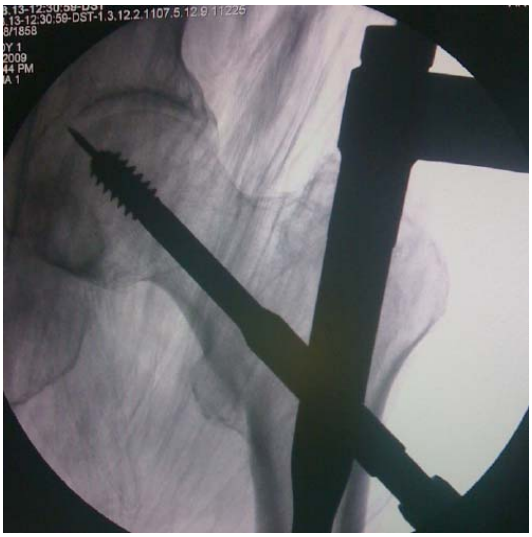
Y-Mahe Lock Trochanteric Nail System
Solution without Compromise!

Surgical Technique
Titanium & Steel Nail System



Revision: 23.02.2011

Introduction

Mahe Medical GmbH is growing worldwide as a medical device manufacturing company, manufactures a wide range of trauma – orthopedic implants. Mahe Medical GmbH products provide top quality and usability while the offered services and support make Mahe Medical GmbH products fully customer orientated.
Mahe Medical GmbH puts special emphasis on innovation, our R&D department works in tight cooperation with international clinical experts in order to develop high quality implants which fit better for patient needs.
We are proud to introduce one of our leading innovation, the Y-Mahe_Lock Trochanteric Nail System in Titanium & Steel.
On the 240mm long nail the distal shaft of the nail is grooved, which helps at the insertion of the nail and its flexibility prevents the erosion of the cortical bone at the tip of the nail implant, which is well known source of pain and fractures.
The basic implantation instruments are coming in a high quality perforated stainless steel tray set (2 pcs.) with lids, where all instruments are assembled in plastic inlays to make the surgery fast and efficient. Every instrument can be disassembled into pieces, and the stainless steel trays and lids make it easy to clean.
Colour coded parts are very useful to find the next step without any mistakes and difficulties.

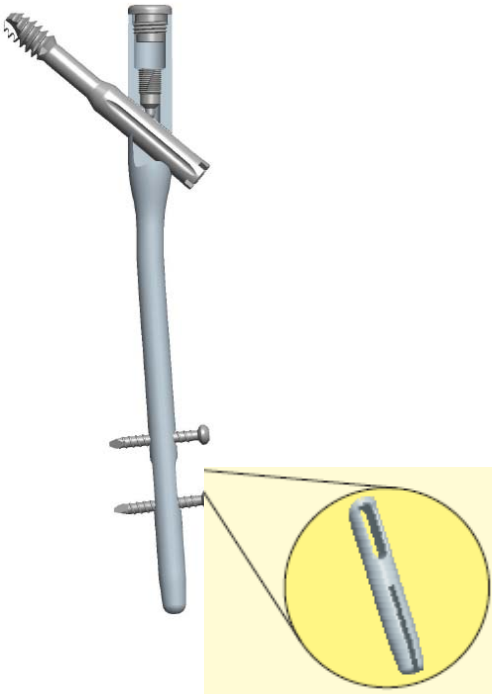
Corporate Philosophy

Mahe designs, develops and manufactures implants for use in specific implant system developed by its customers. We make orthopaedic implants used primarily in knee orthopaedic and hip implant systems, also provides a broad range of trauma implants, dental implants.Surgical instruments used in hip, knee and shoulder reconstruction procedures, as well as in spinal, trauma and other implant procedures.
Mahe designs, develops and manufactures implant-specific and procedure-specific instruments. Mahe does manufacture general surgical instruments. Mahe innovative and exciting product portfolio is updated and expanded in line with technological advances to satisfy the current and future needs of both patients and healthcare professionals.
Mahe is committed to playing our part in achieving improved healthcare outcomes worldwide.

Design & Features

Necessary Components:

Screw plug
Fixation screw

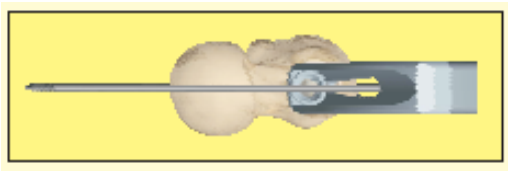


Lag screws length: 75mm-145mm

Y-Mahe_Lock nail implants short
Solid/cannulated
Angle: 130°/135°
Diameter: 11-12mm
Length: 180-240mm

Y-Mahe_Lock nail implants long
Solid/cannulated
Angle: 130°/135°
Diameter: 10mm
Length: 320-420mm

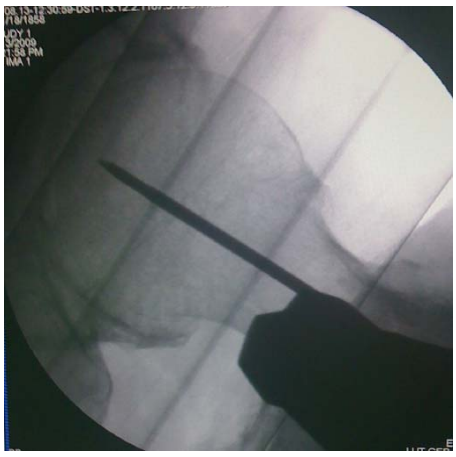
Distal locking screws
Thread Diameter: 4.9mm
Length: 20-80mm (<2mm>); 40-100mm (<5m



Grooved design at the 240mm

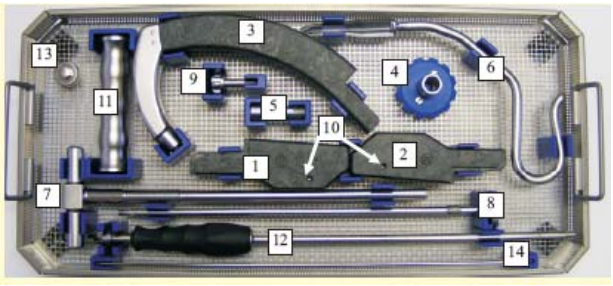
for prevention of cortical bone

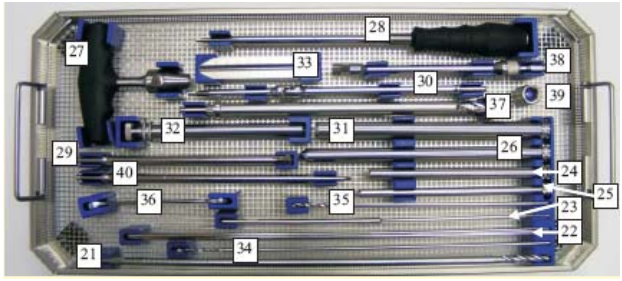
Aiming assistance for increased implantation accuracy



Basic Recommended Instruments

Set-94500-00000 Basic Nail Instrument Set

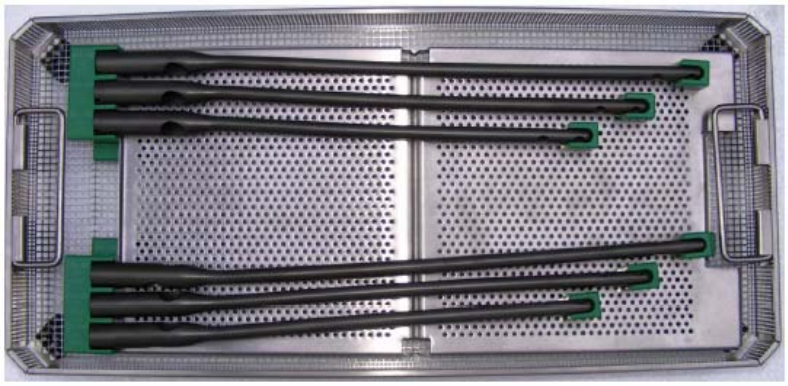




TRAY-94500-10000	Tray set 2 pcs. (steel trays)	1 pcs
INS-94500- 00100	Radiolucent aiming device (carbon)	1 pcs
INS-94500- 00201	Aiming device attachment 130° (carbon)	1 pcs
INS-94500- 00203	Aiming device clamp screw	2 pcs
INS-94500- 00301	Aiming device attachment 135° (carbon)	1 pcs
INS-94500- 00400	Aiming device fixation screw	1 pcs
INS-94500- 00500	Nail adapter screw	1 pcs
INS-94500- 00600	T-wrench for dynamic screw	1 pcs
INS-94500- 00700	Threaded coupling screw for dynamic screw	1 pcs
INS-94500- 00800	Compressing device	1 pcs
INS-94500- 00900	Curved cannulated reamer (awl)	1 pcs
INS-94500- 01000	Hammer guide shaft	1 pcs
INS-94500- 01004	Removal fixation device	1 pcs
INS-94500- 01100	Slide hammer	1 pcs
INS-94500- 01200	Soft tissue protector for dynamic screw ∅16/13 mm	1 pcs
INS-94500- 01300	Drill sleeve for guiding wire ∅13/3 mm	1 pcs
INS-94500- 01400	Reamer for dynamic screw ∅12,8 mm	1 pcs
INS-94500- 01500	Dynamic screw reamer ∅8 mm, cannulated	1 pcs
INS-94500- 01600	Drill guide for dynamic screw reamer ∅12,8/8 mm	1 pcs
INS-94500- 01700	Gauge for dynamic screw	1 pcs
INS-94500- 01800	Soft tissue protector for locking screw ∅10/8 mm	1 pcs
INS-94500- 01900	Drill sleeve for distal locking drill ∅8/4 mm	1 pcs
INS-94500- 02000	Depth gauge for locking screw	1 pcs
INS-94500- 02100	3,5mm hex.x200 mm hexagonal screw driver	1 pcs
INS-94500- 02200	10mm hex.x205mm hexagonal screw driver shaft	1 pcs
INS-94500- 02300	Cardan screw driver shaft 4.0mm hex. with QC	1 pcs
INS-94500- 02400	Cardan for device removal	1 pcs
INS-94500- 02501	Hammer guide head	1 pcs
INS-94500- 02600	Screw driver shaft 3.5mm hex. with QC 310 mm	1 pcs
INS-15000- 35400	K - wire ∅3,5mmx400 mm	1 pcs
INS-15020- 30400	K - wire ∅3,0mmx400 mm with threaded tip	4 pcs
INS-99000- 00004	Wrench width flats 12 mm	1 pcs
INS-99010- 32350	Twist drill ∅ 3,2mmx350 mm	1 pcs
INS-99010- 40310	Twist drill ∅ 4,0mmx310 mm	1 pcs
INS-99000- 00006	Universal T-handle with quick coupling	1 pcs

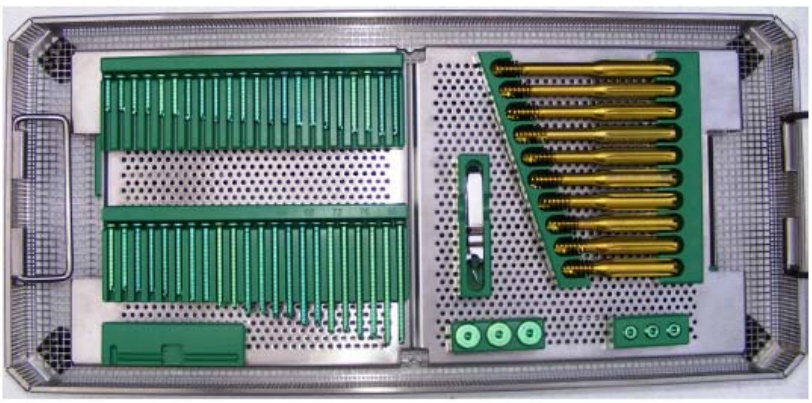
Implant Steel Trays with LID

TRAY-94500-10001 Tray for long nails (steel tray)



TRAY-94500-10002 Tray for short nails (steel tray)

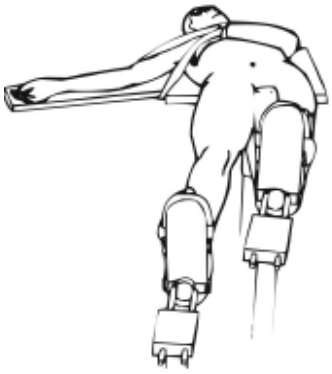
TRAY-94500-10003 Tray for screws (steel tray)



Surgical Technique

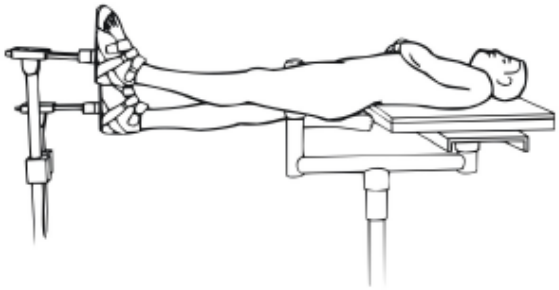
1. Preoperative planning

Preopretaive X-ray of the uninjured distal Femoral is used to estimate proper nail Diameter, nail length, and CCD-angle (caput-collum-diaphyseal angle).



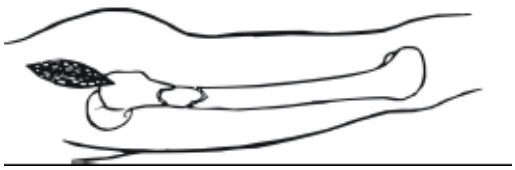
2. Patient positioning and reposition

With the patient supine, abduct the unaffected limb while adducting the trunk and the affected extremity and flex the affected hip 15°.
Apply traction with a foot holder and rotate the foot to obtain correct rotational alignment.
Orthopedic surgical table is recommended!



3. Skin incision

Make an approx. 5cm long skin incision proximal to the greater trochanter. Incise the fascia of the gluteus maximus, identify the subfascial plane and palpate the trochanteric fossa.



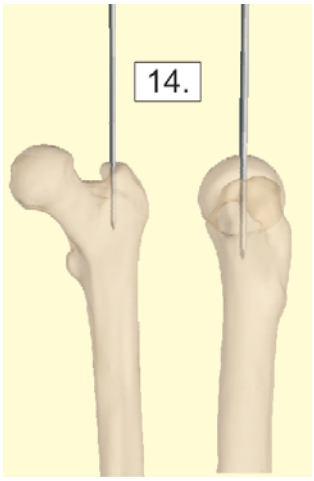
Fluoroscopic control is advised!
The image intensifier must be in a standard position for a-p –and lateral view.

Pay special attention, important step.

15. Numbers in trays after the after the instrument names refer to list number in the instrument trays.

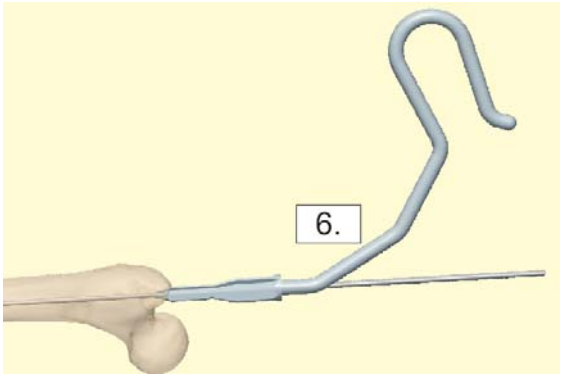
4. Determining the entry point

With a 3x400mm threaded Kirschner wire (14.) find the trochanteric fossa. The tip of the pin should be in the midplane of the femoral in both anteroposterior and lateral views. Under fluoroscopic control insert the Kirschner wire into the medullary canal.



5. Opening the femoral canal

Insert the cannulated 17.6mm curved cannulated reamer – awl (6.) over the Kirschner wire to enlarge the entry portal. Ream the proximal femoral until the reamer sink into it.



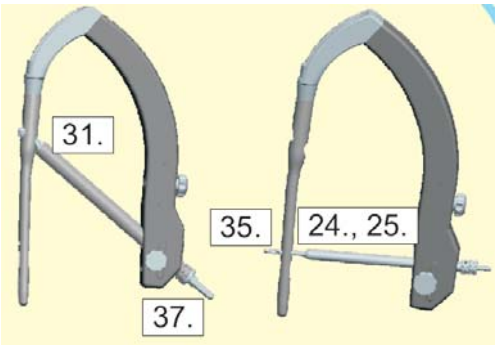
6. Assembling the instruments

Attach the intramedullary nail to the radiolucent aiming device (3.) with the nail adapter screw (5.). Connect the nail with the 10mm hexagonal screwdriver (27,29). Depending on the CCD angle of nail implant (130°/135°) mount the correct aiming device attachment (1.,2.)
aiming device fixation screw.

Drive the fixation screw into the nail, but the tip of the screw should not hinder the rotation of the dynamic screw!

7. Checking the correct assembling

Put into the dynamic screw hole the yellow soft tissue protector (31.) and reamer (37.). Put into the distal hole the green soft tissue protector (24.), drill sleeve (25.) and dia. 4.0mm twist drill (35.).

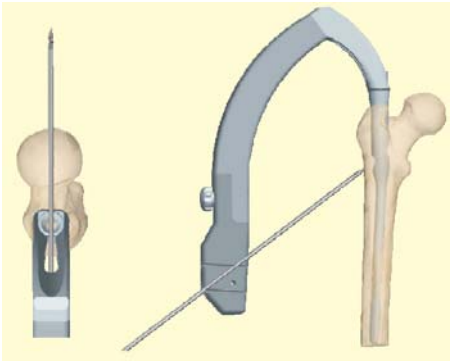


8. Inserting the nail implant

If solid nail is used, remove the Kirschner wire, If it cannulated, the nail should be inserted over the wire.
Insert the nail carefully by hand until axis of the dynamic screw hole reaches the center of the femoral neck.
If resistance is encountered, stop and withdraw the nail implant and push it with slight twisting, or use a smaller nail diameter.
Never hit the aiming device. In difficult cases you may use the extraction device to support insertion.

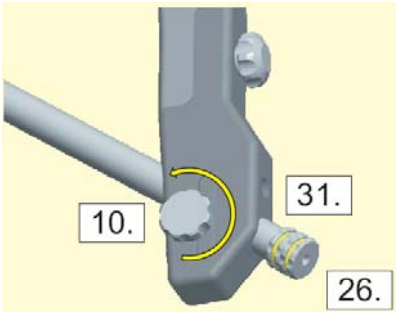
9. X-ray evaluation

Put a Kirschner wire (14.) into the proximal hole of the aiming device.
It is shadow in the lateral view should be in the center of the femoral neck.
The lateral groove of the aiming device is parallel to the dynamic head screw.



10. Skin incision at the dynamic screw

Put the yellow soft tissue protector (31.) and drill sleeve (26.) into the aiming device, incise the skin and fascia and push the drill sleeves to the bone.
With the clamp screw on the aiming device (10.) fix the position.

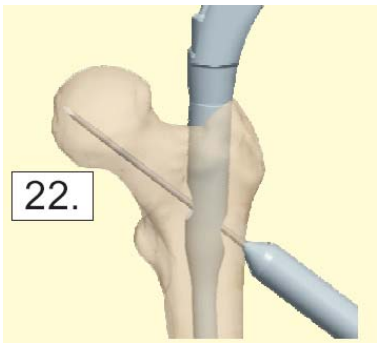


11. Predrill the guide wire

Drill through the cortical bone with the yellow dia. 3.2mm twist drill (34.)
The treaded Kirschner guide wire may damage or bend by the cortical bone, therefore is important to rough-drill it by the termed twist drill.

12. Insertion of the guide wire

Insert the dia. 3.0x400mm threaded Kirschner guide wire (22.) into the femoral head to a level approximately 5mm below the subchondral bone. Confirm the position of the guide wire within the head with a-p and lateral view.



13. Length measurement

Measure the length of the dynamic screw on the guide wire with the length gauge (33.).

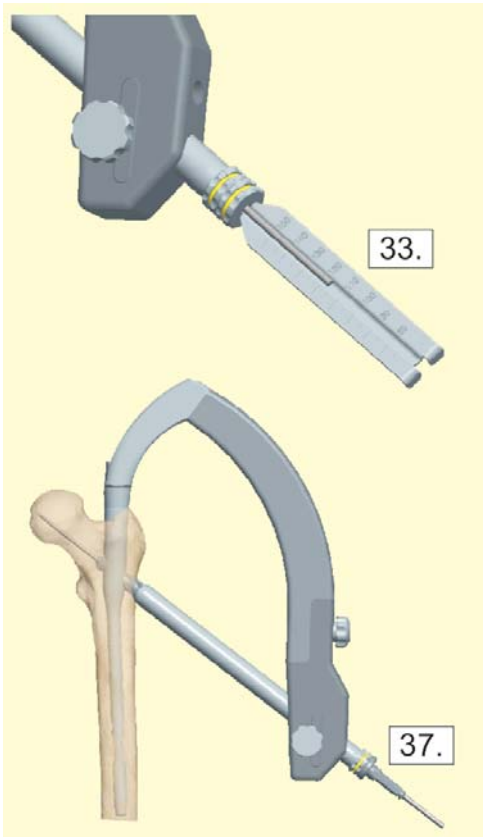
Verify that drill sleeves are against the bone!

14. Reaming for dynamic screw

Remove the yellow drill sleeve and insert the dia. 12.8mm reamer (37.) over the guide wire, drill through the nail.

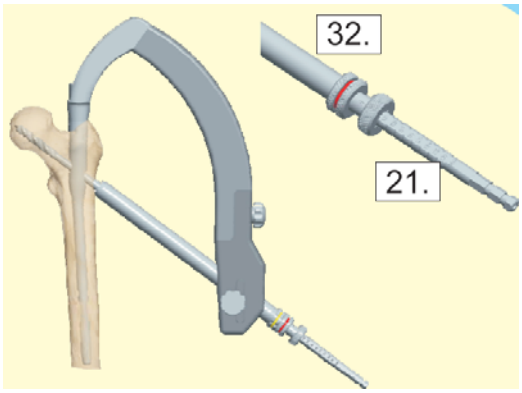
If the reamer get stuck, check the fixation screw in the nail, if the fixation screw driven too deeply it can block and damage the reamer.

You may drill forwards (!) while extracting the drill in order to keep the guide wire in it is place!



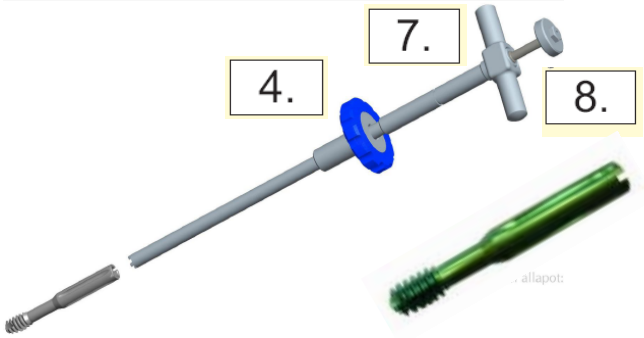
15. Predrilling for dynamic screw

Put the red drill guide (32.) over the red drill (21.) from its back and set its fixation sleeve to the measured dynamic screw length. Drill until the stop.
The T-handle (37.) may be used for for drilling.



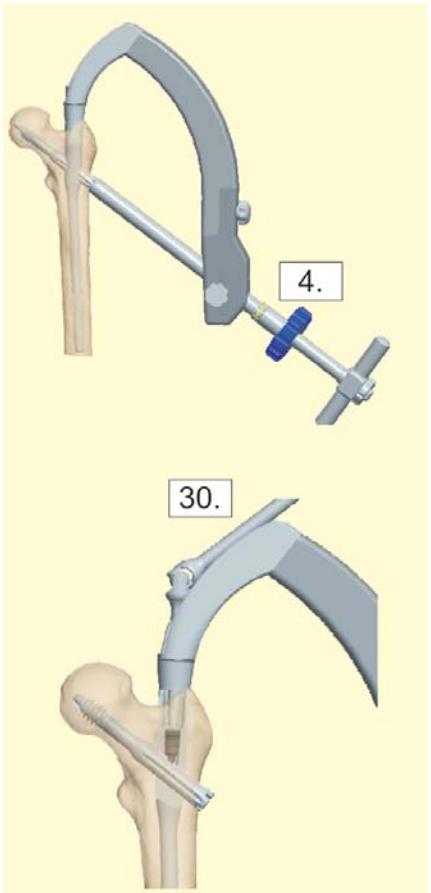
16. Assembling wrench for dynamic screw

Drive the threaded stem (8.) through the T-wrench (7.) from above, drive the compression device (4.) from below.
Set the dynamic screw with the threaded stem.



17. Inserting dynamic screw

Insert the dynamic screw over the guide wire. The tip of the screw should be approximately 5mm before the tip of the guide wire.
The compression device (4.) may be used to compress the fracture.



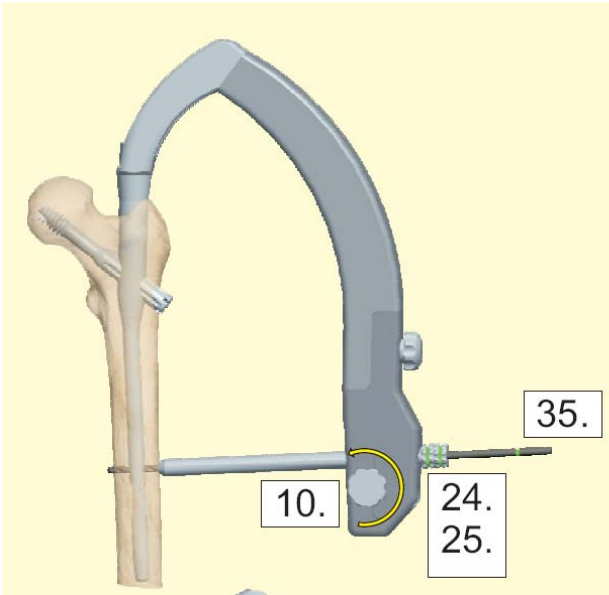
18. Rotational stabilization

Use the cardan screwdriver (30.) with the T-handle (37.) to tighten the fixation screw in the nail. The tip of the fixation screw should be in a groove of the dynamic screw to prevent the rotation.

Unscrew the fixation screw by a quarter revolution in order to dynamize the fixation!

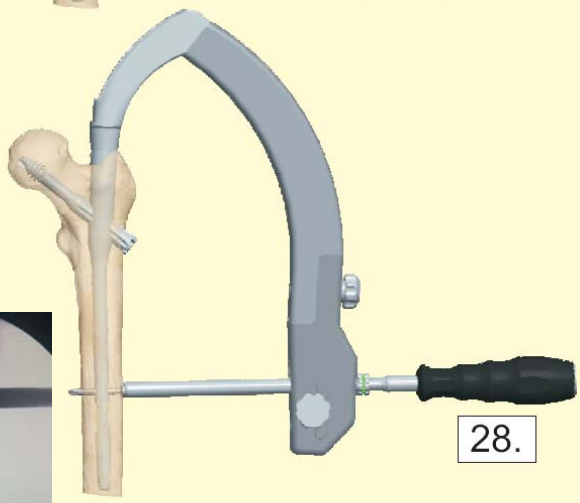
19. Removing the drill sleeves

Remove the dynamic screw wrench by twisting out the threaded stem.
Remove the guide wire.
Remove the yellow soft tissue protector by releasing the clamp screw on the aiming device.



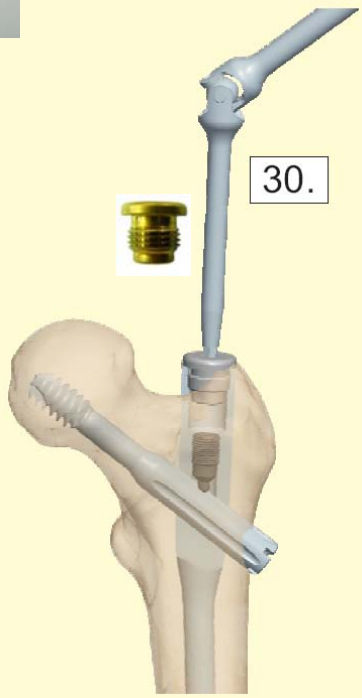
20. Distal interlocking

There is a round and an oval dynamic hole on the distal part of the nail to produce static or dynamic interlocking.
Put the green soft tissue protector (24.) and drill sleeve (25.) into the aiming device attachment, incise the skin, push the drill sleeve to the bone and fix the position with the clamp screw (10.) with the green dia. 4.0mm twist drill (35.) drill trough the nail and opposite cortex. Read the length on the drill or use the depth gauge (33.) to determine the screw length.
Interlock the nail with the dia. 4.9mm locking screw, obtain a final X-ray view to confirm and make sure the satisfactory of the locking screw placement.



21. Closure

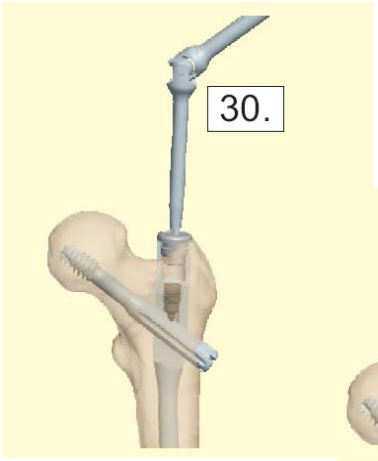
Remove the aiming device by releasing the nail adapter screw (5.) with the 10mm hexagonal screwdriver (29.).
Close the proximal part of the nail with a screw plug, tighten it with the cardan screwdriver (27.,30.).

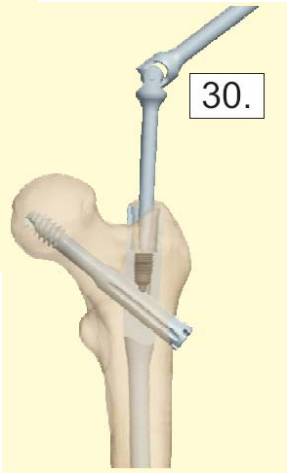


Nail Removal

1. Removal the screw plug

Remove the screw plug with the cardan Screwdriver (27., 30.).



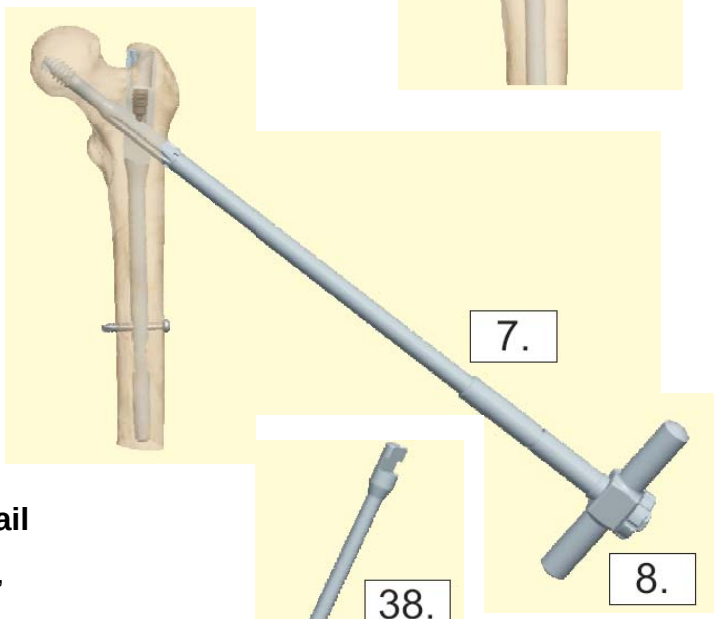


2. Open the fixation screw

Open and return the fixation screw with the same screwdriver (27., 30.) as much to remove the dynamic screw, complete removal is not necessary**.**

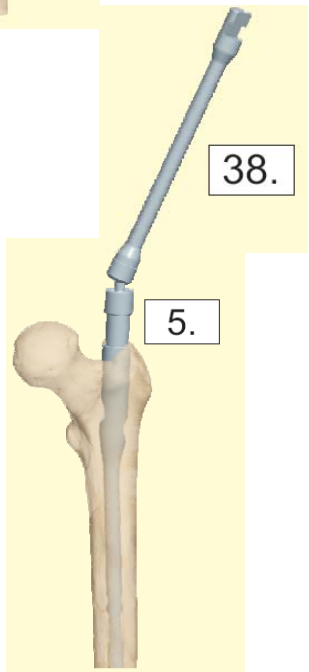
3. Removing the dynamic screw

Drive the threaded stem (8.) through the T-wrench (7.) from above.
Attach the wrench with the dynamic screw, which can be removed by counterclockwise turning.



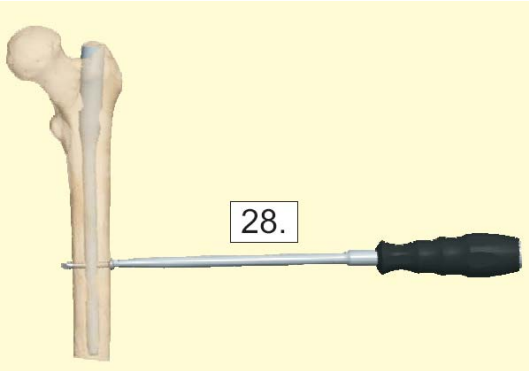
4. Attaching the removal device for nail

Drive the nail adapter screw (5.) into the nail, attach the cardan rod (38.) to it is internal thread.



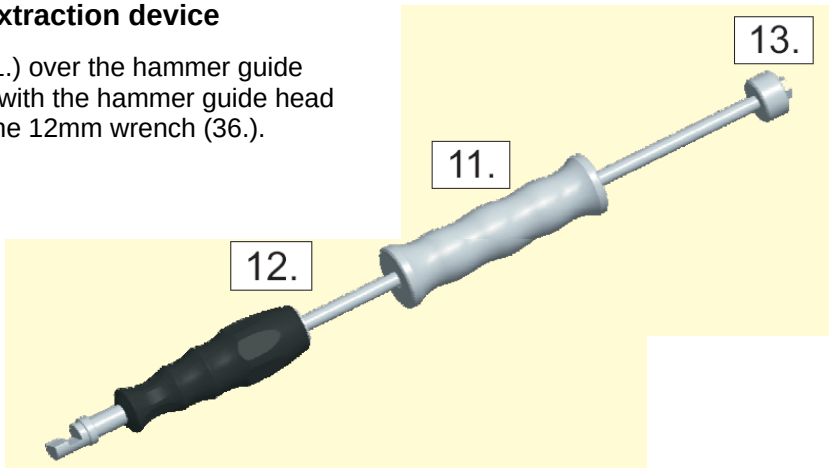
5. Removing the distal interlocking screws

Remove all the distal interlocking screws with the screwdriver (28.).



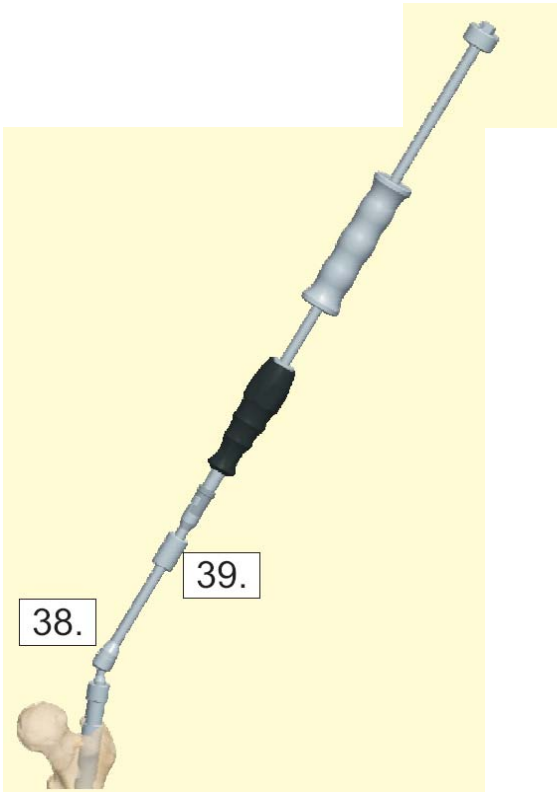
6. Assembling the extraction device

Put the slide hammer (11.) over the hammer guide shaft (12.), close its end with the hammer guide head (13.) and secure it with the 12mm wrench (36.).



7. Extraction of the nail

Put the extraction device fixation sleeve (39.) over the cardan rod (38.) and assemble it with the hammer shaft.
The nail implant can be extracted with the slide hammer.



Y-Mahe_Lock, Short Trochanteric Titanium Nails

Raw material specification: titanium alloy according to ISO 5832-3 Ti-6Al-4V

Cannulated Nails	Solid Nails	Ø Diam. mm	Length mm	Angle - Degree (°)
REF.:	**REF.:**			
NA-34510-11180	NA-34500-11180	11	180	130°
NA-34510-11200	NA-34500-11200	11	200	130°
NA-34510-11220	NA-34500-11220	11	220	130°
NA-34510-11240	NA-34500-11240	11	240	130°
NA-34530-11180	NA-34520-11180	11	180	135°
NA-34530-11200	NA-34520-11200	11	200	135°
NA-34530-11220	NA-34520-11220	11	220	135°
NA-34530-11240	NA-34520-11240	11	240	135°
NA-34510-12180	NA-34500-12180	12	180	130°
NA-34510-12200	NA-34500-12200	12	200	130°
NA-34510-12220	NA-34500-12220	12	220	130°
NA-34510-12240	NA-34500-12240	12	240	130°
NA-34530-12180	NA-34520-12180	12	180	135°
NA-34530-12200	NA-34520-12200	12	200	135°
NA-34530-12220	NA-34520-12220	12	220	135°
NA-34530-12240	NA-34520-12240	12	240	135°

Y-Mahe_Lock, Short Trochanteric Steel Nails

Raw material specification: steel alloy according to ISO 5832-1

Cannulated Nails	Solid Nails	Ø Diam. mm	Length mm	Angle - Degree (°)
REF.:	**REF.:**			
NA-14510-11180	NA-14500-11180	11	180	130°
NA-14510-11200	NA-14500-11200	11	200	130°
NA-14510-11220	NA-14500-11220	11	220	130°
NA-14510-11240	NA-14500-11240	11	240	130°
NA-14530-11180	NA-14520-11180	11	180	135°
NA-14530-11200	NA-14520-11200	11	200	135°
NA-14530-11220	NA-14520-11220	11	220	135°
NA-14530-11240	NA-14520-11240	11	240	135°
NA-14510-12180	NA-14500-12180	12	180	130°
NA-14510-12200	NA-14500-12200	12	200	130°
NA-14510-12220	NA-14500-12220	12	220	130°
NA-14510-12240	NA-14500-12240	12	240	130°
NA-14530-12180	NA-14520-12180	12	180	135°
NA-14530-12200	NA-14520-12200	12	200	135°
NA-14530-12220	NA-14520-12220	12	220	135°
NA-14530-12240	NA-14520-12240	12	240	135°

Y-Mahe_Lock, Long Trochanteric Titanium Nails

Raw material specification: titanium alloy according to ISO 5832-3 Ti-6Al-4V

Cannulated Nails	Solid Nails	Ø Diam. mm	Length mm	Angle - Degree (°)
REF.:	**REF.:**	**RIGHT**		
NA-34610-34130	NA-34630-34130	10	340	130°
NA-34610-36130	NA-34630-36130	10	360	130°
NA-34610-38130	NA-34630-38130	10	380	130°
NA-34610-40130	NA-34630-40130	10	400	130°
NA-34610-42130	NA-34630-42130	10	420	130°
NA-34610-34135	NA-34630-34135	10	340	135°
NA-34610-36135	NA-34630-36135	10	360	135°
NA-34610-38135	NA-34630-38135	10	380	135°
NA-34610-40135	NA-34630-40135	10	400	135°
NA-34610-42135	NA-34630-42135	10	420	135°

Cannulated Nails	Solid Nails	Ø Diam. mm	Length mm	Angle - Degree (°)
REF.:	**REF.:**	**LEFT**		
NA-34600-34130	NA-34620-34130	10	340	130°
NA-34600-36130	NA-34620-36130	10	360	130°
NA-34600-38130	NA-34620-38130	10	380	130°
NA-34600-40130	NA-34620-40130	10	400	130°
NA-34600-42130	NA-34620-42130	10	420	130°
NA-34600-34135	NA-34620-34135	10	340	135°
NA-34600-36135	NA-34620-36135	10	360	135°
NA-34600-38135	NA-34620-38135	10	380	135°
NA-34600-40135	NA-34620-40135	10	400	135°
NA-34600-42135	NA-34620-42135	10	420	135°

Y-Mahe_Lock, Long Trochanteric Steel Nails

Raw material specification: steel alloy according to ISO 5832-1

Cannulated Nails	Solid Nails	Ø Diam. mm	Length mm	Angle - Degree (°)
REF.:	**REF.:**	**RIGHT**		
NA-14610-34130	NA-14630-34130	10	340	130°
NA-14610-36130	NA-14630-36130	10	360	130°
NA-14610-38130	NA-14630-38130	10	380	130°
NA-14610-40130	NA-14630-40130	10	400	130°
NA-14610-42130	NA-14630-42130	10	420	130°
NA-14610-34135	NA-14630-34135	10	340	135°
NA-14610-36135	NA-14630-36135	10	360	135°
NA-14610-38135	NA-14630-38135	10	380	135°
NA-14610-40135	NA-14630-40135	10	400	135°
NA-14610-42135	NA-14630-42135	10	420	135°

Cannulated Nails	Solid Nails	Ø Diam. mm	Length mm	Angle - Degree (°)
REF.:	**REF.:**	**LEFT**		
NA-14600-34130	NA-34620-34130	10	340	130°
NA-14600-36130	NA-34620-36130	10	360	130°
NA-14600-38130	NA-34620-38130	10	380	130°
NA-14600-40130	NA-34620-40130	10	400	130°
NA-14600-42130	NA-34620-42130	10	420	130°
NA-14600-34135	NA-34620-34135	10	340	135°
NA-14600-36135	NA-34620-36135	10	360	135°
NA-14600-38135	NA-34620-38135	10	380	135°
NA-14600-40135	NA-34620-40135	10	400	135°
NA-14600-42135	NA-34620-42135	10	420	135°

Y-Mahe_Lock Titanium & Steel Dynamic Lag Screws used for Trochanteric Y - Nails

Raw material specification: titanium alloy according to ISO 5832-3 Ti-6Al-4V
Raw material specification: steel alloy according to ISO 5832-1

Important Technical Dimension:

- **Thread Diameter = 12.6mm**
- **Core Diameter = 8.0mm**
- **Pitch = 3.0mm**

REF.: Titanium Lag Screws	Length mm	REF.: Steel Lag Screws	Length mm
LS-32700-12075	75	LS-12700-12075	75
LS-32700-12080	80	LS-12700-12080	80
LS-32700-12085	85	LS-12700-12085	85
LS-32700-12090	90	LS-12700-12090	90
LS-32700-12095	95	LS-12700-12095	95
LS-32700-12100	100	LS-12700-12100	100
LS-32700-12105	105	LS-12700-12105	105
LS-32700-12110	110	LS-12700-12110	110
LS-32700-12115	115	LS-12700-12115	115
LS-32700-12120	120	LS-12700-12120	120
LS-32700-12125	125	LS-12700-12125	125
LS-32700-12130	130	LS-12700-12130	130
LS-32700-12135	135	LS-12700-12135	135
LS-32700-12140	140	LS-12700-12140	140
LS-32700-12145	145	LS-12700-12145	145

Y-Mahe_Lock Titanium & Steel Fixation Screw used for Trochanteric Y - Nails

Raw material specification: titanium alloy according to ISO 5832-3 Ti-6Al-4V
Raw material specification: steel alloy according to ISO 5832-1

REF.: Titanium Fixation Screw	REF.: Steel Fixation Screw
LS-32401-09020	LS-12401-09020

Y-Mahe_Lock Titanium & Steel Screw Plug used for Trochanteric Y - Nails

Raw material specification: titanium alloy according to ISO 5832-3 Ti-6Al-4V
Raw material specification: steel alloy according to ISO 5832-1

REF.: Titanium Screw Plug	REF.: Steel Screw Plug
LS-32400-17016	LS-12400-17016

Y-Mahe_Lock Titanium & Steel Dynamic Locking Screws Diameter 4.9mm used for Trochanteric Y - Nails

Raw material specification: titanium alloy according to ISO 5832-3 Ti-6Al-4V
Raw material specification: steel alloy according to ISO 5832-1

Important Technical Dimension:

- **Thread Diameter = 4.9 mm**
- **Core Diameter = 4.2 mm**
- **Head Diameter = 8.0 mm**
- **Pitch = 2.75mm**
- **Hex. width = 3.5 mm**

REF.: Titanium Locking Screws	Length mm	REF.: Steel Locking Screws	Length mm
LS-32200-49020	20	LS-12200-49020	20
LS-32200-49022	22	LS-12200-49022	22
LS-32200-49024	24	LS-12200-49024	24
LS-32200-49026	26	LS-12200-49026	26
LS-32200-49028	28	LS-12200-49028	28
LS-32200-49030	30	LS-12200-49030	30
LS-32200-49032	32	LS-12200-49032	32
LS-32200-49034	34	LS-12200-49034	34
LS-32200-49036	36	LS-12200-49036	36
LS-32200-49038	38	LS-12200-49038	38
LS-32200-49040	40	LS-12200-49040	40
LS-32200-49042	42	LS-12200-49042	42
LS-32200-49044	44	LS-12200-49044	44
LS-32200-49045	45	LS-12200-49045	45
LS-32200-49046	46	LS-12200-49046	46
LS-32200-49048	48	LS-12200-49048	48
LS-32200-49050	50	LS-12200-49050	50
LS-32200-49052	52	LS-12200-49052	52
LS-32200-49054	54	LS-12200-49054	54
LS-32200-49055	55	LS-12200-49055	55
LS-32200-49056	56	LS-12200-49056	56
LS-32200-49058	58	LS-12200-49058	58
LS-32200-49060	60	LS-12200-49060	60
LS-32200-49062	62	LS-12200-49062	62
LS-32200-49064	64	LS-12200-49064	64
LS-32200-49065	65	LS-12200-49065	65
LS-32200-49066	66	LS-12200-49066	66
LS-32200-49068	68	LS-12200-49068	68
LS-32200-49070	70	LS-12200-49070	70
LS-32200-49072	72	LS-12200-49072	72
LS-32200-49074	74	LS-12200-49074	74
LS-32200-49075	75	LS-12200-49075	75
LS-32200-49076	76	LS-12200-49076	76
LS-32200-49078	78	LS-12200-49078	78
LS-32200-49080	80	LS-12200-49080	80
LS-32200-49085	85	LS-12200-49085	85
LS-32200-49090	90	LS-12200-49090	90
LS-32200-49095	95	LS-12200-49095	95
LS-32200-49100	100	LS-12200-49100	100

Y-Mahe_Lock Trochanteric Nails System

Solution without Compromise!

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