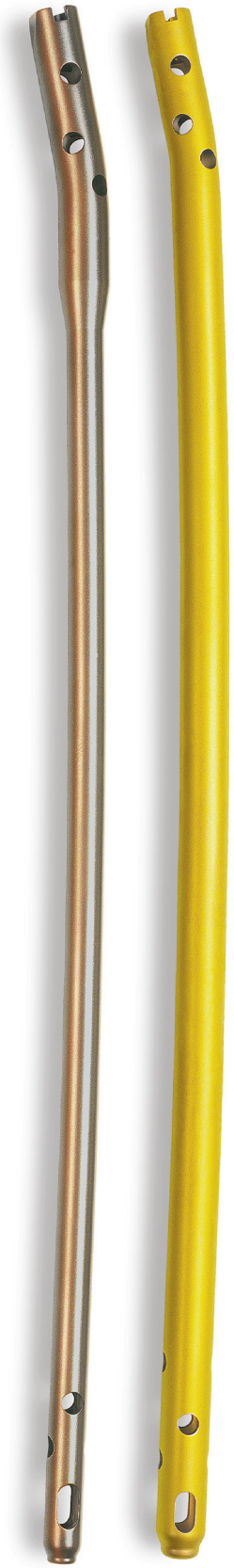
Surgical Technique

smith&nephew

TRIGEN®

IM Nail System

Knee Nail for Tibial Fractures



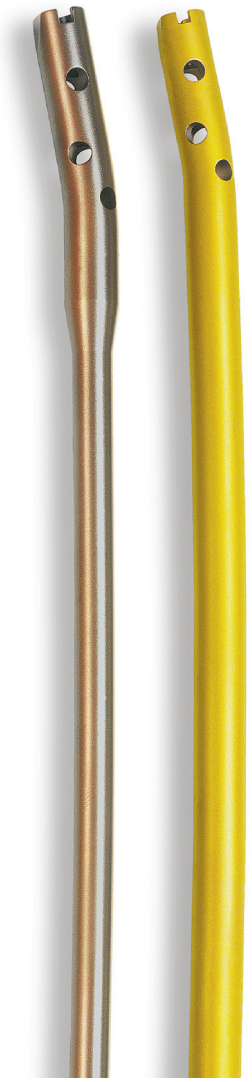
TRIGEN IM Nail System Surgical Technique

Described by
Thomas A. Russell, M.D.
Roy W. Sanders, M.D.

Nota Bene
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.

Warning
This device is not approved for screw attachment or fixation to the posterior elements (pedicles) of the cervical, thoracic, or lumbar spine.

Contents



Indications

The TRIGEN Knee Nail is indicated for shaft fractures between the proximal and distal third of the tibia. Indications include transverse, comminuted, spiral, oblique, and segmental fractures. The Knee Nail may also be used for treatment of non unions or malunions as well as prophylactic nailings of impending pathological fractures.

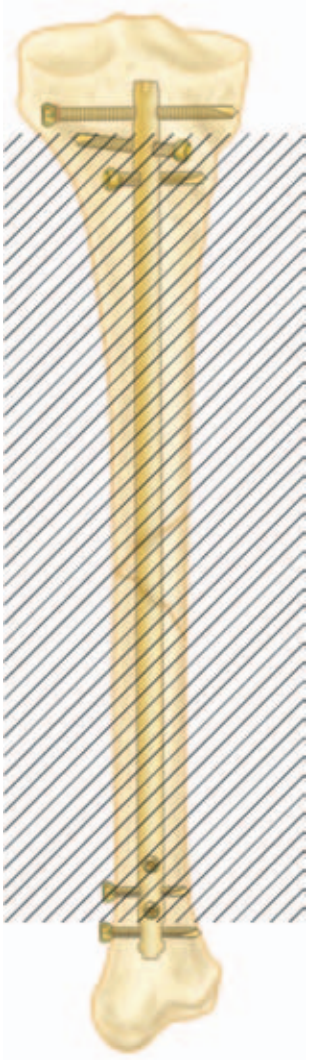


Figure 1

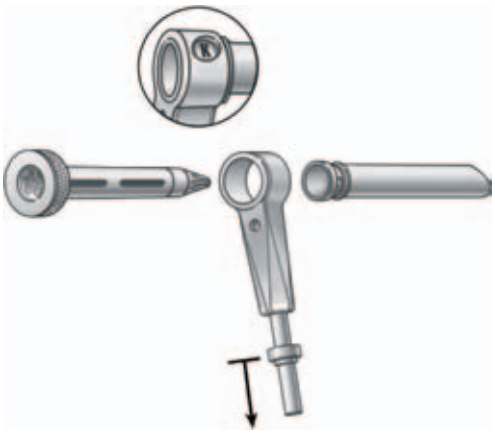


Figure 2

Figure 3

Patient Preparation

Position the patient supine. Place a sterile bolster (leg roll) or use a leg positioner under the thigh and flex the knee for positioning. Check the axial alignment by stretching a "bovie" cord through the middle of the patella to the second toe. The cord should bisect the middle of the tibial plateau and talar dome in the A/P view when the leg is straight. Adjust the leg for rotation and length by comparison with the uninjured leg and by visualizing the fracture configuration. Insertion alignment can be slightly proximal to the fibular neck, but below the articular surface of the knee to avoid meniscular damage. A slightly lateralized entry portal is optimal *(Figure 1)*.

Entry Portal

Make a 3 cm incision medial to the patellar tendon. Rotate the barrel of the Entry Tool (7163-1114) until the "K" is seen, then place the Entry Tool with Honeycomb Insert through the incision to bone *(Figure 2)*. Adjust to align the Entry Tool with the axial line of the tibial shaft in the A/P and lateral image views. Attach the 3.2 Tip-Threaded Guide Wire (7163-1190) to power using the Mini-Connector (7163-1186). Insert the Guide Wire when the axial alignment is acceptable and centered along the tibia. The target zone should be just lateral to the medial tibia tubercle. The Entry Tool may be backed out as needed to confirm that the pilot hole is started correctly. Insert the wire approximately 3 cm in depth. Once proper placement of the Guide Wire has been established, the "honeycomb" insert should be removed *(Figure 3)*.

Attach suction to the Entry Tool to assist in blood evacuation and minimize aerosolisation of blood to operative team. Attach the 12.5 mm Entry Reamer (7163-1116) to power and insert over the Guide Wire (7163-1190) to ream the proximal portion of the tibia. The reamer should be inserted such that it is reaming the anterior cortex and not directed toward the posterior cortex. The Entry Portal Tool functions as a soft tissue protector. The reamer should be advanced to the medullary canal of the tibia, approximately 4-5 cm. Confirm the position of the reamer under lateral X-ray views as well. Remove the flexible 12.5 mm Entry Reamer and Guide Wire *(Figure 4)*.

Figure 4

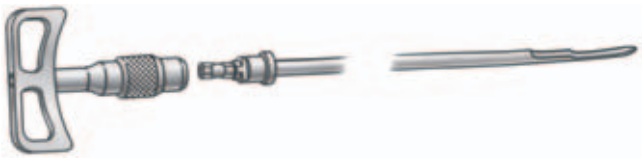


Figure 5

Figure 6

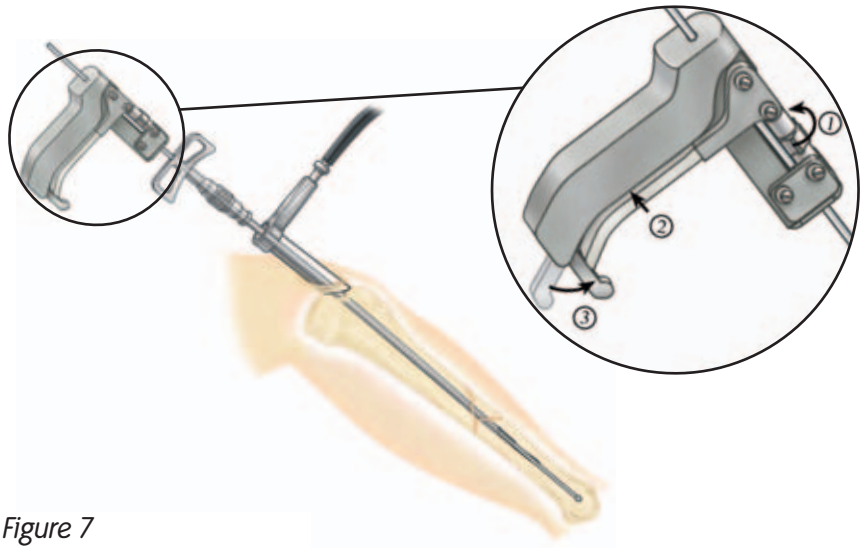


Figure 7

Fracture Reduction

Snap the T-Handle (7163-1172) onto the Reducer (7163-1124) *(Figure 5)*. Insert the Reducer (7163-1124) through the Entry Tool and advance into the distal medullary canal to reduce the fracture *(Figure 6)*. Attach the Gripper (7163-1100) to the Ball-Tipped Guide Rod (7163-1126) and introduce it into the medullary canal through the Reducer and Entry Portal Tool *(Figure 7 and 7 Inset)*. The Guide Rod can be positioned by rotating the Reducer while placing the rod into the medullary canal. Remove the Gripper from the guide rod to allow for removal of the Reducer. When Guide Rod is in place, remove the Reducer.

Note: *The Reducer may be too large to use if the patient has a small diameter intramedullary canal. If this is the case, reduce the tibia manually.*

Canal Preparation

Canal preparation is dependent on surgical decision. If reaming is planned, use progressive reamers through the Entry Tool. Unreamed nails are selected based on preoperative planning, but should be of sufficient size to provide translational fill of the intramedullary canal in mid-diaphysis. The Flex Reamer Extender (7163-1130) is available to extend the reamer shaft for nails longer than 42 cm. If reaming is selected, proceed to sequentially ream the tibial shaft beginning with the 9 mm reamer head. Sequentially ream in half millimeter increments to 0.5 mm to 1.0 mm larger than the selected nails size *(Figure 8).*

Figure 8

Nail Selection

Determine nail diameter from image intensifier, templating, or sounding the canal. Never insert a nail that has a larger diameter than the last reamer used. Confirm placement of the guide rod at the desired portion of the distal tibia metaphysis and then insert the Ruler (7163-1128) over the exposed end of the guide rod pushing the end down to the level where the top of the nail will stop. Confirm the position on the image intensifier *(Figure 9).* Leave the Guide Rod in place. Exchange of the ball-tipped Guide Rod is not necessary.

Note: *Make provisions for countersinking the tibial nail to minimize impingement problems at the knee. Allow for reduction of the fracture, if dynamization is required.*

Read the nail length from the calibrations exposed at the other end of the ruler.

Figure 9

Figure 10

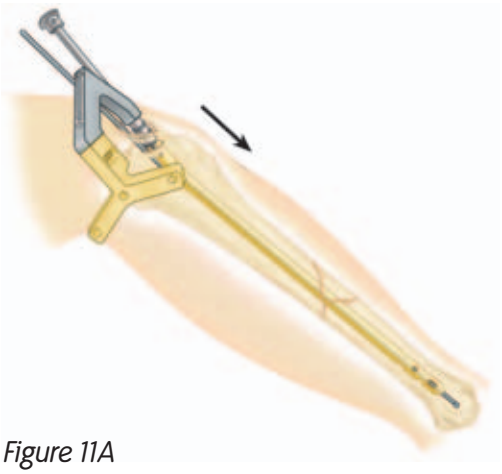


Figure 11A

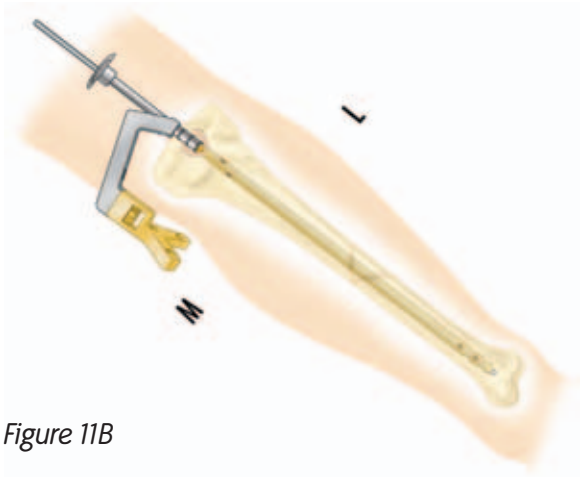


Figure 11B

Drill Guide Assembly - Nail Positioning

Attach the Knee Guide (7163-1142) to the Drill Guide (7163-1134). The Drill Guide is keyed so that the Knee Guide will only fit one way. Secure the Knee Guide to the Drill Guide by tightening the "knurled knob" by hand. Final tightening can also be accomplished by placing the end of the Guide Bolt Wrench (7163-1140) into the holes in the knurled knob. Insert Quick Bolt (7163-1138) in the Drill Guide to secure nail. The Quick Bolt will also be used to rotate Drill Guide 180° as needed for lateral oblique screw insertion. Alternatively, the Knee Guide may be assembled to the Drill Guide after the nail is inserted *(Figure 10)*.

Advance the nail over the Guide Rod and carefully pass the fracture. Countersink the nail approximately 2-5 mm into the tibia proximally *(Figure 11A and Figure 11B)*. Confirm rotation as is appropriate. Remove the Guide Rod.

Interlocking

Proximal Screws: Transverse and Medial Oblique Placement — Insert the Gold Outer Drill Sleeve (7163-1152) through the proximal holes. Make a skin incision and insert the sleeve to bone.

A. Pre-drilling Technique — The Silver Inner Drill Sleeve (7163-1156) is introduced through the Gold Outer Drill Sleeve (7163-1152). Attach the Long Pilot Drill (7163-1110) to power using the Mini-Connector (7163-1186). Insert the Long Pilot Drill through both cortices *(Figure 12)*. The length measurements are taken from the calibrations off the drill in relation to the end of the drill sleeve. The appropriate length screw is selected and attached to the Screwdriver. The Drill and Silver Inner Drill Sleeve are removed. Attach Screwdriver to power or use manual T-Handle (7163-1172) or Straight Screwdriver Handle (7163-1163) and place screws in bone through the Gold Outer Drill Sleeve. The Screwdriver is etched with a laser-marked ring. This ring should be stopped short of the Gold Outer Drill Sleeve to prevent final seating of the screw by power. Final tightening of the screws should always be under manual control using the T-Handle (7163-1172) or Straight Screwdriver Handle (7163-1163) *(Figure 13)*.

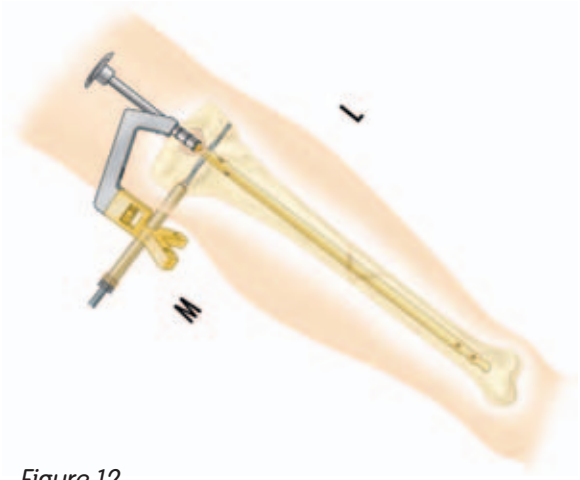


Figure 12

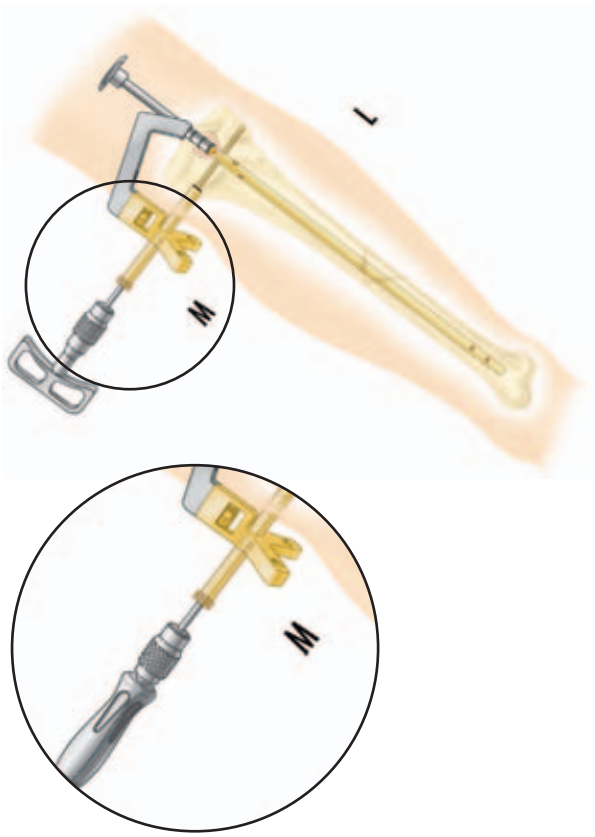


Figure 13

Note: *5.0 mm (GOLD) screws are to be used with 10 mm, 11.5 mm and 13 mm Knee Implants*

4.5 mm (GREY) screws are to be used with 8.5 mm Knee Implants which are indicated for use in the TIBIA only

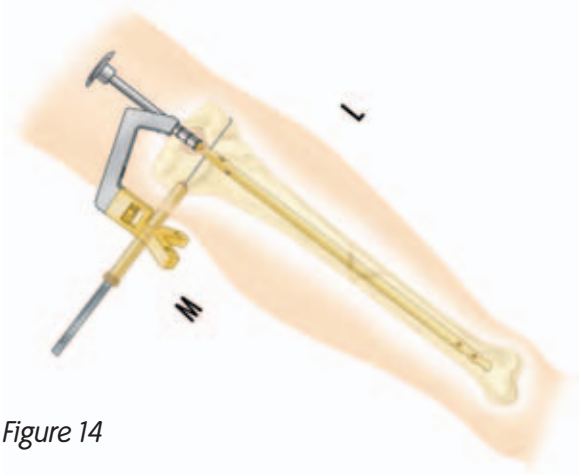
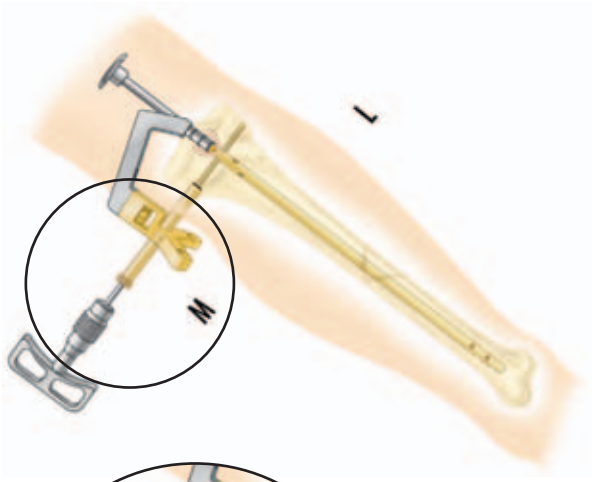


Figure 14



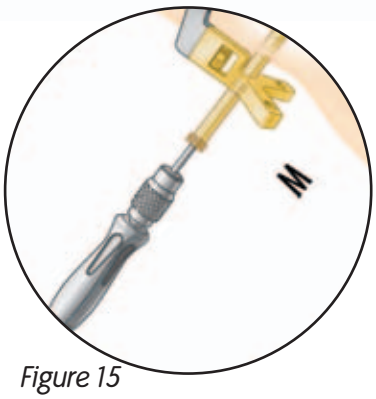


Figure 15

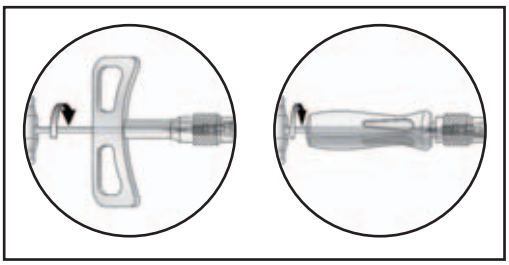


Figure 16

B. Screw Length Gauge — After predrilling through both cortices as outlined above, remove the Silver Inner Drill Sleeve, leaving the Gold Outer sleeve in place. Use the Screw Length Gauge (7163-1170) through the Gold Outer Drill Sleeve (7163-1152) from the far cortex to measure for proper length screw *(Figure 14).* An alternative option in measuring for screw length is the Direct Measuring Gauge (7163-1189). The appropriate length screw is selected and attached to the Medium (7163-1166) or Long (7163-1164) Screwdriver. Attach Screwdriver to power or use manual T-handle (7163-1172) or Straight Screwdriver Handle (7163-1163) and place screws in bone. The Screwdriver is etched with a laser-marked ring. This ring should be stopped short of the Gold Outer Drill Sleeve to prevent final seating of the screw by power. Final tightening of the screws should always be under manual control using the T-Handle (7163-1172) or Straight Screwdriver Handle (7163-1163) *(Figure 15).*

Note: *Once screw is seated, simply insert the Screwdriver Release Handle (7163-1208) into the cannulation of the T-Handle and turn counterclockwise. The Screwdriver Release Handle releases the screw from the screwdriver without the need to remove the T-Handle or Straight Screwdriver (Figure 16).*

Continue with the placement of the medial oblique screw by following the predrilling technique *(Figure 17).*

Proximal Lateral Oblique Screw Placement — For insertion of the lateral oblique screw, the Quick Bolt (7163-1138) is loosened and back-turned two complete revolutions. This allows the Knee Guide to be lifted and rotated 180°. After rotating the Knee Guide, retighten with the Quick Bolt, making sure the key is engaged. The guide is now in correct position for placement of the lateral oblique screw *(Figures 18 and 19).*

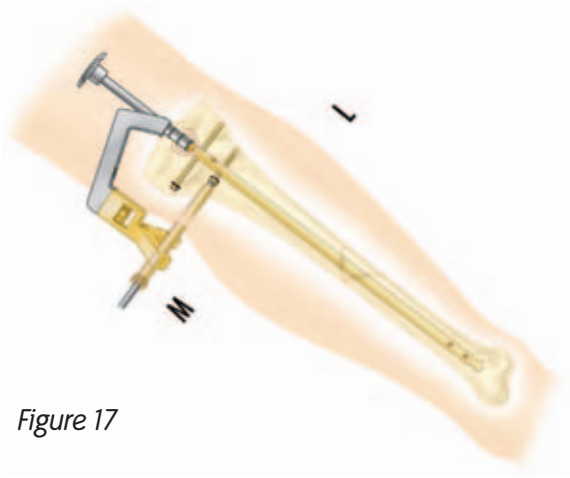


Figure 17

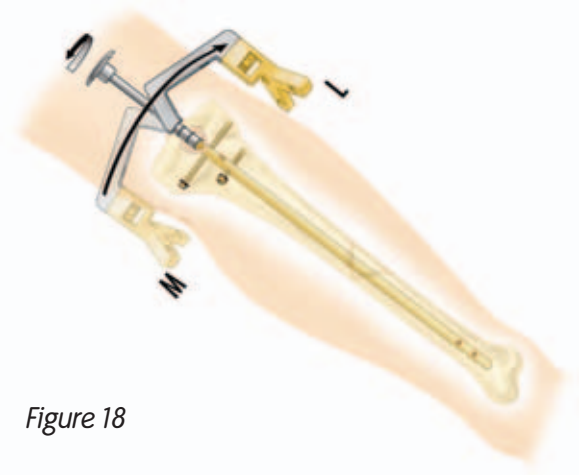


Figure 18

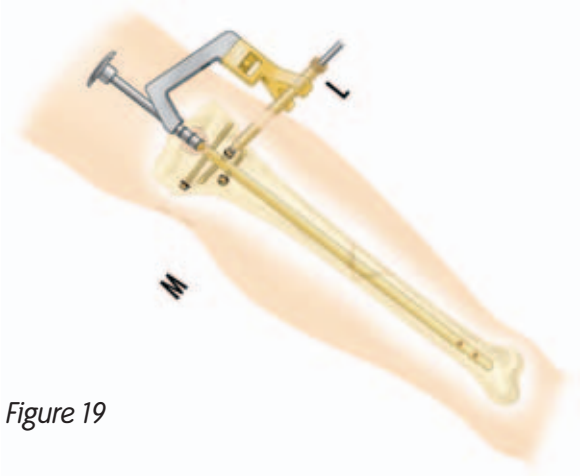


Figure 19

Distal Screws

The freehand technique is used. First, the rotation is confirmed with the tibia to be satisfactory. Next, the image intensifier is used to obtain perfect circles radiographically on the medial view or the anterior view. There are four screw hole options in the standard Knee Nail sizes and three screw hole options with the 8.5 mm Knee Tibial Nails.

After perfect circles are confirmed, a stab incision is made over the holes and the Short Pilot Drill (7163-1117) is inserted through both cortices. The Mini-Connector (7163-1186) can be used to conveniently connect the drill to power.

Note: *The 4.0mm Short AO Step Drill (7164-1123) may be used in hard diaphyseal bone to facilitate seating of the screw.*

Use the Direct Measuring Gauge (7163-1189) to determine screw length. The appropriate length screw is attached to the short Screwdriver (7163-1068. Attach Screwdriver to power or use manual T-Handle (7163-1172) or Straight Screwdriver Handle (7163-1163) place screws in bone. It is recommended that final tightening of the screw should always be under manual control using the T-Handle (7163-1172) or Straight Screwdriver Handle (7163-1163).

Note: *The Short Pilot Drill may be used with the Screw Length Sleeve (110238) for placement of locking screws. The Short Pilot Drill is calibrated, and screw length measurements may be taken from the Drill in relation to the Screw Length Sleeve.*

Note: *Bone graft or bone graft substitutes should be used to fill in gaps around the bones to enhance bony union.*

VIAGRAF®
Demineralized Bone Matrix – Crunch
Cat. no. 71791x

VIAGRAF
Demineralized Bone Matrix – Flex
Cat. no. 71991x

VIAGRAF
Demineralized Bone Matrix – Gel
Cat. no. 71791x

VIAGRAF
Demineralized Bone Matrix – Paste
Cat. no. 71790x

VIAGRAF
Demineralized Bone Matrix – Putty
Cat. no. 71790x

VIAGRAF
Demineralized Bone Matrix – Cancellous Chips
Cat. no. 71792x

Optional — The Targeter (7163-1174) may be used to assist in placing additional distal screws after the first screw has been inserted. Be sure to use the Short Screwdriver (7163-1168) when placing the first screw in bone as outlined in the above options. Leave the Short Screwdriver attached to the first screw in the bone. Choose whether you will be "statically" or "dynamically" locking the implant. Place the appropriate labeled hole on the Targeter over the Screwdriver and push to skin *(Figure 20).* Make sure that the Targeter can freely rotate. The Long Screwdriver (7163-1164) can also be attached to the side of the Targeter. It acts as a handle to stabilize the Targeter, as well as an aid in reducing exposure of the hand during imaging. Use the C-Arm to rotationally locate the second hole. Once the position is found, place the Short Drill (7163-1117) through the wire hole on the Targeter and into bone to maintain position. The Mini-Connector (7163-1186) provides a convenient attachment of the drill to power. Make an incision at the tip of the barrel for the second screw and insert the Silver Inner Drill Sleeve and Targeter to bone. Use of the standard predrill technique or power technique can be used to finish screw placement. The Targeter can be used for both M/L and A/P placement of the second screw. When using the Targeter for A/P locking, the slot marked "dynamic" should be used for the second screw *(Figure 21 and 22 Inset).*

Note: *Once screw is seated, simply insert the Screwdriver Release Handle (7163-1208) into the cannulation of the T-Handle and turn counterclockwise. The Screwdriver Release Handle releases the screw from the screwdriver without the need to remove the T-Handle (Figure 22).*

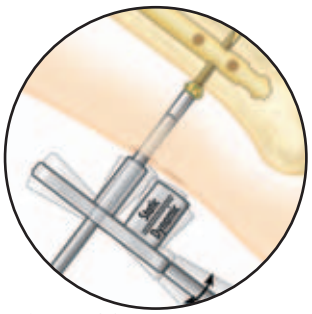


Figure 20

Figure 21

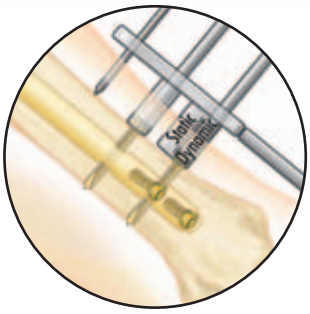


Figure 21 Inset

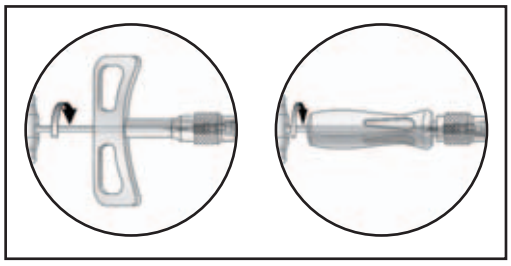


Figure 22

Figure 23

Final position of the fracture is confirmed. Following completion of nailing and interlocking screw placement, the Knee Guide and Drill Guide are disassembled by backing off the Quick Bolt. Irrigate incision with saline and close in a standard fashion *(Figure 23).*

TRIGEN Nail Extraction Technique

Patient Positioning

Patient Positioning for Femoral & Trochanteric Antegrade or Knee Nails used Femoral Retrograde
Place the patient in the lateral decubitus or supine position.

Knee Nails Used Tibial Antegrade
Place the patient in the supine position on a radiolucent table with the affected leg in a figure four configuration.

Surgical Technique

After prepping and draping, remove any distal screws and all but one proximal screw from the nail, leaving the screw closest to the driving end of the nail. Under fluoroscopy, percutaneously place a 3.2mm tip-threaded guide pin *(Figure 1)* (7163-1190) into the threaded end of the nail. (If a cap is on the nail, an incision must be made and the cap removed.) A mallet may be used to insert this guide pin, but usually power equipment is available and can be used for percutaneous placement.

Figure 1

When the guide pin is in the nail, make a one-inch incision about the pin and advance the 12.5mm entry reamer *(Figure 2)* (7163-1116) over the pin to remove the tissue and ingrowth overlying the nail. Note that the tip of the reamer is straight for approximately 1/2 inch before flaring out. It is this portion of the reamer that enters the nail.

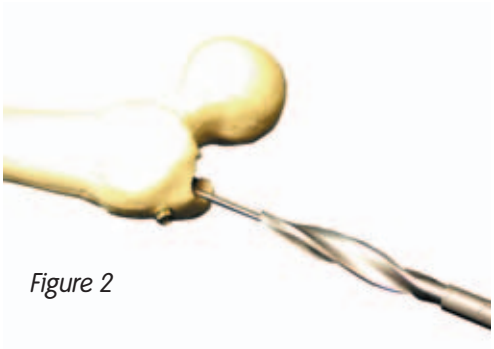


Figure 2

After reaming, remove the reamer and the guide pin and insert the 3.0 X 1000mm TriGen ball tipped guide rod (7163-1126). Attach the extractor to the impactor handle (7163-1185) and tighten, then thread the extractor into the nail (with the guide rod in place) *(Figure 3)*. Place the screwdriver shaft into the impactor handle slot and turn until the impactor is securely engaged. This can be verified by fluoroscopy *(Figure 4)*.

Figure 3

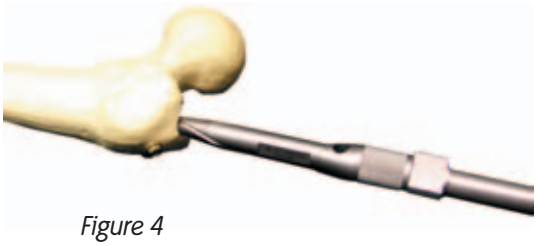


Figure 4

Figure 5

Figure 6

After the impactor is securely engaged in the nail, remove the last locking screw *(Figure 5)*.

Attach the gripper to the guide rod adjacent to the end of the impactor. The gripper will provide a handle for the surgeon to use while backslapping the impactor with the slotted hammer when extracting the nail *(Figure 6)*.

Note: *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 pre-mature failure of the extraction device. In the event of extractor failure, pull the guide rod until the ball tip engages the extractor, re-tighten the gripper adjacent to the impactor and proceed with the extraction.*

Recommended usage for extractor: 7-10 times

TRIGEN Nail Extraction: Alternative Tips

Alternative Methods For Extraction of TRIGEN Nails

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

Part #	Description
115120	2.0 x 700mm smooth
71631126	3.0 x 1000mm ball tip
71118280	2.0 x 900mm smooth
71118202	3.0 x 900mm ball tip
112069	3.0 x 900mm ball tip

After following the patient positioning and entry reaming techniques cited at the beginning of this document, proceed with the following substitution for the quick bolt:
Attach the RUSSELL-TAYLOR® Tibial extraction bolt (112041) to the slide hammer (112011). Thread the assembly into the nail and proceed with extracting the nail via the slide hammer mechanism.

Part #	Description
112041	5/16 - 24 extraction bolt
11-2011	Slide hammer

Additional Tips For Extraction

Thoroughly review all extraction alternatives with the surgeon pre-operatively and have access to instrumentation cited in this update.

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

Part #	Description
115074	Large Extractor Hook
115073	Small Extractor Hook
914659	Small Easy Out
914658	Large Easy Out

Last resort:
In the event that the above techniques are unsuccessful or result in device failure, the screw extractor that is currently available in the cannulated screw sets will remove cannulated extraction devices that have failed during surgery and will also possibly remove the nail. The surgeon should hand tighten the screw extractor (71119014) then tap with the hammer to ensure engagement.

At this point, the surgeon can then attempt to remove the nail with the screw extractor and / or back turn the broken piece of extractor and then insert the guide bolt (71631136), quick bolt, or R-T tibial extraction bolt into the nail to remove the nail.

Retrograde Femoral or Antegrade Tibial

(Gold)

Cat. No.	Length
7163-3226	10 mm x 26 cm
7163-3228	10 mm x 28 cm
7163-3230	10 mm x 30 cm
7163-3232	10 mm x 32 cm
7163-3234	10 mm x 34 cm
7163-3236	10 mm x 36 cm
7163-3238	10 mm x 38 cm
7163-3240	10 mm x 40 cm
7163-3242	10 mm x 42 cm
7163-3244	10 mm x 44 cm
7163-3246	10 mm x 46 cm
7163-3248	10 mm x 48 cm
7163-3250	10 mm x 50 cm
7163-3326	11.5 mm x 26 cm
7163-3328	11.5 mm x 28 cm
7163-3330	11.5 mm x 30 cm
7163-3332	11.5 mm x 32 cm
7163-3334	11.5 mm x 34 cm
7163-3336	11.5 mm x 36 cm
7163-3338	11.5 mm x 38 cm
7163-3340	11.5 mm x 40 cm
7163-3342	11.5 mm x 42 cm
7163-3344	11.5 mm x 44 cm
7163-3346	11.5 mm x 46 cm
7163-3348	11.5 mm x 48 cm
7163-3350	11.5 mm x 50 cm
7163-3426	13 mm x 26 cm
7163-3428	13 mm x 28 cm
7163-3430	13 mm x 30 cm
7163-3432	13 mm x 32 cm
7163-3434	13 mm x 34 cm
7163-3436	13 mm x 36 cm
7163-3438	13 mm x 38 cm
7163-3440	13 mm x 40 cm
7163-3442	13 mm x 42 cm
7163-3444	13 mm x 44 cm
7163-3446	13 mm x 46 cm
7163-3448	13 mm x 48 cm
7163-3450	13 mm x 50 cm

8.5 mm Knee Nail

(Grey)

Cat. No.	Length
7163-3126	8.5 mm x 26 cm
7163-3128	8.5 mm x 28 cm
7163-3130	8.5 mm x 30 cm
7163-3132	8.5 mm x 32 cm
7163-3134	8.5 mm x 34 cm
7163-3136	8.5 mm x 36 cm
7163-3138	8.5 mm x 38 cm
7163-3140	8.5 mm x 40 cm

Implants

4.5 mm Internal Captured Screw

(Grey) For 8.5 mm Implants Only

Cat. No.	Length
7164-2125	25 mm
7164-2130	30 mm
7164-2135	35 mm
7164-2140	40 mm
7164-2145	45 mm
7164-2150	50 mm
7164-2155	55 mm
7164-2160	60 mm
7164-2165	65 mm

5.0 mm Internal Captured Screw

(Gold) For 10 mm,
11.5 mm & 13 mm Implants

Cat. No.	Length
7164-2225	25 mm
7164-2230	30 mm
7164-2235	35 mm
7164-2240	40 mm
7164-2245	45 mm
7164-2250	50 mm
7164-2255	55 mm
7164-2260	60 mm
7164-2265	65 mm
7164-2270	70 mm
7164-2275	75 mm
7164-2280	80 mm
7164-2285	85 mm
7164-2290	90 mm
7164-2295	95 mm
7164-2200	100 mm
7164-2205	105 mm
7164-2210	110 mm

Nail Caps

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

Catalog

Instrumentation

Knee

Gripper
Cat. No. 7163-1100

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

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

4.0 mm Short AO Pilot Drill
Cat. No. 7163-1123

4.0 mm Long AO Pilot Drill
Cat. No. 7163-1121

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

4.0 mm Screw Length Sleeve
Cat. No. 11-0238

Entry Tool
Cat. No. 7163-1114

12.5 mm Entry Reamer
Cat. No. 7163-1116

Obturator
Cat. No. 7163-1122

Reducer
Cat. No. 7163-1124

3.0 mm X 1000 mm Ball Tip Guide Rod
Cat. No. 7163-1126 & 7163-1626 (16 per box)

Ruler
Cat. No. 7163-1128

Flex Reamer Extender
Cat. No. 7163-1130

Skin Protector
Cat. No. 7163-1132

Drill Guide 135°
Cat. No. 7163-1134

Drill Guide 130°
(Not Shown)
Cat. No. 7163-1135

Quick Bolt
Cat. No. 7163-1138

Guide Bolt Wrench
Cat. No. 7163-1140

Knee Guide
Cat. No. 7163-1142

One Piece Impactor
Cat. No. 7163-1185

Hammer
Cat. No. 7163-1150

Gold Outer Drill Sleeve
Cat. No. 7163-1152

Silver Inner Drill Sleeve
Cat. No. 7163-1156

Long External Screwdriver
Cat. No. 7163-1164

Medium External Screwdriver
Cat. No. 7163-1166

Short External Screwdriver
Cat. No. 7163-1168

Screwdriver Replacement Bars for External Screwdrivers

Cat. No.	Description
7163-1165	Large
7163-1167	Medium
7163-1169	Short

Catalog

Hexdriver 4.5 mm, 5.0 mm & 6.4 mm Internal Captured Hex Screws

Cat. No.	Description
7163-1066	Medium
7163-1068	Short
7163-1070	Long

Screw Length Gauge

Cat. No. 7163-1170

Direct Measuring Gauge

Cat. No. 7163-1189

T-Handle (Zimmer-Hall)

Cat. No. 7163-1172

Straight Screwdriver Handle

Cat. No. 7163-1163

Targeter

Cat. No. 7163-1174

Large Extractor

Cat. No. 7163-1278

Small AO Adapter

Cat. No. 7163-1184

Trinkle Adapter

Cat. No. 7163-1183

Mini Connector

Cat. No. 7163-1186

Catalog

Trinkle Mini Connector

Cat. No. 7163-1187

Tip Threaded Guide Wire

Cat. No. 7163-1190 & 7163-1690 (6 per box)

Flex Reamer Shaft

Cat. No. 7163-1192

Screwdriver Release Handle

Cat. No. 7163-1208

Driving End of Nail (All Knee Nails and Distal Tibia)

Pilot Nose Reamer Heads

Cat. No.	Description
7111-8232	9.0 mm Head
7111-8233	9.5 mm Head
7111-8234	10.0 mm Head
7111-8235	10.5 mm Head
7111-8236	11.0 mm Head
7111-8237	11.5 mm Head
7111-8238	12.0 mm Head
7111-8239	12.5 mm Head
7111-8240	13.0 mm Head
7111-8241	13.5 mm Head
7111-8242	14.0 mm Head

Modular Reamer Box

Cat. No. 7163-1218

End Cutting Reamer Head

Cat. No.	Description
7111-8231	9.0 mm Head

Implant Trays

Small Outer Case 2.4”
Cat. No. 7112-9401

TRIGEN Instrument Tray 1
Cat. No. 7163-1199

TRIGEN Instrument Tray 2
Cat. No. 7163-1201

Screw Caddy
Cat. No. 7163-1180

Conversion Packet for Screw Caddy
Cat. No. 7163-1074

Large Outer Case 4.8”
Cat. No. 7112-9400

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

Catalog Information – VIAGRAF◇ Demineralized Bone Matrix

Crunch

Cat No.	Container
717914	5cc Jar
717915	15cc Jar

Flex

Cat No.	Container
717917	5 x 2.5cm Poly Bag
717918	10 x 2.5cm Poly Bag
717919	5 x 5cm Poly Bag

Gel

Cat No.	Container
717910	1cc Syringe
717911	5cc Syringe
717912	10cc Syringe

Paste

Cat No.	Container
717906	1cc Syringe
717907	5cc Syringe
717908	10cc Syringe

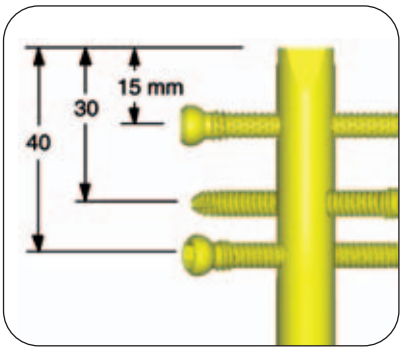
Putty

Cat No.	Container
717902	1cc Jar
717904	5cc Jar
717905	10cc Jar

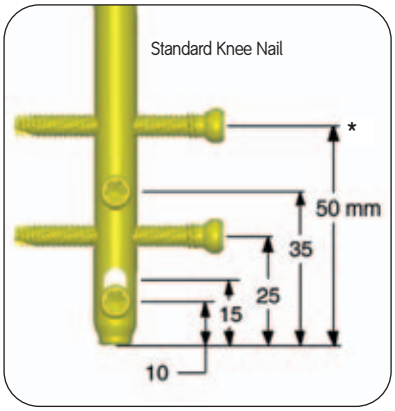
Cancellous Chips

Cat No.	Container
717920	1.7-10mm 15cc Tray
717921	1.7-10mm 30cc Tray

TRIGEN Knee Nail and Distal Tibial Nail – Specifications



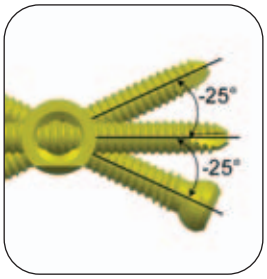
Driving End of Nail (All Knee Nails and Distal Tibia)



Non-driving End of Nail (M/L view)

**Note:* *8.5 mm is for Tibia Mode only. Locking is the same as standard knee nail except for 50mm.*

***The distal tibial nail is on limited release, in the US market. In the international markets, the distal tibial nail is sold in select countries.*



Top View of Nail

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

Specifications	TRIGEN 8.5 Knee Nail Tibia Mode (Only)	TRIGEN Supracondylar Knee Nail
Material	TI6AL4V	TI6AL4V
Diameter	8.5	11.5, 13mm
Lengths	26-40cm	15, 20, 25cm
Nail Color	Grey	Gold
Cross Section	Round	Round
Proximal Diameter (driving end)	11.5mm	11.5mm (11.5 dia.) 13mm (13 dia.)
Proximal Diameter (non-driving end)	8.5mm	11.5, 13mm (dia. of the nail)
Smallest Thru Diameter	4.8mm	5.4mm
Wall Thickness	1.8mm	3.0mm (11.5 dia.) 3.5mm (13 dia.)
Guide Bolt Thread	5/16 - 24	5/16 - 24
Alternative Guide Bolts	RT Tibial, Retrograde, IMSC, Revision	RT Tibial, Retrograde, IMSC, Revision
Alternative Modes	No	No
Proximal Locking (Driving End)		
Screw Diameter	4.5mm	5.0mm
Hex Size	4.7mm	4.7mm
Alternative Hex Drivers	RT Femoral & Recon 7.0mm Cannulated Screw	RT Femoral & Recon 7.0mm Cannulated Screw
Screw Color	Grey	Gold
Screw Lengths	25 - 65mm	25 - 110mm
Location	15, 30 40mm	15, 30 40mm
Proximal Dynamization Slot	No	No
Proximal Screw Hole Dimensions	4.7mm	5.3mm
Orientation	Transverse, (2) 25 Deg Oblique	Transverse, (2) 25 Deg Oblique
Deg of Proximal Bend (Herzog)	10	12.5
Location of Proximal Bend	32mm	32mm
Distal Locking (Non-Driving End)		
Screw Diameter	4.5mm	5.0mm
Major Diameter	4.5mm	5.0mm
Minor Diameter (core)	4.0mm	4.3mm
Distal Screw Hole Dimensions	4.7mm	5.3mm
Screw Color	Grey	Gold
Screw Lengths	25 - 65mm	25 - 110mm
Location	10- 15, 25, 35mm	10-15, 35mm
Orientation	Slot/Hole 1&3 - M-L Hole 2 - A-P	L-M
Dynamization Slot	Yes	Yes
Distal Hole Dimensions	4.7mm	5.3mm
AP Bow	Hybrid Bow - Proximal 2.5 meters Distal 3.0 meters	N/A
Location of Distal Bend	100mm	N/A
Dynamization Slot Location	Most Distal Hole	Most Proximal Hole

Notes

Notes

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

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

www.smith-nephew.com

30013103002a 7118-0663 02/06