Surgical Technique

smith&nephew

TRIGEN® INTERTAN®

Intertrochanteric Antegrade Nail

TRIGEN® INTERTAN® Intertrochanteric Antegrade Nail
Surgical Technique

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Nota Bene

The technique description herein is made available to the healthcare professional to illustrate the author's suggested treatment for the uncomplicated procedure. In the final analysis, the preferred treatment is that which addresses the needs of the specific patient.

Introduction

INTERTAN® Nails - Designed for Stability

The TRIGEN® INTERTAN nail was designed as a trochanteric portal intramedullary nail especially shaped for fractures of the proximal femur. The INTERTAN system offers anatomically shaped trapezoidal implants as opposed to conventional circular shaped intramedullary nails.

The INTERTAN system offers an integrated interlocking screw option to increase stability and resistance to intra-operative and post-operative femoral head rotation, thus eliminating excessive sliding and the possibility of Z-effect. The INTERTAN screw is a 4th generation intramedullary nail combining the rotational stability of the original RUSSELL-TAYLOR® Reconstruction Nail with the enhanced sliding and compression of the IMHS® Intramedullary Hip Screw. The INTERTAN system screw utilizes the best of both concepts.

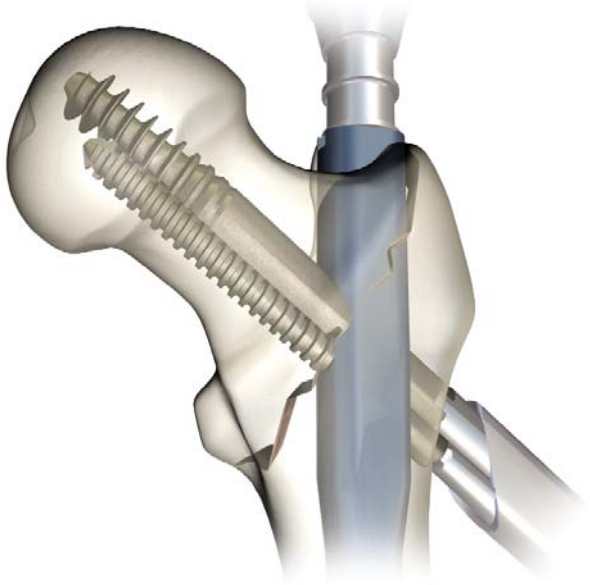
The option of a single lag screw device placed in the femoral head is available for rotationally stable proximal femur fractures.

Devices in the proximal femur are at their greatest stress levels when the hip is placed through its flexion extension arc (ex: chair rise and climbing stairs). During this event, the trapezoidal shape of the INTERTAN system enhances stability of the implant within the femur. In addition, the integrated interlocking screw configuration imparts rotational stability in the femoral head and neck segment, and offers a greater resistance to cutout. With these features, the INTERTAN system provides an innovative treatment option for proximal femur fractures.

This next generation nail in the TRIGEN◊ system provides these clear advantages:

Implants

- Additional strength and stability with a unique integrated interlocking screw and trapezoidal nail shape
- Improved resistance to femoral head rotation and cutout
- Active compression achieved through a linear motion without rotation
- Single subtrochanteric lag screw option for stable fractures below the lesser trochanter
- Preloaded cannulated set screw converts the construct to a fixed angle device
- The small proximal diameter of the nail promotes preservation of the lateral wall of the greater trochanter and gluteus medius tendon
- Clothespin tip for stress modulation in the femoral shaft
- Potential for improved patient mobility and recovery



Instrumentation

- Familiar, easy to use, minimally invasive TRIGEN instrumentation
- Anti-rotation bar maintains stability during drilling and screw insertion
- Alignment guides for proper lag screw placement in the femoral neck and head

INTERTAN◇ System Case Examples

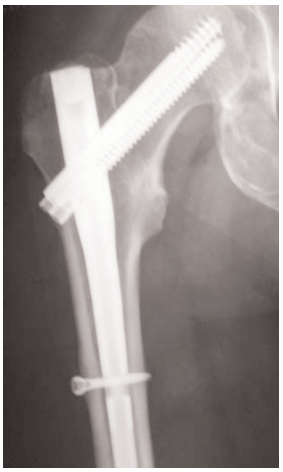
Case 1

Preoperative AP

Preoperative Lateral

Postoperative AP

Postoperative Lateral



12 Month AP

12 Month Lateral

Case 2

Preoperative AP

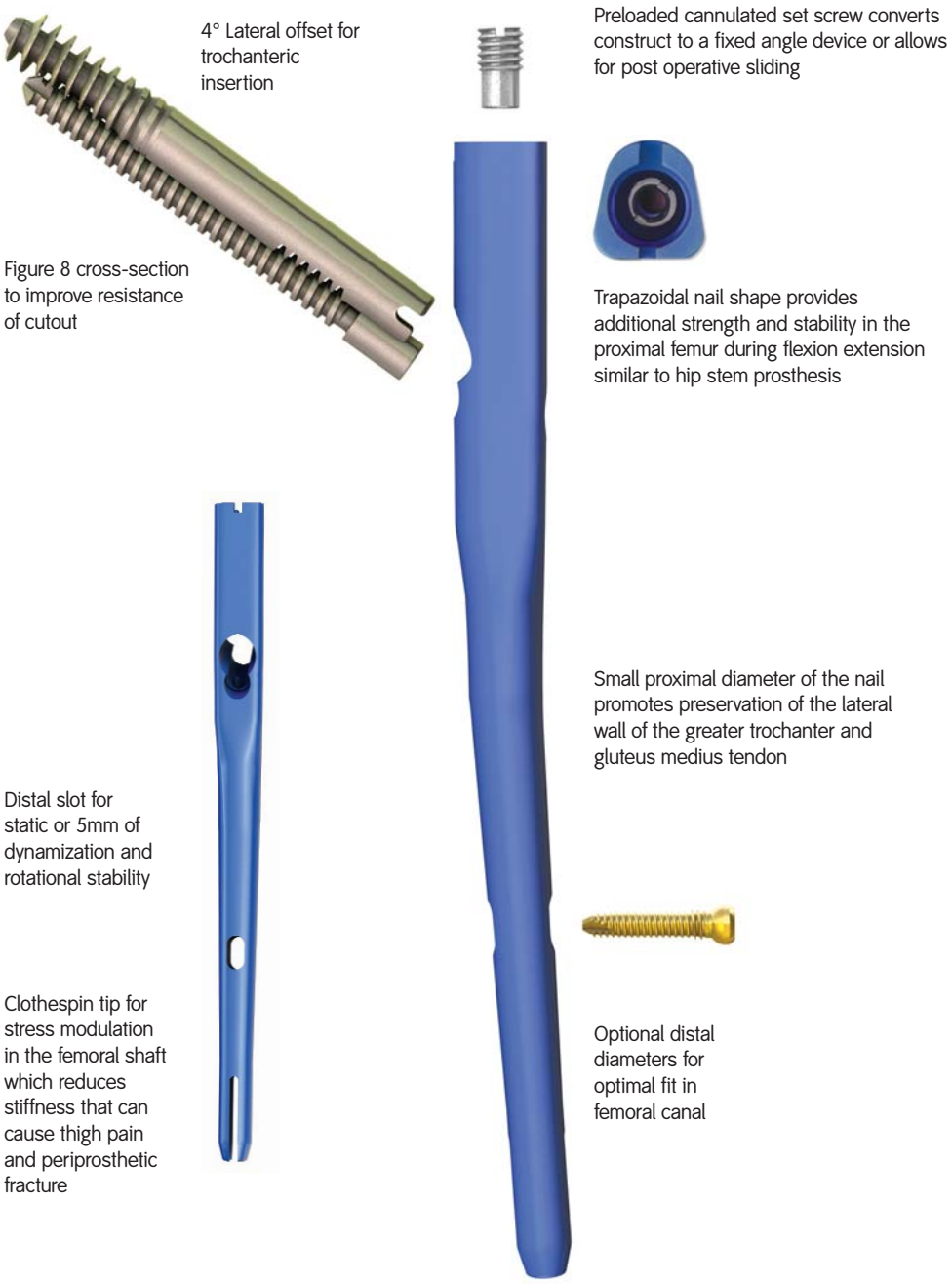
Postoperative AP

Postoperative Lateral

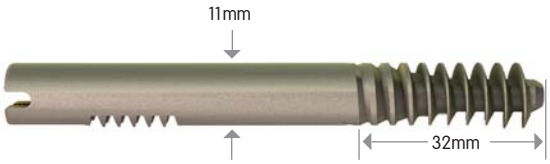
Design Features

Two-screw integrated interlocking provides:

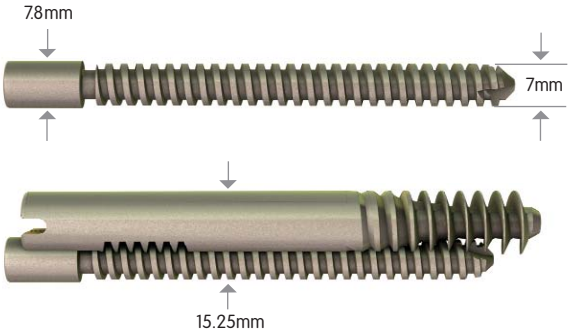
- Improved resistance to femoral head rotation and cutout
- Active compression achieved through a linear motion without rotation



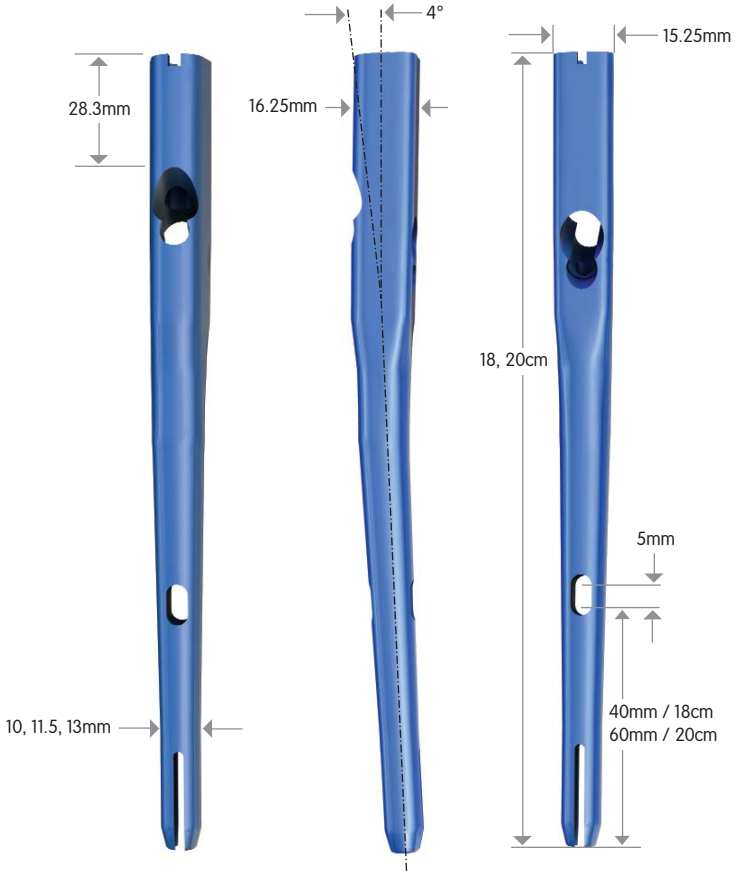
Implant Specifications



Minor diameter tapers from 11-5.6mm

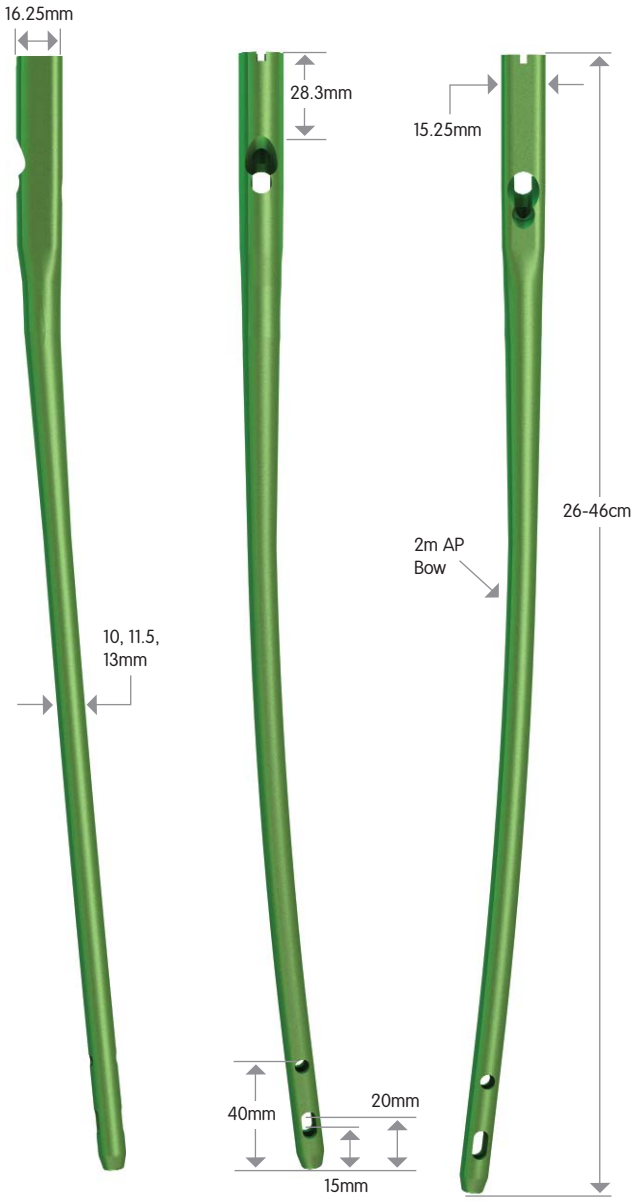


Integrated interlocking screws (sold together) 70-125mm



NOTE: These views are not to scale and should be used as a pictorial representation only.

Implant Specifications continued



Minor diameter tapers from 11-5.6mm

Subtrochanteric lag screw
70-125mm

NOTE: These views are not to scale and should be used as a pictorial representation only.

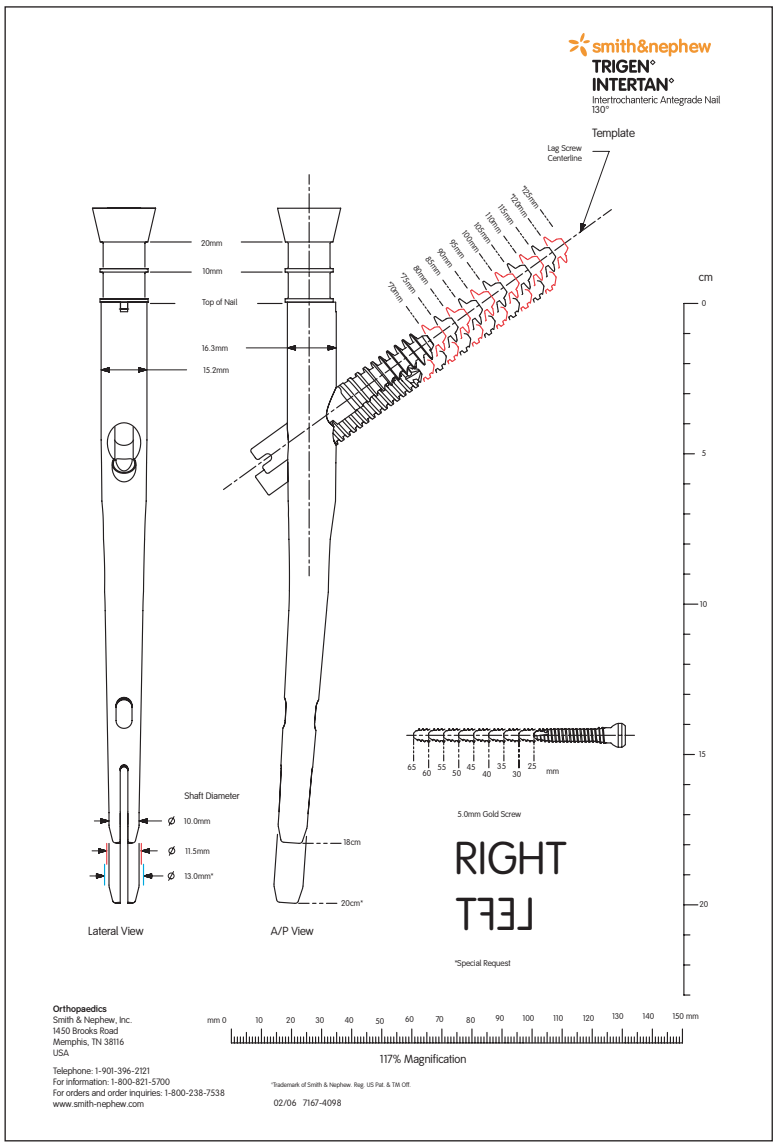
Indications

INTERTAN nails are indicated for simple long bone fractures; severely comminuted, spiral, long oblique and segmental fractures; nonunions and malunions; polytrauma and multiple fractures; prophylactic nailing of impending pathologic fractures; reconstruction following tumor resection and grafting; bone lengthening and shortening; subtrochanteric fractures; ipsilateral femoral shaft/neck fractures; intertrochanteric fractures; and intracapsular fractures.

Templates

Use the Smith & Nephew Preoperative INTERTAN® nail templates to determine the appropriate neck angle, nail length, nail diameter and proper screw length. All INTERTAN nail templates are available with 117% magnification to compensate for radiographic magnification. Please keep in mind that variations in magnification do occur.

When selecting the appropriate nail size take all aspects of the fracture into consideration.

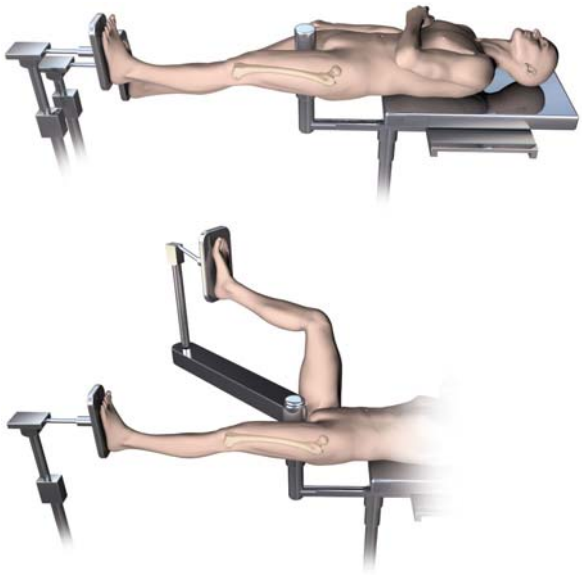


TRIGEN® INTERTAN Nail X-ray Template Set

Cat. No. 7167-4200

Patient Positioning

Place the patient in the supine position on a fracture or radiolucent table with the unaffected limb extended below the affected limb and trunk. Flex the affected hip 15°-40°. Apply traction through a skeletal traction pin or with the fracture table foot holder. Adjust the affected limb for length and rotation by comparison with the unaffected limb. Check rotation by rotating the C-arm in line with the femoral neck anteversion and then make the appropriate correction. This is best checked by visualizing the femoral anteversion proximally and matching it with the correct rotation of the knee.

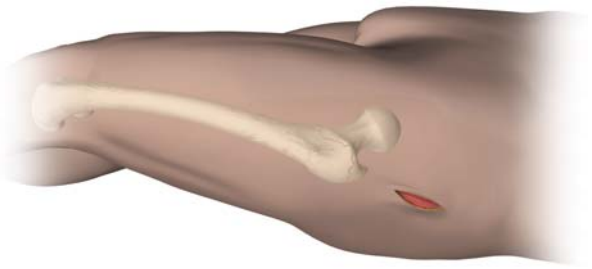


The lateral decubitus position may be selected in certain fracture configurations at the surgeon's discretion.

For short nails only (not recommended for long nail procedures), flex the hip and knee of the unaffected extremity and place it in a leg holder. Abduction and internal rotation of the hip allows unimpeded fluoroscopic imaging.

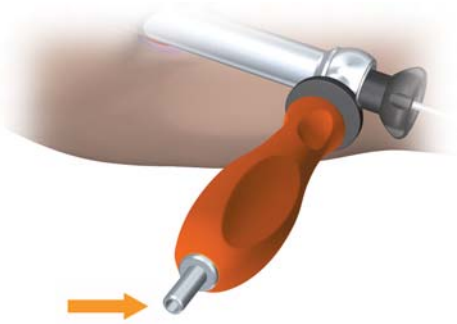
Incision

Palpate the trochanter. Make a 3cm incision approximately 2-3cm proximal to the greater trochanter. Carry the incision through the fascia. Do not damage the gluteal muscles by excessive manipulation.



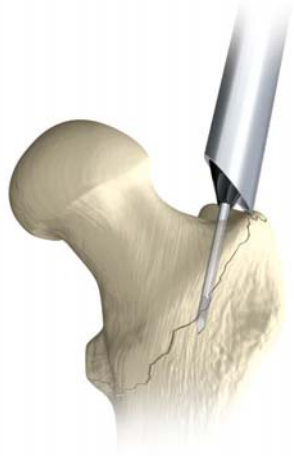
Entry Point

Assemble the entry portal tube to the entry portal handle and insert the honeycomb. The tube assembly is oriented so that the superior side of the bevel is medial or lateral as desired. Advance the assembly until it rests against the lateral aspect of the greater trochanter.



TRIGEN® Tip: Attaching suction to the entry portal handle provides an unobstructed view of the entry site, assists in blood evacuation, and minimizes aerosolization of blood to the operative team.

Attach the 3.2mm guide pin to the mini-connector. The entry point for the guide pin is in line with the medullary canal in the ML view and 4° from center in the AP view. Insert the guide pin through the honeycomb and advance 2-3cm into the cortex at the tip of the greater trochanter. Once proper placement of the guide pin is achieved, remove the honeycomb.



TRIGEN Tip: A two guide pin technique may be used. The first pin is inserted through one of the off-center holes in the honeycomb just lateral to the tip of the greater trochanter. The honeycomb is then rotated to access the definitive site of precise portal placement. The second guide pin can then be easily and accurately placed in the definitive site.

Entry Portal Tube
Cat. No. 7167-4060

Entry Portal Handle
Cat. No. 7167-4092

3.2mm Guide Pin
Cat. No. 7167-4029

Honeycomb
Cat. No. 7167-4075

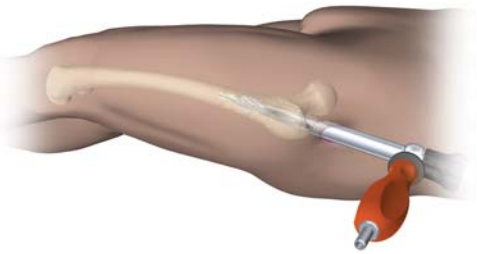
Mini-Connector
Cat. No. 7163-1186

Opening the Proximal Femur

Insert the 12.5mm entry reamer until it “clicks” into the 16mm channel reamer. Attach the channel reamer assembly to power for reaming of the proximal section of the femur. Introduce the assembly over the 3.2mm guide pin through the entry portal tube and advance 1-2cm into bone. The reamer assembly is then manipulated under image until the shaft axis and intended path of the reamer form an angle of approximately 4° in the AP view and is in line with the center of the femoral canal in the ML view. Caution should be taken not to over estimate the angle, as too much of a lateral insertion angle may make advancement of the nail more difficult. Once the correct orientation is obtained, the reamer assembly is advanced to full depth seated against the entry portal tube. Remove the 12.5mm entry reamer and guide pin, keeping the entry portal tube and channel reamer in place.

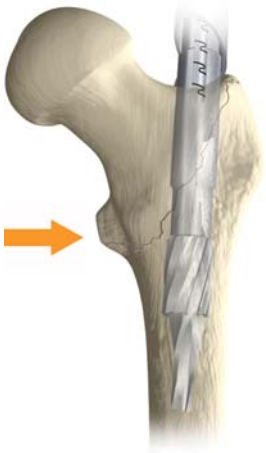
TRIGEN® Tip: View the channel reamer as a three step process:

1. Capture the guide wire with 1st 10mm of channel reamer insertion.
2. The next 20mm of the channel reamer aligns for varus, valgus, flexion, and extension alignment.
3. Controls trajectory of reamer path from proximal metaphysis into the medullary canal.



Note: Use caution not to insert the guide pin in so deeply, that a false trajectory is made in the proximal femur introducing a malalignment at the fracture.

Note: If the entry portal tube is not used, ensure that the channel reamer has reached the level of the lesser trochanter.



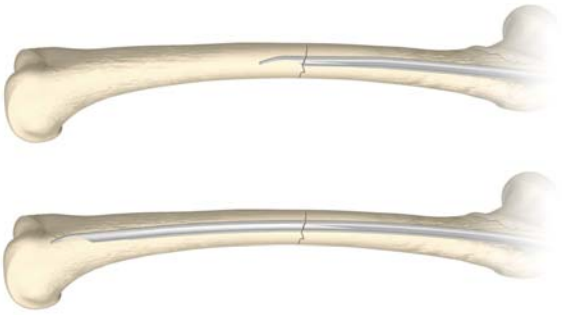
12.5mm Entry Reamer
Cat. No. 7163-1116

16mm Channel Reamer
Cat. No. 7167-4062

Fracture Reduction

Assemble the modular reducer and attach the T-handle. Introduce the assembly through the channel reamer and entry portal tube. Use the reducer to manipulate the proximal fragment and reduce the fracture. Insert the reducer to the level of the distal epiphyseal scar once the distal fragment has been captured.

TRIGEN° Tip: If the fracture is severely displaced, use the curved tip of the reducer to direct the 3.0mm x 1000mm ball tip guide rod into the distal fragment of the femur. Under fluoroscopy, stop the reducer as it approaches the fracture site. Pass the guide rod through the reducer until the tip of the guide rod can be visualized at the end of the curved reducer. Rotate the reducer and direct the guide rod to capture the distal fragment then advance the reducer into the distal fragment. The gripper is useful in holding onto the guide rod during insertion, proper placement, and removal.



Reducer
Cat. No. 7167-4077

T-handle
Cat. No. 7167-4076

3.0mm x 1000mm
Ball Tip Guide Rod
Cat. No. 7163-1626

Gripper
Cat. No. 7167-4080

Guide Rod Placement

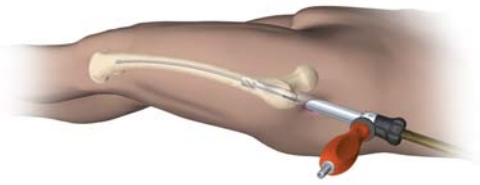
Insert the 3.0mm ball-tipped guide rod through the reducer and into the distal femur. The guide rod should be placed center-center in the shaft of the femur in the AP and ML views stopping in the region of the distal epiphyseal scar. This minimizes the chance of eccentric anterior placement of the nail in osteopenic femurs.

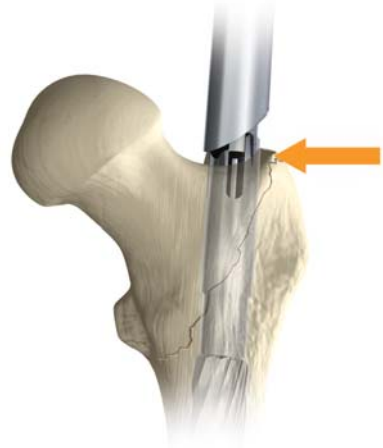
3.0mm x 1000mm
Ball Tip Guide Rod
Cat. No. 7163-1626

Reducer
Cat. No. 7167-4077

Nail Length Measurement

If a long nail has been chosen, it will be necessary to measure for nail length. Confirm the distal tip of the 3.0mm x 1000mm ball tip guide rod is located at the desired position in the distal femur. Slide the ruler over the proximal end of the guide rod. Advance the open end of the ruler through the channel reamer and entry portal tube. The tip of the ruler should be at the level of the greater trochanter. Read the nail length from the calibrations exposed at the other end of the ruler.



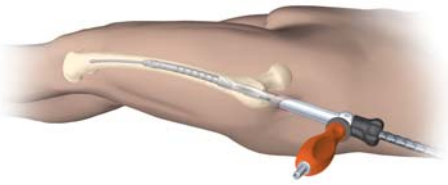


3.0mm x 1000mm
Ball Tip Guide Rod
Cat. No. 7163-1626

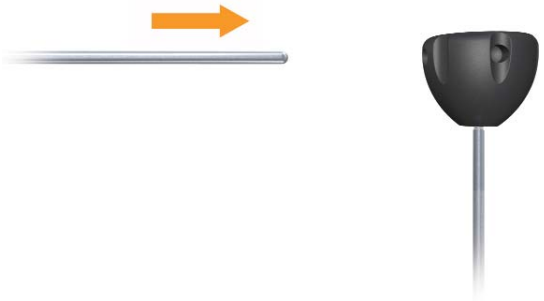
Ruler
Cat. No. 7167-4079

Preparation of Medullary Canal

Canal preparation is dependent upon surgical preference. If diaphyseal reaming is planned, use progressive reamers over the guide rod through the channel reamer and entry portal tube. Sequentially ream in 0.5mm increments to approximately 1mm larger than the chosen nail diameter. The obturator may be used to ensure the guide rod stays in position during reaming. Periodically move the reamer back and forth in the femoral canal to clear debris from the cutting flutes of the reamer.



TRIGEN® Tip: The obturator is used during sequential reaming to maintain the position of the guide rod in the canal. The holes in the black obturator head can be used to hold the exposed end of the guide rod as reamer removal begins. The obturator shaft can then be inserted into the cannulation of the reamer to continue holding the guide rod position.



Note: The channel reamer will not accommodate reamer heads larger than 12.5mm.

Obturator
Cat. No. 7167-4078

Reamer Shaft
(Optional)
Cat. No. 7163-1192

Reamer Set
(Optional)
Cat. No. 7167-1212

Target Device Assembly

Select the appropriate radiolucent drill guide drop based upon the neck angle chosen and attach the drop to the drill guide handle. Confirm the pre-loaded cannulated set screw does not obstruct the lag screw hole in the nail. Insert the 7/16 guide bolt into the drill guide handle and attach the nail using the guide bolt wrench with T-handle. Ensure that the guide bolt is properly seated and threaded into the nail. Any nail incorrectly attached will not accurately target. Verify targeting accuracy by inserting the lag screw drill sleeve into the drill guide and confirm the 11mm lag screw drill passes easily through the nail. Once the correct nail assembly has been verified remove the drill sleeve and attach the Impactor onto the drill guide to insert the nail.

7/16 Guide Bolt
Cat. No. 7167-4071

Guide Bolt Wrench
Cat. No. 7163-1140

T-handle
Cat. No. 7167-4076

Impactor
Cat. No. 7167-4081

Drill Guide Drop
Cat. No. 7167-400x

Nail Insertion

Verify proper fracture reduction. Advance the nail over the guide rod with the drill guide in the lateral position and carefully seat in the proximal femur. Final nail position is achieved with a gentle impaction force applied by the slotted hammer after confirmation of proper anteversion and AP alignment.

Select the appropriate radiolucent drill guide drop based upon the neck angle chosen and attach the drop to the drill guide handle.

TRIGEN® Tip: For long nails, orient the nail and guide 90° anteriorly. Advance the nail over the guide rod until the nail taper is reached and then rotate the guide to the lateral position.

Drill Guide Handle
Cat. No. 7167-4001

Slotted Hammer
Cat. No. 7167-4082

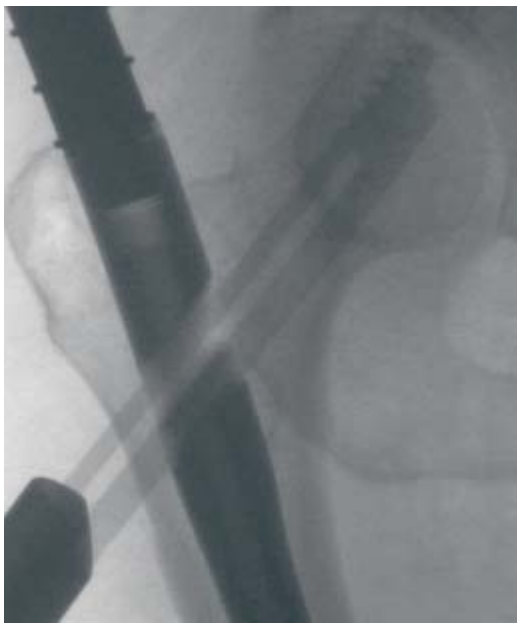
Anteversion Alignment

Anteversion alignment is achieved using the radio-opaque embedded wire in the drill guide handle. Position the C-Arm for an anteverted lateral image. Rotate the drill guide until both the nail and wire are centered within the femoral head. This may also require adjustment of the C-Arm.

Drill Guide Handle
Cat. No. 7167-4001

AP Alignment

Rotate the C-Arm to the AP position. Attach the alignment tower to the drill guide and insert the alignment arm. Verify the markings on the alignment arm match the operative side. Use the C-Arm to position the drill guide so the alignment arm and the center of the lag screw hole in the nail are in line with the femoral head. The alignment arm facilitates visualization of the central axis of the lag screw. Center-center alignment applies to both the single subtrochanteric lag screw and the 11.0mm lag screw of the integrated interlocking screws.

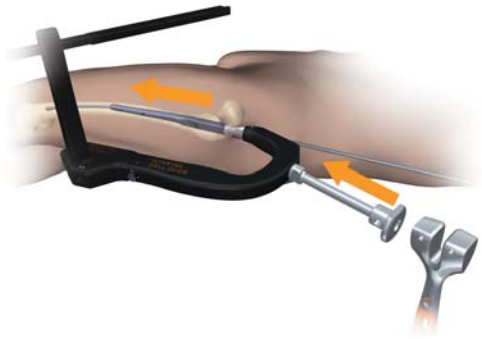


Alignment Tower
Cat. No. 7167-4018

Alignment Arm
Cat. No. 7167-4066

Final Seating of the Nail

Remove the guide rod prior to the last 2cm of final seating. Confirm the nail is in the desired position and exert a gentle impaction force with the hammer to fully seat the nail.



Note: The trapezoidal cross section of the nail helps control rotation during insertion similar to the press fit of uncemented hip stem techniques.

Note: If excessive impaction force was necessary, check to make sure the guide bolt is still tight and the set screw has not migrated into the lag screw hole.

If the nail fails to advance sufficiently, use biplanar imaging of the nail tip and the fracture zone to identify the source of impingement. Additional reaming may be required, especially in the proximal metphyseal diaphyseal junction. If the 16mm channel reamer was previously used, use the 17mm channel reamer. In young strong bone, a narrow proximal metaphyseal to diaphyseal transition may require sequential flexible canal reaming over the guide wire to facilitate nail insertion.

Note: Since the channel reamer must be removed for reaming over 12.5mm, exercise caution not to ream out the lateral cortex in the proximal femur.

17mm Channel
Reamer
Cat. No. 7167-4063

Guide Pin Insertion

Insert the adjustable lag screw drill sleeve and the 4.0mm drill sleeve trocar into the drill guide. Firmly press the trocar tip into the skin. Use this mark to make a small incision down to bone. Advance the drill sleeve and drill sleeve trocar through the incision. Verify the lag screw sleeve locks into the drill guide.

Note: Both sleeves should rest gently against bone. If the drill sleeves are pushed aggressively in position the drill guide may deflect.

Note: The lag screw drill sleeve is adjustable. The "0" setting will accommodate most patients.

Confirm the desired anteversion with the C-Arm in the lateral position.

Lag Screw
Drill Sleeve
Cat. No. 7167-4023

4.0mm Sleeve
Trocar
Cat. No. 7167-4072

Make sure that the trocar sleeve is gently resting against bone and insert the 4.0mm long AO pilot drill. Open the lateral cortex under power. Remove the drill bit and **replace the trocar sleeve with the lag screw 3.2mm guide pin sleeve**. Advance the 3.2mm guide pin through the guide pin sleeve while maintaining the correct anteversion. Final positioning of the guide pin should be done with the C-Arm in the AP plane. Insert the guide pin until the tip reaches the optimal tip-to-apex distance (TAD). Reconfirm the final placement of the pin in both planes.

TRIGEN® Tip: Utilize the 4.0mm drill sleeve trocar to optimize drill position in the lateral cortex and help prevent cephalad malposition of the guide pin.

Note: Do not use the trocar sleeve to read guide pin markings. The 3.2mm guide pin sleeve must be seated within lag screw drill sleeve.

4.0mm Long AO Pilot Drill
Cat. No. 7164-1121

3.2mm Guide Pin
Cat. No. 7167-4029

Lag Screw 3.2mm Guide Pin Sleeve
Cat. No. 7167-4032

Lag Screw Measurement

Read the calibrations off the guide pin for lag screw measurement. Alternatively, lag screw measurement may be obtained by inserting the lag screw length gauge over the guide pin until it sits flush with the end of the lag screw 3.2mm guide pin sleeve. Confirm the guide pin sleeve is seated flush within the lag screw drill sleeve for an accurate measurement. Lag screw measurement is determined by lining up the end of the guide pin with the calibrations on the length gauge.

Note: The lag screw measurement is independent of the proximity of the drill sleeve to the lateral cortex of the femur.

At this point in the procedure it is necessary to determine if a single lag screw or an integrated interlocking lag screw will be chosen. Once you commit to a single lag screw technique you cannot use the integrated interlocking screw technique.

The single lag screw steps are tabbed in Blue.

The integrated interlocking screw steps are tabbed in Green.

Lag Screw
Length Gauge
Cat. No. 7167-4058

Single Lag Screw Insertion

Single Lag Screw Drilling

Confirm that the guide pin tip is 5mm from subcondular bone for adequate screw depth. Drill over the guide pin under image using the 11.0mm lag screw drill. Confirm the guide pin is not being forced forward. Drill until the lag screw drill reaches the measured guide pin depth. This will be indicated by the markings on the shaft of the lag screw drill. Care should be taken to ensure that orientation of the drill guide handle is not altered. Markings on the lag screw drill reference the face of the drill sleeve.

TRIGEN® Tip: Use the obturator to maintain the position of the guide pin during lag screw drill removal.

Lag Screw Selection

If compression is ***not*** needed then select a lag screw length equal to the measurement taken from the drilling depth. For example, if the drilling depth was 100mm then select a 100mm lag screw.

If compression ***is*** needed then select a lag screw length equal to the measurement taken from the guide pin minus the desired amount of compression. For example, if the drilling depth was 100mm and up to 5mm of compression is needed, then select a 95mm lag screw. By selecting a 90mm lag screw a maximum of 10mm of compression can be achieved.

Note: It is not recommended to exceed 10mm of compression.

11mm Lag Screw Drill

Cat. No. 7167-4008

Subtroch Lag screwdriver

Cat. No. 7167-4068

T-handle

Cat. No. 7167-4076

Single Lag Screw Insertion *continued*

Lag Screw Insertion Without Compression

Attach the selected INTERTAN® Subtrochanteric Lag Screw to the subtroch lag screwdriver. Thread the compressing dial onto the end of the driver until the "0" mark is visible. Attach the T-handle and insert the driver assembly into the lag screw drill sleeve. Advance the driver by rotating it clockwise until the dial is flush against the drill sleeve. At final seating, the T-handle must be positioned perpendicular or parallel to the drill guide to properly orient the lag screw.

INTERTAN Lag Screw Insertion With Compression

Attach the selected subtrochanteric lag screw to the subtroch lag screwdriver.

Option #1: 5mm of Compression

If the lag screw selected is 5mm less than what was drilled for, thread the compressing dial onto the end of the driver until the "5" mark is visible.

Option #2: 10mm of Compression

If the lag screw selected is 10mm less than what was drilled for, thread the compressing dial onto the end of the driver until the "10" mark is visible.

Attach the T-handle and insert the driver assembly into the lag screw drill sleeve. Advance the driver by rotating it clockwise until the compressing dial is flush against the drill sleeve. At final seating, the T-handle must be positioned perpendicular or parallel to the drill guide to properly orient the lag screw.

T-handle
Cat. No. 7167-4076

Subtroch Lag Screwdriver
Cat. No. 7167-4068

Compressing Dial
Cat. No. 7167-4069

Compression is achieved by rotating the compressing dial clockwise until desired compression is achieved or the “0” mark on the subtroch lag driver is visible.

Note: The red marking on the driver signifies that the compression limit has been reached.

Locking Set Screw

To ***prevent*** sliding, tighten the set screw firmly using the set screwdriver and T-handle assembly. To ***permit*** sliding, reverse the set screw ¼ turn counterclockwise once the set screw is tightened. Screw design prevents medial screw migration into the femoral head.

Confirm the set screw is engaged in a migration limiting slot on the lag screw by gently turning the T-handle. If turning the T-handle is limited, then the set screw is properly engaged.

T-handle
Cat. No. 7167-4076

Subtroch Lag Screwdriver
Cat. No. 7167-4068

Compressing Dial
Cat. No. 7167-4069

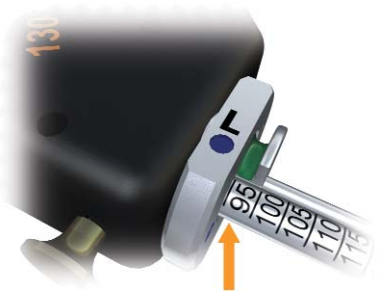
Integrated Interlocking Lag Screw Insertion

Compression Screw Preparation

Attach the 7.0mm compression screw starter drill to power and perforate the lateral cortex beneath the lag screw 3.2mm guide pin sleeve to prepare the bone for the head of the compression screw. Advance the drill until the built in positive stop abuts the guide pin sleeve. Remove the starter drill.

Note: It is imperative to abut the starter drill prior to drilling for the compression screw. The starter drill prepares the lateral cortex for the compression screw head which is larger than its shaft. Failure to complete this step may cause inefficient compression and/or cephalad malposition.

Attach the 7.0mm compression screw drill to power and insert it into the same hole as the starter drill. Advance the drill under fluoroscopy to a depth 5mm less than the guide pin depth. The markings on the compression screw are read from the face of the lag screw drill sleeve.



Remove the compression screw drill and replace it with the anti-rotation bar. The anti-rotation bar should be introduced using hand force only. If the starter drill has not been sufficiently used, the lateral cortex may deflect the anti-rotation bar. If deflection occurs, reuse the starter drill to clear away the bone at the nail interface to facilitate anti-rotation bar insertion.

Note: The anti-rotation bar provides stability of the head and neck segment during lag screw drilling.

INTERTAN® Lag Screw Drilling

Drill over the guide pin using the 11.0mm lag screw drill. Confirm under image the guide pin is not being forced forward beyond the desired depth. Markings on the lag screw drill reference the face of the drill sleeve and confirm guide pin depth. Care should be taken to ensure orientation of the drill guide handle is not altered.

TRIGEN® Tip: Use the obturator to maintain the position of the guide pin during drilling.

7.0mm Compression Screw Starter Drill
Cat. No. 7167-4070

7.0mm Compression Screw Drill
Cat. No. 7167-4034

Anti-Rotation Bar
Cat. No. 7167-4073

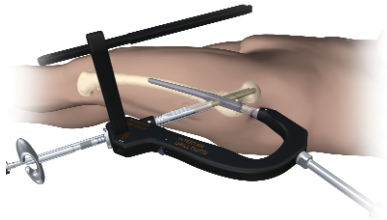
INTERTAN® Lag Screw Selection

If compression is ***not*** needed then select the lag screw length that is equal to the measurement taken from the drilling depth. For example, if the drilling depth was 100mm, then select a 100mm Lag Screw.

If compression ***is*** needed then select the lag screw length that is equal to the measurement taken from the drilling depth minus the desired amount of compression. For example, if the drilling depth was 100mm and up to 5mm of compression is needed, then select a 95mm lag screw. By selecting a 90mm lag screw, a maximum of 10mm of compression can be achieved. The INTERTAN lag screw will be packaged with the 7.0mm compression screw. The compression screw is 5mm shorter than the lag screw.

Note: It is not recommended to exceed 10mm of compression.

INTERTAN Lag Screw Insertion Without Compression



Attach the selected INTERTAN lag screw to the lag screwdriver. Insert the driver assembly into the lag screw drill sleeve. Gently advance the driver through the drilled hole.

Rotate the driver, inserting the screw until the “0” mark on the driver is in line with the face of the lag screw drill sleeve. At final seating, the T-handle of the lag screwdriver must be perpendicular to the drill guide to allow for the removal of the anti-rotation bar.

Remove the anti-rotation bar. Next attach the compression screw to the compression screw hexdriver. Once the compression screw is properly secured, attach the T-handle to the hexdriver. Advance the compression screw by rotating the T-handle clockwise until the blue line on the driver shaft is aligned with the face of the lag screw drill sleeve.

Lag Screwdriver
Cat. No. 7167-4067

Compression Screw Hexdriver
Cat. No. 7167-4035

T-handle
Cat. No. 7167-4076

Integrated Interlocking Lag Screw Insertion *continued*

TRIGEN® Tip: Even if no compression was planned 2-3mm of compression can be achieved by rotating the compression screw T-handle until the red line on the lag screwdriver becomes visible. Do not compress past the red line.

TRIGEN Tip: If additional compression is needed then remove the compression screw hexdriver and assemble the compressing dial onto the lag screwdriver. Thread the compressing dial until is abuts the lag screw drill sleeve. Gently rotate the compressing dial clockwise under image until desired compression is achieved. A maximum of 5mm of compression may be achieved.

INTERTAN® Lag Screw Insertion With Compression

Attach the selected INTERTAN lag screw to the lag screwdriver. Insert the driver assembly into the lag screw drill sleeve. Gently advance the driver through the drilled hole.

Note: Release any traction on the fracture to allow compression.

Option #1: 5mm of Compression

Rotate the driver, inserting the screw until the "5" mark on the driver is in line with the face of the lag screw drill sleeve. At final seating, the T-handle of the lag screwdriver must be perpendicular to the drill guide to allow for the removal of the anti-rotation bar.

Option #2: 10mm of Compression

Rotate the driver, inserting the screw until the "10" mark on the driver is in line with the face of the lag screw drill sleeve. At final seating, the T-handle of the lag screwdriver must be perpendicular to the drill guide to allow for the removal of the anti-rotation bar.

Anti-Rotation Bar
Cat. No. 7167-4073

Lag Screwdriver
Cat. No. 7167-4067

Remove the anti-rotation bar. Next attach the compression screw to the compression screw hexdriver. Once the compression screw is properly secured, attach the T-handle to the hexdriver. Advance the compression screw by rotating the T-handle clockwise until the blue line on the driver shaft is aligned with the face of the lag screw drill sleeve. At this point the compression screw is seated within the nail and compression can begin.

Continue to rotate the T-handle to linearly compress the fracture. Rotating the T-handle will cause the gear mechanism of the integrated interlocking screws to migrate the lag screwdriver back as compression occurs. When the blue line below the "0" mark on the lag screwdriver becomes visible, it is recommended to stop compression.

TRIGEN® Tip: An additional 2-3mm of compression can be achieved by rotating the compression screw T-handle until the red line on the lag screwdriver becomes visible. Once the red line becomes visible, the compression limit has been reached.

Locking Set Screw

To prevent sliding, tighten the preassembled set screw firmly using the set screwdriver and T-handle assembly.

Note: The integrated interlocking lag screw is incapable of superior migration.

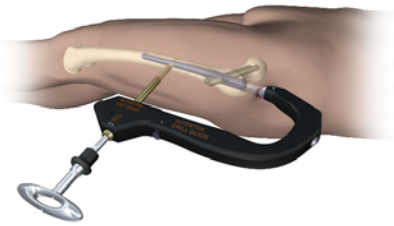
Note: The INTERTAN® subtrochanteric lag screw is incapable of superior migration only if the set screw is engaged.

Compression Screw Hexdriver
Cat. No. 7167-4035

Set Screwdriver
Cat. No. 7166-5014

Distal Locking Short Nails

Insert the 4.0mm drill sleeve into the 9.0mm drill sleeve and place this assembly through the drill guide. Make a stab incision and seat the drill sleeve assembly to bone. Drill through both cortices using the 4.0mm long AO pilot drill. The screw length can be determined using the drill bit calibrations measured against the 4.0mm drill sleeve or the screw depth gauge. Attach the appropriate length internal captured 5.0mm screw to the medium hexdriver. Attach the T-handle to the hexdriver and insert the screw. Targeted static (proximal) and dynamic (distal) locking options are available.



TRIGEN® Tip: Use the screwdriver release handle through the T-handle to release the hexdriver from the screw.

4.0mm Drill Sleeve
Cat. No. 7167-4083

9.0mm Drill Sleeve
Cat. No. 7163-1152

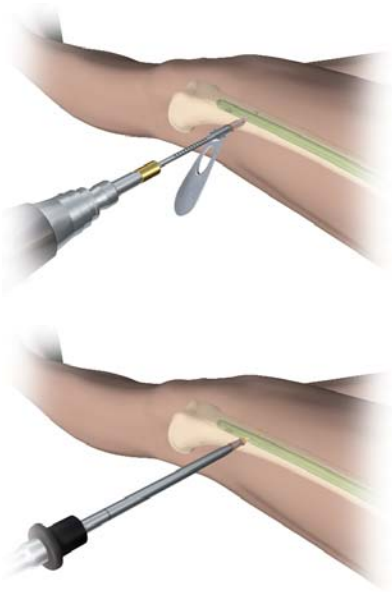
4.0mm Long AO Pilot Drill
Cat. No. 7164-1121

Screw Depth Gauge
Cat. No. 7163-1189

Medium Hexdriver
Cat. No. 7163-1066

Distal Locking Long Nails

Distal locking in the long nail will require a free hand technique. Use the screw length sleeve, 4.0mm short AO pilot drill and the short hexdriver for this technique. Once “perfect circles” are established, make a stab incision. The short pilot drill is used under power to drill through the locking holes in the nail. The screw length can be determined using the drill bit calibrations measured against the 4.0mm drill sleeve or the screw depth gauge. Attach the appropriate length screw to the short hexdriver, connect the T-handle and insert the screw until it is fully seated.



Screw Length Sleeve
Cat. No. 7167-4085

4.0mm Short AO Pilot Drill
Cat. No. 7164-1123

Short Hexdriver
Cat. No. 7163-1068

Nail Cap Insertion

It is recommended to use a nail cap to close the proximal end of the nail if osseous ingrowth is a concern. Attach the nail cap to the medium hexdriver and then attach the T-handle. Insert the assembly into the incision near the greater trochanter and insert the end cap rotating the T-handle clockwise.

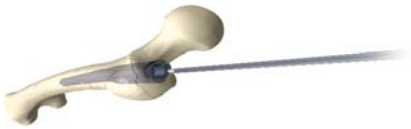
Note: The nail cap should be fully seated and flush within the nail at final seating.

Medium Hexdriver
Cat. No. 7163-1066

Nail Cap
Cat. No. 7167-5040

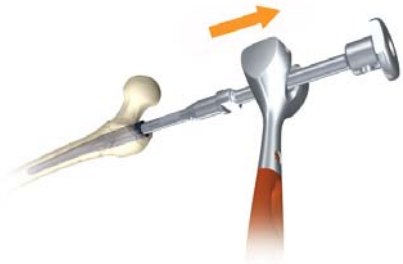
Nail Extraction Technique

Through a small incision, remove any distal locking screws using the short hex driver. Make an incision over the proximal end of the nail. Under fluoroscopy, place a 3.2mm guide pin into the driving end of the nail. A mallet may be used to insert the guide pin, but usually power equipment is available and can be used for percutaneous placement.



When the guide pin is in the nail, make a one inch incision about the guide pin and advance the 12.5mm entry reamer over the pin to remove the osseous ingrowth overlying the nail. Note that the tip of the reamer is straight for approximately one-half inch before flaring out. It is this portion of the reamer that enters the nail.

After reaming, remove the reamer and the guide pin and insert the 3.0mm ball tip guide rod. Attach the extractor to the impactor and tighten, then thread the extractor into the nail (with the guide rod in place). Place the guide bolt wrench shaft into the impactor slot and turn clockwise until the impactor is securely engaged into the nail.



After the impactor is securely engaged in the nail, remove the remaining lag screw.

Single Lag Screw Removal

Make a small incision at the lateral aspect of the INTERTAN® subtrochanteric lag screw and remove any osseous ingrowth that may have formed into the screw. Attach the lag screwdriver to the lag screw. Confirm the lag screwdriver is fully seated and the lag screw is captured. Remove the screw rotating the T-handle counterclockwise.

12.5mm Entry Reamer
Cat. No. 7163-1116

3.2mm Guide Pin
Cat. No. 7167-4029

IMHS® CP Nail Extractor
Cat. No. 7168-7111

Integrated Interlocking Lag Screw Removal

Make a small incision at the lateral aspect of the integrated interlocking lag screw and remove any osseous ingrowth that may have formed into the screws. Attach the long INTERTAN® hexdriver to the inferior compression screw. Confirm the hexdriver is fully seated and remove the screw rotating the T-handle counterclockwise. Once the compression screw has been removed attach the lag screwdriver to the superior lag screw and remove the screw rotating the T-handle counterclockwise.

Confirm that all locking screws have been removed and remove the nail. Gently backslap the impactor with the slotted hammer if needed.

Use extreme caution not to exert any side loads on the impactor extractor assembly. Excessive pulling and pushing on the end of the impactor handle could result in premature failure of the extractor device. In the event of extractor, re-tighten the gripper adjacent to the impactor and proceed with the extraction.

Recommended usage for the extractor: 7-10 times then replace.

An Alternative Method for Extraction

Jamming the Guide Rods

Utilizing two guide rods, one 3.0mm ball tip and one 2.0mm smooth guide rod, advance the ball tip guide rod past the end of the nail then insert the smooth guide rod in a similar manner, past the tip of the nail. Once both rods are in place, attach the gripper to the end of the ball tipped guide rod and pull back to wedge the ball tip with the smooth guide rod and the end of the nail. Backslap against the gripper to remove the nail.

Cat. No.	Description
11-5120	2.0mm x 700mm smooth
7163-1626	3.0mm x 1000mm ball tip
7111-8280	2.0mm x 900mm smooth
7111-8202	3.0mm x 900mm ball tip
11-2069	3.0mm x 900mm ball tip

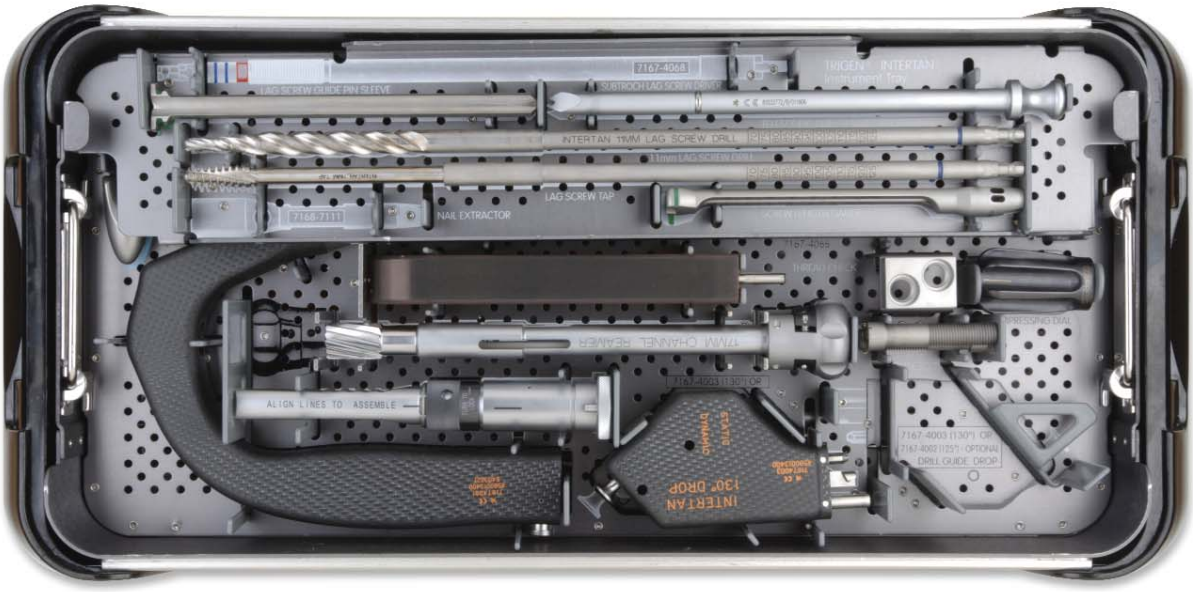
Note: Other items that may be helpful in removal are as follows:

Cat. No.	Description
115074	Large Extractor Hook
115073	Small Extractor Hook
914659	Small Easy Out
914658	Large Easy Out

Set Maps

INTERTAN® Base Tray

Cat. No. 7167-4020



TRIGEN® Instrument Tray

Cat. No. 7167-4021

Catalog Information – Screws

Cat. No.	Description	Qty.
7167-1210	**TRIGEN® 5.0mm Internal Captured 25mm-50mm Screw Set**	
7164-2225	Internal Hex Captured Screw 5.0mm x 25mm	1
7164-2230	Internal Hex Captured Screw 5.0mm x 30mm	3
7164-2235	Internal Hex Captured Screw 5.0mm x 35mm	2
7164-2240	Internal Hex Captured Screw 5.0mm x 40mm	1
7164-2245	Internal Hex Captured Screw 5.0mm x 45mm	1
7162-2250	Internal Hex Captured Screw 5.0mm x 50mm	1

7167-6032	**INTERTAN® Lag/Compression Screw Kit Set**	
7167-2030	INTERTAN Compression Screw 30mm	1
7167-7080	INTERTAN Lag/Comp Screw Kit 80mm x 75mm	1
7167-7085	INTERTAN Lag/Comp Screw Kit 85mm x 80mm	2
7167-7090	INTERTAN Lag/Comp Screw Kit 90mm x 85mm	2
7167-7095	INTERTAN Lag/Comp Screw Kit 95mm x 90mm	2
7167-7100	INTERTAN Lag/Comp Screw Kit 100mm x 95mm	2
7167-7105	INTERTAN Lag/Comp Screw Kit 105mm x 100mm	1
7167-7110	INTERTAN Lag/Comp Screw Kit 110mm x 105mm	1
7167-7115	INTERTAN Lag/Comp Screw Kit 115mm x 110mm	1

7167-2000	**INTERTAN Subtrochanteric Lag Screw Set**	
7167-8005	INTERTAN Subtrochanteric Lag Screw 105mm	1
7167-8010	INTERTAN Subtrochanteric Lag Screw 100mm	1
7167-8011	INTERTAN Subtrochanteric Lag Screw 110mm	1
7167-8015	INTERTAN Subtrochanteric Lag Screw 115mm	1
7167-8080	INTERTAN Subtrochanteric Lag Screw 80mm	1
7167-8085	INTERTAN Subtrochanteric Lag Screw 85mm	2
7167-8090	INTERTAN Subtrochanteric Lag Screw 90mm	3
7167-8095	INTERTAN Subtrochanteric Lag Screw 95mm	3

Catalog Information – Nails

Short

Cat. No.	Description	Qty.
7167-1250	**INTERTAN° 125° 10mm & 11.5mm x 18cm Set**	
7167-5201	INTERTAN 10mm x 18cm 125°	1
7167-5202	INTERTAN 11.5mm x 18cm 125°	1
7167-1350	**INTERTAN 130° 10mm & 11.5mm x 18cm Set**	
7167-5207	INTERTAN 10mm x 18cm 130°	1
7167-5208	INTERTAN 11.5mm x 18cm 130°	1

Long

Cat. No.	Description	Qty.
7167-1251	**INTERTAN 125° 10mm x 34-40cm Set**	
7167-5221	INTERTAN 10mm x 34cm 125° Left Lime	1
7167-5222	INTERTAN 10mm x 34cm 125° Right Rose	1
7167-5223	INTERTAN 10mm x 36cm 125° Left Lime	1
7167-5224	INTERTAN 10mm x 36cm 125° Right Rose	1
7167-5225	INTERTAN 10mm x 38cm 125° Left Lime	1
7167-5226	INTERTAN 10mm x 38cm 125° Right Rose	1
7167-5227	INTERTAN 10mm x 40cm 125° Left Lime	1
7167-5228	INTERTAN 10mm x 40cm 125° Right Rose	1
7167-1351	**INTERTAN 130° 10mm x 34-40cm Set**	
7167-5265	INTERTAN 10mm x 34cm 130° Left Lime	1
7167-5266	INTERTAN 10mm x 34cm 130° Right Rose	1
7167-5267	INTERTAN 10mm x 36cm 130° Left Lime	1
7167-5268	INTERTAN 10mm x 36cm 130° Right Rose	1
7167-5269	INTERTAN 10mm x 38cm 130° Left Lime	1
7167-5270	INTERTAN 10mm x 38cm 130° Right Rose	1
7167-5271	INTERTAN 10mm x 40cm 130° Left Lime	1
7167-5272	INTERTAN 10mm x 40cm 130° Right Rose	1

Long *continued*

Cat. No.	Description	Qty.
7167-1252	**INTERTAN® 125° 11.5mm x 34-40cm Set**	
7167-5243	INTERTAN 11.5mm x 34cm 125° Left Lime	1
7167-5244	INTERTAN 11.5mm x 34cm 125° Right Rose	1
7167-5245	INTERTAN 11.5mm x 36cm 125° Left Lime	1
7167-5246	INTERTAN 11.5mm x 36cm 125° Right Rose	1
7167-5247	INTERTAN 11.5mm x 38cm 125° Left Lime	1
7167-5248	INTERTAN 11.5mm x 38cm 125° Right Rose	1
7167-5249	INTERTAN 11.5mm x 40cm 125° Left Lime	1
7167-5250	INTERTAN 11.5mm x 40cm 125° Right Rose	1
7167-1352	**INTERTAN 130° 11.5mm x 34-40cm Set**	
7167-5287	INTERTAN 11.5mm x 34cm 130° Left Lime	1
7167-5288	INTERTAN 11.5mm x 34cm 130° Right Rose	1
7167-5289	INTERTAN 11.5mm x 36cm 130° Left Lime	1
7167-5290	INTERTAN 11.5mm x 36cm 130° Right Rose	1
7167-5291	INTERTAN 11.5mm x 38cm 130° Left Lime	1
7167-5292	INTERTAN 11.5mm x 38cm 130° Right Rose	1
7167-5293	INTERTAN 11.5mm x 40cm 130° Left Lime	1
7167-5294	INTERTAN 11.5mm x 40cm 130° Right Rose	1

Disposables

Cat. No.	Description	Qty.
7167-1200	**INTERTAN® Disposable Set**	
7163-1121	4.0mm Long AO Pilot Drill (4.0mm x 333mm)	2
7163-1123	4.0mm Short AO Pilot Drill (4.0mm x 161mm)	2
7163-1626	3.0mm x 1000mm Ball Tip Guide Rod	2
7167-4029	3.2mm Guide Pin (3.2mm x 343mm)	3

Catalog Information – Instruments – INTERTAN® System

INTERTAN Instrument Set
Cat. No. 7167-4011

Tray Outer Case
Cat. No. 7112-9401

Lid for Outer Case
(Shown with Case)
Cat. No. 7112-9402

Set Screwdriver
Cat. No. 7166-5014

Drill Guide Handle
Cat. No. 7167-4001

125° Radiolucent Drill Guide Drop
Cat. No. 7167-4002

130° Radiolucent Drill Guide Drop
Cat. No. 7167-4003
(135° Special Order)

11mm Lag Screw Drill
Cat. No. 7167-4008

Lag Screw Tap
Cat. No. 7167-4009

Alignment Tower
Cat. No. 7167-4018

INTERTAN Instrument Tray
Cat. No. 7167-4020

Lag Screw Drill Sleeve
Cat. No. 7167-4023

Lag Screw 3.2mm Guide Pin Sleeve
Cat. No. 7167-4032

7.0mm Compression Screw Drill
Cat. No. 7167-4034

Compression Screw Hexdriver
Cat. No. 7167-4011

Lag Screw Length Gauge
Cat. No. 7167-4058

16mm Channel Reamer
Cat. No. 7167-4062

17mm Channel Reamer
Cat. No. 7167-4063

Alignment Arm
Cat. No. 7167-4066

Lag Screwdriver
Cat. No. 7167-4067

Subtroch Lag Screwdriver
Cat. No. 7167-4068

Compressing Dial
Cat. No. 7167-4069

7.0mm Compression Screw Starter Drill
Cat. No. 7167-4070

7/16 Guide Bolt
Cat. No. 7167-4071

4.0mm Drill Sleeve Trocar
Cat. No. 7167-4072

Anti-Rotation Bar
Cat. No. 7167-4073

IMHS◇ CP Nail Extractor
Cat. No. 7168-7111

Catalog Information – Instruments – TRIGEN® System

TRIGEN System Base Set
Cat. No. 7167-4021

Tray Outer Case
Cat. No. 7112-9401

Lid for Outer Case
(Shown with Case)
Cat. No. 7112-9402

4.7mm Medium Hexdriver
Cat. No. 7163-1066

4.7mm Short Hexdriver
Cat. No. 7163-1068

12.5mm Entry Reamer
Cat. No. 7163-1116

Guide Bolt Wrench
Cat. No. 7163-1140

9mm Drill Sleeve
Cat. No. 7163-1152

Multipurpose Driver
Cat. No. 7163-1161

Not Shown

Mini Connector
Cat. No. 7163-1186

Screw Depth Gauge
Cat. No. 7163-1189

Cannulated Awl
Cat. No. 7167-4000

Entry Portal Tube
Cat. No. 7167-4060

T-handle Trocar
Cat. No. 7167-4074

Honeycomb
Cat. No. 7167-4075

Reducer
Cat. No. 7167-4077

Obturator
Cat. No. 7167-4078

Ruler
Cat. No. 7167-4079

Gripper
Cat. No. 7167-4080

Impactor
Cat. No. 7167-4081

Slotted Hammer
Cat. No. 7167-4082

4.0mm Drill Sleeve
Cat. No. 7167-4083

Screwdriver Release Handle
Cat. No. 7167-4084

Screw Length Sleeve
Cat. No. 7167-4085

T-handle
Cat. No. 7167-4076

Catalog Information – Replacement Parts

Cat. No.	Description	Qty.
7167-4086	Subtroc Lag Screw Hexdriver Rod	1
7167-4087	Lag Wrench Retaining Rod Assembly	1
7167-4088	Compression Screw Hexdriver Shaft	1
7163-1169	Short Hexdriver Screw Retaining Shaft	1
7163-1167	Medium Hexdriver Screw Retaining Shaft	1
7163-1165	Long Hexdriver Screw Retaining Shaft	1
7163-1165	Multipurpose Driver Retaining Shaft	1
7167-4090	Tissue Protector Locking Collar	1

TRIGEN◇ Reamer Set (optional)

Cat. No.	Description	Qty.
7167-1212	**TRIGEN Reamer Set**	
7111-8200	Sculptor Flexible Reamer	1
7111-8232	9.0mm Reamer Head	1
7111-8233	9.5mm Reamer Head	1
7111-8234	10.0mm Reamer Head	1
7111-8235	10.5mm Reamer Head	1
7111-8236	11.0mm Reamer Head	1
7111-8237	11.5mm Reamer Head	1
7111-8238	12.0mm Reamer Head	1
7111-8239	12.5mm Reamer Head	1
7111-8240	13.0mm Reamer Head	1
7111-8241	13.5mm Reamer Head	1
7111-8242	14.0mm Reamer Head	1
7163-1130	Flexible Reamer Extender	1

Notes

Orthopaedics
Smith & Nephew, Inc.
1450 Brooks Road
Memphis, TN 38116
USA

Telephone: 1-901-396-2121
Information: 1-800-821-5700
Orders/Inquiries: 1-800-238-7538

www.smith-nephew.com

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