

SURGICAL TECHNIQUE: PROXIMAL TIBIAL NAIL  
AND INTRAMEDULLARY TIBIAL NAIL – DISTAL AIMING










**Completion of the surgical technique of the proximal tibial nail and intramedullary tibial nail**

**Purpose of use:**

The aiming device is used for locking of the distal holes of the intramedullary tibial nails and proximal tibial nails.

**Warning:**

-  The aiming device crossbeams are made of the transparent material to X-rays. Sterilization can be performed only by using the steam of the temperature of 134 °C! The permanent deformation and loss of the crossbeam functionality can happen when using higher temperature!
-  It is necessary to take into account possible deviation of the aiming at the distal aiming. The check under X-ray amplifier is therefore essential. It is not allowed to use an excessive force to the aiming device.
-  Distal targeting may be inapplicable in the case of very large bending of the nail in both planes.
-  It is necessary before drilling to use the awl to create an entry point for the drill to prevent sliding of the drill on the bone during drilling.
-  The awl is sharp!

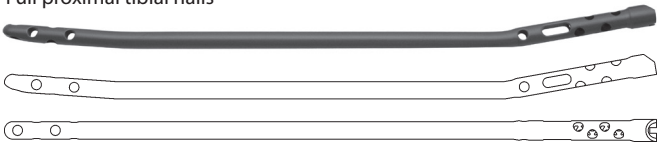


**Implant**

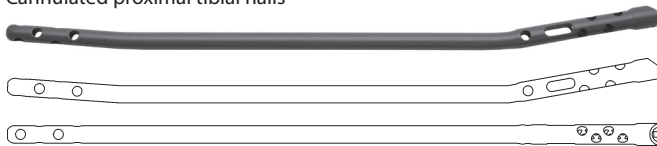
Tibial nails can be locked in the distal part with locking screws of the diameter of 5 mm with a cortical thread in lengths of 25-120 mm with increments of 5 mm. Nails of the diameter of 8 mm are locked in the distal part with screws of the diameter of 3.5 mm and lengths of 20-50 mm with increments of 5 mm. Locking in the distal part of the nail is done using the distal aiming device with a calibration pin.

**Compatibility with nails**

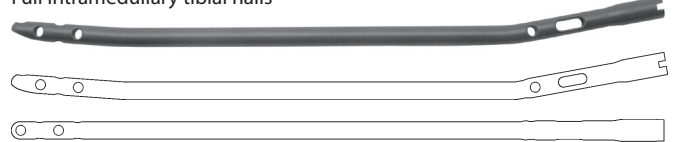
Full proximal tibial nails



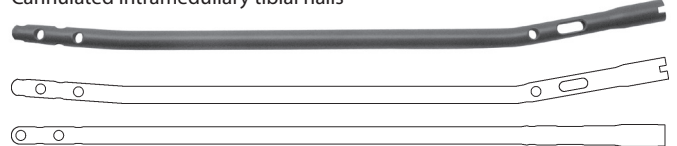
Cannulated proximal tibial nails



Full intramedullary tibial nails

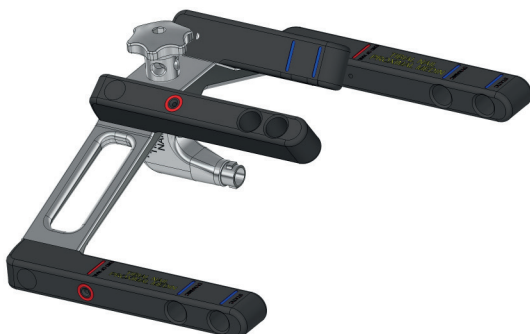


Cannulated intramedullary tibial nails



**Compatibility with the proximal aiming devices**

The proximal aiming device of the tibial proximal nail



The proximal aiming device of the tibial intramedullary nail



This brochure serves only as an illustration instruction for the tibial nail and the instrumentation. The aim of the brochure is to enable the doctors and theatre nurses to quickly orientate, correctly assemble, use the instrumentation and implant to achieve the best surgical outcome. If you have any questions, please contact your representative of MEDIN, a.s.

**Setting of the distal aiming device**

**1. Assembling of the aiming device – proximal aiming device of the proximal tibial nail**

Select the diameter and length of the tibial nail. It is necessary to set the distal aiming device for the selected diameter and length of the nail prior to introduction of the nail into the bone. Attach the nail to the proximal aiming device and lock with the screw. Then insert the distal aiming device into the proximal crossbar and tighten the carbon rod with two screws on both sides. Attach the complete set of the distal aiming to the proximal aiming and tighten with the upper screw (Figure 1-2).

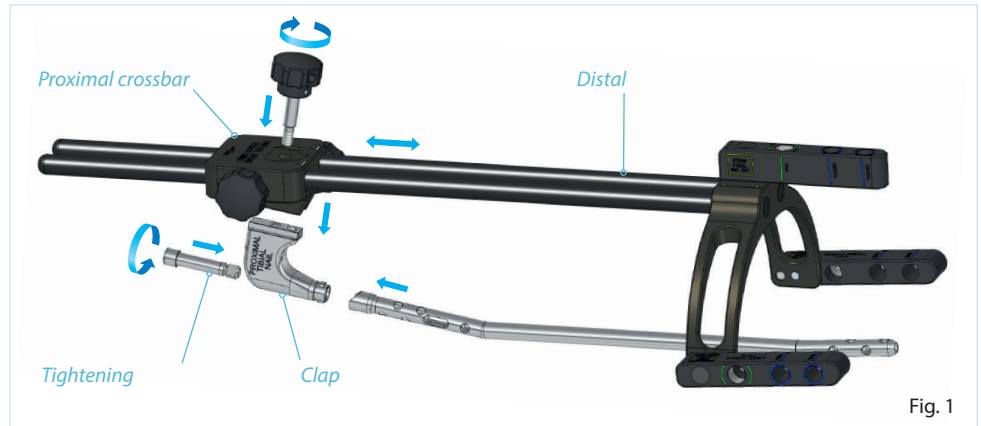


Fig. 1



Fig. 2

**2. Assembling of the aiming device – proximal aiming device of the intramedullary tibial nail**

Select the diameter and length of the tibial nail. It is necessary to set the distal aiming device for the selected diameter and length of the nail prior to introduction of the nail into the bone. Attach the nail to the proximal aiming device and lock with the screw. Then insert the distal aiming device into the proximal crossbar and tighten the carbon rod with two screws on both sides. Remove the proximal aiming device arm and attach on it a reduction part for the right or left side (according to the direction by the proximal target) and tighten it with the screw. Attach the complete set of the distal aiming to the reduction part and tighten with the upper screw (Figure 3).

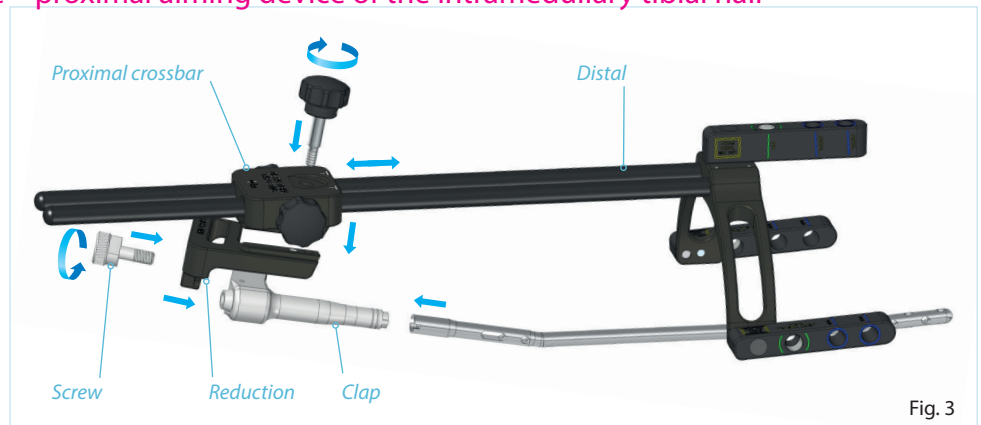


Fig. 3



Fig. 4

### 3. Length setting

Loosen the lateral screws on the proximal crossbar, which enables the length setting (Fig. 5).

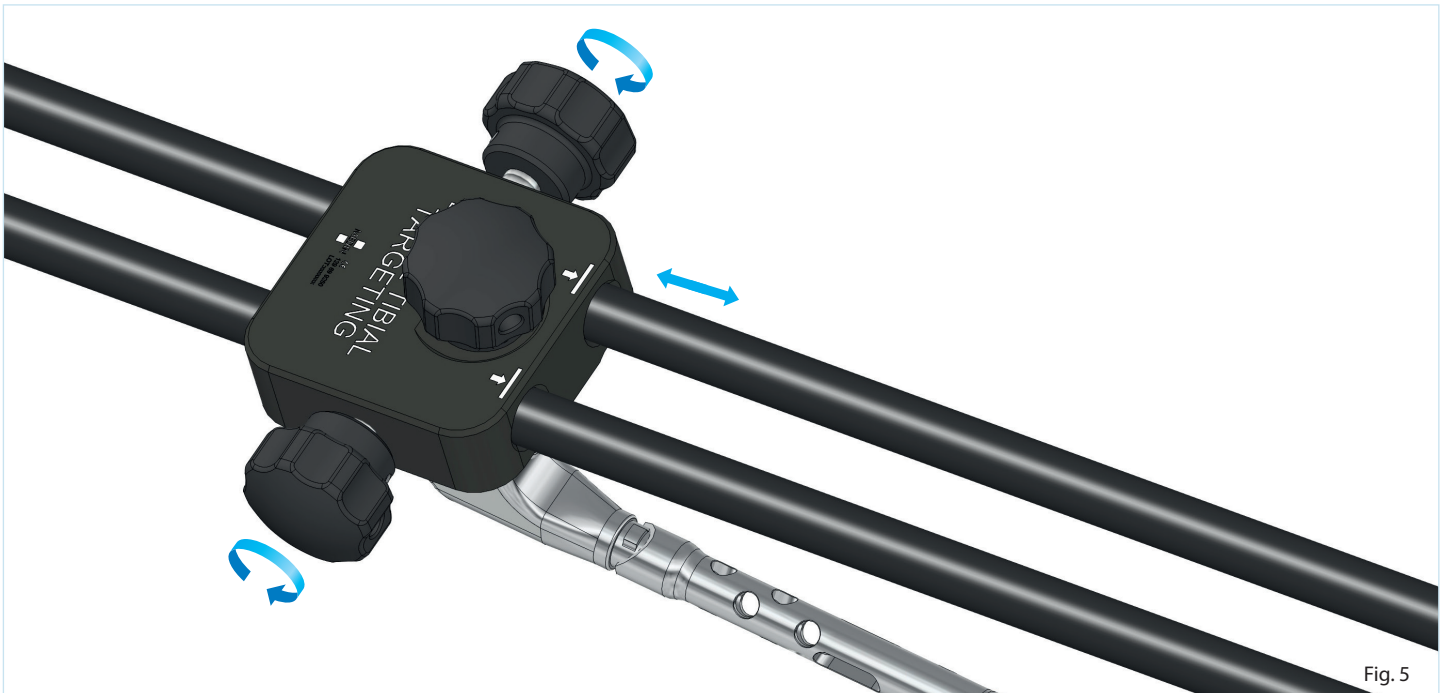


Fig. 5

Insert the sleeves, drills into the holes in the upper and lateral arms and set the length of the distal aiming so that the drills freely pass through the hole axis. Once set properly, tighten the lateral screws on the proximal crossbar with hand and then with the tightening rod (Fig. 6). Then you can remove the drills, sleeves and loosen the upper screw on the proximal crossbar and remove the entire set of the distal aiming.

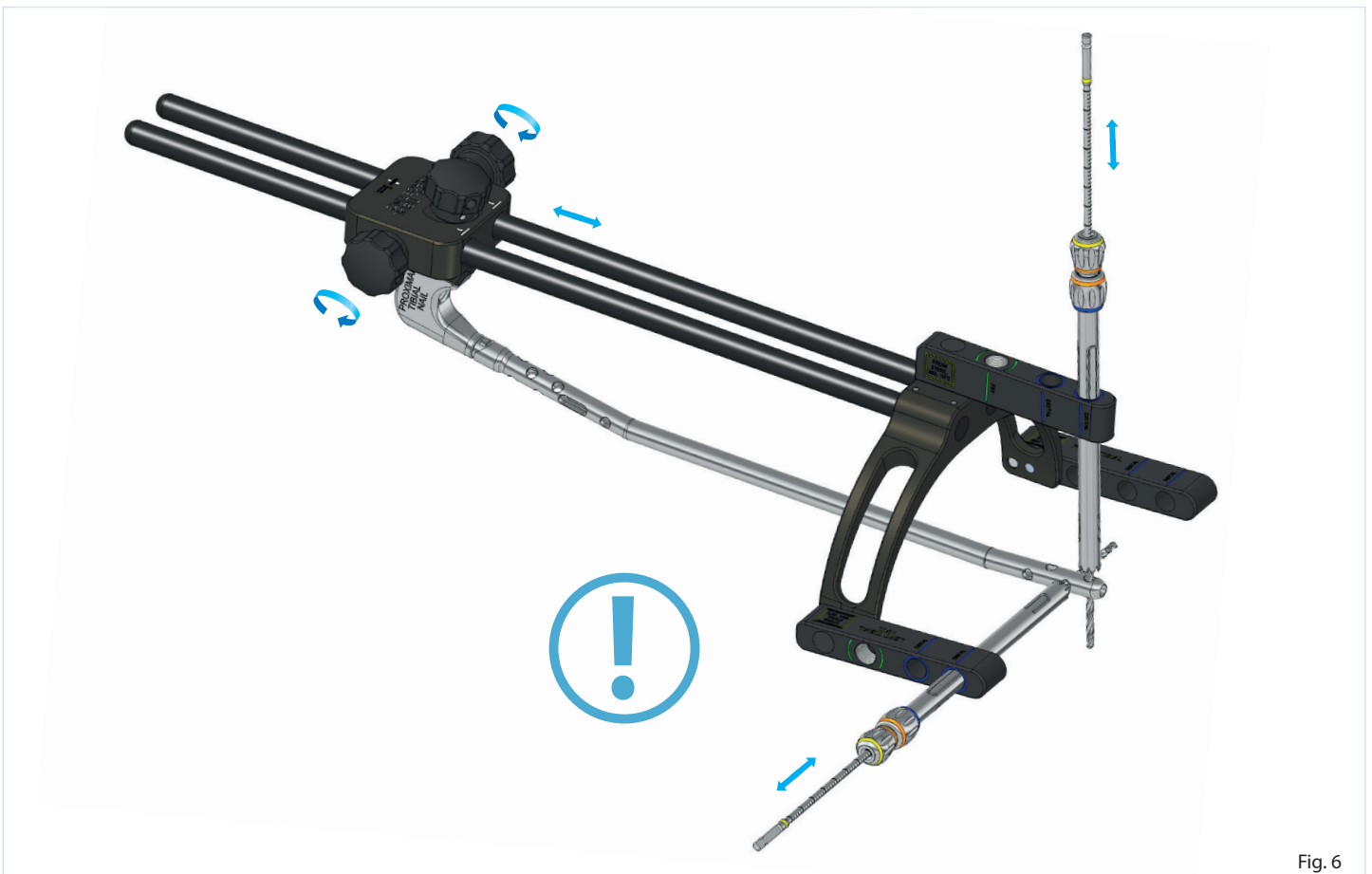


Fig. 6

**Surgical technique**

Distal aiming can be used for introduction of the distal locking screws. The introduction of distal screws can be performed before and after proximal locking. This surgical technique serves as an appendix to the operating instructions for the **intramedullary tibial nail** (OP007) and for the **proximal tibial nail** (OP016).

**1. The aiming device placement**

The proximal tibial aiming device is removed and the distal aiming of the tibia is attached to the clamp (Fig. 7).



Fig. 7

**2. Calibration pin insertion**

Introduce the sleeve of Ø 10/8 mm together with trocar of Ø 8 mm into the hole for the calibration pin. Perform the incision and push the sleeve with trocar to the bone (Fig. 8) and remove the trocar.



Fig. 8

Insert the awl into the sleeve of Ø 10/8 mm and using rotational movements create an entry point in the bone for the drill (Fig. 9) to protect sliding of the drill on the bone during drilling. Then remove the awl.

**ATTENTION! IT IS NECESSARY TO USE THE AWL BEFORE DRILLING USING THE DRILL TO CREATE AN ENTRY POINT FOR THE DRILL TO PREVENT SLIDING OF THE DRILL ON THE BONE DURING DRILLING.**

**ATTENTION! THE AWL IS SHARP!**



Fig. 9

Introduce the sleeve of Ø 8/3,5 mm into the sleeve of Ø 10/8 and carefully drill through the first corticalis until you reach the nail using the drill of 3.5 mm (Fig. 10).

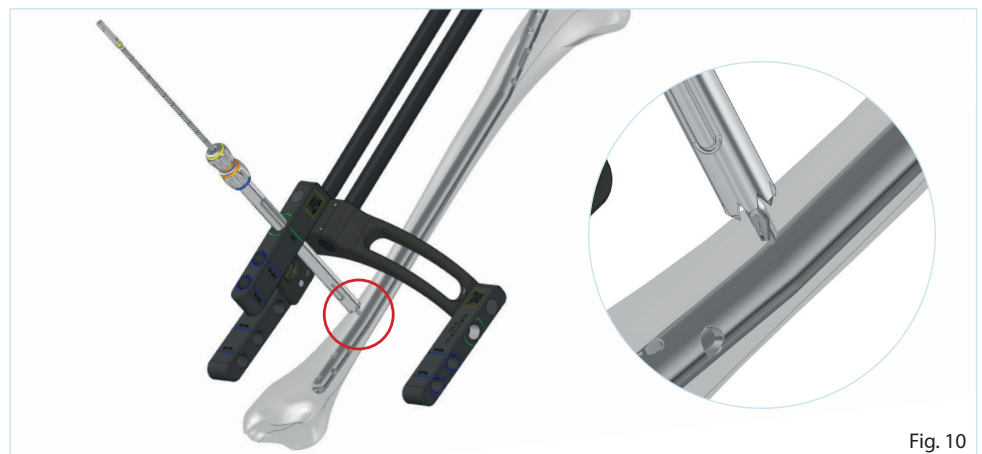


Fig. 10



Remove the drill and sleeves and introduce the calibration pin into the hole and tighten to the stop. The pin has to touch the nail surface. If the nail is bended in the bone cavity so that the pin does not touch the nail, push the distal aiming closer to the nail to determine the distance. If the nail is bended so that the pin touches the nail earlier, screw the pin to the stop or pull the distal aiming from the nail, and screw the pin to the stop (Fig. 11).

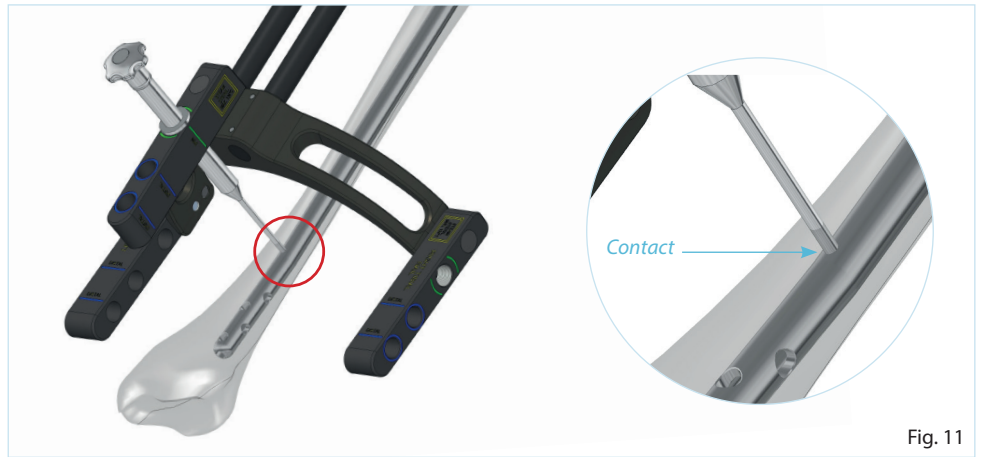


Fig. 11

### 3. Hole locking in the lateral plane

Perform distal locking using the locking screws of  $\varnothing$  3.5 mm for nail of  $\varnothing$  8 mm and screws of  $\varnothing$  5 mm for nail diameters of 9–12 mm. The screws can be introduced lateromedially and ventrodorsally as needed. The arm of the aiming device used for the LEFT TIBIAL NAIL is used for the left extremity, the RIGHT TIBIAL NAIL for the right extremity. First a lateromedial hole is locked. The sleeve of  $\varnothing$  10/8 mm together with the trocar of  $\varnothing$  8 mm is introduced into the hole and pressed against the skin so an incision can be created. Then it is introduced to the bone (Fig. 12).



Fig. 12

The trocar is then removed and the awl is used to create a hole for better drill guiding (Fig. 13).



Fig. 13

The awl is then removed, the sleeve of  $\varnothing$  8/3.5 mm introduced and both corticales are drilled through using a drill of  $\varnothing$  3.5 mm (Fig. 14). Locking screws of  $\varnothing$  3.5 mm are pre-drilled through the sleeve of  $\varnothing$  8/2.9 mm using a drill of  $\varnothing$  2.9 mm.

**ATTENTION! THE CALIBRATION PIN MUST BE LEANED AGAINST THE NAIL ALL THE TIME!**



Fig. 14

The length of the locking screw can be read on the drill. However, this length is indicative and a depth gauge use is recommended (Fig. 15).

Pull out the sleeve of  $\varnothing 8/3.5$  mm and the drill of  $\varnothing 3.5$  mm and use the 5 mm hexagonal screwdriver (Fig. 16) to lock the screw of  $\varnothing 5$  mm. Introduce the sleeve of  $\varnothing 8/6$  mm and the 3.5 mm hexagonal screwdriver to lock the screw of  $\varnothing 3.5$  mm.

**ATTENTION! TIGHTEN THE SCREWS USING EXCLUSIVELY A HAND SCREWDRIVER!**

Use the same procedure as described in the previous step to lock the next hole (Fig. 17).

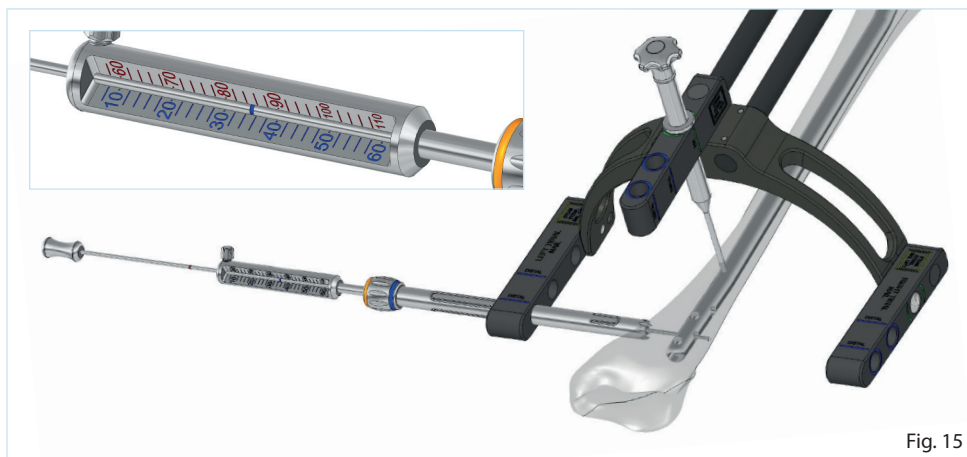


Fig. 15



Fig. 16



Fig. 17

#### 4. The second calibration pin introduction

Introduce the sleeve of  $\varnothing 10/8$  mm together with trocar of  $\varnothing 8$  mm into the hole for the calibration pin in the lateral aiming device. Perform the incision and push the sleeve with the trocar to the bone (Fig. 18) and remove the trocar.

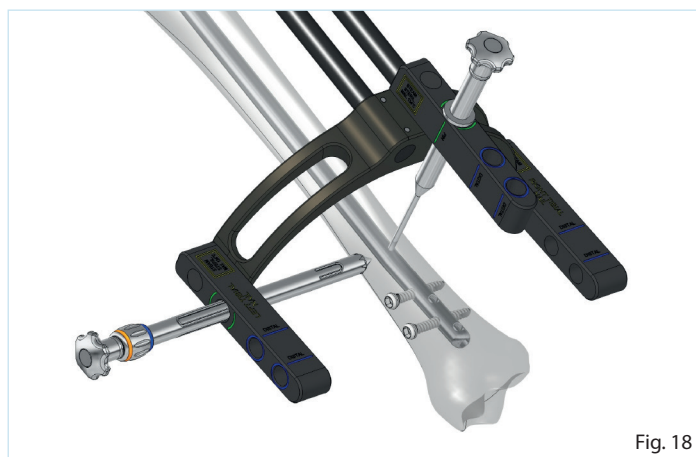


Fig. 18

Insert the awl into the sleeve of  $\varnothing 10/8$  mm and using rotational movements create an entry point in the bone for the drill (Fig. 19) to protect sliding of the drill on the bone during drilling. Then remove the awl.

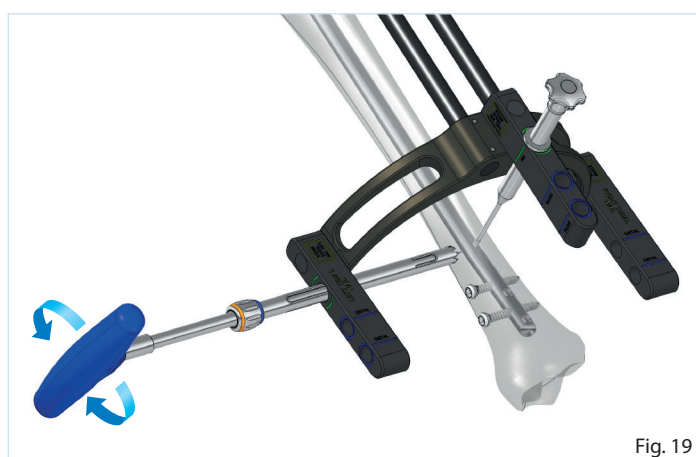


Fig. 19



Introduce the sleeve of  $\varnothing 8/3,5$  mm into the sleeve of  $\varnothing 10/8$  and carefully drill through the first corticalis until you reach the nail using the drill of 3.5 mm (Fig. 20).

**ATTENTION! IT IS NECESSARY TO USE THE AWL BEFORE DRILLING USING THE DRILL TO CREATE AN ENTRY POINT FOR THE DRILL TO PREVENT SLIDING OF THE DRILL ON THE BONE DURING DRILLING.**

**ATTENTION! THE AWL IS SHARP!**

Remove the drill, sleeve and introduce the calibration pin into the hole. Loosen the first calibration pin (Fig. 21) simultaneously during the introduction of the second calibration pin, then remove it and screw the second calibration pin to the stop (Fig. 22). The pin has to touch the nail surface.

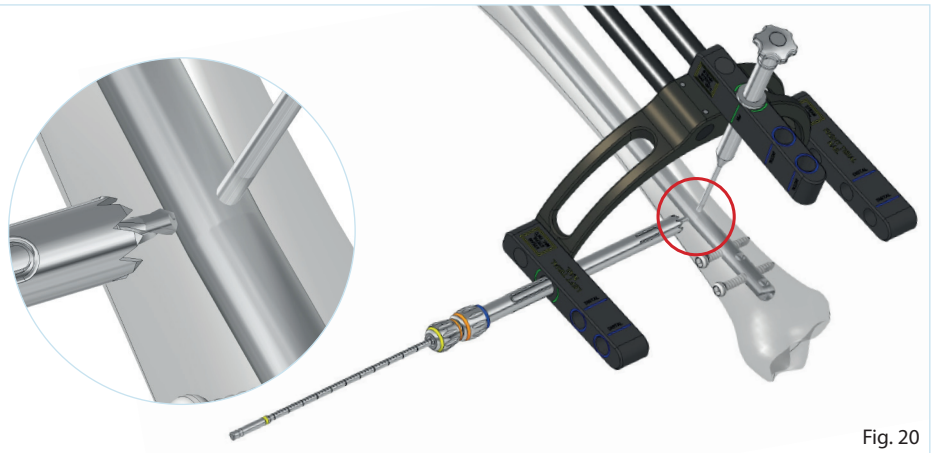


Fig. 20

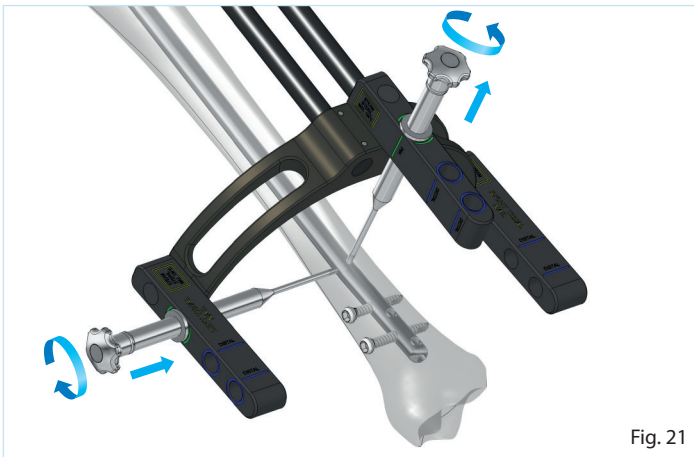


Fig. 21

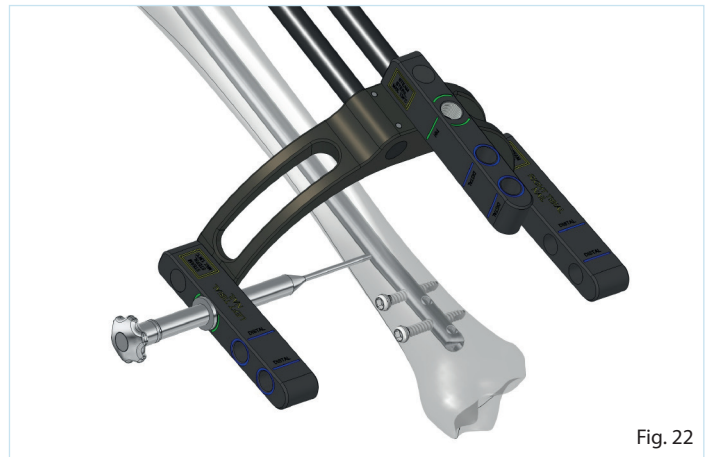


Fig. 22

## 5. Hole locking in the anteroposterior plane

The sleeve of  $\varnothing 10/8$  mm together with the trocar of  $\varnothing 8$  mm is introduced into the hole and pressed against the skin so an incision can be created. Then it is introduced to the bone (Fig. 23).

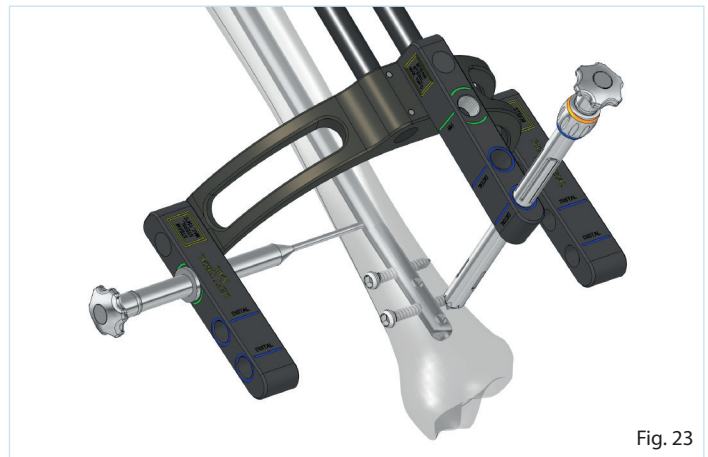


Fig. 23

Trocar is then removed and the awl is used to create a hole for better drill guiding (Fig. 24).



Fig. 24

## PROXIMAL TIBIAL NAIL AND INTRAMEDULLARY TIBIAL NAIL – DISTAL AIMING

The awl is then removed, the sleeve of  $\varnothing 8/3.5$  mm introduced and both corticales are drilled through using a drill of  $\varnothing 3.5$  mm (Fig. 25). Locking screws of  $\varnothing 3.5$  mm are pre-drilled through the sleeve of  $\varnothing 8/2.9$  mm using a drill of  $\varnothing 2.9$  mm.

**ATTENTION! THE CALIBRATION PIN MUST BE LEANED AGAINST THE NAIL ALL THE TIME!**

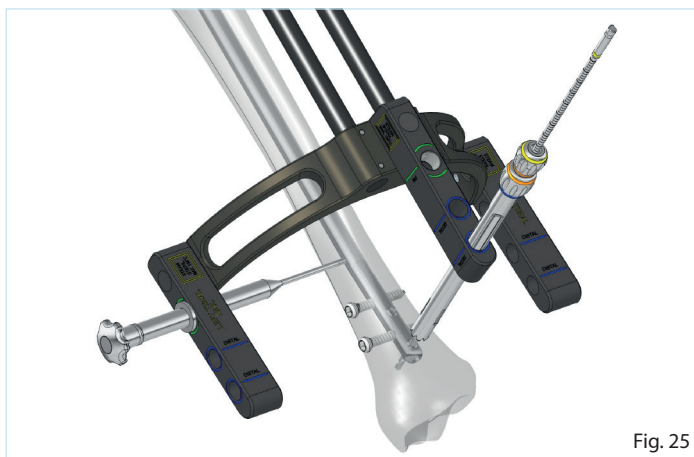


Fig. 25

The length of the locking screw can be read on the drill. However, this length is indicative and a depth gauge use is recommended (Fig. 26).

Pull out the sleeve of  $\varnothing 8/3.5$  mm and the drill of  $\varnothing 3.5$  mm and use the 5 mm hexagonal screwdriver (Fig. 27) to lock the screw of  $\varnothing 5$  mm. Introduce the sleeve of  $\varnothing 8/6$  mm and the 3.5 mm hexagonal screwdriver to lock the screw of  $\varnothing 3.5$  mm.

**ATTENTION! TIGHTEN THE SCREWS USING EXCLUSIVELY A HAND SCREWDRIVER!**

Use the same procedure to lock the next screw (Fig. 28).



Fig. 26

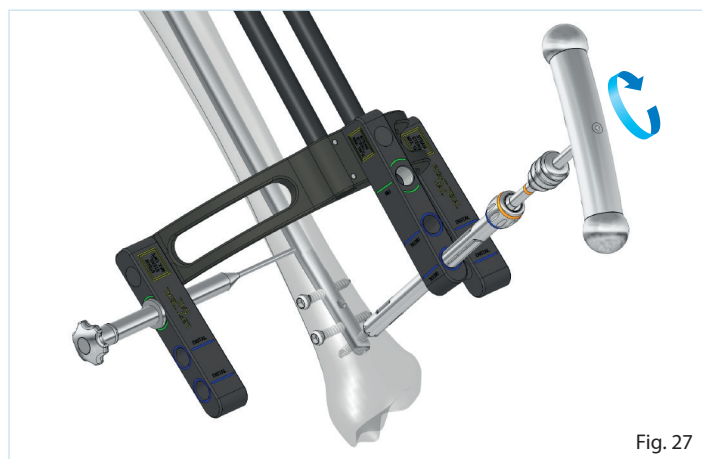


Fig. 27

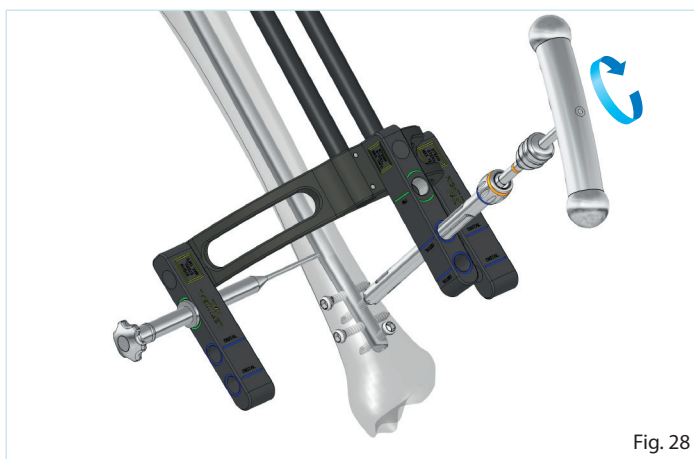


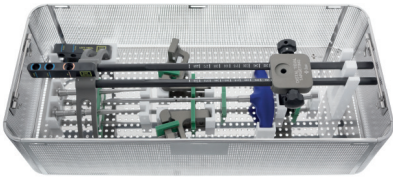
Fig. 28

### 5. Final notes

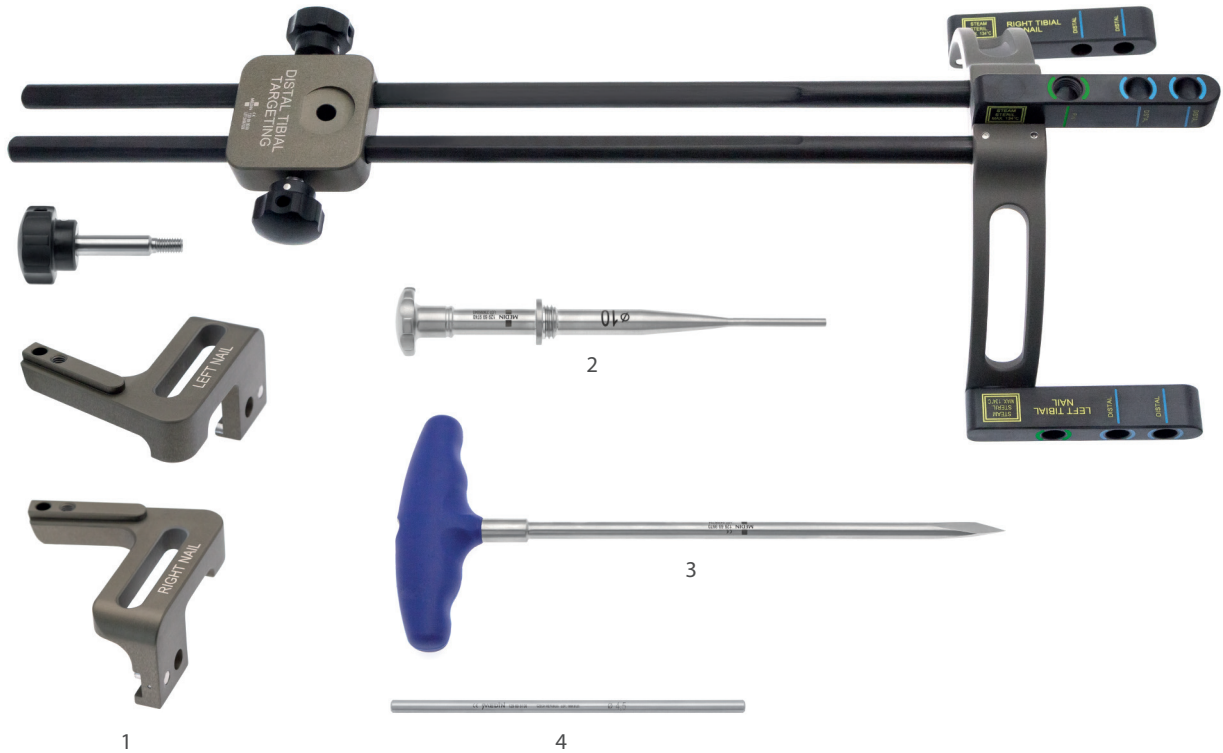
- It is necessary to check if all the holes in which the screws are to be introduced correspond to the holes in the aiming device and the nail after the nail and aiming device assembly and prior the nail introduction.
- The appropriate instruments are marked in colour to facilitate the sleeve introduction, drilling and screw introduction.



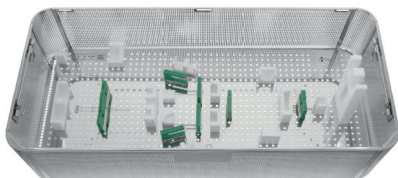
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**139 09 0825** Set of the distal aiming for the tibial nails with sieve  
540 × 240 × 130 mm  
*instruments included*



<b>139 09 0820</b>	set		pcs
1	<b>129 69 9250</b>	Distal aiming device for the tibial nails	1
2	<b>129 69 9740</b>	Calibration pin for the tibial nail; 150 mm	2
3	<b>129 69 9970</b>	Awl; 8 × 250 mm	1
4	<b>129 69 6100</b>	Tightening rod	1



**129 69 9710** Sieve for the distal aiming for the tibial nails  
540 × 240 × 130 mm  
*excluding instruments*

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