



**FEMORAL NAILING WITH „Z“ TROCHANTERIC AND
„Z“ LIGHT TROCHANTERIC NAIL**

IMPLANTS AND OPERATING MANUAL



medimetal[®]
Medical Products Manufacturing and Trading Ltd.

Before starting use the product

Before each use, carefully check the operability of implants and surgical instruments, and ensure they are free of any damage. If you notice any cracks, fractures, deformations, discoloration or any damages that indicate improper storage, imperfect sterilization or prior incorrect treatment, do not use the device. Always carry out the assembly, fitting and operation test of the implants and instruments to be used for the implantation. The product may only be used if the fittings are perfect, the dimensions are accurate, the clamping components work properly and the angles are correctly set.

Requirements regarding the user

The instruments and implants may only be used by qualified surgeons who are familiar with the surgical practice, with the relevant medical literature and are sufficiently experienced in the use of implants and instruments. The operating surgeon is responsible for identifying the correct indication, selecting the implants and conducting the surgical procedure in conformity with the relevant medical practice.

Contraindications

Use of the implant is not recommended if the medical condition of the patient does not allow successful acceptance of the device, or if the recovery of the patient is hindered by causes such as reduced blood circulation, bone system of poor quality or quantity, existing infection, rehabilitation excluded due to the mental condition of the patient etc.

General warnings

Before the surgical procedure, the patient should be informed about the possible disadvantages of implant use. When selecting the implant, the type of the bone fracture as well as the weight and activity level of the patient should always be taken into consideration. Since the solidity of the implant is limited, overloading due to overweight should be avoided. The biomechanical loading of the implant should be as minimal as possible.

The process of recovery should be monitored during the use of the implant. In the event of repeated loading or prolonged bone recovery, the implants may be deformed or dislocated, which should be prevented by timely interventions. Strong and/or repeated deformation of the implant should be avoided. The implants are only for single use, re-implantation is prohibited.

The appropriate type and correct size of the implants must be identified according to the characteristics of the particular case. Before the surgical procedure, the user manuals supplied with the other required devices, e.g. implants, should be carefully studied.

Applied materials

The applied materials are high-quality and high-tensile, nonmagnetic, stainless steel and titanium alloy materials specially developed for implants. Combined use with other materials or products supplied by other manufacturers may lead to harmful processes for which Medimetal Ltd. will not accept any responsibility.

Protection, packaging and preparation for use

The implants are packaged in clean condition, free of any production-related contaminations. Before use, such storage conditions must be ensured that will preserve the integrity of the packaging. The implants should be stored in a clean, dry place, protected from exposure to extreme temperatures and chemicals.

Sterilization

Before use, unpack and sterilize the implant in accordance with the relevant instructions. Do not touch the implant with bare hands. The surgical instruments should be sterilized together with the instrument tray. The instructions provided by the manufacturer of the sterilization equipment must always be followed.

Interactions with medicinal products

It is not known whether the implants interact with medicinal products.



**System of implants:****„Z“-type trochanteric nail, short:**

solid or cannulated, diameter 11 -12 mm, with CCD angle 130° or 135°, length from 180 to 240 mm, steel or titanium alloy

Dynamic screw:

Thread diameter 12,6 mm, core diameter 8,0 mm, pitch 3,0 mm, steel or titanium alloy

Fixing screw: steel (cat. nr. 12401-09020) or titanium alloy (32401-09020)

Locking screw: diameter 4,9 mm, steel or titanium alloy

End cup: steel (cat. nr. 12400-14022) or titanium alloy (cat. nr. 32400-14022)

„Z“-type trochanteric nail, long left, right:

solid or cannulated, diameter 10 mm, with CCD angle 130° or 135°, left or right, length from 340 to 420 mm, steel or titanium alloy

Dynamic screw:

Thread diameter 12,6 mm, core diameter 8,0 mm, pitch 3,0 mm, steel or titanium alloy

Fixing screw: steel (cat. nr. 12401-09020) or titanium alloy (32401-09020)

Locking screw: diameter 4,9 mm, steel or titanium alloy

End cup: steel (cat.nr. 12400-14022) or titanium alloy (cat. nr. 32400-14022)

„Z“-type trochanteric nail, light, short:

proximal diameter 15,5 mm, cannulated, distal diameter 9 -11 mm, with CCD angle 125°, 130° or 135°, length from 180 to 240 mm, steel or titanium alloy

Dynamic screw:

Thread diameter 10,5 mm, core diameter 7 mm, pitch 3 mm, steel or titanium alloy

Fixing screw: steel (cat. nr. 12401-08025) or titanium alloy (cat. nr. 32401-08025)

Locking screw: diameter 4,9 mm, steel or titanium alloy

End cup: steel (cat. nr. 12400-15022) or titanium alloy (cat. nr. 32400-15022)

„Z“-type trochanteric nail, light, long:

proximal diameter 15,5 mm, cannulated, distal diameter 9 -10 mm, with CCD angle 125°, 130° or 135°, length from 340 to 420 mm, steel or titanium alloy

Dynamic screw:

Thread diameter 10,5 mm, core diameter 7 mm, pitch 3 mm, steel or titanium alloy

Fixing screw: steel (cat. nr. 12401-08025) or titanium alloy (cat. nr. 32401-08025)

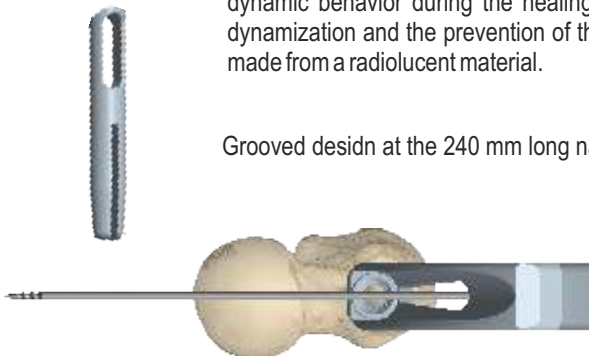
Locking screw: diameter 4,9 mm, steel or titanium alloy

End cup: steel (cat. nr. 12400-15022) or titanium alloy (cat. nr. 32400-15022)

Indications of „Z“-type trochanteric nail:

The "Z" and "Z" light trochanteric nailing was primarily developed for the surgical treatment of trochanteric fractures and of some cases of femoral neck fractures. The system combines the biomechanical advantages of the intramedullary nailing and the traditional dynamic hip screw. Due to its wide length- and diameter ranges it can offer an excellent surgical solution for the upper third femur fractures, and even for its combinations with diaphyseal fractures. The essential component of the system is a dynamic hip screw that is inserted into the femoral neck. The hip screw is able to compress the fracture, but it has a dynamic behavior during the healing. A fixing screw, which is inserted in the nail, ensures both the dynamization and the prevention of the rotation of the hip screw after the surgery. The aiming device is made from a radiolucent material.

Grooved design at the 240 mm long nail for the prevention of cortical bone erosion



Aiming assistance for increased implantation accuracy

Implants for „Z“-type trochanteric nailing

„Z“-type trochanteric nail, short

Ø (mm)	L (mm)	α (°)	Catalogue number			
			cannulated		solid	
			steel	titanium alloy	steel	titanium alloy
11	180	130	14510-11180	34510-11180	14500-11180	34500-11180
11	200	130	14510-11200	34510-11200	14500-11200	34500-11200
11	220	130	14510-11220	34510-11220	14500-11220	34500-11220
11	240	130	14510-11240	34510-11240	14500-11240	34500-11240
11	180	135	14530-11180	34530-11180	14520-11180	34520-11180
11	200	135	14530-11200	34530-11200	14520-11200	34520-11200
11	220	135	14530-11220	34530-11220	14520-11220	34520-11220
11	240	135	14530-11240	34530-11240	14520-11240	34520-11240
12	180	130	14510-12180	34510-12180	14500-12180	34500-12180
12	200	130	14510-12200	34510-12200	14500-12200	34500-12200
12	220	130	14510-12220	34510-12220	14500-12220	34500-12220
12	240	130	14510-12240	34510-12240	14500-12240	34500-12240
12	180	135	14530-12180	34530-12180	14520-12180	34520-12180
12	200	135	14530-12200	34530-12200	14520-12200	34520-12200
12	220	135	14530-12220	34530-12220	14520-12220	34520-12220
12	240	135	14530-12240	34530-12240	14520-12240	34520-12240

„Z“-type trochanteric nail, long, right or left

Ø (mm)	L (mm)	α (°)	Catalogue number			
			long, right, cannulated		long, right, solid	
			steel	titanium alloy	steel	titanium alloy
10	340	130	14610-34130	34610-34130	14630-34130	34630-34130
10	360	130	14610-36130	34610-36130	14630-36130	34630-36130
10	380	130	14610-38130	34610-38130	14630-38130	34630-38130
10	400	130	14610-40130	34610-40130	14630-40130	34630-40130
10	420	130	14610-42130	34610-42130	14630-42130	34630-42130
10	340	135	14610-34135	34610-34135	14630-34135	34630-34135
10	360	135	14610-36135	34610-36135	14630-36135	34630-36135
10	380	135	14610-38135	34610-38135	14630-38135	34630-38135
10	400	135	14610-40135	34610-40135	14630-40135	34630-40135
10	420	135	14610-42135	34610-42135	14630-42135	34630-42135

Ø (mm)	L (mm)	α (°)	Catalogue number			
			long, left, cannulated		long, left, solid	
			steel	titanium alloy	steel	titanium alloy
10	340	130	14600-34130	34600-34130	14620-34130	34620-34130
10	360	130	14600-36130	34600-36130	14620-36130	34620-36130
10	380	130	14600-38130	34600-38130	14620-38130	34620-38130
10	400	130	14600-40130	34600-40130	14620-40130	34620-40130
10	420	130	14600-42130	34600-42130	14620-42130	34620-42130
10	340	135	14600-34135	34600-34135	14620-34135	34620-34135
10	360	135	14600-36135	34600-36135	14620-36135	34620-36135
10	380	135	14600-38135	34600-38135	14620-38135	34620-38135
10	400	135	14600-40135	34600-40135	14620-40135	34620-40135
10	420	135	14600-42135	34600-42135	14620-42135	34620-42135

FEMORAL NAILING „Z“



Dynamic screw for short „Z“-type trochanteric nail



Thread diameter: 12,6 mm
Core diameter: 8,0 mm
Pitch: 3,0 mm

L (mm)	Catalogue number		L (mm)	Catalogue number	
	steel	titanium alloy		steel	titanium alloy
75	12700-12075	32700-12075	115	12700-12115	32700-12115
80	12700-12080	32700-12080	120	12700-12120	32700-12120
85	12700-12085	32700-12085	125	12700-12125	32700-12125
90	12700-12090	32700-12090	130	12700-12130	32700-12130
95	12700-12095	32700-12095	135	12700-12135	32700-12135
100	12700-12100	32700-12100	140	12700-12140	32700-12140
105	12700-12105	32700-12105	145	12700-12145	32700-12145
110	12700-12110	32700-12110			

Fixing screw for short and long „Z“-type trochanteric nail



Cat. nr.	
steel	titanium alloy
12401-09020	32401-09020

End cup screw for short and long „Z“-type trochanteric nail



Cat. nr.	
steel	titanium alloy
12400-14022	32400-14022

Locking screw for all type of „Z“ trochanteric nail



Thread diameter: 4,9 mm
Core diameter: 4,2 mm
Pitch: 2,75 mm
Head diameter: 8,0 mm
Hex width: 3,5 mm

L (mm)	Cat. nr.		L (mm)	Cat. nr.		L (mm)	Cat. nr.	
	steel	titanium alloy		steel	titanium alloy		steel	titanium alloy
20	12200-49020	32200-49020	42	12200-49042	32200-49042	64	12200-49064	32200-49064
22	12200-49022	32200-49022	44	12200-49044	32200-49044	65	12200-49065	32200-49065
24	12200-49024	32200-49024	45	12200-49045	32200-49045	66	12200-49066	32200-49066
25	12200-49025	32200-49025	46	12200-49046	32200-49046	68	12200-49068	32200-49068
26	12200-49026	32200-49026	48	12200-49048	32200-49048	70	12200-49070	32200-49070
28	12200-49028	32200-49028	50	12200-49050	32200-49050	72	12200-49072	32200-49072
30	12200-49030	32200-49030	52	12200-49052	32200-49052	75	12200-49075	32200-49075
32	12200-49032	32200-49032	54	12200-49054	32200-49054	76	12200-49076	32200-49076
34	12200-49034	32200-49034	55	12200-49055	32200-49055	78	12200-49078	32200-49078
35	12200-49035	32200-49035	56	12200-49056	32200-49056	80	12200-49080	32200-49080
36	12200-49036	32200-49036	58	12200-49058	32200-49058	85	12200-49085	32200-49085
38	12200-49038	32200-49038	60	12200-49060	32200-49060	90	12200-49090	32200-49090
40	12200-49040	32200-49040	62	12200-49062	32200-49062	100	12200-49100	32200-49100

Surgical instruments for „Z“-type trochanteric nailing

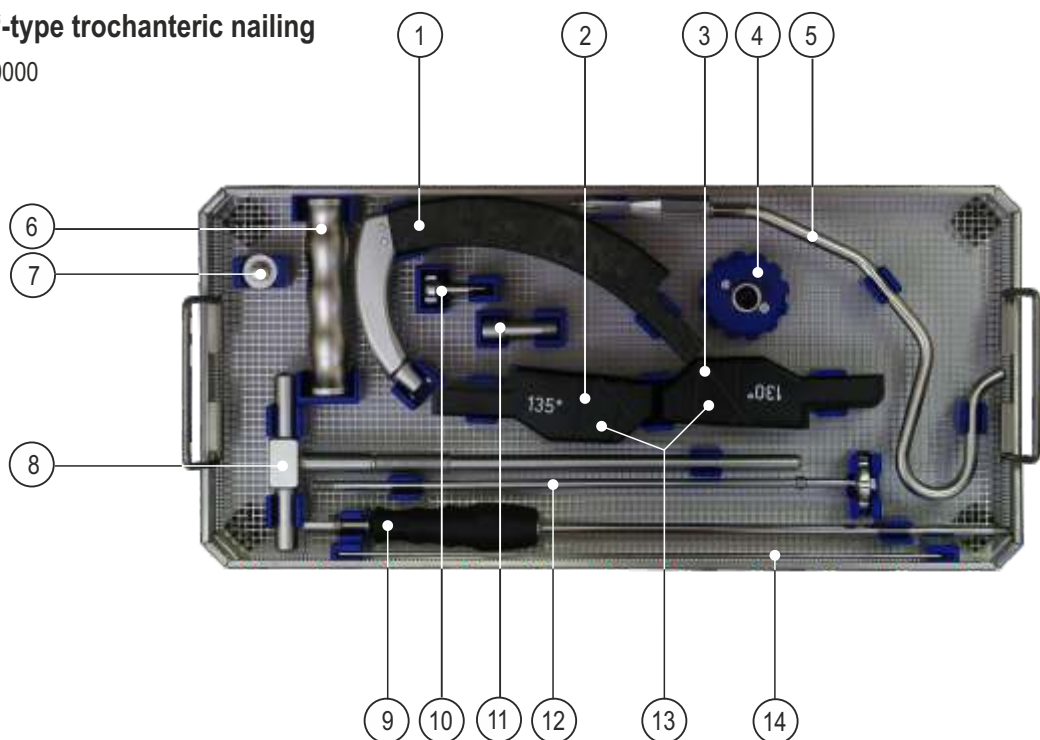
Surgical set

Two trays for „Z“-type trochanteric nailing instrument set, complete with instruments: cat. nr. 94500-00000



Tray I. for „Z“-type trochanteric nailing

Cat. nr. 94500-10000



Pos.	Cat. no.	Description	pcs
1.	94500-00100	Proximal targeting arm, radiolucent	1
2.	94500-00301	Aiming arm attachment, 135°	1
3.	94500-00201	Aiming arm attachment, 130°	1
4.	94500-00800	Compressing device	1
5.	94500-00900	Hollow reamer	1
6.	94500-01100	Slide hammer	1
7.	94500-02501	Hammer guide head	1
8.	94500-00600	T wrench	1
9.	94500-01000	Hammer guide shaft	1
10.	94500-00400	Aiming arm fixing screw	1
11.	94500-00500	Nail adapter screw	1
12.	94500-00700	Threaded stem for dynamic screw	1
13.	94500-00203	Aiming arm clamp screw	2
14.	15000-35400	Kirschner wire, 3,5 × 400 mm	1

Surgical instruments for „Z“-type trochanteric nailing



Pos.	Cat. no.	Description	pcs
1.	94500-00100	Proximal targeting arm radiolucent	1



Pos.	Cat. no.	Description	pcs
2.	94500-00301	Aiming arm attachment 135°	1



Pos.	Cat. no.	Description	pcs
3.	94500-00201	Aiming arm attachment 130°	1



Pos.	Cat. no.	Description	pcs
4.	94500-00800	Compressing device	1



Pos.	Cat. no.	Description	pcs
5.	94500-00900	Hollow reamer	1



Pos.	Cat. no.	Description	pcs
6.	94500-01100	Slide hammer	1



Pos.	Cat. no.	Description	pcs
7.	94500-02501	Hammer guide head	1

Surgical instruments for „Z“-type trochanteric nailing

Pos.	Cat. no.	Description	pcs
8.	94500-00600	T wrench	1



Pos.	Cat. no.	Description	pcs
9.	94500-01000	Hammer guide shaft	1



Pos.	Cat. no.	Description	pcs
10.	94500-00400	Aiming arm fixing screw	1



Pos.	Cat. no.	Description	pcs
11.	94500-00500	Nail adapter screw	1



Pos.	Cat. no.	Description	pcs
12.	94500-00700	Threaded stem for dynamic screw	1



Pos.	Cat. no.	Description	pcs
13.	94500-00203	Aiming arm clamp screw	2



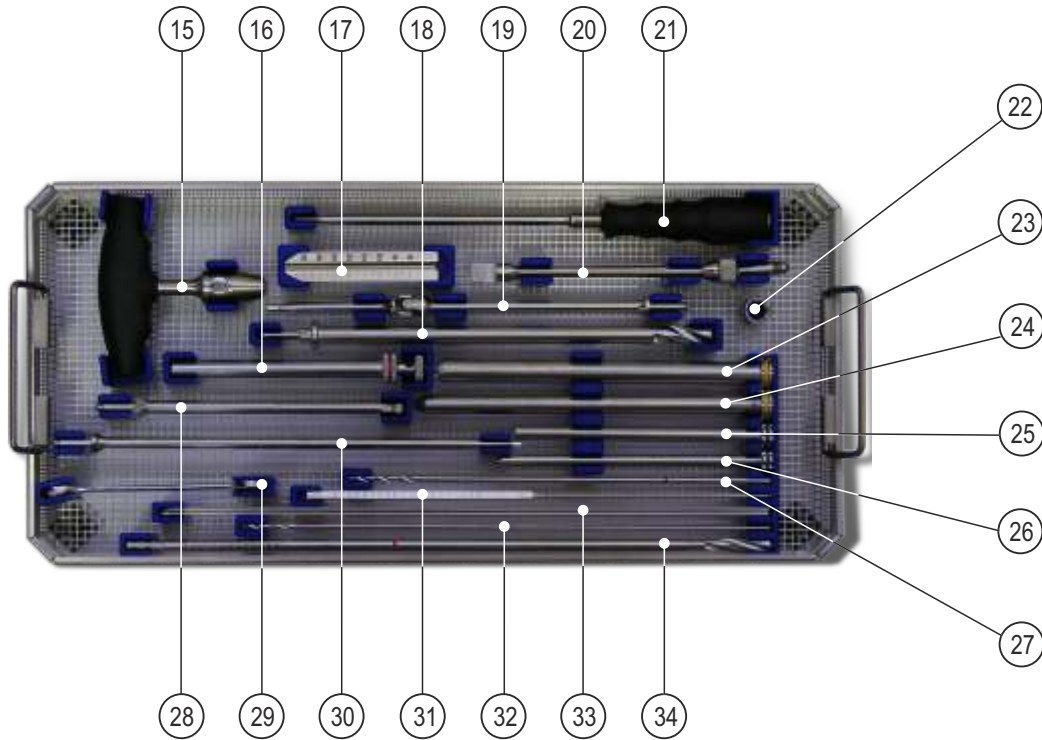
Pos.	Cat. no.	Description	pcs
14.	15000-35400	Kirschner wire 3,5 × 400 mm	1



Surgical instruments for „Z“-type trochanteric nailing

Tray II. for „Z“-type trochanteric nailing

Cat. nr. 94500-20000



Pos.	Cat. no.	Description	pcs
15.	99000-00006	Universal chuck with T handle	1
16.	94500-01600	Drill guide for dynamic screw reamer, (red)	1
17.	94500-01700	Gauge for dynamic screw	1
18.	94500-01400	Reamer for dynamic screw, 12,8 mm	1
19.	94500-02300	Cardan screw driver with quick coupling	1
20.	94500-02400	Cardan rod for removal device	1
21.	94500-02100	Hexagonal screwdriver, 3,5 mm	1
22.	94500-01004	Fixation sleeve for removal device	1
23.	94500-01200	Soft tissue protector for dynamic screw, (yellow)	1
24.	94500-01300	Drill sleeve for guide wire, (yellow)	1
25.	94500-01800	Soft tissue protector for locking screw, (green)	1
26.	94500-01900	Drill sleeve for distal locking drill (green)	1
27.	99010-40310	Spiral drill, 4 × 310 mm, (green)	1
28.	94500-02200	Hexagonal screwdriver shaft, 10 mm	1
29.	99000-00011	Wrench, 12 mm	1
30.	94500-02600	Hexagonal screwdriver with quick coupling, 3,5 mm	1
31.	94500-02000	Depth gauge for locking screw	1
32.	99010-32350	Spiral drill, 3,2 × 350 mm, (yellow)	1
33.	15020-30400	Threaded Kirschner guide wire, 3 × 400 mm	4
34.	94500-01500	Reamer for dynamic screw, (red)	1

Surgical instruments for „Z“-type trochanteric nailing

Pos.	Cat. no.	Description	pcs
15.	99000-00006	Universal chuck with T handle	1



Pos.	Cat. no.	Description	pcs
16.	94500-01600	Drill guide for dynamic screw reamer, (red)	1



Pos.	Cat. no.	Description	pcs
17.	94500-01700	Gauge for dynamic screw	1



Pos.	Cat. no.	Description	pcs
18.	94500-01400	Reamer for dynamic screw 12,8 mm	1



Pos.	Cat. no.	Description	pcs
19.	94500-02300	Cardan screw driver with quick coupling	1



Pos.	Cat. no.	Description	pcs
20.	94500-02400	Cardan rod for removal device	1



Pos.	Cat. no.	Description	pcs
21.	94500-02100	Hexagonal screwdriver 3,5 mm	1



Pos.	Cat. no.	Description	pcs
22.	94500-01004	Fixation sleeve for removal device	1



Pos.	Cat. no.	Description	pcs
23.	94500-01200	Soft tissue protector for dynamic screw, (yellow)	1





Pos.	Cat. no.	Description	pcs
24.	94500-01300	Drill sleeve for guide wire, (yellow)	1





Surgical instruments for „Z“-type trochanteric nailing


	Pos.	Cat. no.	Description	pcs
	25.	94500-01800	Soft tissue protector for locking screw, (green)	1


	Pos.	Cat. no.	Description	pcs
	26.	94500-01900	Drill sleeve for distal locking drill (green)	1


	Pos.	Cat. no.	Description	pcs
	27.	99010-40310	Spiral drill 4 × 310 mm, (green)	1


	Pos.	Cat. no.	Description	pcs
	28.	94500-02200	Hexagonal screwdriver shaft 10 mm	1


	Pos.	Cat. no.	Description	pcs
	29.	99000-00011	Wrench 12 mm	1

	Pos.	Cat. no.	Description	pcs
	30.	94500-02600	Hexagonal screwdriver with quick coupling 3,5 mm	1

	Pos.	Cat. no.	Description	pcs
	31.	94500-02000	Depth gauge for locking screw	1

	Pos.	Cat. no.	Description	pcs
	32.	99010-32350	Spiral drill 3,2 × 350 mm, (yellow)	1

	Pos.	Cat. no.	Description	pcs
	33.	15020-30400	Threaded Kirschner guide wire 3 × 400 mm	4

	Pos.	Cat. no.	Description	pcs
	34.	94500-01500	Reamer for dynamic screw, (red)	1

Surgical technique for „Z“-type trochanteric nailing

1 Preoperative planning

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



Fluoroscopic control is advised.

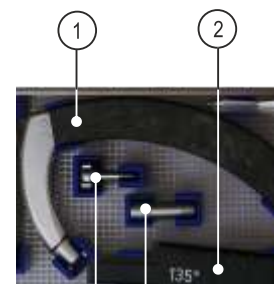
The image intensifier must be in a standard position for a-p and lateral view.



Numbers in brackets after instrument names refer to the list number in the instrument tray.



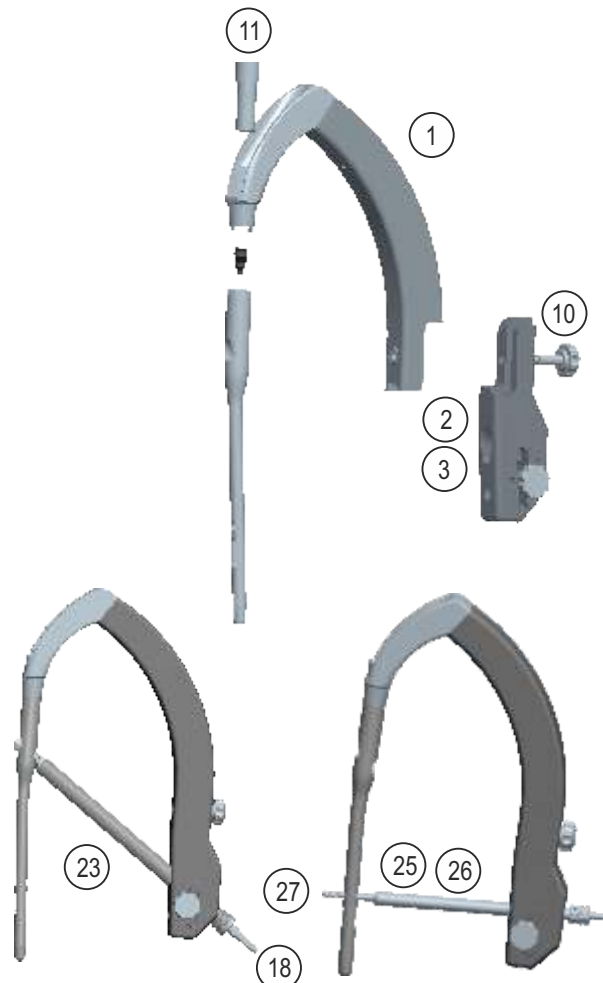
Pay special attention, important step.

**2 Assembling of the instruments**

Attach the intramedullary nail to the radiolucent aiming arm (1) with the nail adapter screw (11). Secure the nail with the 10 mm hexagonal screwdriver (15, 28). Depending on the CCD angle of the implant (130°/135°) mount the correct aiming arm attachment (2, 3) with the aiming arm fixing screw (10).

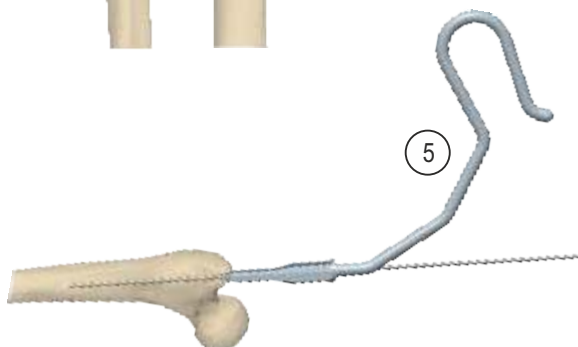
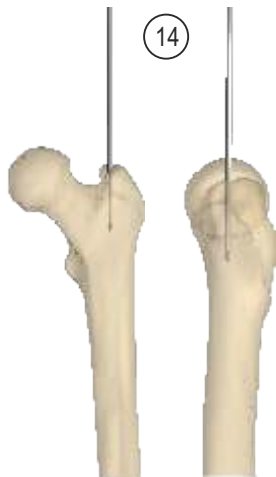
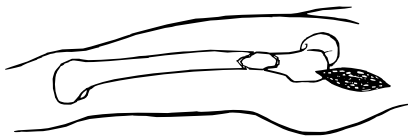
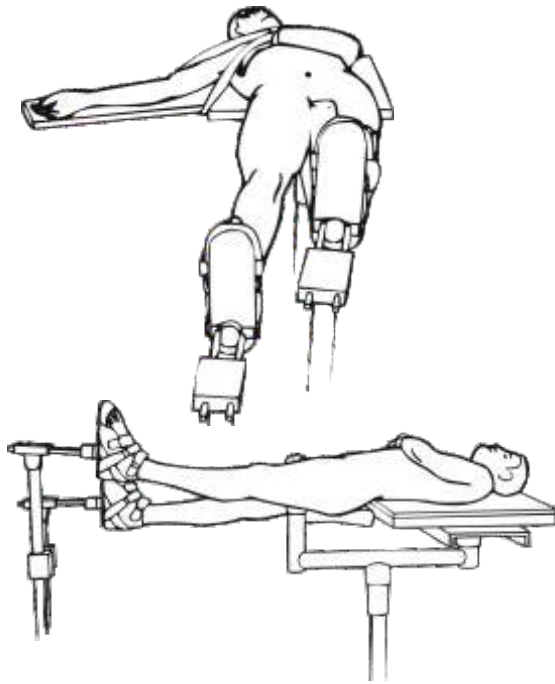


Drive the fixing screw (12400-09020) into the nail, but the tip of the screw should not hinder the rotation of the dynamic screw (12700-...).



- 3** Put into the dynamic screw hole the yellow soft tissue protector (23) and reamer (18). Put into the distal hole the green soft tissue protector (25), drill sleeve (26) and 4 mm spiral drill (27).

Surgical technique for „Z“-type trochanteric nailing

**4 Positioning of the patient 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.

5 Skin incision

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

6 Determining of the entry point

With a 3,5x400 mm threaded Kirschner wire (14.) find the trochanteric fossa. The tip of the pin should be in the midplane of the femur in both anteroposterior and lateral views.

Under fluoroscopic control insert the Kirschner wire into the medullary canal.

7 Opening the femur

Insert the cannulated 17.6 mm Hollow reamer (5) over the Kirschner wire to enlarge the entry portal. Ream the proximal femur until the reamer sink into it.

Surgical technique for „Z“-type trochanteric nailing

8 Inserting of the nail

If solid nail is used, remove the Kirschner wire, if cannulated, it should be inserted over the wire.

Insert the nail carefully by hand until the axis of the dynamic screw hole reaches the center of the femoral neck.

If resistance is encountered, stop and withdraw the implant, and push it with slight twisting, or use a smaller diameter.



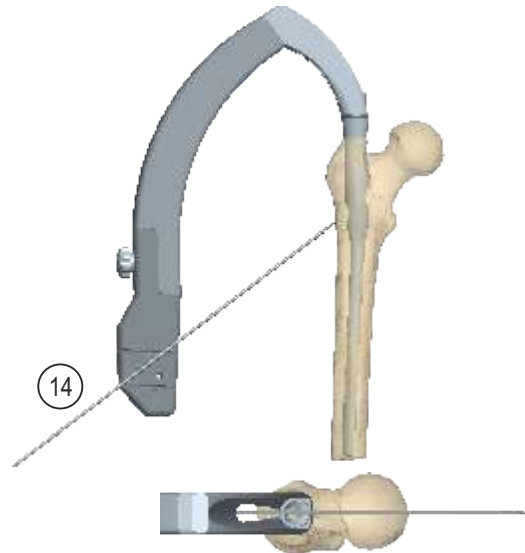
Never hit the aiming arm. In difficult cases you may use the extraction device to support insertion.

**9 X-ray evaluation**

Put a Kirschner wire (14) into the proximal hole of the aiming arm.

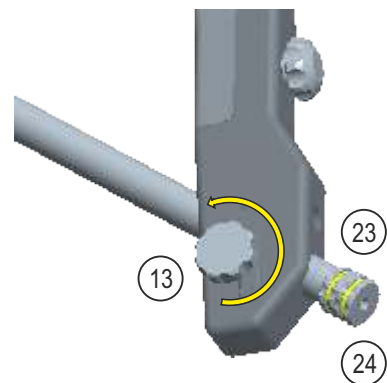
Its shadow in lateral view should be in the center of the femoral neck.

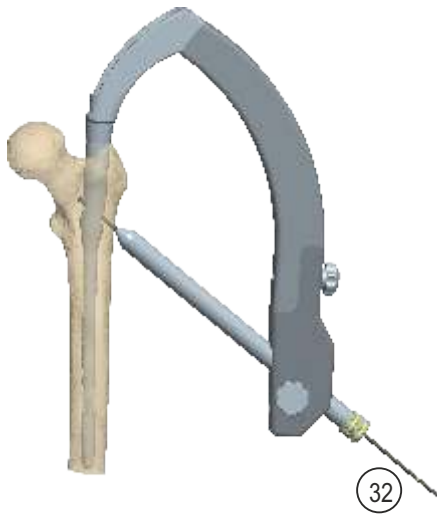
The lateral groove of the aiming arm is parallel to the dynamic head screw.

**10 Skin incision at dynamic screw**

Put the yellow soft tissue protector (23) and drill sleeve (24) into the aiming arm, incise the skin and fascia and push the drill sleeves to the bone.

With the clamp screw on the aiming arm (13) fix the position.

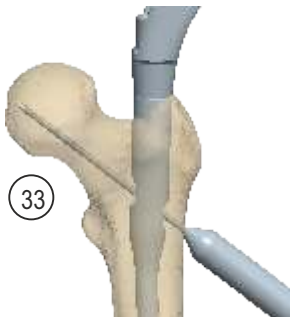




11 Predrilling for the guide wire

Drill through the cortical bone with the yellow 3.2 mm spiral drill (32).

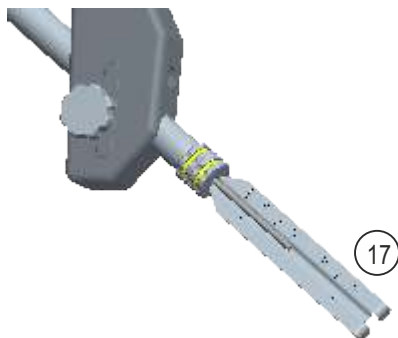
- ! The threaded Kirschner wire may damage or bend by the cortical bone, therefore is important to rough-drill it by the tempered spiral drill.



12 Insertion of the guide wire

Insert the 3×400 mm threaded Kirschner guide wire (33) into the femoral head to a level approximately 5 mm below the subchondral bone.

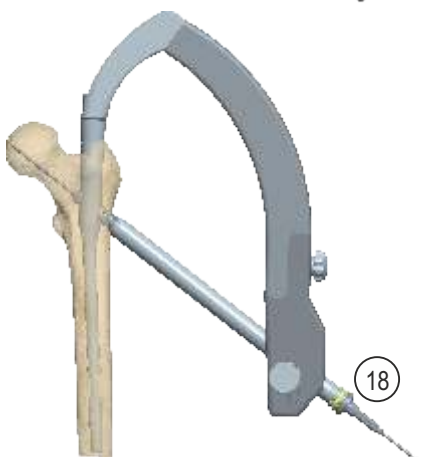
- ☠ Confirm the position of the guide wire within the head with a-p and lateral views.



13 Length measurement

Measure the length of the dynamic screw on the guide wire with the gauge (17).

- ! Verify that drill sleeves are against bone.



14 Reaming for dynamic screw

Remove the yellow drill sleeve and insert the 12.8 mm reamer (18) over the guide wire, drill through the nail.

If the reamer get stuck check the fixing screw in the nail, if it is driven too deeply it can block the reamer.

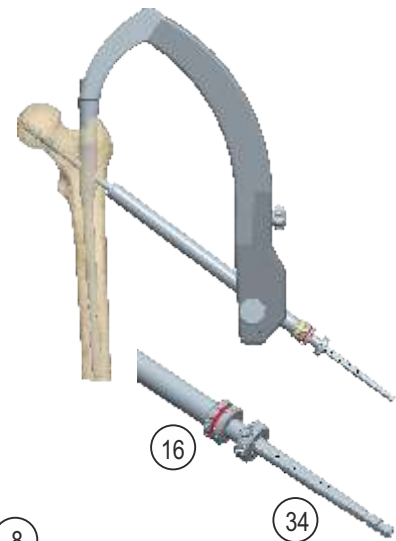
- ! You may drill forwards (!) while extracting the drill in order to keep the guide wire in its place.

Surgical technique for „Z“-type trochanteric nailing

15 Predrilling for dynamic screw

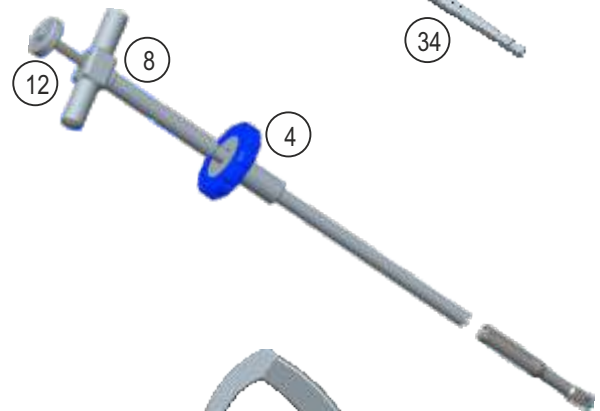
Put the red drill guide (16) over the red drill (34) from its back, and set its fixation sleeve to the measured dynamic screw length. Drill until the stop.


The T-handle (15) may be used for for drilling.

**16 Assembling wrench for dynamic screw**

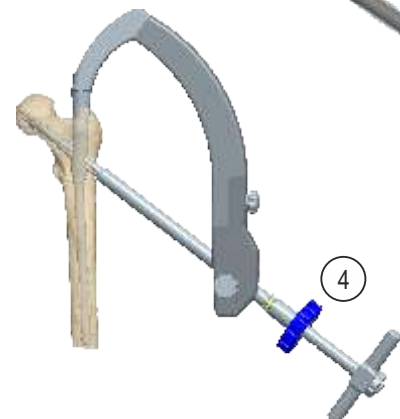
Drive the threaded stem (12) through the T wrench (8) from above, drive the compressing device (4) from below.

Set the dynamic screw with the threaded stem.


**17 Inserting of the dynamic screw**

 Insert the dynamic screw over the guide wire. The tip of the screw should be approximately 5 mm before the tip of the guide wire.

The compressing device (4.) may be used to compress the fracture.

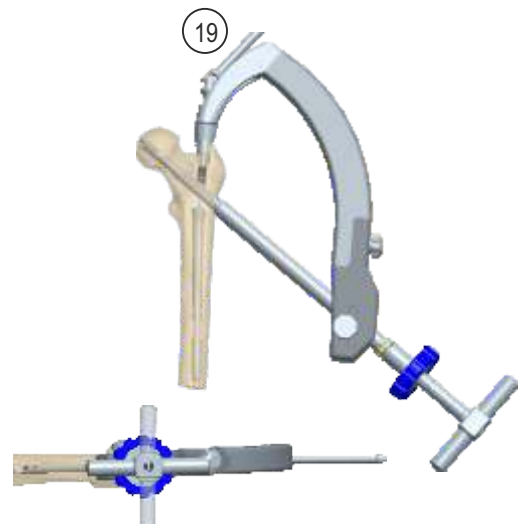
**18 Rotational stabilization**

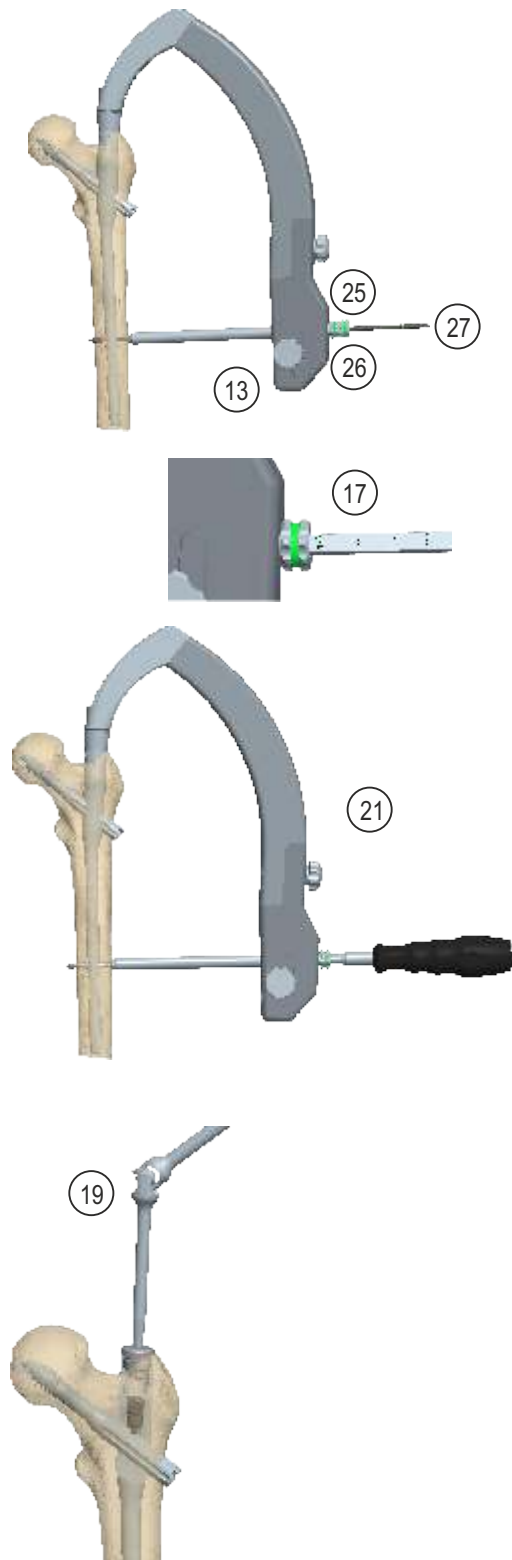
Use the cardan screwdriver (19) with the T handle (15) to tighten the fixing screw in the nail. The tip of the fixing screw should be in a groove of the dynamic screw to prevent its rotation.

 Unscrew the fixing screw by a quarter turning in order to dynamize the fixation.

Remark:

The „T-wrench“ can give you a guideline for the position of the hole on the stem of the dynamic screw. If the handle placed to the right position to the targeting device, then the hole and the fixing screw suited to each other.





19 Removing of 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 arm.

20 Distal interlocking



There is a round and an oval hole on the distal part of the nail to produce static or dynamic interlocking.

Put the green soft tissue protector (25) and drill sleeve (26) into the aiming arm, incise the skin, push the drill sleeve to the bone and fix the position by the clamp screw (13).

With the green 4 mm spiral drill (27) drill through the nail and the opposite cortex. Use the depth gauge (17) to determine screw length.

Interlock the nail with 4.9 mm interlocking screw, obtain a final X-ray view to confirm satisfactory placement.

21 Closure

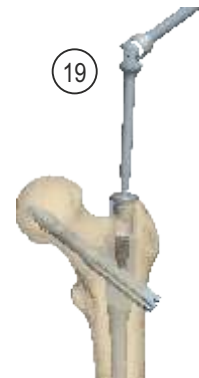
Remove the aiming arm by releasing the nail adapter screw (11) with the 10 mm hexagonal screwdriver (28).

Close the proximal part of the nail with a Cap screw (12400-14022), tighten it with the cardan screwdriver (15, 19).

Removal of the „Z“-type trochanteric nail

22 Removing of the cap screw

Remove the cap screw with the cardan screwdriver (15, 19).

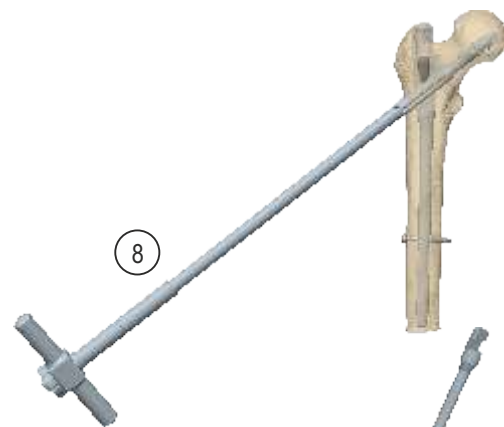
**23 Unscrew of the fixing screw**

Unscrew the fixing screw with the same screwdriver, removal is not necessary.

**24 Removing of the dynamic screw**

Drive the threaded stem (12) through the T wrench (8) from above.

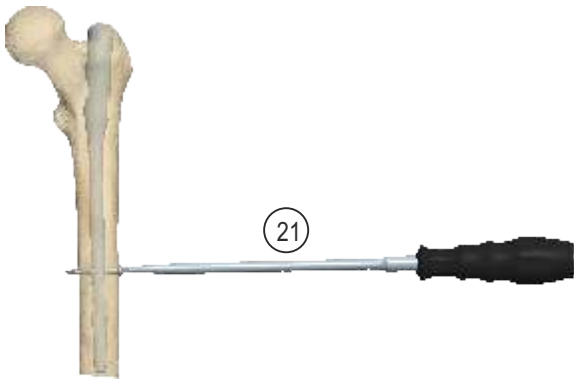
Attach the wrench to the dynamic screw, which can be removed by counterclockwise turning.

**25 Attaching of the removal device to the nail**

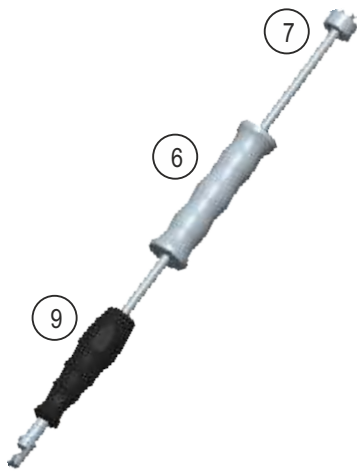
Drive the nail adapter screw (11) into the nail, attach the cardan rod (20) to its internal thread.



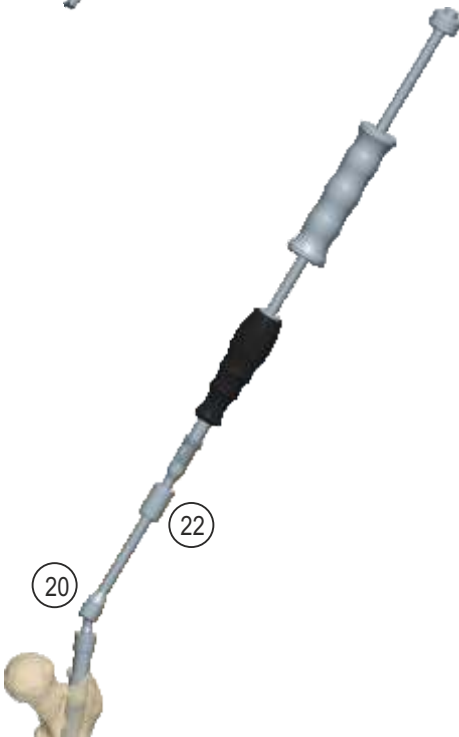
Removal of the „Z“-type trochanteric nail

**26 Removing of the interlocking screws**

Remove all the interlocking screws with the screwdriver (21).

**27 Assembling of the removal hitting device**

Put the slide hammer (6) over the hammer guide shaft (9), close its end with the hammer guide head (7) and secure it with the 12 mm wrench (29).

**28 Removing of the trochanteric nail**

Put the removal device fixation sleeve (22) over the cardan rod (20) and assemble with the hammer shaft. The implantatum can be removed with the slide hammer.



Implants for „Z“-type light trochanteric nailing

„Z“-type trochanteric nail, light, short, cannulated, proximal diameter 15,5 mm

Ø (mm)	L (mm)	Catalogue number					
		α 125°		α 130°		α 135°	
		steel	titanium alloy	steel	titanium alloy	steel	titanium alloy
9	180	14551-09180	34551-09180	14511-09180	34511-09180	14531-09180	34531-09180
9	200	14551-09200	34551-09200	14511-09200	34511-09200	14531-09200	34531-09200
9	220	14551-09220	34551-09220	14511-09220	34511-09220	14531-09220	34531-09220
9	240	14551-09240	34551-09240	14511-09240	34511-09240	14531-09240	34531-09240
10	180	14551-10180	34551-10180	14511-10180	34511-10180	14531-10180	34531-10180
10	200	14551-10200	34551-10200	14511-10200	34511-10200	14531-10200	34531-10200
10	220	14551-10220	34551-10220	14511-10220	34511-10220	14531-10220	34531-10220
10	240	14551-10240	34551-10240	14511-10240	34511-10240	14531-10240	34531-10240
11	180	14551-11180	34551-11180	14511-11180	34511-11180	14531-11180	34531-11180
11	200	14551-11200	34551-11200	14511-11200	34511-11200	14531-11200	34531-11200
11	220	14551-11220	34551-11220	14511-11220	34511-11220	14531-11220	34531-11220
11	240	14551-11240	34551-11240	14511-11240	34511-11240	14531-11240	34531-11240



FEMORAL NAILING „Z“

„Z“-type trochanteric nail, light, long, cannulated, proximal diameter 15,5 mm

Ø (mm)	L (mm)	Catalogue number					
		long, right α = 125°		long, right α = 130°		long, right α = 135°	
		steel	titanium alloy	steel	titanium alloy	steel	titanium alloy
9	340	14615-34125	34615-34125	14615-34130	34615-34130	14615-34135	34615-34135
9	360	14615-36125	34615-36125	14615-36130	34615-36130	14615-36135	34615-36135
9	380	14615-38125	34615-38125	14615-38130	34615-38130	14615-38135	34615-38135
9	400	14615-40125	34615-40125	14615-40130	34615-40130	14615-40135	34615-40135
9	420	14615-42125	34615-42125	14615-42130	34615-42130	14615-42135	34615-42135
10	340	14614-34125	34614-34125	14614-34130	34614-34130	14614-34135	34614-34135
10	360	14614-36125	34614-36125	14614-36130	34614-36130	14614-36135	34614-36135
10	380	14614-38125	34614-38125	14614-38130	34614-38130	14614-38135	34614-38135
10	400	14614-40125	34614-40125	14614-40130	34614-40130	14614-40135	34614-40135
10	420	14614-42125	34614-42125	14614-42130	34614-42130	14614-42135	34614-42135



Ø (mm)	L (mm)	Catalogue number					
		long, left α = 125°		long, left α = 130°		long, left α = 135°	
		steel	titanium alloy	steel	titanium alloy	steel	titanium alloy
9	340	14605-34125	34605-34125	14605-34130	34605-34130	14605-34135	34605-34135
9	360	14605-36125	34605-36125	14605-36130	34605-36130	14605-36135	34605-36135
9	380	14605-38125	34605-38125	14605-38130	34605-38130	14605-38135	34605-38135
9	400	14605-40125	34605-40125	14605-40130	34605-40130	14605-40135	34605-40135
9	420	14605-42125	34605-42125	14605-42130	34605-42130	14605-42135	34605-42135
10	340	14604-34125	34604-34125	14604-34130	34604-34130	14604-34135	34604-34135
10	360	14604-36125	34604-36125	14604-36130	34604-36130	14604-36135	34604-36135
10	380	14604-38125	34604-38125	14604-38130	34604-38130	14604-38135	34604-38135
10	400	14604-40125	34604-40125	14604-40130	34604-40130	14604-40135	34604-40135
10	420	14604-42125	34604-42125	14604-42130	34604-42130	14604-42135	34604-42135



Implants for „Z“-type light trochanteric nailing



Dynamic screw for light, short and long „Z“-type trochanteric nail

Thread diameter: 10,5 mm
Core diameter: 7,0 mm
Pitch: 3,0 mm

L (mm)	Catalogue number		L (mm)	Catalogue number	
	steel	titanium alloy		steel	titanium alloy
75	12721-11075	32721-11075	110	12721-11110	32721-11110
80	12721-11080	32721-11080	115	12721-11115	32721-11115
85	12721-11085	32721-11085	120	12721-11120	32721-11120
90	12721-11090	32721-11090	125	12721-11125	32721-11125
95	12721-11095	32721-11095	130	12721-11130	32721-11130
100	12721-11100	32721-11100	135	12721-11135	32721-11135
105	12721-11105	32721-11105	140	12721-11140	32721-11140



Fixing screw for light, short and long „Z“-type trochanteric nail

Cat. nr.	
steel	titanium alloy
12401-08025	32401-08025



End cup screw for light, short and long „Z“-type trochanteric nail

Cat. nr.	
steel	titanium alloy
12400-15022	32400-15022



Locking screw for all type of „Z“ trochanteric nail

Thread diameter: 4,9 mm
Core diameter: 4,2 mm
Pitch: 2,75 mm
Head diameter: 8,0 mm
Hex width: 3,5 mm

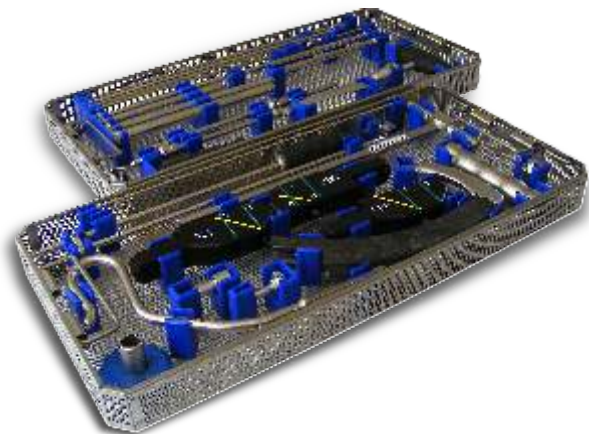
L (mm)	Cat. nr.		L (mm)	Cat. nr.		L (mm)	Cat. nr.	
	steel	titanium alloy		steel	titanium alloy		steel	titanium alloy
20	12200-49020	32200-49020	42	12200-49042	32200-49042	64	12200-49064	32200-49064
22	12200-49022	32200-49022	44	12200-49044	32200-49044	65	12200-49065	32200-49065
24	12200-49024	32200-49024	45	12200-49045	32200-49045	66	12200-49066	32200-49066
25	12200-49025	32200-49025	46	12200-49046	32200-49046	68	12200-49068	32200-49068
26	12200-49026	32200-49026	48	12200-49048	32200-49048	70	12200-49070	32200-49070
28	12200-49028	32200-49028	50	12200-49050	32200-49050	72	12200-49072	32200-49072
30	12200-49030	32200-49030	52	12200-49052	32200-49052	75	12200-49075	32200-49075
32	12200-49032	32200-49032	54	12200-49054	32200-49054	76	12200-49076	32200-49076
34	12200-49034	32200-49034	55	12200-49055	32200-49055	78	12200-49078	32200-49078
35	12200-49035	32200-49035	56	12200-49056	32200-49056	80	12200-49080	32200-49080
36	12200-49036	32200-49036	58	12200-49058	32200-49058	85	12200-49085	32200-49085
38	12200-49038	32200-49038	60	12200-49060	32200-49060	90	12200-49090	32200-49090
40	12200-49040	32200-49040	62	12200-49062	32200-49062	100	12200-49100	32200-49100



Surgical instruments for „Z“-type light trochanteric nailing

Surgical set

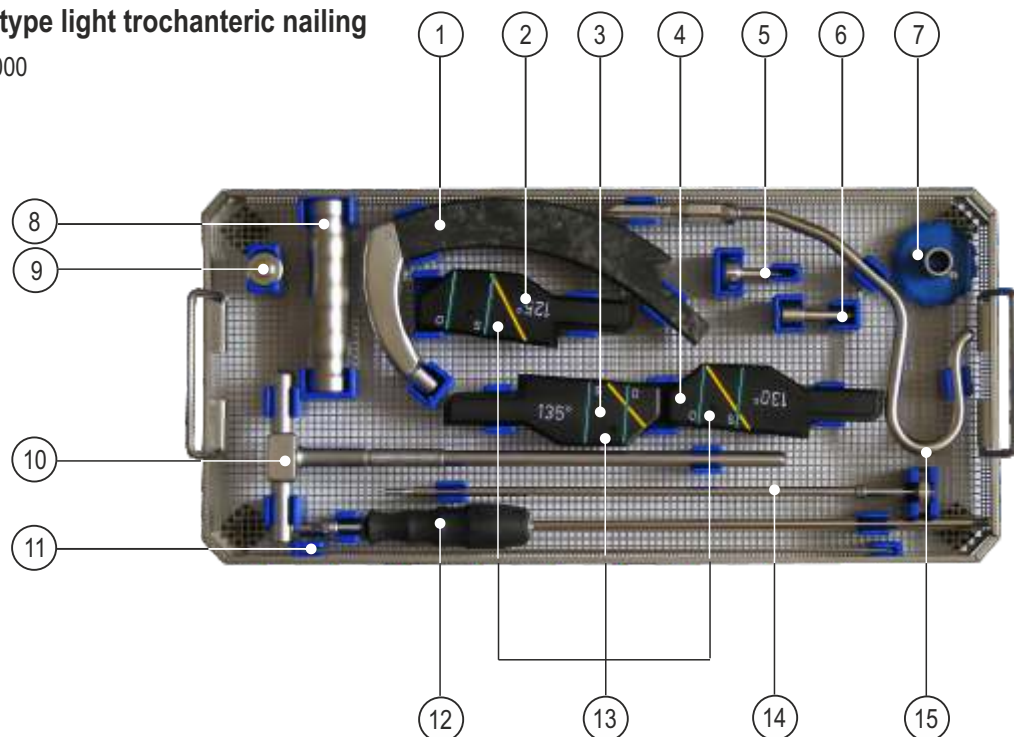
Two trays for „Z“-type light trochanteric nailing instrument set, complete with instruments: cat. nr. 94501-00000



FEMORAL NAILING „Z“

Tray I. for „Z“-type light trochanteric nailing

Cat. nr. 94501-10000



Pos.	Cat. no.	Description	pcs
1.	94501-00100	Targeting arm, radiolucent	1
2.	94501-03000	Aiming arm attachment, 125°	1
3.	94501-00301	Aiming arm attachment, 135°	1
4.	94501-00201	Aiming arm attachment, 130°	1
5.	94500-00400	Aiming arm fixing screw	1
6.	94501-00500	Nail adapter screw	1
7.	94500-00800	Compressing device	1
8.	94500-01100	Slide hammer	1
9.	94500-02501	Hammer guide head	1
10.	94500-00600	T wrench	1
11.	15000-35400	Kirschner wire, 3,5 × 400 mm	1
12.	94500-01000	Hammer guide shaft	1
13.	94500-00203	Aiming arm clamp screw	3
14.	94650-00700	Threaded stem for dynamic screw	1
15.	94501-00900	Hollow reamer	1



Surgical instruments for „Z“-type light trochanteric nailing

FEMORAL NAILING „Z“



Pos.	Cat. no.	Description	pcs
1.	94501-00100	Proximal targeting arm, radiolucent	1



Pos.	Cat. no.	Description	pcs
2.	94501-03000	Aiming arm attachment 125°	1



Pos.	Cat. no.	Description	pcs
3.	94501-00301	Aiming arm attachment 135°	1



Pos.	Cat. no.	Description	pcs
4.	94501-00201	Aiming arm attachment 130°	1



Pos.	Cat. no.	Description	pcs
5.	94500-00400	Aiming arm fixing screw	1



Pos.	Cat. no.	Description	pcs
6.	94501-00500	Nail adapter screw	1



Pos.	Cat. no.	Description	pcs
7.	94500-00800	Compressing device	1



Pos.	Cat. no.	Description	pcs
8.	94500-01100	Slide hammer	1



Surgical instruments for „Z“-type light trochanteric nailing

Pos.	Cat. no.	Description	pcs
9.	94500-02501	Hammer guide head	1



Pos.	Cat. no.	Description	pcs
10.	94500-00600	T wrench	1



Pos.	Cat. no.	Description	pcs
11.	15000-35400	Kirschner wire 3,5 × 400 mm	1



Pos.	Cat. no.	Description	pcs
12.	94500-01000	Hammer guide shaft	1



Pos.	Cat. no.	Description	pcs
13.	94500-00203	Aiming arm clamp screw	3



Pos.	Cat. no.	Description	pcs
14.	94650-00700	Threaded stem for dynamic screw	1



Pos.	Cat. no.	Description	pcs
15.	94501-00900	Hollow reamer	1

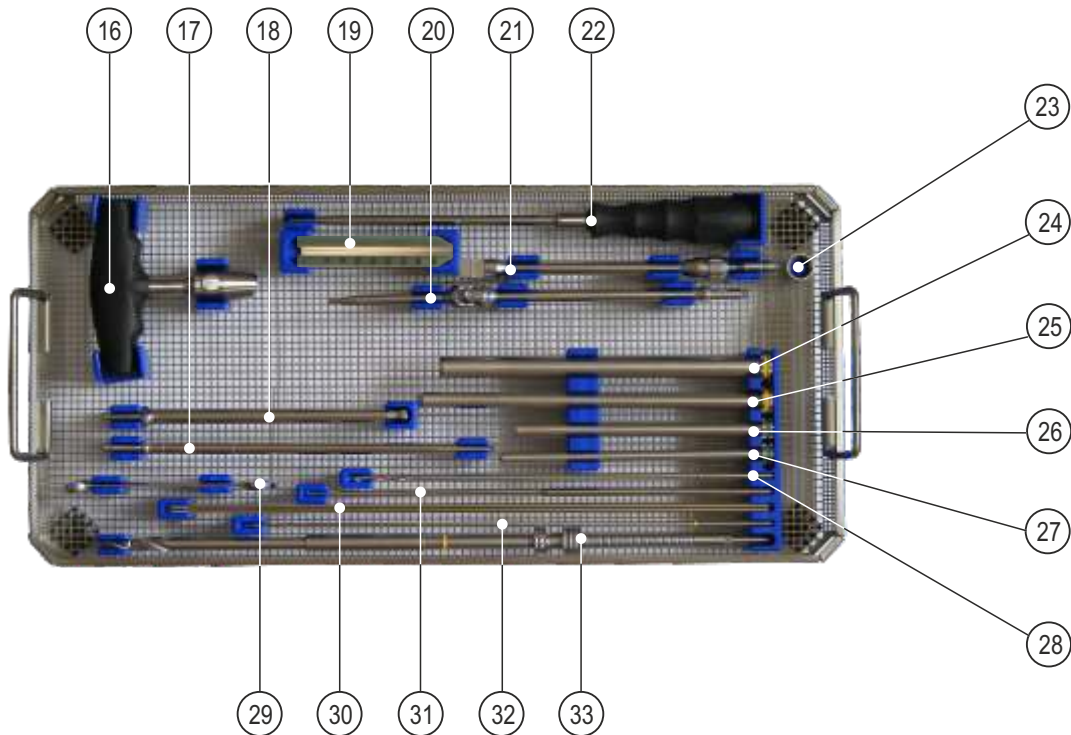




Surgical instruments for „Z“-type light trochanteric nailing

Tray II. for „Z“-type light trochanteric nailing

Cat. nr. 94501-20000



Pos.	Cat. no.	Description	pcs
16.	99000-00006	Universal chuck with T handle, cannulated	1
17.	94500-02600	Hexagonal screwdriver with quick coupling, 3,5 mm	1
18.	94500-02200	Hexagonal spherical screwdriver shaft, 10 mm	1
19.	94500-01700	Gauge for dynamic screw	1
20.	94501-02300	Cardan screw driver with quick coupling, 3,5 mm	1
21.	94501-02400	Cardan rod for removal device	1
22.	94500-02100	Hexagonal screwdriver, 3,5 mm	1
23.	94500-01004	Fixation sleeve for removal device	1
24.	94501-01200	Soft tissue protector for dynamic screw, (yellow)	1
25.	94501-01300	Drill sleeve for guide wire, (yellow)	1
26.	94500-01800	Soft tissue protector for locking screw, (green)	1
27.	94500-01900	Drill sleeve for locking drill (green)	1
28.	99010-40310	Spiral drill, 4 × 310 mm, (green)	1
29.	99000-00011	Wrench, 12 mm	1
30.	15020-30400	Threaded Kirschner guide wire, 3 × 400 mm	4
31.	94500-02000	Depth gauge for locking screw	1
32.	99010-32350	Spiral drill, 3,2 × 350 mm, (yellow)	1
33.	94501-01400	Reamer for dynamic screw, (yellow)	1



Surgical instruments for „Z“-type light trochanteric nailing

Pos.	Cat. no.	Description	pcs
16.	99000-00006	Universal chuck with T handle	1



Pos.	Cat. no.	Description	pcs
17.	94500-02600	Hexagonal screw driver with quick coupling 3,5 mm	1



Pos.	Cat. no.	Description	pcs
18.	94500-02200	Hexagonal spherical screw driver shaft 10 mm	1



Pos.	Cat. no.	Description	pcs
19.	94500-01700	Gauge for dynamic screw	1



Pos.	Cat. no.	Description	pcs
20.	94501-02300	Cardan screw driver with quick coupling 3,5 mm	1



Pos.	Cat. no.	Description	pcs
21.	94501-02400	Cardan rod for removal device	1



Pos.	Cat. no.	Description	pcs
22.	94500-02100	Hexagonal screwdriver 3,5 mm	1



Pos.	Cat. no.	Description	pcs
23.	94500-01004	Fixation sleeve for removal device	1



Pos.	Cat. no.	Description	pcs
24.	94501-01200	Soft tissue protector for dynamic screw, (yellow)	1





Surgical instruments for „Z“-type light trochanteric nailing

Pos.	Cat. no.	Description	pcs
25.	94501-01300	Drill sleeve for guide wire, (yellow)	1



Pos.	Cat. no.	Description	pcs
26.	94500-01800	Soft tissue protector for locking screw, (green)	1



Pos.	Cat. no.	Description	pcs
27.	94500-01900	Drill sleeve for locking drill, (green)	1



Pos.	Cat. no.	Description	pcs
28.	99010-40310	Spiral drill, (green) 4 × 310 mm	1



Pos.	Cat. no.	Description	pcs
29.	99000-00011	Wrench 12 mm	1



Pos.	Cat. no.	Description	pcs
30.	15020-30400	Threaded Kirschner guide wire, 3 × 400 mm	4



Pos.	Cat. no.	Description	pcs
31.	94500-02000	Depth gauge for locking screw	1



Pos.	Cat. no.	Description	pcs
32.	99010-32350	Spiral drill, (yellow) 3,2 × 350 mm	1



Pos.	Cat. no.	Description	pcs
33.	94501-01400	Reamer for dynamic screw, (yellow)	1





Surgical technique for „Z“-type light trochanteric nailing

1 Preoperative planning

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



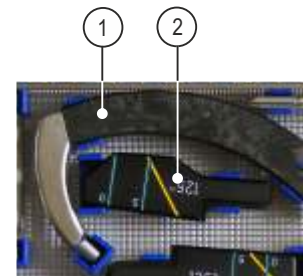
Fluoroscopic control is advised. The imige intensifier must be in a standart position for a-p and lateral view.



Numbers in brackets after instrument names refer to the list number in the instument tray.



Pay special attention, important step.

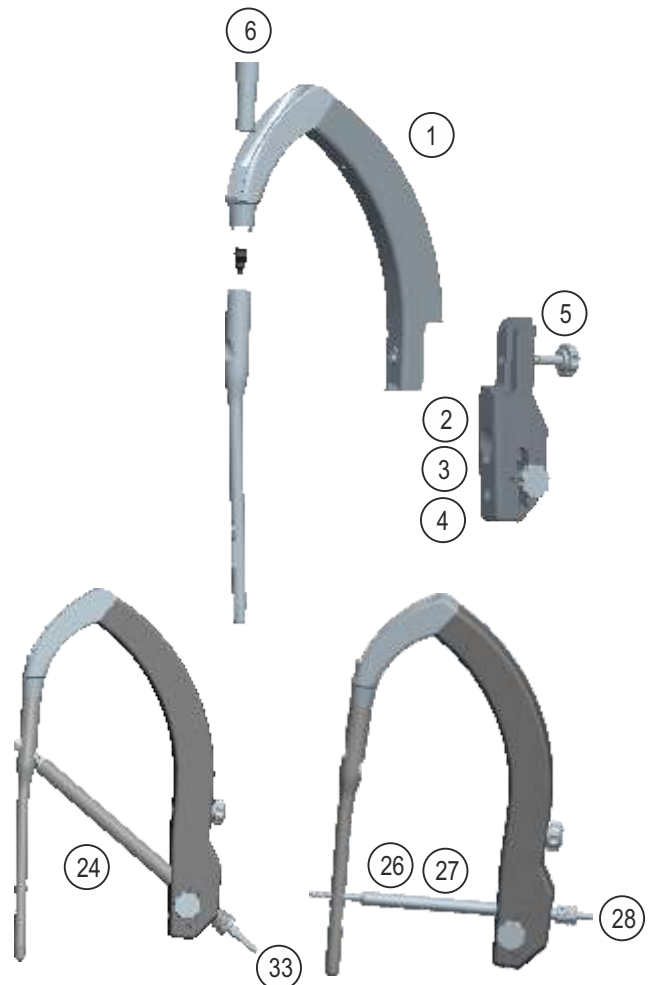


2 Assembling of the instruments

Attach the intramedullary nail to the radiolucent aiming arm (1) with the nail adapter screw (6). Secure the nail with the 10 mm hexagonal screwdriver (16, 18). Depending on the CCD angle of the implant (125°/130°/135°) mount the correct aiming arm attachment (2, 3,4) with the aiming arm fixing screw (5).



Drive the fixing screw (12401-08025) into the nail, but the tip of the screw should not hinder the rotation of the dynamic screw (12721-... or 32721-...).

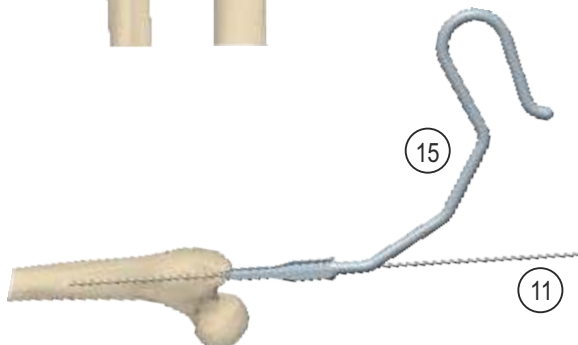
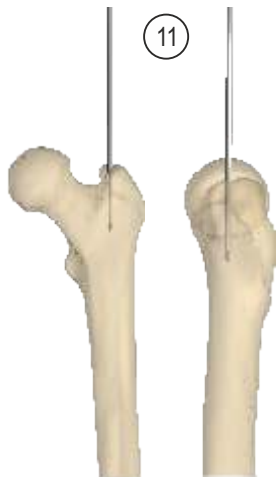
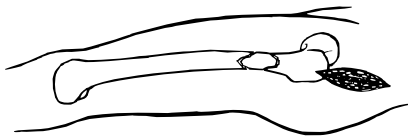
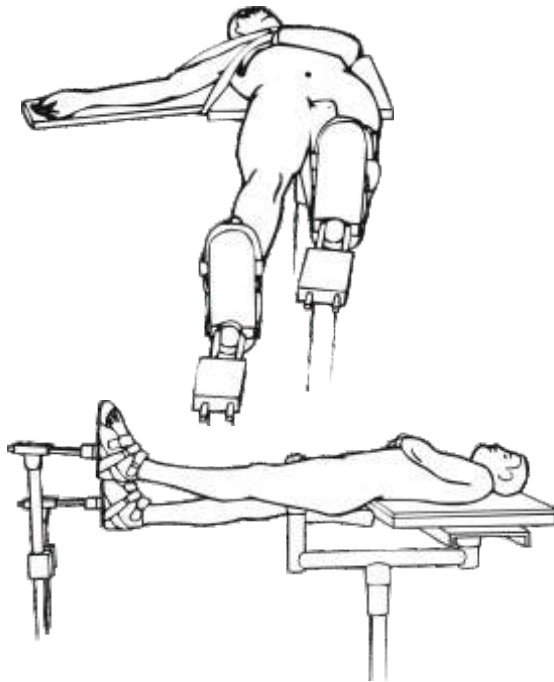


3 Put into the dynamic screw hole the yellow soft tissue protector (24) and reamer (33). Put into the distal hole the green soft tissue protector (26), drill sleeve (27) and 4 mm spiral drill (28).



Surgical technique for „Z“-type light trochanteric nailing

FEMORAL NAILING „Z“



4 Positioning of the patient 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.

5 Skin incision

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

6 Determining of the entry point



With a 3,5x400 mm threaded Kirschner wire (11.) find the trochanteric fossa. The tip of the pin should be in the midplane of the femur in both anteroposterior and lateral views.

Under fluoroscopic control insert the Kirschner wire into the medullary canal.

7 Opening of the femur



Insert the cannulated 17.6 mm Hollow reamer (15) over the Kirschner wire to enlarge the entry portal. Ream the proximal femur until the reamer sink into it.



Surgical technique for „Z“-type light trochanteric nailing

8 Inserting of the nail



If solid nail is used, remove the Kirschner wire, if cannulated, it should be inserted over the wire. Insert the nail carefully by hand until the axis of the dynamic screw hole reaches the center of the femoral neck. If resistance is encountered, stop and withdraw the implant, and push it with slight twisting, or use a smaller diameter.



Never hit the aiming arm. In difficult cases you may use the extraction device to support insertion.

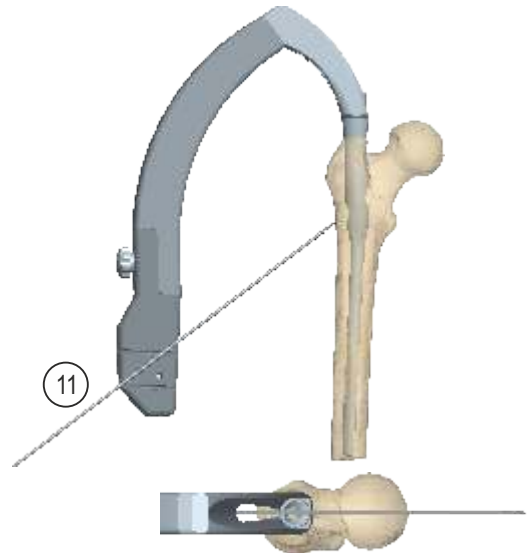


9 X-ray evaluation



Put a Kirschner wire (11) into the proximal hole of the aiming arm. Its shadow in lateral view should be in the center of the femoral neck.

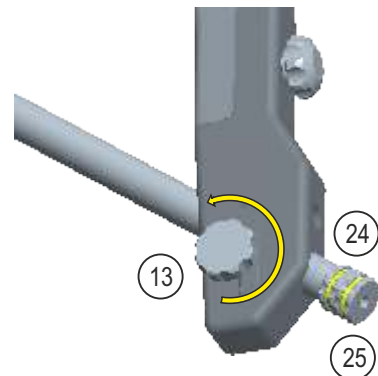
The lateral groove of the aiming arm is parallel to the dynamic head screw.



10 Skin incision at dynamic screw

Put the yellow soft tissue protector (24) and drill sleeve (25) into the aiming arm, incise the skin and fascia and push the drill sleeves to the bone.

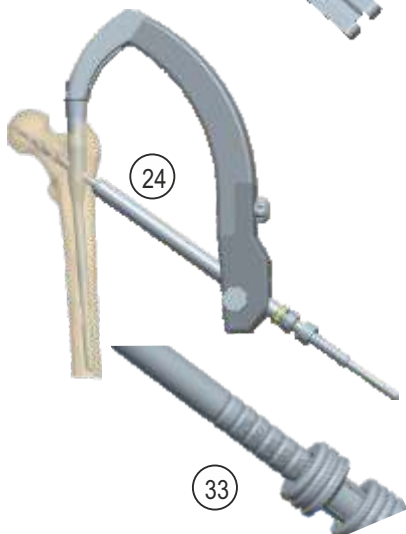
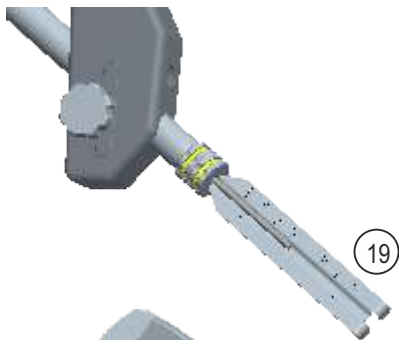
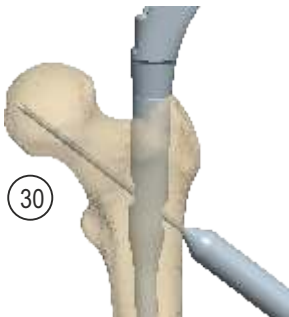
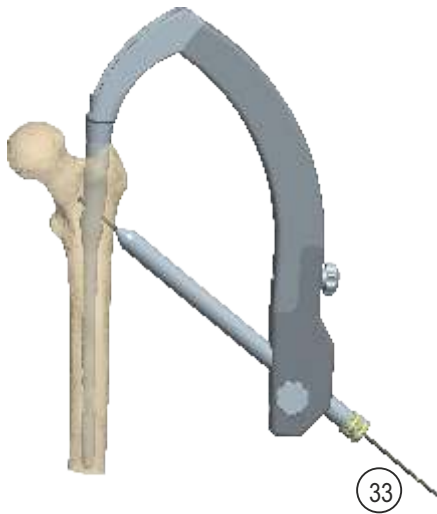
With the clamp screw on the aiming arm (13) fix the position.





Surgical technique for „Z“-type light trochanteric nailing

FEMORAL NAILING „Z“



11 Predrilling for the guide wire

Drill through the cortical bone with the yellow 3.2 mm spiral drill (33).

- ! The threaded Kirschner wire may damage or bend by the cortical bone, therefore is important to rough-drill it by the tempered spiral drill.

12 Insertion of the guide wire

Insert the 3x400 mm threaded Kirschner guide wire (30) into the femoral head to a level approximately 5 mm below the subchondral bone.



Confirm the position of the guide wire within the head with a-p and lateral views.

13 Length measurement

Measure the length of the dynamic screw on the guide wire with the gauge (19).



Verify that drill sleeves are against bone.
After the determination of the length of screw - while keeping the wire - remove the drill sleeve (25).

14 Drilling for dynamic screw

Align the length's buffer to the right position, which is placed on the drill for the dynamic screw (33).

Drill thru the soft tissue protector till buffer (24).

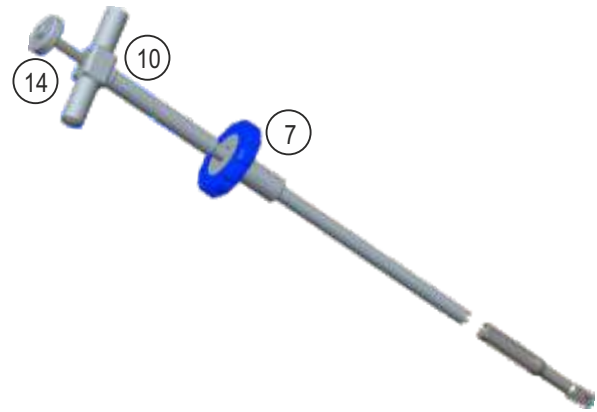


Surgical technique for „Z“-type light trochanteric nailing

15 Assembling wrench for dynamic screw

Drive the threaded stem (14) through the T wrench (10) from above, drive the compressing device (7) from below.

Set the dynamic screw with the threaded stem.

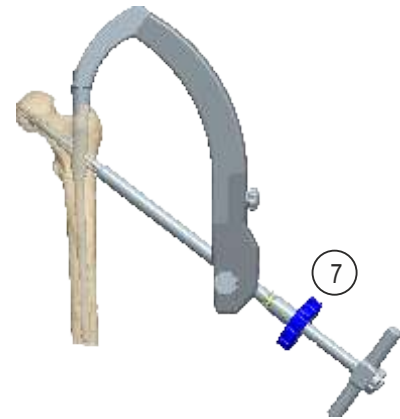


16 Inserting of the dynamic screw



Insert the dynamic screw over the guide wire. The tip of the screw should be approximately 5 mm before the tip of the guide wire.

The compressing device (7.) may be used to compress the fracture.



17 Rotational stabilization

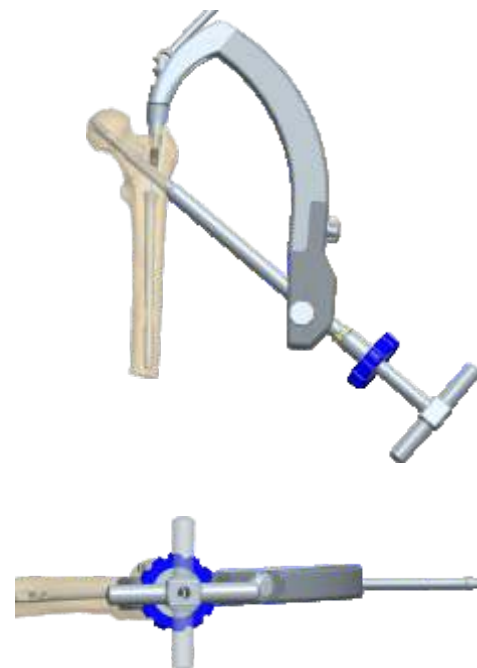
Use the cardan screwdriver (20) with the T handle (16) to tighten the fixing screw in the nail. The tip of the fixing screw should be in a groove of the dynamic screw to prevent its rotation.



Unscrew the fixing screw by a quarter turning in order to dynamize the fixation.

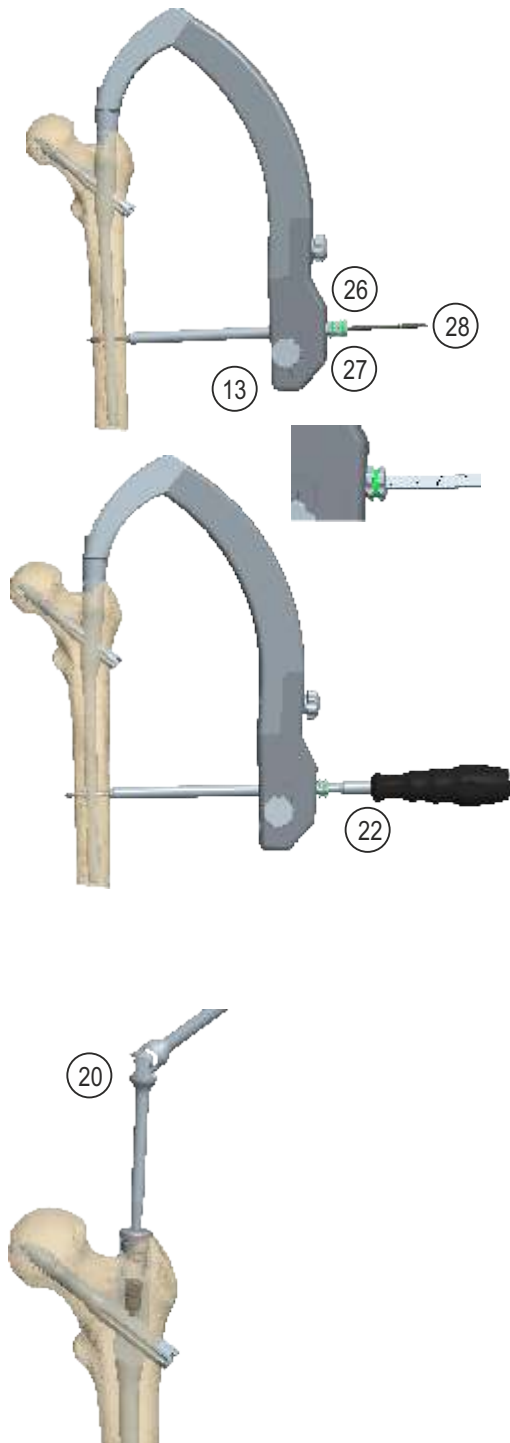
Remark:

The „T-wrench“ can give you a guideline for the position of the hole on the stem of the dynamic screw. If the handle placed to the right position to the targeting device, then the hole and the fixing screw suited to each other.





Surgical technique for „Z“-type light trochanteric nailing



18 Removing of 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 arm.

19 Distal interlocking



There is a round and an oval hole on the distal part of the nail to produce static or dynamic interlocking.

Put the green soft tissue protector (26) and drill sleeve (27) into the aiming arm, incise the skin, push the drill sleeve to the bone and fix the position by the clamp screw (13).

With the green 4 mm spiral drill (28) drill through the nail and the opposite cortex. Read the length on the drill or use the depth gauge (31) to determine screw length.

Interlock the nail with 4.9 mm interlocking screw, obtain a final X-ray view to confirm satisfactory placement.

21 Closure

Remove the aiming arm by releasing the nail adapter screw (6) with the 10 mm hexagonal screwdriver (18).

Close the proximal part of the nail with a cap screw (12400-15022), tighten it with the cardan screwdriver (16, 20).



Removal of the „Z“-type light trochanteric nailing

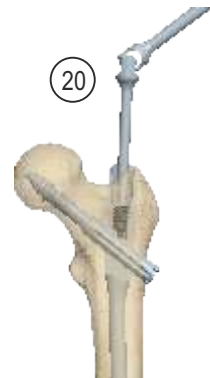
22 Removing of the cap screw

Remove the cap screw with the cardan screwdriver (16, 20).



23 Unscrew of the fixing screw

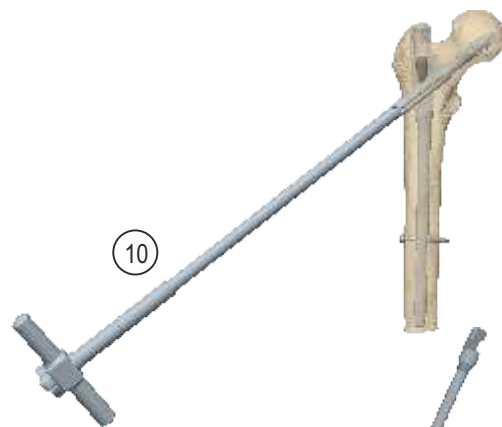
Unscrew the fixing screw with the same screwdriver, removal is not necessary.



24 Removing of the dynamic screw

Drive the threaded stem (14) through the T wrench (10) from above.

Attach the wrench to the dynamic screw, which can be removed by counterclockwise turning.



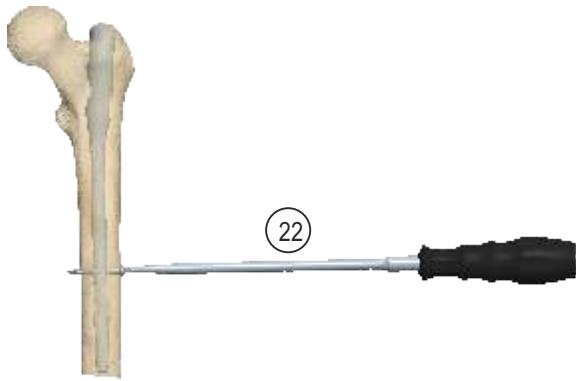
25 Attaching of the removal device to the nail

Drive the nail adapter screw (6) into the nail, attach the cardan rod (21) to its internal thread.



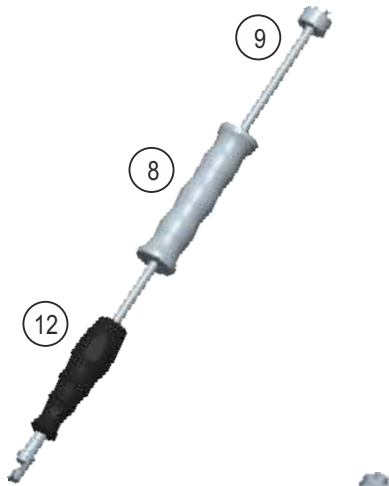


Removal of the „Z“-type light trochanteric nailing



26 Removing of the interlocking screws

Remove all the interlocking screws with the screwdriver (22).



27 Assembling of the removal hitting device

Put the slide hammer (8) over the hammer guide shaft (12), close its end with the hammer guide head (9) and secure it with the 12 mm wrench (29).



28 Removing of the trochanteric nail

Put the removal device fixation sleeve (23) over the cardan rod (20) and assemble with the hammer shaft. The implantatum can be removed with the slide hammer.







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