

Operasjonsteknikk

Retrograd Femur

 **smith&nephew**
TRIGEN[◇]
META-NAIL[◇]
Retrograde Femoral Nail System



TRIGEN™ META-NAIL™ Retrograde Femoral Nail System Surgical Technique

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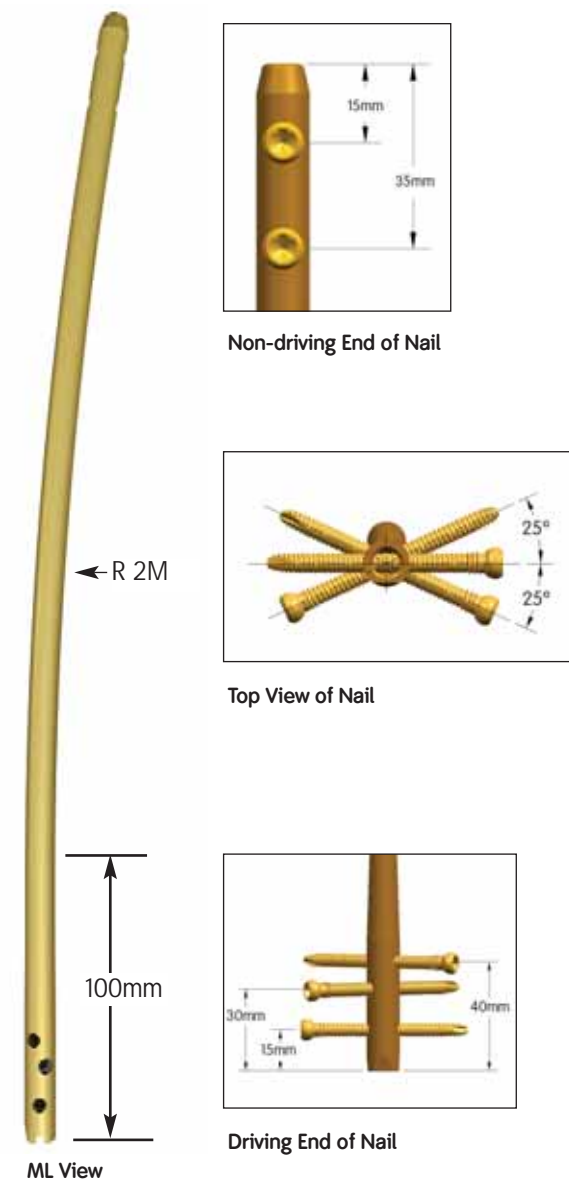
The technique description herein is made available to the healthcare professional to illustrate the authors' suggested treatment for the uncomplicated procedure. In the final analysis, the preferred treatment is that which addresses the needs of the patient.

Indications

The TRIGEN™ META-NAIL™ Retrograde Femoral Nail is indicated for fractures of the femur including stable and unstable distal metaphyseal fractures, diaphyseal fractures, intra-articular fractures, peri-prosthetic fractures, non-unions, mal-unions and for the prophylactic nailing of impending pathological fractures.



TRIGEN™ META-NAIL™ Retrograde Femoral Nail Specifications



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

Specifications	TRIGEN META-NAIL Retrograde Femoral
Material	Ti6AL4V
Diameter	10, 11.5 & 13mm
Lengths	18-50cm*
Nail Color	Gold
Cross Section	Round
Distal Diameter (driving end)	12mm (10, 11.5 dia) 13mm (13 dia)
Proximal Diameter (non-driving end)	10, 11.5 & 13mm
Smallest Thru Diameter	5.0mm
Wall Thickness	2.3mm (10 dia) 3.0mm (11.5 dia) 2.3mm (13 dia)
Guide Bolt Thread	5/16-24 UNF
Screw Diameter	5.0mm
Screw Color	Gold
Major Diameter	5.0mm
Minor Diameter (core)	4.3mm
Screw Lengths	25-110mm
Hex Size	4.7mm
Alternative Hex Drivers	RT Femoral & Recon 7.0mm Cannulated Screw PER-LOC® 4.7mm Hex driver, PROFIX® 4.7mm Hex Driver
Alternative Modes	No
Distal Locking (Driving End)	
Static Lock Locations/Orientations	15mm/ML - Threaded, Can be locked with META-NAIL Cap 30mm/25° - Threaded w/bushing 40mm/25° - Threaded w/bushing
Static Locking Hole Dimensions	Threaded 4.5mm minor dia. Threaded 5.3mm major dia.
Proximal Locking (Non-Driving End)	
Static Lock Locations/Orientations	15mm/AP 35mm/AP
Static Locking Hole Dimensions	5.3mm
Proximal Screw Hole Diameter	5.3mm
AP Bow Radius	2M
AP Bow Location	Starts 100mm from Driving End

* Set does not include all sizes; Outlier sizes may be special order only

Surgical Technique

Patient Positioning

Position the patient supine on a radiolucent table. Flex the affected limb approximately 45° over a posterior support to assist with fracture reduction. Check for length and rotation by comparison to the unaffected limb.



Rotate the C-Arm to ensure optimal AP and lateral visualization of the entire femur. The C-Arm should be able to freely access the femur up to and including the intertrochanteric area. A distraction device may also be applied to obtain and/or maintain traction.

Intra-articular fracture components should be addressed with interfragmentary screw fixation prior to nail insertion. Care should be taken to place the screws in the anterior and posterior aspect of the distal femur and safely out of the nail's intended path.

Note: Cannulated screw guide wires allow for confirmation of definitive screw placement prior to fracture fixation and nail insertion.

Instruments for Opening the Distal Femur



3.2mm Tip Threaded Guide Wire
Cat. No. 7163-1690



Mini Connector
Cat. No. 7163-1186



12.5mm Entry Reamer
Cat. No. 7163-1116



T-Handle
Cat. No. 7167-4076



Honeycomb
Cat. No. 7167-4075



3.2mm T-Handle Trocar
Cat. No. 7167-4074



Entry Portal Tube
Cat. No. 7167-4060



Entry Portal Handle
Cat. No. 7167-4092



Cannulated Awl
Cat. No. 7167-4000

Surgical Technique (continued)

Incision and Entry Point

Assemble the Honeycomb (7167-4075), Entry Handle (7167-4092) and Entry Tube (7167-4060). The pieces will lock in place securely at either 0° or 180°.



A 3-4cm midline incision is made followed by a medial parapatellar capsular incision to expose the intercondylar notch. Gently retract the patellar tendon laterally.

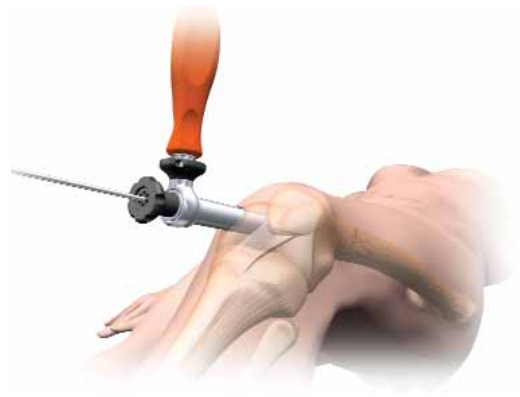


The entry point is located within the intercondylar notch just anterior and lateral to the femoral attachment of the posterior cruciate ligament.

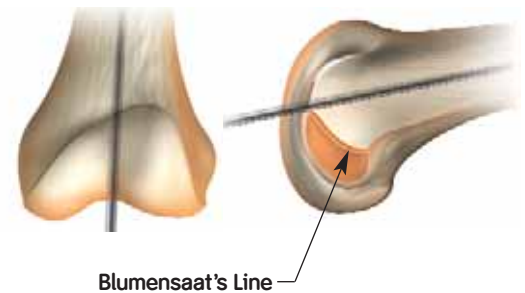


Entry Portal Acquisition

Attach a 3.2mm Tip Threaded Guide Wire (7163-1690) to the drill via the Mini Connector (7163-1186) and insert 6-8cm into the distal femoral metaphysis. The Entry Portal Instrumentation serves as a soft tissue protector.



The Guide Wire should be in-line with the femoral axis in the AP view and anterior to Blumensaat's Line in the lateral.



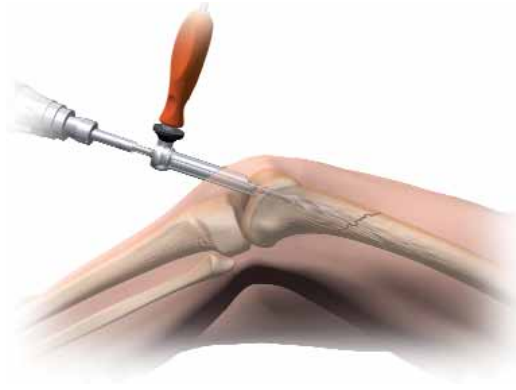
In the instance of suboptimal Wire placement, rotate the Honeycomb within the Entry Tube to the desired location and insert another 3.2mm Tip Threaded Guide Wire.



Surgical Technique (continued)

Entry Portal

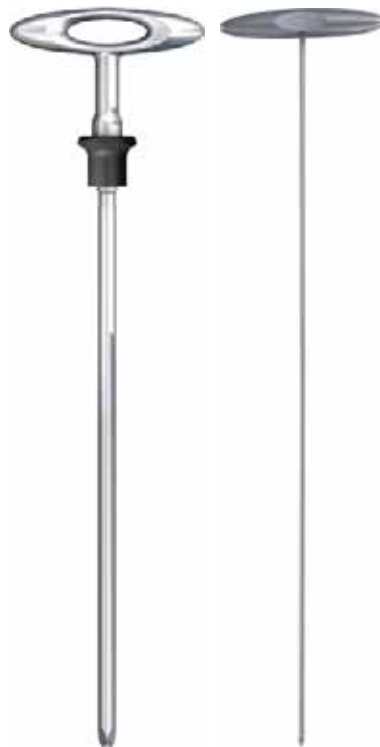
After definitive Guide Wire placement, remove the Honeycomb from the Entry Tube along with any additionally inserted Guide Wires and attach the 12.5mm Entry Reamer to power. Advance over the Guide Wire through the Entry Tube to a depth of 6-8cm.



Check position via radiographic imaging and then remove the 12.5mm Entry Reamer and 3.2mm Tip Threaded Guide Wire.

Alternative Technique: Entry Portal

Attach the T-Handle (7167-4076) to the Cannulated Awl (7167-4000) and insert into the distal femur to a depth of 6-8cm. Introduce the 3.2mm T-Handle Trocar (7167-4074) into the back of the assembly prior to insertion in order to prevent awl slippage and accumulation of cortical bone within the cannulation.



Cannulated Awl
with T-Handle

3.2mm T-Handle
Trocar

Instruments for Fracture Reduction & Reaming



Entry Portal Tube
Cat. No. 7167-4060



Entry Portal Handle
Cat. No. 7167-4092



Gripper
Cat. No. 7163-1186



Ruler
Cat. No. 7167-4079



T-Handle
Cat. No. 7167-4076



Obturator
Cat. No. 7167-4078



Reamer Shaft
Cat. No. 7111-8200



Reamer Heads
Cat. No. 7111-8231-8246



Reducer
Cat. No. 7167-4077



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

Surgical Technique (continued)

Fracture Reduction

Insert the back end of the 3.0mm Ball Tip Guide Rod (7163-1626) into the front of the Gripper (7167-4080) and gently close the trigger-grip. Connect the Reducer and Reducer Connector (7167-4077) so that the words "Slot Orientation" are in line with the opening at the tip. Complete the assembly by connecting it to the T-Handle.



Note: If blocking screws are desired at this point in the procedure, refer to the blocking screws technique section (pp. 18-24).



Advance the Reducer into the intramedullary canal and use the curved tip to direct the 3.0mm Ball Tip Guide Rod past the fracture into the region of the proximal femur.



The Guide Rod should be center-center in the AP and lateral views.



Reducer Removal

Once the Guide Rod is at the desired depth, detach the Gripper and remove the Reducer from the femoral canal. Slide the Obturator (7167-4078) into the back of the T-Handle during extraction in order to maintain Guide Rod position within the canal.



Implant Measurement

After Reducer removal, re-confirm Guide Rod placement within the proximal femur and slide the Ruler (7167-4079) over the Guide Rod to the desired depth. The metal tip of the Ruler denotes the driving end of the META-NAIL™ Retrograde Femoral Nail.



Confirm Guide Rod position in the window at the opposite end of the Ruler as shown in order to ensure accurate implant measurement. Push down on the top of Ruler until contact is made with the 3.0mm Guide Rod. Implant length is read from the exposed calibrations at the end of the ruler.



Note: Implant length selection should take into consideration the fact that the nail must be countersunk past the articular surface of the distal femur.

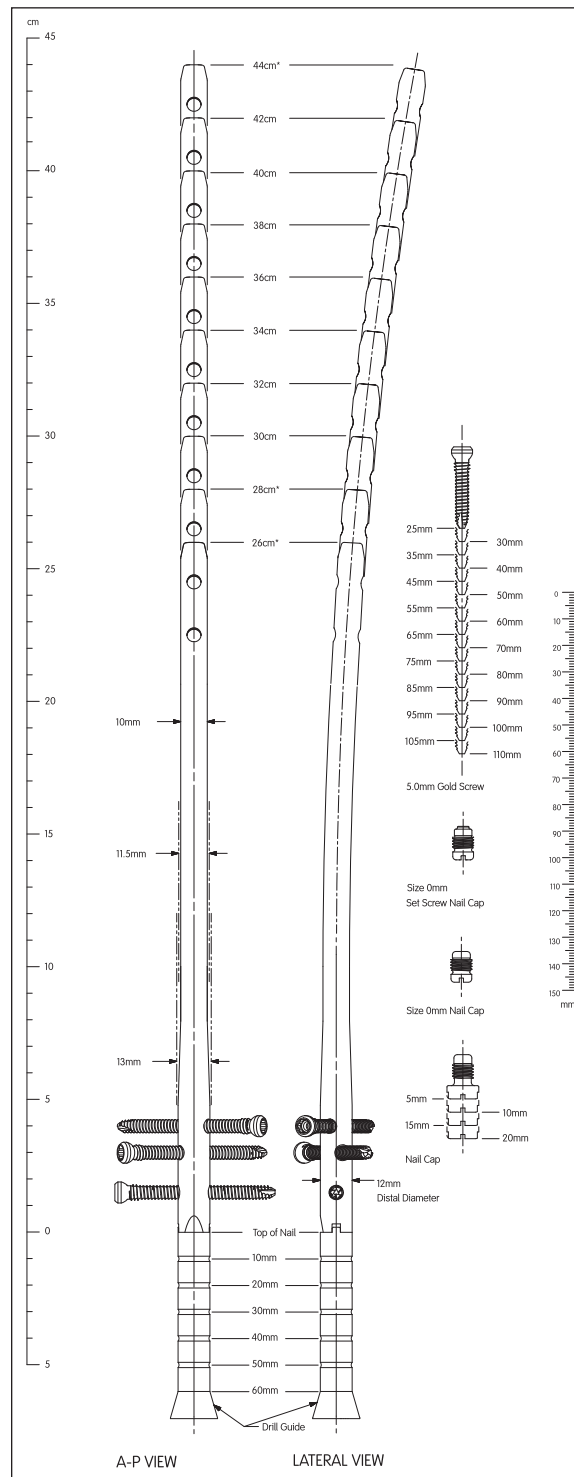
Note: Confirm that the Ruler opens easily and adjust the thumb-wheel connection at the end to allow for free movement.

Surgical Technique (continued)

Unreamed Technique

Radiographic templating is used to determine nail size. The appropriate diameter implant will provide translational fill within the isthmus of the intramedullary canal. Generally, selection of a nail at least 1-1.5mm less than the narrowest canal measurement on the lateral radiograph assists in avoiding implant incarceration during insertion.

Note: The 7.6mm diameter of the Reducer provides an initial "sound" for determining canal width in small diameter femurs.



TRIGEN® META-NAIL® Femoral Retrograde Nail
Radiographic Template
Cat. No. 7118-0811

Reamed Technique

Radiographic templating and intra-operative measurement will determine nail size. Beginning with the 9.0mm Front Cutting Reamer Head (7111-8231) and Flexible Reamer Shaft (7111-8200), ream the intramedullary canal sequentially in half millimeter increments to a size 1-1.5mm larger than the selected nail size.

Ensure Guide Rod placement during reaming by inserting the Obturator into the back of the Reamer unit during retraction. Continue to confirm Guide Rod placement in the proximal femur throughout reaming. Periodically move the reamer back and forth in the canal to clear debris from the cutting flutes.



Surgical Technique (continued)

Instruments for Nail Assembly & Insertion



Guide Bolt Wrench
Cat. No. 7163-1140



META-NAIL Drill Guide
Cat. No. 7165-4502



Guide Bolt Long
Cat. No. 7165-45061



Short Impactor
Cat. No. 7165-4521



T-Handle
Cat. No. 7167-4076



META-NAIL[®] Anterior Drop
Cat. No. 7165-4501



9.0mm Drill Sleeve
Cat. No. 7163-1152



4.0mm Drill Sleeve
Cat. No. 7167-4083



4.0mm Long Pilot Drill*
Cat. No. 7163-1110



Impactor
Cat. No. 7167-4081



Slotted Hammer
Cat. No. 7167-4082

* 4.0mm Long Pilot Drill (7163-1110) is interchangeable with 4.0mm AO Long Drill (7163-1121)

Nail Assembly

Attach the META-NAIL™ Drill Guide (7165-4502) to the nail with the Guide Bolt Long (7165-4506) and tighten with the Guide Bolt Wrench (7163-1140) and T-Handle. The nail is correctly aligned when:

1. The line on the insertion barrel matches the line on the back of the nail
2. The "A" on the nail matches the "A" on the insertion barrel
3. The apex of the nail's AP Bow and the Drill Guide itself are oriented anterior

The bevel on the front of the nail marks the connection to the Drill Guide and can be seen in the lateral view as a means for determining distal insertion depth.

Note: Do not use the META-NAIL Extension Drill Guide to insert the Retrograde Femoral Nail as the Insertion Barrel is too short to allow for adequate countersinking of the nail. It is recommended to use the standard Drill Guide and Long Guide Bolt due to the longer Insertion Barrel.

Attach the Anterior Drop (7165-4501) to the Drill Guide and verify targeting accuracy by inserting a gold 9.0mm Drill Sleeve (7163-1152) and silver 4.0mm Drill Sleeve (7167-4083) into the Drop and passing a 4.0mm Long Pilot Drill (7163-1110)* through the assembly. An incorrectly attached nail will not target.



* 4.0mm Long Pilot Drill (7163-1110) is interchangeable with 4.0mm AO Long Drill (7163-1121)

Surgical Technique (continued)

Nail Insertion

Remove the Anterior Drop and attach the Impactor (7167-4081) to the Drill Guide. Orient the Drill Guide assembly in the AP position and advance the nail over the Guide Rod by light blows from the Slotted Hammer (7167-4082) to the desired depth.

Additional reaming of the intramedullary canal may be necessary if excessive force is required to insert the nail.

Verify fracture reduction as the nail crosses the fracture site paying close attention to rotation, length, alignment, distraction and/or shortening. Check final nail position in both the AP and lateral views for correct alignment.



Check Nail Depth

Distal

In the AP and lateral views, confirm nail position within the distal femur. The notch at the nail/Drill Guide junction will be visible in the lateral. Each gauge on the insertion barrel represents a 10mm depth interval.



Proximal

In the AP view, confirm that the nail has been inserted to the desired depth. Femoral fractures should be treated with the longest nail possible in order to reduce the likelihood of stress risers. Remove the Guide Rod once the nail has been fully seated and attach the Anterior Drop.



Note: Following nail insertion, confirm that the nail and Drill Guide are securely connected as hammering can loosen the Guide Bolt.

Surgical Technique (continued)

Instruments for Standard Locking



Long Screw Length Sleeve
Cat. No. 7165-4520



Nail Cap Set Screw
Cat. No. 7165-6000



META-NAIL® Anterior Drop
Cat. No. 7165-4501



Medium Hexdriver
Cat. No. 7163-1066



4.0mm Drill Sleeve
Cat. No. 7163-1156



Mini Connector
Cat. No. 7163-1186



9.0mm Drill Sleeve
Cat. No. 7163-1152



Screwdriver Release
Cat. No. 7167-4084



4.0mm Long Pilot Drill*
Cat. No. 7163-1110



4.0mm Short Drill**
Cat. No. 7163-1117



T-Handle
Cat. No. 7167-4076



Screw Depth Gauge
Cat. No. 7163-1189

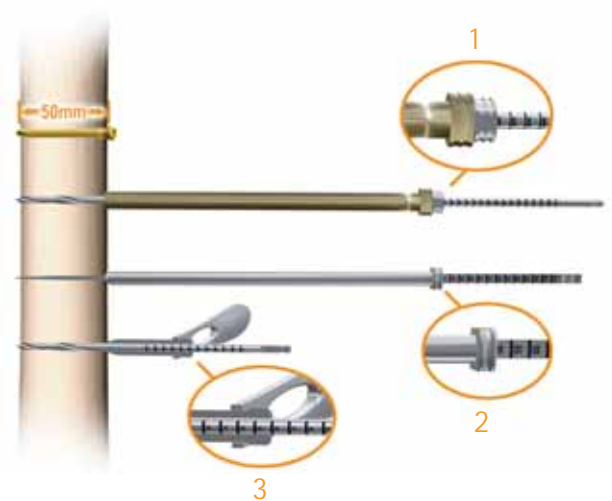
* 4.0mm Long Pilot Drill (7163-1110) is interchangeable with 4.0mm AO Long Drill (7163-1121)

** 4.0mm Short Drill (7163-1117) is interchangeable with 4.0mm AO Short Drill (7163-1123)

Locking Screw Measurement

There are three (3) methods:

1. Gold 9.0mm Drill Sleeve, silver 4.0mm Drill Sleeve and 4.0mm Long Pilot Drill*
2. Screw Depth Gauge (7163-1189)
3. Long Screw Length Sleeve (7165-4520) and 4.0mm Long Pilot Drill*



Locking Screw Insertion

Distal locking options include three (3) statically locked threaded holes that are targeted through the orange and green color-coded holes on the Anterior Drop.

Proximal locking options include two (2) statically locked, non-threaded AP holes.

Gold 5.0mm locking screws are compatible with 10, 11.5 and 13mm diameter nails.



Note: The 4.0mm Short Step Drill (7164-1123) may be used to drill for a gold 5.0mm locking screw in the instance of hard cortical bone. Its 4.7-4.0mm width transition facilitates easier screw insertion without compromising purchase.

* 4.0mm Long Pilot Drill (7163-1110) is interchangeable with 4.0mm AO Long Drill (7163-1121)

Surgical Technique (continued)

Distal Locking

Make a small incision at the site of screw entry and insert the gold 9.0mm Drill Sleeve and silver 4.0mm Drill Sleeve through the desired slot on the Anterior Drop down to bone. Drill both cortices with the 4.0mm Long Pilot Drill*.

Measure for screw length using either the calibrations on the 4.0mm Long Pilot Drill* or by removing the 4.0mm Drill Sleeve and using the Screw Depth Gauge. Attach the appropriate length screw to the end of the Medium Hexdriver (7163-1066) and insert through the gold 9.0mm Drill Sleeve on power until the laser etched ring on the Hexdriver reached the back of the Drill Sleeve. Attach the T-Handle to the Hexdriver and tighten the screw by hand.



Proximal Locking

Proximal locking is performed in the AP plane using a free-hand technique. Confirm fracture reduction and align the C-Arm over the desired locking hole. Obtain a “perfect circle” image of the locking hole and use a blunt object to approximate the location of the locking hole by dimpling the skin.

Make a stab incision at the site, insert the 4.0mm Long Pilot Drill*, and drill both cortices. Measure for screw length using the Screw Depth Gauge. Alternatively, leave the 4.0mm Long Pilot Drill* in place, insert the Long Screw Length Sleeve down to bone, and read the exposed calibrations off the drill. Insert the appropriate length screw using the Medium Hexdriver/T-Handle assembly.



* 4.0mm Long Pilot Drill (7163-1110) is interchangeable with 4.0mm AO Long Drill (7163-1121)

Surgical Technique (continued)

Instruments for Blocking Screw Insertion



**Retrograde Femoral
Blocking Screw
Attachment**
Cat. No. 7165-4508



**11.0mm T-Handle
Awl**
Cat. No. 7165-4522



T-Handle
Cat. No. 7167-4076



**8.5mm/10.0mm
Screw Cartridge**
Cat. No. 7165-4511



**11.5mm/13.0mm
Screw Cartridge**
Cat. No. 7165-4513



**Offset Blocking
Screw Cartridge**
Cat. No. 7165-4514



Blocking Screw Alignment Pin
Cat. No. 7163-1110



4.0mm Long Pilot Drill*
Cat. No. 7163-1110



4.0mm Drill Sleeve
Cat. No. 7163-1156



9.0mm Drill Sleeve
Cat. No. 7163-1152



Medium Hexdriver
Cat. No. 7163-1066



**Blocking Screw
Device**
Cat. No. 7165-4515



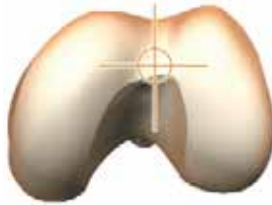
Mini Connector
Cat. No. 7163-1186

* 4.0mm Long Pilot Drill (7163-1110) is interchangeable with 4.0mm AO Long Drill (7163-1121)

Blocking Screw Technique: Incision & Entry Point

A 3-4cm midline incision is made followed by a medial parapatellar capsular incision to expose the intercondylar notch. Gently retract the patellar tendon laterally.

The entry point is located within the intercondylar notch just anterior and lateral to the femoral attachment of the posterior cruciate ligament.



Entry Portal Acquisition

Insert the 11.0mm T-Handle Awl (7165-4522) manually to a depth just distal to the fracture.

Note: When creating the initial entry point, pay close attention to the trajectory of the Awl and its relationship to the anatomic axis of the femur. Correct Awl trajectory in the distal fragment must be established prior to alignment with the anatomic axis of the proximal fragment. This will ensure accurate fracture reduction when the nail is inserted.



AP Blocking Screw Insertion

In order to prevent varus or valgus malalignment of the distal fragment, blocking screws may be placed in the AP plane. Attach the Blocking Screw Device (7165-4515) to the 11.0mm T-Handle Awl and move it into the desired position in the AP plane.

Note: The Blocking Screw Alignment Pins (7165-4523) can be screwed into the three (3) threaded holes on the metal handle of the Blocking Screw Device to serve as external points of reference during fracture alignment.

Tighten the device to the Awl and insert the appropriate Blocking Screw Cartridge (7165-4511, 7165-4513, 7165-4514). Adjust the Cartridge proximally or distally within the Blocking Screw Device to determine blocking screw position.

Insert the gold 9.0mm Drill Sleeve and silver 4.0mm Drill Sleeve into the desired cartridge hole and down to bone. Drill both cortices with the 4.0 mm Long Pilot Drill*. Screw length is determined by reading the exposed drill bit calibrations or by removing the 4.0mm Drill Sleeve and measuring with the Screw Depth Gauge. Insert the screw with the Medium Hexdriver/T-Handle assembly until the screw engages the far cortex.

Note: Use caution during drilling and insertion of blocking screws in the AP plane. Plunging the drill bit past the posterior cortex or insertion of a screw that is too long may damage neurovascular structures located posterior to the distal femur.



* 4.0mm Long Pilot Drill (7163-1110) is interchangeable with 4.0mm AO Long Drill (7163-1121)

Surgical Technique (continued)

Following implantation of the distal blocking screw and fracture reduction, pass the 11.0mm T-Handle Awl into the proximal fragment.

Re-position either the Blocking Screw Cartridge or the Awl as necessary and follow the previously described technique for blocking screw insertion.



ML Blocking Screw Insertion

In order to prevent anterior or posterior malalignment of the distal fragment, blocking screws may also be placed in the ML plane. Attach the Blocking Screw Device to the 11.0mm T-Handle Awl and rotate it into the desired position in the ML plane.



Tighten the device to the Awl and insert the appropriate Blocking Screw Cartridge. Adjust the Cartridge proximally or distally within the Blocking Screw Device to determine blocking screw position. Blocking screw insertion follows the previously described technique.



Blocking Screw Insertion with Reducer

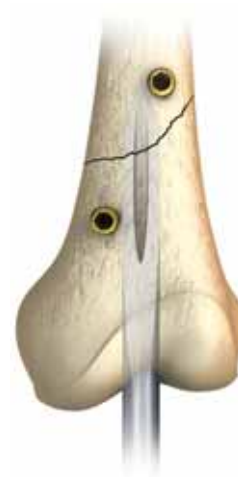
Blocking screw insertion can also be performed by attaching the Blocking Screw Device to the Reducer instead of the 11.0mm T-Handle Awl. Blocking screw insertion follows the previously described technique.



Final View: AP and ML Blocking Screw Insertion

Once blocking screw insertion is complete, remove the Blocking Screw Device from the 11.0mm T-Handle Awl or Reducer and obtain both AP and lateral radiographic images to confirm accurate placement.

The Awl or Reducer provides a good indication of the nail's insertion trajectory based upon the location of the blocking screws. Following confirmation of proper screw placement, proceed with nail insertion following the META-NAIL™ system insertion technique.



Surgical Technique (continued)

Stability Blocking Screw Insertion

Following nail insertion and confirmation of fracture reduction, blocking screws can be placed on either side of the nail in the metaphyseal region for additional stability. Screws may be inserted in both the AP and ML planes.

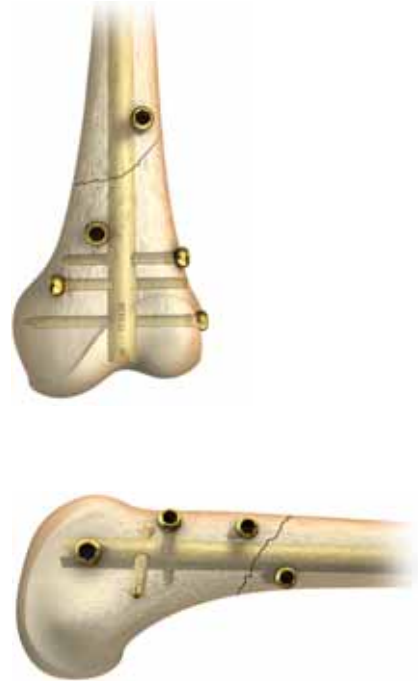
With the nail inserted, attach the Retrograde Femoral Blocking Screw Attachment (7165-4508) to the Anterior Drop, matching the orange shape found on the Blocking Screw Attachment to the corresponding one on the Drop (Triangle to Triangle for AP screws and Square to Square for ML screws). Follow the previously described technique for Cartridge positioning and blocking screw insertion.

Note: The AP blocking screws targeted through the two (2) holes built into the Anterior Drop cannot be used if the most superior oblique distal locking screw has been inserted.



Final View: Stability Blocking Screws

Once stability blocking screw insertion is complete, remove the Blocking Screw Attachment and Anterior Drop from the Drill Guide and obtain both AP and lateral radiographic images to confirm accurate placement.



TRIGEN™ Nail Cap and Nail Cap Set Screw Insertion: Optional

Remove the Drill Guide/Anterior Drop assembly. Attach the selected Nail Cap or Nail Cap Set Screw to the Medium Hexdriver/T-Handle assembly and insert into the end of the nail until tight.



Note: The TRIGEN Nail Cap does not engage with the most distal locking screws to create a fixed angle construct.

Note: If cross-threading occurs, rotate the Nail Cap or Nail Cap Set Screw counterclockwise until its threads line up with those of the nail. Proceed with insertion until tight.

Surgical Technique (continued)

Instruments for Implant Removal



3.2mm Tip Threaded Guide Wire

Cat. No. 7163-1690



Mini Connector

Cat. No. 7163-1186



12.5mm Entry Reamer

Cat. No. 7163-1116



Disposable Nail Extractor**

Cat. No. 7163-1320



Impactor

Cat. No. 7167-4081



One Piece Impactor***

Cat. No. 7163-1185



T-Handle

Cat. No. 7167-4076



3.0mm x 1000mm Ball Tip Guide Rod*

Cat. No. 7163-1626



Medium Hexdriver

Cat. No. 7163-1066



Slotted Hammer

Cat. No. 7167-4082

* Additional Guide Rods listed on page 30

** The One Piece Impactor is located in the original TRIGEN™ Instrument Set (7163-1326)

*** The Disposable Nail Extractor (7163-1320) is interchangeable with the Large Nail Extractor located in the original TRIGEN Instrument Set (7163-1326) and the HFN™ Instrument Set (7170-0001)

Nail Extraction: Optional

Standard Technique

Remove the Nail Cap or Nail Cap Set Screw if implanted and all of the proximal locking screws with the Medium Hexdriver/T-Handle assembly. Remove all of the distal locking screws except for one in the same manner.

Thread the Extraction Bolt (7163-1320) into the Impactor (7167-4081) or One Piece Impactor (7163-1185)* and introduce the extraction assembly into the end of the nail. Remove the remaining distal locking screw and then extract the nail with a back-slapping motion using the Slotted Hammer.



Percutaneous Technique

This technique assumes the absence of a Nail Cap or Nail Cap Set Screw. Remove all proximal locking screws and all but one of the distal locking screws as previously described. Under fluoroscopy, insert a 3.2mm Tip Threaded Guide Wire into the end of the nail on power or by hand. Make a 2cm incision around the Wire and advance the 12.5mm Entry Reamer over the Wire and into the end of the nail to remove any bony in-growth.

Thread the Impactor or One Piece Impactor into the back of the Disposable Nail Extractor** and then thread the assembly into the end of the nail. Remove the remaining distal locking screw and then extract the nail with a back-slapping motion.



Note: The tip of the Entry Reamer is straight for approximately 1cm before flaring out. It is this portion of the Entry Reamer that enters the top of the nail.

* The One Piece Impactor is found only in original TRIGEN™ Instrument Set (7163-1326)

** The Disposable Nail Extractor (7163-1320) is interchangeable with the Large Nail Extractor located in the original TRIGEN Instrument Set (7163-1326) and the HFN™ Instrument Set (7170-0001)

An Alternative Method for Extraction

Guide Rod Jamming Technique

Advance the end of a 3.0mm Ball Tip Guide Rod through the end of the nail. Insert a smooth 2.0mm Guide Rod (7111-8280) in the same manner. With both Guide Rods in place attach the Gripper to the end of the 3.0mm Ball Tip Guide Rod and pull it back so that it wedges the ball tip against the smooth 2.0mm Guide Rod. Backslap against the Gripper with the Slotted Hammer to extract the nail.

Guide Rods

Cat. No.	Description
7111-8280	2.0mm x 900mm Smooth (RUSSELL-TAYLOR™ System)*
7111-8202	3.0mm x 900mm Ball Tip (RUSSELL-TAYLOR System)*
7163-1626	3.0mm x 1000mm Ball Tip (TRIGEN™ System)

Additional Removal Items

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

* Available sterile packed. For nail removal only, do not use for nail insertion

** Located in RUSSELL-TAYLOR Extraction Kit (Set #7508) available through Loaners

Catalog Information – Implants

TRIGEN™ Internal Captured Screws 5.0mm

Set No. 7163-1321

Cat. No.	Length
7164-2225	Internal Hex Captured Screw 5.0mm X 25mm
7164-2230	Internal Hex Captured Screw 5.0mm X 30mm
7164-2235	Internal Hex Captured Screw 5.0mm X 35mm
7164-2240	Internal Hex Captured Screw 5.0mm X 40mm
7164-2245	Internal Hex Captured Screw 5.0mm X 45mm
7164-2250	Internal Hex Captured Screw 5.0mm X 50mm
7164-2255	Internal Hex Captured Screw 5.0mm X 55mm
7164-2260	Internal Hex Captured Screw 5.0mm X 60mm
7164-2265	Internal Hex Captured Screw 5.0mm X 65mm
7164-2270	Internal Hex Captured Screw 5.0mm X 70mm
7164-2275	Internal Hex Captured Screw 5.0mm X 75mm



TRIGEN META-NAIL™ 10mm Retrograde Femoral

Set No. 7165-1000

Cat. No.	Length	Availability
7165-3018*	META-NAIL Retrograde 10mm x 18cm	Outlier
7165-3020*	META-NAIL Retrograde 10mm x 20cm	Outlier
7165-3022*	META-NAIL Retrograde 10mm x 22cm	Outlier
7165-3024*	META-NAIL Retrograde 10mm x 24cm	Outlier
7165-3026	META-NAIL Retrograde 10mm x 26cm	Outlier
7165-3028	META-NAIL Retrograde 10mm x 28cm	Outlier
7165-3030	META-NAIL Retrograde 10mm x 30cm	Implant set
7165-3032	META-NAIL Retrograde 10mm x 32cm	Implant set
7165-3034	META-NAIL Retrograde 10mm x 34cm	Implant set
7165-3036	META-NAIL Retrograde 10mm x 36cm	Implant set
7165-3038	META-NAIL Retrograde 10mm x 38cm	Implant set
7165-3040	META-NAIL Retrograde 10mm x 40cm	Implant set
7165-3042	META-NAIL Retrograde 10mm x 42cm	Implant set
7165-3044	META-NAIL Retrograde 10mm x 44cm	Outlier
7165-3046*	META-NAIL Retrograde 10mm x 46cm	Outlier
7165-3048*	META-NAIL Retrograde 10mm x 48cm	Outlier
7165-3050*	META-NAIL Retrograde 10mm x 50cm	Outlier



* Available through special order

Catalog Information – Implants (continued)

TRIGEN™ META-NAIL™ 11.5mm Retrograde Femoral

Set No. 7165-1001

Cat. No.	Length	Availability
7165-3218*	META-NAIL Retrograde 11.5mm x 18cm	Outlier
7165-3220*	META-NAIL Retrograde 11.5mm x 20cm	Outlier
7165-3222*	META-NAIL Retrograde 11.5mm x 22cm	Outlier
7165-3224*	META-NAIL Retrograde 11.5mm x 24cm	Outlier
7165-3226	META-NAIL Retrograde 11.5mm x 26cm	Outlier
7165-3228	META-NAIL Retrograde 11.5mm x 28cm	Outlier
7165-3230	META-NAIL Retrograde 11.5mm x 30cm	Implant set
7165-3232	META-NAIL Retrograde 11.5mm x 32cm	Implant set
7165-3234	META-NAIL Retrograde 11.5mm x 34cm	Implant set
7165-3236	META-NAIL Retrograde 11.5mm x 36cm	Implant set
7165-3238	META-NAIL Retrograde 11.5mm x 38cm	Implant set
7165-3240	META-NAIL Retrograde 11.5mm x 40cm	Implant set
7165-3242	META-NAIL Retrograde 11.5mm x 42cm	Implant set
7165-3244	META-NAIL Retrograde 11.5mm x 44cm	Outlier
7165-3246*	META-NAIL Retrograde 11.5mm x 46cm	Outlier
7165-3248*	META-NAIL Retrograde 11.5mm x 48cm	Outlier
7165-3250*	META-NAIL Retrograde 11.5mm x 50cm	Outlier



* Available through special order

TRIGEN™ META-NAIL™ 13mm Retrograde Femoral

Set No. 7165-1002

Cat. No.	Length	Availability
7165-3418*	META-NAIL Retrograde 13mm x 18cm	Outlier
7165-3420*	META-NAIL Retrograde 13mm x 20cm	Outlier
7165-3422*	META-NAIL Retrograde 13mm x 22cm	Outlier
7165-3424*	META-NAIL Retrograde 13mm x 24cm	Outlier
7165-3426*	META-NAIL Retrograde 13mm x 26cm	Outlier
7165-3428*	META-NAIL Retrograde 13mm x 28cm	Outlier
7165-3430	META-NAIL Retrograde 13mm x 30cm	Implant set
7165-3432	META-NAIL Retrograde 13mm x 32cm	Implant set
7165-3434	META-NAIL Retrograde 13mm x 34cm	Implant set
7165-3436	META-NAIL Retrograde 13mm x 36cm	Implant set
7165-3438	META-NAIL Retrograde 13mm x 38cm	Implant set
7165-3440	META-NAIL Retrograde 13mm x 40cm	Implant set
7165-3442	META-NAIL Retrograde 13mm x 42cm	Implant set
7165-3444	META-NAIL Retrograde 13mm x 44cm	Outlier
7165-3446*	META-NAIL Retrograde 13mm x 46cm	Outlier
7165-3448*	META-NAIL Retrograde 13mm x 48cm	Outlier
7165-3450*	META-NAIL Retrograde 13mm x 50cm	Outlier



Nail Cap Set Screw

Cat. No. 7165-6000



TRIGEN Nail Caps

Cat. No.	Length
7163-4000	0mm
7163-4005	5mm
7163-4010	10mm
7163-4015	15mm
7163-4020	20mm



* Available through special order

Catalog Information – Instruments (continued)

TRIGEN™ META-NAIL™ Blocking Screw Instruments

Set No. 7165-4001

Blocking Screw Device

Cat. No. 7165-4515



Tibia Blocking Screw Attachment*

Cat. No. 7165-4509



11.0mm T-Handle Awl

Cat. No. 7165-4522



8.5mm/10mm Blocking Screw Cartridge

Cat. No. 7165-4511



11.5mm/13mm Blocking Screw Cartridge

Cat. No. 7165-4513



Offset Blocking Screw Cartridge

Cat. No. 7165-4514



Blocking Screw Alignment Pin

Cat. No. 7165-4523



Retrograde Femoral Blocking Screw Attachment

Cat. No. 7165-4508



Blocking Screw Instrument Case

Cat. No. 7165-4552

Blocking Screw Instrument Lid

Cat. No. 7165-4553



* Not used in META-NAIL tibial technique

TRIGEN™ META-NAIL™ Blocking Screw Instruments

Set No. 7165-4002

META-NAIL Anterior Drop

Cat. No. 7165-4501



META-NAIL Drill Guide

Cat. No. 7165-4502



META-NAIL Extension Drill Guide

Cat. No. 7165-4503



Extension Guide Bolt (23mm)

Cat. No. 7165-4505



Guide Bolt Long (51mm)

Cat. No. 7165-4506



META-NAIL Instrument Case

Cat. No. 7165-4551



META-NAIL Instrument Lid

Cat. No. 7165-4550



Long Screw Length Sleeve

Cat. No. 7165-4520



Short Impactor

Cat. No. 7165-4521



Catalog Information – Instruments (continued)

Instruments used if you have TRIGEN™ Base

Set No. 7167-4012

Medium Hexdriver

Cat. No. 7163-1066



Short Hexdriver

Cat. No. 7163-1068



Entry Reamer

Cat. No. 7163-1116



Guide Bolt Wrench

Cat. No. 7163-1140



9.0mm Drill Sleeve

Cat. No. 7163-1152



Multipurpose Driver

Cat. No. 7163-1161



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



3.2mm T-Handle Trocar

Cat. No. 7167-4074



Honeycomb

Cat. No. 7167-4075



Reamer Shaft

Cat. No. 7111-8200



Reamer Heads

Cat. No. 7111-8231-8246



T-Handle

Cat. No. 7167-4076



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

Cat. No. 7167-4084



Screw Length Sleeve

Cat. No. 7167-4085



Entry Portal Handle

Cat. No. 7167-4092



Catalog Information – Instruments (continued)

Instruments used if you have existing TRIGEN™ set

Set No. 7163-1326

Medium Hexdriver

Cat. No. 7163-1066



Short Hexdriver

Cat. No. 7163-1068



Gripper

Cat. No. 7163-1100



Entry Tool

Cat. No. 7163-1114



Connector

Cat. No. 7163-1120



12.5mm Entry Reamer

Cat. No. 7163-1116



Obturator

Cat. No. 7163-1122



Reducer

Cat. No. 7163-1124



Ruler

Cat. No. 7163-1128



Guide Bolt Wrench

Cat. No. 7163-1140



Hammer

Cat. No. 7163-1150



9.0mm Drill Sleeve

Cat. No. 7163-1152



4.0mm Drill Sleeve

Cat. No. 7163-1156



Multipurpose Driver

Cat. No. 7163-1161



T-Handle
Cat. No. 7163-1172



Mini Connector
Cat. No. 7163-1186



Screw Depth Gauge
Cat. No. 7163-1189



Screw Driver Release Handle
Cat. No. 7163-1208



One Piece Impactor
Cat. No. 7163-1185



Reamer Shaft
Cat. No. 7111-8200



Reamer Heads
Cat. No. 7111-8231-8246



META-NAIL™ Disposables

Set No. 7165-4003

4.0mm Long Pilot Drill*

Cat. No. 7163-1110



4.0mm Short Drill**

Cat. No. 7163-1117



3.0mm x 1000mm Ball Tip Guide Rod

Cat. No. 7163-1626



3.2mm Tip Threaded Guide Wire

Cat. No. 7163-1690



TRIGEN™ META-NAIL Disposable Compression Driver

Cat. No. 7165-4517



Disposable Nail Extractor***

Cat. No. 7163-1320



* 4.0mm Long Pilot Drill (7163-1110) is interchangeable with 4.0mm AO Long Drill (7163-1121)

** 4.0mm Short Drill (7163-1117) is interchangeable with 4.0mm AO Short Drill (7163-1123)

*** The Disposable Nail Extractor (7163-1320) is interchangeable with the Large Nail Extractor located in the original TRIGEN Instrument Set (7163-1326) and the HFN™ Instrument Set (7170-0001)

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