



For intramedullary fixation of proximal femoral fractures

SURGICAL TECHNIQUE

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TFN–ADVANCED™ PROXIMAL FEMORAL NAILING SYSTEM (TFNA)

CLINICAL CASES

Case 1*

- 72-year-old female
- Fracture

AO 31A3 fracture (transverse intertrochanteric fracture pattern) which is unstable and would benefit from a cephalomedullary device. A short or a long nail would be sufficient in this case. A long nail was chosen to "protect" the entire femur from future fracture that could presumably occur at the tip of a short nail.

Case 2*

- 85-year-old
- Fracture

31A3 fracture with subtrochanteric extension (transverse intertrochanteric fracture pattern with comminution and extension down into the subtrocanteric region). This is a highly unstable fracture. The patient had multiple medical problems necessitating a quick procedure be performed closed, if possible, to minimize blood loss and additional stress to the patient's cardiopulmonary system. The goal was to reduce the fracture as anatomically as possible (and acceptable) without having to open the fracture.

^{*}Case studies are not necessarily predictive of results in other cases. Results in other cases may vary.



Postoperative



Preoperative



Preoperative



Postoperative



AO PRINCIPLES

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation^{1, 2}.

Anatomic reduction

Fracture reduction and fixation to restore anatomical relationships.

Early, active mobilization

Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.



Stable fixation

Fracture fixation providing absolute or relative stability, as required by the patient, the injury, and the personality of the fracture.

Preservation of blood supply

Preservation of the blood supply to soft tissues and bone by gentle reduction techniques and careful handling.

1. Müller ME, Allgöwer M, Schneider R, Willenegger H. *Manual of Internal Fixation*. 3rd ed. Berlin, Heidelberg New York: Springer 1991.

2. Rüedi TP, RE Buckley, CG Moran. *AO Principles of Fracture Management*. 2nd ed. Stuttgart, New York: Thieme. 2007.

INDICATIONS AND PRECAUTIONS

The TFN–ADVANCED Proximal Femoral Nailing System is intended for treatment of fractures in adults and adolescents (12-21) in which the growth plates have fused. Specifically, the system is indicated for:

- Stable and unstable pertrochanteric fractures
- Intertrochanteric fractures
- Basal neck fractures
- Combinations of pertrochanteric, intertrochanteric, and basal neck fractures

The Long Nail is additionally intended for treatment of fractures in adults and adolescents (12-21) in which the growth plates have fused for the following indications:

- Subtrochanteric fractures
- Pertrochanteric fractures associated with shaft fractures
- Pathologic fractures (including prophylactic use) in both trochanteric and diaphyseal regions
- Long subtrochanteric fractures
- · Proximal or distal non-unions, malunions and revisions

Precautions

- Use of these devices is not recommended when there is systemic infection, infection localized to the site of the proposed implantation or when the patient has demonstrated allergy or foreign body sensitivity to any of the implant materials.
- Physician should consider patient bone quality to ensure it provides adequate fixation to promote healing.
- Conditions that place excessive stresses on bone and implant such as severe obesity or degenerative diseases, should be considered. The decision whether to use these devices in patients with such conditions must be made by the physician taking into account the risks versus the benefits to the patients.
- Compromised vascularity in the site of proposed implantation may prevent adequate healing and thus preclude the use of this or any orthopaedic implant.

MR information: This device has not been evaluated for safety and compatibility in the MR environment. This device has not been tested for heating or migration in the MR environment.



PREPARATION

1

Position patient

Position the patient in the lateral decubitus or supine position on a fracture or radiolucent table. Position the image intensifier to enable visualization of the proximal femur in both the AP and lateral planes.

For unimpeded access to the medullary canal, abduct the upper part of the body approximately $10-15^{\circ}$ to the contralateral side (or adduct the affected leg by $10-15^{\circ}$).



2

Fracture reduction

Perform closed reduction manually by axial traction under image intensifier control. The use of the large distractor (refer to instructions for use) may be appropriate in certain circumstances.

If reduction can not be achieved in a closed approach, open reduction may be considered.



Determine femoral neck angle

Instruments	
03.037.006	Radiographic Ruler
357.399	3.2 mm Guide Wire 400 mm

The three oblique holes at the proximal end of the radiographic ruler are used to determine the femoral neck angle. Select a 3.2 mm guide wire and insert the guide wire in line with one of the grooves marked 125°, 130°, or 135°. Position the ruler over the proximal femur and take an AP image. Select the angle that most closely matches the angle of the femoral neck and position the radiographic ruler such that the guide wire is aimed centrally in the femoral head. Mark the position of the ruler on the skin to assist the next steps. Mark the skin at the proximal outline of the ruler.

Notes:

- The proximal end of the ruler represents the proximal nail end after insertion. The slot on the proximal end refers to the path of the guide wire, used for opening of the femur.
- All AP images of the proximal femur are made with correction for the anteversion, either by internally rotating the femur or by adjustment of the image intensifier.





Determine nail length

Instrument	
03.037.006	Radiographic Ruler

Move the image intensifier to the distal femur, place the proximal end of the radiographic ruler at the skin mark, and take an AP image of the distal femur. Verify fracture reduction. Read nail length directly from the ruler image, selecting the measurement that places the distal end of the nail at, or just proximal to, the physeal scar, or the chosen insertion depth.

Alternative: Nail length may also be determined by using a reaming rod, see page 15 for technique.



Determine nail diameter

Instrument		
03.037.006	Radiographic Ruler	

To determine nail diameter, position the image intensifier for an AP view of the femur at the level of the isthmus. Hold the radiographic ruler perpendicular to the femur and position the diameter windows over the isthmus. Read the estimated diameter measurement on the circular indicator that fills the canal.

Notes

The distance of the radiographic ruler from the bone affects the diameter measurement. Estimate the width as follows:

- Distance between the radiographic ruler and bone
 a. 25 mm = 1 mm larger reading
 b. 50 mm = 2 mm larger reading
 - c. 100 mm = 3 mm larger reading
- If the reamed technique is used, the diameter of the largest medullary reamer applied must be 0.5 mm to 1.5 mm larger than the nail diameter.



OPEN PROXIMAL FEMUR

1

Identify nail entry point

Make a longitudinal incision proximal to the greater trochanter. Carry the dissection down to the gluteus medius fascia longitudinally in the direction of the wound. Separate the underlying muscle fibers and palpate the tip of the greater trochanter.

In the AP view, the nail insertion point is on the tip or slightly lateral to the tip of the greater trochanter, in the curved extension of the medullary cavity. This represents a point, 5° lateral of the femoral shaft axis, measured from a point just below the lesser trochanter, as the ML angle of the nail is 5°.

In the lateral view, the entry point for the nail is centered in the greater trochanter and in line with the medullary canal.





Insert guide wire

Instruments

inou annonto	
03.037.000	Multi Hole Wire Guide
03.037.001	16 mm Protection Sleeve
357.399	3.2 mm Guide Wire 400 mm
393.10	Universal Chuck with T-Handle
Alternative ins	struments
03.037.100	Percutaneous Multi Hole Wire Guide
03.037.101	16 mm Percutaneous Protection Sleeve
09.037.010	3.2 mm Guide Wire 475 mm
393.10	Universal Chuck with T-Handle

Position the 16 mm protection sleeve and the multi hole wire guide assembly at the insertion point.

Insert the guide wire through the wire guide. Confirm guide wire placement in both the AP and lateral planes. Insert to a depth of approximately 15 cm. Remove the wire guide.

Alternatively the guide wire can be inserted without the protection sleeve and multiple wire guide. The protection sleeve and wire guide can then be passed over the guide wire.

If the first guide wire is inserted in an incorrect position, a second guide wire can be inserted through one of the additional holes in the multi hole wire guide at either 4 mm or 6 mm from the central hole. Once the guide wire is in the desired entry point, remove the first guide wire.







Alternative technique

Instrument	
03.037.008	8 mm Cannulated Curved Awl
or 03.037.007	8 mm Cannulated Straight Awl

Instead of using the guide wire, the 8 mm awl can be used to create a path for the reaming rod. After initial opening with the awl, insert the 950 mm reaming rod through the cannulation.



Open canal

Instruments	
03.037.001	16 mm Protection Sleeve
03.037.002 or	16 mm Cannulated Flexible Drill Bit
03.037.003	16 mm Cannulated Drill Bit
Alternative in	nstruments
03.037.101	16 mm Percutaneous Protection Sleeve
03.037.102	16mm Cannulated Percutaneous Flexible Drill Bit
or	
03.037.103	16 mm Cannulated Percutaneous Drill Bit

Guide the 16 mm cannulated drill bit over the guide wire through the 16 mm protection sleeve to the bone and drill to the stop.

Remove and dispose of the guide wire. Do not reuse.



Option: Ream medullary canal

If necessary, enlarge the femoral canal to the desired diameter using the medullary reamer and the corresponding technique guide.

Use image intensification to confirm fracture reduction. Insert the reaming rod into the medullary canal to the desired insertion depth. The tip must be correctly positioned in the medullary canal since it determines the final distal position of the nail.

Reaming

Starting with the 8.5 mm diameter reaming head, ream to a diameter of 0.5 mm to 1.5 mm greater than the nail diameter. Ream in 0.5 mm increments and advance the reamer with steady, moderate pressure. Do not force the reamer. Partially retract the reamer repeatedly to clear debris from the medullary canal.

Option: Reamer protection tube

Instruments	
03.037.001	16 mm Protection Sleeve
03.037.005	Reamer Protection Tube
03.037.105	Trocar for Protection Tube

The reamer protection tube can be used to help protect the proximal metaphysis during reaming.

Assemble the reamer protection tube, trocar and protection sleeve together. Then take the reamer protection tube assembly and insert it over the reaming rod, sliding the trocar and reamer protection tube into the bone.

Remove the inner trocar from the assembly and pass the reamer over the reaming rod and through the protection tube. Then ream per the technique described above.





When removing the reamer head through the reamer protection tube be sure to align the angle of the reamer shaft to the protection tube. This will help ensure the reamer head will not get caught on the tube upon removal.

Note: The reamer protection tube can only be used with reamer heads up to 13.5 mm. Therefore it can only be used for nails up to 12 mm. Use the "Flexible Reamer Set, Long" if reaming down to the distal femur is required.

Option: Determine nail length over reaming rod
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Instruments	
03.037.036	Depth Gauge for Trochanteric Nailing System
351.719	Depth Gauge Extension Tube

Nail length can be determined over a 950 mm reaming rod. Confirm reaming rod insertion depth under image intensification. Insert the reaming rod to hold fracture reduction. Pass the reaming rod measuring device over the reaming rod and down to the bone. Read nail length directly from the measuring device.

If a 1150 mm reaming rod is used, the nail length measurement should be read off the etched line on the reaming rod.



INSERT NAIL

Assemble insertion instruments

1

Cannulated Connecting Screw
Complete Radiolucent Insertion Handle
Hybrid Insertion Handle
Percutaneous Radiolucent Insertion Handle
T-Handle Ball Hex Screwdriver 8 mm
5 mm Hex Flexible Screwdriver

Assemble the ball hexagonal screwdriver to the connecting screw by inserting the tip of the screwdriver until it clicks into the recess of the connecting screw.

Match the geometry of the handle to the nail and connect the nail to the insertion handle. The nail will click-in and self-retain.

Pass the connecting screw through the insertion handle and securely tighten with the ball hexagonal screwdriver. Remove the hexagonal screwdriver.

To verify the appropriate position of the locking mechanism for the screw, pass the 5.0mm flexible screwdriver through the cannulated connecting screw and turn counter clockwise until its stops.

Precautions

- Ensure that the connection between the nail and the insertion handle is tight (retighten if necessary).
- Do not attach the aiming arm to the handle yet.
- If a 235 mm or longer nail is selected, reconfirm that the correct nail (right or left) is assembled.







Insert nail

Instrument	
03.037.012 or	Complete Radiolucent Insertion Handle
03.037.011	Hybrid Insertion Handle
or 03.037.112	Percutaneous Radiolucent Insertion Handle

Short nails (170 mm, 200 mm, and 235 mm)

Orient the insertion handle laterally, taking into consideration the anteversion of the femoral head and neck. Manually insert the nail into the femoral opening. When using a reaming rod, pass the cannulated nail over the reaming rod and into the femoral opening.

Under image intensification, verify fracture reduction and insert the nail as far as possible by hand. Use the insertion assembly to manipulate the nail across the fracture. When inserting a short nail (170 mm, 200 mm, and 235 mm), no hammer blows should be required.

Long nails (260 mm to 480 mm)

Orient the insertion handle anteriorly until the nail reaches the isthmus. Manually insert the nail into the femoral opening. When using a reaming rod, pass the cannulated nail over the reaming rod and into the femoral opening. As the nail is advanced, rotate the handle so it is positioned laterally for final seating.

Under image intensification, verify fracture reduction and insert the nail as far as possible by hand. Use the insertion assembly to manipulate the nail across the fracture. Insertion can be aided by light hammer blows on the driving cap, as described in the step below.

If a reaming rod has been used, it should be removed once the nail has crossed the fracture site.







Long nails.

3 Insert nail with hammer (optional)

Instruments	
03.010.522	Spiral Combination Hammer 500 Grams
03.010.523	Driving Cap/Threaded
03.037.031	Combination Wrench 11 mm/Blade Screw
03.037.120	Threaded Hammer Guide Connector
03.010.170	Hammer Guide

To use a hammer, insert the threaded hammer guide connector into the anterior side of the insertion handle. Then screw the driving cap through the insertion handle into the hammer guide connector and tighten with combination wrench. When using the hybrid insertion handle, the threaded hammer guide connector is not used and the driving cap is inserted directly into the hybrid insertion handle.

While applying light blows, monitor the tip of the nail using image intensification. Verify that there is no evidence of impingement distally. Remove the driving cap and hammer guide connector once the nail has been seated.

Note: Using light blows, the hammer can also be used with the threaded hammer guide to back slap the nail if the nail has been slightly over inserted.

Precaution: Confirm that the nail is tightly connected to the insertion handle, as hammering may loosen the connection.





PROXIMAL LOCKING

1

Choose aiming arm

Instruments	
03.037.013 or	130 Deg Aiming Arm
03.037.014	125 Deg Aiming Arm
or 03.037.035	135 Deg Aiming Arm

Ensure that the nail is tightly connected to the insertion handle. Retighten if necessary.

Choose the aiming arm that matches the angle of the nail inserted and securely attach to the insertion handle using the thumb screw.



2

Verify nail insertion depth

Instrument

357.399 3.2 mm Guide Wire 400 mm

Verify nail insertion depth and position for the helical blade/screw. Place a guide wire on the yellow marking of the aiming arm and radiographically check the guide wire position in AP.



Alternative technique: Position guide wire with guide wire aiming device

Instruments	
03.010.412	Guide Wire Aiming Device F/TFN For Ant Posterior Orientation
03.010.415	Connecting Screw F/Guide Wire Aiming Device F/TFN
03.010.471*	Guide Wire Aiming Device Offset Block

Attach the guide wire aiming device for AP orientation into the three holes on the anterior side of the aiming arm and lock in place using the connecting screw.

Option: The guide wire aiming device offset block can be added between the aiming arm and the guide wire aiming device to obtain an additional 10 cm of soft tissue clearance.

Position the image intensifier for an AP image. Rotate the image intensifier until any two orientation lines are parallel to the hole for the helical blade/screw. The midline (line between the two orientation lines) represents the guide wire trajectory.

Note: The outer lines can be used to determine the center of the femoral head.







*Also available.

Verify	nail	anteversion
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Instrument	
357.399	3.2 mm Guide Wire 400 mm

Position the image intensifier in the true lateral view (alignment of the axis of the femoral neck parallel to the axis of the femoral shaft).

Adjust nail rotation until the two radiographic lines on the insertion handle are parallel to the nail.

Option: A 3.2 mm guide wire can be inserted in the corresponding hole in the insertion handle to predict the location of the guide wire and helical blade/screw.

Note: The guide lines are located in the handle portion of the insertion handle and are made from a radio-opaque material. The lines provide a visual reference for guide wire insertion verifying nail anteversion.





Insert guide sleeve

Instruments	
03.037.016	Buttress/Compression Nut
03.037.017	Blade/Screw Guide Sleeve
03.037.018	3.2 mm Wire Guide Sleeve
03.037.019	3.2 mm Trocar
03.010.491	Long Scalpel Handle

To make an incision to accommodate the path of the sleeve assembly, insert the scalpel handle with scalpel blade attached through the corresponding hole of the aiming arm. Ensure that the incision and dissection of the fascia is in line with the path of the guide sleeve.

Thread the buttress/compression nut onto the blade/ screw guide sleeve, to the black marking on the blade/screw guide sleeve.

Insert the wire guide sleeve and trocar into the blade/screw guide sleeve. Place the yellow marked guide sleeve assembly through the aiming arm and through the soft tissue to the bone. Slightly rotating the wire guide sleeve while pushing the guide sleeve assembly through the soft tissue may help facilitate insertion. The buttress/compression nut will snap into the aiming arm.









Turn the buttress/compression nut counterclockwise to advance the guide sleeve to the bone. Take an AP image to confirm that the tooth on the guide sleeve is just touching the lateral cortex.

Precaution: The distal tooth of the guide sleeve should rest on the lateral cortex. Do not over tighten on the cortex as this may affect the accuracy of the aiming assembly.

Using a light hammer blow, hit the trocar into the bone to create an indentation in the bone which will help prevent the guide wire from skiving off of the bone in the next step.

Reconfirm fracture reduction using image intensification.



5 Insert guide wire for blade or screw

Instruments	
03.037.019	3.2 mm Trocar
357.399	3.2 mm Guide Wire 400 mm

Remove the 3.2 mm trocar and pass a new 3.2 mm guide wire through the wire guide to the bone. Advance the guide wire, under power, into the femoral head, stopping approximately 10 mm below the joint level.

The guide wire should be centered in the femoral head and neck in both the AP and lateral planes. The tip of the guide wire is positioned where the tip of the head element will be when the head element is properly inserted.

Confirm guide wire placement, in both planes, using the image intensifier.

Precautions

- If the nail must be repositioned to improve guide wire placement, remove the sleeve assembly and adjust with the insertion handle. Make a new incision for insertion of the guide sleeve. Do not pull on the guide sleeve or power tool to make this adjustment as this could affect the accuracy of the aiming.
- Do not reuse guide wires as they may bend during initial use. If the guide wire is deformed during insertion use a new guide wire and discard deformed guide wire.

Note: When inserting the guide wire in patients with larger anatomies, you may need to stop during insertion of the wire and remove the wire guide sleeve and continue advancing the wire to the desired depth. This is most likely to occur in anatomies requiring blade/screw lengths of 120 mm or larger.





Optional technique: Rotational control of femoral head

Instruments	
357.399	3.2 mm Guide Wire 400 mm
357.413	5.6 mm/3.2 mm Drill Guide 198 mm

If the fracture line is perpendicular to the axis of the head element or if rotational control of the femoral head during head element insertion is a concern, the following technique may be utilized.

Pass the 5.6 mm/3.2 mm drill guide through the corresponding anterior or posterior hole on the aiming arm. Make a stab incision and pass the guide to the bone. Advance a 3.2 mm guide wire into the femoral head. Monitor passage with the image intensifier.

Repeat to place a second guide wire if necessary.

The guide wires will converge toward the tip of the head element, in the lateral view, but will not touch it. The guide wires should be used for provisional fixation only and removed once the head element has been inserted.





6 Measure for length of blade or screw

Instrument	
03.037.020	Helical Blade/Screw Measuring Device

To measure for blade or screw length, pass the helical blade/screw measuring device over the guide wire to the back of the guide sleeve. Blade or screw length is read directly from the measuring device. No calculations are required.

Note: The measurement is calibrated from the tip of the guide wire to the tip of the tooth on the guide sleeve.





7 Drill for helical blade or screw

Instruments	
03.037.017	Blade/Screw Guide Sleeve
03.037.021	10 mm Cannulated Tapered Drill Bit

Remove the wire guide sleeve from the blade/screw guide sleeve. Place the 10 mm cannulated tapered drill bit in a power tool. Pass the drill bit over the guide wire, through the blade/screw guide sleeve, and advance under power. Drill to the stop. This will open the lateral cortex.

Note: If the guide wire deflected as it passed into the femoral head/neck, it may be removed before drilling and blade/screw insertion. If the guide wire falls out or comes out when the drill bit is removed, it may be left out for blade/screw insertion. Care should be taken to ensure the orientation of the insertion handle and aiming arm is not altered.







Option: Drilling for dense bone or when using a TFN-ADVANCED Screw

Instruments	
03.037.022	6 mm/9 mm Cannulated Stepped Drill Bit
03.037.023	Drill Stop for 03.037.022
03.010.093	Reaming Rod Push Rod with Ball Handle

For dense bone or when using a TFN-ADVANCED Screw, the 6 mm/9 mm cannulated stepped drill bit should be used to prepare a path for the full length of the shaft of the head element. The stepped drill bit should be used only after the cortex has been opened using the 10 mm tapered drill bit.

Pass the drill stop over the back end of the stepped drill bit and check the drill stop for wear per the instructions on page 50. Adjust the setting to the measured blade or screw length. Pass the drill bit over the guide wire, through the guide sleeve and advance under power. Drill to the stop.

Use the rod pusher through the power tool to hold the guide wire in place while removing the 6 mm/9 mm cannulated stepped drill.

Notes

- Clean the flutes if high resistance is felt.
- Drill always stops 5 mm short of the wire tip.
- Rod pusher can be used to hold the guide wire in the bone when the drill is retracted.
- Precaution: Monitor the drill depth under fluoroscopy throughout the procedure.





Proximal Locking OPTION A: BLADE INSERTION

8a

Assemble helical blade	
Instruments	
03.037.024	Helical Blade Inserter
03.037.026	Helical Blade/Screw Coupling Screw

Insert the cannulated helical blade coupling screw and thread in until fully captured in the helical blade inserter. The coupling screw will remain attached to the inserter. Select the appropriate length helical blade as measured. Align the back end of the helical blade with the inserter. Further thread the coupling screw into the helical blade and finger tighten the assembly.



9a

Insert helical blade

Instrument	
03.010.522	Spiral Combination Hammer 500 Grams

Pass the helical blade insertion assembly through the helical blade/screw guide sleeve and align the red line on the inserter shaft with the red line on the guide sleeve. Advance the blade as far as possible by hand. Use light hammer blows on the back of the coupling screw until the blade inserter comes to a stop at the back of the blade/screw guide sleeve. In the final position the yellow line of the helical blade/screw guide sleeve and the helical blade inserter are in alignment.

The helical blade **MUST** be fully inserted.

Precaution: Image intensifier should be used during blade insertion to monitor positioning.





Option: Intraoperative exchange of the blade

Instrument

03.010.523 Driving Cap/Threaded

To intraoperatively exchange the blade, attach the driving cap/threaded to the back of the coupling screw. Use the hammer to back slap if needed.



Proximal Locking OPTION B: SCREW INSERTION

8b

Tap for screw (optional)

Instrument	
03.037.027	Tap for Screw

The tap may be used to prepare a pathway for the screw.

Note: Only use the tap in dense bone.

Pass the tap over the guide wire, through the guide sleeve and through the nail. Advance the tap manually by turning clockwise until the measurement graduations on the shaft of the tap reach the measurement selected for the screw.

- Precaution: There is no stop on the tap so monitoring insertion via the following methods is recommended:
 - Monitor the depth under fluoroscopy.
 - Monitor the respective graduations of the instrument shaft in relation to the guide sleeve.

Remove the tap by turning counterclockwise.

9b

Assemble screw

Instruments	
03.037.025	Screw Inserter
03.037.026	Helical Blade/Screw Coupling Screw

Insert the cannulated coupling screw and thread in until fully captured in the screw inserter. The coupling screw will remain attached to the inserter. Select the appropriate length screw as measured. Align the back end of the screw with the inserter. Further thread the coupling screw into the screw and finger tighten the assembly.





10b

Insert screw

Starting notes

- The screw advances in 1.75 mm increments by turning the handle 180° (or 3.5 mm by turning 360°).
- When adjusting for final positioning, always rotate the handle clockwise, further engaging the screw in the bone. Do not rotate counterclockwise, as this will leave a gap between the screw and the bone.
- The screw can be over inserted a maximum of 1 (one) full turn.
- The etched image of the screw on the inserter shaft indicates the orientation of the lateral oblique cut of the screw.

Pass the screw insertion assembly over the guide wire, through the guide sleeve and through the nail. Advance the screw by turning the inserter clockwise until the line on the inserter meets the flange surface of the guide sleeve. At this depth the screw tip will be positioned at the tip of the guide wire. Assure that the inserter handle is aligned to the aiming arm. This is essential for proper engagement of the locking mechanism.

Precaution: Image intensifier should be used during screw insertion to monitor positioning.











Rotational locking

Engaging locking mechanism against rotation

Instrument

03.037.028 5 mm Hex Flexible Screwdriver

The preassembled locking mechanism in the nail must be advanced to control the rotation of the blade or screw. Pass the 5 mm flexible screwdriver through the cannulated connecting screw and insertion handle until it is seated in the hexagonal recess of the locking mechanism. Turn clockwise to advance the locking mechanism. Advance the screwdriver down until it stops completely, then back the screwdriver off by turning counterclockwise 1/2 turn (180 degrees). The blade or screw is now locked in rotation but can still slide.

Caution: If the locking mechanism is not turned back 1/2 turn after initial tightening as described above, controlled collapse and compression of the fracture may not occur.





*Also available.

Proximal Locking

OPTION: INTERFRAGMENTARY COMPRESSION

Option A: Blade compression		
Instrument		
321.17	4.5 mm Pin Wrench 120 mm	

Once the blade has been locked in rotation, interfragmentary compression can be obtained by turning the buttress/compression nut clockwise by hand. For additional leverage, use the 4.5 mm pin wrench.

Precaution: Caution should be taken when using the buttress/compression nut with the pin wrench to avoid over compression which could potentially cause the blade or screw to lose purchase in the bone, especially in patients with poor bone quality.

Option B: Screw compression

Instruments	
03.037.116	Compression Nut for Screw Inserter
321.17	4.5 mm Pin Wrench 120 mm

Once the screw has been locked in rotation, interfragmentary compression can be obtained by mounting the compression nut onto the screw inserter, advancing it until it abuts the guide sleeve, and then turning the buttress/compression nut clockwise by hand or with the assistance of the 4.5 mm pin wrench.

Precaution: Caution should be taken when using the buttress/compression nut with the pin wrench to avoid over compression which could potentially cause the blade or screw to lose purchase in the bone, especially in patients with poor bone quality.




Option: Static locking

Engage locking mechanism to prevent sliding

Ins	fr	ur	n	en	ts
1113	u	uı			

03.037.0295 mm Hex Screwdriver Shaft*03.140.023Torque Limiting Attachment 6Nm**03.010.496T-Handle/Cannulated with
Quick Coupling*

Alternative instrument

03.231.018	6Nm Torque Limiting Blue Handle with
	6 mm Hex Coupling

Once compression has been achieved, the blade or screw can be statically locked to prevent sliding of the blade/ screw through the nail.

Assemble the 6Nm torque limiting attachment into the T-Handle and then the 5 mm hex shaft into the torque limiting attachment to complete the static locking screwdriver assembly.

Pass the static locking screwdriver assembly through the cannulated connecting screw and insertion handle until it is seated in the hexagonal recess of the lock drive and turn clockwise to advance. After one click, the optimal torque is reached and the blade or screw is statically locked.

Note: The torque limiting attachment ensures that the correct torque is achieved, thus ensuring sliding is prevented.



*Also available.

**Recalibration of the torque limiter: DePuy Synthes Trauma recommends annual servicing and inspection by the original manufacturer. The torque limiter has to be sent to your DePuy Synthes Trauma repair center annually for calibration. The user accepts the responsibility for this annual calibration.

Remove proximal locking instruments

Disconnect the coupling screw from the blade or screw and remove the inserter/coupling screw assembly. If the connecting screw cannot be loosened by hand, use the 5 mm flexible hexagonal screwdriver to loosen the connection.

Remove the guide sleeve from the aiming arm by depressing the locking device on the aiming arm and pulling out the guide sleeve. Remove the guide wire. Continue with distal locking.







DISTAL LOCKING – SHORT NAILS (170 mm, 200 mm, and 235 mm)

1

Reconfirm reduction

Instrument		
03.010.491	Long Scalpel Handle	
-		

Confirm reduction of the fracture with AP and lateral images.

Make a stab incision by sliding the scalpel through the hole of the aiming arm.



2

Drill and measure for locking screw

Instruments	
03.025.040	11.0 mm/8.0 mm Protection Sleeve 188 mm for ASLS
03.010.065	8.0 mm/4.2 mm Drill Sleeve 200 mm
03.010.070	4.2 mm Trocar 210 mm
03.010.061	4.2 mm Three-Fluted Drill Bit QC/ 330 mm/100 mm Calibration

Insert the green triple trocar assembly through the aiming arm to the bone.

Note: Using a light hammer blow, hit the trocar into the bone to create an indentation in the bone which will help prevent the drill bit from skiving off of the bone.



Distal Locking – Short Nails (170 mm, 200, mm and 235 mm)

Remove the trocar and drill through both cortices using the calibrated 4.2 mm three-fluted drill bit.

Read the length for the locking screw directly from the drill bit at the back of the drill sleeve. Press the drill sleeve to the bone to ensure accurate measurement.



Alternative technique

Instrument	
03.010.428	Depth Gauge for Locking Screws to 100 mm for IM Nails
or 03.010.072	Depth Gauge for Locking Screws to 100 mm for IM Nails

The depth gauge for locking screws may be used through the 11.0 mm/8.0 mm protection sleeve to determine locking screw length. Remove the 8.0 mm/4.2 mm drill sleeve and pass the measuring hook through the 11.0 mm/8.0 mm protection sleeve. Read locking screw length directly from the measuring device at the back of the protection sleeve.



Insert locking screw

Instruments	
03.010.518	STARDRIVE™ Screwdriver/T25 Self Retaining/ 320 mm
or	
03.010.152	Star/Hexdrive Scrwdrvr Shaft T25 3.5 mm Hex/SLF-Retain 280 mm
03.025.040	11.0 mm/8.0 mm Protection Sleeve 188 mm for ASLS

Insert the appropriate 5.0 mm locking screw through the protection sleeve using the appropriate hexagonal or STARDRIVE Screwdriver.

Remove the protection sleeve and aiming arm.



FREEHAND DISTAL LOCKING – LONG NAILS

1

Distal locking

Distal locking of the long nail is performed with the freehand technique. Alternatively distal locking can be performed using the SURELOCK[™] System and the corresponding technique guide.

Note: The SURELOCK System will only target the two most proximal distal locking holes in the long nail and only works with the Trochanteric Femoral Nails 280 mm to 460 mm in length.

There are three distal locking options:

- Two transverse, lateral to medial holes
- One of the holes is static and the other allows for static or dynamic locking options
- One oblique locking hole for enhanced stability in trochanteric fractures with a shaft fracture. This is the most distal hole.





Align image

- Confirm reduction of the fracture with AP and lateral images.
- Align the image intensifier with the hole in the nail until a perfect circle is visible in the center of the screen.





ŀ

Aligned.

3

Determine incision point

Place a scalpel blade on the skin over the center of the hole to mark the incision point and make a stab incision.



4 Dri

Drill

Instruments	
03.010.101	4.2 mm Three-Fluted Radiolucent Drill Bit/ Needle Point/145 mm
511.30	Radiolucent Drive Mark II

Insert the drill into the radiolucent drive and insert it, through the incision, down to the bone.

Incline the drive so that the tip of the drill bit is centered over the locking hole. The drill bit should almost completely fill the circle of the locking hole. Hold the drill bit in this position and drill through both cortices.

Stop drilling immediately after perforation of both cortices and disassemble the drill bit from the power equipment.

Note: Before inserting the drill bit in the power tool, determine the right drilling position and fix the position with a light hammer tap on the back of the drill bit.

Alternative instrument

03.010.104 4.2 mm Three-Fluted Drill Bit QC/ Needle Point/145 mm

Note: For greater drill bit control, discontinue drill bit power after perforating the near cortex. Manually guide the drill bit through the nail before resuming power to drill the far cortex.

Stop drilling immediately after perforation of both cortices and disassemble the drill bit from the power equipment.





Measure for screw length

Instruments

03.010.106	Direct Measuring Device for LCKNG SCR to 100 mm F/IM Nails
or	
03.010.429	Direct Measuring Device for LCKNG SCR to 100 mm F/IM Nails

Slide the measuring device onto the drill bit.

Ensure correct position of the drill bit beyond the far cortex, and that the measuring device is against the bone.

Read the measurement on the measuring device at the end of the drill bit, not from the green line.

Note: Correct placement of the drill bit and measuing device are important for accurate locking screw length measurement.

Alternative instruments

03.010.428	Depth Gauge for Locking Screws to 100 mm for IM Nails
or	Depth Gauge for Locking Screws to
03.010.072	100 mm for IM Nails

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

Ensure the correct position of the depth gauge beyond the far cortex.

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





Insert locking screw

Instruments	
03.010.518	STARDRIVE Screwdriver/T25 Self-Retaining/320 mm
03.010.473*	Inter-lock Screwdriver T25/3.5 mm Hex/ 224 mm

Insert the appropriate length screw using the screwdriver.

Verify locking screw length under image intensification.

Repeat steps 2 to 7 for the second and third proximal locking screw if the fracture necessitates additional distal fixation.



INSERT END CAP

1 Incont and can

insert end cap		
Instruments		
03.010.517	T-Handle Ball Hex Screwdriver 8 mm	
03.010.520	Cannulated STARDRIVE Screwdriver/ T40/ 277 mm	
357.399	3.2 mm Guide Wire 400 mm	

Use of an end cap is recommended if bony ingrowth into the proximal end of the nail is of concern. Also, in reverse oblique intertrochanteric and high subtrochanteric fractures, the nail should be slightly proud of the greater trochanter to provide an added point of fixation. If the nail has been over inserted, it should be extended by the use of an end cap of appropriate length.

Note: The insertion depth of the nail is indicated by the rings on the insertion handle. Starting distally, each ring is an additional 5 mm from the tip of the nail. This will help in end cap selection.

Inserting the 0 mm end cap

Remove the connecting screw using the ball hexagonal screwdriver while leaving the insertion handle connected to the nail.

Insert the 0 mm end cap using the cannulated STARDRIVE Screwdriver through the insertion handle. A 3.2 mm guide wire can be used to help ensure alignment while inserting the end cap.

After the end cap is inserted, remove the insertion handle from the nail.

Inserting the 5–15 mm end cap

Remove the connecting screw and insertion handle using the ball hexagonal screwdriver.

Insert the end cap using the cannulated STARDRIVE Screwdriver. A 3.2 mm guide wire can be used to help ensure alignment while inserting the end cap.



Inserting the 0 mm end cap.



Inserting the 5–15 mm end cap.

IMPLANT REMOVAL

Disengage locking mechanism

1

Instruments	
03.037.028	5 mm Hex Flexible Screwdriver
03.037.030	Helical Blade/Screw Extractor
03.037.032	Nail Extractor
03.010.520	Cannulated STARDRIVE Screwdriver/ T40/ 277 mm
356.717*	Guide Wire 2.8 mm Length 460 mm with Hook

Use the cannulated STARDRIVE Screwdriver to remove the end cap, optionally assisted by use of the guide wire with hook.

Turning counterclockwise, thread the helical blade/screw extractor into the end of the helical blade or screw. Do not yet extract the helical blade/screw.

Thread the nail extractor into the top of the nail. Pass the 5 mm hex flexible screwdriver through the nail extractor and engage the hex in the locking mechanism. Turn the locking mechanism counterclockwise until it stops. The locking mechanism is disengaged.

Note: It may be easier to align the nail extractor if the flexible screwdriver is passed through the nail extractor first and then both instruments engage in the top of the nail.

Precaution: Do not attempt to remove the nail at this point.





Do not yet extract the screw/blade.



Do not yet extract the nail.

Remove helical blade or screw and distal locking screw

Instruments	
03.037.030	Helical Blade/Screw Extractor
03.010.522	Spiral Combination Hammer 500 Grams
03.010.518	STARDRIVE Screwdriver/T25/ Self Retaining/320 mm
03.010.170*	Hammer Guide

For the blade, slide the spiral combination hammer over the helical blade/screw extractor and using light hammer blows, hammer until the blade is removed from the bone.

Note: The hammer guide may be threaded in the back of the helical blade/screw extractor to extend the working length and thus support the removal.

For the screw, continue to turn counterclockwise with a slight pulling force until the screw is removed from the bone.

Remove the distal locking screw using the screwdriver.

Remove helical blade or screw from the extractor

Instrument	
03.037.031	Combination Wrench 11 mm/Blade Screw

The end of the combination wrench marked "BLADE/ SCREW" can be attached to the blade or screw and then used to disengage the helical blade or screw from the helical blade/screw extractor. Rotate clockwise as the blade and screw have a left-handed thread for removal.







3 Extract nail

Instruments	
03.010.170*	Hammer Guide
03.010.522	Spiral Combination Hammer 500 Grams

To remove the nail, thread the hammer guide onto the back end of the nail extractor. Attached the spiral combination hammer to the hammer guide and then use light hammer blows to extract the nail.

After the nail has been extracted from the bone, dissemble the extractor from the nail.





ALTERNATIVE TECHNIQUE – EXTRACTION HOOK for removal of broken nail

Instruments

355.399	Extraction Hook for TI Cannulated Nails*
393.10	Universal Chuck with T-Handle

Begin with Steps 1 and 2 of Implant Removal.

Option 1

1

Assemble extraction hook and universal chuck

Insert the extraction hook into the universal chuck with T-Handle. The hook should be parallel with the T-Handle. This facilitates visualization of the hook position in the bone.

2

Insert extraction hook through nail

Remove the nail extractor and pass the extraction hook through the cannula of the nail, including the distant fragment.

Note: Under image intensification, verify that the hook has passed through and engaged the distant end of the nail.

3

Extract nail

Extract both nail fragments.

Note: Keep the patient's limb restrained to increase the efficiency of the extraction force.





Option 2

1

Remove near nail fragment

Remove the near nail fragment using the technique described in step 3 of the implant removal.

Note: The extraction hook can be used as an alternative to extraction instrumentation.

2

Ream canal

Ream the medullary canal 1 mm larger than the nail diameter to clear a path for the distant nail fragment.

3

Align extraction hook

Insert the extraction hook and explanted near nail fragment into the medullary canal. The near nail fragment aligns the extraction hook with the cannulation of the distant nail fragment.

4

Engage distant fragment

Pass the extraction hook through the cannula of the distant nail fragment.

Note: Under image intensification, verify that the hook has passed through and engaged the distant end of the nail.

5

Extract nail

Extract both nail fragments.

Note: Keep the patient's limb restrained to increase the efficiency of the extraction force.

CHECKING DRILL STOP WEAR

Instruments

03.037.022	6 mm/9 mm Cannulated Stepped Drill Bit
03.037.023	Drill Stop for 03.037.022

Possible damage

If excessive wear occurs, the drill stop can slip, resulting in incorrect drilling depth.

Before use:

- Slide the drill stop onto the drill bit
- Press on the stop with the thumb without pressing the button. If the stop moves under pressure, replace it
- Do the same test in the opposite direction. If the stop moves, replace it

Recommendations:

- Drill only under periodic image intensifier control
- While drilling, do not force
- Replace drill stops that do not pass the described wear test



IMPLANTS

TFN-ADVANCED PROXIMAL FEMORAL NAILING SYSTEM, LONG NAILS



TFN–ADVANCED System, Long Nails, 9 mm distal diameter, sterile

TFN–ADVANCED System, Long Nails, 10 mm distal diameter, sterile

		Length	Femoral
Right	Left	(mm)	Neck Angle
04.037.9165	04.037.9175	260	125°
04.037.9185	04.037.9195	280	125°
04.037.9205	04.037.9215	300	125°
04.037.9225	04.037.9235	320	125°
04.037.9245	04.037.9255	340	125°
04.037.9265	04.037.9275	360	125°
04.037.9285	04.037.9295	380	125°
04.037.9305	04.037.9315	400	125°
04.037.9325	04.037.9335	420	125°
04.037.9345	04.037.9355	440	125°
04.037.9365	04.037.9375	460	125°
04.037.9385	04.037.9395	480	125°
04.037.9465	04.037.9475	260	130°
04.037.9485	04.037.9495	280	130°
04.037.9505	04.037.9515	300	130°
04.037.9525	04.037.9535	320	130°
04.037.9545	04.037.9555	340	130°
04.037.9565	04.037.9575	360	130°
04.037.9585	04.037.9595	380	130°
04.037.9605	04.037.9615	400	130°
04.037.9625	04.037.9635	420	130°
04.037.9645	04.037.9655	440	130°
04.037.9665	04.037.9675	460	130°
04.037.9685	04.037.9695	480	130°

10 mm distal diameter, sterile			
D: 1 (Length	Femoral
Right	Left	(mm)	Neck Angle
04.037.0165	04.037.0175	260	125°
04.037.0185	04.037.0195	280	125°
04.037.0205	04.037.0215	300	125°
04.037.0225	04.037.0235	320	125°
04.037.0245	04.037.0255	340	125°
04.037.0265	04.037.0275	360	125°
04.037.0285	04.037.0295	380	125°
04.037.0305	04.037.0315	400	125°
04.037.0325	04.037.0335	420	125°
04.037.0345	04.037.0355	440	125°
04.037.0365	04.037.0375	460	125°
04.037.0385	04.037.0395	480	125°
04.037.0465	04.037.0475	260	130°
04.037.0485	04.037.0495	280	130°
04.037.050S	04.037.0515	300	130°
04.037.0525	04.037.0535	320	130°
04.037.0545	04.037.0555	340	130°
04.037.0565	04.037.0575	360	130°
04.037.0585	04.037.0595	380	130°
04.037.0605	04.037.0615	400	130°
04.037.0625	04.037.0635	420	130°
04.037.0645	04.037.0655	440	130°
04.037.0665	04.037.0675	460	130°
04.037.0685	04.037.0695	480	130°

For detailed cleaning and sterilization instructions, please refer to: www.synthes.com/cleaning-sterilization In Canada, the cleaning and sterilization instructions will be provided with

In Canada, the cleaning and sterilization instructions will be provided w the Loaner shipments.

TFN–ADVANCED System, Long Nails, 11 mm distal diameter, sterile

TFN-ADVANCED System, Long Nails, 12 mm distal diameter, sterile

	ulainetei, ster	Length	Femoral
Right	Left	(mm)	Neck Angle
04.037.1205	04.037.1215	300	125°
04.037.1225	04.037.1235	320	125°
04.037.1245	04.037.1255	340	125°
04.037.1265	04.037.1275	360	125°
04.037.1285	04.037.1295	380	125°
04.037.1305	04.037.1315	400	125°
04.037.1325	04.037.1335	420	125°
04.037.1345	04.037.1355	440	125°
04.037.1365	04.037.1375	460	125°
04.037.1385	04.037.1395	480	125°
04.037.1505	04.037.1515	300	130°
04.037.1525	04.037.1535	320	130°
04.037.1545	04.037.1555	340	130°
04.037.1565	04.037.1575	360	130°
04.037.1585	04.037.1595	380	130°
04.037.1605	04.037.1615	400	130°
04.037.1625	04.037.1635	420	130°
04.037.1645	04.037.1655	440	130°
04.037.1665	04.037.1675	460	130°
04.037.1685	04.037.1695	480	130°
04.037.1805	04.037.1815	300	135°
04.037.1825	04.037.1835	320	135°
04.037.1845	04.037.1855	340	135°
04.037.1865	04.037.1875	360	135°
04.037.1885	04.037.1895	380	135°
04.037.1905	04.037.1915	400	135°
04.037.1925	04.037.1935	420	135°
04.037.1945	04.037.1955	440	135°
04.037.1965	04.037.1975	460	135°
04.037.1985	04.037.1995	480	135°

12 mm distal diameter, sterile			
Right	Left	Length (mm)	Femoral Neck Angle
04.037.2205	04.037.2215	300	125°
04.037.2225	04.037.2235	320	125°
04.037.2245	04.037.2255	340	125°
04.037.2265	04.037.2275	360	125°
04.037.2285	04.037.2295	380	125°
04.037.230S	04.037.2315	400	125°
04.037.2325	04.037.233S	420	125°
04.037.234S	04.037.2355	440	125°
04.037.2365	04.037.237S	460	125°
04.037.2385	04.037.2395	480	125°
04.037.250S	04.037.2515	300	130°
04.037.2525	04.037.253S	320	130°
04.037.254S	04.037.2555	340	130°
04.037.2565	04.037.257S	360	130°
04.037.2585	04.037.2595	380	130°
04.037.260S	04.037.2615	400	130°
04.037.2625	04.037.263S	420	130°
04.037.264S	04.037.2655	440	130°
04.037.266S	04.037.2675	460	130°
04.037.2685	04.037.2695	480	130°

TFN–ADVANCED System, Long Nails, 14 mm distal diameter, sterile

Right	Left	Length (mm)	Femoral Neck Angle
04.037.4505	04.037.4515	300	130°
04.037.4525	04.037.4535	320	130°
04.037.4545	04.037.4555	340	130°
04.037.4565	04.037.4575	360	130°
04.037.4585	04.037.4595	380	130°
04.037.4605	04.037.4615	400	130°
04.037.4625	04.037.4635	420	130°
04.037.4645	04.037.4655	440	130°
04.037.4665	04.037.4675	460	130°
04.037.4685	04.037.4695	480	130°



TFN–ADVANCED PROXIMAL FEMORAL NAILING SYSTEM, SHORT NAILS



TFN-ADVANCED System, Short Nails, 170 mm length, sterile

		Femoral
	Dia. (mm)	Neck Angle
04.037.9125	9	125°
04.037.9425	9	130°
04.037.9725	9	135°
04.037.0125	10	125°
04.037.0425	10	130°
04.037.0725	10	135°
04.037.1125	11	125°
04.037.1425	11	130°
04.037.1725	11	135°
04.037.2125	12	125°
04.037.2425	12	130°
04.037.2725	12	135°

TFN–ADVANCED System, Short Nails, 235 mm length, sterile			
Right	Left	Dia. (mm)	Femoral Neck Angle
04.037.9145	04.037.9155	9	125°
04.037.9445	04.037.9455	9	130°
04.037.9745	04.037.9755	9	135°
04.037.0145	04.037.0155	10	125°
04.037.0445	04.037.0455	10	130°
04.037.0745	04.037.0755	10	135°
04.037.1145	04.037.1155	11	125°
04.037.1445	04.037.1455	11	130°
04.037.1745	04.037.1755	11	135°
04.037.2145	04.037.2155	12	125°
04.037.2445	04.037.2455	12	130°
04.037.274S	04.037.2755	12	135°

TFN–ADVANCED System, Short Nails, 200 mm length, sterile

0	Dia. (mm)	Femoral Neck Angle
04.037.9135	9	125°
04.037.9435	9	130°
04.037.9735	9	135°
04.037.0135	10	125°
04.037.0435	10	130°
04.037.0735	10	135°
04.037.113S	11	125°
04.037.143S	11	130°
04.037.1735	11	135°
04.037.2135	12	125°
04.037.2435	12	130°
04.037.2735	12	135°

HEAD ELEMENTS

TFNA Screws^{\lambda}

- Ti-6Al-7Nb (TAN)
- Color: gold
- 10.35 mm diameter
- 70 mm–130 mm
- Cannulated

TFNA Helical Blades[◊]

- Ti-6Al-7Nb (TAN)
- Color: gold
- 70 mm-130 mm (5 mm increments)
- 10.35 mm diameter
- Cannulated

Titanium Screws

	Length (mm)		Length (mm)
04.038.070	70	04.038.105	105
04.038.075	75	04.038.110	110
04.038.080	80	04.038.115	115
04.038.085	85	04.038.120	120
04.038.090	90	04.038.125	125
04.038.095	95	04.038.130	130
04.038.100	100		





Titanium Helical Blades

	Length (mm)		Length (mm)
04.038.270	70	04.038.305	105
04.038.275	75	04.038.310	110
04.038.280	80	04.038.315	115
04.038.285	85	04.038.320	120
04.038.290	90	04.038.325	125
04.038.295	95	04.038.330	130
04.038.300	100		

Titanium End Caps for TFN-ADVANCED Nail, sterile

- Ti-6Al-7Nb (TAN)
- Color: green
- 0 mm (sits flush with nail end)
- 5 mm/10 mm and 15 mm extensions
- STARDRIVE Recess T40, hexagonal recess 5.0 mm





0 mm

	Extension
04.038.0005	0 mm
04.038.0055	5 mm
04.038.0105	10 mm
04.038.0155	15 mm

◊Available nonsterile or sterile-packed.

Add "S" to catalog number to order sterile product.

SCREWS USED WITH THE TFN–ADVANCED PROXIMAL FEMORAL NAILING SYSTEM

5.0 mm Ti Locking Screws with T25 STARDRIVE Recess for IM Nails^o



- Light green
- 4.2 mm diameter drill
- 26 mm-80 mm (2 mm increments) 80 mm-100 mm (5 mm increments)
- STARDRIVE Recess T25

5.0 mm Titanium Locking Screws with Hexagonal Drive^{\diamond}

- Ti-6Al-7Nb (TAN)
- Light green
- 4.2 mm diameter drill
- 26 mm-80 mm (2 mm increments) 80 mm-100 mm (5 mm increments)
- 3.5 hexagonal recess

5.0 mm Ti Locking Screws with T25 STARDRIVE Recess for IM Nails^o

	Length (mm)	Length (mm)
04.005.516	26 mm	04.005.542 52 mm
04.005.518	28 mm	04.005.544 54 mm
04.005.520	30 mm	04.005.546 56 mm
04.005.522	32 mm	04.005.548 58 mm
04.005.524	34 mm	04.005.550 60 mm
04.005.526	36 mm	04.005.554 64 mm
04.005.528	38 mm	04.005.558 68 mm
04.005.530	40 mm	04.005.562 72 mm
04.005.532	42 mm	04.005.566 76 mm
04.005.534	44 mm	04.005.570 80 mm
04.005.536	46 mm	04.005.575 85 mm
04.005.538	48 mm	04.005.580 90 mm
04.005.540	50 mm	

5.0 mm Titanium Locking Screws with Hexagonal Drive^

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 0 Available nonsterile or sterile-packed. Add "S" to catalog number to order sterile product. Synthes is a trademark of Synthes USA Products, LLC or its affiliates.



INSTRUMENTS

03.010.061	4.2 mm Three-Fluted Drill Bit quick coupling, 330 mm, 100 mm calibration	
03.010.065	8.0 mm/4.2 mm Drill Sleeve 200 mm	
03.010.070	4.2 mm Trocar 210 mm	. <u> </u>
03.010.072	Depth Gauge for Locking Screws to 100 mm for IM Nails	
03.010.093	Reaming Rod Push Rod with Ball Handle	
03.010.104	4.2 mm Three-Fluted Drill Bit quick coupling, needle point, 145 mm	
03.010.106	Direct Measuring Device for Locking Screws to 100 mm for IM Nails	

03.010.151	Star/HexDrive Screwdriver Shaft T25, 3.5 mm Hexagonal self-retaining, quick coupling, 165 mm	
03.010.152	Star/HexDrive Screwdriver Shaft T25, 3.5 mm Hexagonal self-retaining, quick coupling, 280 mm	
03.010.170	Hammer Guide	■
03.010.412	Guide Wire Aiming Device for Trochanteric Fixation Nail for Anterior Posterior orientation	
03.010.415	Connecting Screw for Guide Wire Aiming Device for Trochanteric Fixation Nail, Anterior Posterior orientation	C- NY
03.010.471	Guide Wire Aiming Device Offset Block	
03.010.473	Inter-lock Screwdriver T25 StarDrive/ 3.5 mm Hexagonal, 224 mm	

n Gauge for Locking Screws 0 mm	
dle Cannulated, with quick coupling	
dle Ball Hex Screwdriver 8 mm	
vdriver self-retaining, T25, 320 mm	
vdriver T40, 277 mm	
Combination Hammer 500 grams	
	0 mm dle Cannulated, with quick coupling dle Ball Hex Screwdriver 8 mm rdriver self-retaining, T25, 320 mm





03.037.020	Helical Blade and Screw Measuring Device	
03.037.021	10 mm Cannulated Tapered Drill Bit large quick coupling, 300 mm	
03.037.022	6 mm/9 mm Cannulated Stepped Drill Bit large quick coupling, 500 mm	
03.037.023	Drill Stop for use with 6.0 mm/10.0 mm cannulated stepped drill bit (03.037.022)	
03.037.024	Helical Blade Inserter for Trochanteric Fixation Nail Advanced	
03.037.025	Screw Inserter	
03.037.026	Helical Blade and Screw Coupling Screw	

03.037.027	Tap for Screw	
03.037.028	5 mm Hexagonal Flexible Screwdriver	a (<u>17778886555555555555</u>
03.037.029	5 mm Hexagonal Screwdriver Shaft	PROXIMAL STATIC LOCKING ONLY
03.037.030	Helical Blade and Screw Extractor for use with Trochanteric Fixation Nail Advanced System	
03.037.031	Combination Wrench 11 mm for blade and screws	11 • BLADE/SCREW
03.037.032	Nail Extractor	
03.037.036	Depth Gauge for Trochanteric Nailing System	2240 2600 2600 2600 2600 2600 2600 4600 4

03.037.116	Compression Nut for use with Trochanteric Fixation Nail Advanced Screw Inserter
03.037.120	Threaded Hammer Guide Connector
03.140.023	Torque Limiting Attachment 6Nm for AO Reaming Coupler
321.17	4.5 mm Pin Wrench 120 mm
351.719	Depth Gauge Extension Tube for use with 351.717 or 03.019.001
357.399	3.2 mm Guide Wire 400 mm
357.413	5.6 mm/3.2 mm Drill Guide 198 mm

357.415 5.0 mm Hexagonal Shaft 210 mm

393.10

Universal Chuck with T-Handle



TFN–ADVANCED PROXIMAL FEMORAL NAILING SYSTEM, TFNA STANDARD SET (01.037.000)

Graphic Case

60.037.002	Full Length Graphic Case 2 high
60.037.003	Full Length Graphic Case 3 high
60.037.020	Opening Tray for Trochanteric Fixation Nail-Advanced
60.037.021	Nail Insertion Tray for Trochanteric Fixation Nail-Advanced
60.037.022	Blade/Screw Insertion Tray for Trochanteric Fixation Nail-Advanced
60.037.023	Locking Tray for Trochanteric Fixation Nail-Advanced
60.037.011	TFNA Complete Set Graphic Case Label Sheet



For detailed cleaning and sterilization instructions, please refer to: www.synthes.com/cleaning-sterilization In Canada, the cleaning and sterilization instructions will be provided with the Loaner shipments.

Instruments		03.037.008	8 mm Cannulated Curved AWL
03.010.061	4.2 mm Three-Fluted Drill Bit quick	03.037.010	Cannulated Connecting Screw, 2 ea.
	coupling, 330 mm, 100 mm calibration	03.037.012	Complete Radiolucent Insertion Handle
03.010.065	8.0 mm/4.2 mm Drill Sleeve 200 mm	03.037.013	130 Degree Aiming Arm
03.010.070	4.2 mm Trocar 210 mm	03.037.015	Aiming Arm Locking Device
03.010.072	Depth Gauge for Locking Screws to	03.037.016	Buttress Compression Nut
	100 mm for IM Nails	03.037.017	Blade/Screw Guide Sleeve
03.010.093	Reaming Rod Push Rod with Ball Handle	03.037.018	3.2 mm Wire Guide Sleeve 248 mm
03.010.104	4.2 mm Three-Fluted Drill Bit quick	03.037.019	3.2 mm Trocar 270 mm
	coupling, needle point, 145 mm	03.037.020	Helical Blade and Screw Measuring Device
03.010.106	Direct Measuring Device for Locking	03.037.021	10 mm Cannulated Tapered Drill Bit
	Screws to 100 mm for IM Nails		large quick coupling, 300 mm
03.010.151	Star/HexDrive Screwdriver Shaft T25,	03.037.022	6 mm/9 mm Cannulated Stepped Drill
	3.5 mm Hexagonal self-retaining,		Bit large quick coupling, 500 mm
	quick coupling, 165 mm Star/HexDrive Screwdriver Shaft T25,	03.037.023	Drill Stop for use with 6.0 mm/10.0 mm
03.010.152	3.5 mm Hexagonal self-retaining,		cannulated stepped drill bit (03.037.022)
	quick coupling, 280 mm	03.037.024	Helical Blade Inserter for Trochanteric
03.010.170	Hammer Guide		Fixation Nail Advanced
03.010.412	Guide Wire Aiming Device for	03.037.025	Screw Inserter
05.010.412	Trochanteric Fixation Nail for Anterior	03.037.026	Helical Blade and Screw Coupling Screw
	Posterior orientation	03.037.027	Tap for Screw
03.010.415	Connecting Screw for Guide Wire Aiming	03.037.028	5 mm Hexagonal Flexible Screwdriver
05.010.115	Device for Trochanteric Fixation Nail,	03.037.029	5 mm Hexagonal Screwdriver Shaft
	Anterior Posterior orientation	03.037.030	Helical Blade and Screw Extractor for use
03.010.471	Guide Wire Aiming Device Offset Block		with Trochanteric Fixation Nail Advanced
03.010.473	Inter-lock Screwdriver T25 StarDrive/	02 027 021	System
	3.5 mm Hexagonal, 224 mm	03.037.031	Combination Wrench 11 mm for blade and screws
03.010.491	Long Scalpel Handle	03.037.032	Nail Extractor
03.010.496	T-Handle Cannulated, with quick coupling	03.037.032	Depth Gauge for Trochanteric Nailing System
03.010.517	T-Handle Ball Hex Screwdriver 8 mm	03.037.030	Compression Nut for use with Trochanteric
03.010.518	Screwdriver self retaining, T25, 320 mm	03.037.110	Fixation Nail Advanced Screw Inserter
03.010.520	Screwdriver T40, 277 mm	03.037.120	Threaded Hammer Guide Connector, 2 ea.
03.010.522	Spiral Combination Hammer 500 grams	03.140.023	Torque Limiting Attachment 6Nm for
03.010.523	Driving Cap threaded	05.140.025	AO Reaming Coupler
03.025.040	11.0 mm/8.0 mm Protection Sleeve	321.17	4.5 mm Pin Wrench 120 mm
	188 mm for Angular Stable Locking System	351.719	Depth Gauge Extension Tube for use
03.037.000	Multi Hole Wire Guide 136 mm	551.715	with 351.717 or 03.019.001, 10 ea.
03.037.001	16 mm Protection Sleeve 118 mm	357.399	3.2 mm Guide Wire 400 mm, 2 ea.
03.037.002	16 mm Cannulated Flexible Drill Bit	357.413	5.6 mm/3.2 mm Drill Guide 198 mm
	Large Quick Coupling - 266 mm	357.415	5.0 mm Hexagonal Shaft 210 mm
03.037.006	Radiographic Ruler	393.10	Universal Chuck with T-Handle

TFN–ADVANCED PROXIMAL FEMORAL NAILING SYSTEM, TFNA PERCUTANEOUS INSTRUMENT SET (01.037.001)

Graphic Cases

60.037.001 Full Length Graphic Case 1 high
60.037.024 Percutaneous Instrument Tray for Trochanteric Fixation Nail Advanced System

Instruments

03.037.100	Percutaneous Multi Hole Wire Guide
	260 mm
03.037.101	16 mm Percutaneous Sleeve 242 mm
03.037.102	16 mm Cannulated Percutaneous Flexible
	Drill Bit large quick coupling, 390 mm
03.037.112	Percutaneous Radiolucent Insertion Handle
	for Trochanteric Fixation Nail Advanced
	Nailing System
09.037.010	3.2 mm Guide Wire 475 mm, 5 ea.



ALSO AVAILABLE

Sets

01.004.306	Flexible Reamer Set, Long
01.010.201	SureLock Instrument Set
01.116.041	Reduction Instrument Set with MIPO complete
01.037.002	TFNA Implant Set
01.037.003	TFNA Basic Blade Instrument Set
01.037.005	TFNA Basic Removal Instrument Set
01.116.042	Reduction Instrument Set complete
105.309	Reamer/Irrigator/Aspirator Set
150.060	Flexible Reamer Set for IM Nails

Instruments

03.231.018	6Nm Torque Limiting Blue Handle with 6 mm Hex Coupling
351.7065	2.5 mm Reaming Rod with ball tip, 950 mm, sterile
351.7075	2.5 mm Reaming Rod with ball tip and extension, 950 mm, sterile
355.3995	Extraction Hook, sterile; for Titanium Cannulated Nails
394.35	Large Distractor, complete

The TFN-ADVANCED[™] Proximal Femoral Nailing System is designed to advance hip fracture treatment with:

- Outcome-based Design
- Reduced Procedural Complexity
- Comprehensive Surgical Options

To learn more about the future of hip fracture treatment, contact your DePuy Synthes Sales Consultant or visit: **www.tfnadvanced.com**



TFNXdvanced PROXIMAL FEMORAL NAILING SYSTEM

Indications for Use: TFN-ADVANCED[™] Proximal Femoral Nailing System is intended for treatment of fractures in adults and adolescents (12-21) in which the growth plates have fused. Specifically, the system is indicated for: stable and unstable pertrochanteric fractures; intertrochanteric fractures; basal neck fractures; combinations of pertrochanteric, intertrochanteric, and basal neck fractures.

The long Nail is additionally intended for treatment of fractures in adults and adolescents (12-21) in which the growth plates have fused for the following indications: subtrochanteric fractures; pertrochanteric fractures associated with shaft fractures; pathologic fractures (including prophylactic use) in both trochanteric and diaphyseal regions; long subtrochanteric fractures; proximal or distal non-unions, malunions and revisions.

WARNING: In the USA, this product has labeling limitations. See package insert for complete information.

CAUTION: Federal law restricts these devices to sale by or on the order of a physician.

CAUTION: Some devices listed in this technique guide may not have been licensed in accordance with Canadian law and may not be for sale in Canada. Please contact your sales consultant for items approved in Canada.

Manufactured by (United States): Synthes USA Products, LLC 1302 Wrights Lane East West Chester, PA 19380 Telephone: (610) 719-5000 To order: (800) 523-0322 Fax: (610) 251-9056 Legal Manufacturer (Canada): Synthes (Canada) Ltd. 2566 Meadowpine Blvd. Mississauga, Ontario L5N 6P9 Telephone: (905) 567-0440 To order: (800) 668-1119 Fax: (905) 567-3185

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