locking configuration, proximal screw insertion may be performed prior to distal locking. Attach the proximal targeting arm assembly to the Nail Adapter Femur Retrograde as previously described. Insert the sleeve assembly through the appropriate hole of the proximal targeting arm. The sleeves should not contact the skin of the patient. Do not make an incision until the C-arm and sleeves are correctly positioned as described in the steps below.

Fig. 47

The following three steps must be taken prior to drilling.

1. Oblique positioning of C-arm
2. Orbital rotation and second plane of rotation adjustment of the C-arm
3. Sleeve adjustment to the nail position

Fig. 48

Operative technique
Guided proximal locking

Oblique positioning of C-arm

To perform guided proximal locking, it is essential to place the X-ray beam of a C-arm approximately 30° oblique to the axis of the drill sleeve assembly (fig. 49). As an option, the 3 x 285mm K-wire or alignment wire can be inserted from the K-wire hole of the adjusting device. The wire indicates a 30° axis to the drill sleeve assembly to aid in correct C-arm positioning.

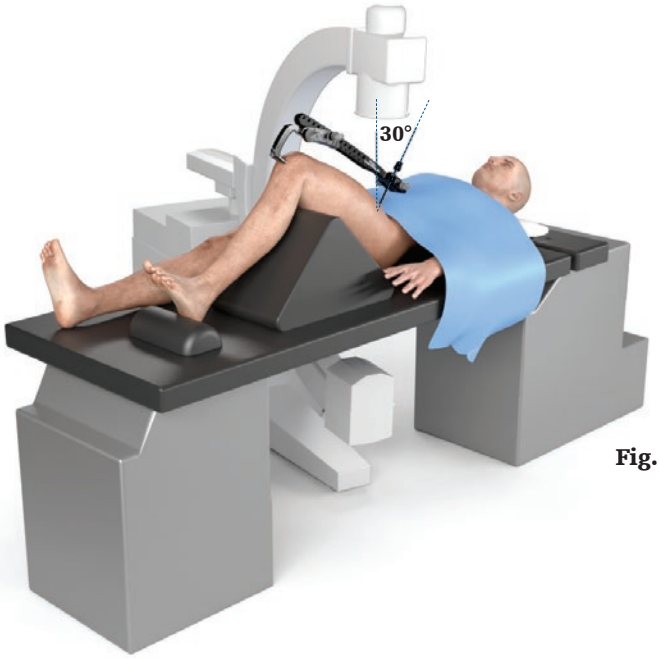


Fig. 49

Orbital rotation and the second rotation of the C-arm

In this step, it is important to position the C-arm so that the nail tip and the sleeve axis are seen parallel in the fluoroscopic image.

After oblique C-arm positioning, adjust the height and orbital rotation of the X-ray beam at the same plane as the drill sleeve assembly. Take an X-ray.

If the sleeve and nail tip are parallel (fig. 50) or colinear in the X-ray image, the C-arm is correctly positioned and no adjustments to the C-arm position are necessary. If the sleeve and nail tip are not parallel, the C-arm is incorrectly positioned (fig 51).

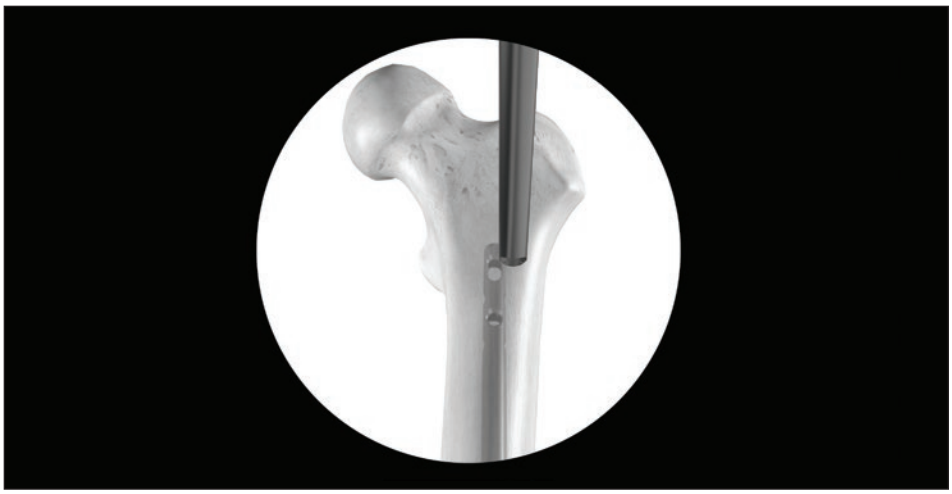


Fig. 50

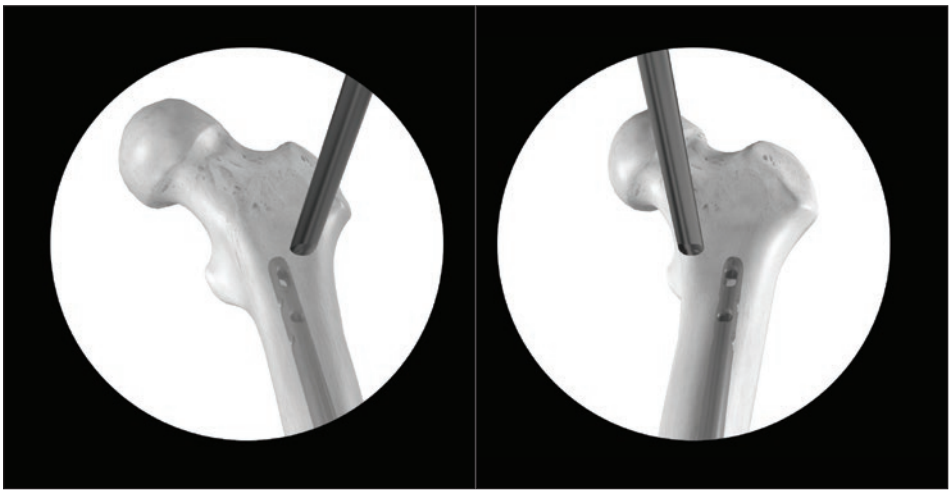


Fig. 51

Operative technique
Guided proximal locking

Adjust the rotation of the C-arm (fig. 52) until the tip of the nail and sleeve are parallel or colinear in the X-ray.

This step requires appropriate C-arm positioning only. Do not turn the knob of the proximal targeting arm before the nail and sleeve are parallel.

Sleeve adjustment to the nail position

Once the C-arm has been adjusted so that nail and sleeve are shown in parallel (fig. 50), the deviated image will show the sleeve either medial or lateral to the nail. If the sleeve and the nail are shown parallel and collinear (fig. 54), no further adjustment of the sleeve is needed.

If the sleeve and nail tip are not seen on the same axis, sleeve adjustment is required by turning the knob of the Proximal Targeting Arm, Femur Retrograde. By turning the adjusting knob, the sleeves move medially or laterally (fig. 53).

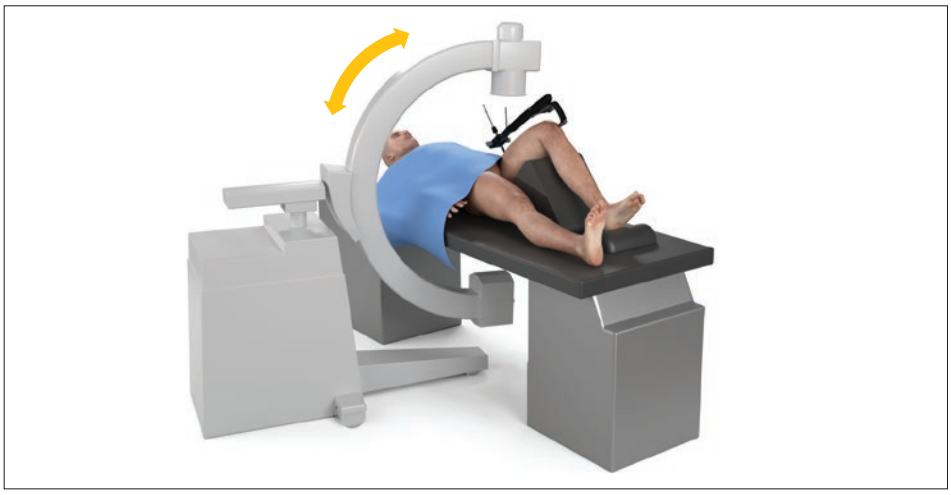


Fig. 52

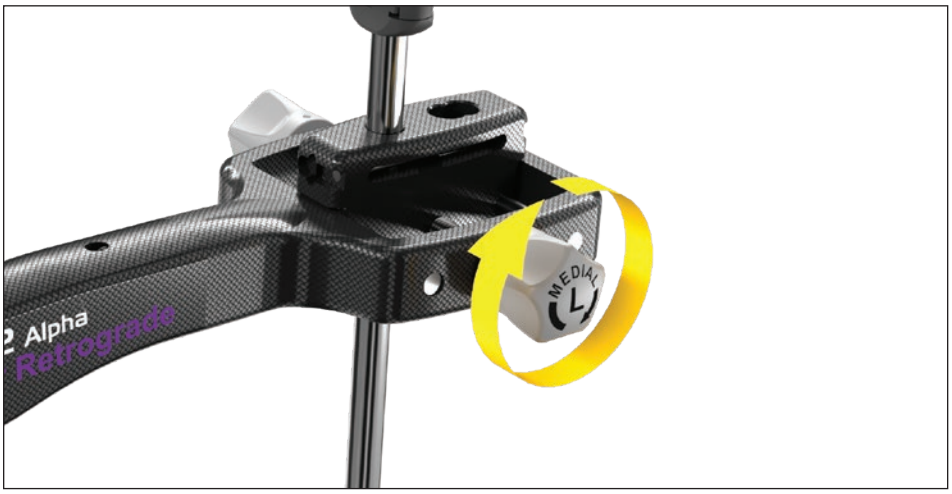


Fig. 53

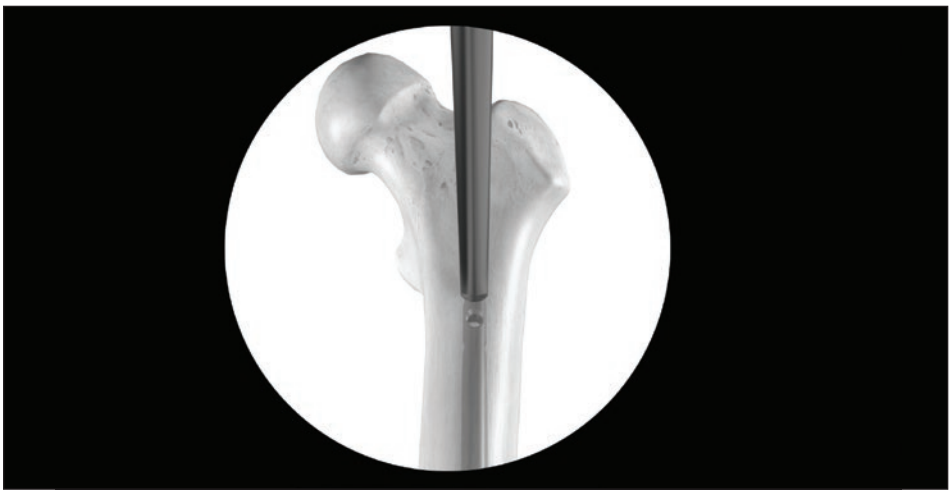


Fig. 54

Operative technique
Guided proximal locking

Proximal drilling and locking

Once the correct nail and sleeve adjustment has been obtained, make a small skin incision at the sleeve entry point. Ensure that the incision is straight to avoid forces on the sleeve.

Advance the Locking Tissue Protection Sleeve, Long, Locking Drill Sleeve, long, and Locking Trocar, Long, assembly through the incision until the sleeve tip is close to the cortex. Do not force the chamfers of the sleeve into the bone as this could cause deviations. Take an X-ray to confirm correct position of the sleeve as sleeve alignment could be compromised by soft tissue or slippage on the bone. Adjust sleeve position if needed.

Once sleeve position has been confirmed, commence distal drilling (fig. 55) and screw insertion as outlined in the distal locking section. Repeat these steps for the insertion of a second AP screw.

Fig. 55

⚠CAUTION

To prevent skiving of the sleeve while ensuring bone contact for correct screw measurement, gently seat the sleeve on the bone. Do not apply excessive forces to the sleeve.

⚠CAUTION

Avoid applying soft tissue pressure to the sleeve assembly. Do not make skin incision until correct alignment of screw trajectory is confirmed.

NOTICE

Patient anatomy, entry point or other factors may result in excessive nail bending that cannot be compensated by design or with the adjustment function. In these instances, freehand proximal locking must be performed.

Guided proximal locking – short nail only

The Proximal Targeting Device Short Femur Retrograde is designed to provide guided proximal locking for the short version of the T2 Alpha Femoral Nail Retrograde (170 and 200mm).

To use, attach the device to the Targeting Arm Femur Retrograde by inserting the pins of the Proximal Targeting Device Short Femur Retrograde into the Targeting Arm Femur Retrograde (fig. 56).

Attach the Proximal Targeting Device Short Femur Retrograde knob to the proximal targeting device. Rotating this knob will lock the sleeve assembly into position (fig. 57).

Employ drilling and routine screw insertion as previously described while ensuring that forces are not applied to the targeting arm or drill sleeve assembly (fig. 58).

NOTICE

Patient anatomy, entry point or other factors may result in excessive nail bending that cannot be compensated by design or with the adjustment function. In these instances, freehand proximal locking must be performed.

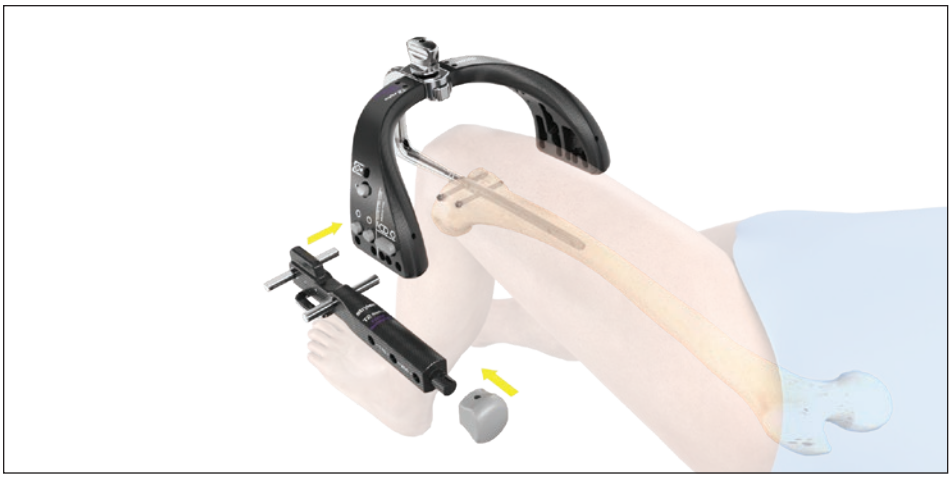


Fig. 56

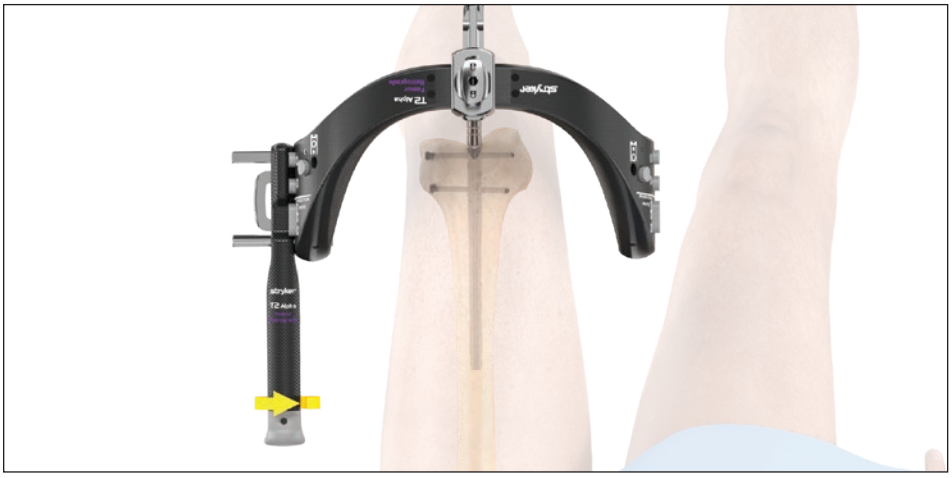


Fig. 57

Fig. 58

Operative technique
Freehand proximal locking

The freehand technique may be used to insert the proximal AP screws. The critical step with any freehand locking technique is to adjust the C-arm until a perfectly circle locking hole is visualized with the C-arm (fig. 59b).
Once the C-arm is correctly positioned, make a skin incision that is in line with the distal hole of the nail (fig. 60a). Place the 4.2 x 130mm or 4.2 x 185mm Freehand Drill at an oblique angle in the frontal plane with the tip on the center hole (fig. 60b). Move the drill into the same axis as the holes in the nail and drill through the first cortex of the nail until resistance of the second cortex is felt. Confirm in both the AP and ML planes that the Freehand Drill passes through the hole in the nail. Use the screw scale with the drill to read off the screw length directly at the color coded marking (fig. 61a).

Alternatively, the Freehand Depth Gauge, Long, or Freehand Depth Gauge, Short, may be used after drilling to determine the required screw length (fig. 61b).

Repeat steps as needed to insert additional screws.

⚠ CAUTION

Take care to avoid capturing soft tissue during freehand drilling.

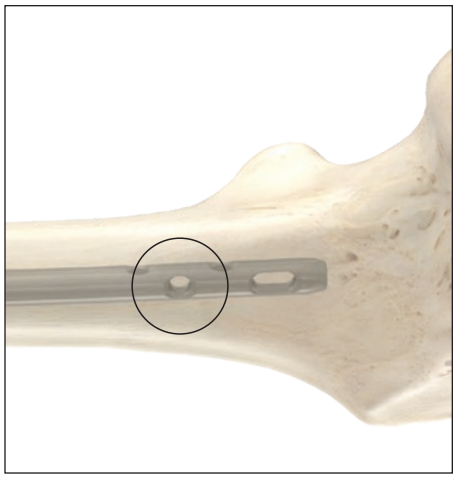


Fig. 59a: Locking hole is not perfectly circular. The C-arm is not correctly positioned.

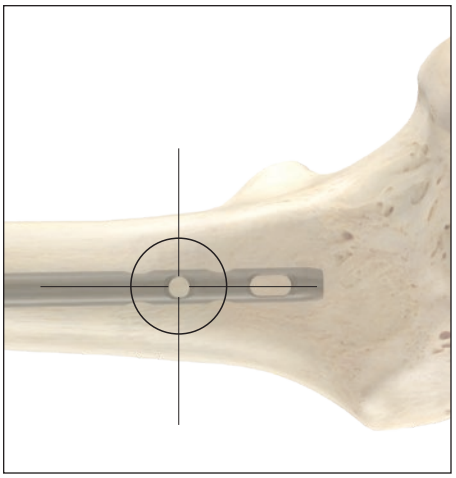


Fig. 59b: Locking hole is perfectly curcular. The C-arm is correctly positioned.

Fig. 60a

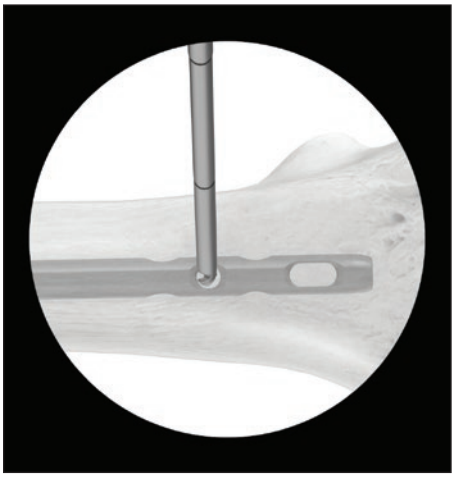


Fig. 60b

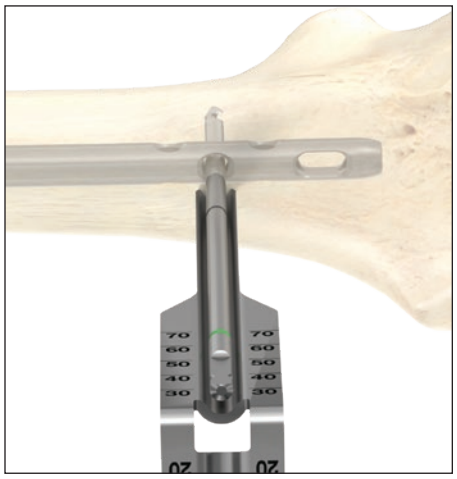


Fig. 61a

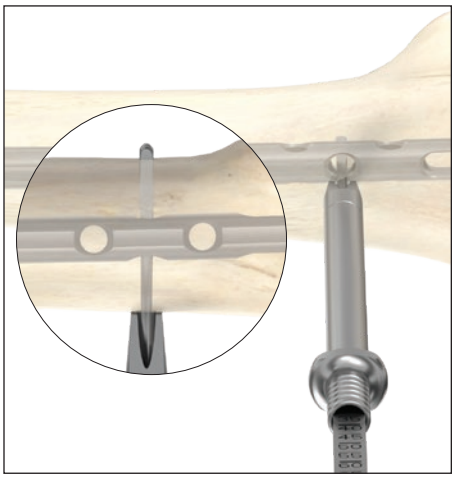


Fig. 61b

Operative technique
Advanced locking screws

The self-retaining screwdriver assembly may be used to facilitate freehand locking. To use, assemble the Self-retaining Screwdriver Sleeve to the Self-Retaining Screwdriver Bit / quick-lock delta handle assembly (fig. 62) and attach the screwdriver to the screw and secure the connection by turning the screwdriver sleeve counter-clockwise.

Routine screw insertion is employed to insert the screw.

Fig. 62

Advanced Locking Screws

Advanced Locking Screws (fig. 63) can be used as an alternative to the Locking Screws. The Advanced Locking Screws are designed with oversized threads that engage with the internal threads of the T2 Alpha Retrograde Femoral Nail while maintaining bicortical purchase.

Overdrilling of the near cortex must be performed to create a path for the screw. Advanced Locking Screws may be preferred in instances of osteopenic bone and in other instances when axial stability is desired.

Advanced Locking Screws may be inserted in any circular hole of the nail (fig. 64). They cannot be used in the dynamic / oblong holes.

The Advanced Locking Screws are inserted in a guided locking technique via the Targeting Arm Femur Retrograde and / or the Proximal Targeting Arm Femur Retrograde or using a proximal freehand technique.

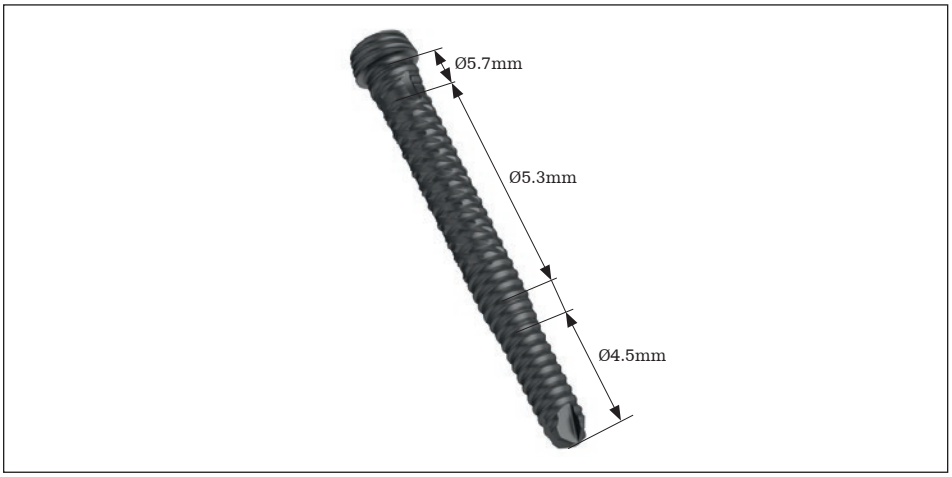


Fig. 63

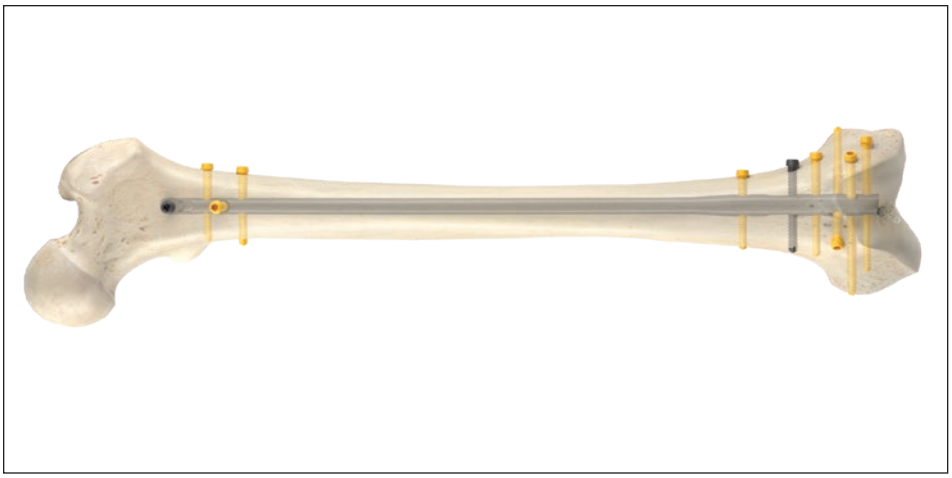


Fig. 64

Gold screws indicate holes which accept advanced locking screws.

Operative technique
Advanced locking screws

When using a guided technique, drilling and insertion of the Advanced Locking Screws is performed through the sleeve(s) of the Proximal Targeting Arm Femur Retrograde or distal targeting arm. Drill both cortices (fig. 65) and determine screw length in a guided or freehand manner as previously described in this operative technique. Once screw length has been determined, open the near cortex using the counterbore drill (fig. 66, 67). Freehand locking requires use of the Counterbore Drill, Short, and guided locking requires use of the Counterbore Drill, Long.

Ensure that the drill is centered with the hole of the nail prior to insertion, and then drill until the stop is felt. Verify under imaging. In some instances, thick cortex or strong trabecular bone stock may prevent the counterbore drill from fully clearing the insertion path to the nail.

When this occurs, use the Counterbore Drill, Manual, in combination with the quick Quick-Lock Handle to ensure that the passage to the nail is sufficiently widened.

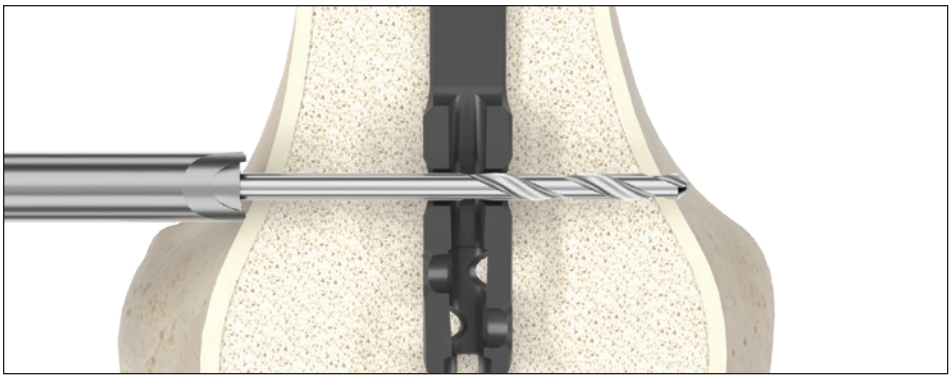


Fig. 65

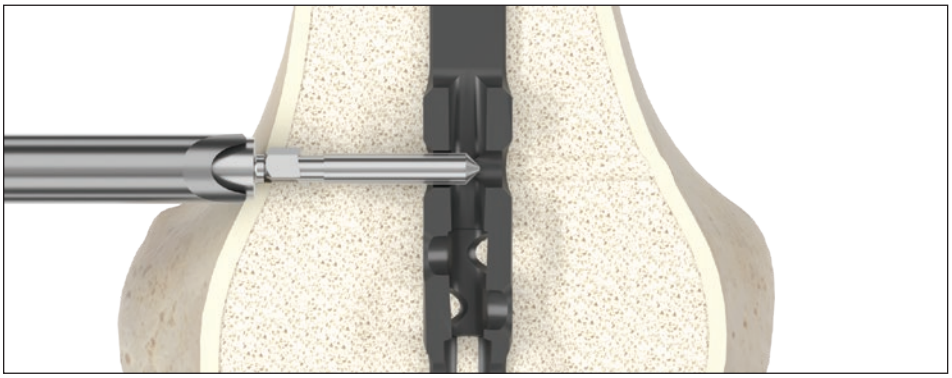


Fig. 66

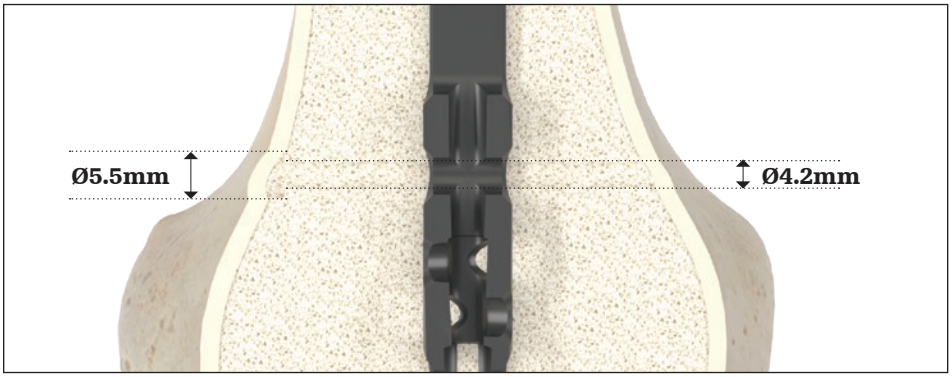


Fig. 67

⚠CAUTION

Overdrilling with the counterbore drill must be performed prior to Advanced Locking Screw Insertion.

NOTICE

Do not use the Counterbore Drill, Manual with the power tool.

Operative technique
Advanced locking screws

To use, insert the Counterbore Drill, Manual, through the path created by the first counterbore drill and turn the drill in a gentle clockwise motion with moderate axial pressure until the pathway to the nail has been opened (fig. 68). Once drilling has been completed, insert the Advanced Locking Screw with gentle axial force using the appropriate screwdriver through the near cortex without turning the screw, while ensuring that the axis of the screw is aligned with the corresponding locking hole. Push the screw until the leading tip is engaged with the nail hole. X-ray verification can be used to confirm position. To confirm correct starting point and axial alignment of the screw, gently rotate the screw counter-clockwise while applying gentle axial force (fig. 69). A click sound or snapping of the thread indicates that the screw is in the correct position.

Once position has been confirmed, insert the screw by rotating clockwise until the screw is fully seated (fig. 70). Use X-ray to confirm.

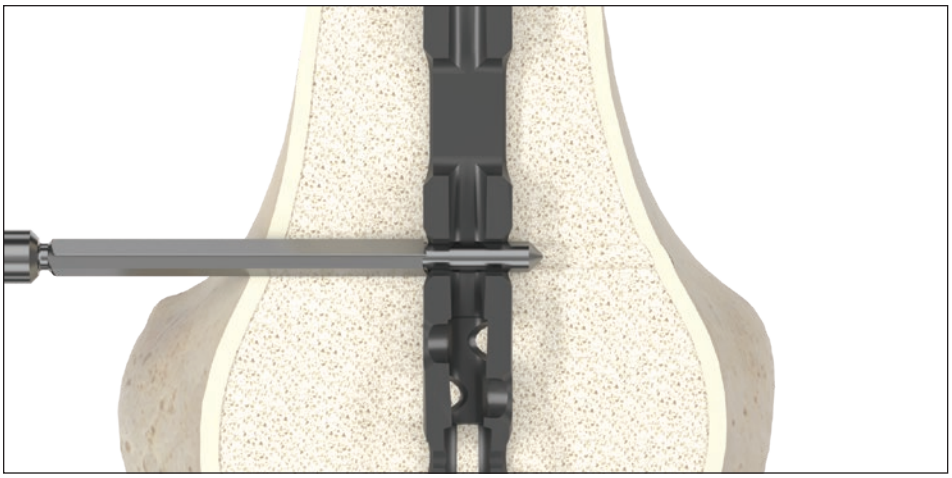


Fig. 68

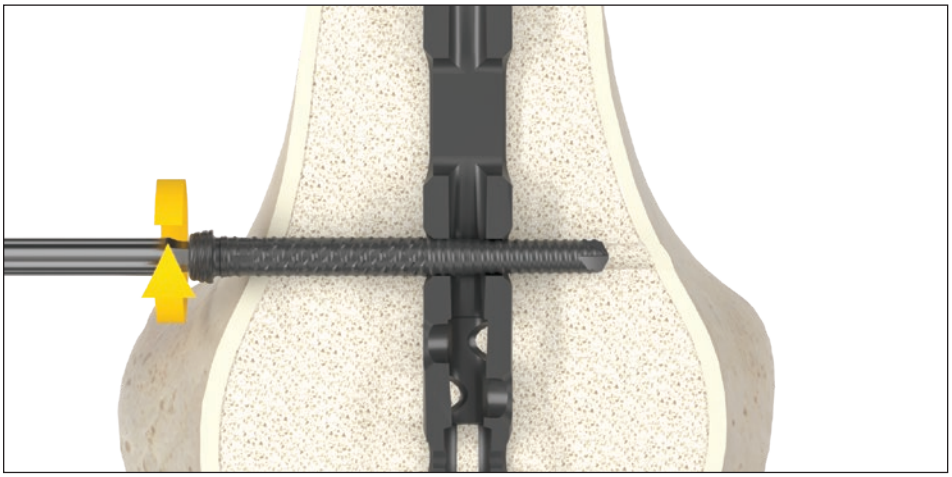


Fig. 69

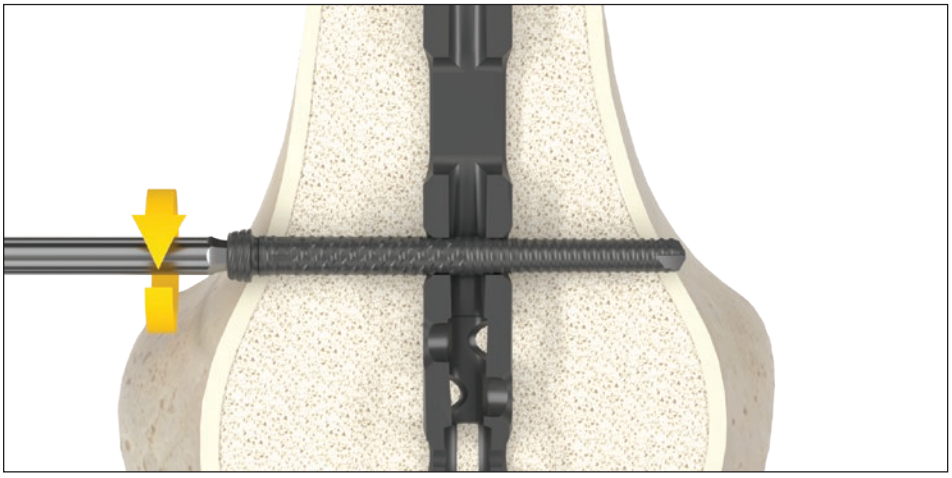


Fig. 70

⚠ CAUTION

The Advanced Locking Screw must be inserted using reasonable force to provide desired function and to avoid damaging the screw. If unreasonable insertion torque is noticed, stop insertion, turn the screw counterclockwise and then attempt to insert the screw. If unreasonable insertion torque is still noticed, remove the screw and proceed with a Locking Screw.

Operative technique
Condyle screw insertion

Optionally, Condyle Screws can be used as an alternative to the Advanced Locking or Locking Screws in the distal transverse static holes. If a Condyle Screw is to be inserted, drill both cortices with the 4.2 x 360mm drill through the triple sleeve assembly (fig. 71). Screw length measurement should be determined as previously described in this operative technique.

Note: The measurement equals Condyle Screw fixation length (from top of the Condyle Screw head to the top of Condyle Nut head). The Condyle Screw length is defined with the Condyle Screw tip flush to the Condyle Nut head. The possible fixation length ranges from 2mm longer than the Condyle Screw length to 5mm shorter. Ensure that the Condyle Nut is tightened a minimum of 5 turns on the Condyle Screw.

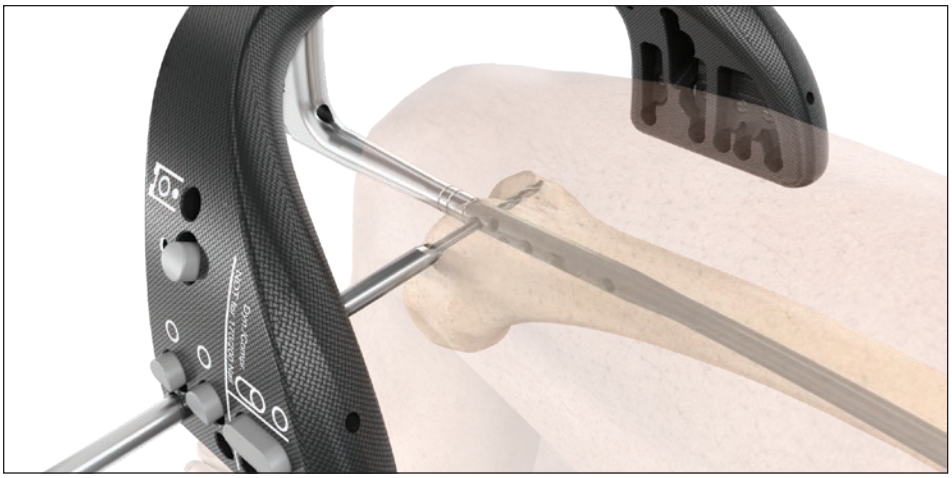


Fig. 71

Operative technique
Condyle screw insertion

Use of the countersink (fig. 72) is necessary to widen the path to the nail and to prepare the cortex to properly seat the Condyle Screw and nut. To use, attach the countersink to the Quick Lock Delta Handle and insert the countersink through the Tissue Protection Sleeve into the path created by the 4.2mm drill. Turn the Countersink Bit for Condyles in a gentle clockwise motion while applying gentle axial pressure until the stop at the Tissue Protection Sleeve (fig. 73). This step must be performed from the lateral and then from the medial side.

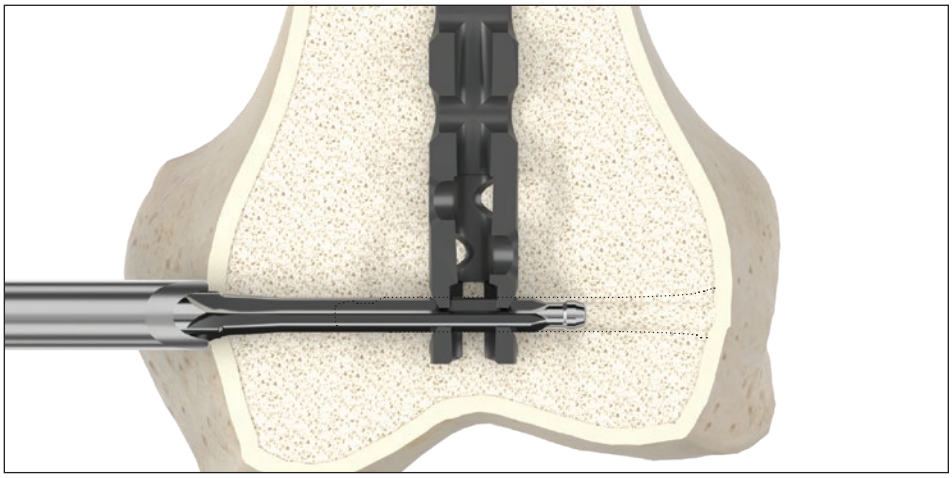


Fig. 72

NOTICE

- In cases where the chosen Condyle Screw is too long it may be easier to extract the screw with the Revision Condyle Screwdriver Bit (1806-0257) placed on top of the Condyle Screwdriver.
- Do not use the revision Condyle Screwdriver Bit for screw insertion and/or compression.

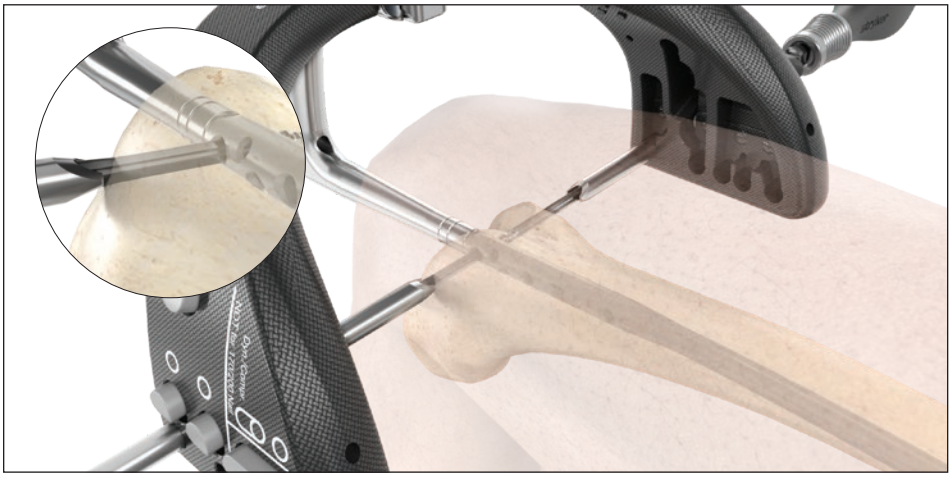


Fig. 73

⚠CAUTION

The measurement equals Condyle Screw fixation length (from top of the condyle screw head to the top of Condyle Nut head). The Condyle Screw length is defined with the Condyle Screw tip flush to the Condyle Nut head. The possible fixation length ranges from 2mm longer than the condyle screw length to 5mm shorter. Ensure that the condyle nut is tightened a minimum of 5 turns on the Condyle Screw!

Operative technique

Condyle screw insertion

Once both the medial and lateral side have been opened, using the countersink, insert the 1.8 × 310mm K-Wire through the path created by the countersink so it passes all the way through the leg. (The K-wire may have to be bent under the targeter). Then remove the targeting arm from the nail adapter (fig 74, 75, 76). From the medial side, the Condyle Screw is now brought forward over the K-wire and inserted using the condyle screwdriver bit/delta handle assembly.

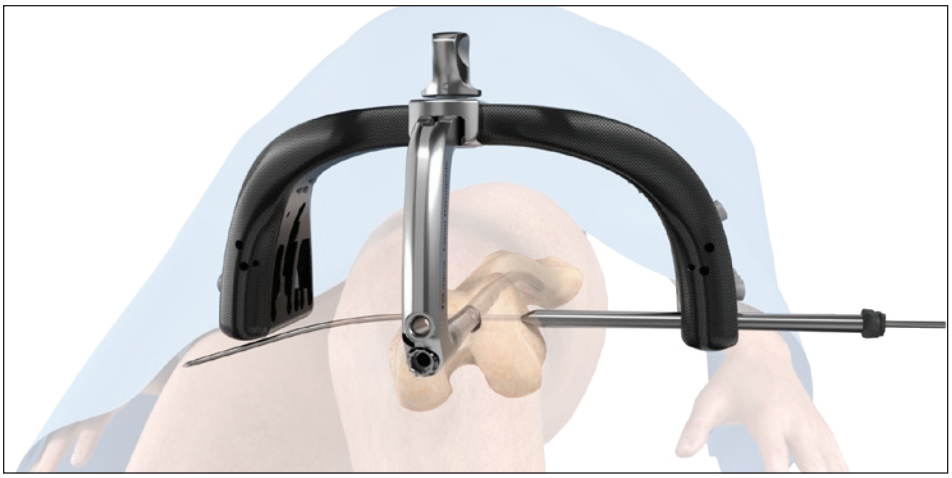


Fig. 74

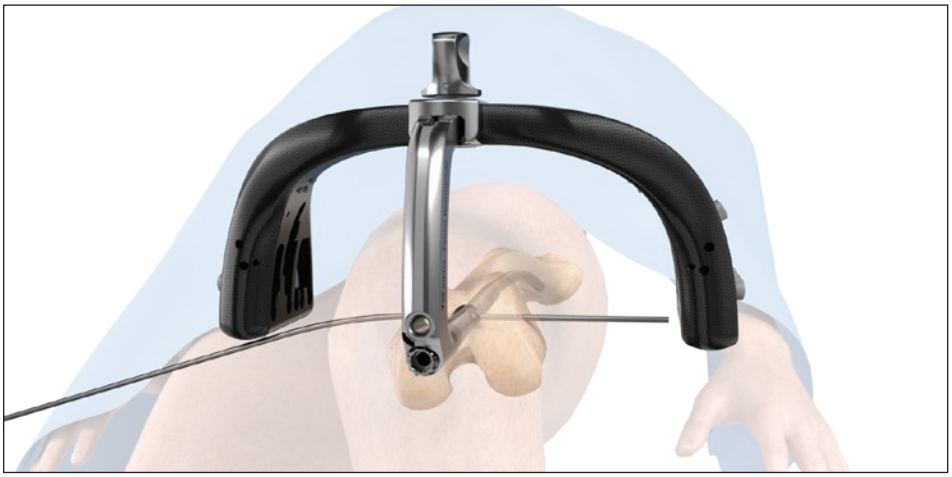


Fig. 75

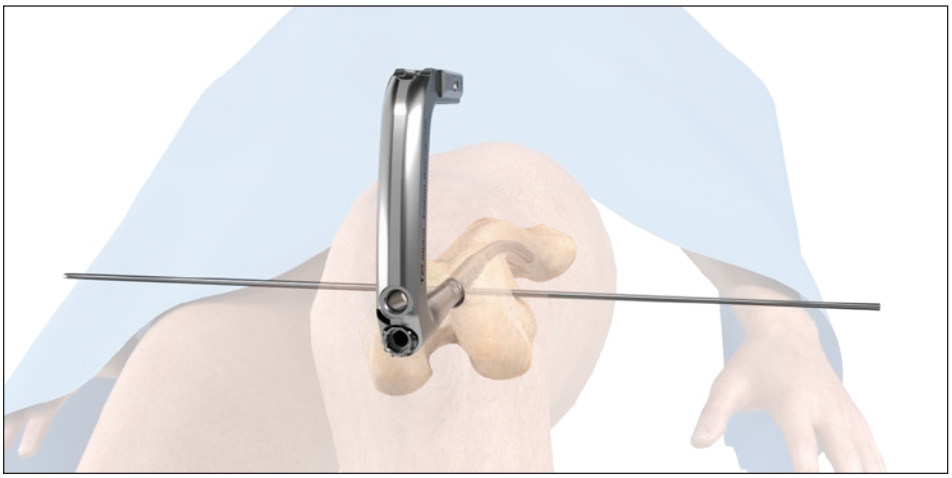


Fig. 76

Operative technique
Condyle screw insertion

Using both Condyle Screwdriver Bits, tighten the Condyle Nut and the Condyle Screw. Once tightened, remove the K-wire (fig. 77, 78).

Alternatively, the Condyle Screw may be introduced from lateral to medial in a similar manner as described above.

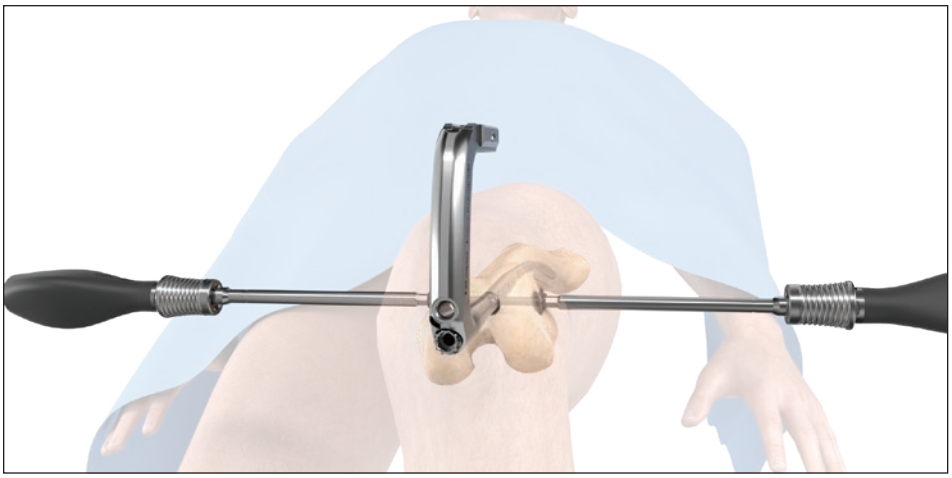


Fig. 77

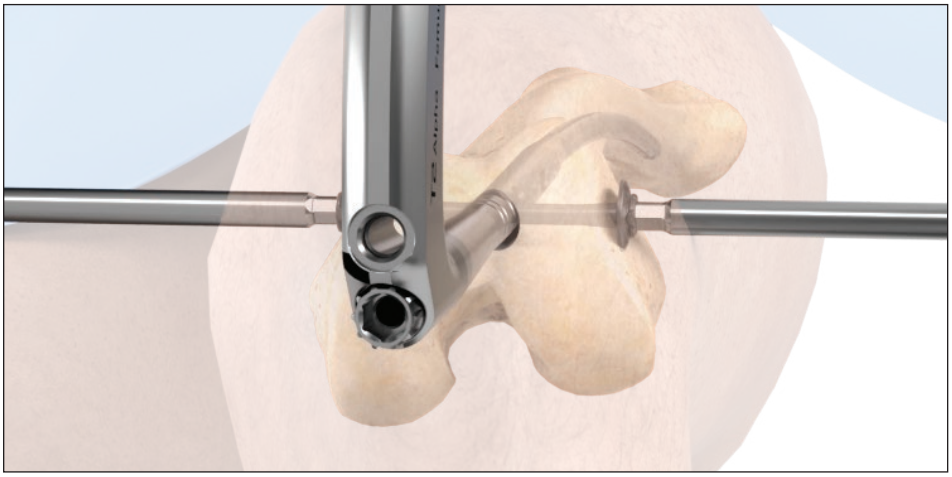


Fig. 78

End cap insertion

Remove the targeting arm and nail holding screw. Be sure to maintain the position of nail adapter and nail while removing the nail holding screw (fig. 79). Insert the End Cap through the nail adaptor using the Screwdriver, Long, and delta handle assembly (fig. 80). Fully seat the end cap to minimize the potential for loosening. The End Cap will lock the Locking Screw at the distal end of the nail. This will create a fixed angle between nail and Locking Screw and prevent lateral sliding of the nail. Remove the nail adapter (fig. 81). Thoroughly irrigate the wound to prevent debris from remaining within the knee joint and close using a standard technique.

Fig. 79

Fig. 80

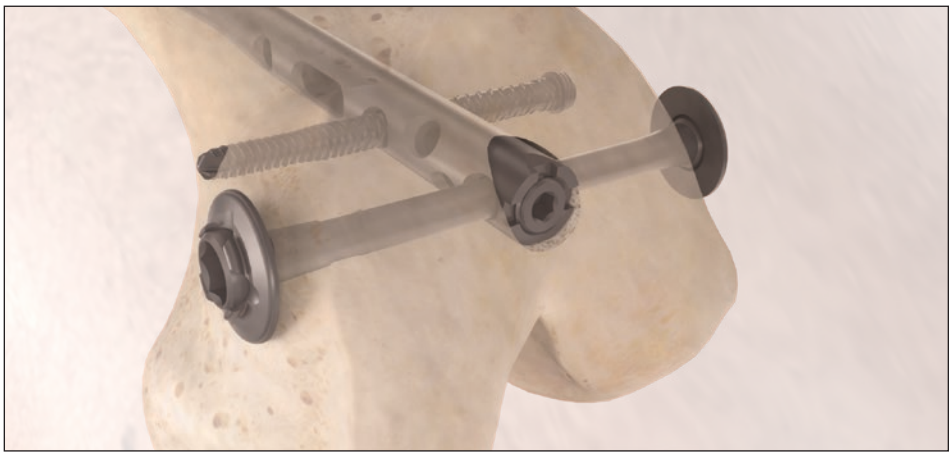


Fig. 81

Operative technique
Nail removal

The End Cap SCN and the most Distal Locking Screw is removed with the Screwdriver Bit, Long and Quick-Lock Delta Handle assembly. To remove the nail, thread the Universal Rod into the driving end of the nail and use the Slotted Hammer to extract the nail in a controlled manner. Alternatively, the Universal Rod used in conjunction with the Extraction Shaft may be threaded into the nail and used for extraction. All screws must be removed prior to nail removal.

All IMN Screws are removed with the Screwdriver Bit. If the Compression Screw Femur was used, it must be removed prior to assembly of the Extraction Shaft. Unlock and loosen the Compression Screw Femur with the Compression Screwdriver.

The Condyle Screws must be removed with the Condyle Revision Screwdriver.

When extracting a Condyle Screw, it may be easier to extract with the Revision Condyle Screwdriver Bit placed on top of the Condyle Screwdrivers.

⚠CAUTION

Special care must be taken to check if the nail moves off-center of the entry point when screws are removed. Any attempt to remove a nail that is off-center may result in fractures of the distal condylar region.

When extracting a Condyle Screw, it may be easier to extract with the T2 Emergency Screwdriver Bit placed on top of the Condyle Screwdrivers.

⚠CAUTION

Stryker offers a universal implant extraction set that is not compatible with the T2 Alpha Femur Retrograde Nailing System. Use of the T2 Alpha Extraction Shaft is Required for removal. The universal implant extraction set may be used for removal of IMN Screws or other internal fixation systems.

Femoral Nail Retrograde

9.0mm

Ref #	Diameter (mm)	Length (mm)
2339-0922S	Ø9.0	220
2339-0924S	Ø9.0	240
2339-0926S	Ø9.0	260
2339-0928S	Ø9.0	280
2339-0930S	Ø9.0	300
2339-0932S	Ø9.0	320
2339-0934S	Ø9.0	340
2339-0936S	Ø9.0	360
2339-0938S	Ø9.0	380
2339-0940S	Ø9.0	400
2339-0942S	Ø9.0	420
2339-0944S	Ø9.0	440
2339-0946S	Ø9.0	460
2339-0948S	Ø9.0	480

10.0mm

Ref #	Diameter (mm)	Length (mm)
2339-1022S	Ø10.0	220
2339-1024S	Ø10.0	240
2339-1026S	Ø10.0	260
2339-1028S	Ø10.0	280
2339-1030S	Ø10.0	300
2339-1032S	Ø10.0	320
2339-1034S	Ø10.0	340
2339-1036S	Ø10.0	360
2339-1038S	Ø10.0	380
2339-1040S	Ø10.0	400
2339-1042S	Ø10.0	420
2339-1044S	Ø10.0	440
2339-1046S	Ø10.0	460
2339-1048S	Ø10.0	480

11.0mm

Ref #	Diameter (mm)	Length (mm)
2339-1122S	Ø11.0	220
2339-1124S	Ø11.0	240
2339-1126S	Ø11.0	260
2339-1128S	Ø11.0	280
2339-1130S	Ø11.0	300
2339-1132S	Ø11.0	320
2339-1134S	Ø11.0	340
2339-1136S	Ø11.0	360
2339-1138S	Ø11.0	380
2339-1140S	Ø11.0	400
2339-1142S	Ø11.0	420
2339-1144S	Ø11.0	440
2339-1146S	Ø11.0	460
2339-1148S	Ø11.0	480

12.0mm

Ref #	Diameter (mm)	Length (mm)
2339-1222S	Ø12.0	220
2339-1224S	Ø12.0	240
2339-1226S	Ø12.0	260
2339-1228S	Ø12.0	280
2339-1230S	Ø12.0	300
2339-1232S	Ø12.0	320
2339-1234S	Ø12.0	340
2339-1236S	Ø12.0	360
2339-1238S	Ø12.0	380
2339-1240S	Ø12.0	400
2339-1242S	Ø12.0	420
2339-1244S	Ø12.0	440
2339-1246S	Ø12.0	460
2339-1248S	Ø12.0	480

13.0mm

Ref #	Diameter (mm)	Length (mm)
2339-1322S	Ø13.0	220
2339-1324S	Ø13.0	240
2339-1326S	Ø13.0	260
2339-1328S	Ø13.0	280
2339-1330S	Ø13.0	300
2339-1332S	Ø13.0	320
2339-1334S	Ø13.0	340
2339-1336S	Ø13.0	360
2339-1338S	Ø13.0	380
2339-1340S	Ø13.0	400
2339-1342S	Ø13.0	420
2339-1344S	Ø13.0	440
2339-1346S	Ø13.0	460
2339-1348S	Ø13.0	480

14.0mm

Ref #	Diameter (mm)	Length (mm)
2339-1422S	Ø14.0	220
2339-1424S	Ø14.0	240
2339-1426S	Ø14.0	260
2339-1428S	Ø14.0	280
2339-1430S	Ø14.0	300
2339-1432S	Ø14.0	320
2339-1434S	Ø14.0	340
2339-1436S	Ø14.0	360
2339-1438S	Ø14.0	380
2339-1440S	Ø14.0	400
2339-1442S	Ø14.0	420
2339-1444S	Ø14.0	440
2339-1446S	Ø14.0	460
2339-1448S	Ø14.0	480

System components

Femoral Nail Retrograde, Short

Ref #	Diameter (mm)	Length (mm)
2339-0917S	Ø9.0	170
2339-0920S	Ø9.0	200
2339-1017S	Ø10.0	170
2339-1020S	Ø10.0	200
2339-1117S	Ø11.0	170
2339-1120S	Ø11.0	200
2339-1217S	Ø12.0	170
2339-1220S	Ø12.0	200
2339-1317S	Ø13.0	170
2339-1320S	Ø13.0	200
2339-1417S	Ø14.0	170
2339-1420S	Ø14.0	200

System components

End Cap

Ref #	Diameter (mm)
1826-0003S	Ø8.0

Compression Screw, Femur

Ref #	Diameter (mm)
2330-0001S	Ø5.5

Condyle Screws

Ref#	Diameter (mm)	Length (mm)
1895-5040S	Ø5.0	40
1895-5045S	Ø5.0	45
1895-5050S	Ø5.0	50
1895-5055S	Ø5.0	55
1895-5060S	Ø5.0	60
1895-5065S	Ø5.0	65
1895-5070S	Ø5.0	70
1895-5075S	Ø5.0	75
1895-5080S	Ø5.0	80
1895-5085S	Ø5.0	85
1895-5090S	Ø5.0	90
1895-5095S	Ø5.0	95
1895-5100S	Ø5.0	100
1895-5105S	Ø5.0	105
1895-5110S	Ø5.0	110
1895-5115S	Ø5.0	115
1895-5120S	Ø5.0	120

Condyle Screw Nut

Ref#	Diameter (mm)
1895-5001S	Ø5.0

Locking Screws

Ref #	Diameter (mm)	Length (mm)
2360-5025S	Ø5.0	25.0
2360-5027S	Ø5.0	27.5
2360-5030S	Ø5.0	30.0
2360-5032S	Ø5.0	32.5
2360-5035S	Ø5.0	35.0
2360-5037S	Ø5.0	37.5
2360-5040S	Ø5.0	40.0
2360-5042S	Ø5.0	42.5
2360-5045S	Ø5.0	45.0
2360-5047S	Ø5.0	47.5
2360-5050S	Ø5.0	50.0
2360-5052S	Ø5.0	52.5
2360-5055S	Ø5.0	55.0
2360-5057S	Ø5.0	57.5
2360-5060S	Ø5.0	60.0
2360-5065S	Ø5.0	65.0
2360-5070S	Ø5.0	70.0
2360-5075S	Ø5.0	75.0
2360-5080S	Ø5.0	80.0
2360-5085S	Ø5.0	85.0
2360-5090S	Ø5.0	90.0
2360-5095S	Ø5.0	95.0
2360-5100S	Ø5.0	100.0
2360-5105S	Ø5.0	105.0
2360-5110S	Ø5.0	110.0
2360-5115S	Ø5.0	115.0
2360-5120S	Ø5.0	120.0

Advanced Locking Screws

Ref #	Diameter (mm)	Length (mm)
2361-5030S	Ø5.0	30.0
2361-5032S	Ø5.0	32.5
2361-5035S	Ø5.0	35.0
2361-5037S	Ø5.0	37.5
2361-5040S	Ø5.0	40.0
2361-5042S	Ø5.0	42.5
2361-5045S	Ø5.0	45.0
2361-5047S	Ø5.0	47.5
2361-5050S	Ø5.0	50.0
2361-5052S	Ø5.0	52.5
2361-5055S	Ø5.0	55.0
2361-5057S	Ø5.0	57.5
2361-5060S	Ø5.0	60.0
2361-5065S	Ø5.0	65.0
2361-5070S	Ø5.0	70.0
2361-5075S	Ø5.0	75.0
2361-5080S	Ø5.0	80.0
2361-5085S	Ø5.0	85.0
2361-5090S	Ø5.0	90.0
2361-5095S	Ø5.0	95.0
2361-5100S	Ø5.0	100.0

System components

Basic Instruments Basic Long*

	Ref #	Description
	2351-0010	Curved Awl
	2351-0011	Awl Plug
	2351-0020	Reduction Rod
	2351-0030	Guide Wire Handle
	2351-0040	Ball Tip Screwdriver
	1806-0150	Strike Plate
	2351-0060	Slotted Hammer
	2351-0070	Tissue Protection Sleeve, Long
	2351-0100	Screwdriver Bit, Short
	2351-0101	Self-Retaining Screwdriver Sleeve, Short
	2351-0105	Screwdriver Bit, Medium
	2351-0106	Self-Retaining Screwdriver Sleeve, Medium
	2351-0110	Screwdriver Bit, Long
	2351-0140	Quick-Lock Delta Handle, Modified Trinkle
	2351-0150	Guided Depth Gauge
	2351-0160	Freehand Depth Gauge, Short
	2351-0170	Freehand Depth Gauge, Long
	2351-0180	Extraction Shaft
	2351-0340	Screw Scale
	2351-0380	Guide Wire Pusher
	2351-0400	Compression Screwdriver
	2351-0420	X-ray Ruler
	2351-4280	Locking Drill Sleeve, Long
	2351-4290	Locking Trocar, Long
	2355-5000	Basic Tray IMN Instruments
	2355-5005	Basic Tray Base IMN Instruments
	2355-5010	Basic Tray Insert IMN Instruments
	2355-5020	Upgrade Tray Insert IMN Instruments

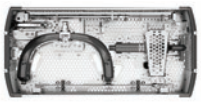
* IMN Instrument System

System components

Optional Instruments*

	Ref #	Description
	2351-0145	Quick-Lock T-Handle, Modified Trinkle
	2351-0370	Reamer Head Tray Insert
	2355-5030	Drills and Pins Tray Insert
	2351-0111	Self-Retaining Screwdriver Sleeve, Long
	1806-0022	Guide Wire Ruler
	1806-0110	Universal Rod, Ø9.0

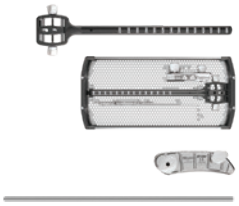
Retrograde Indication Set

	Ref #	Description
	1806-0257	T2 Emergency Screwdriver Bit 6.3mm
	2351-0070	Tissue Protection Sleeve, Long
	2351-0140	Quick-Lock Delta Handle, Modified Trinkle
	2351-0250	External Compression Device Femur
	2351-0330	Screwdriver Bit For Condyles
	2351-0335	Countersink Bit For Condyles
	2351-6000	Opening Reamer Handle
	2351-6112	Opening Reamer, Ø11.5
	2351-6212	Opening Reamer, Sleeve Ø11.5
	2351-6312	Opening Reamer, Trocar Ø11.5
	2353-3903	Nail Adapter Femur Retrograde
	2353-3904	Nail Holding Screw Femur Retrograde
	2353-3907	Distal Targeting Device (DTD) Femur Retrograde
	2355-3910	Femur Retrograde Indication Tray
	2355-3920	Femur Retrograde Indication Tray Insert

* IMN Instrument System

System components

Proximal Targeting Device instruments



Ref #	Description
2353-3906	Proximal Targeting Device (PTD) Femur Retrograde
2355-3915	Femur Retrograde Proximal Targeting Tray
2353-4109	Adapter Tibia / Femur Retrograde
1320-5395	Oblique Alignment Wire

Proximal Targeting Device Short Instruments (optional)

Ref #	Description
2353-3908	Proximal Targeting Device (PTD) Short Femur Retrograde
2353-3909	Knob for Proximal Targeting Device (PTD) Short

Disposables*

Ref #	Description
2351-3028S	K-Wire, Ø3.0 × 285mm
0152-0218S	K-Wire, Ø1.8 × 310mm
2351-4236S	Locking Drill, Ø4.2 × 360mm
2351-4213S	Freehand Drill, Ø4.2 × 130mm
2351-4218S	Freehand Drill, Ø4.2 × 185mm
1806-0085S	Guide-Wire, Ball Tip, Ø3.0 × 1000mm
2351-5500	Counterbore Drill, Short, Ø5.5 × 185mm
2351-5500S	Counterbore Drill, Short, Ø5.5 × 185mm, Sterile
2351-5510	Counterbore Drill, Long, Ø5.5 × 255mm
2351-5510S	Counterbore Drill, Long, Ø5.5 × 255mm, Sterile
2351-5515	Counterbore Drill, Manual, Ø5.5 × 280mm
2351-5515S	Counterbore Drill, Manual, Ø5.5 × 280mm, Sterile
2351-0335S	Countersink Bit For Condyles, Sterile

* IMN Instrument System

The information in the section is not intended to be used for sales and/or promotional purposes. This information is solely intended to be used as a reference for clinical usage.

Notes

Notes

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

The information presented is intended to demonstrate a Stryker product. A surgeon must always refer to the product label and/or Instructions for Use, including the instructions for Cleaning and Sterilization (if applicable), before using any Stryker product. Products may not be available in all markets because product availability is subject to the regulatory and/or medical practices in individual markets. Please contact your Stryker representative if you have questions about the availability of Stryker products in your area.

The Instructions for Use, Operative Techniques, Cleaning instructions, patient information leaflets and other associated labeling may be requested online at www.ifu.stryker.com or www.stryker.com. If saving the Instructions for Use, Operative Techniques, Cleaning instructions from the above mentioned websites, please make sure you always have the most up to date version prior to use.

This document is is only applicable to US and Canada.

Content ID: 'T2-ST-37_Rev-1, 09-2022

Manufacturer:

Stryker GmbH
Bohnackerweg 1
2545 Selzach, Switzerland

stryker.com