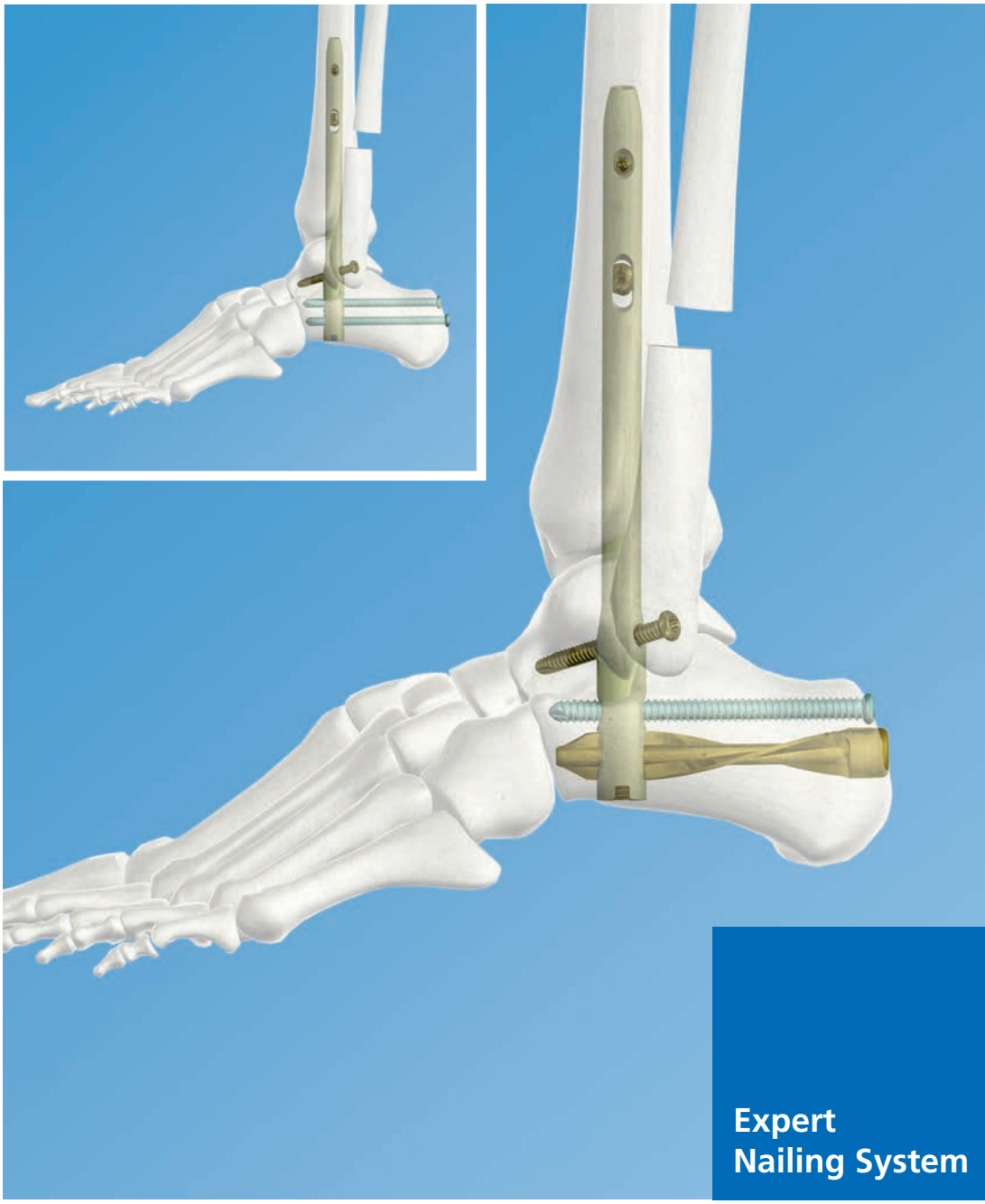
Expert HAN. Expert Hindfoot Arthrodesis Nail.

Surgical Technique



Expert Nailing System

This publication is not intended for distribution in the USA.

Instruments and implants approved by the AO Foundation.

DePuy Synthes
COMPANIES OF Johnson & Johnson

Image intensifier control

Warning
This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

Processing, Reprocessing, Care and Maintenance
For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:
http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance
For general information about reprocessing, care and maintenance of Synthes reusable devices, instrument trays and cases, as well as processing of Synthes non-sterile implants, please consult the Important Information leaflet (SE_023827) or refer to:
http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance

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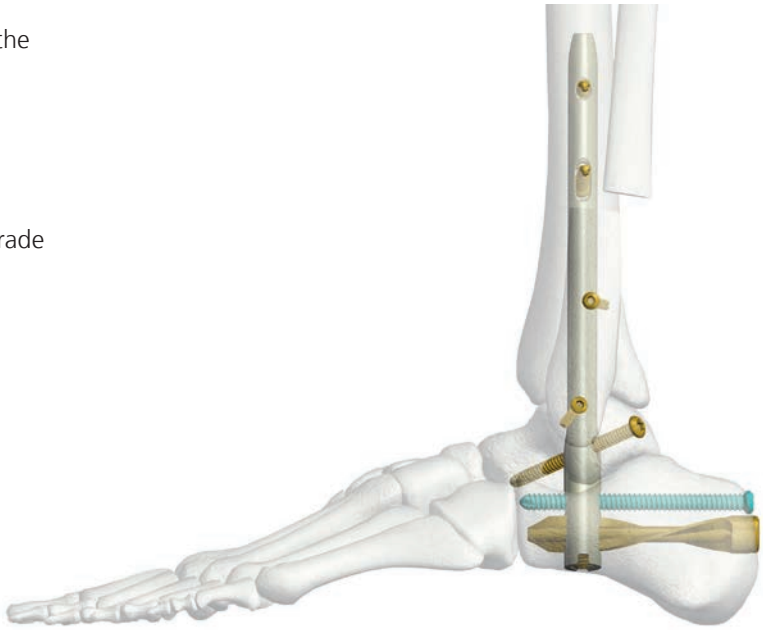
Advanced solutions

Distal and Talar Locking Options
Screw orientation options:
- Calcaneus into the cuboid
- Talus into the navicular

Spiral Blade
- Increased surface area optimizes load distribution in the calcaneus
- Lengths: 45 mm – 100 mm (5 mm increments)
- Cannulated for insertion over a 3.2 mm guide wire
- 12.5 mm blade diameter
- Front cutting end
- Implants common with the Expert Retrograde/Antegrade Femoral Nail System
- Titanium alloy *



Improved stability

End Caps
- Securely lock spiral blade or the most distal locking screw
- Prevent ingrowth of soft tissue and facilitate nail extraction
- Sit flush with end of nail
- Self-retaining, T25 recess for easy pickup and insertion of end cap
- Titanium alloy *

For securing the spiral blade

For securing the most distal locking screw

* Ti-6Al-7Nb alloy

Nail Design

- The lateral bend allows an entry site in the center of the lateral column of the calcaneus
- Permits proper hindfoot alignment and restores 3°–5° valgus positioning for a better gait
- Cannulated for use over all Synthes 2.5 mm or 3.0 mm ball-tipped reaming rods. Reaming rods may be removed through the nail and the insertion handle assembly (no exchange tube required)
- Titanium alloy*

The nail design and aiming arm enable targeted medial-to-lateral or lateral-to-medial proximal locking.

Standard Locking Screws

- Double-lead threads for ease of insertion
- Thread closer to screw head for better bone purchase in the near cortex
- Self-tapping blunt tip
- Self-retaining, T25 Stardrive recess, improved torque transmission, increased resistance to stripping relative to a hex recess and secure locking screw pickup
- 6.0 mm for distal locking options
- 5.0 mm for talar and proximal locking options
- Titanium alloy *

5.0 mm

6.0 mm

AO Principles

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation in general [1], and intramedullary nailing in particular.

The Expert Hindfoot Arthrodesis Nail enables an intramedullary approach for the fixation and the fusion of the ankle and of the subtalar joints. The system consists of a series of cannulated nails, cannulated spiral blades, cannulated end caps and locking screws. All the implants are made of titanium alloy.

Anatomic reduction
Fracture reduction and fixation to restore anatomical relationships. The Expert Hindfoot Arthrodesis Nail is designed to fit anatomically in the calcaneus and distal tibial canal allowing anatomic fusion of the ankle.

Stable fixation
Stability by fixation or splintage, as the personality of the fracture and the injury requires. The Expert Hindfoot Arthrodesis Nail provides secure fixation for ankle fusions. The use of the spiral blade with end cap or the distal locking screw with end cap provides a fixed-angle construct ideal for patients with poor bone quality.

Preservation of blood supply
Preservation of the blood supply to soft tissue and bone by careful handling. The instruments and implants in the Expert Hindfoot Arthrodesis Nail enable less tissue stripping than other treatment methods.

Early mobilization
The Expert Hindfoot Arthrodesis Nail provides secure fixation with minimal trauma to the vascular supply, which creates an improved environment for healing, and permits controlled, early, active rehabilitation conducive to optimum recovery.

[1] M.E. Müller, M. Allgöwer, R. Schneider, and H. Willenegger. AO Manual of Internal Fixation, 3rd Edition. Berlin: Springer-Verlag. 1991.

Indications and Contraindications

Indications
The Expert Hindfoot Arthodesis Nail is indicated to facilitate tibiotalocalcaneal arthrodesis to treat
- Severe foot/ankle deformity
- Arthritis
- Instability and skeletal defects, including but not limited to after tumor resection and neuro-osteoarthropathy (Charcot's foot)
- Avascular necrosis of the talus
- Failed joint replacement or failed ankle fusion
- Distal tibial fracture/non-unions
- Osteoarthritis
- Rheumatoid arthritis and pseudoarthrosis

Contraindications
The Expert Hindfoot Arthrodesis Nail system is not recomended for:
- Dysvascular limp
- Active infection
- Insufficient plantar pad

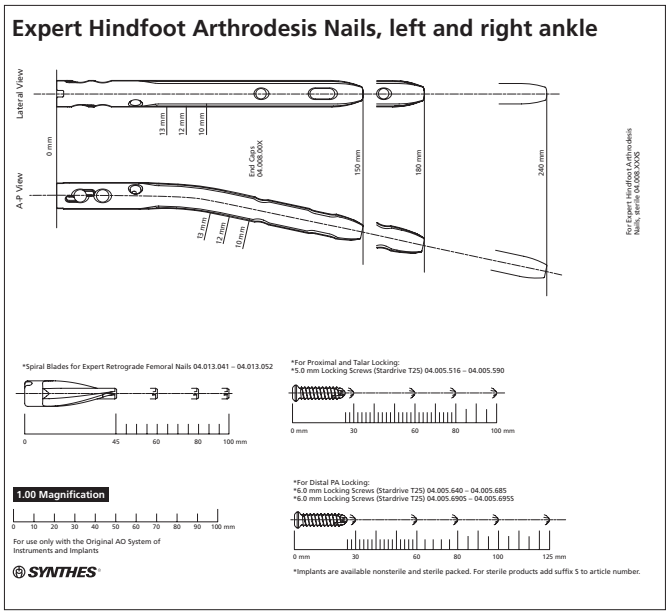
1
Estimate nail diameter and length

Use the Preoperative Planner Template for the Expert Hindfoot Arthrodesis Nail to estimate nail diameter and length.

To estimate nail diameter, place the template on the AP or lateral x-ray of the distal tibia and measure the diameter of the medullary canal at the narrowest part that will contain the nail.

To estimate nail length, place the template on the AP x-ray of the hindfoot and select the appropriate nail length based on patient anatomy. When selecting nail size, consider canal diameter, indication, patient anatomy and postoperative protocol.

Note: Template is available in actual size of the nail (034.000.532).

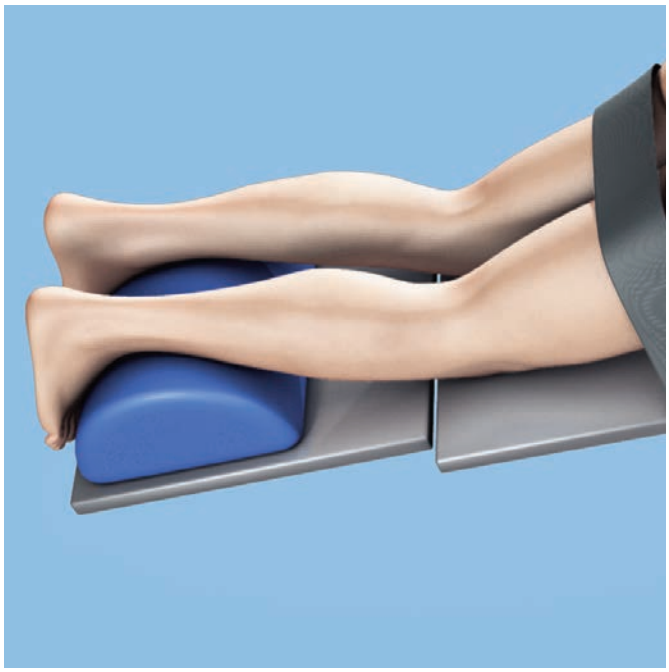


2
Position patient

Position the patient in a prone or a lateral decubitus (or supine) position on a radiolucent operating table. Position the C-arm to allow visualization of the tibiotalar and subtalar joints in both the AP and ML views.

This surgical technique is performed with the patient in a prone position, which is recommended.

Tip: Drape both limbs so that the contralateral limb can provide a biological reference for controlling angulation.



3
Determine nail length and diameter

Instrument	
03.008.001	Radiographic Ruler

Measure length
Position the C-arm for a lateral view of the distal tibia and subtalar joint. With long forceps, hold the radiographic ruler parallel to the tibia.

Adjust the ruler until the distal end is at the desired nail insertion depth. Mark the skin at that site on the lateral side.

Move the image intensifier proximally with the ruler positioned on the distal skin mark. An image of the ruler can be used to choose the optimum nail length.

Measure diameter
Position the C-arm for a lateral view of the tibia with the distal tibia centered on the screen.

Hold the ruler over the tibia so that the diameter gauge is centered over the narrowest part of the medullary canal that will contain the nail.

Read the diameter measurement on the circular indicator to estimate the canal size.

Opening the Hindfoot

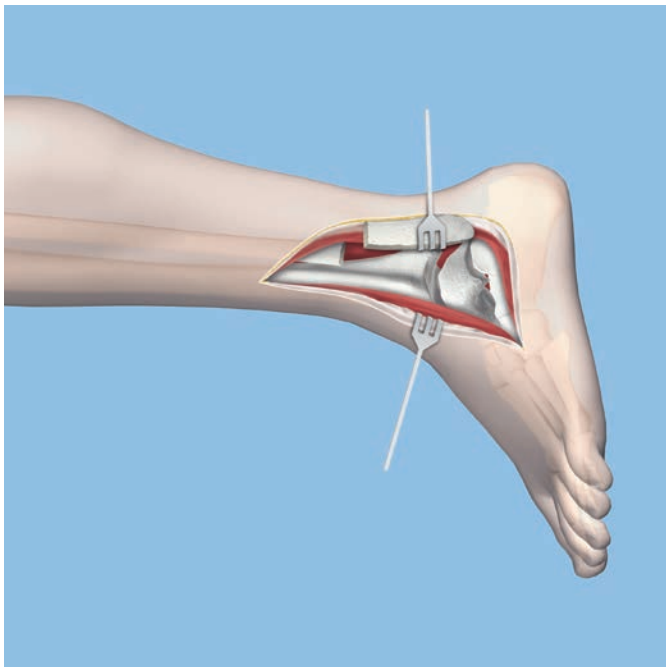
1
Perform fibula osteotomy

Create an incision laterally over the fibula. Dissection to the bone is directed anteriorly. Using a sagittal saw, create an osteotomy 10 cm from the distal tip of fibula. Resect approximately 1 cm of bone proximal to the first cut, creating a gap. This bone segment can be utilized as bone graft.

Incise the anterior soft tissue including anterior tibiofibular, calcaneofibular and talofibular ligaments.

Take care to preserve the posterior soft tissue. By maintaining a blood supply to this bone, it can be used later as a live biological plate on the lateral distal tibia.

Reflect the distal segment posteriorly hanging on the posterior ligaments.



2
Prepare articular surfaces for fusion

Remove the articular surfaces between the tibia and talus and between the talus and calcaneus, for fusion.

Technique tips: Drill multiple holes in the subchondral bone to encourage the fusion. Be sure to adequately prepare the subtalar articular surface, as this is a common site of failure for fusion.

3
Determine entry point

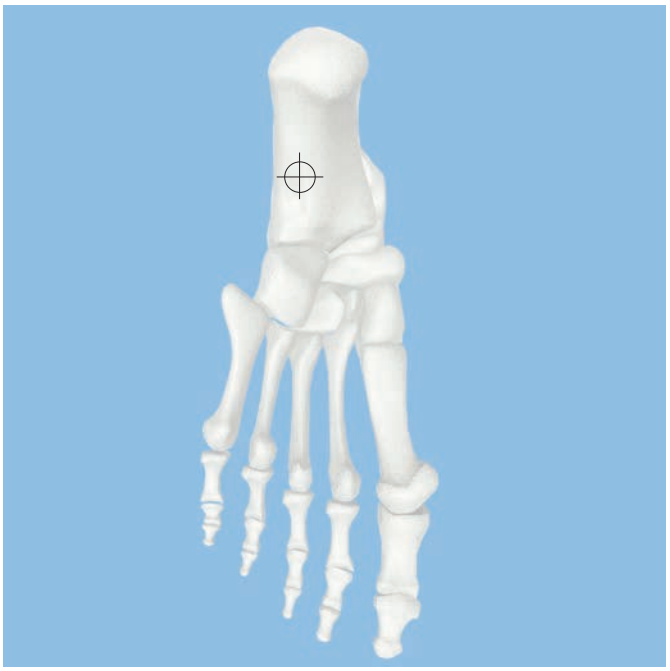
Instrument	
03.010.115	Guide Wire ∅ 3.2 mm, length 290 mm

The entry site is in line with the tibial canal and the lateral column of the calcaneus.

Using a C-arm, identify the center of the tibial canal by placing a 3.2 mm guide wire along the canal. Draw a line.

Palpate the center of the lateral column of the calcaneus. Draw a line.

The entry point is located at the intersection of these two lines; the incision should be in line with the longitudinal axis of the foot.

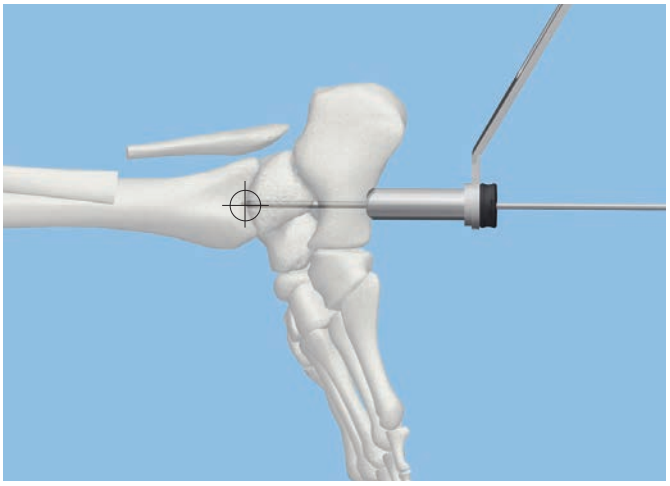


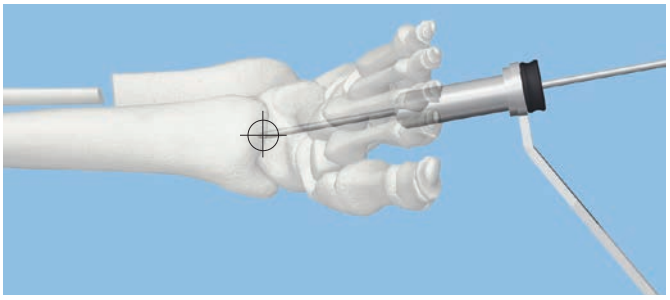
4
Insert guide wire through calcaneus and talus

Instruments	
03.010.115	Guide Wire ∅ 3.2 mm, length 290 mm
357.127	Protection Sleeve 13.0
357.128	Drill Sleeve 13.0/3.2, with trocar tip

Thread the drill sleeve into the protection sleeve. Insert this assembly through the incision to the bone. Hold the protection sleeve firmly and insert the 3.2 mm guide wire through the drill sleeve. Under power, insert the guide wire through the center of the lateral column of the calcaneus up to the center of the talar dome.

Direct the guide wire so it exits the talus in the center of the articular surface in both AP and ML views.



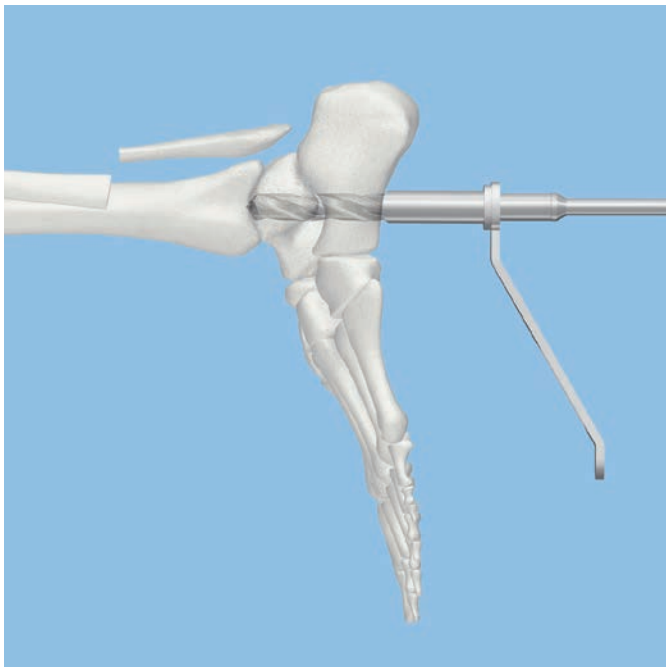


5
Open the canal

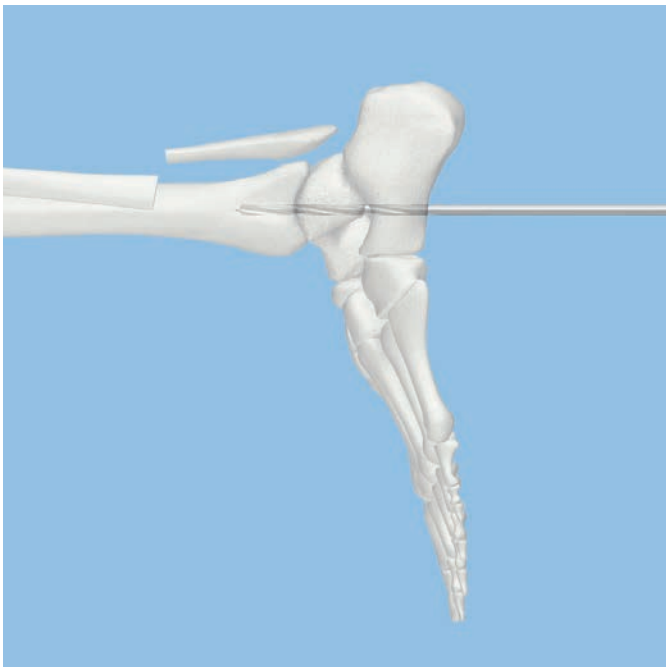
Instruments	
351.270	Drill Bit ∅ 13.0 mm, cannulated, length 290 mm, 3-flute
357.127	Protection Sleeve 13.0
03.008.008	Drill Bit ∅ 5.0 mm, calibrated, length 365 mm, 3-flute, for Quick Coupling, for No. 03.010.066

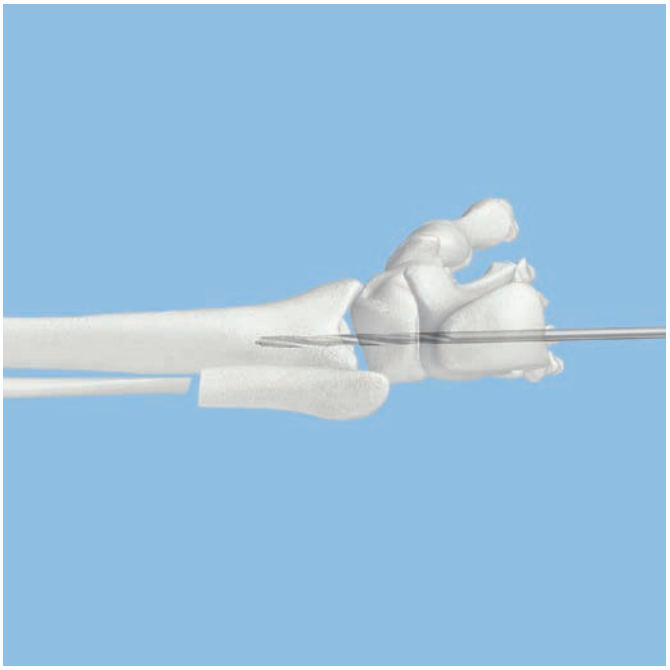
Remove the drill sleeve from the protection sleeve. Place the 13.0 mm cannulated drill bit over the guide wire and through the protection sleeve to the bone. Drill through the calcaneus and talus.

Remove the 3.2 mm guide wire.



Invert the hindfoot and insert the 5.0 mm drill bit through the canal created in the calcaneus and talus. Under image intensifier control, center the drill point under the tibial canal in both the AP and lateral planes. Use the drill to create a defect in the subchondral bone to allow passage of the reaming rod.





Reaming (recommended)

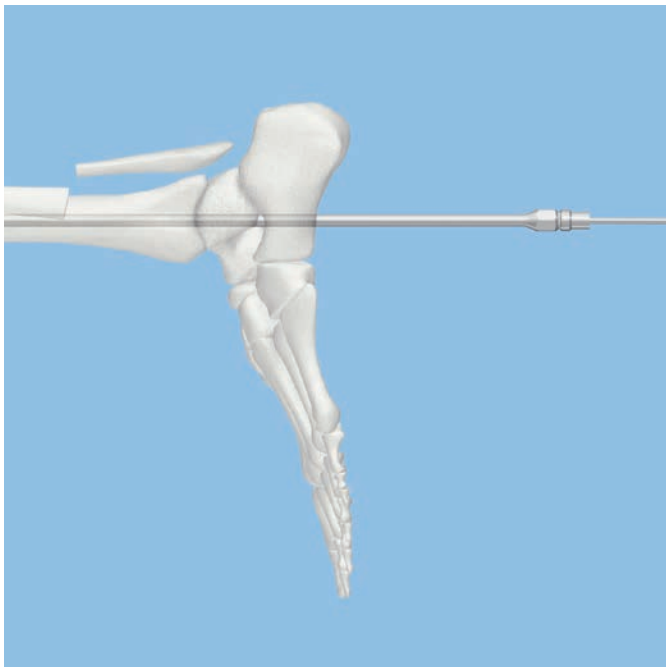
Reaming (recommended)

Instruments	
189.060	SynReam Intramedullary Reaming System
393.100	Universal Chuck with T-Handle
352.032S	SynReam Reaming Rod ∅ 2.5 mm, short, length 950 mm*

Insert reaming rod
Insert the reaming rod through the calcaneus and talus into the medullary canal of the tibia.

Ream
Keep the foot inverted and starting with the 8.5 mm reaming head, ream in 0.5 mm increments to a diameter of 1 mm larger than the nail diameter. Advance the reamer with steady, moderate pressure and do not force it. Partially retract the reamer often to clear debris from the medullary canal.

Note: All Expert Hindfoot Arthrodesis Nails can be inserted over the 2.5 mm reaming rod with ball tip. Reaming rod exchange is not required.



Optional Technique

Instrument	
352.033S	SynReam Reaming Rod ∅ 2.5 mm, long, length 1150 mm*
03.010.093	Rod Pusher for Reaming Rod

Use the rod pusher to help retain the reaming rod during reamer extraction.

* Available nonsterile or sterile packed. For nonsterile products remove "S" from the article number.

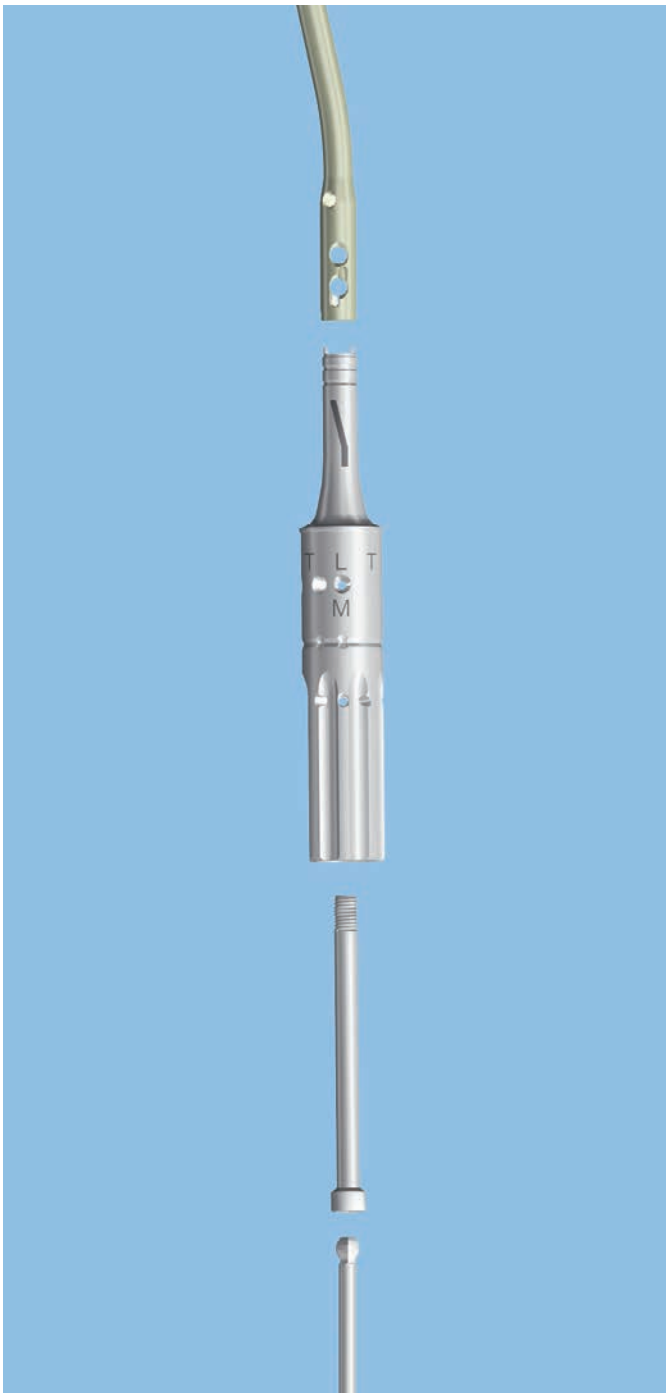
1
Assemble insertion instruments

Instruments	
03.008.007	Insertion Handle
03.010.042 or 03.010.146	Connecting Screw, long, cannulated Connecting Screw, cannulated, with Internal M6x1 Thread
03.010.092	Screwdriver, hexagonal with spherical head ∅ 8.0 mm

Orient the nail so that it matches the nail diagram on the insertion handle.

Match the tang on the handle to the notch in the Expert Hindfoot Arthrodesis Nail. Place the connecting screw into the insertion handle and thread it into the nail using the 8 mm hex screwdriver.

The aligned tangs will interface properly only if the nail bend is oriented toward the flat portion of the insertion handle.



2
Inserting the nail

Instruments	
03.008.005	Connector
03.008.007	Insertion Handle
03.010.056	Combined Hammer 700 g
321.170	Pin Wrench ∅ 4.5 mm, length 120 mm

Verify reduction and alignment under image intensification.

Note: While inserting the nail, the flat portion of the insertion handle should be facing laterally.

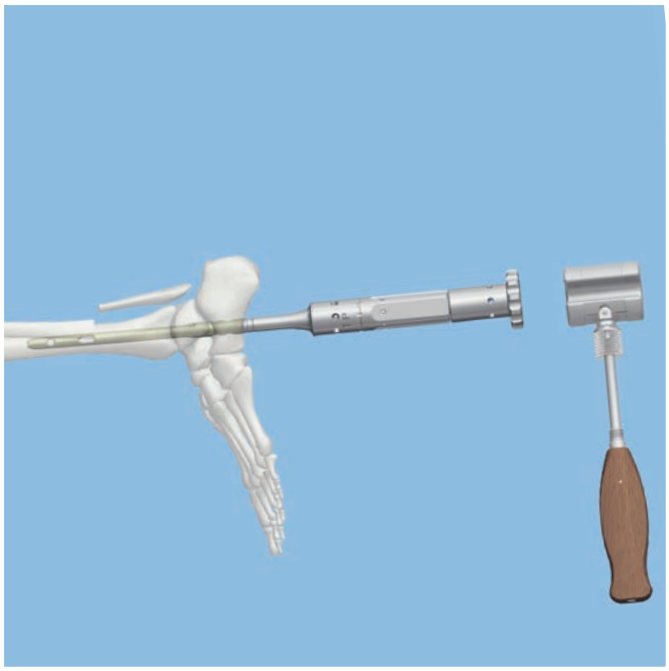
Using a twisting motion, insert the nail over the reaming rod as far as possible. Use the insertion assembly to manipulate the nail across the joints. Insert the nail until its instrumented end is flush with the calcaneal opening.

If needed, use light, controlled hammer blows to seat the nail. Thread the connector onto the insertion handle. Lock the head of the combined hammer in place, using the 4.5 mm pin wrench to tighten the nut onto the threads below the hammer head. Strike the connector directly.

Confirm that the nail has aligned the foot anatomically.

Once the nail is seated, remove the driving cap.

Note: The nail depth should be determined by optimal position of the most critical locking option, i.e. spiral blade position or medial column screw.



Optional Technique

Instrument	
357.220	Hammer Guide

The hammer guide can be threaded into the connector and the hammer can be used as a slide hammer. Loosen the nut from the threads below the hammer head and secure onto the threads located above the handle.

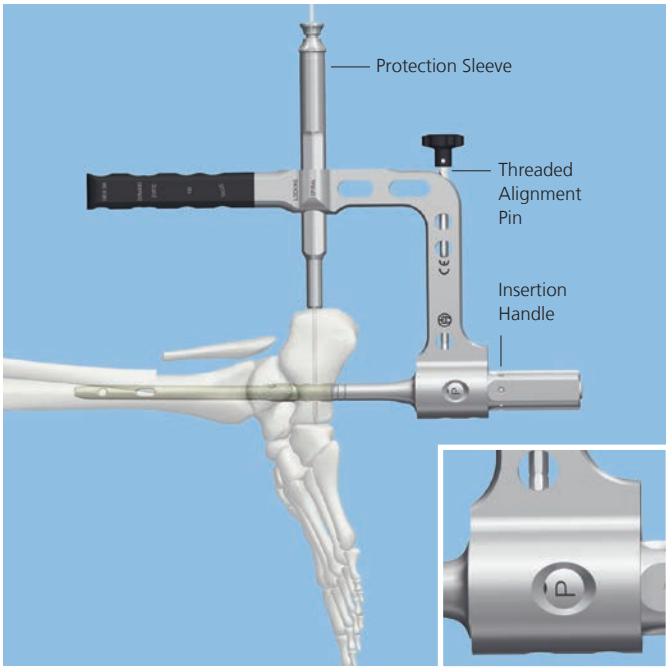
Notes

- Distal locking first is recommended, to allow later compression across joints being fused.
- Standard distal locking consists of two 6.0 mm locking screws. **If the spiral blade is used, refer to page 19 for the technique.**
- Optimal talar navicular screw placement will dictate nail depth and rotation. If this is determined to be a critical screw, the distal locking procedure may be started with this screw. However, it should be understood that this method limits calcaneus locking elements positioning.

1

Confirm nail and screw position

Instruments	
03.008.002	Protection Sleeve 18.0/8.0, length 188 mm
03.008.009	Aiming Arm
03.008.004	Threaded Alignment Pin
03.010.064	Drill Sleeve 8.0/3.2
03.010.069	Trocar ∅ 3.2 mm
357.399	Guide Wire ∅ 3.2 mm, length 400 mm



Insert the alignment pin into the aiming arm
Attach the aiming arm to the insertion handle. Orient the aiming arm so the letter "P", for posterior, can been seen on the insertion handle. Tighten the threaded alignment pin.

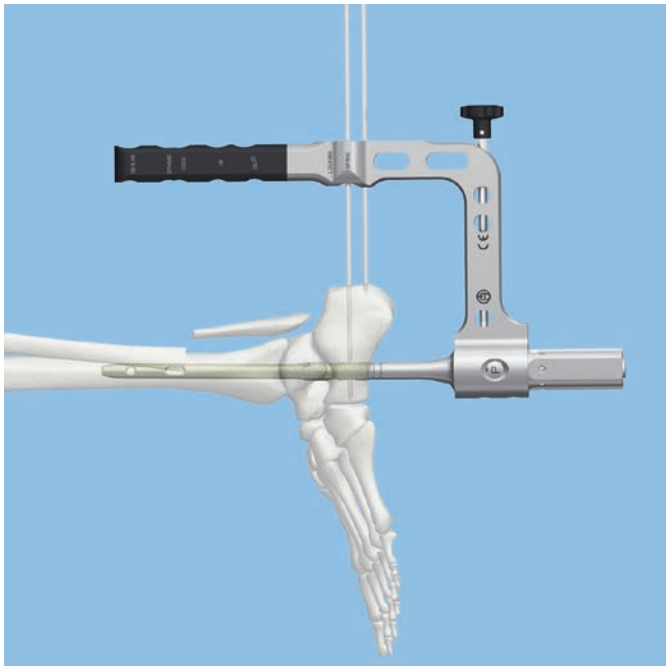
Insert trocar combination
Insert the three-part trocar combination (protection sleeve, corresponding drill sleeve and trocar) through the most inferior hole of the aiming arm. Make a stab incision and insert the trocar to the bone. Remove the Trocar.

Verify nail insertion depth and location by inserting a 400 mm guide wire through the drill sleeve into the bone. Confirm guide wire position radiographically. This position will determine the final position of the most distal locking screw.

2
Maintain aiming arm in position

Instrument	
03.010.115	Guide Wire ∅ 3.2 mm, length 290 mm

Insert a second 290 mm guide wire under power through the hole in the aiming arm. This will maintain aiming arm position through the initial locking screw insertion.

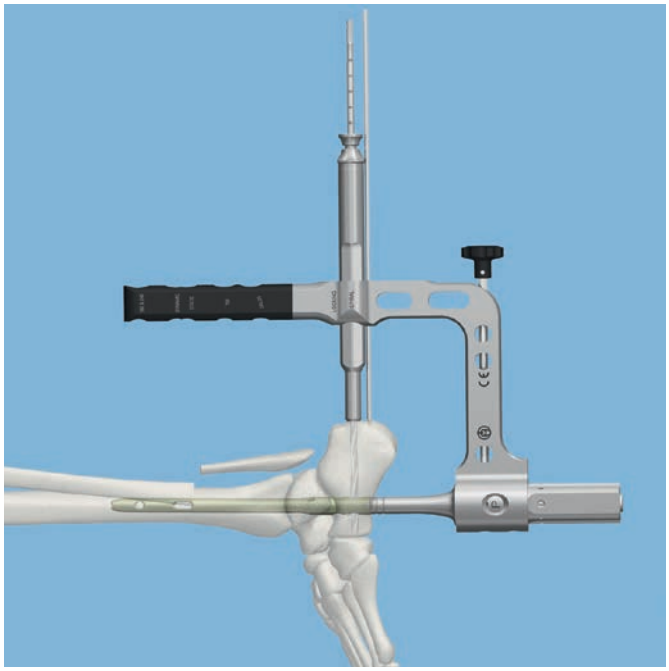


3
Drill and determine locking screw length

Instruments	
03.008.002	Protection Sleeve 18.0/8.0, length 188 mm
03.008.008	Drill Bit ∅ 5.0 mm, calibrated, length 365 mm, 3-flute, for Quick Coupling
03.010.066	Drill Sleeve 8.0/5.0
03.010.071	Trocar ∅ 5.0 mm

Remove initial guide wire to allow for screw predrilling. Insert the drill sleeve 8.0/5.0 into the protection sleeve.

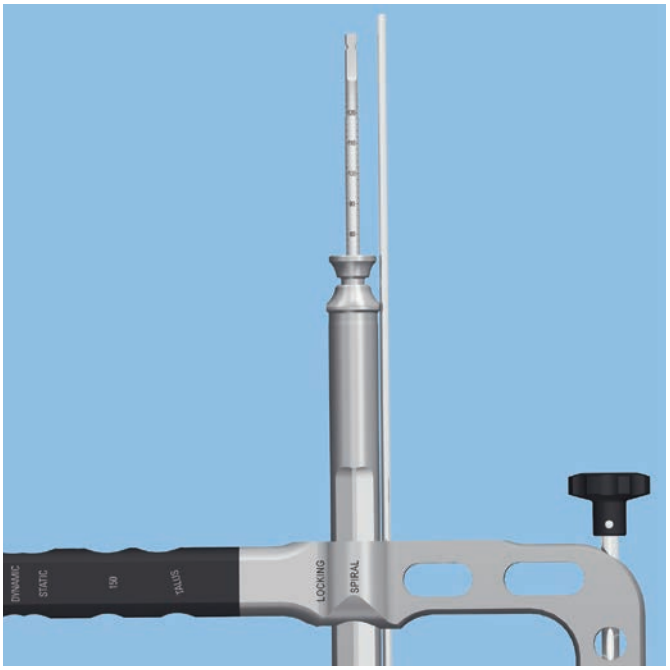
Drill through the calcaneus using the 5.0 mm drill bit until the tip of the drill bit reaches the far cortex.



Confirm drill bit position radiographically.

Ensure that the drill sleeve is pressed firmly to the bone and read the locking screw length directly from the drill bit, at the back of the drill sleeve.

Remove the drill bit and drill sleeve.



Alternative instrument

03.010.072	Depth Gauge for Locking Screws, measuring range up to 110 mm

After drilling through the calcaneus, remove the drill bit and the drill sleeve.

Disassemble the depth gauge into two parts: the outer sleeve and the measuring device with hook. Insert the measuring device into the protection sleeve. Make sure that the hook grasps the far cortex and that the protection sleeve is flush to the bone.

Read the measurement from the back of the protection sleeve, which indicates the appropriate length locking screw.

4
Insert most distal 6 mm locking screw

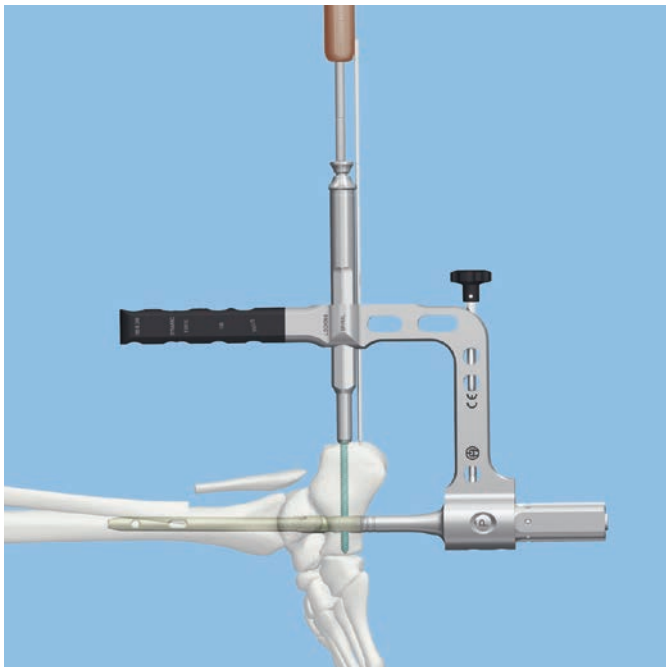
Instruments	
311.431	Handle with Quick Couping
03.008.002	Protection Sleeve 18.0/8.0, length 188 mm
03.010.109	Screwdriver Stardrive, T25, length 280 mm, for Quick Coupling

Insert the appropriate length 6.0 mm locking screw through the protection sleeve using the Stardrive screwdriver.

Verify locking screw length under image intensification.

Remove the 3.2 mm aiming arm stabilization wire.

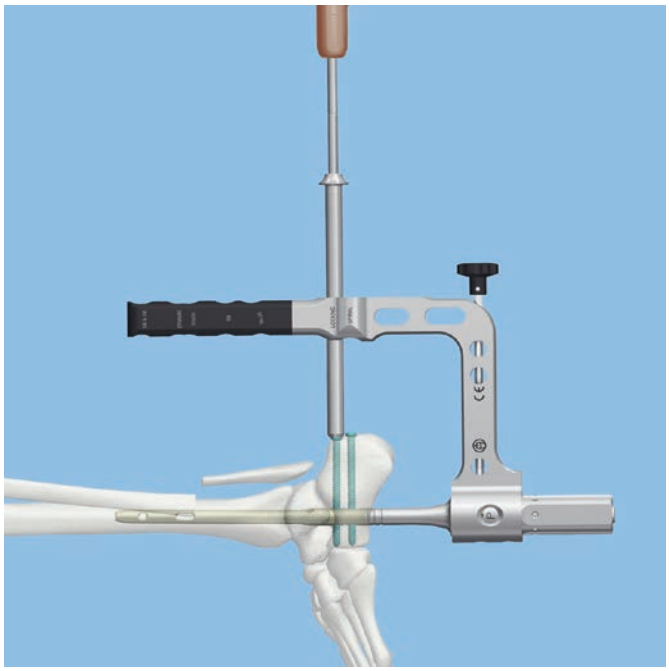
Alternative instrument	
03.010.108	Screwdriver Stardrive, T25, length 330 mm



5
Insert second distal 6 mm locking screw

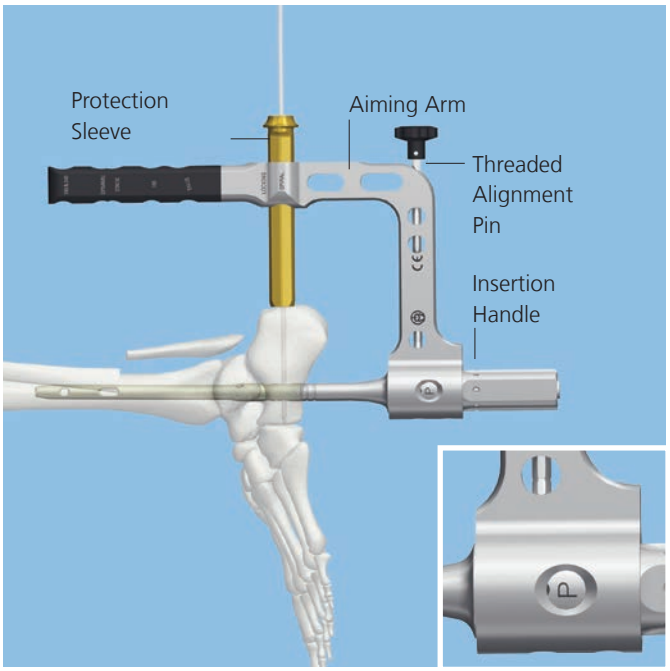
Instrument	
03.010.063	Protection Sleeve 12.0/8.0, length 188 mm

Repeat the procedure for a second distal locking screw, using the protection sleeve 12.0/8.0.



1
Confirm nail and spiral blade position

Instruments	
03.008.009	Aiming Arm
03.008.004	Threaded Alignment Pin
03.010.081	Protection Sleeve 15.0/13.0, for Spiral Blade Locking, yellow
03.010.082	Drill Sleeve 13.0/3.2, yellow
03.010.115	Guide Wire ∅ 3.2 mm, length 290 mm



Partially thread the alignment pin into the aiming arm.

Attach the aiming arm to the insertion handle. Orient the aiming arm so the letter "P", for posterior, can been seen on the insertion handle. Tighten the threaded alignment pin.

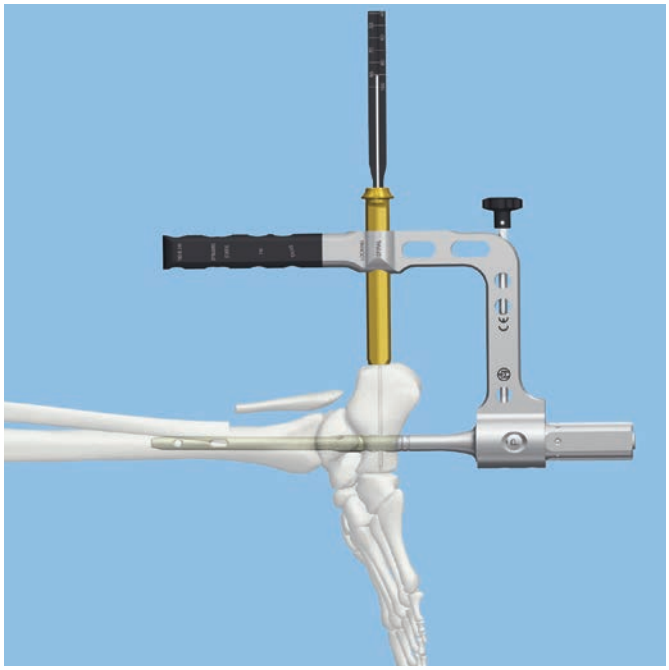
Assemble the protection sleeve and drill sleeve and insert the sleeve assembly into the aiming arm. Create a posterior incision and advance the sleeve to the bone.

Insert a guide wire through the drill sleeve into the calcaneus until the tip is flush with the anterior cortex. Confirm wire position radiographically. This position will determine the final position of the spiral blade.

2
Measure for spiral blade length

Instrument	
03.010.083	Depth Gauge for Spiral Blades

Remove the drill sleeve. Place the depth gauge over the guide wire and advance it to the bone. Read the graduation of the measuring device at the end of the guide wire. This measurement is the length of the spiral blade.

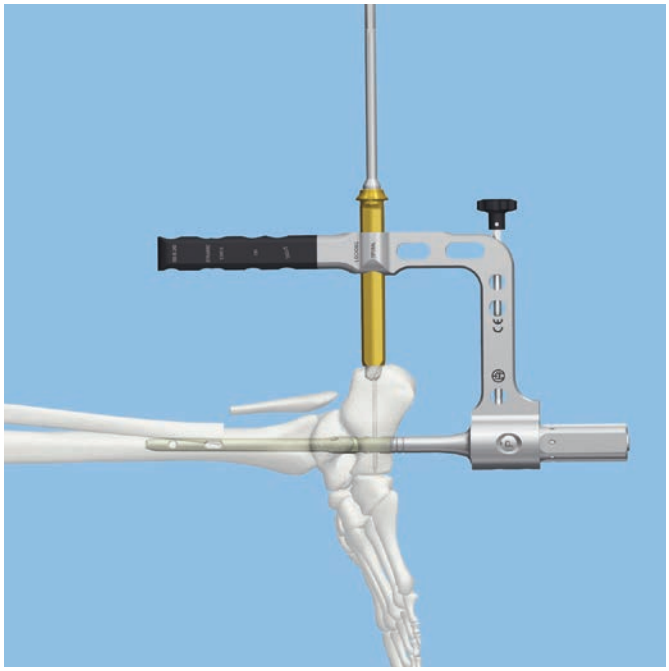


3
Open posterior cortex

Instrument	
351.270	Drill Bit ∅ 13.0 mm, cannulated, length 290 mm, 3-flute

Make an incision to split the Achilles tendon before inserting the spiral blade, to prevent damage to the soft tissue and risk of necrosis.

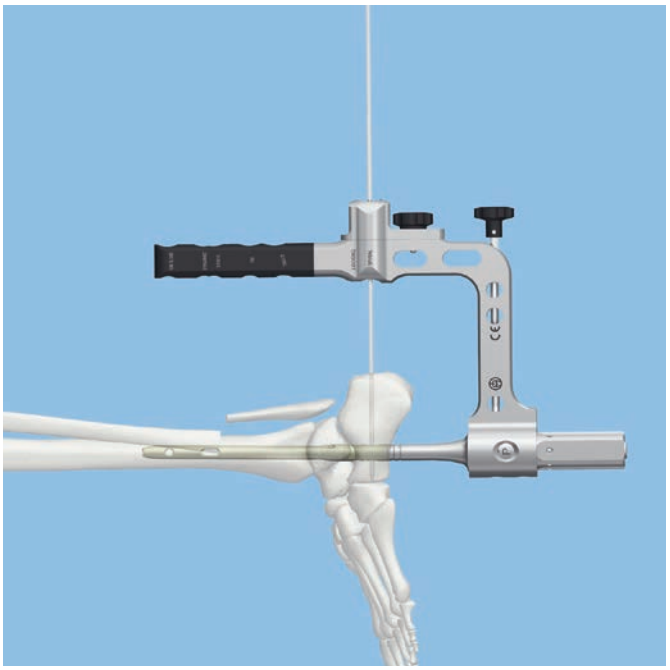
Insert the cannulated drill bit over the guide wire and through the protection sleeve to perforate the posterior cortex. An automatic stop prevents the drill bit from penetrating too far. Remove the drill bit and protection sleeve.



4
Attach adapter

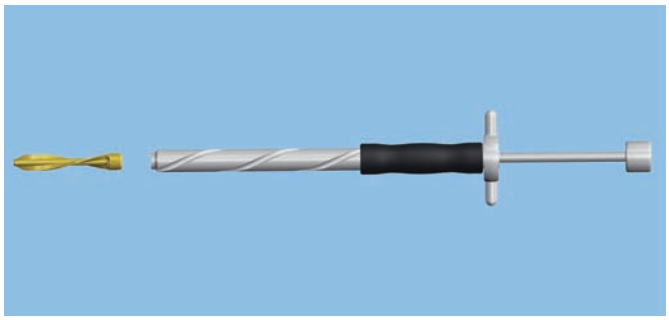
Instrument	
03.008.010	Aiming Adapter for Expert Hindfoot Arthrodesis Nail, for No. 03.008.009

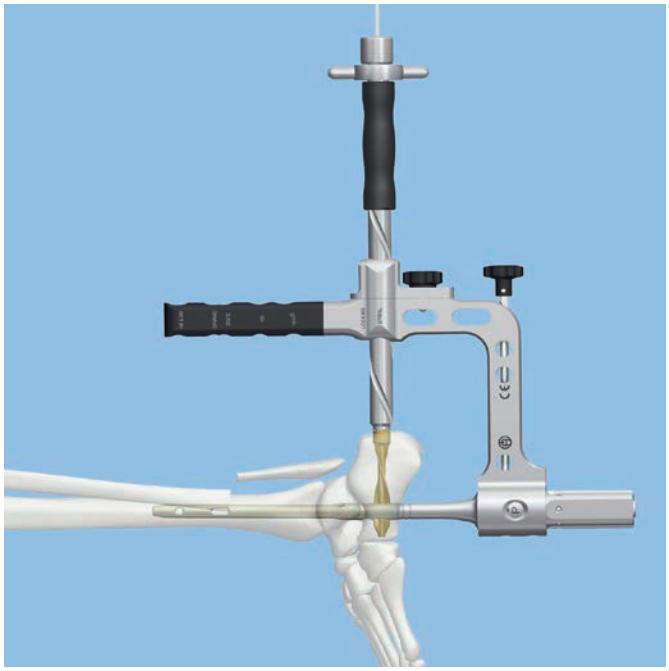
Attach the aiming arm adapter.



5
Insert the spiral blade

Instruments	
03.010.056	Combined Hammer 700 g
03.008.011	Spiral Inserter for Spiral Blade Insertion
357.340	Connecting Screw for Spiral Blade
03.008.010	Aiming Adapter for Expert Hindfoot Arthrodesis Nail, for No. 03.008.009





Attach the appropriate length spiral blade to the spiral inserter using the connecting screw.

Pass the spiral blade assembly over the guide wire. Advance the spiral inserter through the aiming arm, ensuring engagement of the inserter's helical grooves with the mating pins of the aiming arm.

Manually advance the spiral blade to the bone. Use light, controlled blows of the combined Hammer in a fixed position to seat the spiral blade. Advancement should be monitored radiographically.

The correct insertion depth is reached when the spiral blade head is flush with the posterior cortex.

Remove connecting screw and spiral inserter.

Remove the 3.2 mm guide wire.

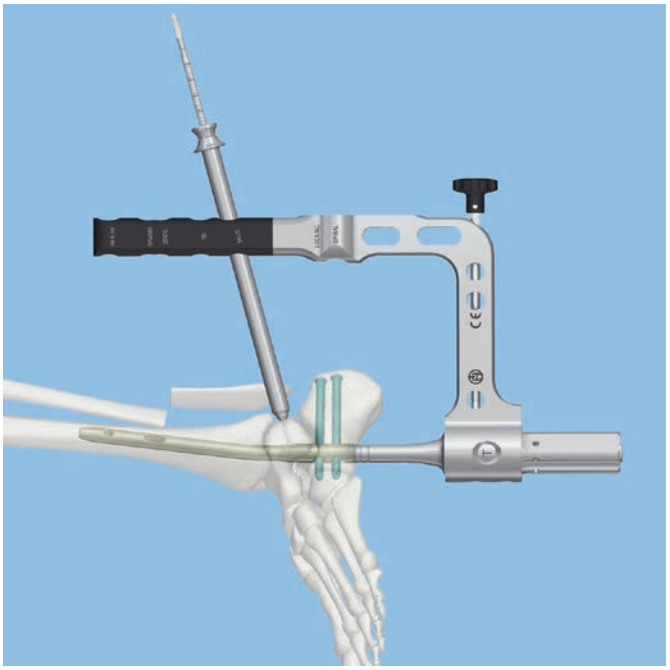
6
Insert second distal 6 mm locking screw (optional)

Follow the standard locking procedure with the protection sleeve 12.0 / 8.0, if insertion of a second distal locking element is desired.

1

Drill and determine length of talar locking screw

Instruments	
03.008.009	Aiming Arm
03.008.004	Threaded Alignment Pin
03.008.005	Connector
03.010.056	Combined Hammer 700 g
03.010.061	Drill Bit ∅ 4.2 mm, calibrated, length 340 mm, 3-flute, for Quick Coupling
03.010.063	Protection Sleeve 12.0/8.0, length 188 mm
03.010.065	Drill Sleeve 8.0/4.2
03.010.070	Trocar ∅ 4.2 mm



If compression across the subtalar joint is desired, thread the connector to the insertion handle and use light hammer blows until the gap is sufficiently reduced. .

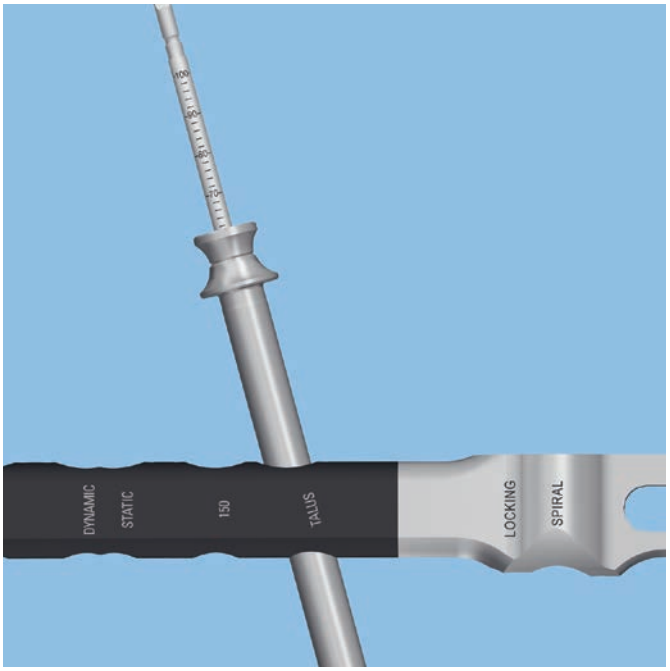
Loosen the threaded alignment pin and rotate the aiming arm laterally so the letter “T”, for talus, can be seen on the insertion handle.

Insert the three-part trocar combination (protection sleeve, drill sleeve and trocar) into the aiming arm and through a stab incision to the bone. Remove the trocar.

Drill to the anterior side of the talus, using the 4.2 mm drill bit. Confirm drill bit position radiographically.

Ensure that the drill sleeve is pressed firmly to the bone and read the locking screw length directly from the drill bit at the back of the drill sleeve.

Remove the drill bit.



Alternative instrument

03.010.072	Depth Gauge for Locking Screws, measuring range up to 110 mm

After drilling through the talus, remove the drill bit and the drill sleeve.

Disassemble the depth gauge into two parts: the outer sleeve and the measuring device with hook. Insert the measuring device into the protection sleeve. Ensure that the hook grasps the far cortex and the protection sleeve is flush to the bone. Read the measurement from the back of the protection sleeve, which indicates the appropriate length locking screw.

2
Insert talar screw

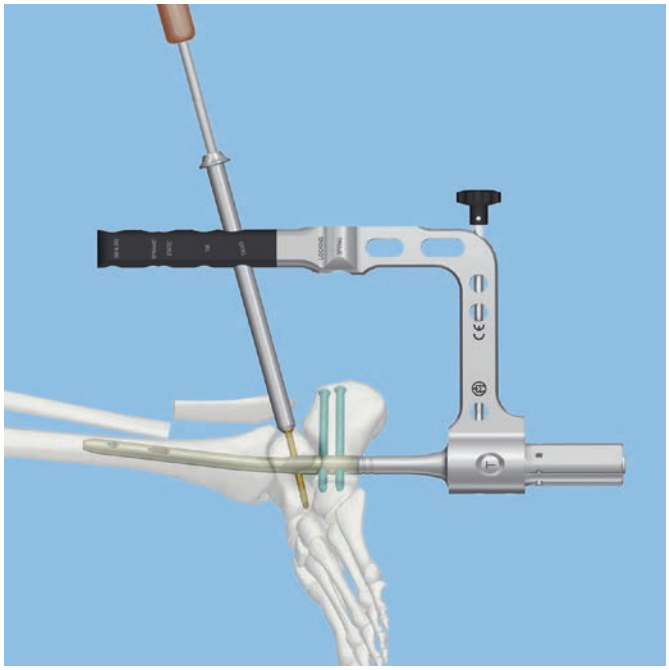
Instruments

03.010.063	Protection Sleeve 12.0/8.0, length 188 mm
03.010.109	Screwdriver Stardrive, T25, length 280 mm
311.431	Handle with Quick Coupling

Insert the appropriate locking screw through the protection sleeve using the Stardrive screwdriver.

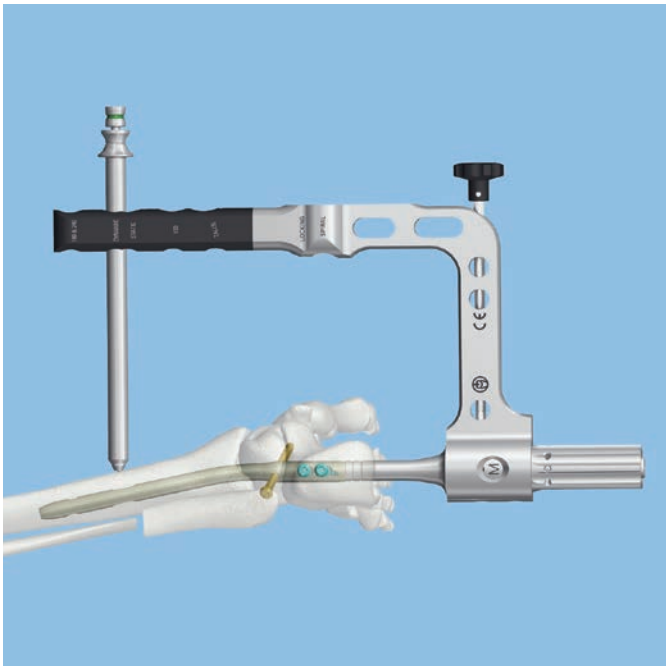
Verify locking screw length under image intensification.

Note: If starting with talar screw, please refer to page 15 of the surgical guide for calcaneus locking screws or page 19 for spiral blade positioning.



1
Drill and determine length of proximal screw

Instruments	
03.008.009	Aiming Arm
03.008.004	Threaded Alignment Pin
03.008.005	Connector
03.008.007	Insertion Handle
03.010.056	Combined Hammer 700 g
03.010.061	Drill Bit ∅ 4.2 mm, calibrated, length 340 mm, 3-flute, for Quick Coupling
03.010.063	Protection Sleeve 12.0/8.0, length 188 mm
03.010.065	Drill Sleeve 8.0/4.2
03.010.070	Trocar ∅ 4.2 mm



If compression across the ankle joint is desired, thread the connector into the insertion handle and use light hammer blows until the gap is sufficiently reduced.

Orient the aiming arm so the letter “M” for medial or “L” for lateral can be seen on the insertion handle.

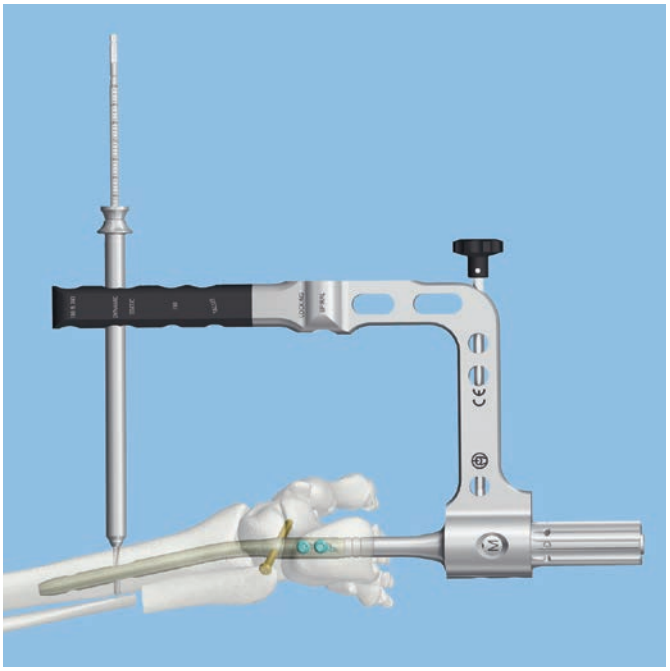
Tighten the alignment pin.

Choose the screw position (in the static hole or in the dynamic slot). The dynamic slot controlles dynamization of the bone fragments.

Insert the protection sleeve, drill sleeve and trocar assembly into the aiming arm and through a stab incision to the bone.

Remove the trocar.

Drill through both cortices using the calibrated drill bit, stopping the drill immediately after penetrating the far cortex. Confirm drill bit position radiographically.



Ensure that the drill sleeve is pressed firmly to the bone and read the locking screw length directly from the drill bit at the back of the drill sleeve.

Remove the drill bit and drill sleeve.

Alternative instrument	
03.010.072	Depth Gauge for Locking Screws

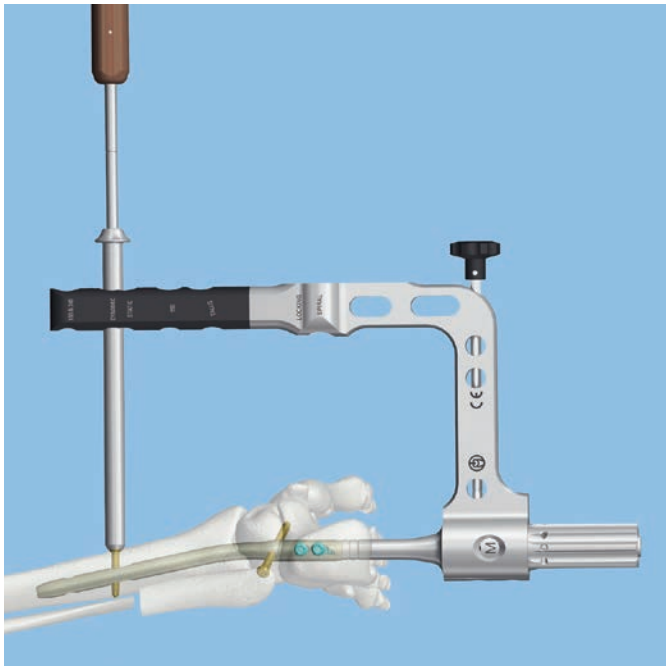
Measure screw length as described above using the depth gauge.

2
Insert proximal screws

Instruments	
03.010.063	Protection Sleeve 12.0/8.0, length 188 mm
03.010.109	Screwdriver Stardrive, T25, length 280 mm
311.431	Handle with Quick Coupling

Insert the appropriate length locking screw through the protection sleeve using the Stardrive screwdriver. Verify locking screw length under image intensification.

Repeat the procedure for a second proximal locking screw if desired.



End Cap Insertion

1
Insert end cap

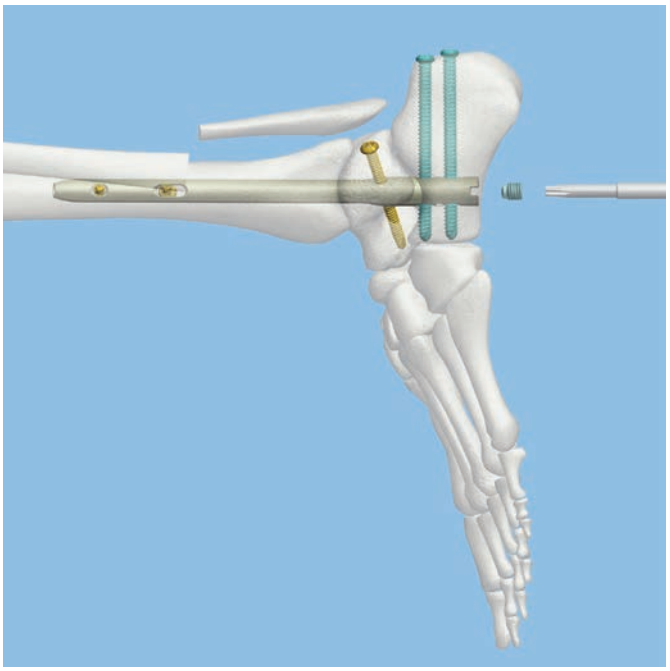
Instrument	
03.010.109	Screwdriver Stardrive, T25, length 280 mm
311.431	Handle with Quick Coupling

Remove the nail insertion instruments.

For locking screws, insert the aqua end cap with the Stardrive screwdriver.

For spiral blade, insert the gold end cap with the Stardrive screwdriver.

Turn the end cap clockwise to thread it into the nail until it engages the distal screw.

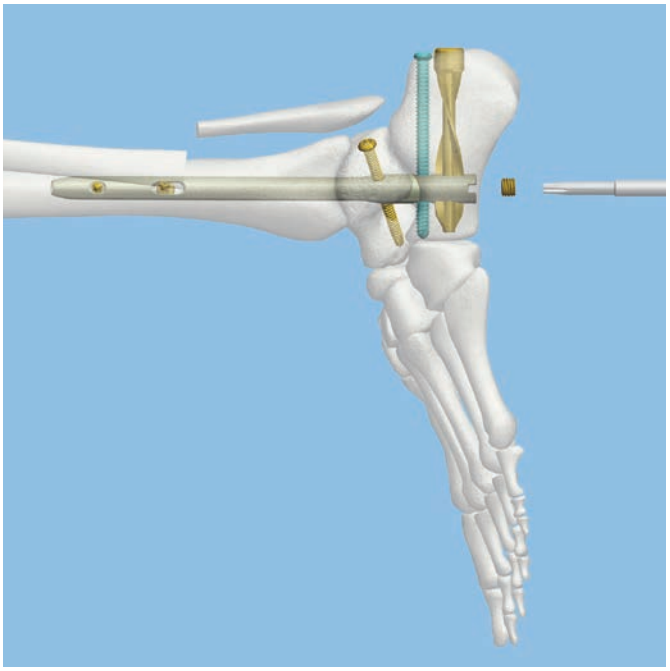


Technique Tip: To minimize the chance of cross-threading, turn the end cap counterclockwise until the threads of the end cap align with the threads of the nail.

Fix the fibula (optional)

Instruments	
310.250	Drill Bit ∅ 2.5 mm, Lenght 110/85 mm
310.350	Drill Bit ∅ 3.5 mm, Lenght 110/85 mm
311.431	Handle with Quick Coupling
312.280	Double Drill Guide 3.5/2.5
314.030	Screwdriver, hexagonal, small, ∅ 2.5 mm

Fix the fibula as a live biological plate using two 3.5 mm cortex screws.

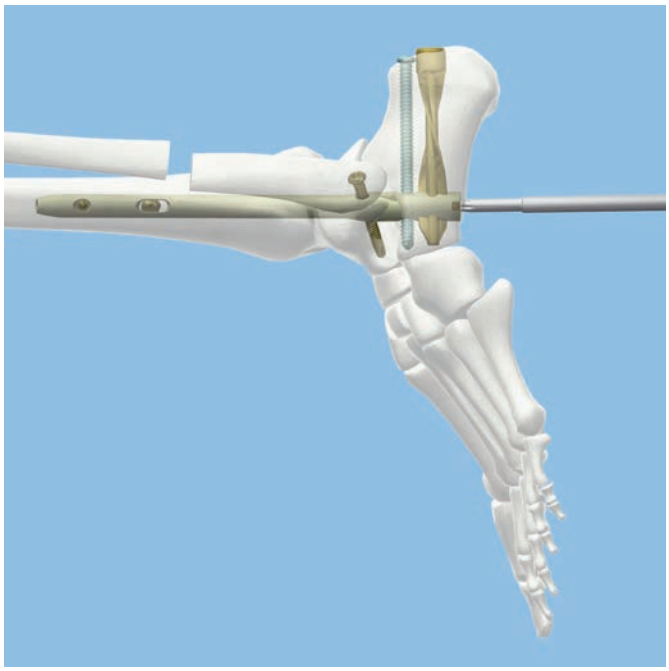


Implant Removal (optional)

1
Remove end cap

Instrument	
03.010.109	Screwdriver Stardrive, T25, length 280 mm
311.431	Handle with Quick Coupling

Clear the Stardrive recess of the end cap and the locking implants of any tissue ingrowth. Remove the end cap using the Stardrive screwdriver.



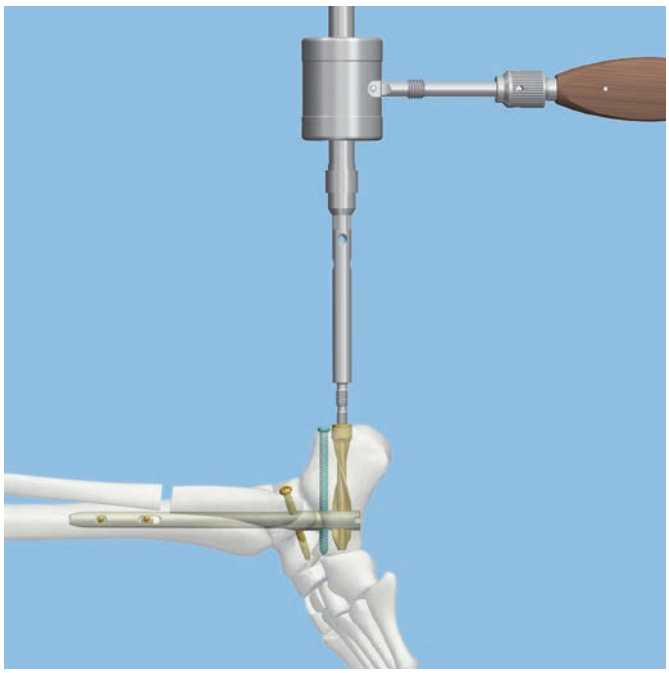
2
Remove the spiral blade

Instruments	
03.010.056	Combined Hammer 700 g, can be mounted
321.170	Pin Wrench ∅ 4.5 mm, length 120 mm
357.220	Hammer Guide
357.360	Extraction Screw for Spiral Blade

Thread the extraction screw into the hub of the spiral blade.

Thread the hammer guide into the extraction screw. Use controlled blows of the combined hammer to extract the spiral blade.

Leave a loose grip on the extraction assembly, as it and the blade rotate during extraction.

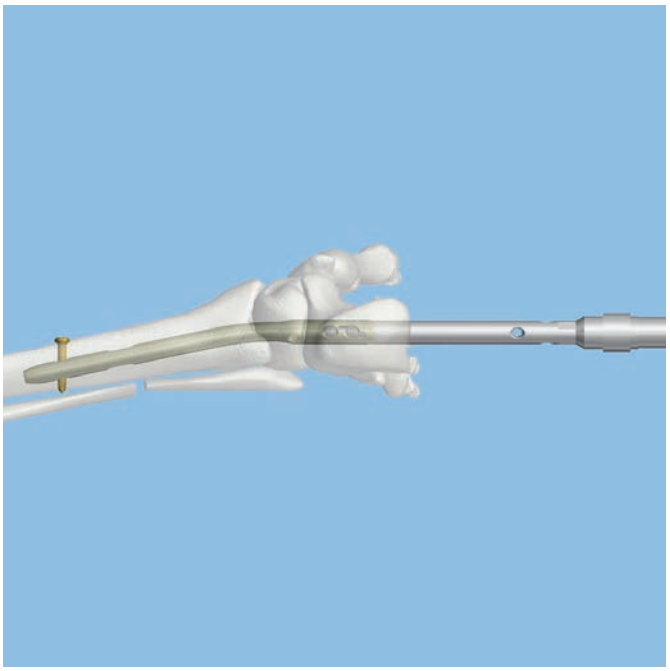


3
Remove locking screws

Instrument	
03.010.109	Screwdriver Stardrive, T25, length 280 mm
311.431	Handle with Quick Coupling
357.360	Extraction Screw for UFN/CFN and Spiral Blade

Remove all but the most proximal locking screw.

Attach the extraction screw to the nail.



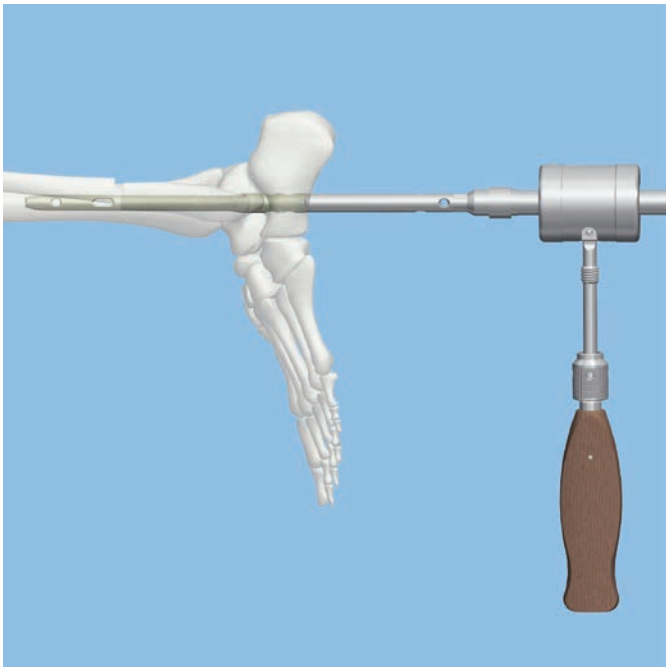
4
Remove nail

Instruments	
03.010.056	Combined Hammer 700 g, can be mounted
321.170	Pin Wrench ∅ 4.5 mm, length 120 mm
357.22	Hammer Guide, for Slide Hammer
357.360	Extraction Screw

Attach the hammer guide to the extraction screw.

Remove the last locking screw.

Extract the nail by applying gentle blows with the hammer.



Implant Specifications

Expert Hindfoot Arthrodesis Nail
- Right and left designs
- Cannulated for use over all Synthes 2.5 mm/3.0 mm ball-tipped reaming rods
- 12° lateral bend

Material
- Titanium-6% aluminum-7% niobium alloy

Diameters
- 10 mm, 12 mm and 13 mm
- 10 mm and 12 mm nails have a 12.5 mm distal diameter
- 13 mm nails have a 13 mm distal diameter

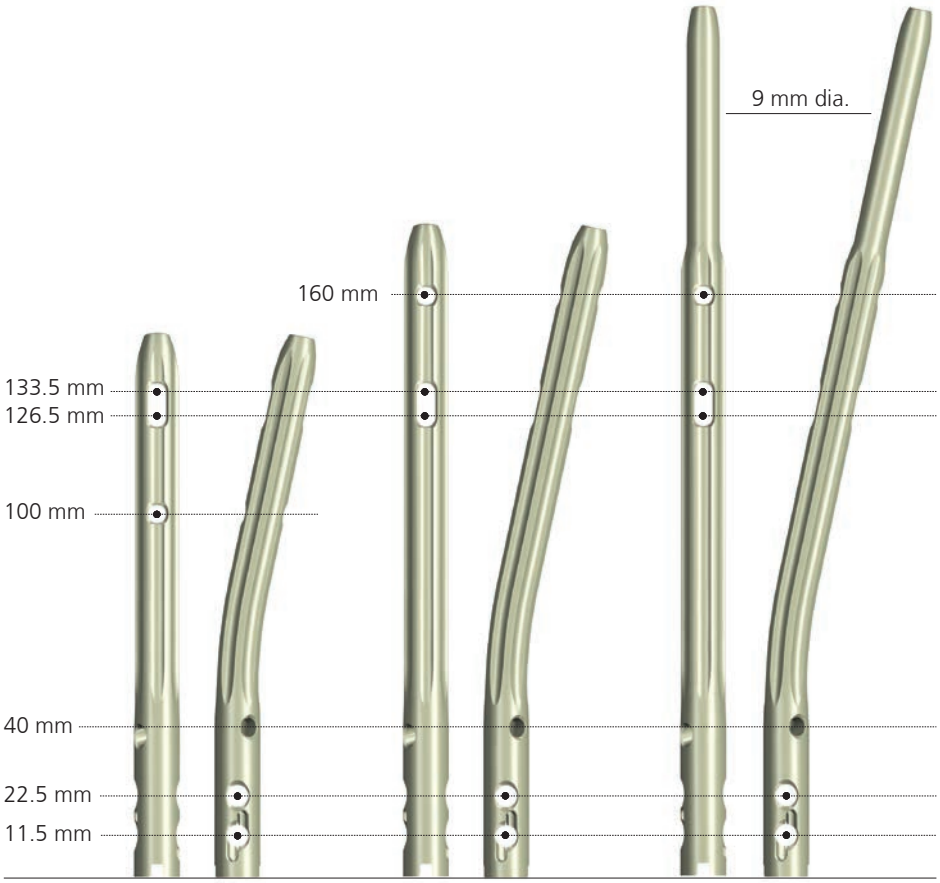
Color
- Light green

Lengths
- 150 mm, 180 mm and 240 mm

Cross section
- 10 mm nails are round
- 12 mm and 13 mm nails are fluted
- 240 mm length nails have a 9 mm proximal diameter

Proximal locking
- Fully targeted from lateral or medial side
- Dynamization slot (5.0 mm locking screw)
- Static transverse locking hole (5.0 mm locking screw)

Distal locking
- Static oblique locking (5.0 mm locking screw)
- Static transverse locking (6.0 mm locking screw)
- Spiral blade slot (spiral blade or 6.0 mm locking screw)



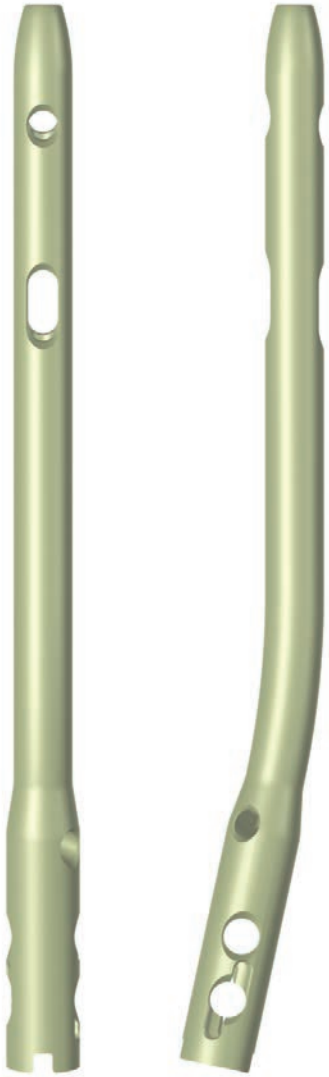
Implants

Expert Hindfoot Arthrodesis Nails
Sterile only

	Right	Left
Length (mm)	∅ 10 mm	∅ 10 mm
150	04.008.010S	04.008.060S
180	04.008.016S	04.008.066S
240	04.008.028S	04.008.078S

Length (mm)	∅ 12 mm	∅ 12 mm
150	04.008.210S	04.008.260S
180	04.008.216S	04.008.266S
240	04.008.228S	04.008.278S

Length (mm)	∅ 13 mm	∅ 13 mm
150	04.008.310S	04.008.360S
180	04.008.316S	04.008.366S
240	04.008.328S	04.008.378S



5.0 mm Locking Screws (light green)
Nonsterile and sterile*

- Titanium alloy**
- 4.3 mm core diameter
- Stardrive T25 recess
- Fully threaded
- Self-tapping, blunt tip

	Length (mm)		Length (mm)
04.005.516	26	04.005.548	58
04.005.518	28	04.005.550	60
04.005.520	30	04.005.552	62
04.005.522	32	04.005.554	64
04.005.524	34	04.005.556	66
04.005.526	36	04.005.558	68
04.005.528	38	04.005.560	70
04.005.530	40	04.005.562	72
04.005.532	42	04.005.564	74
04.005.534	44	04.005.566	76
04.005.536	46	04.005.568	78
04.005.538	48	04.005.570	80
04.005.540	50	04.005.575	85
04.005.542	52	04.005.580	90
04.005.544	54	04.005.585	95
04.005.546	56	04.005.590	100

* Available nonsterile or sterile-packed. For sterile products add suffix "S" to article number.
** Titanium-6% aluminum-7% niobium alloy

6.0 mm Locking Screws (aqua)
Unsterile and sterile*

- Titanium alloy***
- 4.8 mm core diameter
- Stardrive T25 recess
- Fully threaded
- Self-tapping, blunt tip

	Length (mm)		Length (mm)
04.005.616	26	04.005.654	64
04.005.618	28	04.005.656	66
04.005.620	30	04.005.658	68
04.005.622	32	04.005.660	70
04.005.624	34	04.005.662	72
04.005.626	36	04.005.664	74
04.005.628	38	04.005.666	76
04.005.630	40	04.005.668	78
04.005.632	42	04.005.670	80
04.005.634	44	04.005.675	85
04.005.636	46	04.005.680	90
04.005.638	48	04.005.685	95
04.005.640	50	04.005.690	100
04.005.642	52	04.005.691	105**
04.005.644	54	04.005.692	110**
04.005.646	56	04.005.693	115**
04.005.648	58	04.005.694	120**
04.005.650	60	04.005.695	125**
04.005.652	62		

* Available nonsterile or sterile-packed. For sterile products add suffix "S" to article number.
** Available sterile-packed only.
*** Ti-6Al-7Nb alloy

Spiral Blades (gold)
Non sterile and sterile*

- Titanium alloy**
- Cannulated for insertion over a 3.2 mm guide wire
- 12.5 mm blade diameter
- Front cutting end

	Length (mm)
04.013.041	45
04.013.042	50
04.013.043	55
04.013.044	60
04.013.045	65
04.013.046	70
04.013.047	75
04.013.048	80
04.013.049	85
04.013.050	90
04.013.051	95
04.013.052	100

* Available nonsterile or sterile-packed. For sterile products add suffix "S" to article number.
** Ti-6Al-7Nb alloy

End Cap (gold) for securing the spiral blade
Sterile only

- Titanium alloy*
- Mandatory to securely lock the spiral blade
- Sits flush with end of nail (no extension)
- Protects nail threads from tissue ingrowth

04.008.000S	For securing the spiral blade

End Cap (aqua) for securing the most distal locking screw
Sterile only

- Titanium alloy*
- Securely locks the most distal locking screw
- Sits flush with end of nail (no extension)
- Protects nail threads from tissue ingrowth

04.008.001S	For securing the most distal locking screw

* Ti-6Al-7Nb alloy

Instruments

03.008.001	Radiographic Ruler for Expert Hindfoot Arthrodesis Nail	
03.008.002	Protection Sleeve 18.0/8.0, length 188 mm	
03.008.004	Threaded Alignment Pin, for No. 03.008.009	
03.008.005	Connector for Expert Hindfoot Arthrodesis Nail, for No. 03.008.007	
03.008.007	Insertion Handle for Expert Hindfoot Arthrodesis Nail	
03.008.008	Drill Bit ∅ 5.0 mm, calibrated, length 365 mm, 3-flute, for Quick Coupling, for No. 03.010.066	

03.008.009	Aiming Arm for Expert Hindfoot Arthrodesis Nail, for No. 03.008.007	
03.008.010	Aiming Adapter for Expert Hindfoot Arthrodesis Nail, for No. 03.008.009	
393.100	Universal Chuck with T-handle	
03.010.042	Connecting Screw, long, cannulated, for Expert Femoral Nails, for No. 03.010.046	
or 03.010.146	Connecting Screw, cannulated, with Internal M6x1 Thread	
03.010.056	Combined Hammer 700 g, can be mounted, for No. 357.220	
03.010.061	Drill Bit ∅ 4.2 mm, calibrated, length 340 mm, 3-flute, for Quick Coupling, for No. 03.010.065	
03.010.063	Protection Sleeve 12.0/8.0, length 188 mm	

03.010.064	Drill Sleeve 8.0/3.2, for No. 03.010.063	
03.010.065	Drill Sleeve 8.0/4.2, for No. 03.010.063	
03.010.066	Drill Sleeve 8.0/5.0, for No. 03.010.063	
03.010.069	Trocar ∅ 3.2 mm, for No. 03.010.064	
03.010.070	Trocar ∅ 4.2 mm, for No. 03.010.065	
03.010.071	Trocar ∅ 5.0 mm, for No. 03.010.066	
03.010.072	Depth Gauge for Locking Screws, measuring range up to 110 mm, for No. 03.010.063	

03.010.081	Protection Sleeve 15.0/13.0, for Spiral Blade Locking, yellow	
03.010.082	Drill Sleeve 13.0/3.2, for No. 03.010.081, yellow	
03.010.083	Depth Gauge for Spiral Blades	
03.008.011	Spiral Inserter for Spiral Blade Insertion, for No. 03.010.051	
03.010.092	Screwdriver, hexagonal with spherical head ∅ 8.0 mm	
03.010.109	Screwdriver Stardrive, T25, length 280 mm, for Quick Coupling	
03.010.115	Guide Wire ∅ 3.2 mm, length 290 mm	

311.431	Handle with Quick Coupling	
321.170	Pin Wrench ∅ 4.5 mm, length 120 mm	
351.270	Drill Bit ∅ 13.0 mm, cannulated, length 290 mm, 3-flute, for Quick Coupling No. 511.760	
357.127	Protection Sleeve 13.0, for retrograde approach	
357.128	Drill Sleeve 13.0/3.2, with trocar tip, for retrograde approach, for No. 357.127	
357.220	Hammer Guide, for No. 357.250	

357.340	Connecting Screw for Spiral Blade for UFN/ CFN, for No. 357.310	
357.360	Extraction Screw for UFN/CFN and Spiral Blade	
357.398	Shaft, hexagonal, ∅ 8.0 mm, cannulated, short, length 125 mm	
357.399	Guide Wire ∅ 3.2 mm, length 400 mm	
321.160	Combination Wrench ∅ 11.0 mm	

Optional Instruments

310.250 310.350	Drill Bit ∅ 2.5 mm, length 110/85 mm Drill Bit ∅ 3.5 mm, length 110/85 mm	
314.116	Screwdriver Shaft Stardrive 3.5, T15, self-holding	
321.200	Ratchet Wrench for Nut, hexagonal, 11.0 mm	
312.280	Double Drill Guide 3.5/2.5	
314.030	Screwdriver Shaft, hexagonal, small, ∅ 2.5 mm	

* Available nonsterile or sterile-packed. For sterile product add suffix "S" to article number.

03.010.093	Rod Pusher for Reaming Rod with Hexagonal Screwdriver ∅ 8.0 mm	
03.010.108	Screwdriver Stardrive, T25, length 330 mm	
03.010.112	Holding Sleeve, with Locking Device	

Vario Case

01.008.006	Standard Instruments for Expert Hindfoot Arthrodesis Nail, in Vario Case
68.008.001	Vario Case for Instrument Set, for Expert Hindfoot Arthrodesis Nail, without Lid, without Contents
689.530	Lid (Stainless Steel), extra-large, for Vario Case
68.003.010	Vario Case for Locking Implants, for Expert Femoral Nails
68.003.010.02	Module for Spiral Blade for Expert Retrograde Femoral Nail in Vario Case, for No. 68.003.010*
68.003.010.05	Rack for Locking Screws Stardrive 5.0 mm, for Vario Case No. 68.003.010
68.003.010.06	Rack for Locking Screws Stardrive 6.0 mm, for Vario Case No. 68.003.010

* For Spiral Blades only. End Caps will be offered only sterile.

Power Tools

530.010	Power Drive, complete (2 Battery Casings, 2 Batteries and 2 Sterile Covers)
530.100	Power Drive
530.200	Battery for Power Drive
530.280	Battery Casing, for Power Drive, for No. 530.200
511.300	Radiolucent Drive
511.730	Chuck with Key, for Compact Air Drive and for Power Drive
511.750	AO/ASIF Quick Coupling, for Compact Air Drive and Power Drive
511.761	Quick Coupling for DHS/DCS Triple Reamers
511.785	Attachment for Acetabular and Medullary Reaming, for Compact Air Drive and Power Drive
511.790	Quick Coupling for Kirschner Wires ∅ 0.6 to 3.2 mm, for Compact Air Drive and for Power Drive

MRI Information

Torque, Displacement and Image Artifacts according to ASTM F 2213-06, ASTM F 2052-06e1 and ASTM F2119-07

Non-clinical testing of worst case scenario in a 3 T MRI system did not reveal any relevant torque or displacement of the construct for an experimentally measured local spatial gradient of the magnetic field of 3.69 T/m. The largest image artifact extended approximately 169 mm from the construct when scanned using the Gradient Echo (GE). Testing was conducted on a 3 T MRI system.

Radio-Frequency-(RF-)induced heating according to ASTM F2182-11a

Non-clinical electromagnetic and thermal testing of worst case scenario lead to peak temperature rise of 9.5 °C with an average temperature rise of 6.6 °C (1.5 T) and a peak temperature rise of 5.9 °C (3 T) under MRI Conditions using RF Coils [whole body averaged specific absorption rate (SAR) of 2 W/kg for 6 minutes (1.5 T) and for 15 minutes (3 T)].

Precautions: The above mentioned test relies on non-clinical testing. The actual temperature rise in the patient will depend on a variety of factors beyond the SAR and time of RF application. Thus, it is recommended to pay particular attention to the following points:

- It is recommended to thoroughly monitor patients undergoing MR scanning for perceived temperature and/or pain sensations.
- Patients with impaired thermo regulation or temperature sensation should be excluded from MR scanning procedures.
- Generally it is recommended to use a MR system with low field strength in the presence of conductive implants. The employed specific absorption rate (SAR) should be reduced as far as possible.
- Using the ventilation system may further contribute to reduce temperature increase in the body.

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