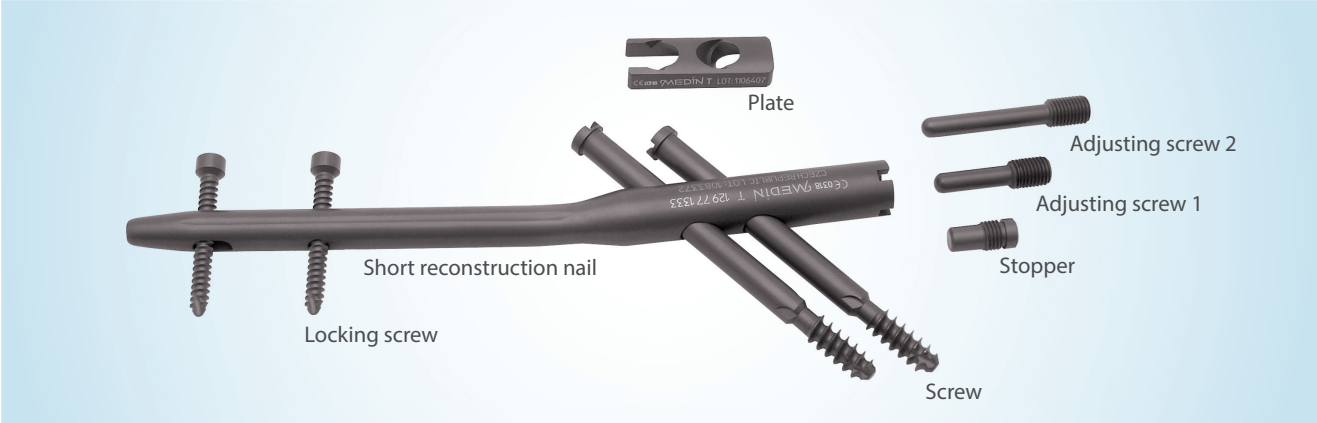
SURGICAL PROCEDURE
SHORT RECONSTRUCTION NAIL – PFN

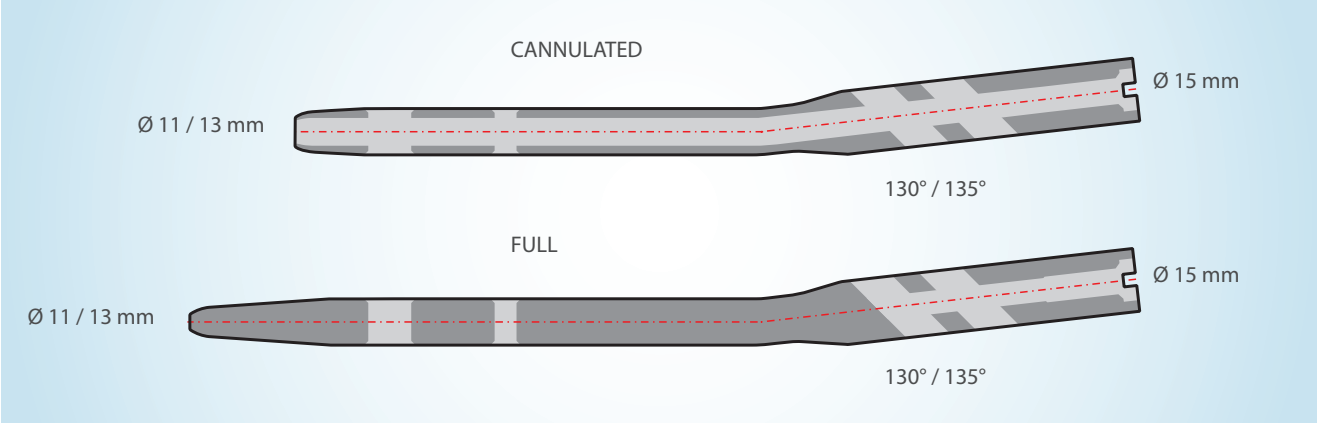
MEDIN

Description of the medical device

Implant system of Short reconstruction nail consists of one type or size of the short reconstruction nail, one or two screws that are inserted into the femoral neck. Under the screw heads, you can insert a plate to partially stabilize trochanteric massif. It is recommended to close the nail with a plug. In the distal part the nail is secured by locking screws, in dynamic or static opening. It is also possible to secure proximal or distal screw in the neck by an adjusting screw.



Short reconstruction nail has circular section. Proximal 80 mm regardless of the size of the nail is reinforced to 15 mm. The proximal part of 90 mm is skewed by 6°30'. This allows its introduction from the top of the great trochanter. The nail is universal; it is the same for both right and left leg. The nail is hollow, allowing its introduction using the guide wire. Its length is 200 mm in 11 and 13 mm diameters. Alternatively a full nail can be used for this indication, length 225 mm in diameters 11 and 13 mm. The nails are made of steel or titanium alloy. They are provided with 130 ° or 135 ° angle between the stem and screws. It is possible to make special order for nail with angle 125 °. But it is also necessary to order aiming arm 125 ° which is not in standard equipment too.



Screws' diameter is 8 mm. Screw head is mounted on a diameter of 10 mm and designed to be secured in the key. Larger head size of the cervical screw prevents the penetration of the screw through the proximal lateral femoral cortical layer and the nail. It allows you to create compression in the fracture line between the femoral head and lateral corticaof femur. Screw lengths range from 70 to 135 mm by 5 mm. The screw is provided with a special thread and equipped with self-tapping grooves.

Indications of a medical device

Indications of Short reconstruction nail: allows the synthesis of cluster pertrochanteric, intertrochanteric, upper subtrochanteric fractures and their combinations with the hip fracture.

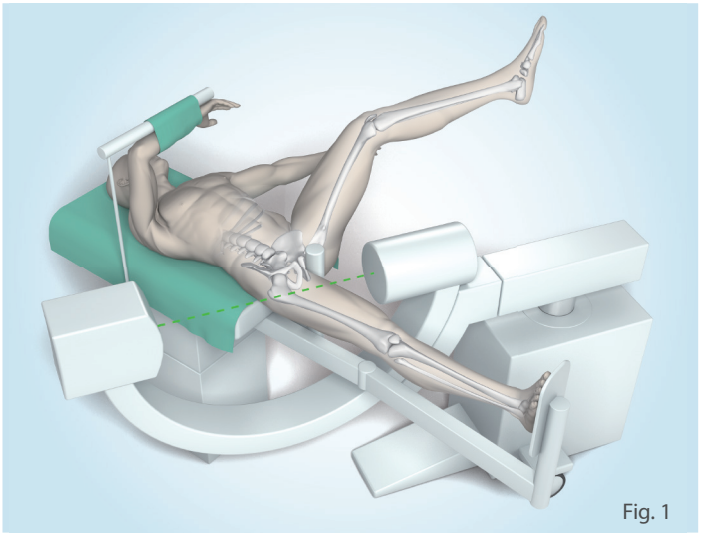


Fig. 1

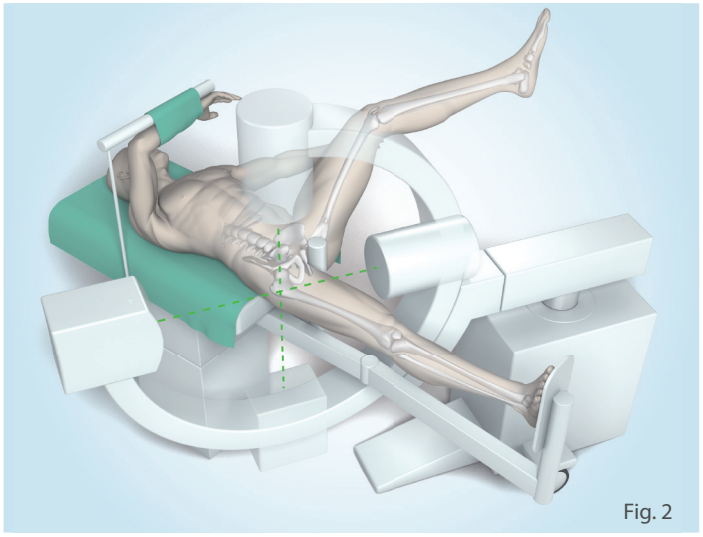


Fig. 2

Surgical technique

1. Position of the patient

a) The patient lies on their back on the traction table; healthy limb is bent away from the body not to hinder the location of display device (Fig. 1).

b) Display of the neck and the femoral head in its entirety in two projections (Fig. 2).

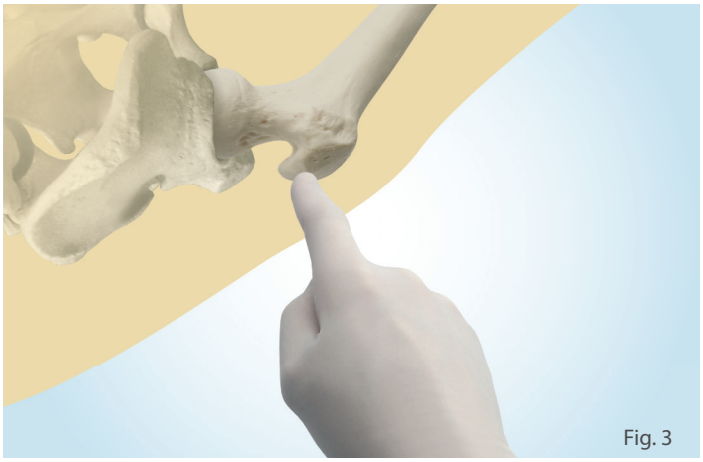


Fig. 3

2. Fracture reconstruction

X-ray equipment is used, the patient is on traction table. Under the control of X-ray amplifier it is necessary to make the best reposition of the fracture. It is usually necessary to perform adequate internal rotation and move the injured limb on the traction table. It is advantageous to skew the body towards the healthy leg in obese patients; the angle of the neck should not drop below 130 degrees within this procedure. Imperfect reduction can be completed after the introduction of the nail (raising the aiming device, using Hohman retractor, raspatorium, Steinmann nail, using reduction forceps through the incision for hip screws). The correct position can be ensured by K-wires located outside the planned implant, but is usually not necessary.

If the fracture is unstable and difficult to reposition, it is the indication for open reduction of fracture. Stabilization should be performed on repositioned bone.

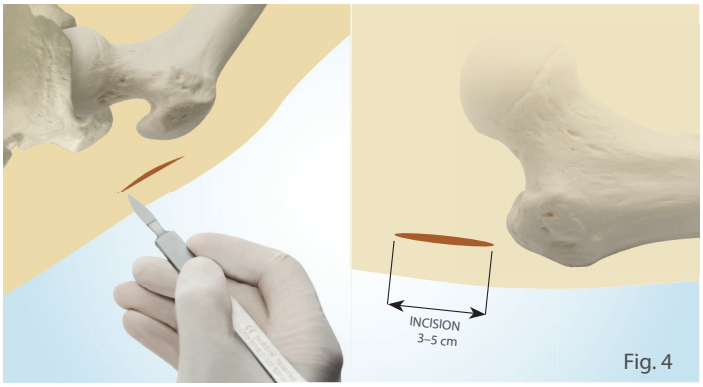


Fig. 4

3. Incision

– Palpation of great trochanter (Fig. 3)
– Incision about 3–5 cm long, cranially of the great trochanter (Fig. 4)

Note: Obese patients however require a longer incision.

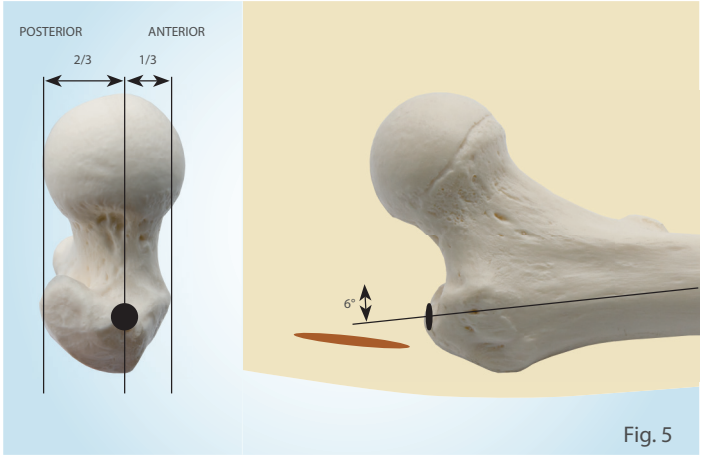


Fig. 5

4. Entry point

Use your finger to feel the great trochanter peak or the cluster zone. Prepare the entry point to the bone under 6 ° angle to the shaft using a perforator (Fig. 5). Monitoring is always necessary using X-ray equipment in two projections.
It is also possible to proceed either:

Option 1

Perforator creates a maximum opening of 14 mm in diameter (Fig. 6). To create a hole in the cancellous part of the femur a hand-held punch 5 mm in diameter should be used, it is then possible to introduce a loader for pre-drilling by flexible cutters.
Carry out pre-drilling of the proximal 80 mm in length by 0.5 to 1 mm larger hole by a flexible cutter 15.5 or 16 mm. The remaining part of the cavity of the femur usually need not be pre-drilled. If the diameter of the bone of femoral diaphysis does not allow for nail introduction, it is recommended to pre-drill using flexible cutters through opening up to 1 mm larger than the size of the nail.

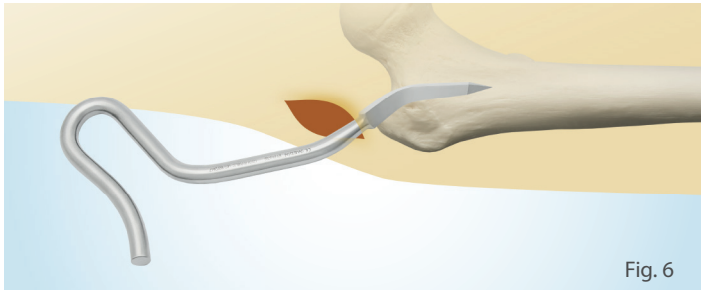


Fig. 6

Option 2

Perforator is used to make a dent about 4 mm in diameter (Fig. 7). The actual entrance into the bone is made using the guide wire Ø3 L400 mm, which is clamped to a hand chuck or drill chuck (Fig. 8). Using X-ray its exact direction is done (6 ° angle to the shaft of the femur) and drilling carried out. Then a centering sleeve is put on the wire, on which the protective sleeve is installed (Fig. 9).

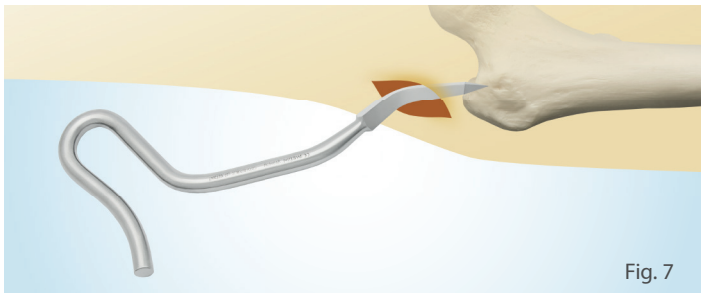


Fig. 7

Centering sleeve is removed and the entry into the bone with a diameter of 15.5 mm is made through the protective sleeve with a pre-drilling cutter (Fig. 10).

It is also possible after removing the guide wire and the introduction of pre-drilling introducer to pre-drill the shaft with flexible cutters by the size of the nail. The remaining part of the cavity of the femur usually need not be pre-drilled. If the diameter of the bone of femoral diaphysis does not allow for nail introduction, it is recommended to pre-drill using flexible cutters through opening up to 1 mm larger than the size of the nail.

Carry out the replacement of the pre-drilling introducer for nail introduction (within introduction of cannulated nails).

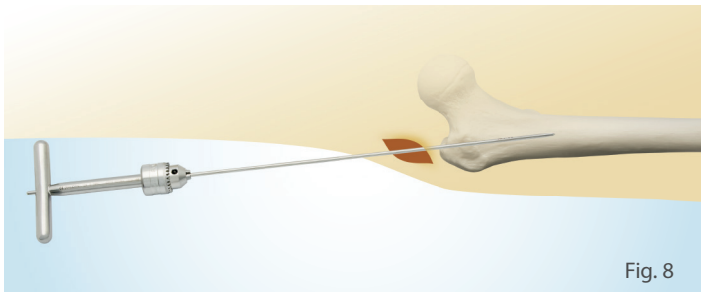


Fig. 8

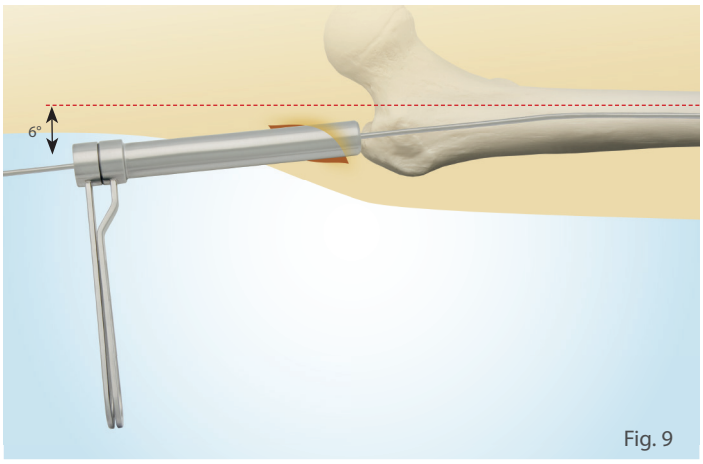


Fig. 9

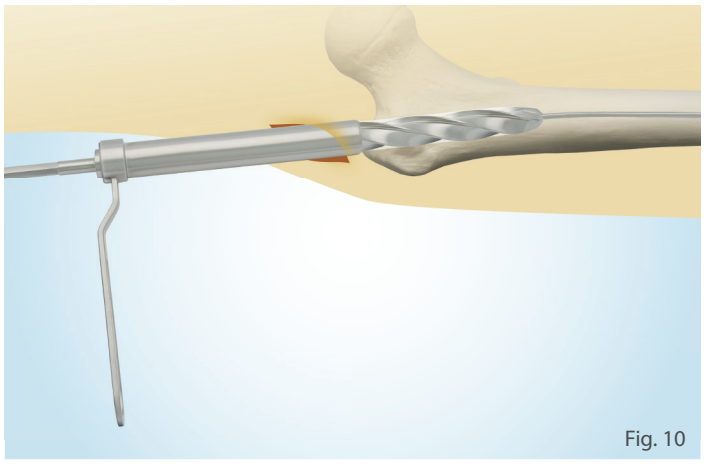


Fig. 10

5. Selection of the nail

Typical gradient of proximal screws into the neck is 135 °. To use the nails with a different angle of cervical screws an aiming device must be used for the desired angle of cervical screws.
Diameter of the nail has been determined by the size of the cavity of the femoral shaft in pre-drilling. For not pre-drilled screws it will be determined now.
To select the nail the screws angle to neck (130 ° or 135 °) must be accurately determined; preliminary determination of the depth of nail anchorage and screws length into the neck through a lumen (Fig. 11).
Perform the anteroposterior X-ray projection perpendicular to the neck of the femur. Place one of the two lumen on the image (screws' angle to neck 130 ° or 135 °) and thus select the screws' angle to the neck and pre-determine the depth of the nail anchorage, so that the distal screw into the neck would be close to the inner corticalis at the Adams arc.
You can also pre-determine the length of the screws into the neck. Lumen enlargement is 150 %.

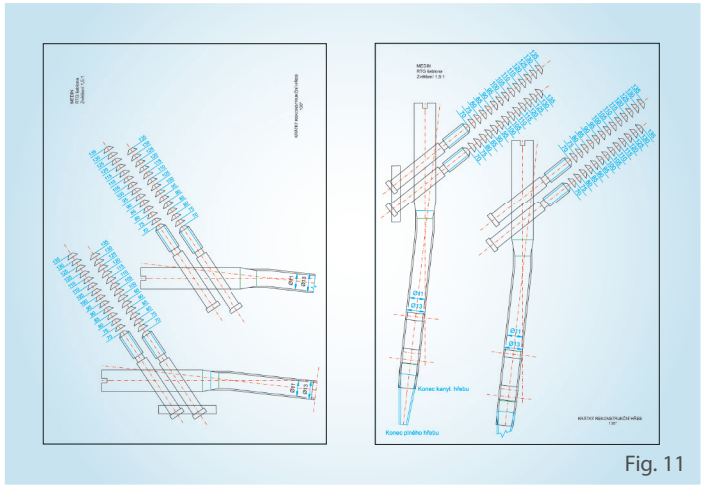


Fig. 11

6. Installation of aiming device and nail insertion

a) Completion of the aiming device with nail

Now the assembly of the chosen nail and aiming device is done. 135 ° aiming device is used to deploy the nails with a femoral neck angle of 135 degrees. 130 ° aiming device is used to deploy the nails with a femoral neck angle of 130 degrees. Assembly is done with aiming device screw (Fig. 12).

Note: For the first batch aiming device screw was secured against falling out. It is inserted into the hub of aiming device by rotating the screw in the hub to face the pin with a groove in its head, screw is moved axially and then it has to be rotated by 90 degrees and completely plugged into the hub. Reverse the procedure to remove the screw of aiming device from the hub.

Fig. 12

b) Assembly of the aiming device with sleeves and checking the aiming device with a nail

Appropriate sleeves are deployed in the aiming device and all openings are checked for aiming device and nail conformity (Fig. 13). The control is recommended with Ø10 Centre punch. Mallet guide rod or impactor is also mounted on the aiming device, by way of introduction of the nail. We recommend installation of an impactor, as the nail it should be introduced by hand, or very fine strokes (introducing a short reconstruction nail).

Aiming device allows the introduction of two screws into the neck and two screws within the distal protection (for a short reconstruction nail). All screws can be pre-drilled and introduced through the aiming device. Before drilling the holes the introducer needs to be removed.

130 ° / 135 ° Aiming device is supplied by the manufacturer as a set consisting of three main parts (two interchangeable arms and fixing part of the nail). Their interchangeability is not possible. It is always necessary to check the corresponding angles of cervical screws on the nail and the aiming device.

Any doubts or confusion must be consulted with our sales representative.

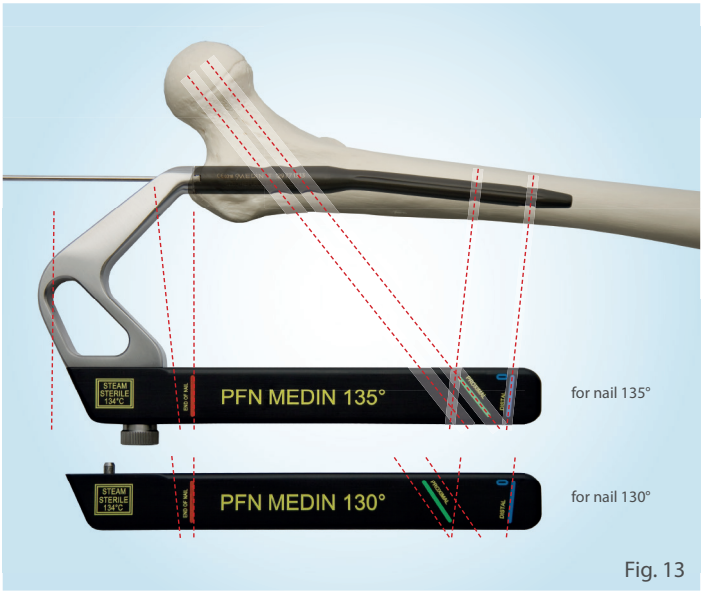


Fig. 13

c) The introduction of the nail

Carry out the introduction of the nail with the aiming device in the cavity of the femur. The introduction of the nail is done with hand pressure.

It is not possible to hit the aiming device elsewhere but on the impactor or using weights on the bar, or handle. Aiming device is a highly accurate product that could be damaged by inappropriate and rough handling.

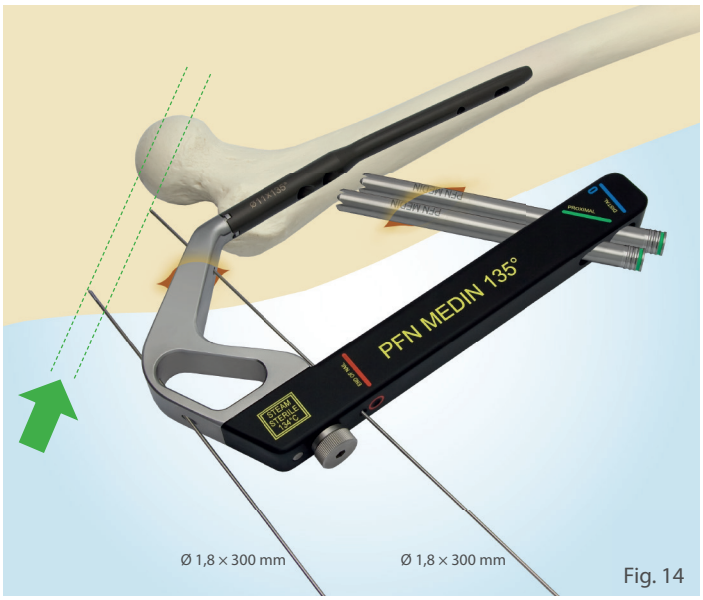
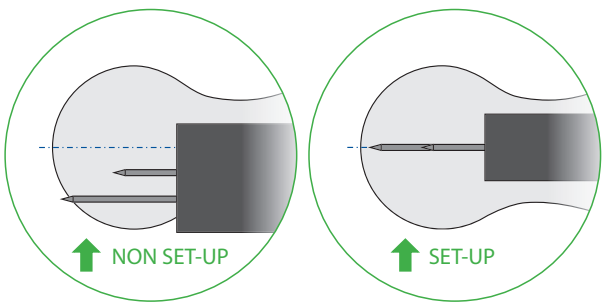


Fig. 14

d) Setting up X-ray equipment in the medial lateral direction (axial projection)

According to the femoral antiversion set the angle of aiming device through dorsal rotation (or tilting the table to the healthy side). Aiming device allows for the introduction of two K-wires Ø 1.8 × 300 mm into two holes in the aiming device (Fig. 14). X-ray projection must be such that the introduced wires are in the axial X-ray projection in alignment and also pass through the axis of the neck. X-ray amplifier beam is mostly not an in a horizontal position, but is slightly tilted in proximal-distal direction by about 10–15 °. This pre-set nail angle and rotation allows very accurate introduction of K-wires into the neck in the axial projection. Finally, K-wires are all aligned in axial projection, specifying the rotation of the nail and two wires inserted into the femoral head and neck.

The third K-wire can be inserted into the hole of aiming device to accurately determine the proximal end of the nail.



7. The introduction of the proximal screws

A) INCISION AND INSTALLATION OF A NAIL

About 4 cm incision on the lateral side of the subtrochanteric area for the introduction of two screws into the neck. Establishment of nails is done with the help of displaying the two main projections. In the medial lateral direction (the axial projection – see accurate rotation by directing K-wires through the aiming device, except femoral neck) and anteroposterior projection. Following the incision place the Ø12/Ø10 sleeves, Ø10/Ø3 sleeves and Ø3 × 330 mm guide wires into the holes in the aiming device facing the neck.

When a small incision is used, it is appropriate to insert a Ø10 centre punch within insertion of the sleeve into the aiming device, and introduce the Ø12/Ø10 sleeve with mild strokes through soft tissues, see images of the introduction of screws into the neck, option 1 (Fig. 17a–17l) or 2 (Fig. 17a–d, 18e–k).

Ø12/Ø10 sleeve should slightly hack into bone tissue with its gear finish. All sleeves are protected against falling out. That means they are adapted not to spontaneously fall out of the aiming device arm or a sleeve out of another. This includes sleeves for distal protection. Protection against falling out is done by pre-tensioned prongs.

establishment of the nail in the anteroposterior projection

It is done using the x-ray equipment and guide wire Ø3 L330, which we put into the distal hole, leading to femoral neck. Extended axis of the K-wire should be 10 mm above the femoral Adams arch (Fig. 15).

establishment of the nail in the lateral projection

X-ray amplifier is set so that the 1.8 × 300 mm K-wires, which are inserted into holes of the aiming device and plunging into the soft tissues (distal to the acetabulum of the pelvis), or a third wire, which also signals the end of the nail, are aligned with the axis of the neck.
K-wires must be directed through the center of the femoral neck to the center of the femoral head. If not, then K-wires need to be pulled out, rotational axis of the nail adjusted; try again whether the wires are aligned through their introduction and whether they pass through the neck and head axis. It is wrong to spin the nail with the established K-wires may bend within this manipulation in soft tissues and distort the accurate targeting of the cervical K-wires. Aiming device with nail is set up properly when the Ø3 × 330 mm guide wire introduced into the proximal hole in the nail is in alignment with other wires as well as passing through the axis of the neck. Such aiming device allows the introduction of screws into the axis of the neck and medial lateral direction (Fig. 16).

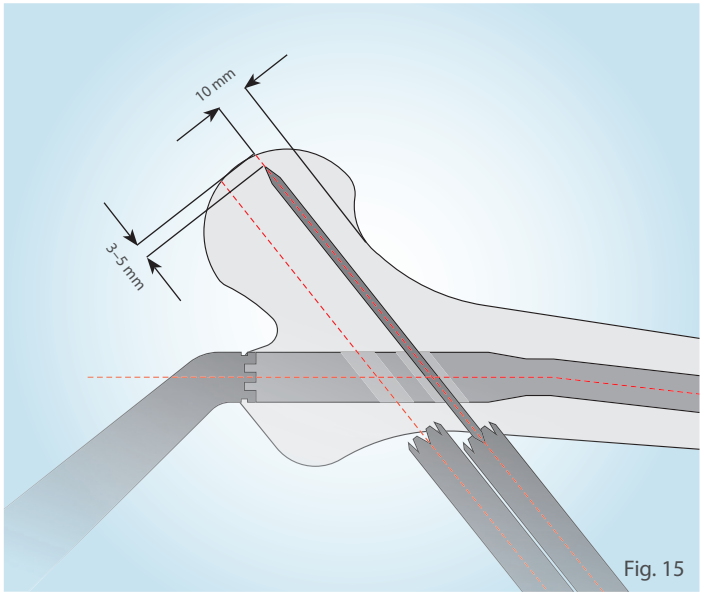


Fig. 15

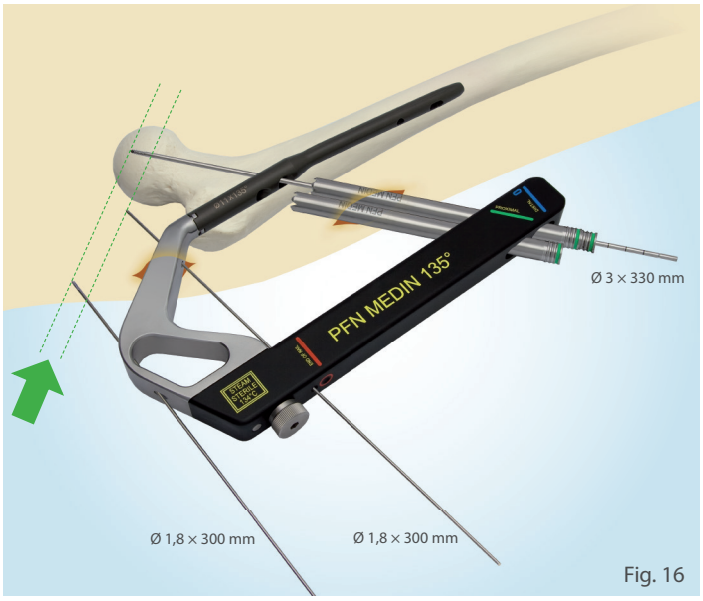
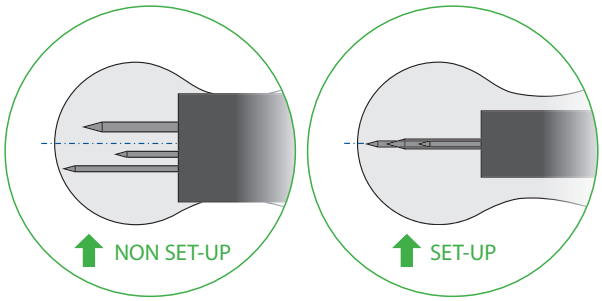


Fig. 16



B) INTRODUCTION OF SCREWS

The procedure according to individual options is evident from Figures of introducing screws into the neck – Option 1 (Fig. 17a-l) or 2 (Fig. 17a–d, 18e–k).

a) The introduction of sleeves into the aiming device

Both Ø12/Ø10 sleeves are gradually inserted into the arm of the aiming device. For gentle transition through the soft tissue it is suitable to insert Ø12/Ø10 sleeve into which Ø10 centre punch is inserted. The Ø10 centre punch can be supported by slight mallet blows.

Before introducing the guide wire it is appropriate to make a small dent into the bone at the point of entry. It is possible to use embedded Ø10 centre punch or use a hand punch.

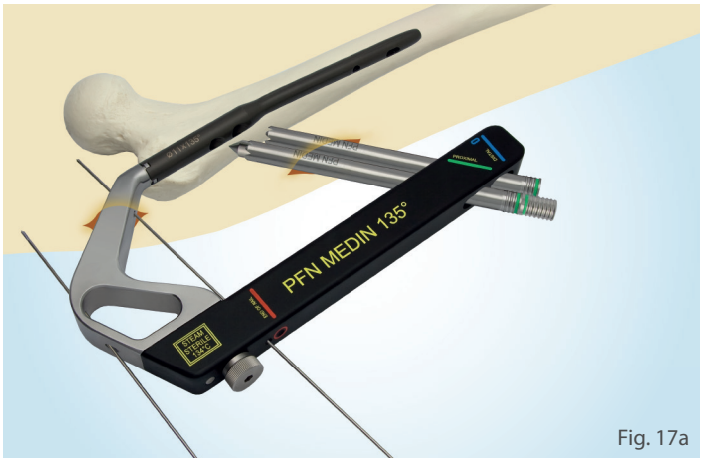


Fig. 17a

b) The introduction of the distal guide wire

It is necessary to use a prescribed guide wire of Ø3 × 330 mm. Ø10/Ø3 sleeve is inserted into the Ø12/Ø10 sleeve in the aiming device arm through which the actual introduction of the wire is done. As stated above, the guide wire should pass about 10 mm above the outer edge of Adams arch in the anteroposterior projection. Drilling depth should be about 3–5 mm from the edge of the head bone (Fig. 15).

The guide wire may have a tendency to spin proximally due to hard cortica of Adams pillar and angle of drilling through the lateral femoral cortica. During its implementation the direction of guide wire drilling should be followed. Anchoring depth is determined by X-ray device in sagittal projection.

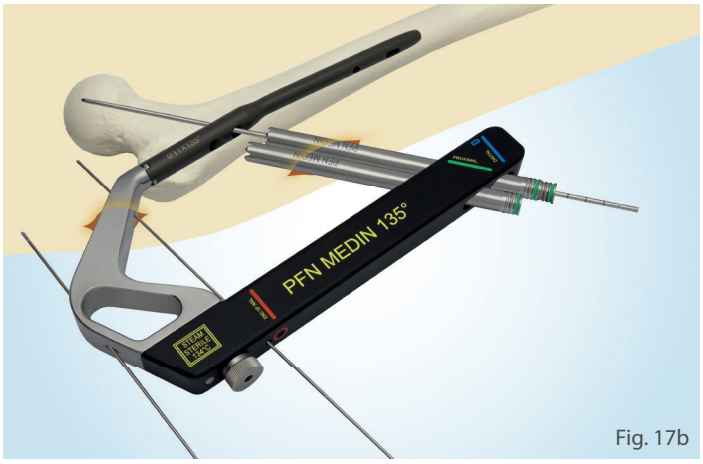


Fig. 17b

c) The introduction of the proximal guide wire

It is necessary to use a prescribed guide wire of Ø3 × 330 mm. Ø10/Ø3 sleeve is inserted into the Ø12/Ø10 sleeve in the aiming device arm through which the actual introduction of the wire is done. Drilling depth should be about 3–5 mm from the edge of the head bone.

After a successful introduction of two guide wires into the aiming device and sleeves in axial projection, two guide-wires and two targeting K-wires should be aligned prior to drilling (see item 17d).

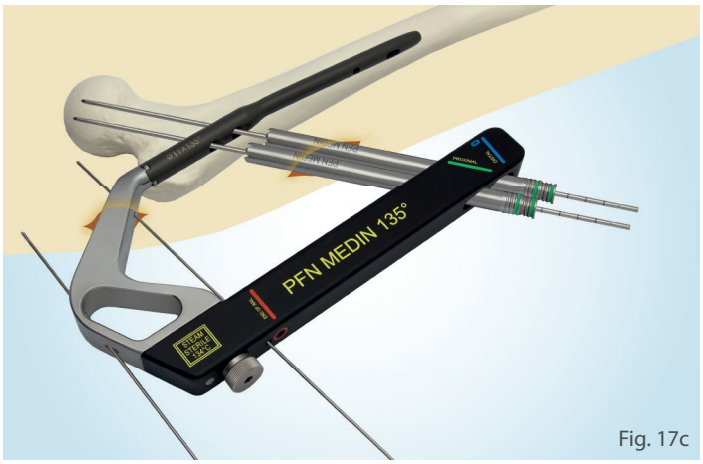


Fig. 17c

d) The introduction of cannulated cutter

Ø10/Ø3 sleeve is removed from the distal opening of the aiming device, the Ø10/Ø8P sleeve is inserted and the cannulated cutter is screwed in up to the head of the Ø10/Ø8P sleeve. This cutter pre-drills the lateral cortex only, and the channel through the nail to a depth of 4 cm, allowing subsequently precise guidance of the drill head without deflection. When crossing the nail, drill with due care. Cutter is adapted for guiding itself into the hole in the nail. After drilling all the way through it passes through the nail and extends partially into the bone under the nail.

At this point, the aiming device with the nail is attached firmly and its displacement or rotationcan is prevented.

Then you can proceed choosing one of two options, either option 1, which establishes the first distal screw in the neck, that we recommend or option 2, introducing first the proximal screw into femoral neck and, consequently, the distal screw. In option 1 the advantage is that distal screw is introduced into the neck first just around the Adams pillar and thus the fracture can be quite precisely fixed aong with the nail in mutually correct position and fixed stabilization.

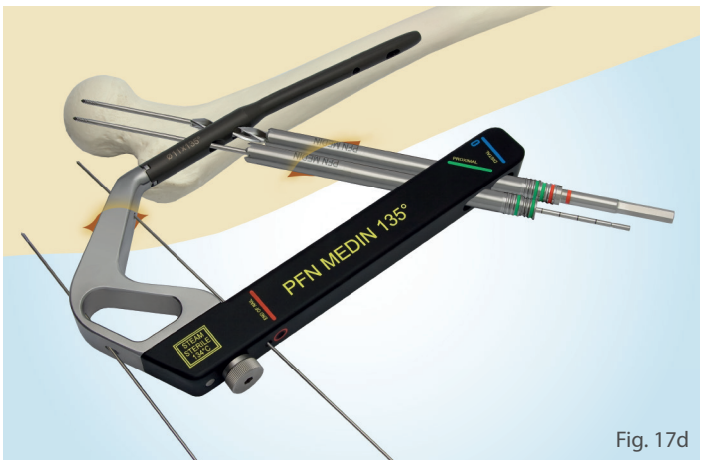


Fig. 17d

Option 1

e) Measuring the length of the distal screw

Ø10/Ø3 sleeve and the Ø3 × 330 mm guide wires are inserted into the Ø12/Ø10 sleeve established under section 7 B b) 3–5 mm to the edge of the femoral head. Use the gauge read the value of the anchorage (length of guide wire protruding from the guide sleeve). The guide wire includes an auxiliary scale by which you can also deduct the value of the anchorage.

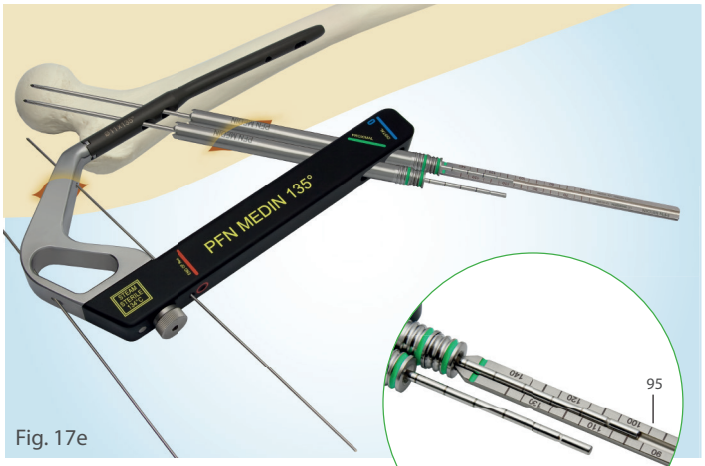


Fig. 17e

f) Pre-drilling of the distal hole for screw introduction

Remove the guide wire and Ø10/Ø3 sleeve, insert Ø10/Ø8P sleeve into the Ø12/Ø10 sleeve. Anchorage value is set on the drill. Perform drilling. Drilling device predrills the bone in the neck and the femoral head for thread and the screw shank at the same time.

When drilling, it is necessary to check it with X-ray projector in the sagittal and axial projection. Although targeting is accurate, it should be borne in mind that errors may always occur. Before drilling is finished X-ray inspection is necessary in the anteroposterior projection, the drilling depth must be adjusted accordingly.

To determine the length of the nail several facts must be taken into account:
- at the femoral neck fracture site a shift of fragments could occur during an accident or during surgery that are partially compressed within the introduction of the screw
- the length of the screw includes the height of the screw head (3 mm)
- when using the plate under the screw it is necessary to count with the plate thickness of about 5 mm

The screws are self-tapping, so there is no need pre-cut the thread in the femoral head.

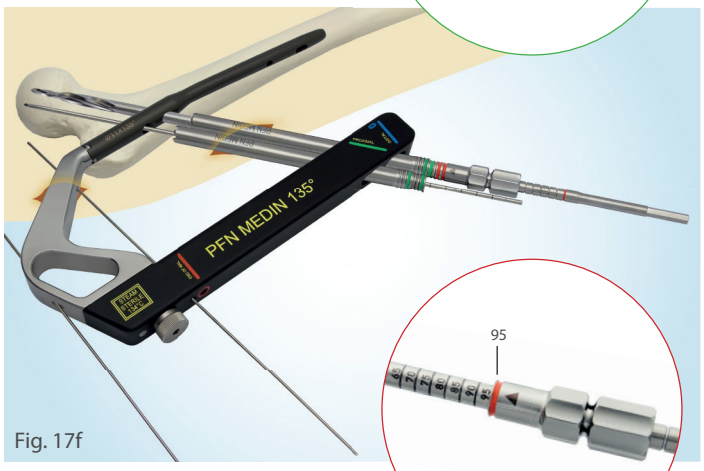


Fig. 17f

g) The introduction of the distal screw

The drilling device and sleeve Ø10/Ø8P were removed. The selected screw is fixed to the wrench. Its length is chosen according to the depth of pre-drilled hole. The screw is introduced through the Ø12/Ø10 sleeve into the bone. Screw thread is self-tapping, it is not necessary to use the tap. The optimal shape of the screw thread allows a very strong fixation of the screw in spongiosa of the femoral head. Before tightening the screw it is necessary to check with an X-ray projector in the sagittal and axial projection.

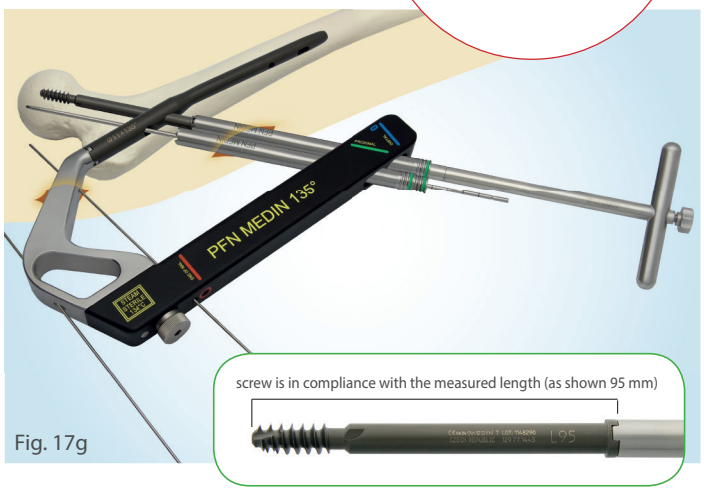


Fig. 17g

h) The introduction of cannulated cutter into the proximal hole

The same procedure as for the introduction into the distal hole. Ø10/Ø3 sleeve is removed from the proximal opening of the aiming device with Ø12/Ø8 sleeve, the Ø10/Ø8P sleeve is inserted and the cannulated cutter is screwed in up to the head of the Ø10/Ø8P sleeve. This cutter pre-drills the lateral cortex only, and the channel through the nail to a depth of 4 cm, allowing subsequently precise guidance of the drill head without deflection. When crossing the nail, drill with due care. Cutter is adapted for guiding itself into the hole in the nail. After drilling all the way through it passes through the nail and extends partially into the bone under the nail.

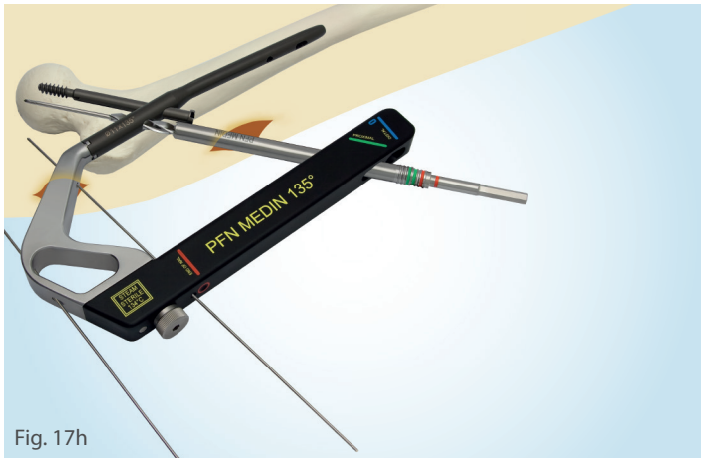


Fig. 17h

i) Measuring the length of the proximal screw

Cannulated cutter and Ø10/Ø8P sleeve are removed. Ø10/Ø3 sleeve and the Ø3 L330 mm guide wires are inserted into the Ø12/Ø10 sleeve established under Fig. 15 up to the edge of the femoral head. Use the gauge read the value of the anchorage (length of guide wire protruding from the guide sleeve). The wire includes an auxiliary scale by which you can also deduct the value of the anchorage..

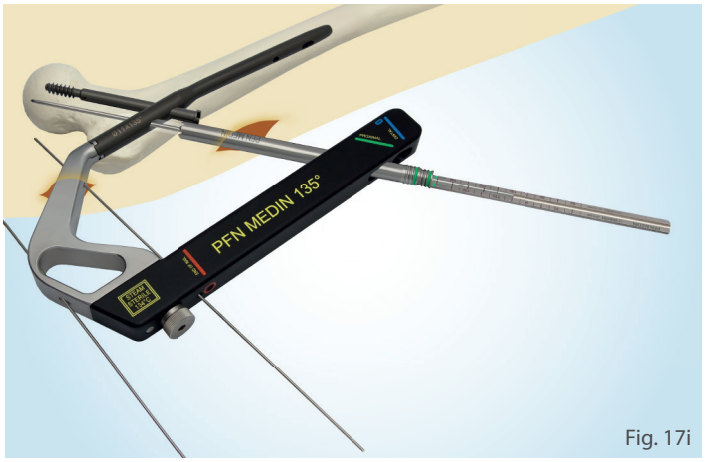


Fig. 17i

j) Pre-drilling of the proximal hole

Remove the K-guide wire and Ø10/Ø3 sleeve, insert Ø10/Ø8P sleeve into the Ø12/Ø10 sleeve. Anchorage value is set on the drill. Perform drilling. Drilling device predrills the bone in the neck and the femoral head for thread and the screw shank at the same time.

When drilling, it is necessary to check it with X-ray projector in the sagittal and axial projection. Although targeting is accurate, it should be borne in mind that errors may always occur.

Fig. 17j

k) The introduction of the proximal screw

The drilling device and sleeve Ø10/Ø8P were removed. The selected screw is fixed to the wrench. Its length is chosen according to the depth of predrilled holes. The screw is introduced through the Ø12/Ø10 sleeve into the bone. Screw thread is self-tapping, it is not necessary to use the tap. The optimal shape of the screw thread allows a very strong fixation of the screw in spongiosa of the femoral head. Before tightening the screw it is necessary to check with an X-ray projector in the sagittal and axial projection.

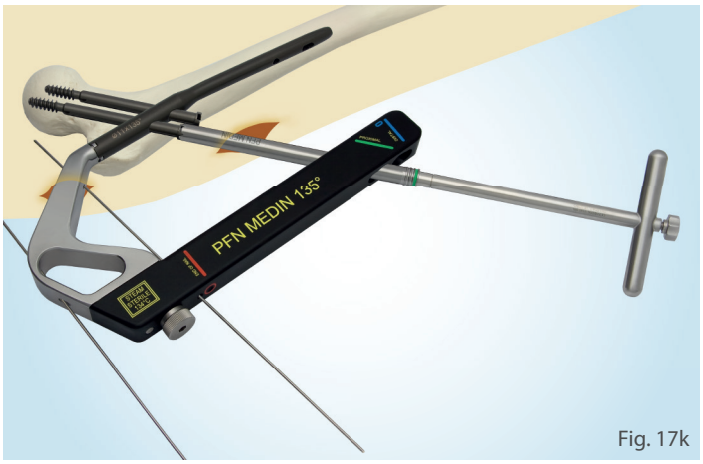


Fig. 17k

Note: After the introduction of both cervical screws you can create the compression in the fracture by gradual tightening of both screws through turning by about 1/3 to 1/2 alternately. This is allowed by screws mounting, which rests on the lateral femoral cortica and the shape of the screw thread. When you need to create a compressed neck, it is very convenient to use a plate under the screw head (plate application – Fig. 19). When tightening, it is necessary to monitor very closely the power of tightening to avoid disruption of threaded connection in the cancellous bone head and screw thread.

Fig. 17l

Option 2

Same procedure as in Option 1. But the proximal screw is introduced first.

This option is possible due to the same diameter and screws thread into the neck.

For more see Fig. 18e–18k.

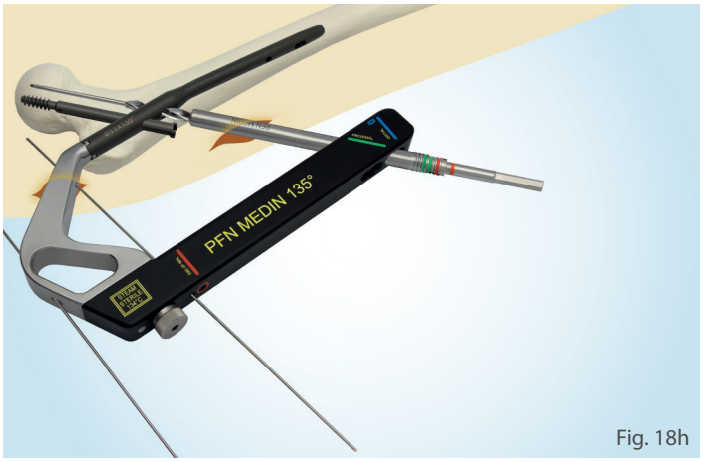


Fig. 18h

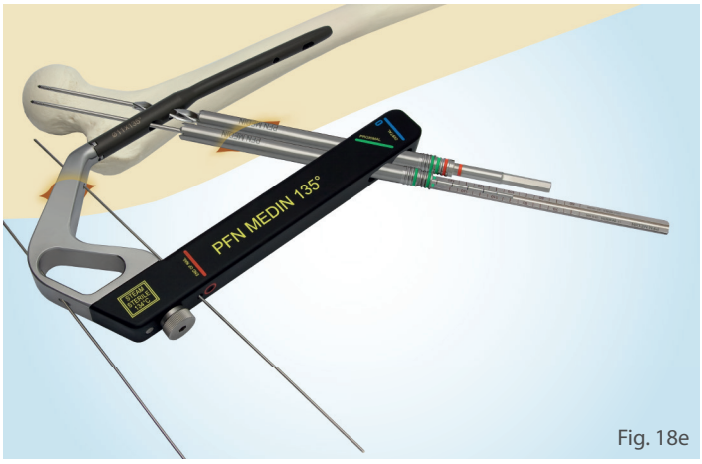


Fig. 18e

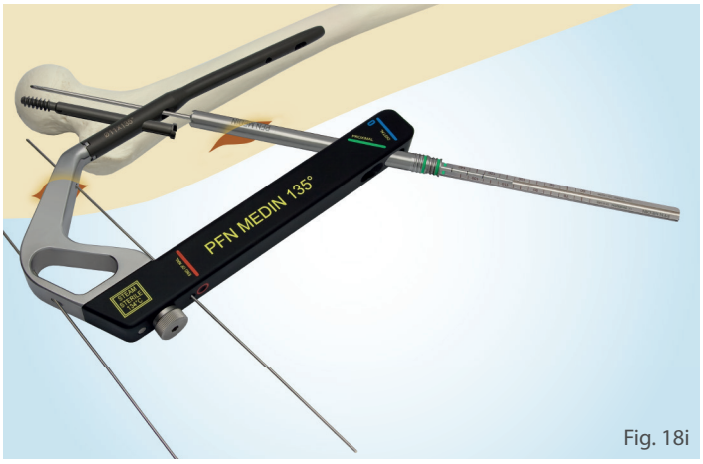


Fig. 18i

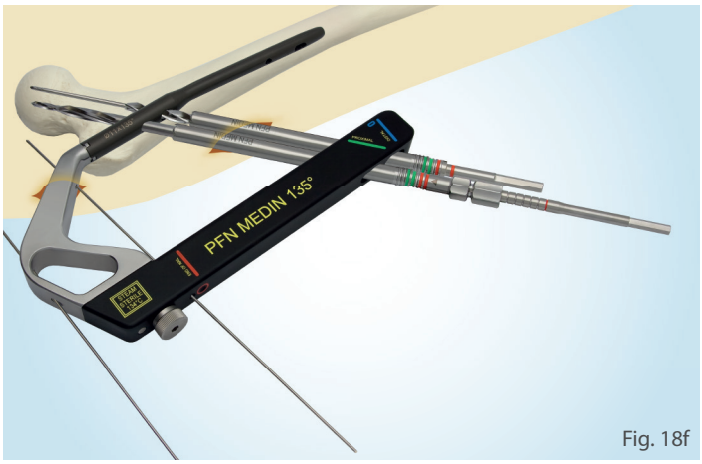


Fig. 18f

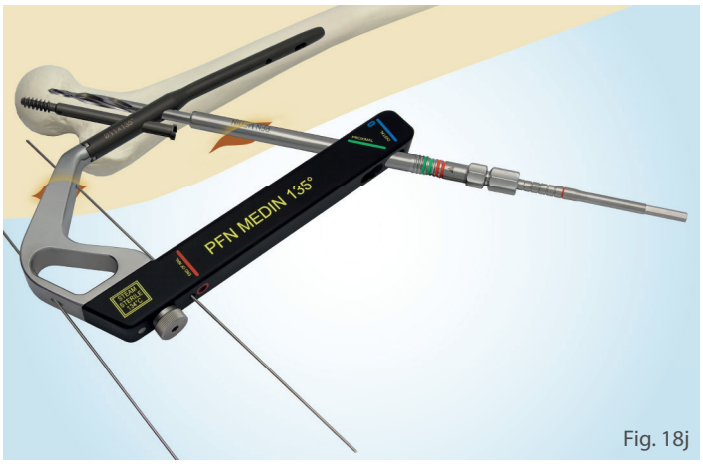


Fig. 18j

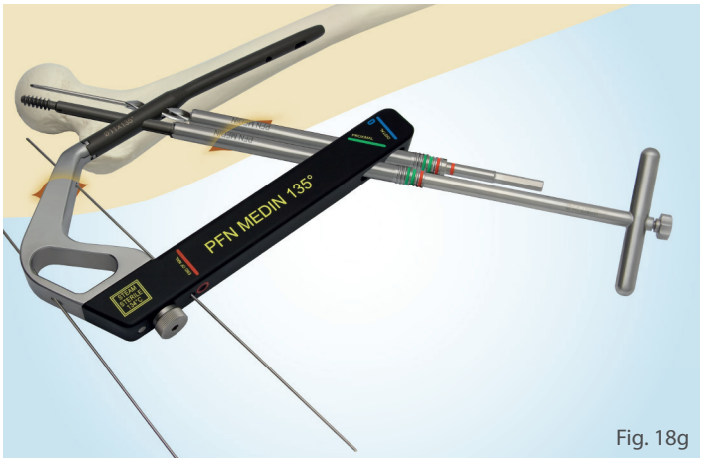


Fig. 18g

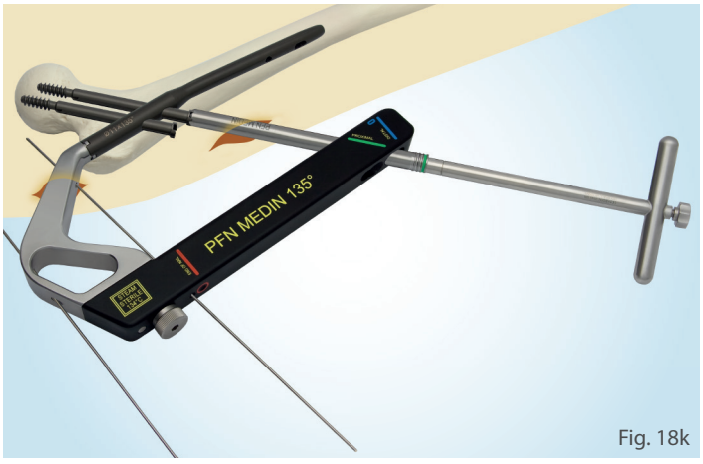


Fig. 18k

C) APPLICATION OF PLATE UNDER THE SCREW HEADS

If you plan to compress the neck directly on the operating table or the hip bone is damaged in the site of screw heads contact with the neck, it is advisable to use a plate under the screw heads. When seating the screw head straight to the bone (without plates) large pressing of the edge of the screw head into the bone or complete dents can occur.

Recommended plate introduction:
- introduce the distal femoral screw to be introduced into the second fragment (head), but not tightened yet (the screw head must allow insertion of the plate)
- when inserting the proximal screw into the neck place the plate between the aiming device and the patient that is inserted under the head of partially introduced distal screw at the same time. Pass the proximal screw through the plate into the neck and place the plate on the lateral cortica of the femur (Fig. 19)
- tighten the two screws into the neck
- for compression of the neck on the operating table, we recommend tightening the screws through gradual tightening of these screws by about 1/3 to 1/2 of screw turn

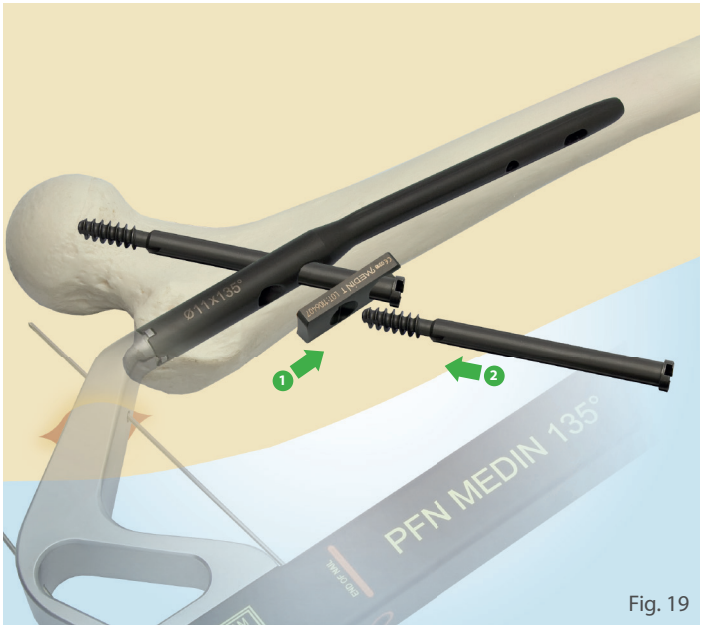


Fig. 19

8. Distal locking

Into the appropriate holes of the aiming device arm (opening for dynamic and static locking of the nail) the Ø10/Ø8D sleeve is inserted with a Ø8 center punch. Incision is performed in place of contact with the skin (Fig. 20). Ø8 centre punch facilitates the introduction of Ø10/Ø8D sleeve through soft tissues. At the same time this Ø8 center punch can mark the hole to be drilled. Centre punch Ø8 is removed and sleeves are inserted into the aiming device arm according to the type of locking screw.

Our recommendation is to use a locking screw threaded up to the screw head. This will prevent the possible problems when removing the screw.

The procedure is as follows. Ø10/Ø8D and Ø8/Ø3 sleeves are first inserted into the holes in the aiming device arm and then the Ø8/Ø3.5 sleeve. Carry out pre-drilling with a 3.5 mm drill through both cortices (Fig. 21). Remove the Ø8/Ø3.5 sleeve and determine the length of the screw with a depth gauge. Indicative length of the screw can be determined by reading the scale on the drill of 3.5 mm diameter. Drill must be in the same position as the introduced locking screw should be. Using a screwdriver the selected screw is introduced through the Ø10/Ø8 sleeve.

Distal hole can be used for dynamic compression (about 5 mm). Axis of the dynamic distal screw is marked with an oval on the arm of the aiming device.

Distal proximal hole is used to ensure static nail locking.

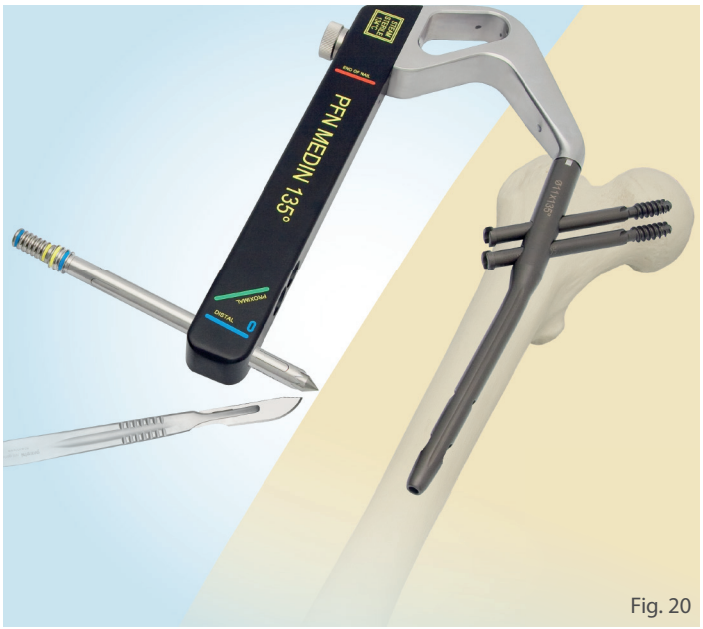


Fig. 20

Note: To facilitate the use of sleeves and tools colored markings are provided.

- green color – screw holes into the neck in the aiming device arm, on the Ø12/Ø10 sleeve, Ø10 center punch, Ø10/Ø3 sleeve, the guide wire 3×330 mm in diameter and Ø10/Ø8P sleeve
- red color – Ø10/Ø8P sleeve, cannulated cutter, drilling device
- blue color – the holes for distal locking screws in the aiming device arm, on the Ø10/Ø8D sleeve and Ø8 center punch
- yellow color – Ø10/Ø8D sleeve, Ø8/Ø3.5 sleeve and 3.5 mm drill

Use of tools is facilitated by color marking primarily in the way that each tool can be mutually inserted by matching color coding.

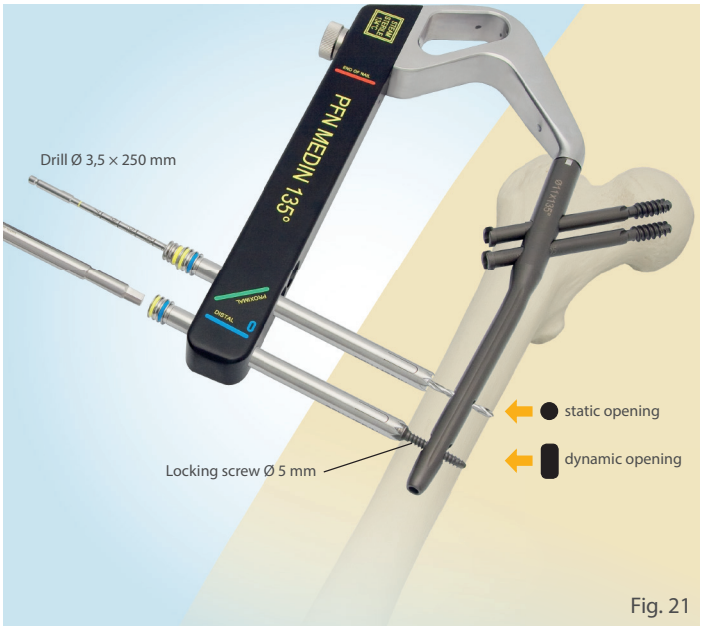


Fig. 21

9. Closing the nail with a plug

After proximal and distal locking the nail is closed with a stopper (Fig. 22). To remove the aiming device screw use screwdriver with hexagon 7 mm. For mounting and removing of the plug use the 5 mm hexagonal screwdriver.

Fig. 22

10. Securing screws in the neck against sliding

When you need to lock fracture of the neck in the revised position, it is possible to secure the screws into the neck with adjusting screws. The implant can be locked either by the proximal screw (Fig. 23) or using a single screw into the femoral neck by the distal screw (Fig. 24). Locking is done using adjusting screw which is mounted with help of the screwdriver into the nail instead of the plug.

11. Completion of the operation

After lavage the wounds are gradually closed. Exhausted drain can be introduced at the point of introducing of the nail into the femur, but blood must not be drained directly from the cavity. The wound is covered with a soft bandage amd X-ray documentation is performed.

Fig. 23

Fig. 24

12. The introduction of full of nails

The range of short reconstruction nail implants includes full – non-cannulated nails (material: steel for implants or titanium alloy Ti6Al4V). The surgery procedure is the same as the above for the cannulated nail, the only difference being that the nail is not introduced after the guide wire.

13. Concluding notes

a) before the introduction of the nail it is necessary to check following the assembly of the nail and the aiming device, whether all the holes into which screws are to be introduced, correspond to holes in the nail and the aiming device

b) use of the plate under the heads of screws into the neck depends solely on the surgeon's decision. The implant is designed so that the use or non-use of plate does not affect the progress of the surgery. The plate, however, should not be applied in cases where it is desirable to use compression directly on the operating table or when corticalis in the seating of the screw head into the neck does not provide any support

c) to facilitate insertion of sleeves, drilling , and the screws introduction, appropriate instrumentation tools are color-coded

d) implants can be ordered in two material versions, either steel or titanium alloy. When used in one patient, their combination should never occur.

e) to guarantee the safe use of the implant MEDIN company requires that only the company's implants are used. There must be no combination with implants by other companies.

f) the patient must be warned that the implant does not bear the entire weight of the patient. The patient must use walking support means and burden the implant progressively, depending on how the callus at the fracture site creates.

g) Screw of the aiming device is made of martensitic (hardening) stainless steel. If broken in the nail, the broken part of the screwmust be removed from the nail. If impossible, it is necessary to remove the nail with the broken aiming device screw. Broken aiming device screw may not remain in the patient.

14. Recommended implant extraction procedure

Gradually remove the screws from the distal nail and neck. When using an adjusting screw, that must be removed before you begin removing the locked screw to the neck. If the nail plug is introduced, it must be removed before the introduction of the nail extractor. Nail extractor must be screwed into the nail before removing the last locking screw of the nail to prevent any rotation of the nail in the cavity of the femur. Pull rod with added weights and installed handle is screwed into the inner cavity of the proximal nail end. The nail is gradually removed by striking against the handle (Fig. 25).

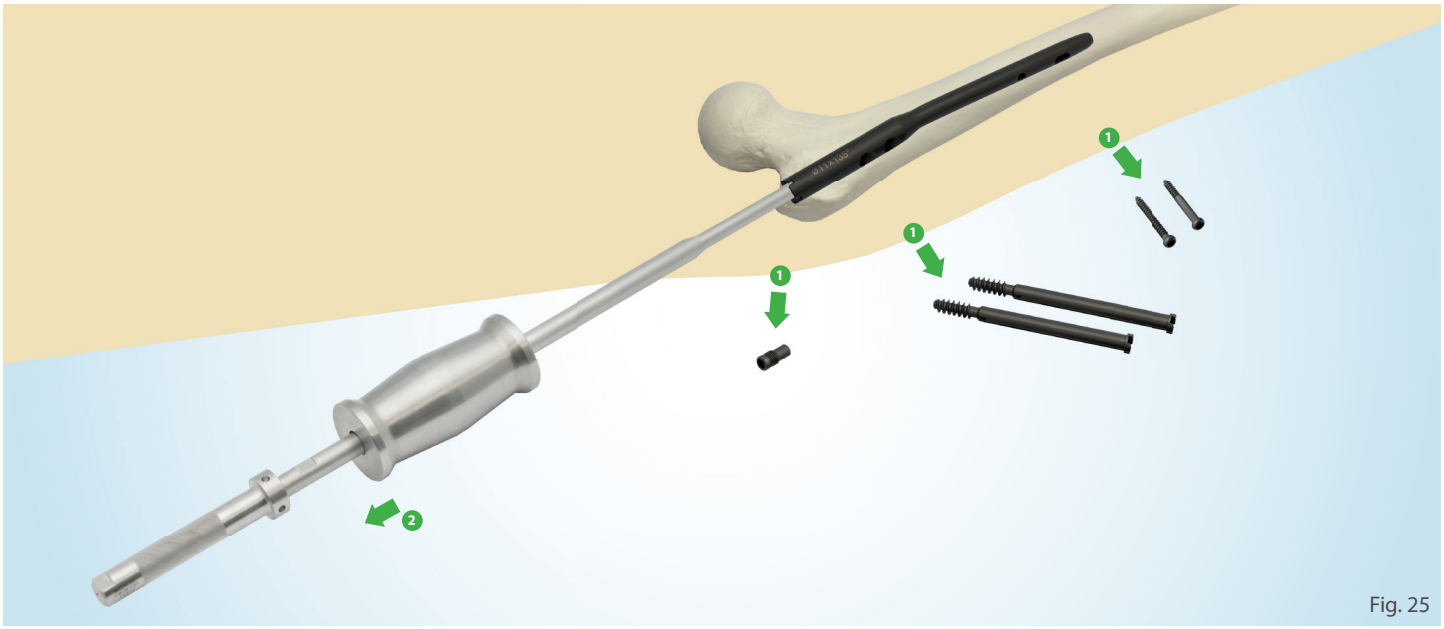
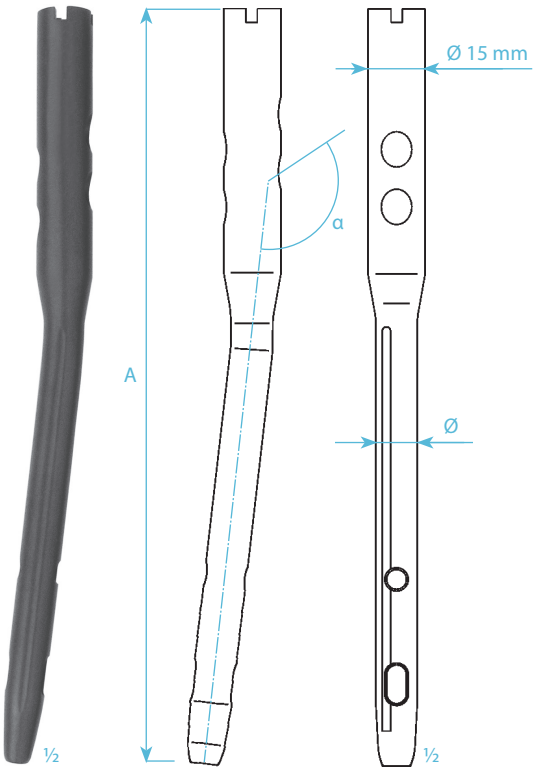


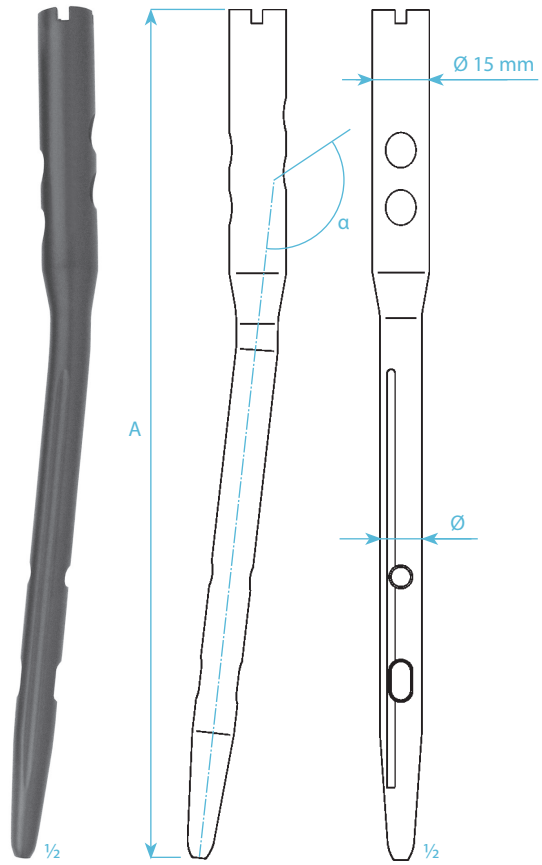
Fig. 25

SHORT RECONSTRUCTION NAIL – NAILS



Short reconstruction nail, cannulated

SSt	Ti	A	Ø	α
129 77 1320	**129 77 1323**	200 mm	11 mm	130°
129 77 1360	**129 77 1363**	200 mm	13 mm	130°
129 77 1330	**129 77 1333**	200 mm	11 mm	135°
129 77 1370	**129 77 1373**	200 mm	13 mm	135°
for special order				
129 77 1310		200 mm	11 mm	125°
129 77 1350		200 mm	13 mm	125°

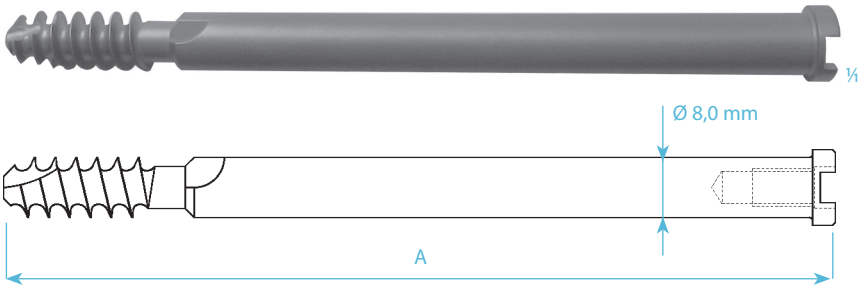


Short reconstruction nail, full

SSt	Ti	A	Ø	α
129 77 2920	**129 77 2923**	225 mm	11 mm	130°
129 77 2960	**129 77 2963**	225 mm	13 mm	130°
129 77 2930	**129 77 2933**	225 mm	11 mm	135°
129 77 2970	**129 77 2973**	225 mm	13 mm	135°
for special order				
129 77 2910		225 mm	11 mm	125°
129 77 2950		225 mm	13 mm	125°

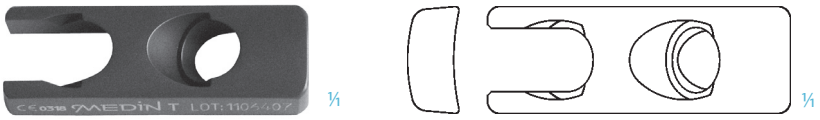
NOTES: SSt – stainless steel in accordance with ISO 5832-1 Ti – titanium version, material: Ti6Al4V ELI in accordance with ISO 5832-3

SHORT RECONSTRUCTION NAIL – IMPLANTS



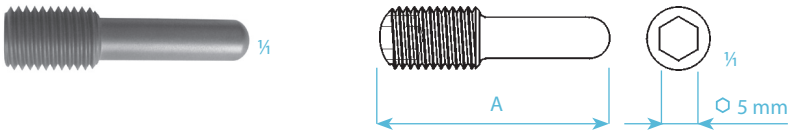
Screw

SSt	Ti	A
129 77 1390	**129 77 1393**	70 mm
129 77 1400	**129 77 1403**	75 mm
129 77 1410	**129 77 1413**	80 mm
129 77 1420	**129 77 1423**	85 mm
129 77 1430	**129 77 1433**	90 mm
129 77 1440	**129 77 1443**	95 mm
129 77 1450	**129 77 1453**	100 mm
129 77 1460	**129 77 1463**	105 mm
129 77 1470	**129 77 1473**	110 mm
129 77 1480	**129 77 1483**	115 mm
129 77 1490	**129 77 1493**	120 mm
129 77 1500	**129 77 1503**	125 mm
129 77 1510	**129 77 1513**	130 mm
129 77 1520	**129 77 1523**	135 mm



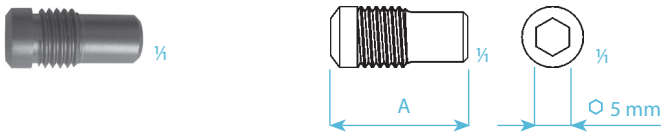
Plate

SSt	Ti	
129 77 1540	**129 77 1543**	40 × 14 × 6 mm



Adjusting screw

SSt	Ti	A
129 77 1580	**129 77 1583**	32 mm
129 77 1590	**129 77 1593**	47 mm

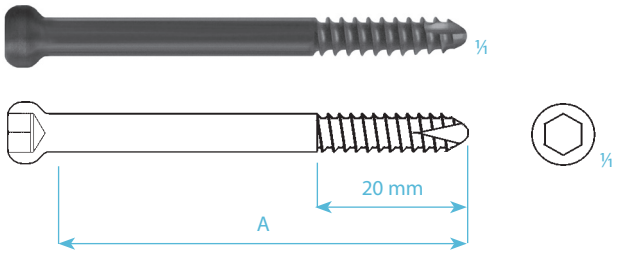


End cap

SSt	Ti	A
129 77 1610	**129 77 1613**	18 mm

NOTES: SSt – stainless steel in accordance with ISO 5832-1 Ti – titanium version, material: Ti6Al4V ELI in accordance with ISO 5832-3

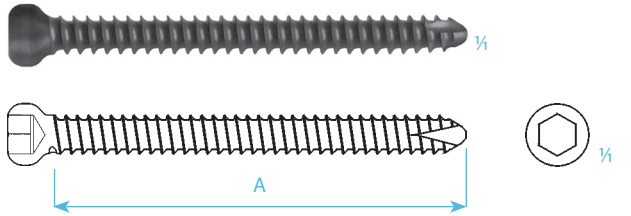
SHORT RECONSTRUCTION NAIL – IMPLANTS



thread diameter	5,0 mm
shank diameter	5,0 mm
core diameter	3,5 mm
head diameter	8,0 mm
drill bit for threaded hole	Ø 3,5 mm
drill bit for gliding hole	Ø 5,0 mm
screwdriver	⬡ 3,5 mm

Locking screw 5 mm, thread 20 mm

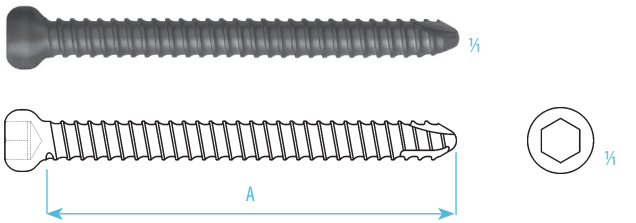
SSt	Ti	A
129 79 1500	**129 79 1503**	25 mm
129 79 1520	**129 79 1523**	30 mm
129 79 1540	**129 79 1543**	35 mm
129 79 1560	**129 79 1563**	40 mm
129 79 1580	**129 79 1583**	45 mm
129 79 1600	**129 79 1603**	50 mm
129 79 1620	**129 79 1623**	55 mm
129 79 1640	**129 79 1643**	60 mm
129 79 1660	**129 79 1663**	65 mm
129 79 1680	**129 79 1683**	70 mm
129 79 1700	**129 79 1703**	75 mm
129 79 1720	**129 79 1723**	80 mm
129 79 1740	**129 79 1743**	85 mm
129 79 1760	**129 79 1763**	90 mm



thread diameter	5,0 mm
core diameter	3,5 mm
head diameter	8,0 mm
drill bit for threaded hole	Ø 3,5 mm
drill bit for gliding hole	Ø 5,0 mm
screwdriver	⬡ 3,5 mm

Locking screw 5 mm, fully threaded

SSt	Ti	A
129 79 1510	**129 79 1513**	25 mm
129 79 1530	**129 79 1533**	30 mm
129 79 1550	**129 79 1553**	35 mm
129 79 1570	**129 79 1573**	40 mm
129 79 1590	**129 79 1593**	45 mm
129 79 1610	**129 79 1613**	50 mm
129 79 1630	**129 79 1633**	55 mm
129 79 1650	**129 79 1653**	60 mm
129 79 1670	**129 79 1673**	65 mm
129 79 1690	**129 79 1693**	70 mm
129 79 1710	**129 79 1713**	75 mm
129 79 1730	**129 79 1733**	80 mm
129 79 1750	**129 79 1753**	85 mm
129 79 1770	**129 79 1773**	90 mm
129 79 1290	**129 79 1293**	95 mm
129 79 1300	**129 79 1303**	100 mm
129 79 1310	**129 79 1313**	105 mm



thread diameter	5,0 mm
core diameter	4,4 mm
head diameter	8,0 mm
drill bit for threaded hole	Ø 4,4 mm
drill bit for gliding hole	Ø 5,0 mm
screwdriver	⬡ 3,5 mm

Locking screw strengthened 5 mm

SSt	Ti	A
129 79 9631	**129 79 9634**	25 mm
129 79 9641	**129 79 9644**	30 mm
129 79 9651	**129 79 9654**	35 mm
129 79 9661	**129 79 9664**	40 mm
129 79 9671	**129 79 9674**	45 mm
129 79 9681	**129 79 9684**	50 mm
129 79 9691	**129 79 9694**	55 mm
129 79 9701	**129 79 9704**	60 mm
129 79 9711	**129 79 9714**	65 mm
129 79 9721	**129 79 9724**	70 mm
129 79 9731	**129 79 9734**	75 mm
129 79 9741	**129 79 9744**	80 mm
129 79 9751	**129 79 9754**	85 mm
129 79 9761	**129 79 9764**	90 mm

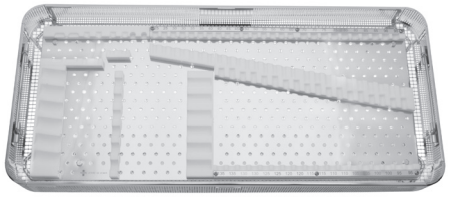
NOTES: SSt – stainless steel in accordance with ISO 5832-1 Ti – titanium version, material: Ti6Al4V ELI in accordance with ISO 5832-3

INSTRUMENTS FOR SHORT RECONSTRUCTION NAIL

139 09 0280 Set PFN
sieve 1 + sieve 2 + instruments

139 09 0290 Set PFN MEDIN for strenghened locking screws
sieve 1 + sieve 2 + instruments

		alternative instruments	pcs
7	**129 79 8461**	Sleeve Ø10/Ø 4.4	1
16	**129 79 8431**	Drill Ø4.4	1



129 79 9331 Sieve for implants keeping
500 × 210 mm

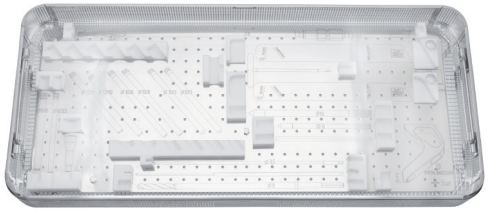
Sieve 129 79 9331 is for keeping of implant set for short reconstructional nail made of stainless steel or titanium. Implants are not parts of the sieve. Short reconstruction nail cannulated or Short reconstruction nail full (6 × 1 pcs); Screws (14 × 2 pcs); Plates (1 × 2 pcs); Adjusting screws (2 × 2 pcs); Stoppers (1 × 2 pcs); Locking screw (25–60 mm, 8 × 2 pcs)

hreb_rekonstrukcni_kratky_PFN_full_OP014EN-R02_2014-08-15

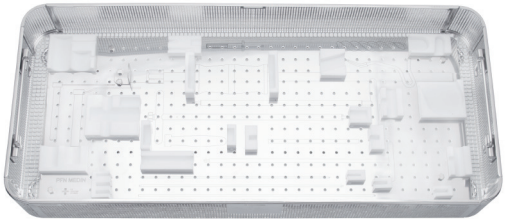
INSTRUMENTS FOR SHORT RECONSTRUCTION NAIL

SET OF INSTRUMENTS FOR SHORT RECONSTRUCTION NAIL
129 69 5770

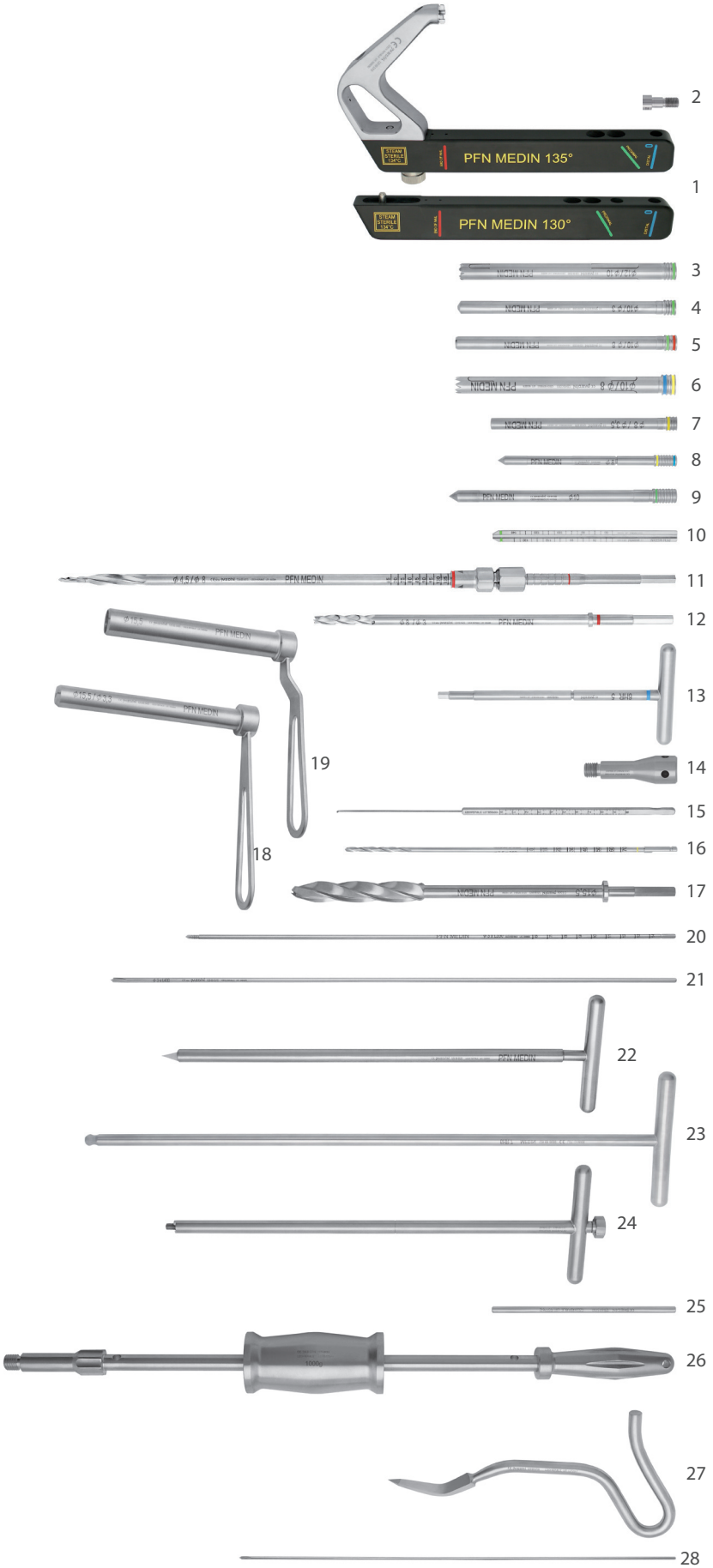
			pcs
1	**129 69 5310**	PFN MEDIN aiming device 130°a 135°	1
2	**129 69 8130**	Screw of aiming device, inner hex. 7 mm	2
3	**129 69 5330**	Sleeve Ø12/Ø10	2
4	**129 69 5340**	Sleeve Ø10/Ø3	2
5	**129 69 5350**	Sleeve Ø10/Ø8P	2
6	**129 69 5360**	Sleeve Ø10/Ø8D	1
7	**129 69 5370**	Sleeve Ø10/Ø3,5	1
8	**129 69 5380**	Trocar Ø8	1
9	**129 69 5390**	Trocar Ø10	1
10	**129 69 5400**	Wire gauge	1
11	**129 69 5410**	Drill	1
12	**129 69 5420**	Cannulated reamer	1
13	**129 69 5430**	Screwdriver	1
14	**129 69 5660**	Impactor	1
15	**129 69 2140**	Depth gauge	1
16	**129 79 4991**	Drill Ø3,5 mm	1
17	**129 69 5470**	Reamer	1
18	**129 69 5480**	Centering sleeve	1
19	**129 69 5490**	Protecting sleeve	1
20	**129 69 5500**	Guide wire Ø3 × 330 mm	3
21	**129 69 5510**	Guide wire Ø3 × 400 mm	2
22	**129 69 5520**	Hand perforator	1
23	**129 69 8050**	Screwdriver, hexagonal 7 мм	1
24	**129 69 1590**	T-wrench	1
25	**129 69 5700**	Rod	2
26	**129 69 5670**	Mallet (axis, weight 1000 g, holder)	1
27	**129 09 0700**	Perforator curved K12	1
28	**129 09 2560**	K-wire 1,8×300 mm	3



Sieve 1
129 69 5580



Sieve 2
129 69 5590




2014