zimed®

Trauma | Arthroplasty | Sports Medicine | Bone Substitutes

PFNA SURGICAL TECHNIQUE

zimed®
Trauma | Arthroplasty | Sports Medicine | Bone Substitutes

CONTENS

zimed®
Trauma | Arthroplasty | Sports Medicine | Bone Substitutes

Lag Screw
Proximal Femoral Nail

PFN-A Intramedullary Nail
The PFN-A Nail is used in the treatment of unstable intertrochanteric fractures. Intertrochanteric femur fractures are common in the elderly population. This is because of osteoporosis. Due to the decrease in bone quality and deterioration of its microstructure, fractures often develop with very low-energy trauma

Lag is the most important feature of the nail. There are three types.
They come to the forefront with their features such as screw thread structures, compression, blade features and they have their own unique application forms.

Lag Screw
Can be used in low-energy unstable intertrochanteric fractures and in patients with non osteoporosis and younger

PFN-A Nail Technical Specifications
-Proximal diameter Ø16mm
-Distal diameter Ø10mm - Ø11mm - Ø12mm - Ø13mm - Ø14mm
-Proximal – Distal angle 5°
-Lag screw center angle 55° to proximal body
-Cannula diameter Ø3,7mm for all diameters of PFN-A nails
-Distal antirotation (Ø2,5mm X 25mm)
-Ø5mm locking screw dynamic locking screw

REF. NO	LENGTH
4582-0080	80
4582-0085	85
4582-0090	90
4582-0095	95
4582-0100	100
4582-0105	105
4582-0110	110
4582-0115	115
4582-0120	120

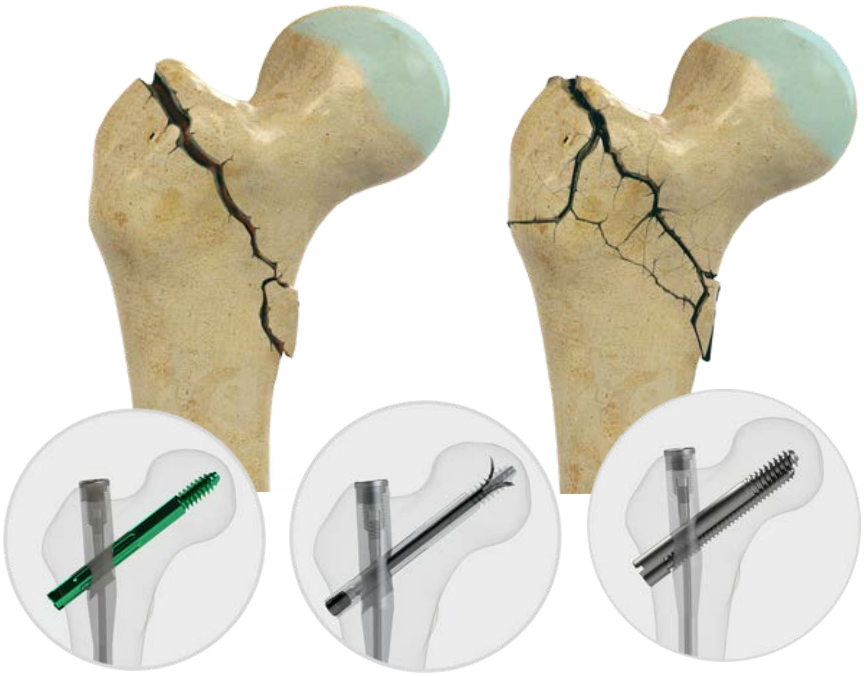
Fracture

Evan's classification system divides intertrochanteric fractures into stable and unstable fracture patterns. The distinction between stable and unstable fractures is based on the integrity of the posterior medial cortex. Other intertrochanteric fracture classifications are variations of Evan's classification, including AO.

In general, when the posterior medial cortex is fragmented, fractures are considered unstable due to the possibility of the fracture collapsing into varus and retroversion.(Fig.1)

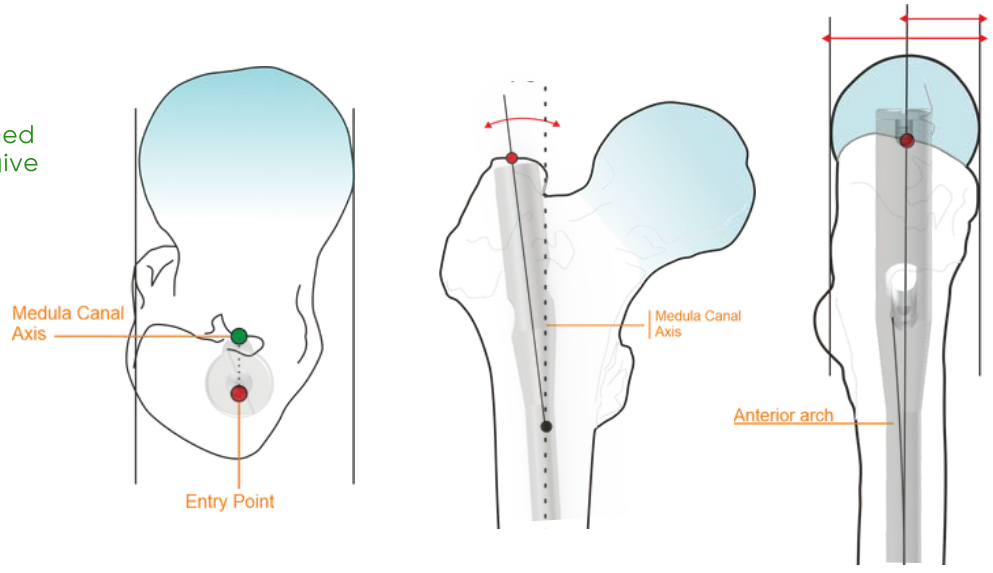
It is preferred in simple and complex intertrochanteric fractures.

Appropriate lag screw can be selected according to fracture severity and bone quality.



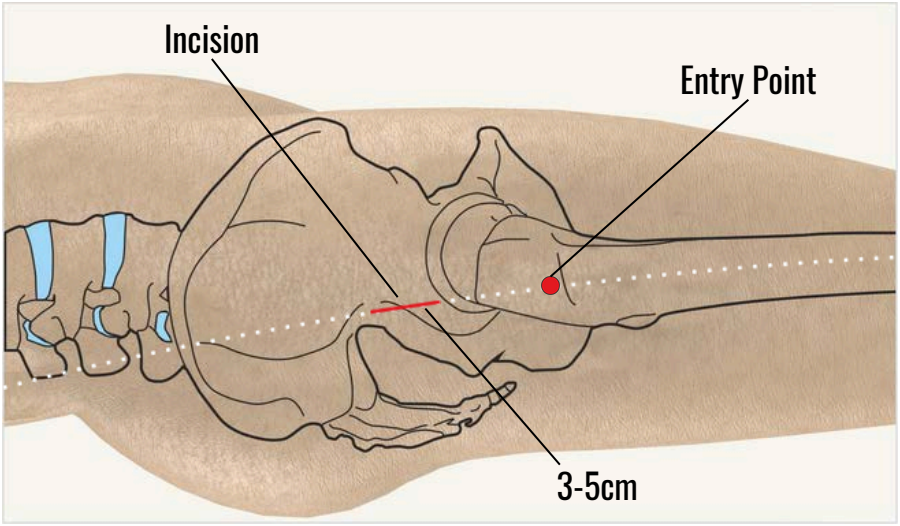
Entry Point

The design of the nail is designed according to the slope. It will give the appropriate angle when placed from the right point.

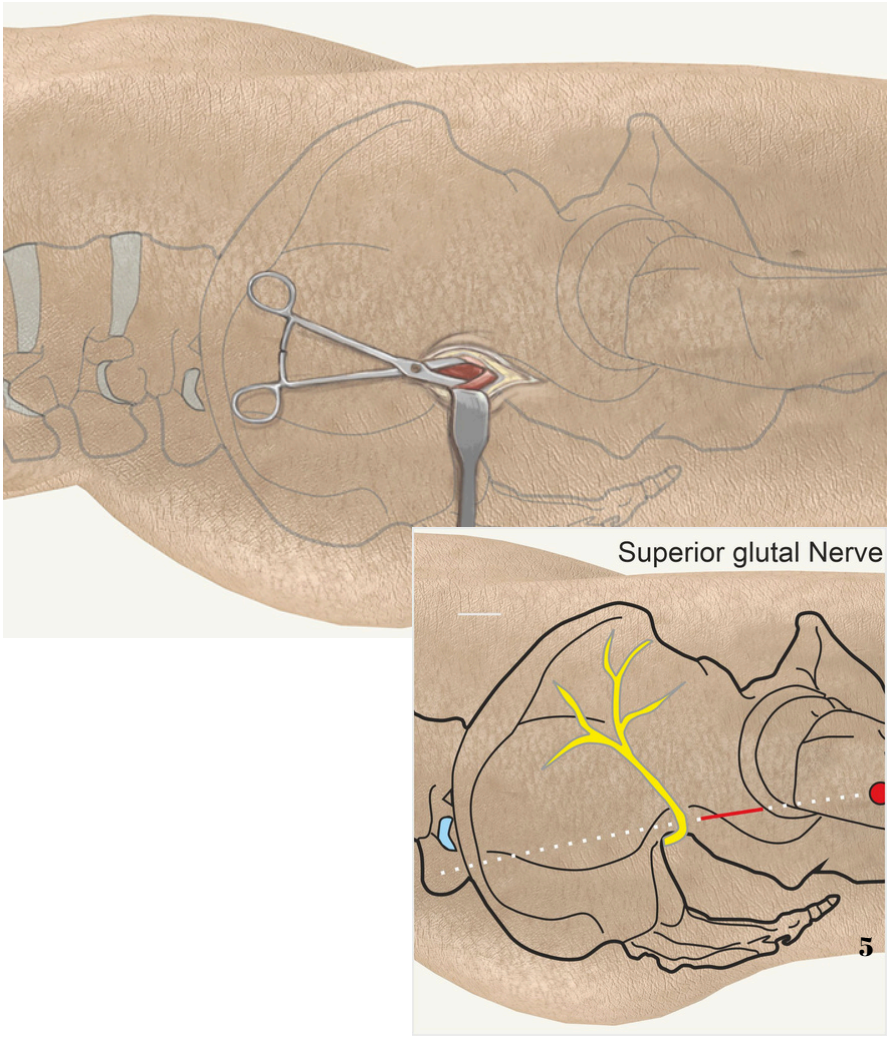


Approach

A 3-5 cm skin incision is made a few centimeters proximal to the tip of the greater trochanter. It is located in the proximal extension of the curved axis of the femoral shaft.



Pay attention to the systems that need attention



Opening the Proximal Femur

Kirschner Wire

Send the wire from the entry point you have determined with the motor.

Kirshner Wire
Two Type
Curved & Normal
Threaded

Proximal Drill Guide

Place the guide over the kirschner wire

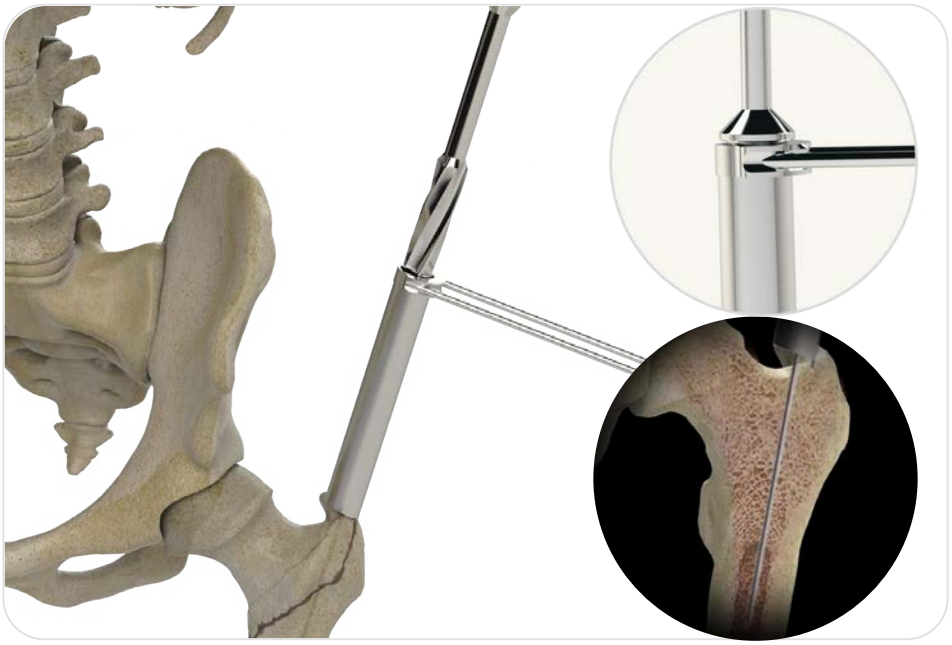
Proximal Drill Guide Handle
Below the carving process to preserve the tissues.
Ø17mm
Ref:9455-0051

Opening the Proximal Femur

Proximal Reamer

Insert the proximal reamer into the guide
Remaing up to the stoper on the reamer

Proximal Reamer
Ø17mm Cannulated Reamer
Ref:9455-0047



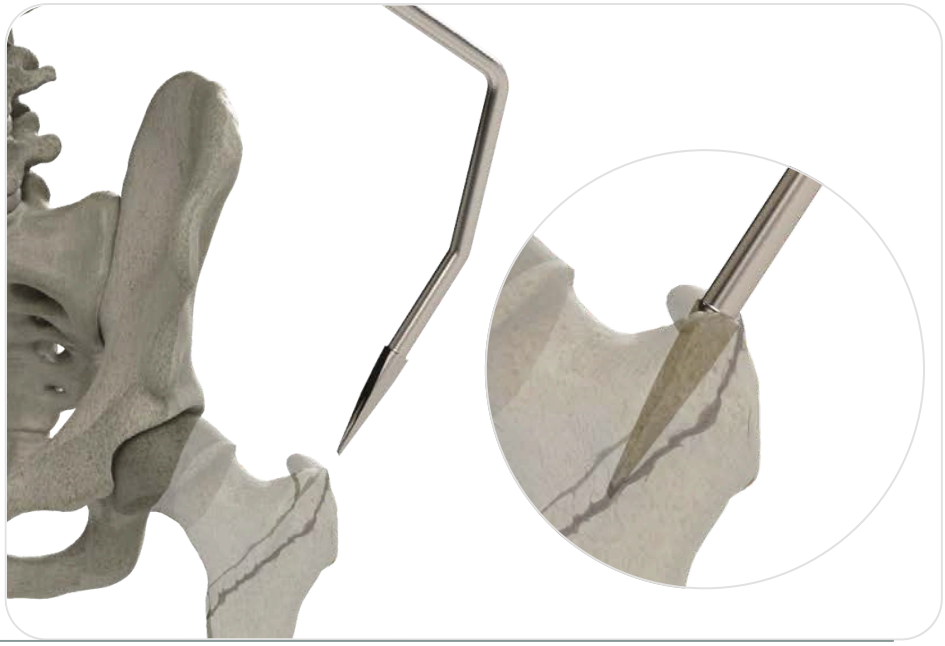
Remove proximal reamer, K wire, Guide

AWL For First Entry

Optional Option

Open the cortex with awl

AWL
Ø3.5mm
Ref:9455-0016



Guide Wire

Find the canal with guide wire

Gripper

AWL For First Entry

Optional Option

Remove Awl
Guide wire is stands in canal

Proximal Reamer

Insert the proximal reamer into the guide over guide wire Remaing up to the stoper on the reamer

Nail Insert

Preparing the nail

For the nail, the fracture is reduced and the channel is opened. The length of the nail was also determined. To be able to insert the nail into the canal, it must be combined with the holder. The connecting screw is attached to the holder . It is fixed with screwdriver

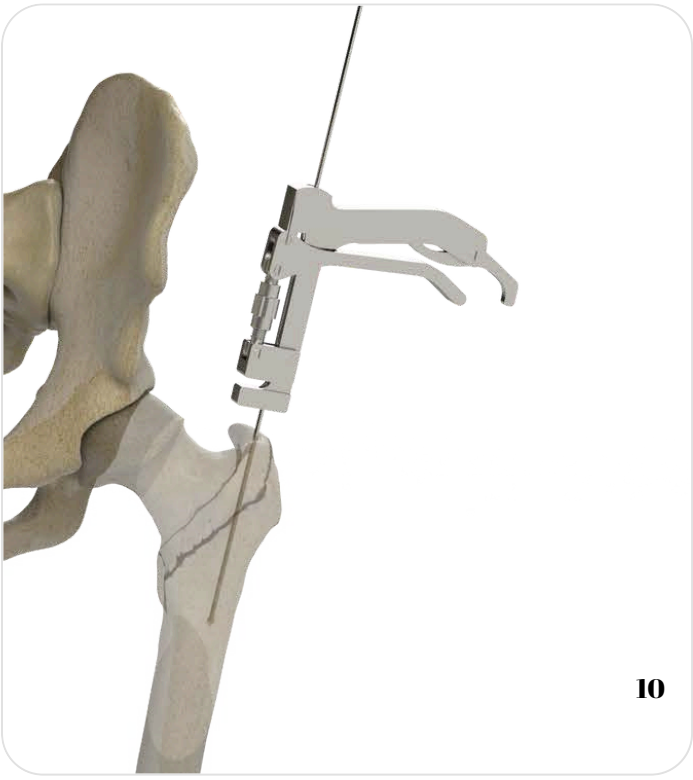
Targeting Device Handle
Ref:9455-0030

T Holder 8 Allen
Ref:9455-0018

Cannulated Targeting Connection Screw
M10xØ4.6x42.5mm
Ref:9455-0041

Guide wire

Attach it to the gripper with guide wire. Insert the guide wire through the opened inlet channel, and advance it through the opened channel.



zimed®
Trauma | Arthroplasty | Sports Medicine | Bone Substitutes

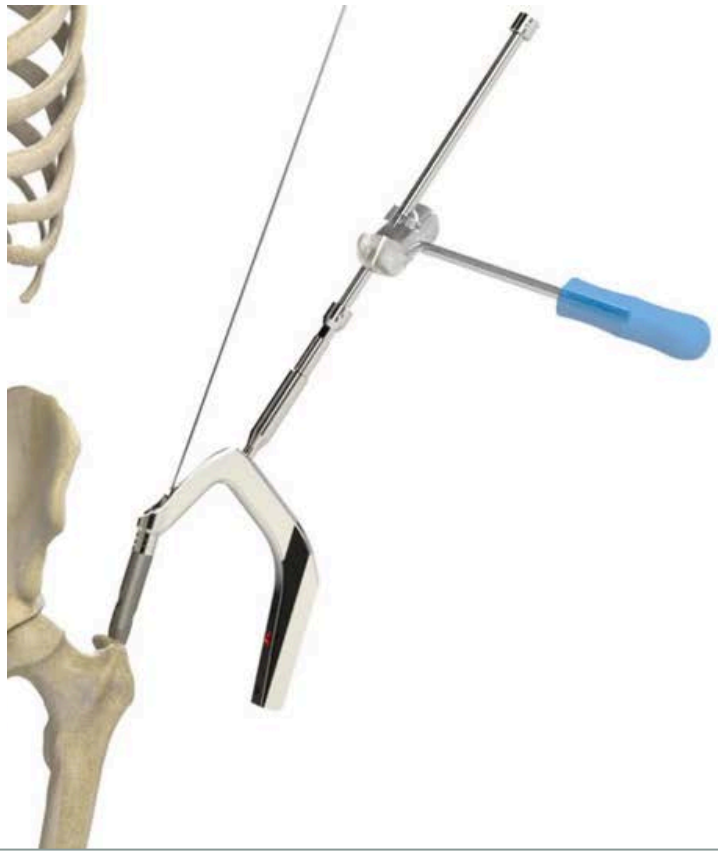
Inserting Nail

After it is attached to the holder the driving apparatus and the hammer swing shaft are combined. It's advanced in the channel with the help of hammer

Blue Handle Combination Hammer
Ref:9455-0032

Combined Hammer Shaft (Long)
Ref:9455-0043

Combined Hammer Shaft (Short)
Ref:9455-0044



Control

Check by inserting the Krischner wire into the holes on the guide. At this stage, you will also determine the size of the end cap that you will insert in the following stages.

Connection Devices

Attached insertion Handle
with Proximal Lag Screw
Targeting device handle

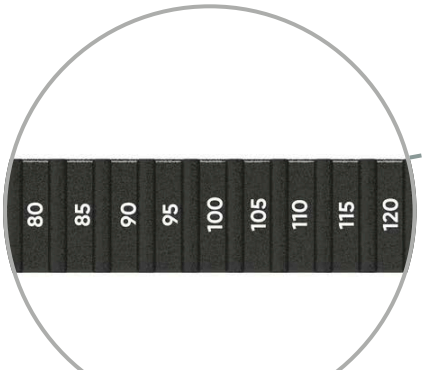
Lag Screw
Targeter Arm (CARBON)
Ref:9456-0002

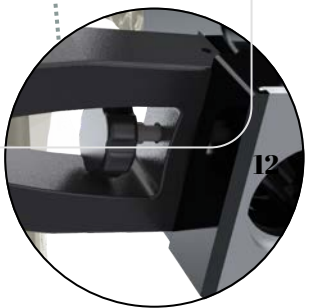
L A
Targeter Arm (CARBON)
Ref:9456-0002

Carbon Kishner Guide

Optional Device

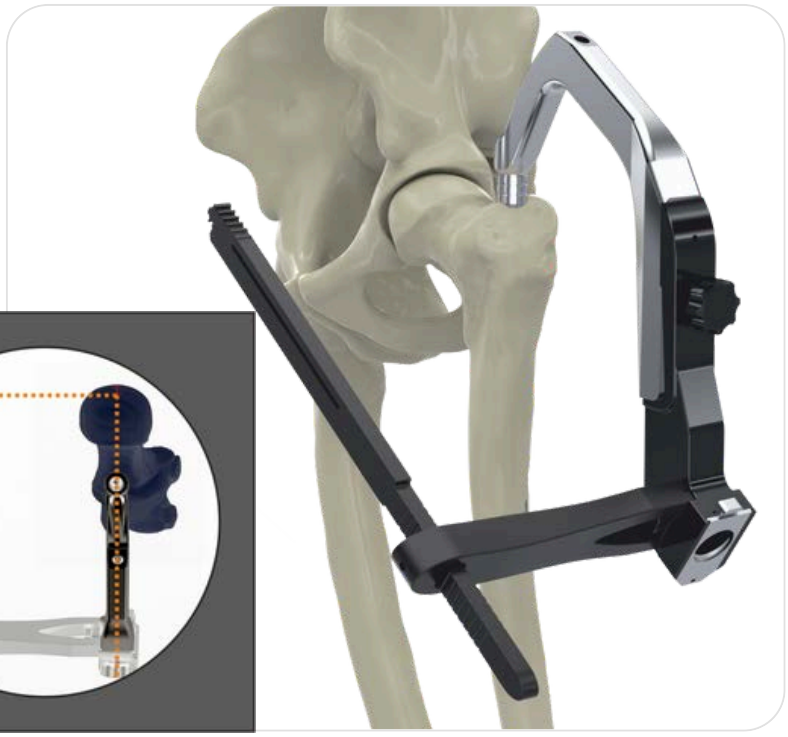
This optional product allows you to check in advance the length of the Lag screw and whether it will be in the right place with the Kirshner wire you will attach.

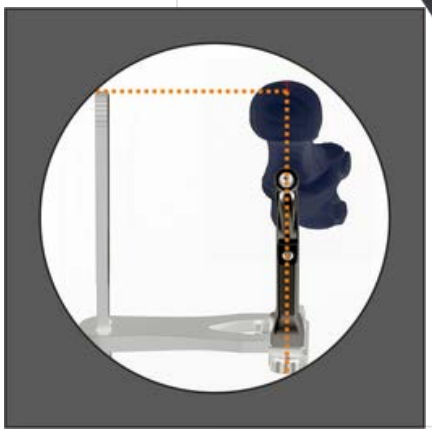




Carbon Kishner Guide

Optional Device





Preparing Lag screw

Lag Screw Guide Point Marker

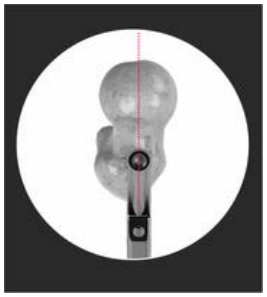
Insert the group sleeve and mark with the point maker and remove it

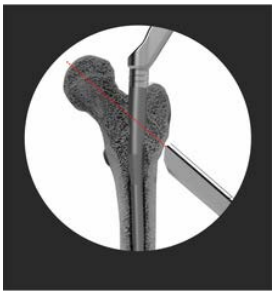
Preparing Lag screw

Lag Screw Guide
Kirschner Guide

Insert the Kirshner wire with motor

Remove Kirshner Sleeve Control under the image place of Kirchner wire. Right place important Beacuse Lag screw will send over this wire.





Lag Screw Guide
Kirschner Guide

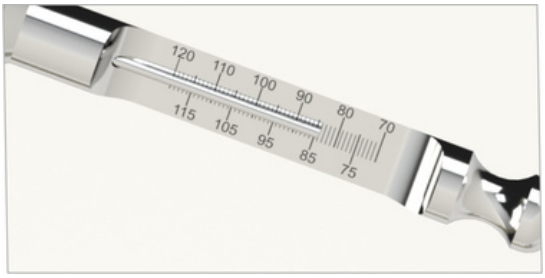
Use the Lag Screw gauge determine screw lenght over the Krishner wire

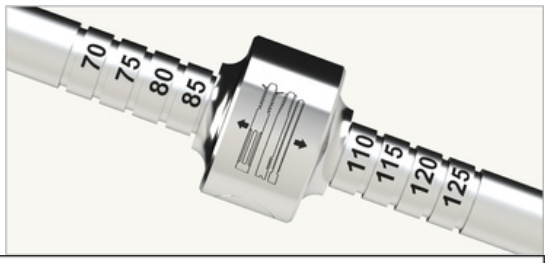
Lag Screw Depth Guide
Ref:9455-0046

Preparing Lag screw

Prepare drill

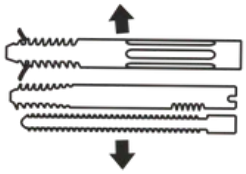
Prepare Ø10.8xØ3.2mm Cannulated Drill Bit) for drilling. Adjust (drill stoper) according to prestage size measurement





Cannulated Drill Bit
Ø10.8mmxØ3.2mm
Ref:9455-0042

NOTE



Lag screw or blade read this direction number

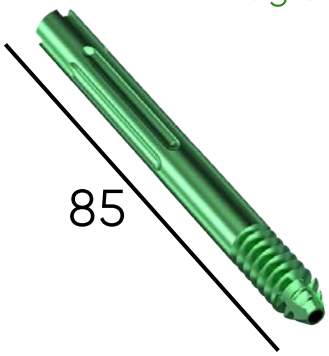
For the simplelock read this direction

Drilling

Insert the Cannulated drill bit into the Drill sleeve and make drill to the stopper

Lag Screw
Prepare Lag Screw

Lag Screwdriver
Ref:9455-0000



Lag Screw Lenghts

80
85
90
95
100
105
110
115
120

Selecting the Right Screw Length Based on the Measurement during the Drilling Phase

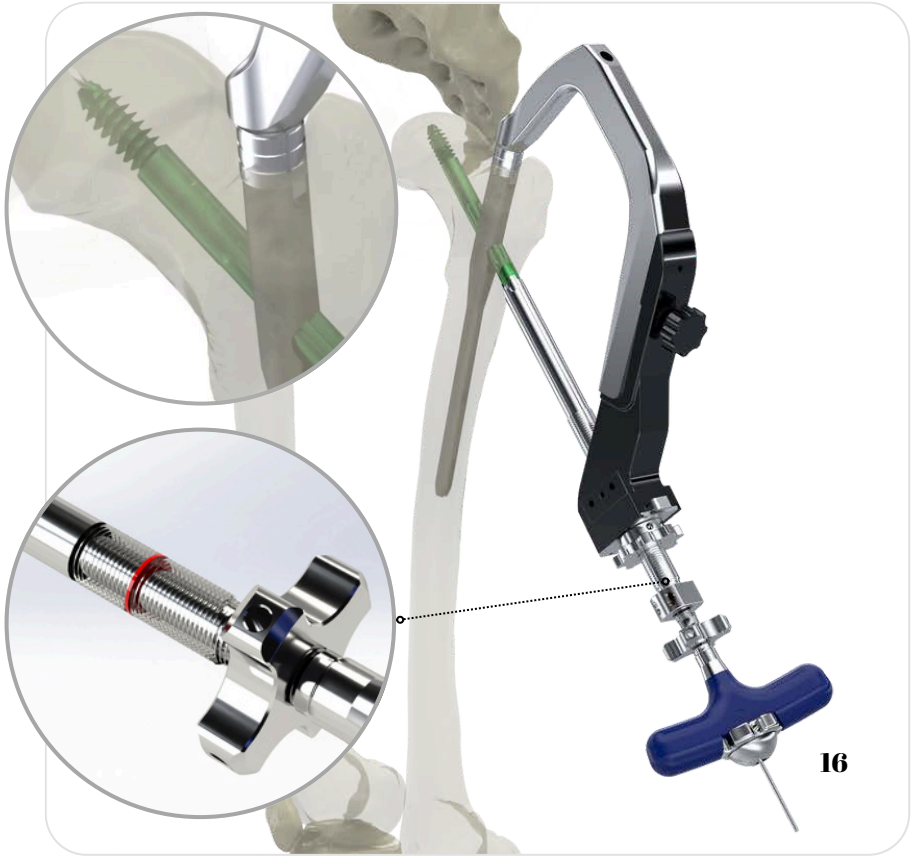
"The screw that fits the determined size is attached to the screwdriver."

Lag Screw Driver
Ref:9455-0000

Lag Screw
Lag Screw insert

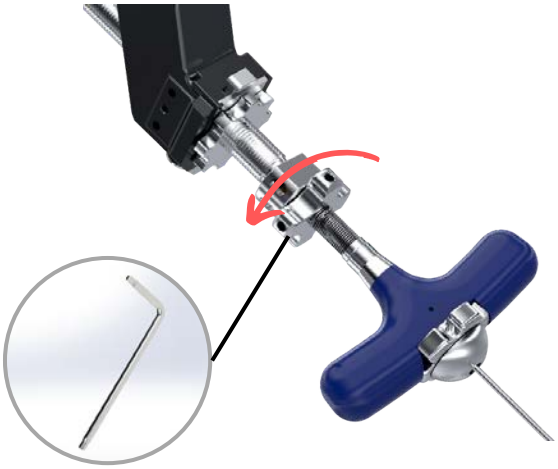
The guide is used to insert the screw with screwdriver

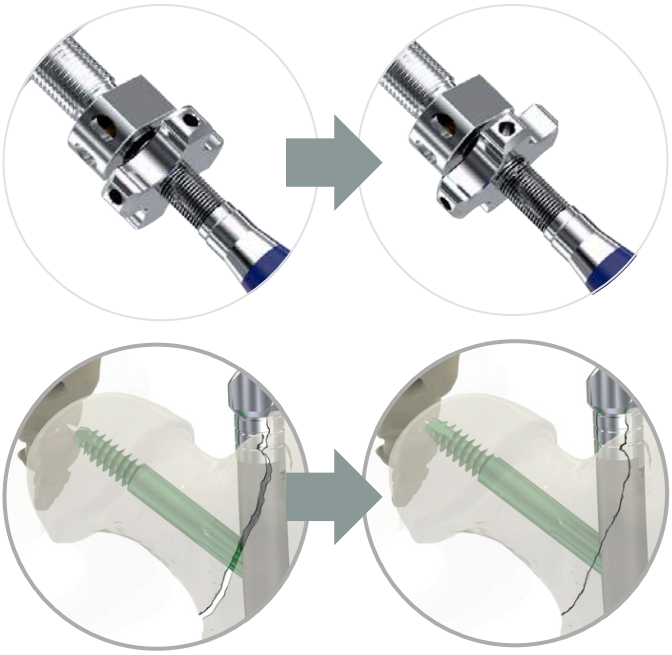
Red Marker is used for 0 point its show of where the end of screwdriver



Lag Screw
Compression

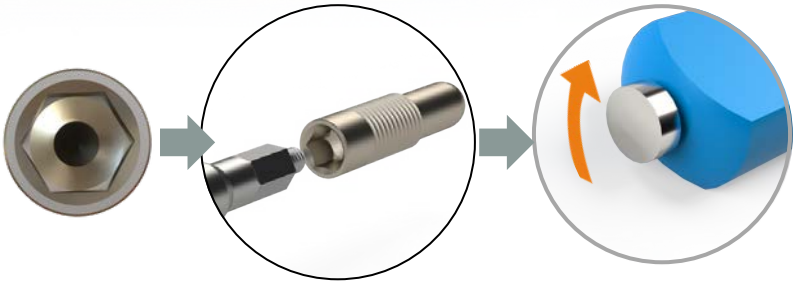
Compression is applied as needed based on the requirements.





Lag Screw
Lag Compression Screw

Combine the compression screwdriver with the features of the compression screw. In this way, the screw is prevented from falling out during the installation phase.



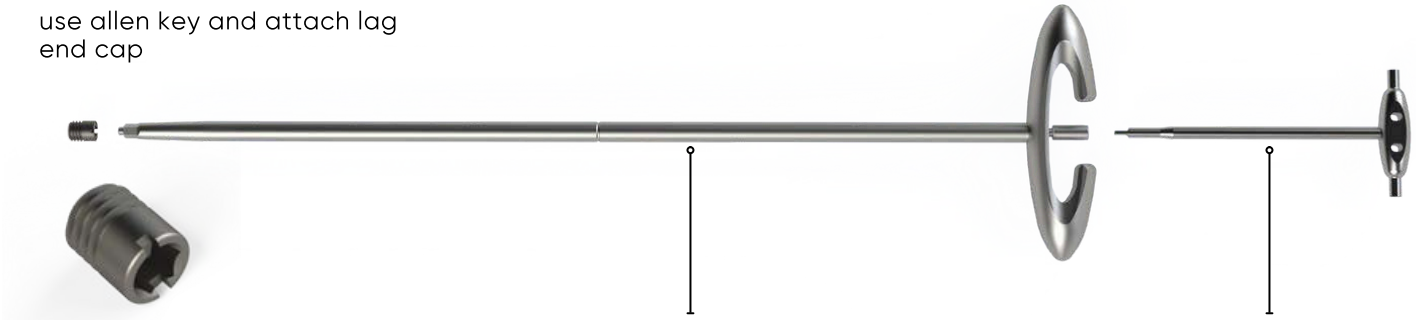
Send the lag lag locking screw throught handle to proximal of the nail

Lag Screw

Preparing lag end cup

Before Remove the lag screwdriver and Kirschner wire.

use allen key and attach lag end cap

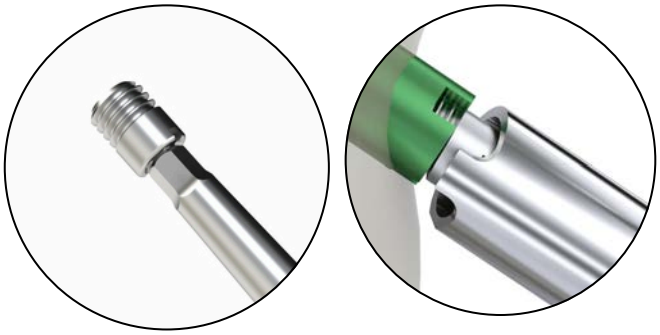


Lag End Cap
Ref:9455-0000

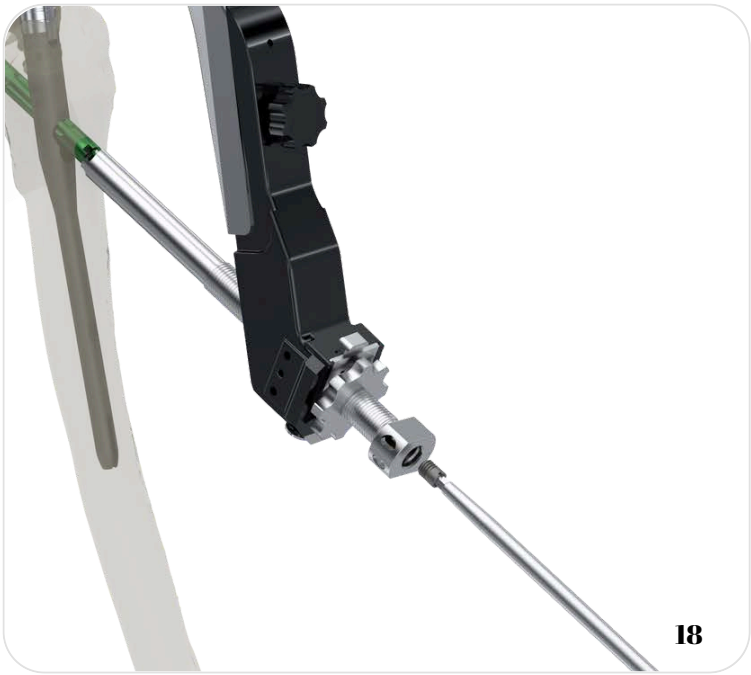
Anti-Rotation Screwdriver
Ref:9455-2065

T Allen Key
Ø10.8mmxØ3.2mm
Ref:9456-0003

Attaching lag end cup



send the lag end cap throught to the guide



Distal Screw

Removing targeting devices

The lag screw installation process is completed. Sleeve and aiming device are removable

Distal Targeting Device Attachment

Dynamic-Static Locking
Distal Target Arm
Ref:9455-0055

Ø4.0mm Sleeve
Ref:9455-0019

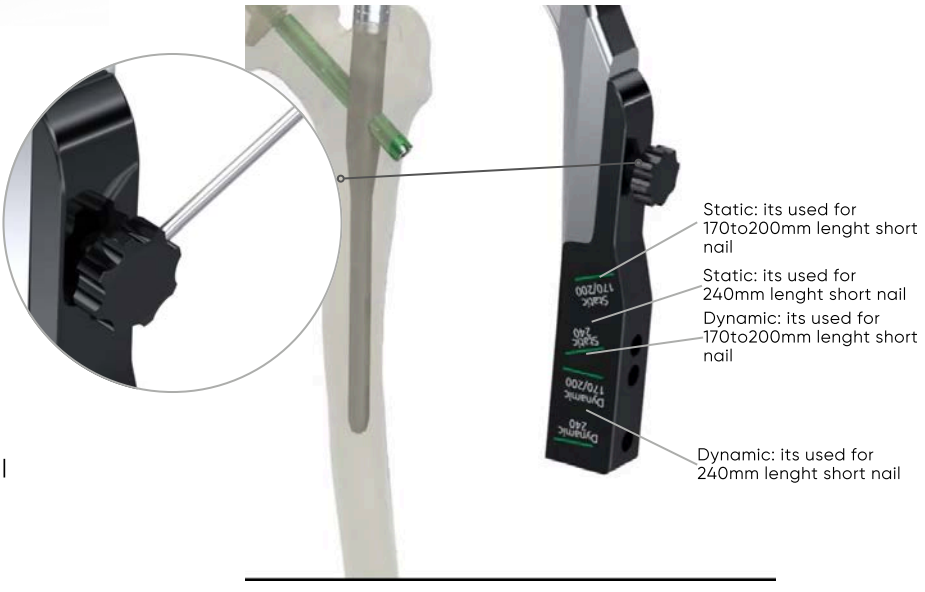
Ø4.0mm Guide
Ref:9455-0020

ØØ4.0mm Point Marke
Ref:9455-0021

Ø4.3 x 300 Drill
Ref:9455-0008

Depth Guide
Ref:9455-0055

For the distal screw, a distal screwing guide is attached It is fixed with a connecting screw Secure with L allen



Decide for dynamic or distal locking

Distal Screw

Removing targeting devices

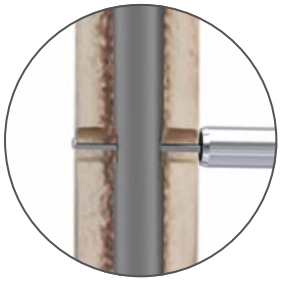
If necessary, a dynamically static distal screw can be sent. Marking is done and marker is removed. Drilling with motor and remove sleeve decide screw lenght with depth guide. Send screw

Send Sleeve

Point marked and remove

Drilling

Remove Sleeve



Decide screw lenght with depth guide

Send the Screw

Ø4,8mm Distal Locking Screw
30to90mm lenght

choose
50mm

T Allen Key
Ø10.8mmxØ3.2mm
Ref:9456-0003

The distal screw head is grooved and can be held with a screwdriver.

Anti-Rotation Screwdriver
Ref:9455-2065

Remove sleeve and distal targeting device

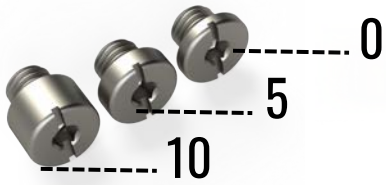
Nail End Cap

Removing handle

T Holder 8 Allen
Ref:9455-0018

Remove (distal targeting device & handle device) before sending end cap

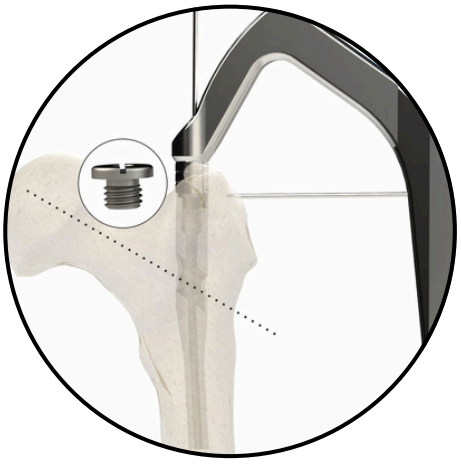
Nail End cap attachment



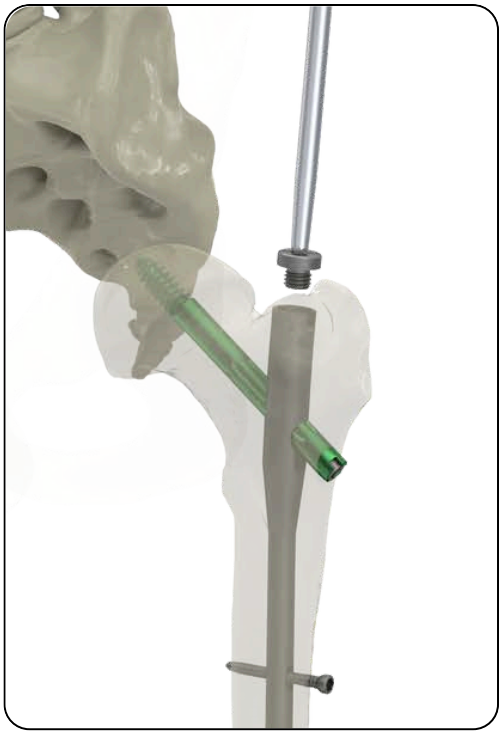
Anti-Rotation Screwdriver
Ref:9455-2065

T Allen Key
Ref:9456-0003

REF. NO	LENGTH
4562-0000	0
4562-0005	5
4562-0010	10



There are 3 types of end cups. Install the appropriate one.



Complete the process by inserting the End Cap screw with a screwdriver. Make the final check under Imaging and complete the process.

Interclaw Lag Screw with Blade
Proximal Femoral Nail

PFN-A Intramedullary
The PFN-A Nail is used in the treatment of unstable intertrochanteric fractures. Intertrochanteric femur fractures are common in the elderly population. This is because of osteoporosis. Due to the decrease in bone quality and deterioration of its microstructure, fractures often develop with very low-energy trauma

Interclaw Lag Screw with Blade
Can be used in high-energy unstable intertrochanteric fractures and in p
atients with osteoporosis and older

PFN-A Nail Technical Specifications
-Proximal diameter Ø16mm
-Distal diameter Ø10mm - Ø11mm - Ø12mm - Ø13mm - Ø14mm
-Proximal – Distal angle 5°
-Lag screw center angle 55° to proximal body
-Cannula diameter Ø3,7mm for all diameters of PFN-A nails
-Distal antirotation (Ø2,5mm X 25mm)
-Ø5mm locking screw dynamic locking screw

Interclaw Lag Screw

REF. NO	LENGTH
4592-0080	80
4592-0085	85
4592-0090	90
4592-0095	95
4592-0100	100
4592-0105	105
4592-0110	110
4592-0115	115
4592-0120	120

Interclaw Lag Screw

Preparing The Lag

The blade, which comes mounted inside the lag screw, ensures its retention when opened.

Note:The stages up to the bladed lag screw are applied with the same procedures as the lag screw.

Prepare lag screw driver for blade and lag screw

Lag Screw Driver
Ref:9455-0000

Lag Screw attachment

Send Interclaw lag screw with screw driver over the Kirschner Wire and remove wire

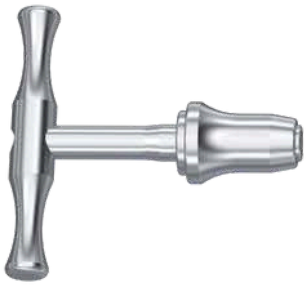
Interclaw Lag Screw

Blade oppening preparing

Pusher
Ref:9455-0046

Cannulated T Handle
Ref:9455-0031

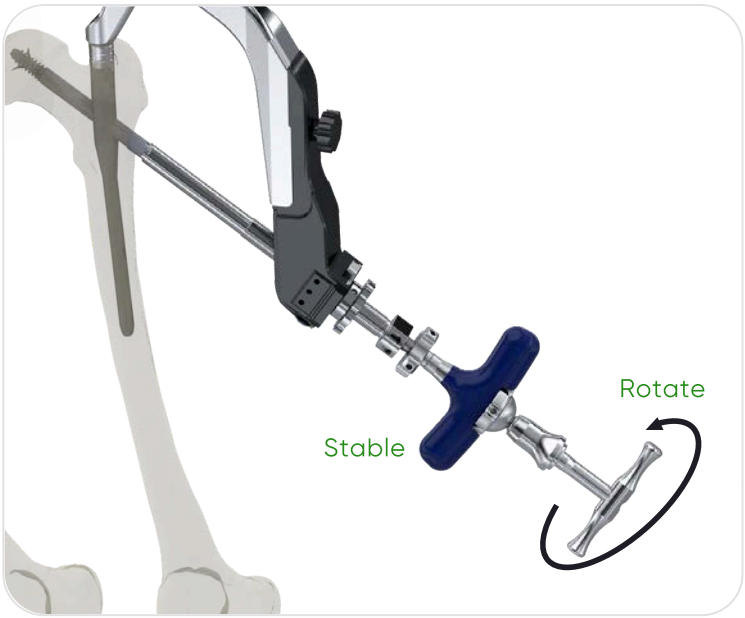
The blade, which comes mounted inside the lag screw, ensures its retention when opened.



combine t holder and pusher,

Blade oppening preparing

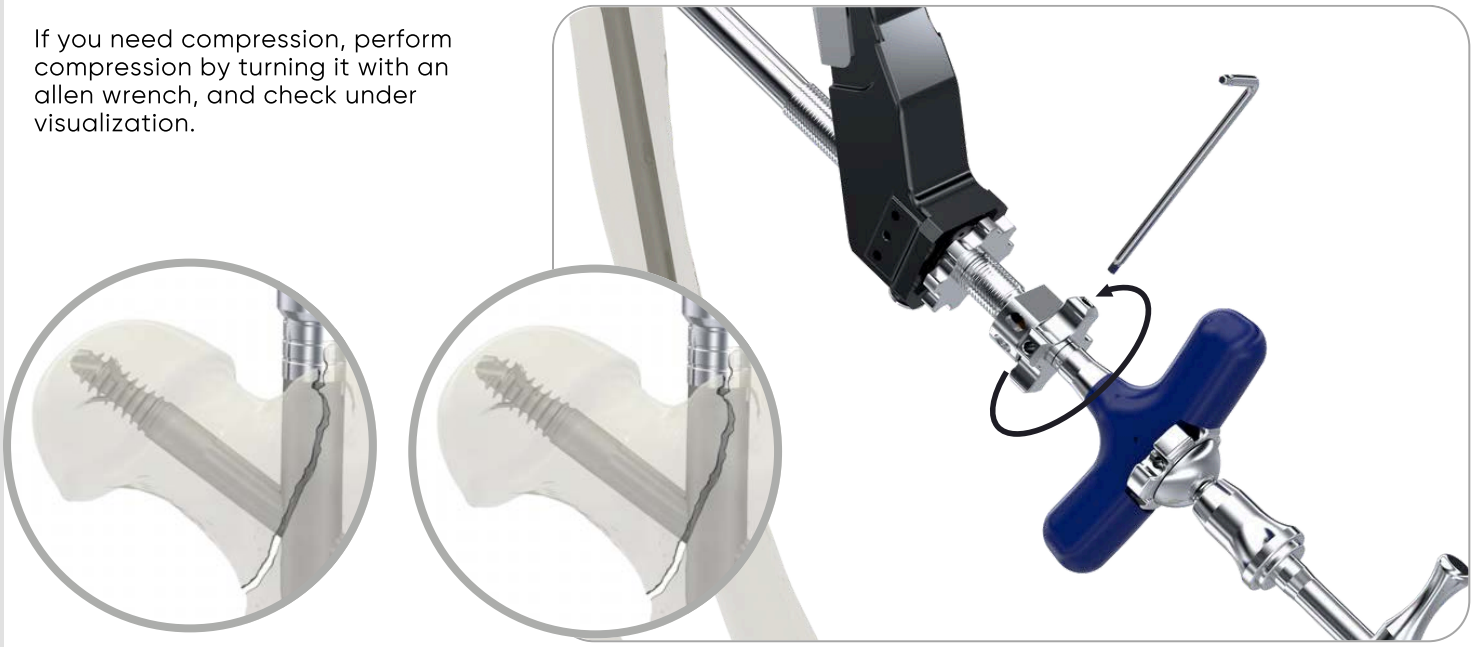
Open Blade



Interclaw Lag Screw

Compression

If you need compression, perform compression by turning it with an allen wrench, and check under visualization.



Lag compression screw

Screwdriver
4.0mm
Ref:9455-0055

Prepare lag locking screw with screw driver and attach

it is used for stabilization of the lag to prevent it from moving in any situation

Interclaw Lag Screw

Lag end cap

Prepare lag end cap and send it with screwdriver

Lag end cap
Ref:9455-0055

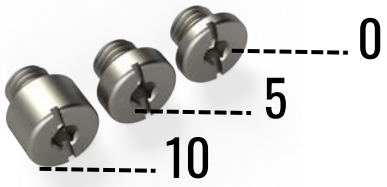
Remove the screwdriver

Nail End Cap

Lag end cap

To install the nail end cap, remove the c arm .

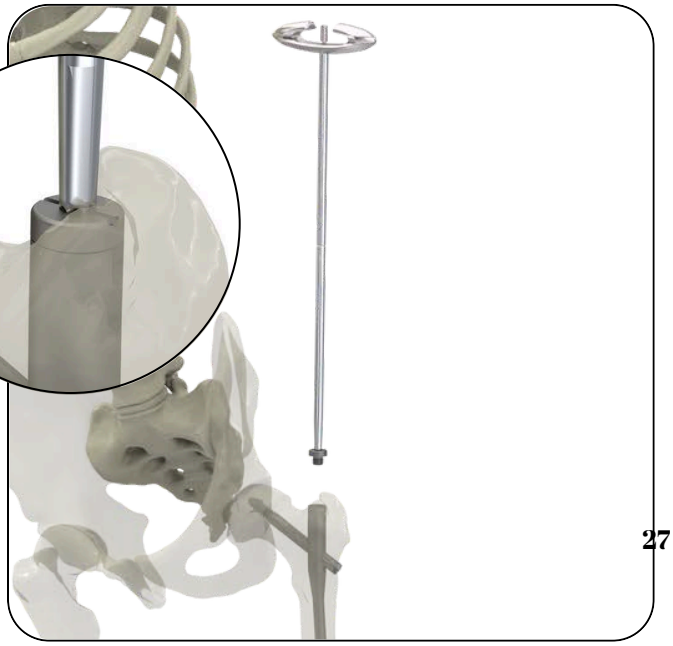
T Holder 8 Allen
Ref:9455-0018



REF. NO	LENGTH
4562-0000	0
4562-0005	5
4562-0010	10

Prepare nail end cap

and then install the nail end cap

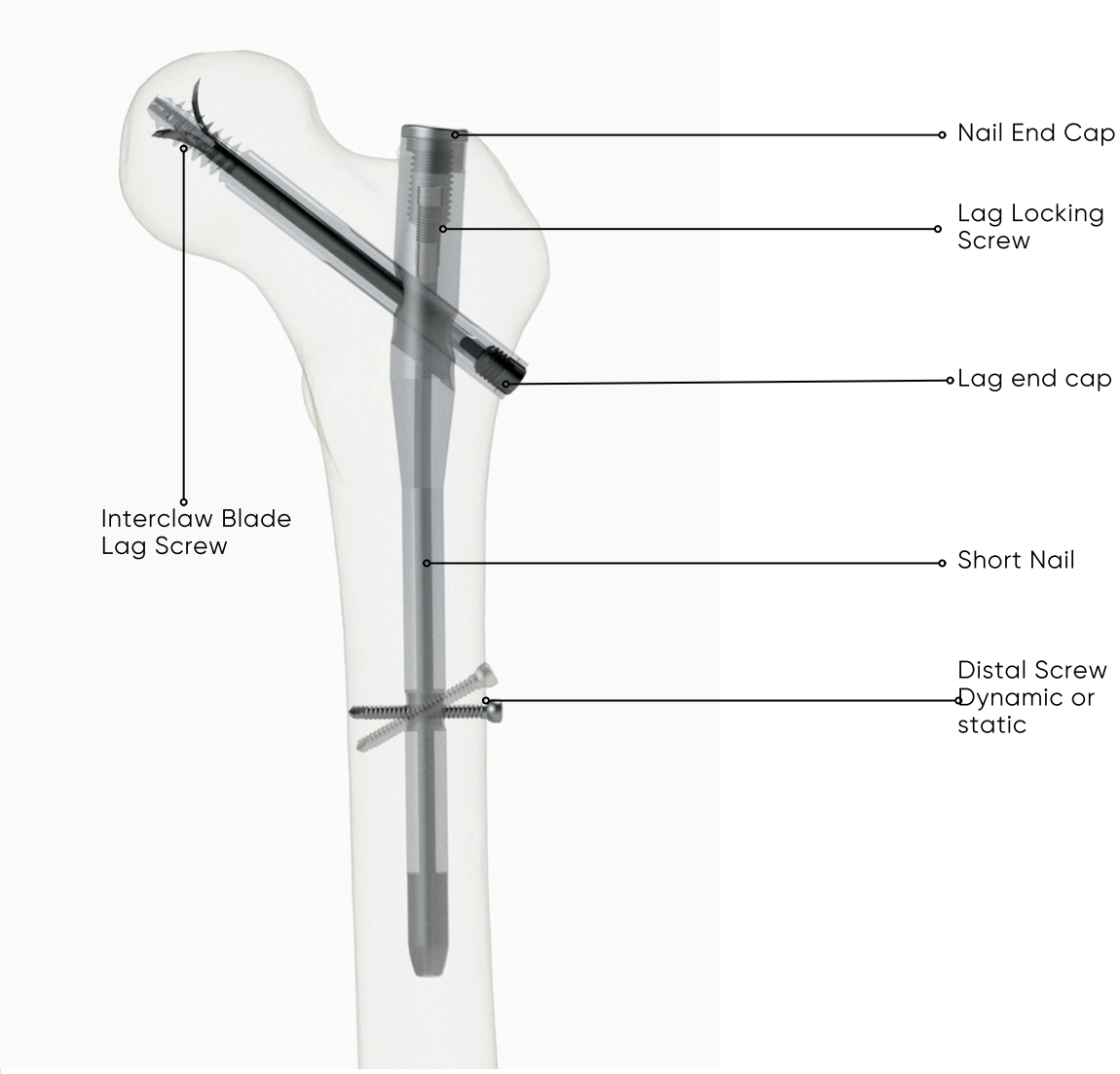


Note:
Distal screw attachment procedure same for all short nail technique. Look for distal screw stage

finish and provide necessary controls

Finish

Complete the procedures by providing the necessary checks and complete the surgery.



The procedure is complete. Depending on the patient's condition and the doctor's decision, the implants can be removed when healing occurs. For this procedure, you can review the removal procedures section.

Extract

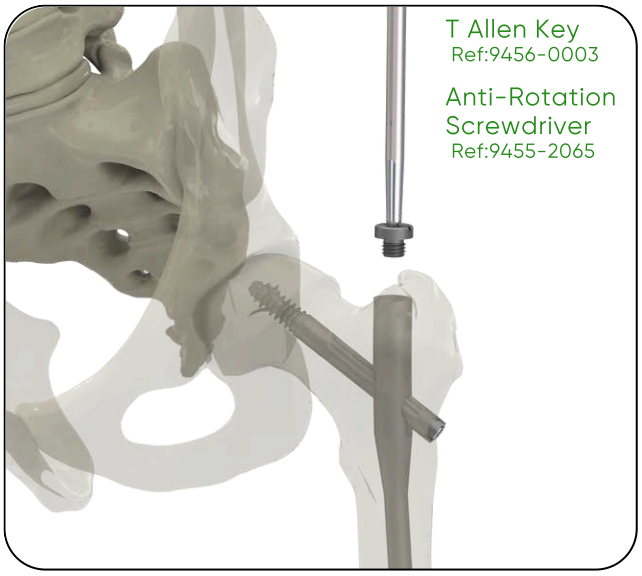
Nail extracting devices

After the necessary checks, the nail may need to be removed due to the patient's request and the doctor's approval, and similar reasons. This section shows the removal of the nail and the removal of the bladed lag screw.

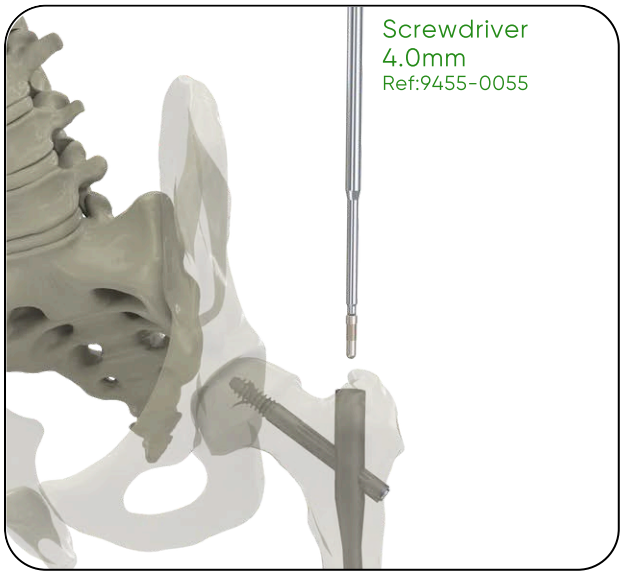
The entire set is not needed to remove the nail. Some of the tools in the set are used. Depending on the situation, only the tools used for removal are sent to the surgery.

Device for extracting

End Cap Removing



Remove Nail end cup with Anti-rotation screw driver



Remove lag locking screw with screwdriver 4.0mm

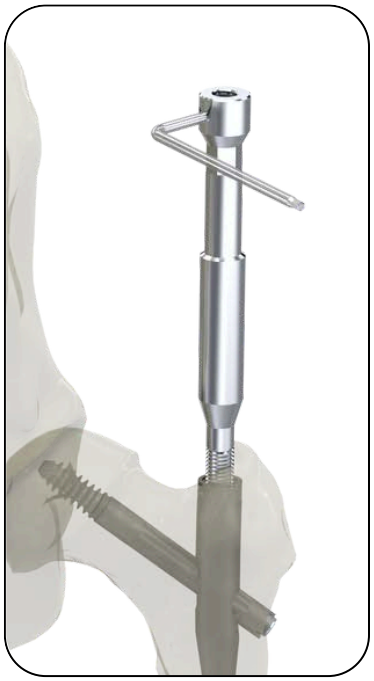
Extract

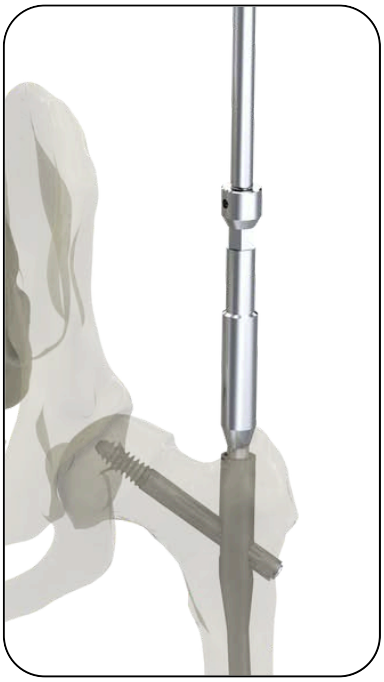
Nail extracting preparing

In order to remove the nail, insert the rod at this stage (before removing the lag screw). In this way, you will prevent the nail from falling into the channel when you remove the lag screw.

Combined Hammer Shaft (Long)
Ref:9455-0043

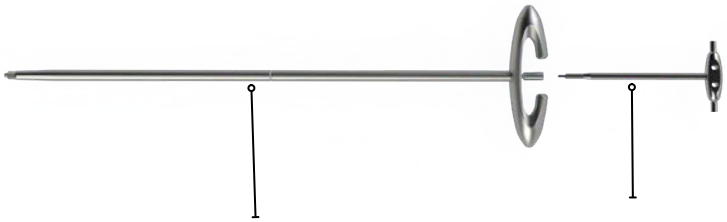
Combined Hammer Shaft (Short)
Ref:9455-0044





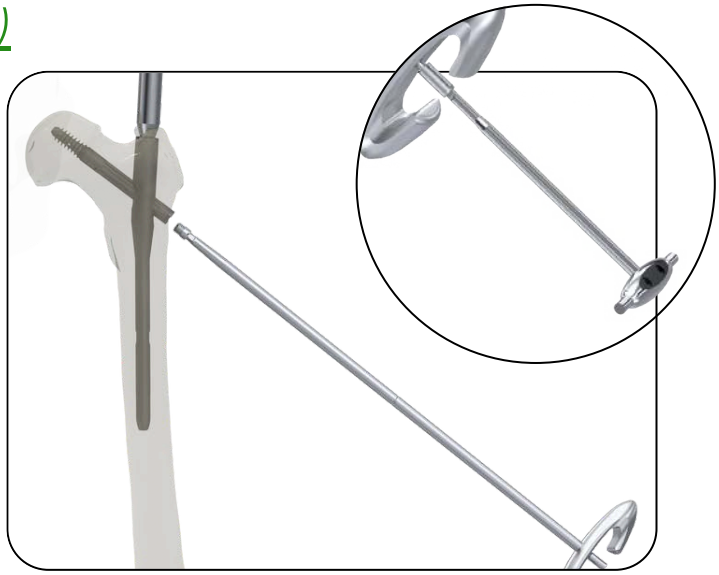
lag screw removing (Lag end cap)

Lag end cap must be removed before removing lag screw



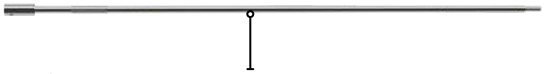
Anti-Rotation Screwdriver
Ref:9455-2065

T Allen Key
Ø10.8mmxØ3.2mm
Ref:9456-0003



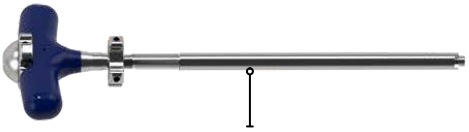
lag screw removing (Preparing for blade close)

Cannulated T Handle
Ref:9455-0031



Extractor

Handle

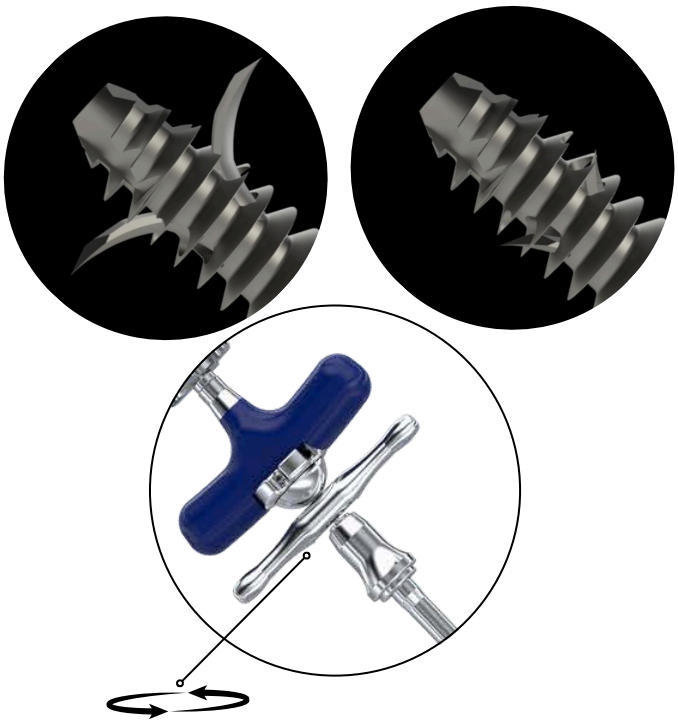


Lag Screw Driver
Ref:9455-0000

Extract

Blade closing

Attach lag screw driver to lag screw and others



Rotate handle and blade will close.

You can remove lag screw securely now.

Extract

Distal srew removing

Remove distal screw with screw driver

Remove nail with moving hammer over the rod. Nail is now removed. Complete other procedures and check-ups required to complete the surgery.

zimed®
Trauma | Arthroplasty | Sports Medicine | Bone Substitutes

Anti-Rotation Proximal Femoral Nail

PFN-A Intramedullary
The PFN-A Nail is used in the treatment of unstable intertrochanteric fractures. Intertrochanteric femur fractures are common in the elderly population. This is because of osteoporosis. Due to the decrease in bone quality and deterioration of its microstructure, fractures often develop with very low-energy trauma

Simplelock Lag Screw
may be preferred in high-energy and unstable fractures if more compression is needed

PFN-A Nail Technical Specifications
--Proximal diameter Ø16mm
-Distal diameter Ø10mm - Ø11mm - Ø12mm - Ø13mm - Ø14mm
-Proximal – Distal angle 5°
-Lag screw center angle 55° to proximal body
-Cannula diameter Ø3,7mm for all diameters of PFN-A nails
-Distal antirotation (Ø2,5mm X 25mm)
-Ø5mm locking screw dynamic locking screw

REF. NO	LENGTH
4792-0060	60
4792-0065	65
4792-0070	70
4792-0075	75
4792-0080	80
4792-0085	85
4792-0090	90
4792-0095	95
4792-0100	100
4792-0105	105
4792-0110	110
4792-0115	115

Anti-Rotation Proximal Femoral Nail

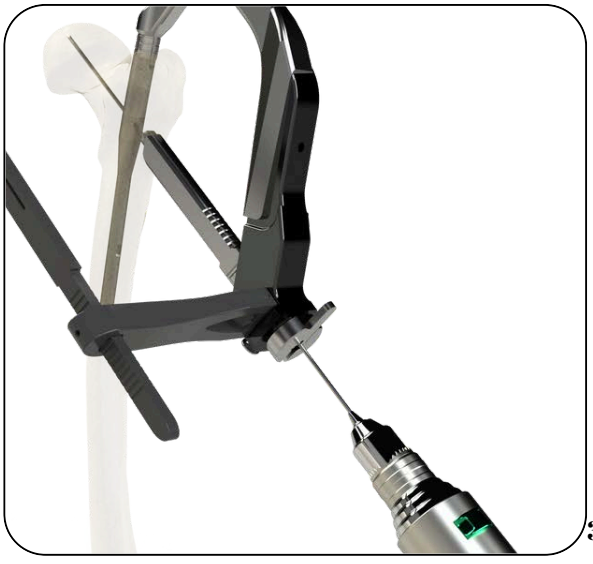
Guides

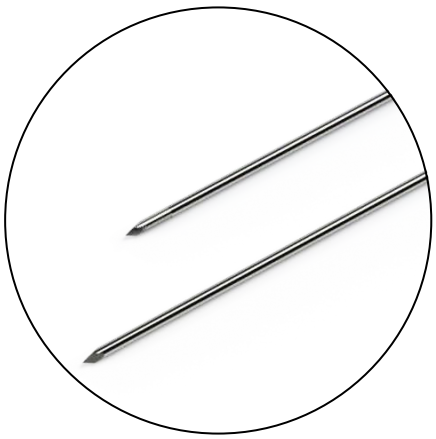
Decide Lag srew right place with guide

Attach lag drill guide througth inside targeting device and Kirshner guide

Kirshner Wire

Send the Kirshner Wire with motor





Kirshner Wire Two Type
Curved & Normal
Threaded

Anti-Rotation Proximal Femoral Nail

Measurement

Send the Measurement Guide over the Kirshner Wire

Send the Measurement Guide over the Kirshner Wire

Drill with Lag drill for compression screw, Drill -5

Anti-Rotation device

Attach anti rotation device

Anti rotation device ref:

Anti-Rotation Proximal Femoral Nail

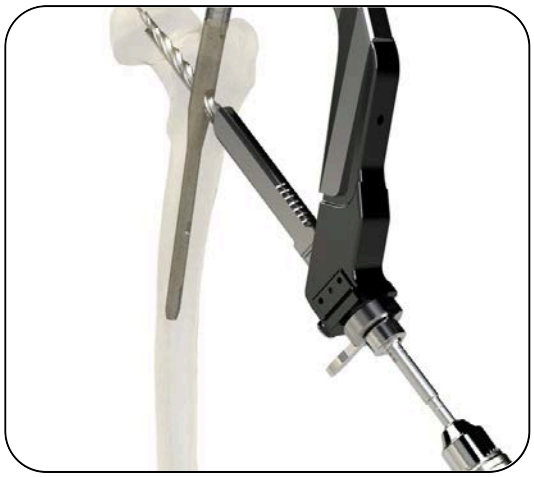
Drilling&Simple Lock Lag Screw

Remove Kirshner guide

Adjust the stopper according to the measurement and perform drilling.

Select and install the lag screw according to the measurement length

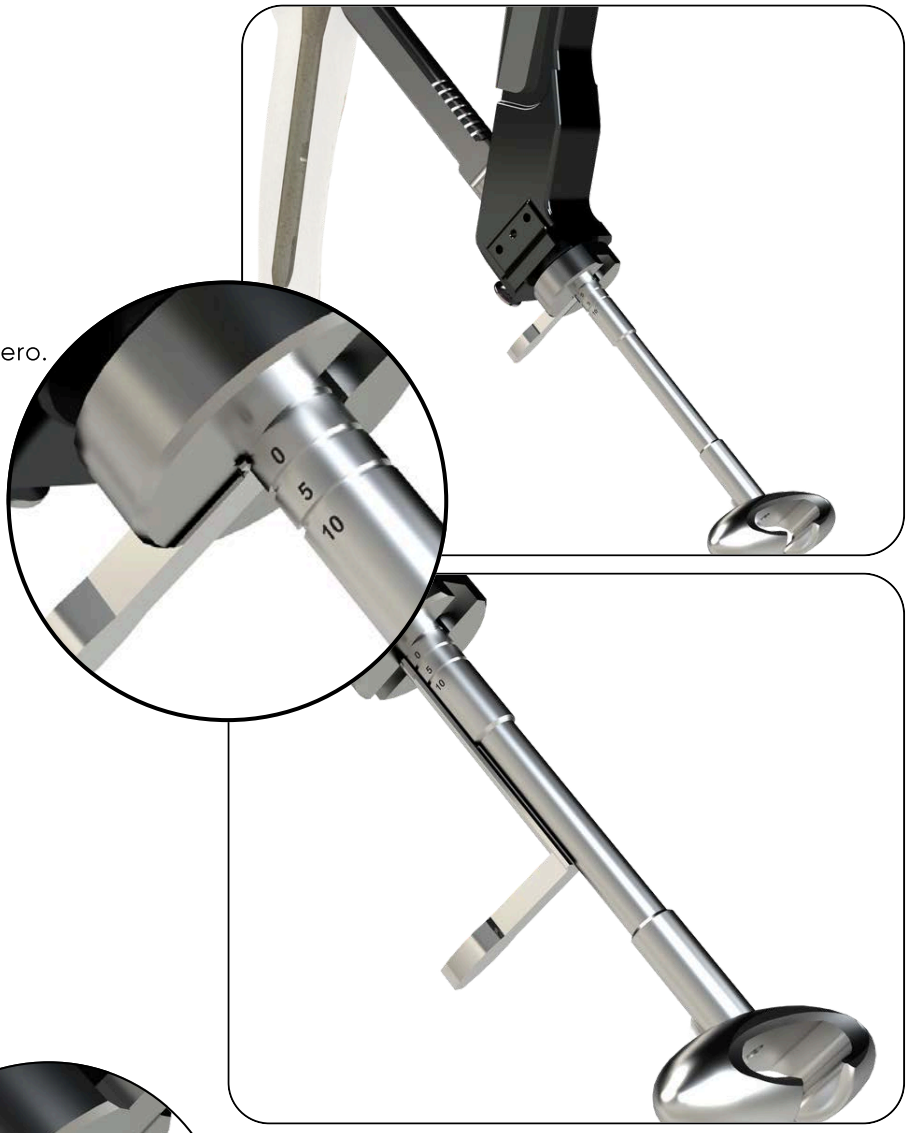
Choose 110 mm



Anti-Rotation Proximal Femoral Nail

Compression Screw

Send the screw until the number zero.



Remove antirotation device

Choose a 105 mm screw. Because during the drilling phase, we drilled 5 mm less than the 110 mm we measured.

Choose 105 mm

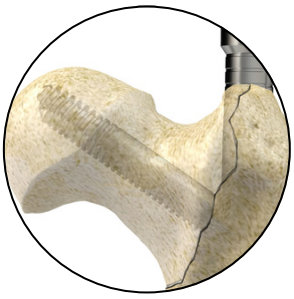
Anti-Rotation Proximal Femoral Nail

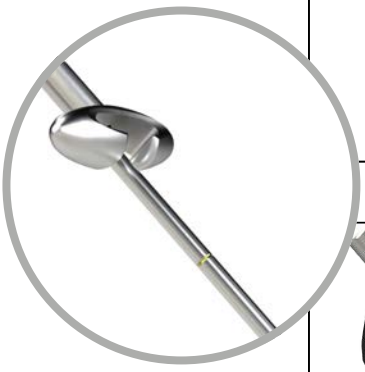
Compression

Make sure that the yellow mark on the compression screw is inserted until it matches the zero number on the lag screw.

If you are not going to tighten, you can remove the screwdrivers and move on to the next steps. If you are going to tighten, turn the lag screwdriver to 5. If you need more tightening, you can turn it up to 10.

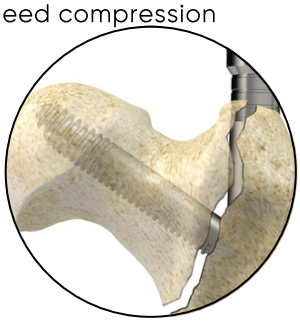
Number 0
no need compression



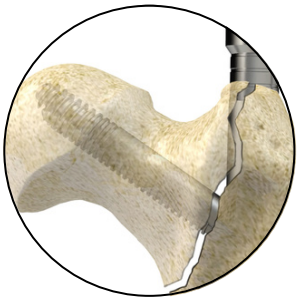


compression example

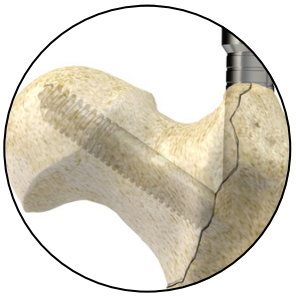
Number 0
need compression



Number 5
Try number 5 but
insufficient compression



sufficient compression was
achieved



zimed®
Trauma | Arthroplasty | Sports Medicine | Bone Substitutes

Appendix

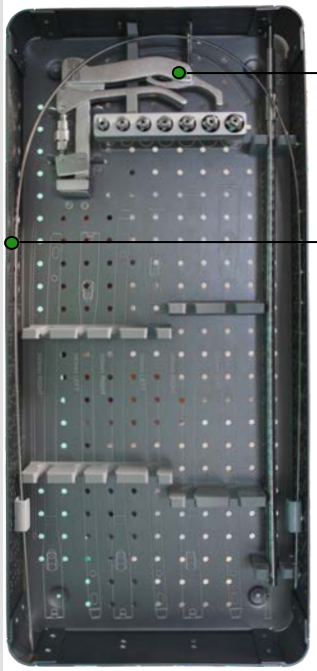
Long Nail,Determining the length of the nail &thickness

The long Pfna nail is used in the treatment of intertrochanteric fractures as well as fractures occurring in the shaft.

Appendix

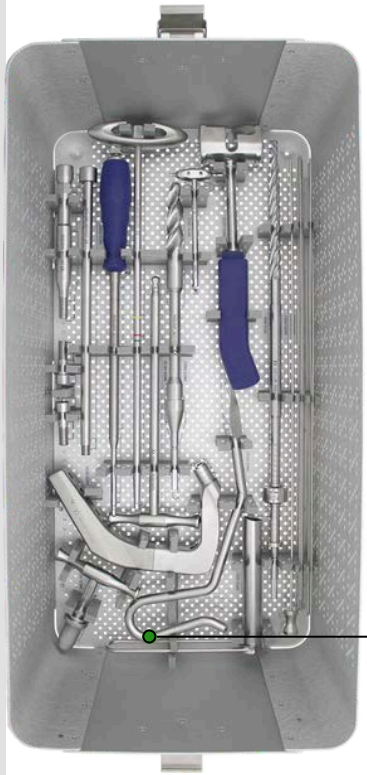
Long Nail,Determining the length of the nail &thickness

Devices for first entry



Gripper
Ref:9413-0002

Guide Wire
Ø2.5/Ø3.3x1000mm



AWL
Ref:9455-0016

Appendix

Long Nail,Determining the length of the nail &thickness

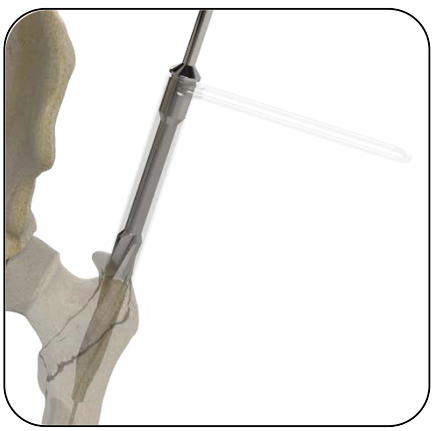
First entry &Drilling

Open the cortex with awl

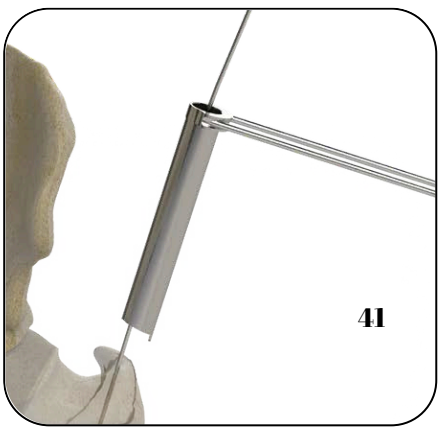
Find the canal with
guide wire

Remove Awl

use proximal reamer sleeve and make drill
with proximal remaer



remove sleeve



zimed®
Trauma | Arthroplasty | Sports Medicine | Bone Substitutes

Appendix

Long Nail,Determining the length of the nail &thickness

Reamer

Flexible reamer
Ref:9426-0008

Reamer Heads
Ref:9455-0033-0039

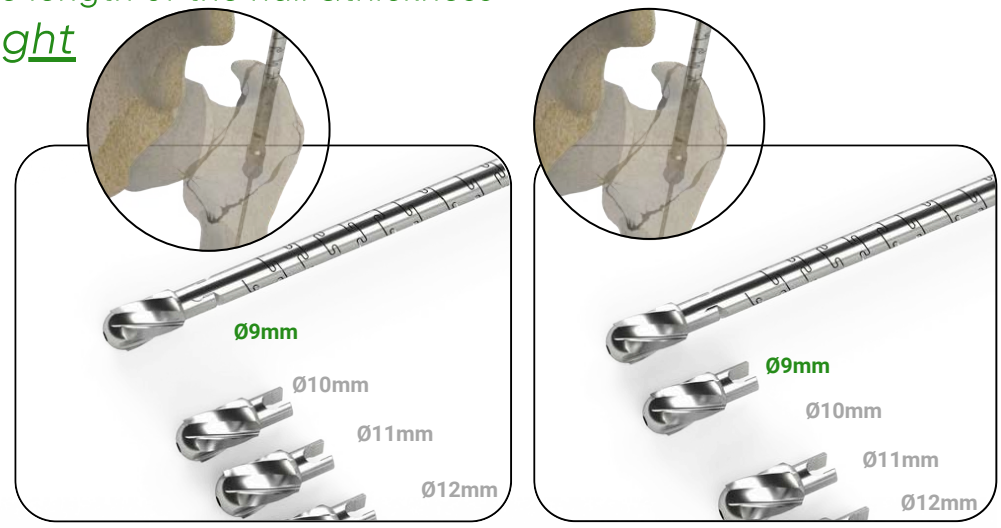
Combine reamer and start with small size

Appendix

Long Nail,Determining the length of the nail &thickness

Determine Nail Lenght

You can determine the thickness of the screw with reamer tips. Start from the smallest size and carve towards the largest size. In this process, you can decide the thickness of the nail



Short PFNA

Long PFNA

The appropriate nail size can be determined from the lines on the reamer.

Short

10x170	12x200
10x200	12x240
10x240	13x170
11x170	13x200
11x200	13x240
11x240	14x170
12x170	14x200
	14x240

Long

Left	Right
10x340	10x340
10x360	10x360
10x380	10x380
11x340	11x340
11x360	11x360
11x380	11x380
12x340	12x340
12x360	12x360
12x380	12x380
13x340	13x340
13x360	13x360
13x380	13x380

zimed®
Trauma | Arthroplasty | Sports Medicine | Bone Substitutes

Disinfection

DEVICE CLEANING CONDITIONS

Do not use metal brushes or rubbing pads during Decontamination of the tools should be performed immediately after the surgical procedure is completed. Contaminated tools must not be allowed to dry before reprocessing.

Excessive blood or debris must be removed in order to prevent the drying on the surface. All users must be qualified staff with documented evidence of training and competence. Training should include the current guidelines, standards and hospital policies. Even if they are made of high-grade stainless steel, the surgical tools must be thoroughly dried in order to prevent rust formation. Prior to sterilization, all the tools should be examined for the cleanliness of the lumens of the joints of the surfaces. manual cleaning process. Use cleaning agents with low-foam surfactant to be able to see the tools in the cleaning solution. Rinse the cleaning materials easily from the tool in order to prevent residue formation.

Mineral oil or silicon lubricants should not be used on Zimed tools. Neutral pH enzymatic and cleaning materials are recommended for cleaning the reusable instruments. It is very important to neutralize and rinse the alkaline cleaning materials thoroughly from the tools. Anodized aluminum should not contact with certain cleaning or disinfectant solutions. Avoid strong alkaline cleaners and disinfectants and solutions containing iodine, chlorine or certain metal salts.

Manual Cleaning/Disinfection

Prepare the enzymatic and cleaning materials at the dilution rates and temperatures as recommended by the manufacturer. New solutions should be prepared when the existing solutions are heavily contaminated. Place the tools in the enzymatic solution so that they are completely immersed. Operate all the movable parts so that the detergent contacts with all the surfaces.

Keep in the fluid for minimum 20 min. Use a nylon, soft-bristled brush to gently rub the tools until all visible debris is cleaned. Pay particular attention to the accessible areas and use a suitable bottle brush. In order to remove the dirt in the open springs, coils or flexible parts, wash the recesses with plenty of cleaning solution. Rub the surface with a scrubbing brush to remove all the visible dirt from the surface and the recesses. To ensure that all the recesses are cleaned, turn the component while rubbing. Remove the tools and rinse them for minimum 3 min. under running water. Pay particular attention to the cannulas and use a syringe to pass the fluid through the hard-to-reach areas. Place all the tools that are completely immersed in water, in an ultrasonic unit containing teh cleaning solution. Operate all the movable parts so that the detergent contacts with all the surfaces. Expose the tools to sonification process for minimum 10 min..

Remove the tools and rinse with deionized water for at least 3 minutes or unless all the blood or dirt traces are eliminated in the rinsing water. Examine the tools under normal light to verify that visible dirt is removed. If visible dirt is present, repeat the above mentioned sonification procedure and the rinsing steps. Remove the excessive moisture on the tool with a clean, absorbent, lint-free cloth.

Combination Manual / Automated Cleaning and Disinfection

Prepare the enzymatic and cleaning materials at the dilution rates and temperatures as recommended by the manufacturer. New solutions should be prepared when the existing solutions are heavily contaminated. Place the tools in the enzymatic solution so that they are completely immersed. Operate all the movable parts so that the detergent contacts with all the surfaces. Keep in the fluid for minimum 10 min. Use a nylon, soft-bristled brush to gently rub the tools until all visible debris is cleaned. Pay particular attention to the accessible areas and use a suitable bottle brush. A sonicator will help to clean the instruments thoroughly. The use of a syringe or a water fountain will facilitate passing of the liquid from the low-spaced areas and difficult-to-access areas. Remove the tools from the enzyme solution and rinse them for minimum 1 min. under deionized water. Place the tools in a suitable washer / disinfector basket and perform a standard washer / disinfector cycle. Specific minimum parameters are essential for a complete cleaning and disinfection. These parameters are given in a below mentioned table.

Automated Cleaning and Disinfection

Automated washing / drying systems are not recommended as the only cleaning method for surgical tools. An automated system can be used as a follow-up operation after manual cleaning. To ensure an effective cleaning, tools must be thoroughly examined before sterilization. For detailed information on Washing and Disinfection see

Specific minimum parameters used for a complete cleaning and disinfection:

Definition	
1	Pre-washing for 2 minutes with cold tap water
2	enzyme sprey for 20 seconds with hot tap water
3	Immersion in enzyme after 1 minute
4	rinsing for 15 seconds with cold tap water (Should be repeated twice)
5	Washing with detergent for 2 minutes with hot tap water
6	rinsing for 15 seconds with hot tap water
7	Rinsing with 10 seconds with optional lubricated purified water
8	Drying for 7 minutes with hot air

Note: Follow the isntruction of the washer/disinfector manufacturer

Zimed Medical, as the manufacturer of this device, and their surgical consultants do not recommend this or any other surgical technique for use on a specific patient. The surgeon who performs any implant procedure is responsible for determining and utilizing the appropriate techniques for implanting the device in each individual patient. Zimed and their surgical consultants are not responsible for selection of the appropriate surgical technique to be utilized for an individual patient.