



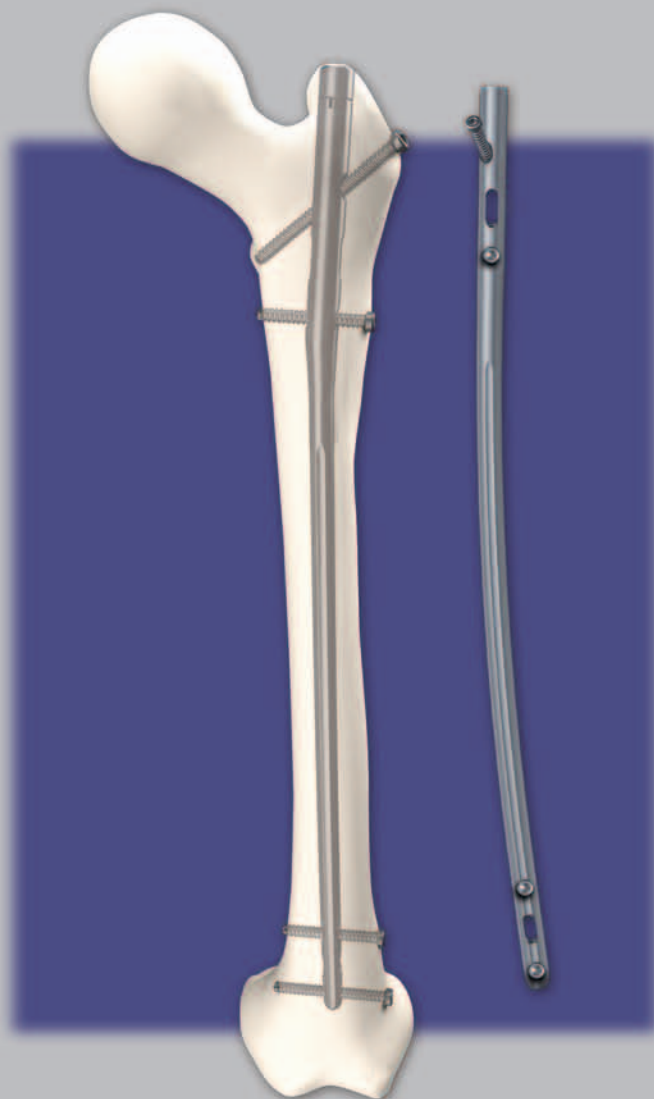
stryker®

T2 GTN

Greater Trochanter Entry Femoral Nailing System

Operative Technique

Femur Fractures



Femoral Nailing System

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This publication sets forth detailed recommended procedures for using Stryker Osteosynthesis 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 first surgery.

All non-sterile devices must be cleaned and sterilized before use. Follow the instructions provided in our reprocessing guide (L24002000). Multi-component instruments must be disassembled for cleaning. Please refer to the corresponding assembly/disassembly instructions.

See package insert (L22000023) for a complete list of potential adverse effects, contraindications, warnings and precautions. The surgeon must discuss all relevant risks, including the finite lifetime of the device, with the patient, when necessary.

Warning:

Fixation Screws

Stryker Osteosynthesis bone screws are not approved or intended for screw attachment or fixation to the posterior elements (pedicles) of the cervical, thoracic or lumbar spine.

Contents

	Page
1. Introduction	4
Implant Features	4
Instrument Features	6
References	6
2. Indications, Precautions & Contraindications	7
3. Additional Information	8
Locking Options	8
4. Pre-operative Planning	9
5. Operative Technique	10
Patient Positioning	10
Incision	10
Entry Point	11
Unreamed Technique	12
Reamed Technique	12
Nail Selection	14
Guided Locking Mode (via Target Device)	15
Nail Insertion	16
Static Locking Mode	18
Freehand Distal Locking	20
End Cap Insertion	21
Dynamic Locking Mode	22
External Apposition / Compression Mode	23
Internal Apposition / Compression Mode	25
Nail Removal	26
<hr/>	
Ordering Information – Implants	27
Ordering Information – Instruments	30

Introduction

Introduction

Over the past several decades **ante-grade femoral nailing** has become the treatment of choice for most femoral shaft fractures.

The T2 GTN System is one of the first femoral nailing systems to offer an option for tip of greater trochanteric entry point insertion with the option to apply compression either by an external compression device or by an internal compression screw.

Through the development of a common, streamlined and intuitive surgical approach the T2 GTN System offers **the potential for more efficient treatment** of fractures as well as simplifying the training requirements for all personnel involved.

Implant Features

The T2 GTN Nailing System is the realization of biomechanical intramedullary stabilization using small caliber, strong, cannulated implants for internal fixation of the femur. According to the fracture type, the system offers the option of different locking modes. In addition to static locking, a controlled dynamization with rotational stability is an option.

In some indications, a controlled apposition/compression of bone fragments can be applied by attaching an external compression device to the top of a shaft screw inserted in the oblong hole. Alternatively, an internal Compression Screw can be introduced from the top of the nail. To further help increase rotational stability, the nail can be locked statically after using the controlled dynamization and apposition/compression option. When compression is applied the Partially Threaded Locking Screw (Shaft Screw) that has been placed in the oblong hole is drawing either the distal or the proximal segment towards the fracture site. In stable fractures, this offers the biomechanical advantage of creating active circumferential compression to the fracture site, transferring axial load to the bone, and reducing the function of the nail as a load bearing device (1).

This ability to transfer load back to the bone may reduce the incidence of implant failure secondary to fatigue (2). Typical statically locked nails function as load bearing devices, and failure rates in excess of 20 % have been reported (2).

The beneficial effect of apposition/compression in treating long bone fractures in cases involving transverse and short oblique fractures that are axially stable is well documented (3, 4).

Common 5mm cortical screws* simplify the surgical procedure and promote a minimally invasive approach. Fully Threaded Locking Screws are available for regular locking procedures. Partially Threaded Locking Screws (Shaft Screws) are designed to apply apposition/compression.

A Cannulated Compression Screw to close the fracture site and End Caps are available in various sizes to allow an improved fit.

All implants of the T2 Nailing Systems are made of Type II anodized titanium alloy (Ti6AL4V) for enhanced biomechanical performance**.

See the detailed chart on the next page for the design specifications and size offerings.

* Special order 8mm T2 Femoral Nails can only be locked with 4mm Fully Threaded screws at the non-driving end. As with all diameters of T2 Femoral Nails, the screws for driving end locking are 5mm.

** Axel Baumann, Nils Zander, Ti6Al4V with Anodization Type II: Biological Behaviour and Biomechanical Effects, White Paper, March 2005.

Introduction

Nails

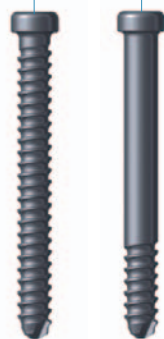
Diameter 8–15mm* (8,14 and 15mm nails are special order)
 Sizes Ø8-15mm: 240–480mm****

5.0mm Partially Threaded Locking Screws (Shaft Screws)

L = 25–120mm

5.0mm Fully Threaded Locking Screws

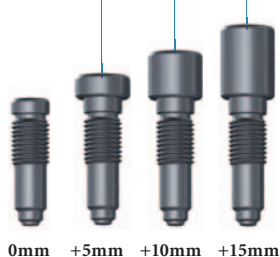
L = 25–120mm



Note:

Screw length is measured from top of head to tip.

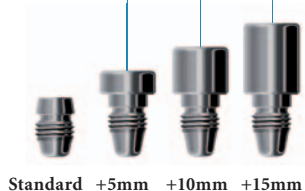
End Caps GTN **



Cannulated Compression Screw



End Caps T2 ***



* 8mm nails require 4mm Fully Threaded Screws for Distal Locking

** Cannot be used when the internal compression screw is applied

*** To be used when the Cannulated Compression Screw is applied

**** Check with your local representative regarding availability of implant sizes

Introduction

Instrument Features

A major advantage of the instrument system is a breakthrough in the integration of the instrument platform which can be used for the complete T2 Nailing System, thereby helping to reduce complexity and inventory.

The instrument platform offers precision and usability, and features ergonomically styled targeting devices.

Symbol coding on the instruments indicates the type of procedure, and dissimilar instruments must not be mixed.

Symbol

- Square = Long instruments
- ▲ Triangular = Short instruments

Drills

Drills feature color coded rings :

4.2mm = **Green**

For 5.0mm Fully Threaded Locking Screws and for the second cortex when using 5.0mm Partially Threaded Locking Screws (Shaft Screws).

5.0mm = **Black**

For the first cortex when using 5.0mm Partially Threaded Locking Screws (Shaft Screws).

References

1. T. E. Richardson, M. Voor, D. Seligson, Fracture Site Compression and Motion with Three Types of Intramedullary Fixation of the Femur, Osteosynthese International (1998), 6: 261-264
2. Hutson et al., Mechanical Failures of Intramedullary Tibial Nails Applied without Reaming, Clin. Orthop. (1995), 315: 129-137
3. M.E. Müller, et al., Manual of Internal Fixation, Springer-Verlag, Berlin, 1991
4. O. Gonschorek, G. O. Hofmann, V. Bühren, Interlocking Compression Nailing: a Report on 402 Applications. Arch. Orthop. Trauma Surg (1998), 117: 430-437
5. Mehdi Mousavi, et al., Pressure Changes During Reaming with Different Parameters and Reamer Designs, Clinical Orthopaedics and Related Research, Number 373, pp. 295-303, 2000
6. Axel Baumann, Nils Zander, Ti6Al4V with Anodization Type II: Biological Behaviour and Biomechanical Effects, White Paper, March 2005.
7. Jan Paul M. Frolke, et al. ; Intramedullary Pressure in Reamed Femoral Nailing with Two Different Reamer Designs., Eur. J. of Trauma, 2001 #5

Indications, Precautions & Contraindications

Indications

- Open and closed femoral fractures
- Pseudarthrosis and correction osteotomy
- Pathologic fractures, impending pathologic fractures and tumor resections
- Ipsilateral femur fractures
- Fractures proximal to a total knee arthroplasty
- Non-unions and mal-unions

Precautions

Stryker Osteosynthesis systems have not been evaluated for safety and use in MR environment and have not been tested for heating or migration in the MR environment, unless specified otherwise in the product labeling or respective operative technique.



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 can not 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.

Additional Information

Locking Options



Static Mode (1)

Dynamic Mode



Static Mode (2)

**Internal Apposition/
Compression Mode**



Static Mode (3)

**External Apposition/
Compression Mode**



Pre-operative Planning

An X-Ray Template 1806-1605 is available **with a magnification of 15%** for pre-operative planning.

Thorough evaluation of pre-operative radiographs of the affected extremity is critical. Careful radiographic examination of the trochanteric region and intercondylar regions may prevent certain intra-operative complications.

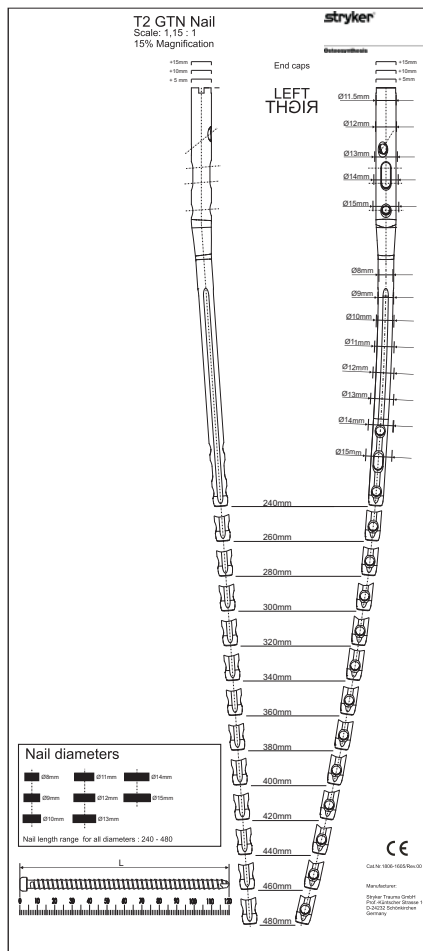
The proper nail length should extend from the tip of the greater trochanter to the epiphyseal scar.

This allows the surgeon to consider the apposition/compression feature of the T2 GTN knowing that up to 10mm of active apposition/ compression is possible, prior to determining the final length of the implant.

If apposition/compression is planned, the nail should be 10mm to 15mm shorter.

Note:

**Check with local representative
regarding availability of nail sizes.**



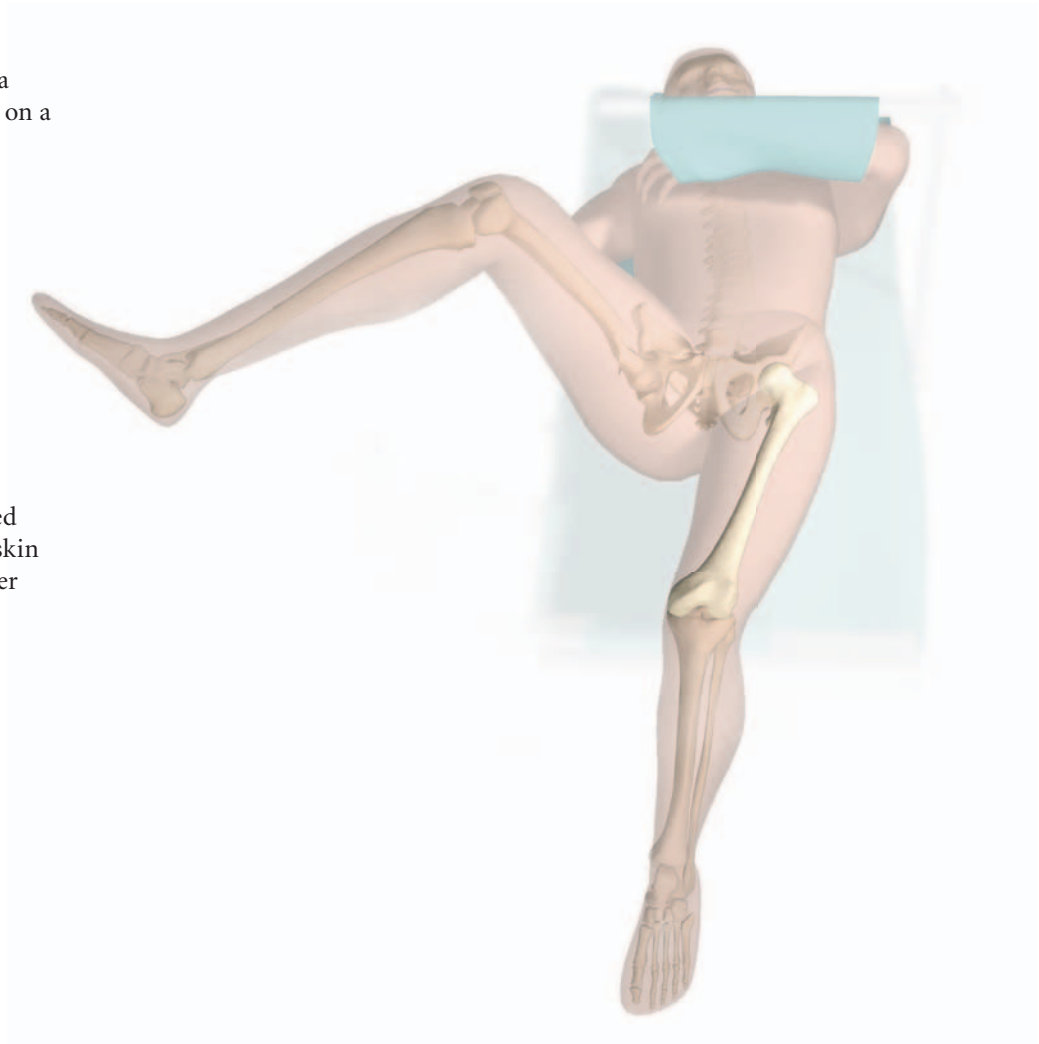
Operative Technique

Patient Positioning

Patient positioning is surgeon dependent. The patient may be positioned supine or lateral on a fracture table, or simply supine on a radiolucent table.

Incision

With experience, the tip of the greater trochanter can be located by palpation, and a horizontal skin incision is made from the greater trochanter to the iliac crest.



Operative Technique

Entry Point

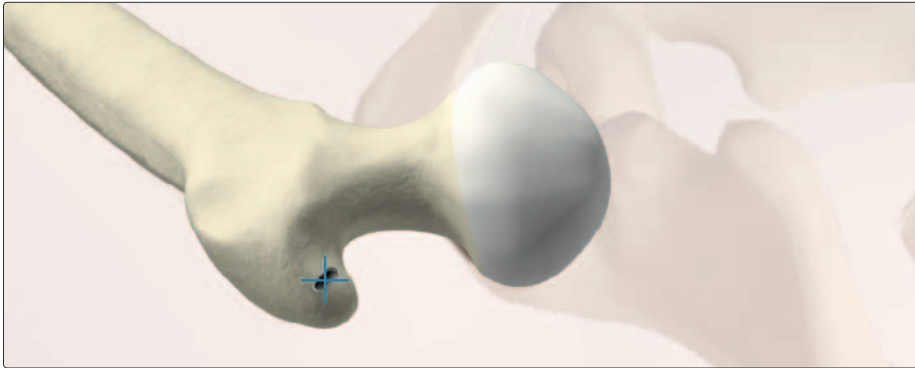


Fig. 1



Fig. 2



Fig. 3

The medullary canal is opened with the Curved Awl (1806-0041) at the junction of the anterior third and posterior two-thirds of the greater trochanter, on the medial edge of the tip itself (Fig. 1 & Fig. 2). Image intensification (A/P and lateral) is used for confirmation.

Once the tip of the greater trochanter has been penetrated, the 3 × 1000mm Ball Tip Guide Wire (1806-0085S) may be advanced through the cannulation of the Curved Awl with the Guide Wire Handle (1806-1095 and 1806-1096) (Fig. 3).

Note:

During opening the entry portal with the Awl, dense cortex may block the tip of the Awl. An Awl Plug (1806-0032) can be inserted through the Awl to avoid penetration of bone debris into the cannulation of the Awl shaft.

Operative Technique

Unreamed Technique

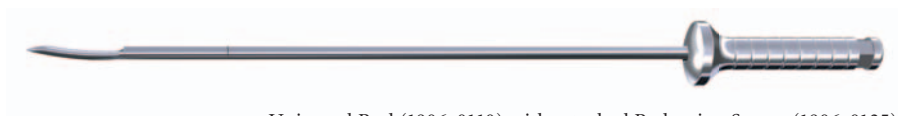
If an unreamed technique is preferred, the 3 × 1000mm Ball Tip Guide Wire (1806-0085S) is passed through the fracture site using the Guide Wire Handle.

The Ø9mm Universal Rod (1806-0110) with Reduction Spoon (1806-0125) may be used as a fracture tool to facilitate Guide Wire insertion through the fracture site (Fig. 4), and in an unreamed technique, may be used as a “sound” to help determine the diameter of the medullary canal.

Internal rotation during insertion will aid in passing the Guide Wire down the femoral shaft. The Guide Wire is advanced until the tip rests at/or to the level of the epiphyseal scar or the mid-pole of the patella. The Guide Wire should lie in the center of the metaphysis in the A/P and M/L views to avoid offset positioning of the nail. The Guide Wire Handle is removed, leaving the Guide Wire in place.



Fig. 4



Universal Rod (1806-0110) with attached Reduction Spoon (1806-0125)

Reamed Technique

If the procedure will be performed using a reamed technique, the 3 × 1000mm Ball Tip Guide Wire is inserted with the Guide Wire Handle through the fracture site to the level of the epiphyseal scar or the mid-pole of the patella and does not need a Guide Wire exchange.

The Ø9mm Universal Rod (1806-0110) with Reduction Spoon (1806-0125) may be used as a fracture reduction tool to facilitate Guide Wire insertion through the fracture site (Fig. 4), and as in an unreamed technique, may be used as a “sound” to help determine the diameter of the medullary canal.

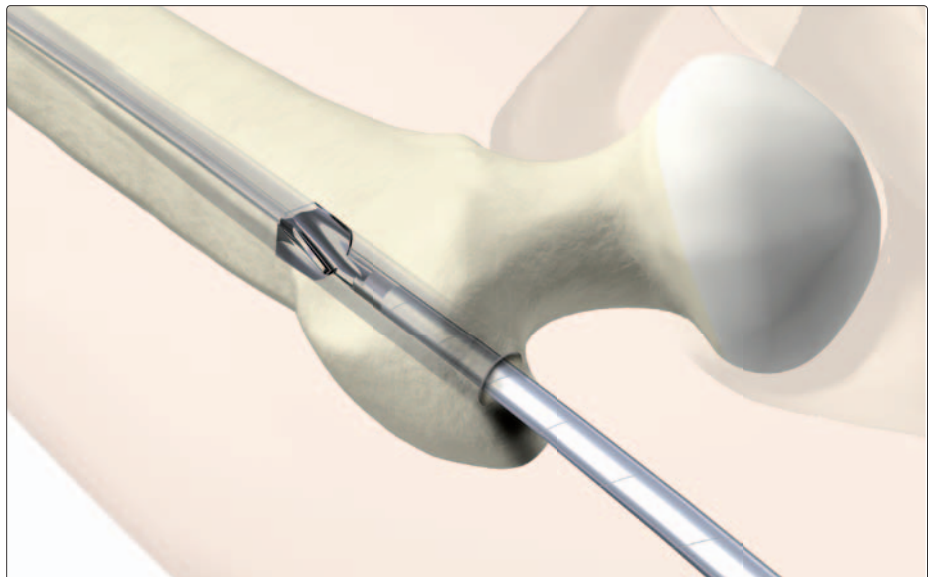
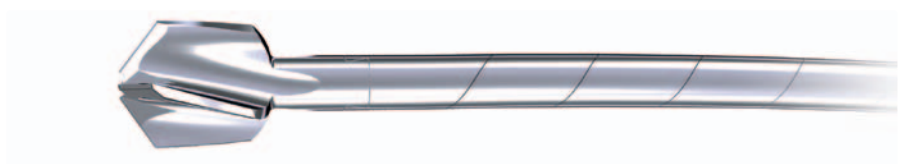


Fig. 5

Note:

The Ball Tip at the end of the Guide Wire will stop the reamer head.

Reaming is commenced in 0.5mm increments until cortical contact is achieved (Fig. 5). Final reaming should be 1mm-1.5mm larger than the diameter of the nail to be used.



Bixcut Reamer

Operative Technique

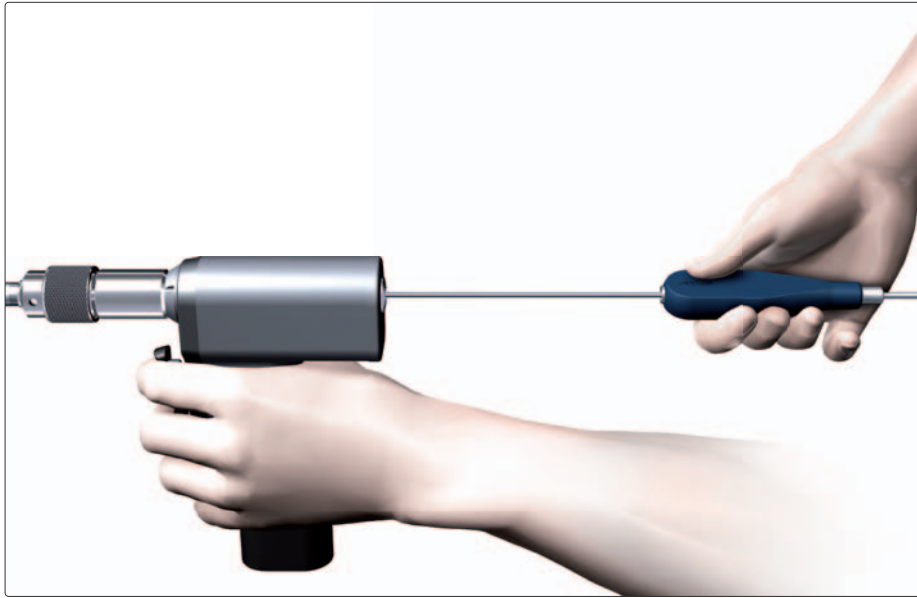


Fig. 6

The Guide Wire Pusher can be used to help keep the Guide Wire in position during reamer shaft extraction. The metal cavity at the end of the handle pushed on the end of the power tool facilitates to hold the Guide Wire in place when starting to pull the power tool (Fig. 6).

When close to the Guide Wire end place the Guide Wire Pusher with its funnel tip to the end of the power tool cannulation (Fig. 7).

While removing the power tool the Guide Wire Pusher will keep the Guide Wire in place.

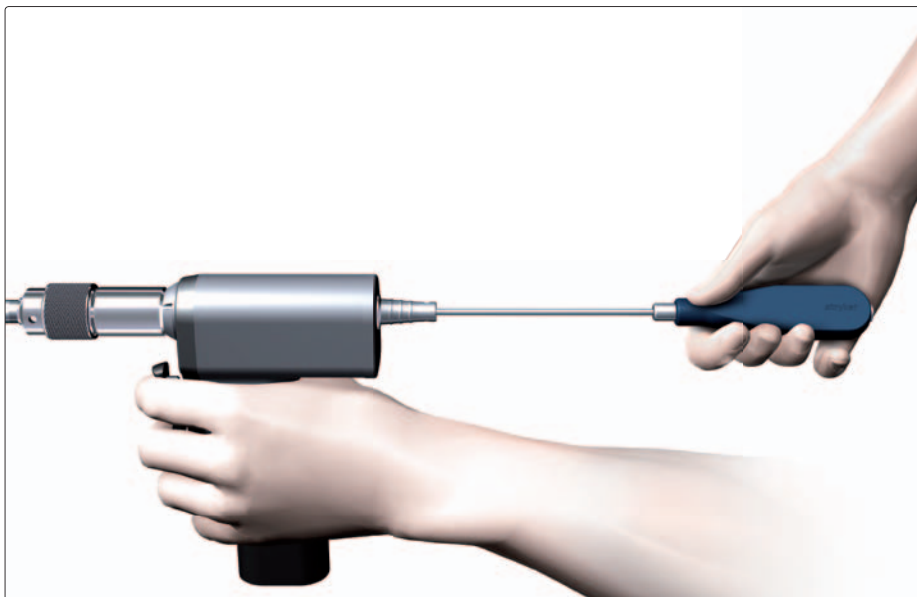


Fig. 7

Note:

The proximal diameter (driving end) of the 8mm–11mm diameter nails is 11.5mm. Nail sizes 12–15mm have a constant diameter. Additional metaphyseal reaming may be required to facilitate nail insertion.



Guide Wire Pusher (1806-0271)

Operative Technique

Nail Selection

Diameter

The diameter of the selected nail should be 1-1.5mm smaller than that of the last reamer used. Alternatively, the nail diameter may be determined using the Femur X-Ray Ruler T2 GTN (1806-1606) (Fig. 8).

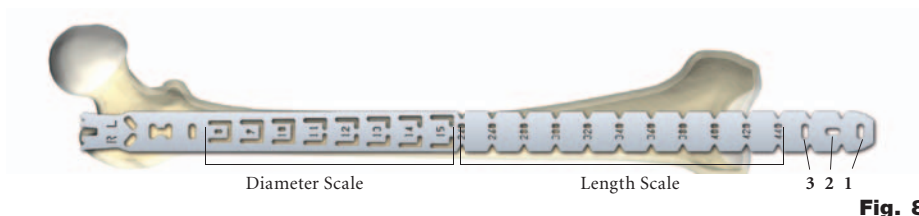


Fig. 8

Fig. 8

Hole Positions (non-driving end)

1. Round hole – static locking – M/L
2. Oblong hole – dynamic locking – M/L
3. Round hole – static locking – M/L

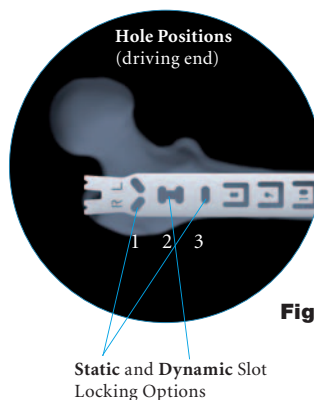


Fig. 9

Fig. 9

Hole Positions (driving end)

1. Round hole (oblique) – static locking – M/L
2. Oblong hole – dynamic or static locking – M/L
3. Round hole – static locking – M/L

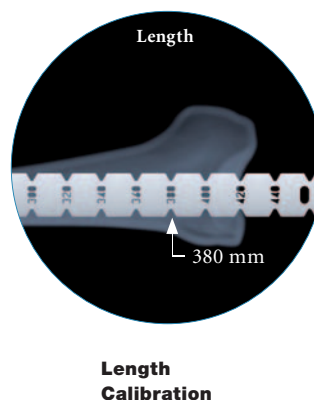


Fig. 10

Determination of Nail Length

Nail length may be determined by measuring the remaining length of the Guide Wire. The Guide Wire Ruler (1806-0022) may be used by placing it on the Guide Wire reading the correct nail length at the end of the Guide Wire on the Guide Wire Ruler (Fig. 11 and Fig. 12).

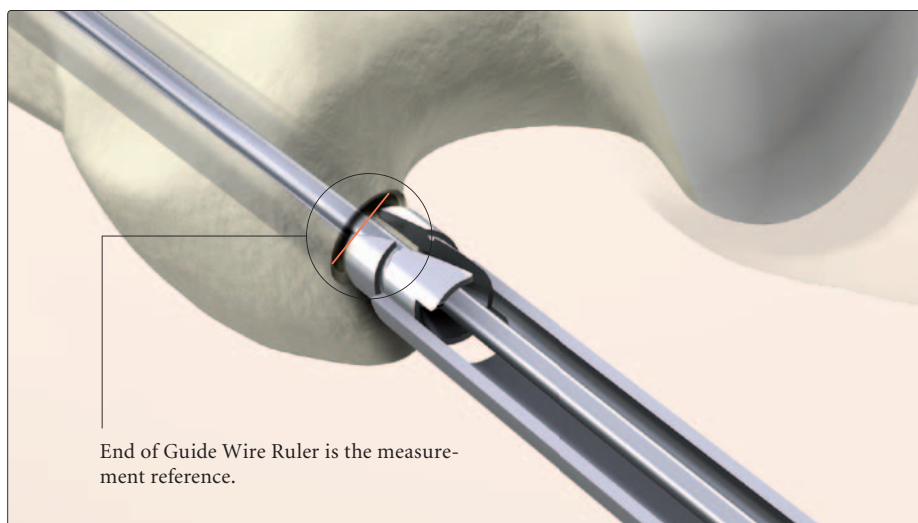


Fig. 11

Alternatively, the X-Ray Ruler (1806-1606) may be used to determine nail diameter and length (Fig. 8 and 10). Additionally, the X-Ray Ruler can be used as a guide for locking screw positions and the entry point of the nail in the greater trochanter.

Caution:

If the fracture is suitable for apposition/compression, the implant selected should be 10–15mm shorter than measured, to help avoid migration of the nail beyond the insertion site.



Fig. 12

Operative Technique

Guided Locking Mode (via Target Device)

The Target Device is designed to provide three options for proximal locking.

In Static Locking Mode, the round oblique hole and the round M/L hole are to be used. (Fig. 13, 14, 15).

- 1. Round M/L static**
- 2. Oblique static**

Alternatively,

- 1. Round M/L static**
- 2. Oblong M/L static**

or,

- 1. Round M/L static**
- 2. Oblique static**
- 3. Oblong M/L static**

In controlled Dynamic Mode, and/or controlled internal Apposition/Compression Mode, the oblong hole is required. This hole is also used for compression (Fig. 16).

- 3. Dynamic**

In External Compression Mode, the dynamic hole is required first. After utilizing compression the static M/L hole is to be used. (Fig. 17).

- 3. Dynamic**
- 2. Static**

In Internal Compression Mode, the dynamic hole is required. A second ML screw is recommended

- 3. Dynamic**
- 2. Static**

Friction Locking Mode

The Long Tissue Protection Sleeve (1806-0185) together with the Long Drill Sleeve (1806-0215) and the Long Trocar (1806-0315) is inserted into the Target Device by pressing the friction lock clip. This mechanism will help keep the sleeve in place and help prevent it from falling out.

It will also help prevent the sleeve from sliding during screw measurement. To release the Tissue Protection Sleeve, the friction lock mechanism must be pressed again.

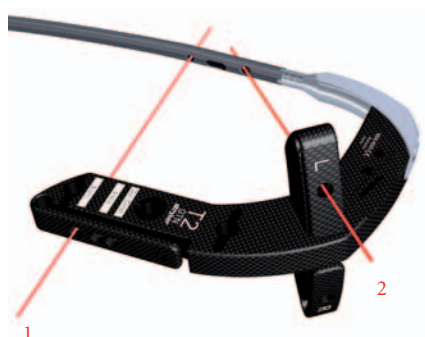


Fig. 13

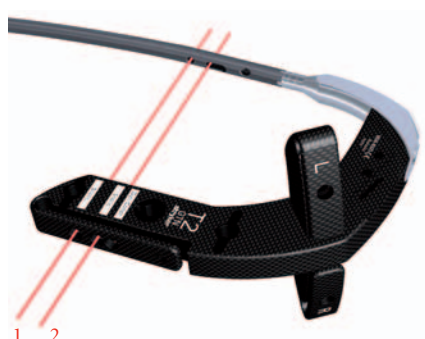


Fig. 14

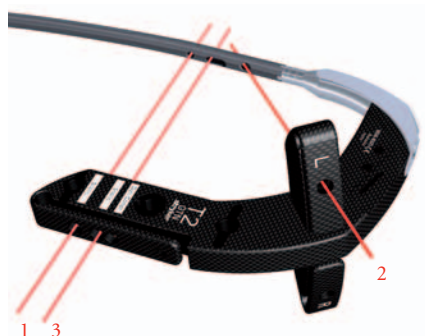


Fig. 15

Static Locking Mode



Fig. 16

Controlled Dynamic Locking Mode

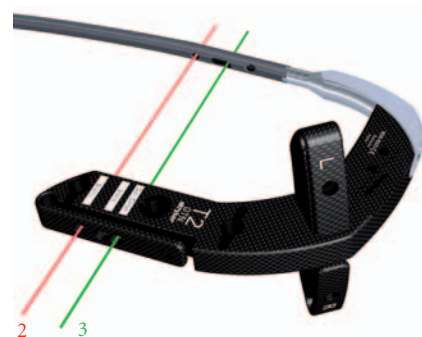


Fig. 17

Internal/external Compression Mode

Operative Technique

Nail Insertion

The selected nail is assembled onto the GTN Target Device (1806-1600) with the Nail Holding Screw (1806-1602) (Fig. 18 a).

Tighten the Nail Holding Screw with the Ball Tip Screwdriver (1320-0065) securely so that it does not loosen during nail insertion (Fig. 19).

Caution:

Prior to nail insertion confirm correct alignment by inserting a drill bit through the assembled Tissue Protection and Drill Sleeve placed in the required holes of the targeting device.

Upon completion of reaming, the appropriate size nail is ready for insertion. Unique to the T2 GTN, the 3 × 1000mm Ball Tip Guide Wire does not need to be exchanged for any of the available sizes.

The Strike Plate (1806-0150) may be threaded into the hole next to the Nail Holding Screw and the nail is advanced through the entry point past the fracture site to the appropriate level (Fig. 20).

Additionally, the 3 × 285mm K-Wire may be inserted through the dedicated K-Wire hole in the Targeting Device which identifies the junction of the nail and insertion post which helps determine nail depth through a mini incision using X-Ray (Fig. 18 b).

Caution:

- Do not use bent K-Wires.
- Curvature of the nail must match the curvature of the femur.

Note:

**DO NOT hit the Target Device.
Only hit the Strike Plate.**

The Slotted Hammer can be used on the Strike Plate to insert the nail over a Guide Wire (Fig. 20).

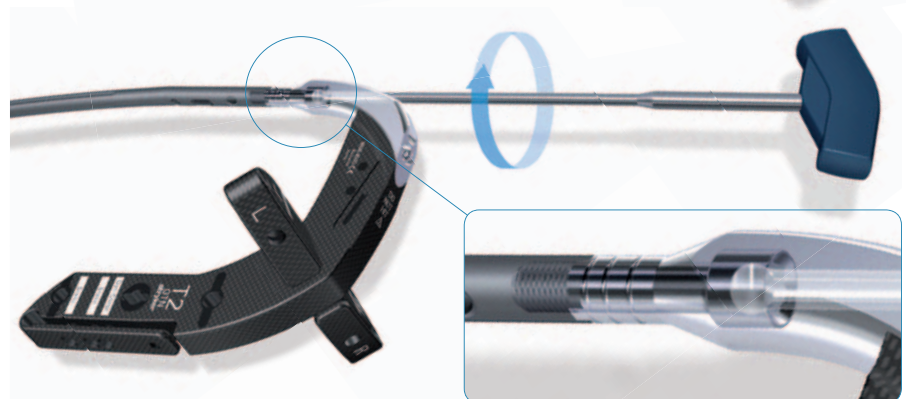
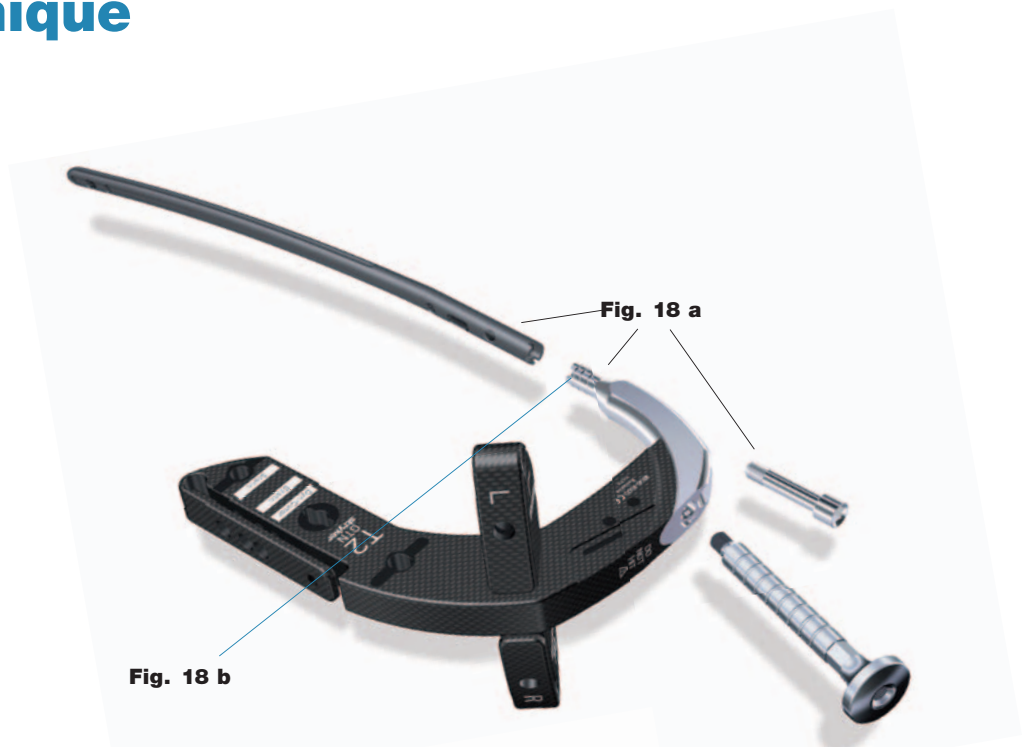


Fig. 19



Fig. 20

Operative Technique

Note:

A chamfer is located on the working end of the nail to denote the end under X-Ray. Three circumferential grooves are located on the insertion post at 1 mm, 5 mm, and 10 mm from the driving end of the nail (Fig. 21). The start of the cone on the metal piece of the targeting arm indicates the 15mm mark. Depth of insertion may be visualized with the aid of fluoroscopy.

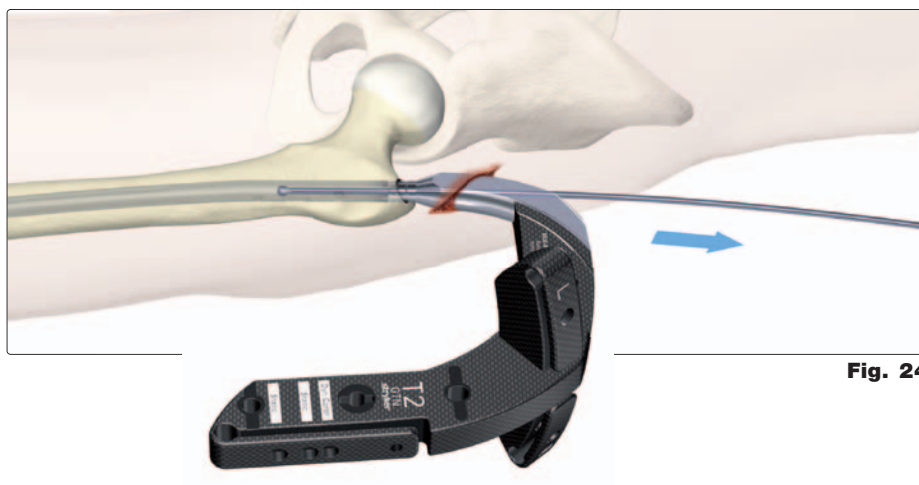
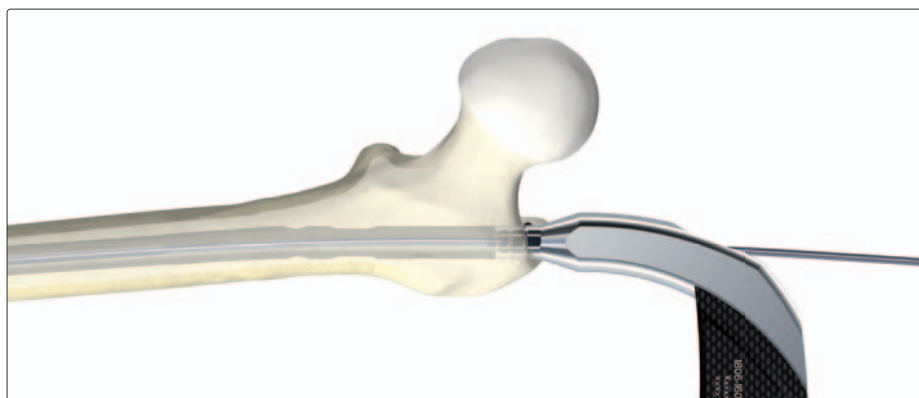
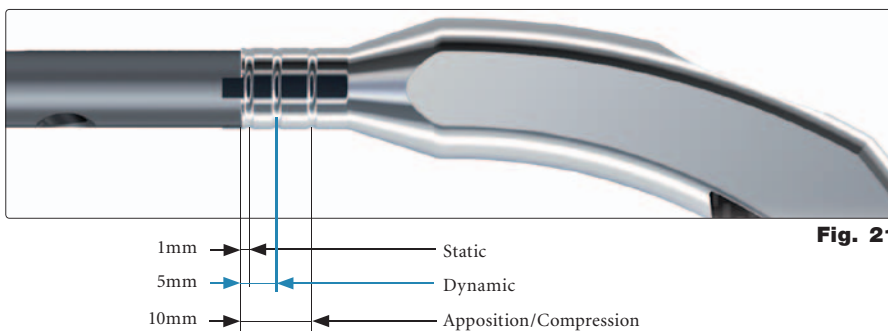
Repositioning should be carried out either by hand or by using the Strike Plate on the top of the Target Device. The Universal Rod and Slotted Hammer may then be attached to the Strike Plate to carefully and smoothly extract the assembly.

In static locking mode, the nail is countersunk a minimum of 5mm (Fig. 22).

When the implant is inserted in the dynamic mode, or when the implant is inserted with active apposition/compression, the recommended depth of insertion is 15mm (Fig. 23).

Note:

Remove the Guide Wire prior to drilling and inserting the Locking Screws (Fig. 24).



Operative Technique

Static Locking Mode

The Long Tissue Protection Sleeve together with the Long Drill Sleeve and the Long Trocar are positioned through the static locking hole on the Target Device by pressing the friction lock clip. A small skin incision is made, and the assembly is pushed through until it is in contact with the lateral cortex of the femur (Fig. 25). The friction lock clip is released to hold the Tissue Protection Sleeve in place.

The Trocar is removed while the Tissue Protection Sleeve and the Drill Sleeve remain in position.

Alternatively, the Trocar, Paddle (1806-0311) can be advanced together with the Tissue Protection Sleeve while pressing the friction lock clip. Push the assembly down to the bone (Fig. 26) and release the friction lock clip. The paddle tip design may help to pass the soft tissue and prepare the way for drilling.

Remove the Trocar to insert the Drill Sleeve. Forward the Tissue Protection Sleeve onto the cortex.

To help ensure accurate drilling and easy determination of screw length, use the center tipped, calibrated Ø4.2 × 340mm Drill (1806-4260S).

The centered Drill is forwarded through the Drill Sleeve and pushed onto the cortex (Fig. 27).

After drilling both cortices, the screw length may be read directly off of the calibrated Drill at the end of the Drill Sleeve (Fig. 28).

Alternatively, the Screw Gauge, Long can be used through the Tissue Protection Sleeve to read off the length at the end of the Tissue Protection Sleeve.



Fig. 25



Fig. 26



Fig. 27

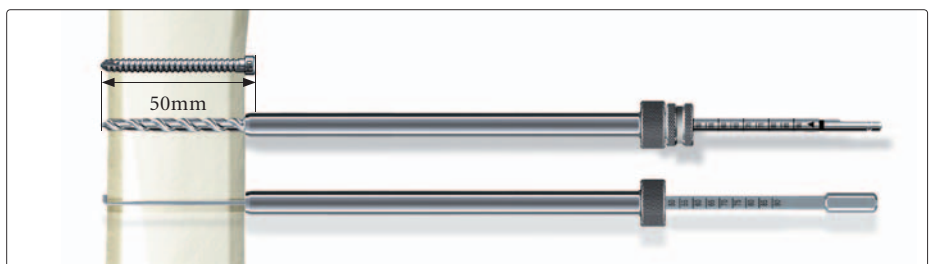


Fig. 28

Operative Technique



Fig. 29

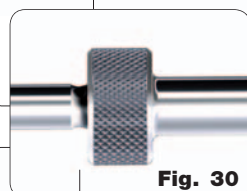


Fig. 30

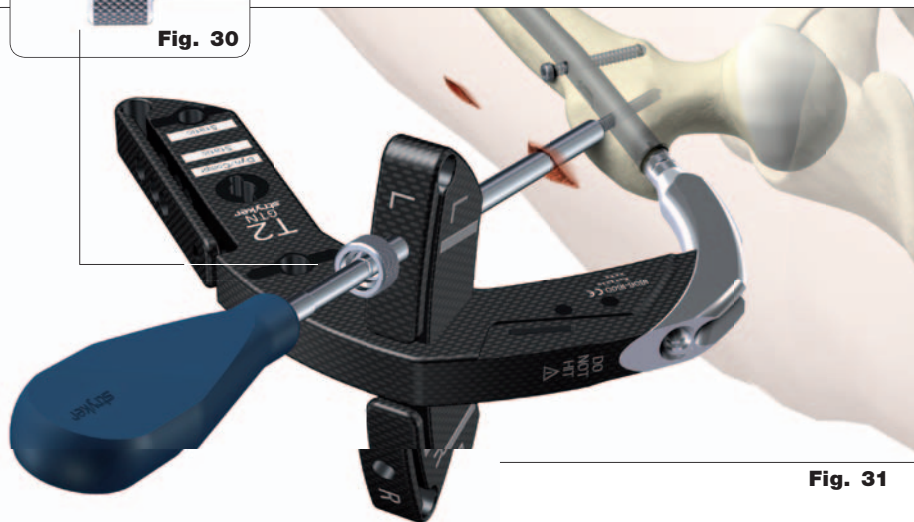


Fig. 31



Fig. 32

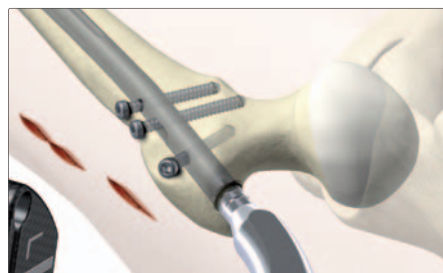


Fig. 33

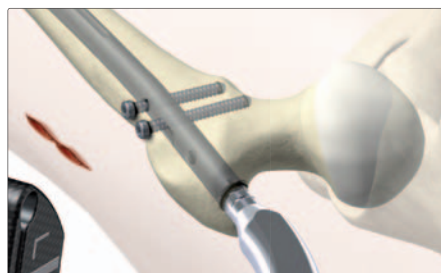


Fig. 34

When the Drill Sleeve is removed, the correct Locking Screw is inserted through the Tissue Protection Sleeve using the Long Screwdriver Shaft (1806-0227) with Teardrop Handle (702429) (Fig. 29).

Alternatively, the 3.5mm Hex Self-Holding Screwdriver Long (1806-0233) can be used for screw insertion.

The screw is advanced through both cortices. The screw is near its proper seating position when the groove around the shaft of the screwdriver is approaching the end of the Tissue Protection Sleeve (see Fig. 30).

Repeat the locking procedure for the oblique positioned Locking Screw (Fig. 31, 32).

Caution:

- The oblique locking hole is threaded medially, which may lead to increased torque during screw insertion. The lateral cortex shall therefore be opened with the 5.0 × 230mm Drill (1806-5000).
- A partially threaded locking screws should never be placed in the oblique locking hole.
- In unstable fracture patterns, static locking should always be performed with at least two distal Locking Screws and two proximal Locking Screws.

In order to increase proximal fragment stability a third locking screw can be inserted (Fig. 33).

If fracture pattern allows, it is possible to insert two M/L locking screws in static position (Fig. 34).

Operative Technique

Freehand Distal Locking

The freehand technique is used to insert Fully Threaded Locking Screws into all distal M/L holes in the nail. Rotational alignment must be checked prior to locking the nail.

Multiple locking techniques and radiolucent drill devices are available for freehand locking. The critical step with any freehand locking technique, proximal or distal, is to visualize a perfectly round locking hole or perfectly oblong locking hole with the C-Arm.

The center-tipped Ø4.2 × 180mm Drill (1806-4270S) is held at an oblique angle to the center of the locking hole (Fig. 35). Upon X-Ray verification, the Drill is placed perpendicular to the nail and drilled through the lateral and medial cortex (Fig. 36).

Confirm in both the A/P and M/L planes by X-Ray that the Drill passes through the hole in the nail.

Caution:

8mm diameter T2 GTN Nails can only be locked with 4mm Fully Threaded screws at the non-driving end.

Use the Ø3.5 × 180mm Drill (1806-3570S) for freehand locking.

The Depth Gauge, Long for Freehand Locking (1806-0331), may be used after drilling to determine the required screw length (Fig. 37).

Alternatively, the Screw Scale, Long can be used with the 4.2 × 230mm Drill (1806-4290S) to read off the length directly at the green ring.

Routine Locking Screw insertion is employed with the assembled Long Screwdriver Shaft and Teardrop Handle (Fig. 38).

Alternatively, the 3.5mm Hex Self-Holding Screwdriver Long (1806-0233) or Extra-short (1806-0203) can be used for screw insertion.

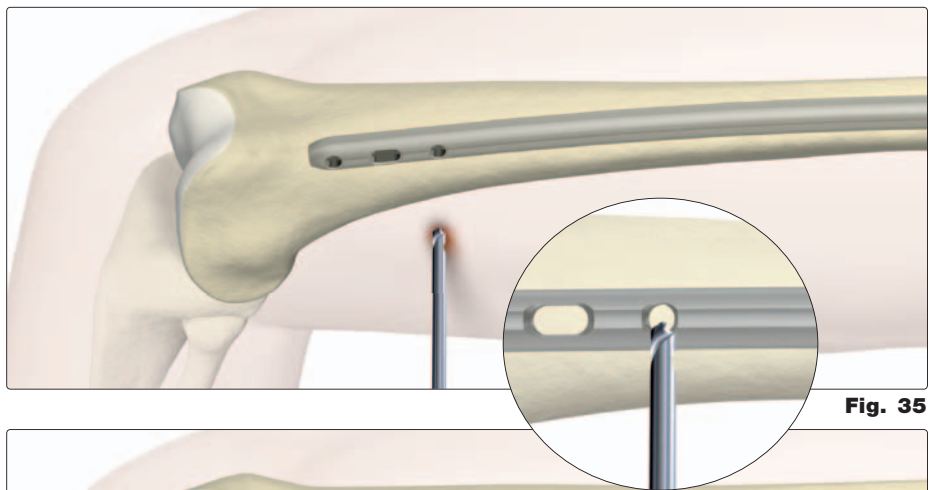


Fig. 35

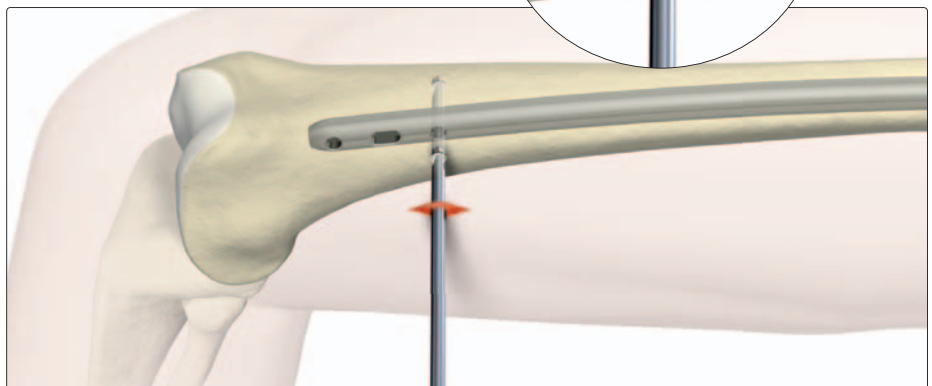


Fig. 36

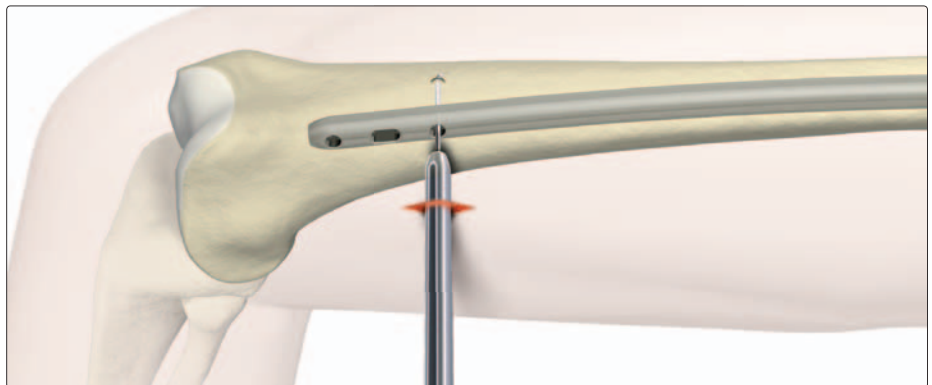


Fig. 37

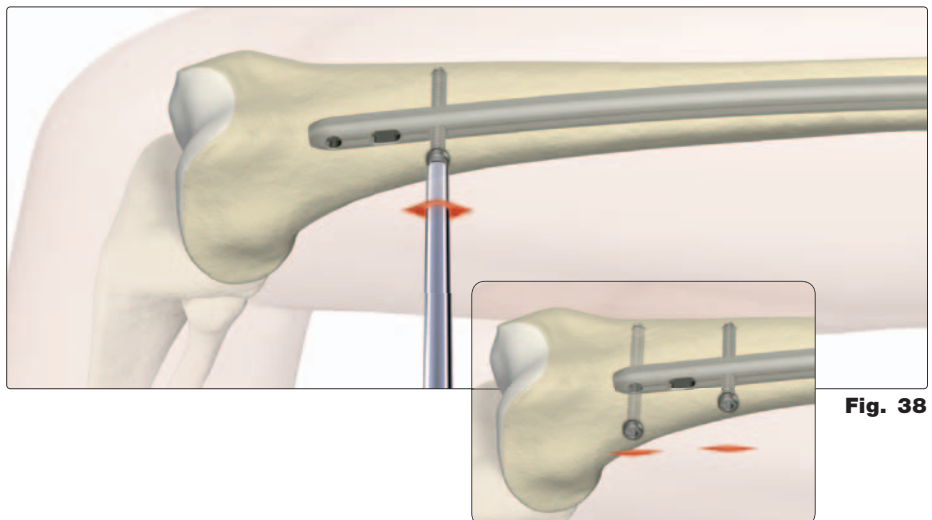


Fig. 38

Operative Technique

End Cap Insertion

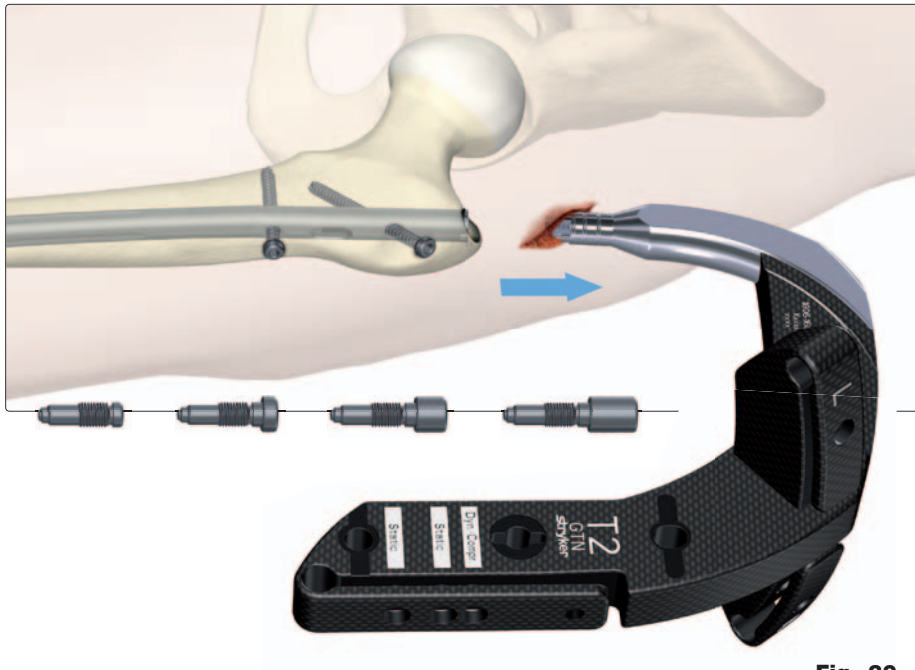


Fig. 39

After removal of the Target Device, an End Cap is used. Different sizes of End Caps are available to adjust nail length and to reduce the potential for bony in-growth into the proximal thread of the nail (Fig.39).

Note:

All T2 GTN End Caps are designed to tighten down onto the oblique Locking Screw at the driving end of the nail.

The End Cap is inserted with the Self-Holding Screwdriver Long (1806-0233) after intra-operative radiographs show satisfactory reduction and hardware implantation (Fig. 40 - 42). Fully seat the End Cap to minimize the potential for loosening.

Caution:

- **Final verification of implants should be confirmed by X-Ray at this time.**
- **If the internal compression screw is applied, the T2 GTN End Caps can not be used.**

When a Cannulated Compression Screw is applied a standard T2 End Cap has to be used instead of the GTN End Cap.

Thoroughly irrigate the wound to prevent debris from remaining. Close the wound using the standard technique.

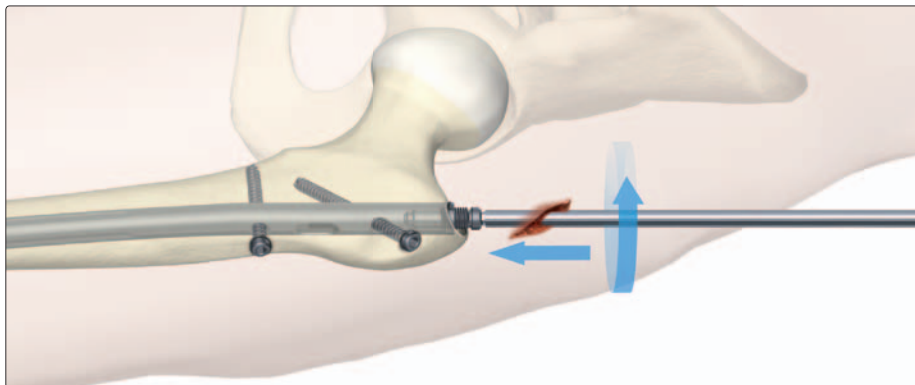


Fig. 40

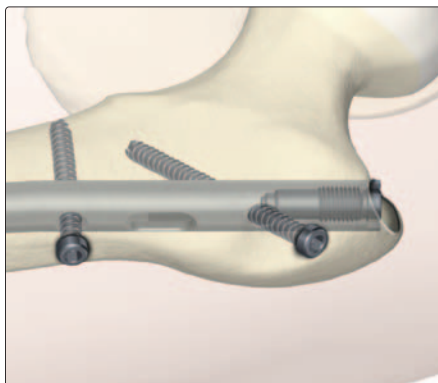


Fig. 41

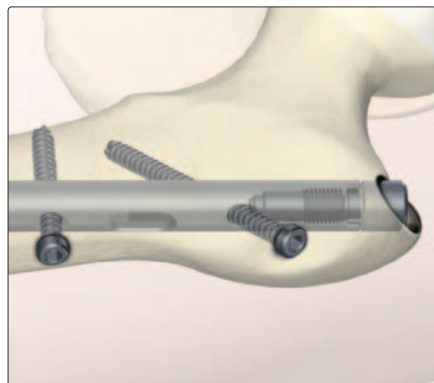


Fig. 42

Operative Technique

Dynamic Locking Mode

If the fracture profile permits, dynamic locking may be utilized for transverse, axially stable fractures.

The Partially Threaded Locking Screw is placed in the dynamic position of the oblong hole via the Target Device.

This allows the nail to move and the fracture to settle while providing torsional stability (Fig. 43).

Dynamization is performed by statically locking the nail distally with two M/L Fully Threaded Locking Screws in a freehand technique.

For screw insertion follow the steps as already described.

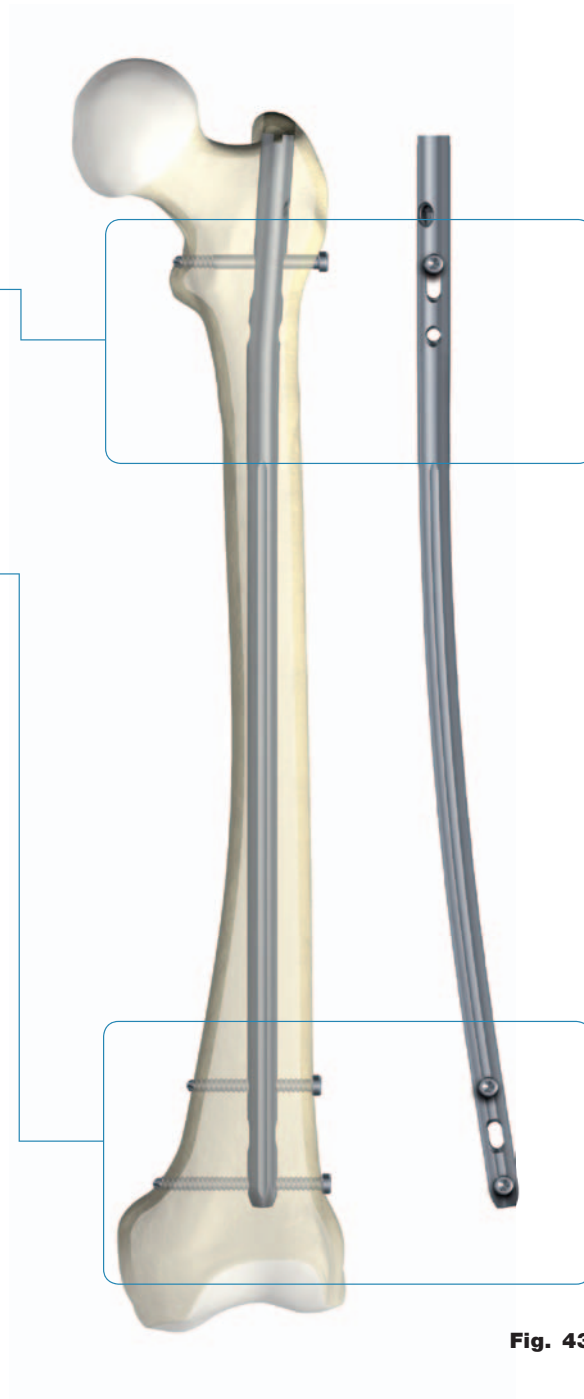


Fig. 43

Operative Technique

External Apposition/Compression Mode



Fig. 44

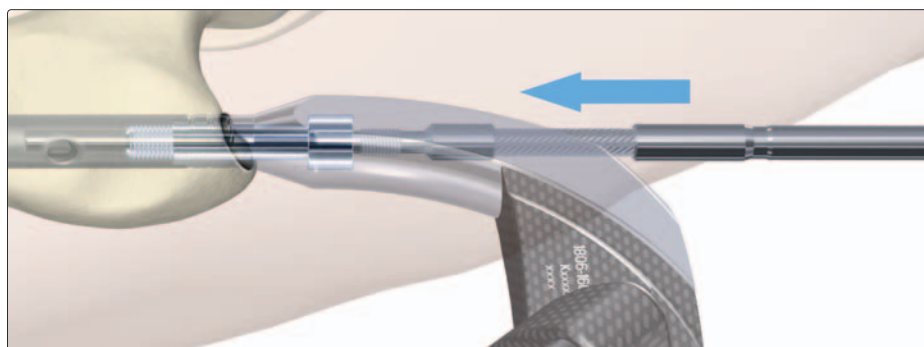
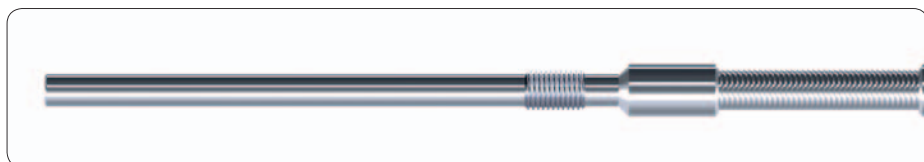


Fig. 45

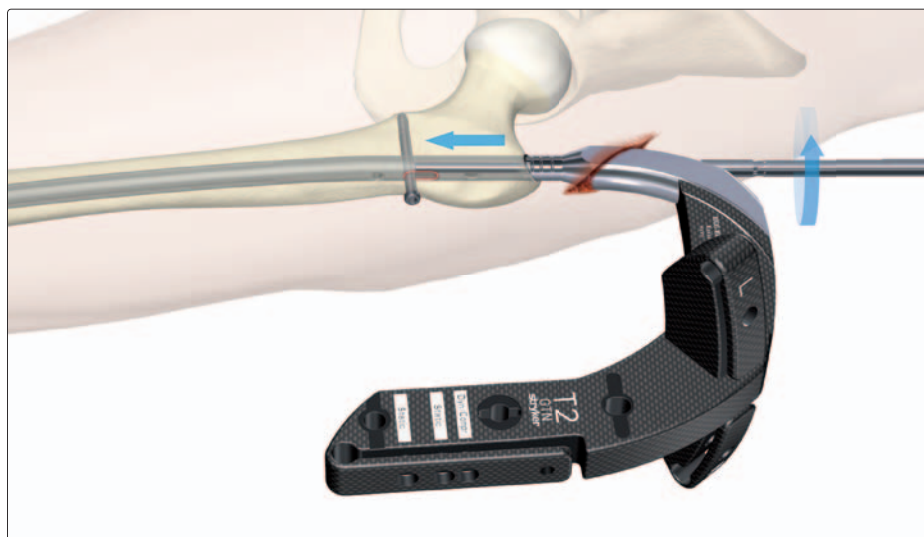


Fig. 46

In transverse, axially stable fracture patterns, active apposition / compression increases fracture stability while potentially enhancing fracture healing and allowing for early weight bearing. The T2 GTN gives the option to treat a femur fracture with active mechanical apposition/compression prior to leaving the operating room.

Caution:

Distal freehand static locking with two Fully Threaded Locking Screws must be performed prior to applying active, controlled apposition/compression to the fracture site.

If active apposition/compression is required, a Partially Threaded Locking Screw (Shaft Screw) is inserted via the Target Device in the dynamic position of the oblong hole (Fig. 44).

After the Shaft Screw is inserted, the External Compression Device (1806-1601) is inserted through the target device and threaded into the Nail Holding Screw (Fig. 45, 46).

Caution:

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

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.

Operative Technique

External Apposition/Compression Mode



Fig. 47

After successful apposition / compression a second Locking Screw is inserted in the round hole distally to the oblong hole. This will keep the nail in compressed position (Fig. 47).

Note:

The round oblique hole above the oblong hole is blocked by the External Compression Device and cannot be used while the latter is attached.



Fig. 48

After inserting the locking screw distally, the External Compression Device can be detached (Fig. 48).

Operative Technique

Internal Apposition/Compression Mode

Alternatively, to apply apposition/compression the Cannulated Compression Screw can be utilized.

The Cannulated Compression Screw is attached onto the Preloader (1806-1604) and then inserted into the nail until the Preloader disengages itself from the Compression Screw. This position of the Compression Screw indicates that the oblong hole is free to receive the Shaft Locking Screw in the oblong part of the hole (Fig. 49). After this, pull back the Preloader.

After the nail is attached to the Target Device and the locking holes are checked with a Drill, the nail is ready for insertion (Fig. 50).

As the Compression Screw is cannulated, the nail can be inserted over the Guide Wire (1806-0085S). There is no need to exchange the Guide Wire. This is also true for the 8mm dia. GTN.

Distal Locking Screw and Shaft Locking Screw insertion is conducted in a standard manner as previously described.

When the shaft screw is seated, the Flexible Compression Screwdriver (1806-1603) is inserted and apposition/compression is applied (Fig. 51).

Leave the Flexible Compression Screwdriver in place while proceeding to insert the second Locking Screw in the static hole below (Fig. 52).

When the second Locking Screw is seated the Flexible Compression Screwdriver can be removed (Fig. 53).

Note:

When using the Cannulated Compression Screw, the proximal oblique locking hole can not be used.

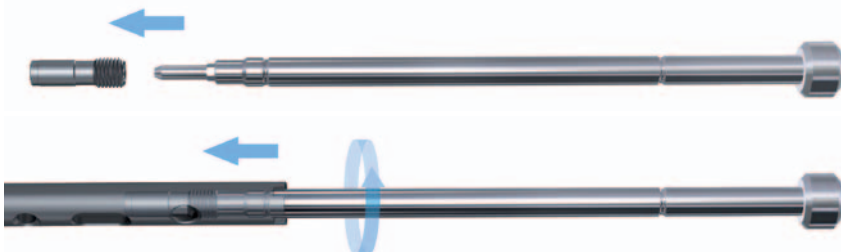


Fig. 49

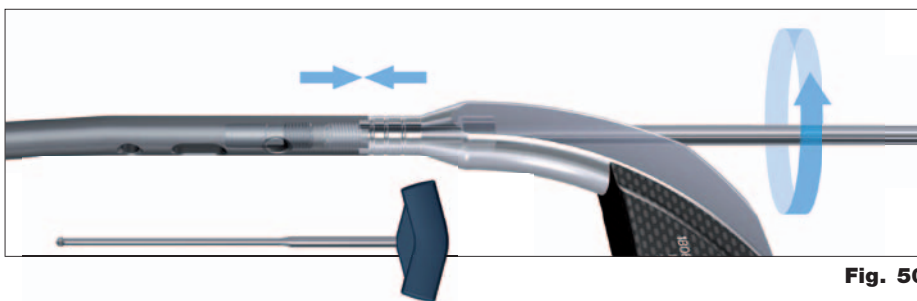


Fig. 50

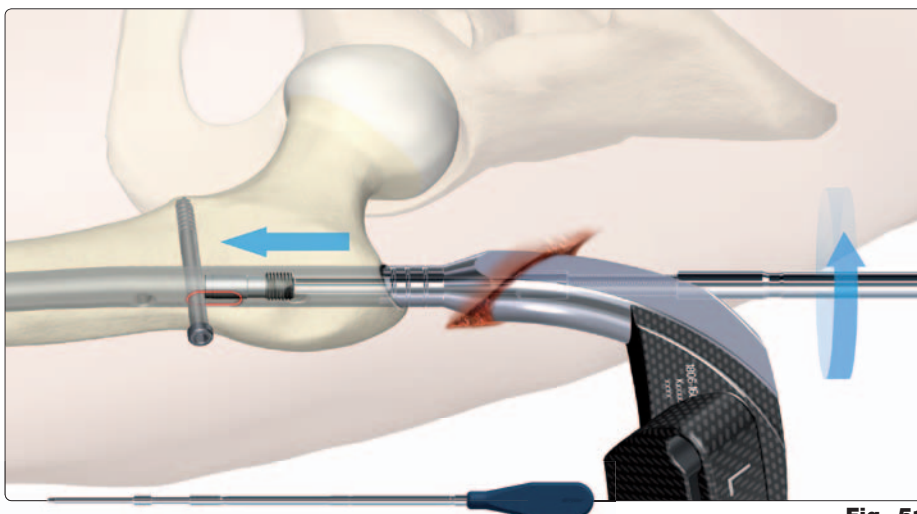


Fig. 51



Fig. 52

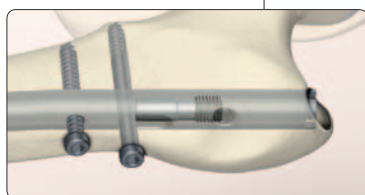


Fig. 53

Operative Technique

Nail Removal

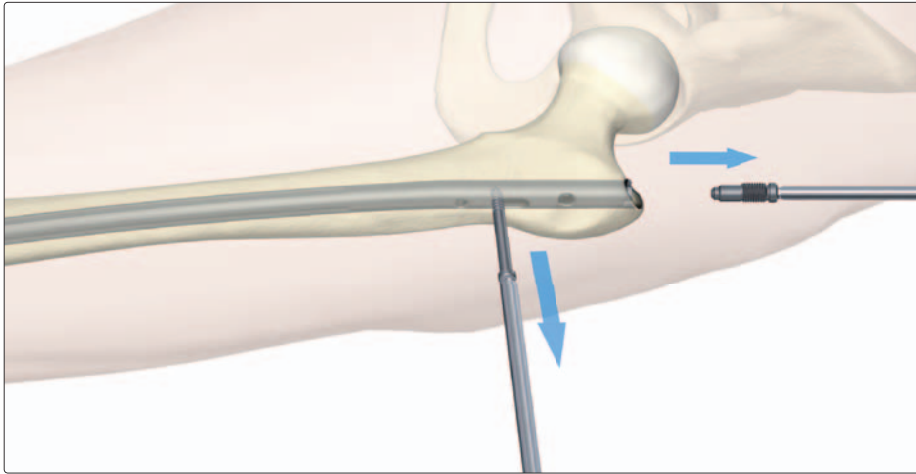


Fig. 54

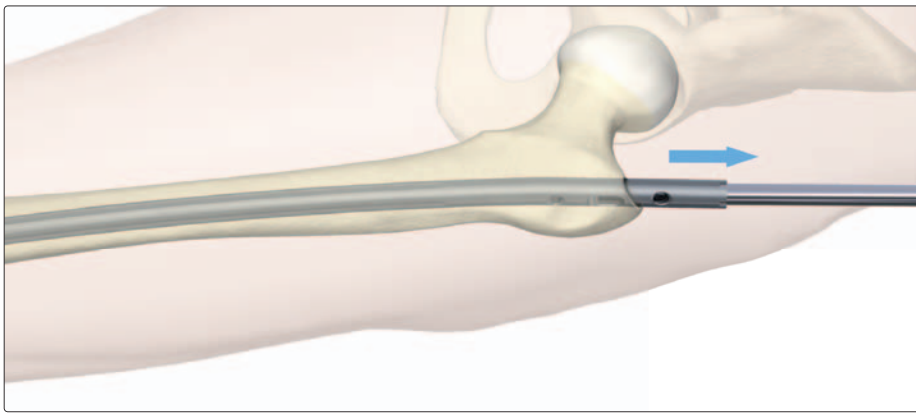


Fig. 55

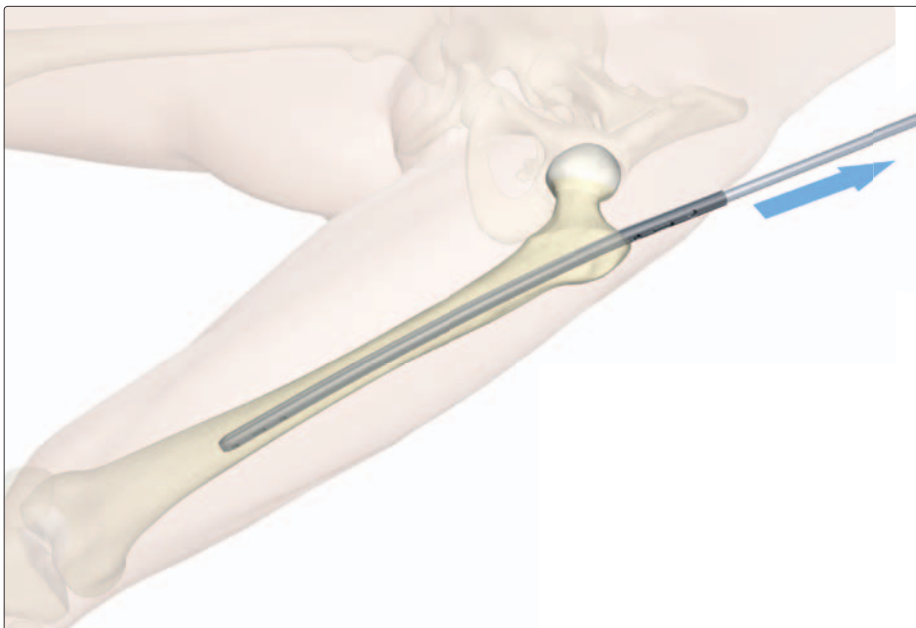


Fig. 56

If needed, the End Cap is removed with the Long Screwdriver Shaft and Teardrop Handle. Alternatively, the 3.5mm Hex Self-Holding Screwdriver Long can be used. For removal of the Cannulated Compression Screw the 4.0mm Hex Flexible Compression Screwdriver is to be used.

Note:

As an alternative to removing the Cannulated Compression Screw entirely (if used), it can be just disengaged from the Partially Threaded Locking Screw (Shaft Screw) by turning the Flexible Compression Screwdriver (1806-1603) one full turn in a counter-clockwise direction. There is no need to remove it from the nail.

The Universal Rod is inserted into the driving end of the nail. All Locking Screws are removed with the Long Screwdriver Shaft and Teardrop Handle (Fig. 55).

The “optional” Long Screw Capture Sleeve may be used on the Screwdriver Shaft. The Slotted Hammer is used to extract the nail in a controlled manner (Fig. 56).



A captured Sliding Hammer (1806-0175) is available as an “optional” addition to the basic instrument set.

Note:

- Stryker offers also a universal Implant Extraction Set for the removal of internal fixation systems and associated screws.
- Check with local representative regarding availability of optional instruments and the Implant Extraction Set.

Ordering Information – Implants

T2 FEMUR GTN (LEFT)



REF	Diameter mm	Length mm
1850-0824S	8.0	240
1850-0826S	8.0	260
1850-0828S	8.0	280
1850-0830S	8.0	300
1850-0832S	8.0	320
1850-0834S	8.0	340
1850-0836S	8.0	360
1850-0838S	8.0	380
1850-0840S	8.0	400
1850-0842S	8.0	420
1850-0844S	8.0	440
1850-0846S	8.0	460
1850-0848S	8.0	480
1850-0924S	9.0	240
1850-0926S	9.0	260
1850-0928S	9.0	280
1850-0930S	9.0	300
1850-0932S	9.0	320
1850-0934S	9.0	340
1850-0936S	9.0	360
1850-0938S	9.0	380
1850-0940S	9.0	400
1850-0942S	9.0	420
1850-0944S	9.0	440
1850-0946S	9.0	460
1850-0948S	9.0	480
1850-1024S	10.0	240
1850-1026S	10.0	260
1850-1028S	10.0	280
1850-1030S	10.0	300
1850-1032S	10.0	320
1850-1034S	10.0	340
1850-1036S	10.0	360
1850-1038S	10.0	380
1850-1040S	10.0	400
1850-1042S	10.0	420
1850-1044S	10.0	440
1850-1046S	10.0	460
1850-1048S	10.0	480
1850-1124S	11.0	240
1850-1126S	11.0	260
1850-1128S	11.0	280
1850-1130S	11.0	300
1850-1132S	11.0	320
1850-1134S	11.0	340
1850-1136S	11.0	360
1850-1138S	11.0	380
1850-1140S	11.0	400
1850-1142S	11.0	420
1850-1144S	11.0	440
1850-1146S	11.0	460
1850-1148S	11.0	480
1850-1224S	12.0	240
1850-1226S	12.0	260
1850-1228S	12.0	280
1850-1230S	12.0	300
1850-1232S	12.0	320
1850-1234S	12.0	340
1850-1236S	12.0	360
1850-1238S	12.0	380
1850-1240S	12.0	400
1850-1242S	12.0	420
1850-1244S	12.0	440
1850-1246S	12.0	460
1850-1248S	12.0	480

REF	Diameter mm	Length mm
1850-1324S	13.0	240
1850-1326S	13.0	260
1850-1328S	13.0	280
1850-1330S	13.0	300
1850-1332S	13.0	320
1850-1334S	13.0	340
1850-1336S	13.0	360
1850-1338S	13.0	380
1850-1340S	13.0	400
1850-1342S	13.0	420
1850-1344S	13.0	440
1850-1346S	13.0	460
1850-1348S	13.0	480
1850-1424S	14.0	240
1850-1426S	14.0	260
1850-1428S	14.0	280
1850-1430S	14.0	300
1850-1432S	14.0	320
1850-1434S	14.0	340
1850-1436S	14.0	360
1850-1438S	14.0	380
1850-1440S	14.0	400
1850-1442S	14.0	420
1850-1444S	14.0	440
1850-1446S	14.0	460
1850-1448S	14.0	480
1850-1524S	15.0	240
1850-1526S	15.0	260
1850-1528S	15.0	280
1850-1530S	15.0	300
1850-1532S	15.0	320
1850-1534S	15.0	340
1850-1536S	15.0	360
1850-1538S	15.0	380
1850-1540S	15.0	400
1850-1542S	15.0	420
1850-1544S	15.0	440
1850-1546S	15.0	460
1850-1548S	15.0	480

Implants in sterile packaging.

Note:

Check with your local representative regarding availability of nail sizes.

Ordering Information – Implants

T2 FEMUR GTN (RIGHT)

REF	Diameter mm	Length mm	REF	Diameter mm	Length mm
1851-0824S	8.0	240	1851-1324S	13.0	240
1851-0826S	8.0	260	1851-1326S	13.0	260
1851-0828S	8.0	280	1851-1328S	13.0	280
1851-0830S	8.0	300	1851-1330S	13.0	300
1851-0832S	8.0	320	1851-1332S	13.0	320
1851-0834S	8.0	340	1851-1334S	13.0	340
1851-0836S	8.0	360	1851-1336S	13.0	360
1851-0838S	8.0	380	1851-1338S	13.0	380
1851-0840S	8.0	400	1851-1340S	13.0	400
1851-0842S	8.0	420	1851-1342S	13.0	420
1851-0844S	8.0	440	1851-1344S	13.0	440
1851-0846S	8.0	460	1851-1346S	13.0	460
1851-0848S	8.0	480	1851-1348S	13.0	480
1851-0924S	9.0	240	1851-1424S	14.0	240
1851-0926S	9.0	260	1851-1426S	14.0	260
1851-0928S	9.0	280	1851-1428S	14.0	280
1851-0930S	9.0	300	1851-1430S	14.0	300
1851-0932S	9.0	320	1851-1432S	14.0	320
1851-0934S	9.0	340	1851-1434S	14.0	340
1851-0936S	9.0	360	1851-1436S	14.0	360
1851-0938S	9.0	380	1851-1438S	14.0	380
1851-0940S	9.0	400	1851-1440S	14.0	400
1851-0942S	9.0	420	1851-1442S	14.0	420
1851-0944S	9.0	440	1851-1444S	14.0	440
1851-0946S	9.0	460	1851-1446S	14.0	460
1851-0948S	9.0	480	1851-1448S	14.0	480
1851-1024S	10.0	240	1851-1524S	15.0	240
1851-1026S	10.0	260	1851-1526S	15.0	260
1851-1028S	10.0	280	1851-1528S	15.0	280
1851-1030S	10.0	300	1851-1530S	15.0	300
1851-1032S	10.0	320	1851-1532S	15.0	320
1851-1034S	10.0	340	1851-1534S	15.0	340
1851-1036S	10.0	360	1851-1536S	15.0	360
1851-1038S	10.0	380	1851-1538S	15.0	380
1851-1040S	10.0	400	1851-1540S	15.0	400
1851-1042S	10.0	420	1851-1542S	15.0	420
1851-1044S	10.0	440	1851-1544S	15.0	440
1851-1046S	10.0	460	1851-1546S	15.0	460
1851-1048S	10.0	480	1851-1548S	15.0	480
1851-1124S	11.0	240			
1851-1126S	11.0	260			
1851-1128S	11.0	280			
1851-1130S	11.0	300			
1851-1132S	11.0	320			
1851-1134S	11.0	340			
1851-1136S	11.0	360			
1851-1138S	11.0	380			
1851-1140S	11.0	400			
1851-1142S	11.0	420			
1851-1144S	11.0	440			
1851-1146S	11.0	460			
1851-1148S	11.0	480			
1851-1224S	12.0	240			
1851-1226S	12.0	260			
1851-1228S	12.0	280			
1851-1230S	12.0	300			
1851-1232S	12.0	320			
1851-1234S	12.0	340			
1851-1236S	12.0	360			
1851-1238S	12.0	380			
1851-1240S	12.0	400			
1851-1242S	12.0	420			
1851-1244S	12.0	440			
1851-1246S	12.0	460			
1851-1248S	12.0	480			

Implants in sterile packaging.

Note:
Check with your local representative regarding availability of nail sizes.

Ordering Information – Implants

5MM FULLY THREADED LOCKING SCREWS



REF	Diameter mm	Length mm
1896-5025S	5.0	25.0
1896-5027S	5.0	27.5
1896-5030S	5.0	30.0
1896-5032S	5.0	32.5
1896-5035S	5.0	35.0
1896-5037S	5.0	37.5
1896-5040S	5.0	40.0
1896-5042S	5.0	42.5
1896-5045S	5.0	45.0
1896-5047S	5.0	47.5
1896-5050S	5.0	50.0
1896-5052S	5.0	52.5
1896-5055S	5.0	55.0
1896-5057S	5.0	57.5
1896-5060S	5.0	60.0
1896-5065S	5.0	65.0
1896-5070S	5.0	70.0
1896-5075S	5.0	75.0
1896-5080S	5.0	80.0
1896-5085S	5.0	85.0
1896-5090S	5.0	90.0
1896-5095S	5.0	95.0
1896-5100S	5.0	100.0
1896-5105S	5.0	105.0
1896-5110S	5.0	110.0
1896-5115S	5.0	115.0
1896-5120S	5.0	120.0

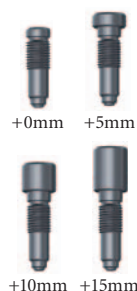
5MM PARTIALLY THREADED LOCKING SCREWS



(Shaft Screws)

REF	Diameter mm	Length mm
1891-5025S	5.0	25
1891-5030S	5.0	30
1891-5035S	5.0	35
1891-5040S	5.0	40
1891-5045S	5.0	45
1891-5050S	5.0	50
1891-5055S	5.0	55
1891-5060S	5.0	60
1891-5065S	5.0	65
1891-5070S	5.0	70
1891-5075S	5.0	75
1891-5080S	5.0	80
1891-5085S	5.0	85
1891-5090S	5.0	90
1891-5095S	5.0	95
1891-5100S	5.0	100
1891-5105S	5.0	105
1891-5110S	5.0	110
1891-5115S	5.0	115
1891-5120S	5.0	120

T2 GTN END CAPS



REF	Diameter mm	Length mm
1850-0002S	8.0	+ 0mm
1850-0005S	11.5	+ 5mm
1850-0010S	11.5	+10mm
1850-0015S	11.5	+15mm

CANNULATED COMPRESSION SCREW



REF	Diameter mm	Length mm
1850-0003S	8.0	

4MM FULLY THREADED LOCKING SCREWS *



REF	Diameter mm	Length mm
1896-4020S	4.0	20
1896-4025S	4.0	25
1896-4030S	4.0	30
1896-4035S	4.0	35
1896-4040S	4.0	40
1896-4045S	4.0	45
1896-4050S	4.0	50
1896-4055S	4.0	55
1896-4060S	4.0	60

END CAPS T2




















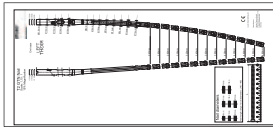





















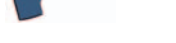



REF	Diameter mm	Length mm
1822-0003S	8.0	Standard
1822-0005S	11.5	+ 5mm
1822-0010S	11.5	+10mm
1822-0015S	11.5	+15mm

* For distal locking of 8mm nails.

Note:

Check with your local representative regarding availability of implant size.

Ordering Information – Instruments

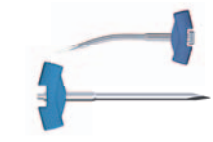
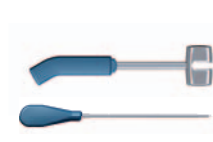


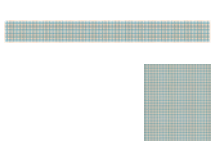






REF	Description	REF	Description
T2 Basic Long		T2 GTN Instruments	
	702429 Teardrop Handle, AO Coupling		1320-0065 G3 Screwdriver T-Handle 8mm, Ball Tip
	703165 Protection Sleeve, Retrograde		1806-0050S K-Wire 3 × 285mm*
	1806-0022 Guide Wire Ruler		1806-0311 Trocar, Paddle
	1806-0032 Awl Plug		1806-1600 GTN Target Arm
	1806-0041 Awl, Curved 9mm		1806-1601 External Compression Device
	1806-0110 Universal Rod, 9mm		1806-1602 GTN Nail Holding Screw
	1806-0125 Reduction Spoon, 9mm		1806-1603 Flexible Compression Screwdriver, (4.0)
	1806-0130 Wrench 8mm/10mm		1806-1604 Preloader
	1806-0135 Insertion Wrench, 10mm		1806-1605 T2 X-Ray Template GTN
	1806-0150 Strike Plate		1806-1606 X-Ray Ruler, GTN
	1806-0170 Slotted Hammer		1806-4260S Drill Ø4.2 × 340mm, AO 340mm*
	1806-0185 Tissue Protection Sleeve, Long, 9mm		1806-4270S Drill Ø4.2 × 180mm, AO 180mm*
	1806-0203 Screwdriver, Self-Holding, Extra Short (3.5mm)		1806-4290S Drill Ø4.2 × 230mm, AO 230mm*
	1806-0215 Drill Sleeve, Long, 5mm		1806-5000S Drill Ø5.0 × 230mm, AO 230mm*
	1806-0227 Screwdriver Shaft AO, Long, 3.5mm		1806-9080 T2 GTN Indication Metal Tray
	1806-0233 Screwdriver, Self-Holding, Long (3.5mm)		
	1806-0268 Screwdriver Shaft, Compression (hex 3.5)		
	1806-0271 Guide Wire Pusher		
	1806-0315 Trocar, Long		
	1806-0325 Screw Gauge, Long		
	1806-0331 Screw Gauge (20-120mm)		
	1806-0350 Extraction Rod, Conical (Ø8mm)		
	1806-0365 Screw Scale, Long		
	1806-1095 Guide Wire Handle		
	1806-1096 Guide Wire Handle Chuck, 2-3.5mm		
	1806-2014 Rigid Reamer Ø12mm		
	1806-9900 T2 Basic Long Instrument Tray		
		T2 GTN 8mm Instruments	
			1806-3570S Drill Ø3.5 × 180mm AO, sterile*







Caution:

8mm Nails require 4mm Fully Threaded Screws for locking at the non-driving end.

* Please check with your local representative availability of sterile or non-sterile instruments as well as implant sizes.

Ordering Information – Instruments

REF	Description
Optional	
	1806-0040 Awl Curved, 10mm
	1806-0045 Awl, Straight, Ø10mm
	1806-0085S Guide Wire, Ball Tip, 3×1000mm, sterile
	1806-0175 Sliding Hammer
	1806-0232 Screwdriver, Long, 3.5mm
	1806-0237 Screwdriver, Short, 3.5mm
	1806-0240 Screw Capture Sleeve, Long
	1806-0270 Ratchet T-Handle AO
	1806-0300 Screw Driver Shaft, Ball Tip, 3.5mm
	1806-0480 Long Screw Gauge (20mm–80mm)
	1806-9010 Screw Tray
	1806-9971 T2 Femur Drill Rack
	1806-9083 T2 Silicon Mat Drill Rack
	1806-9084 GTN Silicon Mat Free Space

REF	Description
Optional	
	702427 T-Handle, AO Coupling
	0140-0002 Reaming Protector
	1806-0047 Awl, Straight Ø11.5mm
	1806-0202 Screwdriver, Extra Short
	1806-0450 Long Freehand Tissue Protection Sleeve
	1806-0460 Long Drill Sleeve Ø4.2mm
Spare Parts	
1806-1097	Handle
1806-0098	Cage
1806-0099	Clamping Sleeve

Caution:
8mm Nails require 4mm Fully Threaded Screws for locking at the non-driving end.

* Please check with your local representative availability of sterile or non-sterile instruments as well as implant sizes.

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