SURGICAL TECHNIQUE
PROXIMAL TIBIAL NAILS

MEDIN®

Medical device description

The implant system consists of the nail, locking screws, end cap and alternatively compression screw.

Proximal tibial nails

The implant system consists of the nail, locking screws, end cap and alternatively compression screw. The nails are full of Ø 8–10 mm and cannulated of Ø 9–12 mm and are anatomically pre-bended in the proximal 80 mm by 10 ° and in distal 60 mm by 4 °.

Nail sizes:	nail Ø	nail length in 15 mm increments:
	Ø 8 mm	240–360 mm
	Ø 9 mm	270–420 mm
	Ø 10 mm	270–420 mm
	Ø 11 mm	270–390 mm
	Ø 12 mm	270–390 mm

Proximal two pairs of holes for the locking screws are oriented at 35 ° angle posteromedially or rather posterolaterally into the condyles of tibial plateau. The second pair of the locking screws heading to the right has slight 10 ° proximal direction to ensure that the first two proximal screws will „prominate" through the second corticalis in the same horizontal level considering the size of tibial plateau. It is about 35 mm from the axis of diaphyseal part of the nail in a mediolateral view. There is a dynamic and static hole distally from four locking screws, which is mainly used to secure at the diaphyseal fractures. There are also two pairs of holes for the nail locking in the distal part of the nail; the first pair for locking in the frontal plane and the second for locking in AP direction (sagittal plane).

Locking screws for nails of Ø 9–12 mm:

Locking screw of Ø 5 mm with cortical thread are available in lengths of 25–105 mm in increments of 5 mm.

Locking screw of Ø 5 mm with lowered cortical thread are available in lengths of 25–90 mm in increments of 5 mm.

Locking screws for nails of Ø 8 mm:

Locking screw of Ø 3.5 mm with lowered cortical thread are available in lengths of 20–50 mm in increments of 2 mm and in lengths of 55–70 mm in increments of 5 mm.

End caps

End caps are made in three sizes of 0 mm, 5 mm a 10 mm. Size 0 mm is completely hidden in nail, sizes 5 mm and 10 mm overlap the nail proximally by 5 mm and 10 mm respectively.

Compression screws

Compression screws are made in two diameters – Ø 3.2 mm for nails of Ø 8 mm and Ø 4.4 mm for nails of Ø 9–12 mm.

Indications

Tibial nail is intended for osteosynthesis of metaphysis, diaphysis and simple intercondylar proximal and distal tibia fractures. Mainly for fracture treatment of types 41–A2, A3; 42; 43–A1, A2, A3 according to Müller.

Planning prior the procedure

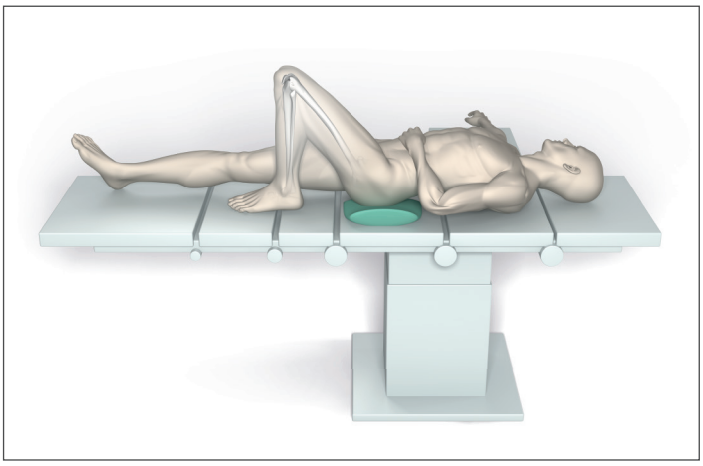
Pre-select suitable implants. Measure approximately the diameter of the medullary cavity in its narrowest place on the X-ray image, and thus pre-determine the planned diameter of the nail. It is advisable to plan the placement of complementary implants (screws for stabilization of fragments of the comminuted metaphyseal fracture of proximal or distal tibial metaphyses), possibly supporting implants (K-wires, delimitation screws) to ensure ideal nail introduction.

Preparation of instrumentation and implants

It is necessary to check before the surgery:
- the completeness and functionality of all parts of the instrumentation
- the correct assembly of the aiming device and nail
- to try the functionality of the aiming; verify this with guide and drill sleeves and the appropriate drills

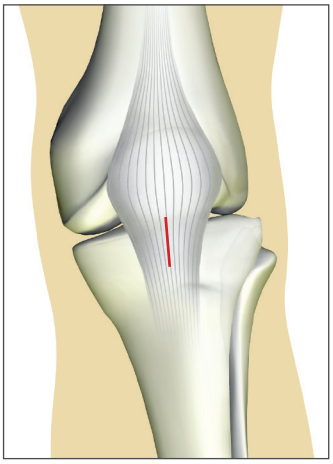
⚠ IF THE NAIL HOLES DO NOT CORRESPOND TO THE HOLES OF THE AIMING DEVICE IT IS NOT POSSIBLE TO PROCEED TO THE SURGERY.

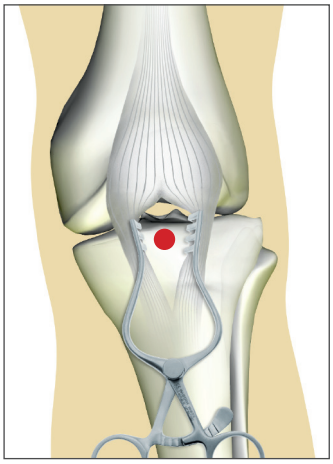
Surgical technique



1. The patient's position

Position the patient on the operating table lying on their back. It is possible to use a standard or traction operating table according to the surgeon custom. Position of the operated limb, which requires flexion in the knee joint in range from 100° up to 110°, is a condition of the smooth implantation of the tibial nail. Furthermore the surgeon must be able to perform peroperative X-ray checks using amplifier in the AP and lateral projections throughout the entire lower leg. It is necessary to perform position of the operated limb and setting of X--ray before the surgical team washing. Traction can be performed using skeletal calcaneal drilling, soft traction by figure-of-eight bandage or one-time traction during surgery.





2. Reduction

Reposition fragments into the original anatomical position. Reposition fragments of the tibial plateau, fix their position by K-wires. Then perform osteosynthesis using cancellous screws. Check reposition using X-rays. Keep in mind that poor repositioning of the tibial plateau fragments and metaphyseal fractures can lead to healing of the fracture in malposition and can negatively affect the proper functioning of the knee and ankle joint.

3. Entry point

Perform approximately five centimetre longitudinal incision over the centre of lig. proprium patellae. Cut the ligamentum longitudinally, pull both halves apart and keep their position with a retractor. The entry point is localised about 5 mm behind the front edge of tibia, in the extension of its longitudinal axis.

Introduce a K-wire of Ø 2 mm approximately 5 mm dorsally from the front edge of tibia, with inclination of about 10°dorsally and about 60 mm deep (Fig. a).

Create an entry point:

1. using a bended cannulated perforator of Ø 13 mm (Fig. b)
2. using a cannulated pre-drilling cutter of Ø 9/12 mm and protection sleeve of Ø 12 mm (Fig. c)
3. using a hand cannulated perforator and protection sleeve of Ø 12 mm (Fig. d)

Fig. a

Fig. b

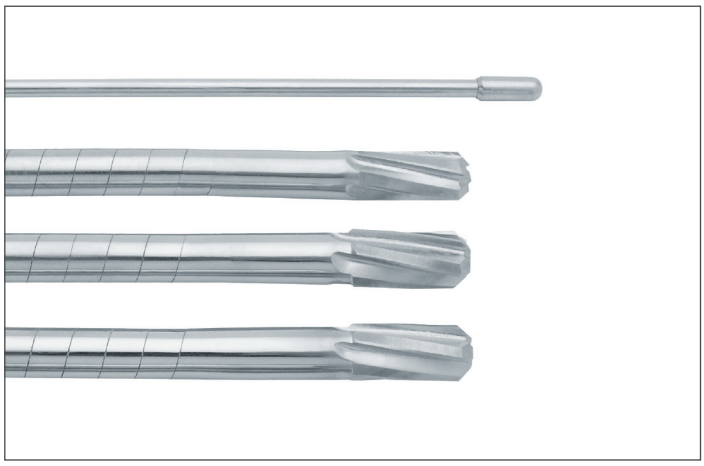
Fig. c

Fig. d

TAKE EXTRA CAUTION DURING THE ENTRY POINT CREATION TO AVOID PERFORATING OF THE DORSAL SURFACE OF THE PROXIMAL TIBIA.

4. Medullary cavity preparation

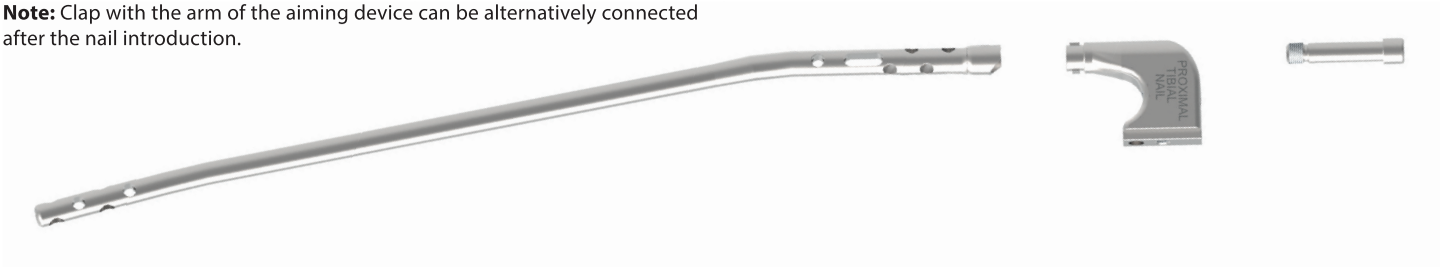
Nail is intended for nailing without pre-drilling. You can pre-drill the cavity in certain indications (e.g. non-union) with the flexible cutters. Introduce the introducer with an olive into the cavity. Always cut the cavity with cutters step by step from Ø 8 up to diameter 1 mm bigger than is the diameter of the chosen nail. It is not recommended to irrigate the medullary cavity after pre-drilling, on the contrary, it is advisable to return the bone material into the cavity – the so-called internal spongioplasty. The irrigation after pre-drilling is recommended only in case that infarction is solved. Remove the introducer with an olive. You can use introducer without an olive if you introduce cannulated nail.



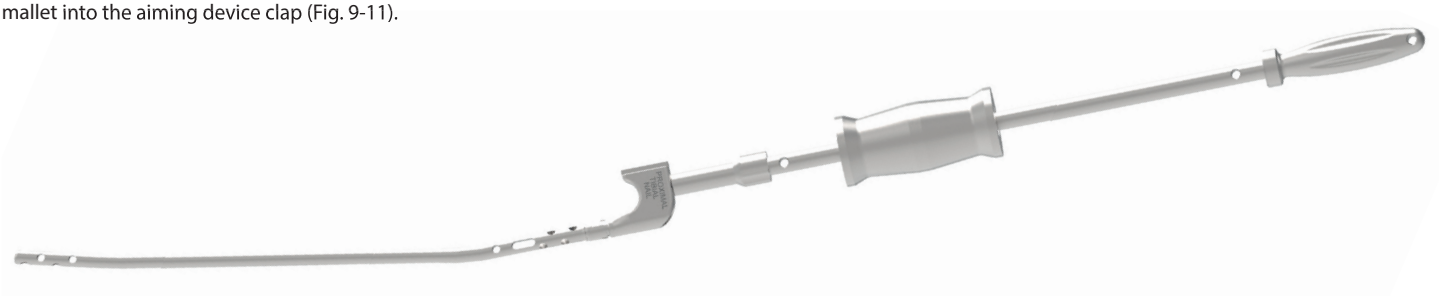
5. Completing of aiming device with mallet

The aiming device is supplied with a clap for the Tibial nail and with second clap for the Tibial proximal nail. Connect the clap with the chosen nail using a screw and tighten it.

Note: Clap with the arm of the aiming device can be alternatively connected after the nail introduction.



Slide the weight onto the hammer rod and screw the handle. After screw the mallet into the aiming device clap (Fig. 9-11).



6. Nail introduction

Nail can be introduced by the light mallet blows as carefully as possible. Consider the correct selection of the nail diameter in case of difficulty when introducing the nail, or replace it with a nail of the corresponding length but with a smaller diameter. Pull out the nail slightly by the back tapping of the mallet into the handle in the case of excessive nail introduction into the tibia as at the extraction, but be careful that the nail in the resulting position is not short and that it reaches distally far enough below the fracture line level. Perform fragment reposition back to the anatomical position and verify under X-rays (Fig. 1) in the case that fragment dislocation happened during the nail introduction.

Alternatively you can use an impactor instead of a mallet. In this case when hard introduction tap on a driver with a surgical mallet (Fig. 2).

Remove the mallet or the driver after the nail introduction.

Fig. 1

Fig. 2

You can use K-wire introduced into the red colour marked holes in the arm to check the correct depth of the nail introduction in respect to the tibia (Fig. 3).

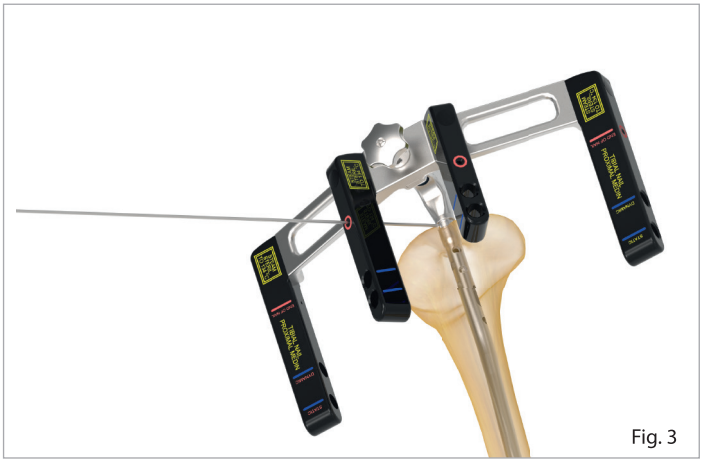


Fig. 3

Perform the correct nail introduction and rotation towards the locking - position under the X-ray check of the K-wire of Ø 2 mm introduced together with sleeves of Ø 10/8 mm **(with little tongues)** and Ø 8/2.5 mm **(marked by purple)** into two proximal holes in the nail (Fig. 4).

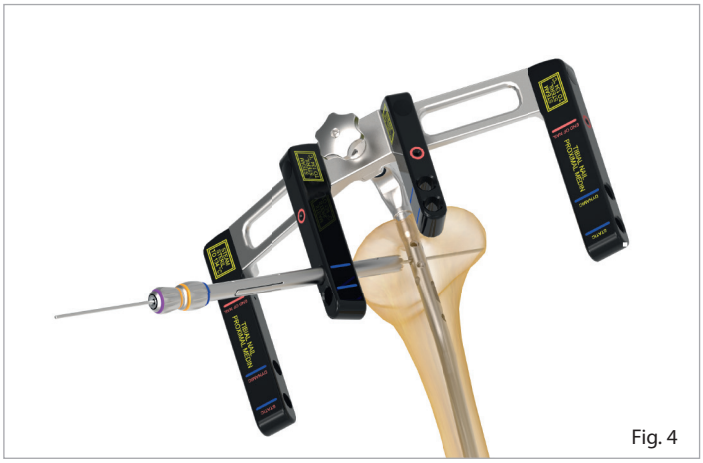


Fig. 4

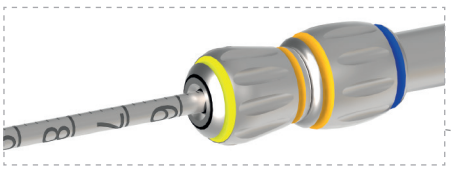
7. Pre-drilling of the proximal bone screws

7.1. Locking screw of Ø 5 mm, full thread

Introduce a sleeve of Ø 10/8 mm **(with little tongues)** together with trocar into the hole in the nail and perform incision at the site of contact with the skin. Always introduce a sleeve of Ø 10/8 mm **(with little tongues)** together with trocar, it will facilitate the aiming device introduction up to corticalis and prevent soft tissues intrusion into the sleeve. Carefully tap the trocar together with the sleeve using mallet and push to the bone (Fig. 5). Remove the trocar.

Fig. 5

Insert the sleeve of Ø 8/3.5 mm **(marked by yellow)** for pre-drilling of the holes for the locking screws of Ø 5 mm and drill through both fragment using the drill of Ø 3.5 mm **(marked by yellow)**. It is possible to read the depth of the drilled hole directly from the relevant drill when kept the condition that the drilling sleeve of Ø 8/3.5 mm **(marked by yellow)** is tightly pushed onto the guide sleeve **(with little tongues)** and tightly pushed onto the bone (Fig. 6).



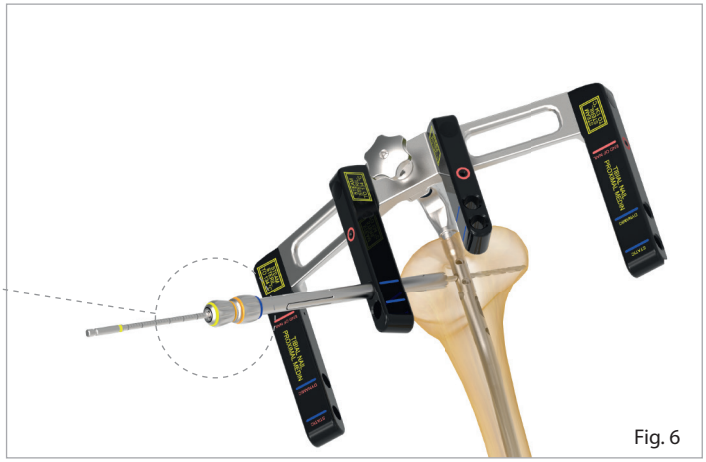


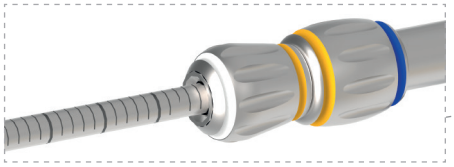
Fig. 6

⚠ INSERT THE SCREWS IN THE AREA OF PROXIMAL TIBIA MONOCORTICALLY ONLY!

Remove the sleeve of Ø 8/3.5 mm (marked by yellow) and drill of Ø 3.5 mm (marked by yellow).

Note: Insert a sleeve of Ø 8/5 mm **(marked by white)** and drill through the first fragment only using a drill of Ø 5 mm **(marked by white)** if you need to perform compression or pull fragment in the area of the proximal metaphysis or tibial condyle. It is possible to read the depth of the drilled hole directly from the relevant drill when kept the condition that the drilling sleeve of Ø 8/5 mm **(marked by white)** is tightly pushed onto the guide sleeve **(with little tongues)** and tightly pushed onto the bone (Fig. 7).

These instruments are available only on special order.



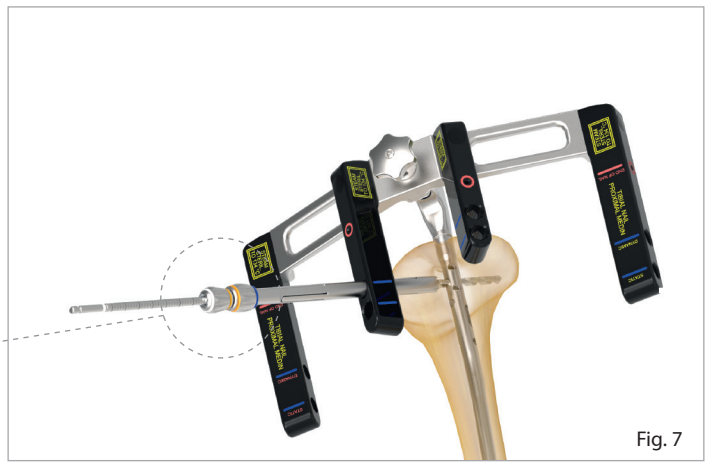
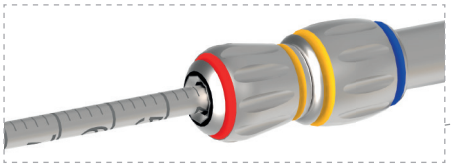


Fig. 7

7.2 Locking reinforced screw of Ø 5 mm, lowered thread

Insert the sleeve of Ø 8/4.4 mm **(marked by red)** for the pre-drilling of the hole for the locking reinforced screws of Ø 5 mm with the lowered thread and drill through both fragment using the drill of Ø 4.4 mm **(marked by red)**. It is possible to read the depth of the drilled hole directly from the relevant drill when kept the condition that the drilling sleeve of Ø 8/4.4 mm **(marked by yellow)** is tightly pushed onto the guide sleeve **(with little tongues)** and tightly pushed onto the bone (Fig. 8).



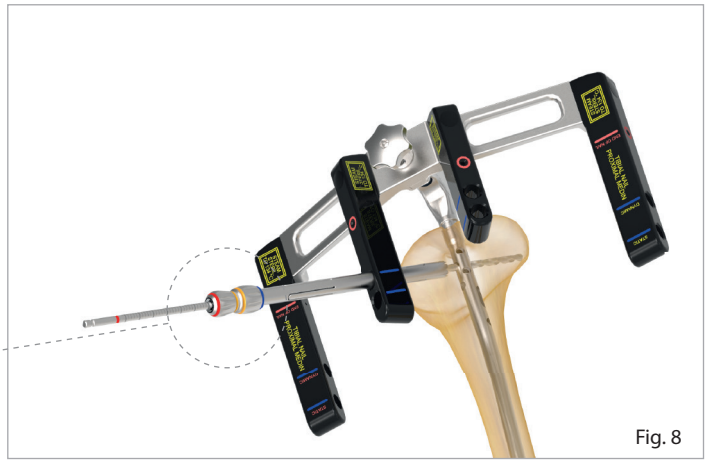


Fig. 8

INSERT THE SCREWS IN THE AREA OF PROXIMAL TIBIA MONOCORTICALLY ONLY!

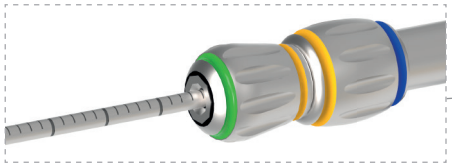
Remove the sleeve of Ø 8/4.4 mm **(marked by red)** and drill of Ø 3.5 mm **(marked by red)**.

Note: Insert a sleeve of Ø 8/5 mm **(marked by white)** and drill through the first fragment only using a drill of Ø 5 mm **(marked by white)** if you need to perform compression or pull fragment in the area of the proximal metaphysis or tibial condyle. It is possible to read the depth of the drilled hole directly from the relevant drill when kept the condition that the drilling sleeve of Ø 8/5 mm **(marked by white)** is tightly pushed onto the guide sleeve **(with little tongues)** and tightly pushed onto the bone.

These instruments are available only on special order.

7.3 Locking reinforced screw of Ø 3.5 mm, lowered thread

Pre-drill the locking screw of Ø 3.5 mm using the drill of Ø 2.9 mm **(marked by green)** introduced through the sleeve of Ø 8/2.9 mm **(marked by green)**. It is possible to read the depth of the drilled hole directly from the relevant drill when kept the condition that the drilling sleeve of Ø 8/2.9 mm **(marked by green)** is tightly pushed onto the guide sleeve **(with little tongues)** and tightly pushed onto the bone (Fig. 9).



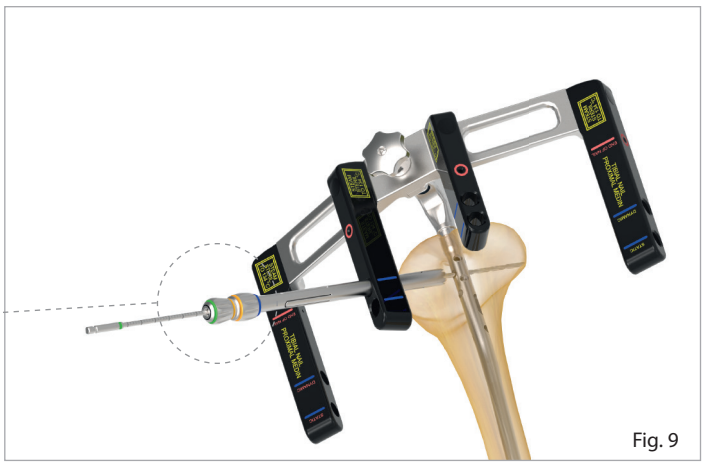
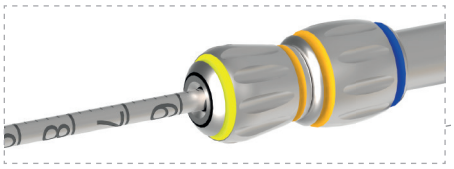


Fig. 9

INSERT THE SCREWS IN THE AREA OF PROXIMAL TIBIA MONOCORTICALLY ONLY!

Remove the sleeve of Ø 8/2,9 mm **(marked by green)** and drill of Ø 2,9 mm **(marked by green)**.

Note: Insert a sleeve of Ø 8/5 mm **(marked by yellow)** and drill through the first fragment only using a drill of Ø 3.5 mm **(marked by yellow)** if you need to perform compression or pull fragment in.. It is possible to read the depth of the drilled hole directly from the relevant drill when kept the condition that the drilling sleeve of Ø 8/3.5 mm **(marked by green)** is tightly pushed onto the guide sleeve **(with little tongues)** and tightly pushed onto the bone (Fig. 10).



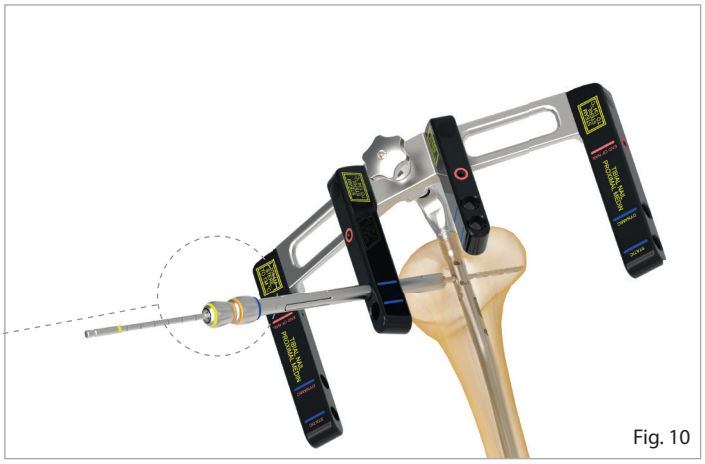


Fig. 10

8. Introduction of the proximal bone screws

Measure depth of a pre-drilled hole for a screw by depth gauge. Measurement is exact only when the guide sleeve **(with little tongues)** is tightly pushed to the bone (Fig. 11).

Fig. 11

Complete the screwdriver and insert the corresponding locking screw. Measure the depth of screwing on the shaft of the screwdriver. Repeat this process for the required number of locking screws (Fig. 12a, 12b).

Note: It is possible to connect the screwdrivers with the axial handle or T-handle.

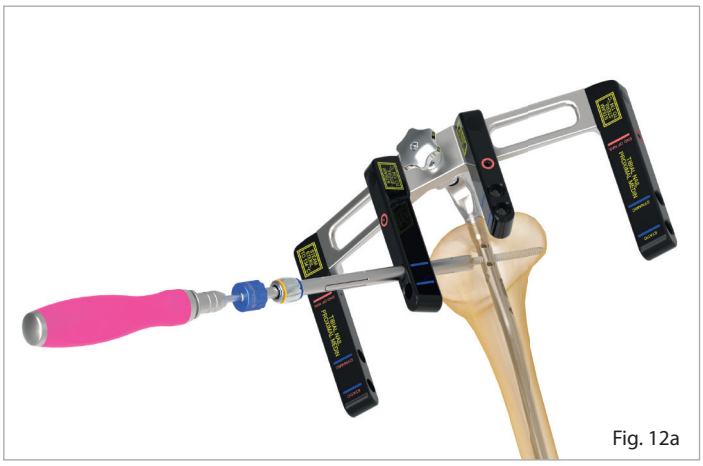


Fig. 12a

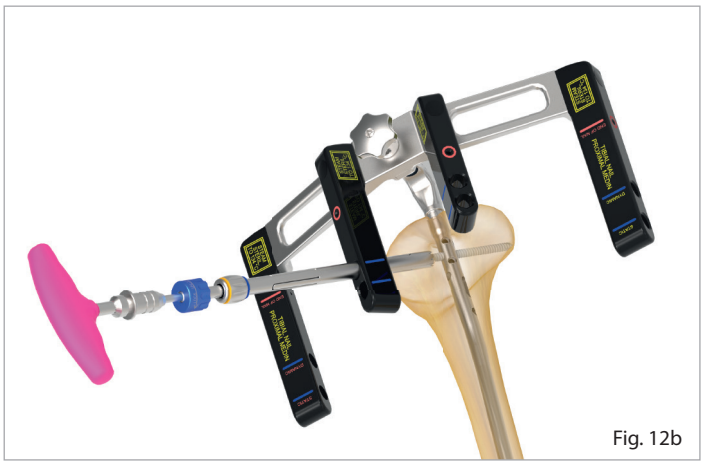


Fig. 12b

Use the screwdriver 6HR 5 mm with the locking for the locking screws of Ø 5 mm.

Use the screwdriver 6HR 3.5 mm with the locking for the locking screws of Ø 3.5 mm.

Remove the aiming device after the introduction of the required proximal screws and close the nail with the corresponding end cap (Fig. 13a).

Note: It is not necessary to secure the nail in the four proximal holes at the osteosynthesis of the diaphysis fractures. It is sufficient to secure the nail in the dynamic, static or possibly in both holes depending on the fracture type.


Fig. 13a

Note: A compression can be performed at a maximum range of 10 mm using a compression screw after locking of the nail with distal locking screws during the introduction of the locking screw into the dynamic hole. This screw is introduced into the nail same way as the end cap after the aiming device removal from the top to the nail. The introduced compression screw serves also as an end cap so it is not necessary to introduce the end cap in this case (Fig. 13b).

⚠ THE NAIL HAS TO BE LOCKED IN ITS DISTAL PART FOR SUCH PERFORMED COMPRESSION AND THE STATIC LOCKING MUST NOT BE USED IN THE PROXIMAL PART.


Fig. 13b

9. Distal locking

Distal locking is performed using the same locking screws of Ø 3.5 for nail of Ø 8 mm and Ø 5 mm for nail diameters of 9–12 mm with a free hand. The screws can be introduced in the frontal plane - mediolaterally or in the sagittal plane ventrodorsally. Choose the distal locking and locking screw combination according to the need of the fracture localization and distal fragment size (Fig. 14).

It is necessary to check anatomic reduction, correct fragment position and the length of the tibial bone before performance of the distal locking. Set X-ray device above the distal holes in the nail in a way that those will be displayed as circles (Fig. 15).

Place the tip of the scalpel on the skin above the hole centre, and perform a stab incision with a scalpel down to the bone (Fig. 16).

Attach the appropriate drill into the drilling machine and introduce into the performed incision along with a protection sleeve, tilt and adjust under X-ray device so that the drill tip will be positioned exactly in the centre of the hole circle (Fig. 17). **Possibly use the shortened drills of the relevant diameters for the distal hole drilling; there are no protection sleeves in the set for these drills.**

Drill of Ø 2.9 mm for nails of Ø 8 mm

Drill of Ø 3.5 mm for locking screw of Ø 5 mm, full thread

Drill of Ø 4.4 mm for locking reinforced screw of Ø 5 mm, lowered thread


Fig. 14

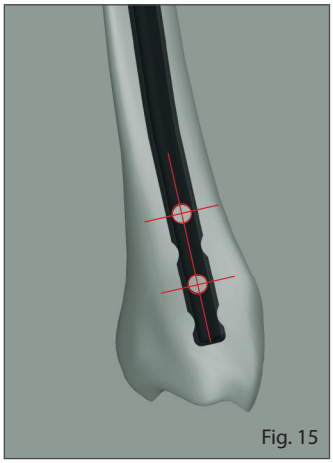


Fig. 15


Fig. 16


Fig. 17

Then rotate drilling machine with a drill so that it is perpendicular to the axis of the nail and drill a hole through both cortices. Check the position and aiming of the drill into the locking hole using an X-ray amplifier. Measure the screw length using a depth gauge through the guide sleeve **(with little tongues)** pushed tightly to the bone (Fig. 18).

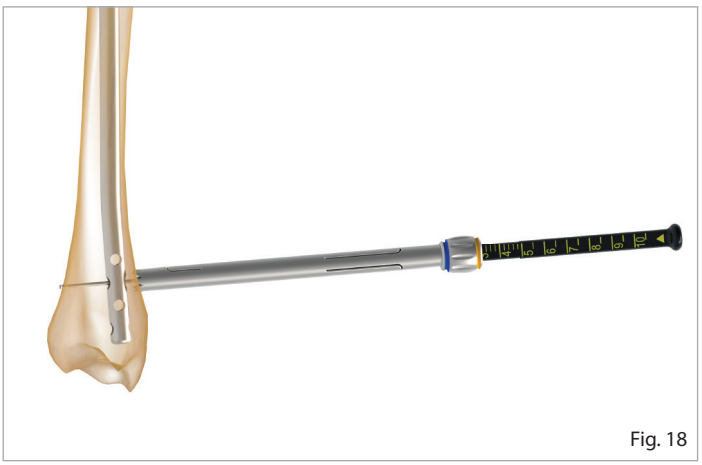


Fig. 18

Attach the locking screw onto the screwdriver and perform its screwing in. The self-tapping tip of the locking screw has to exceed 1–2 mm over the bone contour. Introduce the other distal locking screws as needed (Fig. 19).

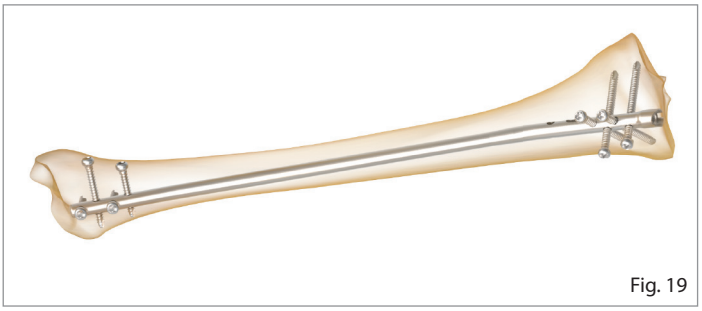


Fig. 19

10. Closure of the operation

After irrigation gradually close the incision. Introduce the sucking drain to the place of the nail introduction in the case that the cavity was not pre-drilled.

THE SUCKING DRAIN APPLICATION TO THE PLACE OF THE NAIL INTRODUCTION TO THE BONE IS NOT RECOMMENDED IN THE CASE OF THE ENTRY POINT PRE-DRILLING. THE DRAIN WOULD SUCK BLOOD DIRECTLY FROM THE CAVITY AND IT WOULD RESULT IN A BIG BLOOD LOSS.

Cover the wound with a soft bandage and perform an X-ray documentation.

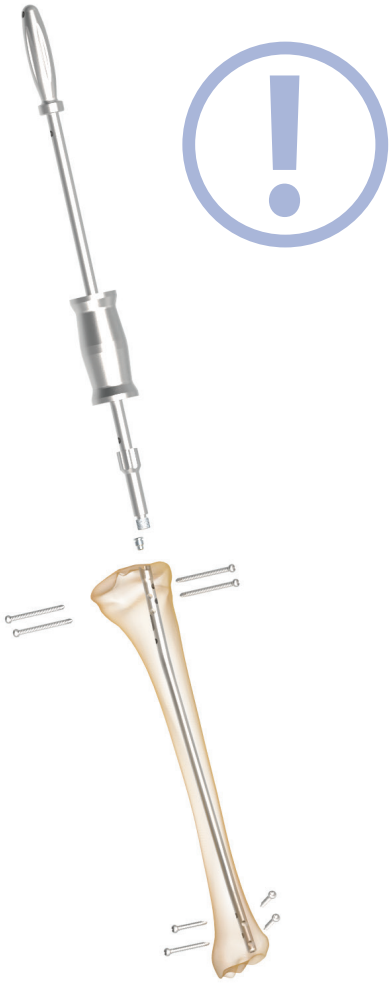
11. Final notes

– Never combine different osteosynthetic materials in one patient.
– The MEDIN company requires to use their own implants only to guarantee safe use of the implant. Implants from different companies must never be combined.
– The patient must be warned that the implant does not bear the entire weight of the patient. The patient must use support when walking and burden the implant progressively depending on how callus is being created at the fracture healing site.
– The implants are intended for single use, single patient and single bone stabilization only. Repeated use is forbidden. This fact is stated in the product leaflet and is valid for all implants.

12. Removal of the implants

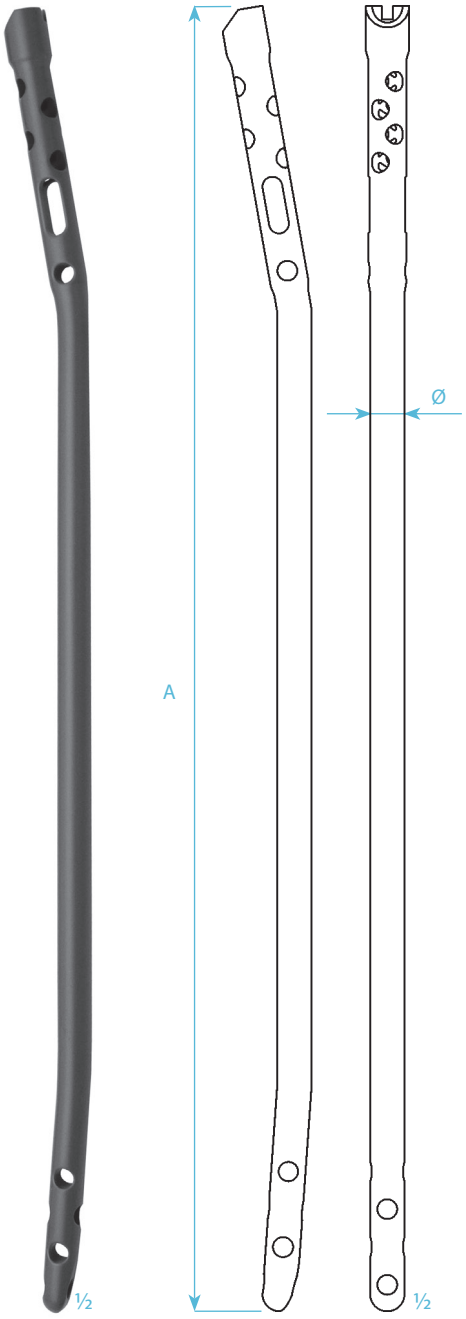
Implants are mostly retained permanently.
When removing the implant, gradually remove the end cap/compression screw and after the screws from the distal and proximal parts of the nail. Nail extraction rod should be screwed into the nail before removing the last locking screw from the nail to prevent possible slide or rotation of the nail in the tibial medullary cavity. Slide the weights onto the extraction rod and screw a handle to it. Extract the nail with blows of the weight against the handle.

Note: This part of the instrumentation has to be hold constantly after the weight and handle attachment to avoid burden of the fused bone by a bending moment.



FUSED BONE COULD BE DAMAGED!

FULL PROXIMAL TIBIAL NAILS

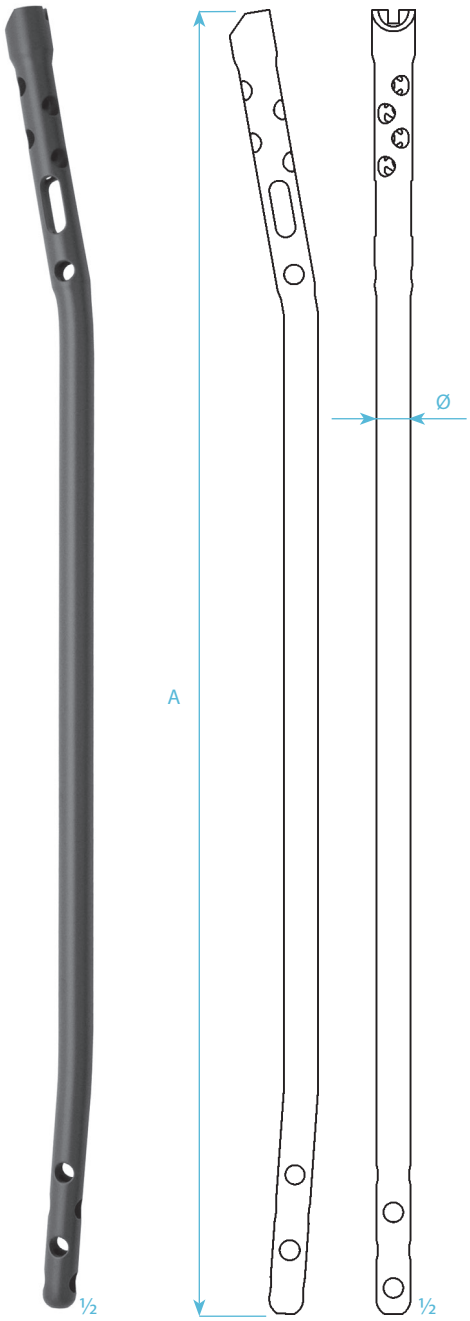


Full proximal tibial nail

SSt	Ti	A	Ø
397 129 78 1500	**397 129 78 1503**	240 mm	8 mm
397 129 78 1510	**397 129 78 1513**	255 mm	8 mm
397 129 78 1520	**397 129 78 1523**	270 mm	8 mm
397 129 78 1530	**397 129 78 1533**	285 mm	8 mm
397 129 78 1540	**397 129 78 1543**	300 mm	8 mm
397 129 78 1550	**397 129 78 1553**	315 mm	8 mm
397 129 78 1560	**397 129 78 1563**	330 mm	8 mm
397 129 78 1570	**397 129 78 1573**	345 mm	8 mm
397 129 78 1580	**397 129 78 1583**	360 mm	8 mm
397 129 78 1610	**397 129 78 1613**	270 mm	9 mm
397 129 78 1620	**397 129 78 1623**	285 mm	9 mm
397 129 78 1630	**397 129 78 1633**	300 mm	9 mm
397 129 78 1640	**397 129 78 1643**	315 mm	9 mm
397 129 78 1650	**397 129 78 1653**	330 mm	9 mm
397 129 78 1660	**397 129 78 1663**	345 mm	9 mm
397 129 78 1670	**397 129 78 1673**	360 mm	9 mm
397 129 78 1680	**397 129 78 1683**	375 mm	9 mm
397 129 78 1690	**397 129 78 1693**	390 mm	9 mm
397 129 78 1700	**397 129 78 1703**	405 mm	9 mm
397 129 78 1710	**397 129 78 1713**	420 mm	9 mm
397 129 78 1740	**397 129 78 1743**	270 mm	10 mm
397 129 78 1750	**397 129 78 1753**	285 mm	10 mm
397 129 78 1760	**397 129 78 1763**	300 mm	10 mm
397 129 78 1770	**397 129 78 1773**	315 mm	10 mm
397 129 78 1780	**397 129 78 1783**	330 mm	10 mm
397 129 78 1790	**397 129 78 1793**	345 mm	10 mm
397 129 78 1800	**397 129 78 1803**	360 mm	10 mm
397 129 78 1810	**397 129 78 1813**	375 mm	10 mm
397 129 78 1820	**397 129 78 1823**	390 mm	10 mm
397 129 78 1830	**397 129 78 1833**	405 mm	10 mm
397 129 78 1840	**397 129 78 1843**	420 mm	10 mm

NOTES: SSt – steel implant version according to ISO 5832-1 Ti – titanium version, material Ti6Al4V ELI according to ISO 5832-3

CANNULATED PROXIMAL TIBIAL NAILS

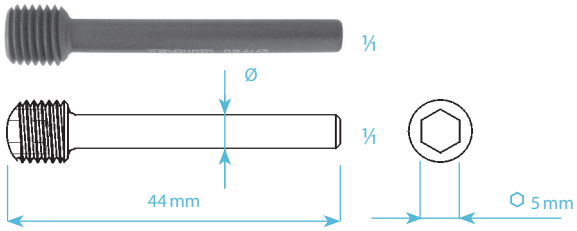


Cannulated proximal tibial nail

SSt	Ti	A	Ø
397 129 78 2090	**397 129 78 2093**	270 mm	9 mm
397 129 78 2100	**397 129 78 2103**	285 mm	9 mm
397 129 78 2110	**397 129 78 2113**	300 mm	9 mm
397 129 78 2120	**397 129 78 2123**	315 mm	9 mm
397 129 78 2130	**397 129 78 2133**	330 mm	9 mm
397 129 78 2140	**397 129 78 2143**	345 mm	9 mm
397 129 78 2150	**397 129 78 2153**	360 mm	9 mm
397 129 78 2160	**397 129 78 2163**	375 mm	9 mm
397 129 78 2170	**397 129 78 2173**	390 mm	9 mm
397 129 78 2180	**397 129 78 2183**	405 mm	9 mm
397 129 78 2190	**397 129 78 2193**	420 mm	9 mm
397 129 78 2220	**397 129 78 2223**	270 mm	10 mm
397 129 78 2230	**397 129 78 2233**	285 mm	10 mm
397 129 78 2240	**397 129 78 2243**	300 mm	10 mm
397 129 78 2250	**397 129 78 2253**	315 mm	10 mm
397 129 78 2260	**397 129 78 2263**	330 mm	10 mm
397 129 78 2270	**397 129 78 2273**	345 mm	10 mm
397 129 78 2280	**397 129 78 2283**	360 mm	10 mm
397 129 78 2290	**397 129 78 2293**	375 mm	10 mm
397 129 78 2300	**397 129 78 2303**	390 mm	10 mm
397 129 78 2310	**397 129 78 2313**	405 mm	10 mm
397 129 78 2320	**397 129 78 2323**	420 mm	10 mm
397 129 78 1870	**397 129 78 1873**	270 mm	11 mm
397 129 78 1880	**397 129 78 1883**	285 mm	11 mm
397 129 78 1890	**397 129 78 1893**	300 mm	11 mm
397 129 78 1900	**397 129 78 1903**	315 mm	11 mm
397 129 78 1910	**397 129 78 1913**	330 mm	11 mm
397 129 78 1920	**397 129 78 1923**	345 mm	11 mm
397 129 78 1930	**397 129 78 1933**	360 mm	11 mm
397 129 78 1940	**397 129 78 1943**	375 mm	11 mm
397 129 78 1950	**397 129 78 1953**	390 mm	11 mm
397 129 78 1980	**397 129 78 1983**	270 mm	12 mm
397 129 78 1990	**397 129 78 1993**	285 mm	12 mm
397 129 78 2000	**397 129 78 2003**	300 mm	12 mm
397 129 78 2010	**397 129 78 2013**	315 mm	12 mm
397 129 78 2020	**397 129 78 2023**	330 mm	12 mm
397 129 78 2030	**397 129 78 2033**	345 mm	12 mm
397 129 78 2040	**397 129 78 2043**	360 mm	12 mm
397 129 78 2050	**397 129 78 2053**	375 mm	12 mm
397 129 78 2060	**397 129 78 2063**	390 mm	12 mm

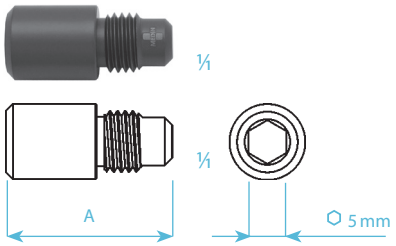
NOTES: SSt – steel implant version according to ISO 5832-1 Ti – titanium version, material Ti6Al4V ELI according to ISO 5832-3

IMPLANTS FOR THE PROXIMAL TIBIAL NAILS



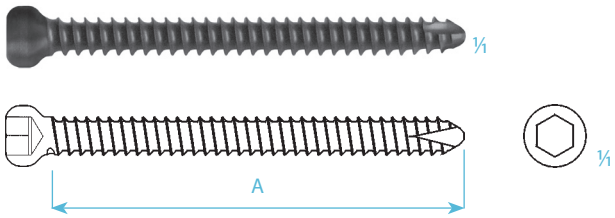
Compression screw

SSt	Ti	Ø	for nail
397 129 79 1800	**397 129 79 1803**	3,2 mm	Ø 8 mm
397 129 79 1810	**397 129 79 1813**	4,4 mm	Ø 9–12 mm



End cap

SSt	Ti	A
397 129 78 1420	**397 129 78 1423**	12 mm
397 129 78 1430	**397 129 78 1433**	22 mm
397 129 78 1440	**397 129 78 1443**	27 mm



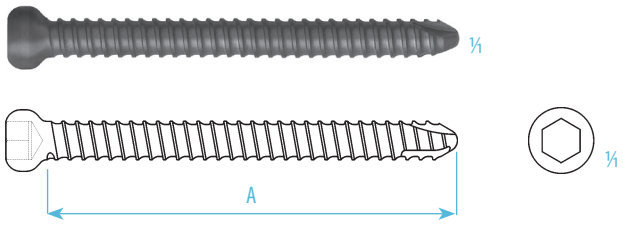
thread diameter	5,0 mm
core diameter	3,5 mm
head diameter	8,0 mm
drill for thread	Ø 3,5 mm
drill for sliding hole	Ø 5,0 mm
screwdriver	⬡ 5,0 mm

Locking screw 5 mm, full thread

SSt	Ti	A
397 129 79 1510	**397 129 79 1513**	25 mm
397 129 79 1530	**397 129 79 1533**	30 mm
397 129 79 1550	**397 129 79 1553**	35 mm
397 129 79 1570	**397 129 79 1573**	40 mm
397 129 79 1590	**397 129 79 1593**	45 mm
397 129 79 1610	**397 129 79 1613**	50 mm
397 129 79 1630	**397 129 79 1633**	55 mm
397 129 79 1650	**397 129 79 1653**	60 mm
397 129 79 1670	**397 129 79 1673**	65 mm
397 129 79 1690	**397 129 79 1693**	70 mm
397 129 79 1710	**397 129 79 1713**	75 mm
397 129 79 1730	**397 129 79 1733**	80 mm
397 129 79 1750	**397 129 79 1753**	85 mm
397 129 79 1770	**397 129 79 1773**	90 mm
397 129 79 1290	**397 129 79 1293**	95 mm
397 129 79 1300	**397 129 79 1303**	100 mm
397 129 79 1310	**397 129 79 1313**	105 mm

NOTES: SSt – steel implant version according to ISO 5832-1 Ti – titanium version, material Ti6Al4V ELI according to ISO 5832-3

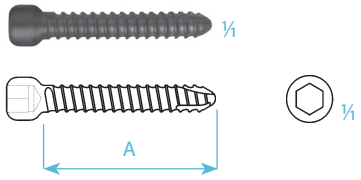
IMPLANTS FOR THE PROXIMAL TIBIAL NAILS



thread diameter	5,0 mm
core diameter	4,4 mm
head diameter	8,0 mm
drill for thread	Ø 4,4 mm
drill for sliding hole	Ø 5,0 mm
screwdriver	⬡ 5,0 mm

The strengthened locking screw 5 mm

SSt	Ti	A
397 129 79 9631	**397 129 79 9634**	25 mm
397 129 79 9641	**397 129 79 9644**	30 mm
397 129 79 9651	**397 129 79 9654**	35 mm
397 129 79 9661	**397 129 79 9664**	40 mm
397 129 79 9671	**397 129 79 9674**	45 mm
397 129 79 9681	**397 129 79 9684**	50 mm
397 129 79 9691	**397 129 79 9694**	55 mm
397 129 79 9701	**397 129 79 9704**	60 mm
397 129 79 9711	**397 129 79 9714**	65 mm
397 129 79 9721	**397 129 79 9724**	70 mm
397 129 79 9731	**397 129 79 9734**	75 mm
397 129 79 9741	**397 129 79 9744**	80 mm
397 129 79 9751	**397 129 79 9754**	85 mm
397 129 79 9761	**397 129 79 9764**	90 mm



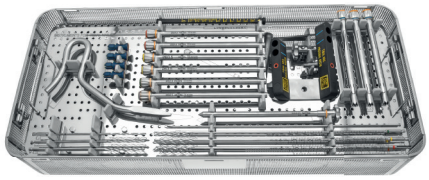
thread diameter	3,5 mm
core diameter	2,9 mm
head diameter	5,6 mm
drill for thread	Ø 2,9 mm
drill for sliding hole	Ø 3,5 mm
screwdriver	⬡ 3,5 mm

The strengthened locking screw 3.5 mm

SSt	Ti	A
397 129 77 6551	**397 129 77 6554**	20 mm
397 129 77 6561	**397 129 77 6564**	22 mm
397 129 77 6571	**397 129 77 6574**	24 mm
397 129 77 6581	**397 129 77 6584**	26 mm
397 129 77 6591	**397 129 77 6594**	28 mm
397 129 77 6601	**397 129 77 6604**	30 mm
397 129 77 6611	**397 129 77 6614**	32 mm
397 129 77 6621	**397 129 77 6624**	34 mm
397 129 77 6631	**397 129 77 6634**	36 mm
397 129 77 6641	**397 129 77 6644**	38 mm
397 129 77 6651	**397 129 77 6654**	40 mm
397 129 77 6661	**397 129 77 6664**	42 mm
397 129 77 6671	**397 129 77 6674**	44 mm
397 129 77 6681	**397 129 77 6684**	46 mm
397 129 77 6691	**397 129 77 6694**	48 mm
397 129 77 6701	**397 129 77 6704**	50 mm
397 129 77 6711	**397 129 77 6714**	55 mm
397 129 77 6721	**397 129 77 6724**	60 mm
397 129 77 6731	**397 129 77 6734**	65 mm
397 129 77 6741	**397 129 77 6744**	70 mm

NOTES: SSt – steel implant version according to ISO 5832-1 Ti – titanium version, material Ti6Al4V ELI according to ISO 5832-3

INSTRUMENTATION FOR THE PROXIMAL TIBIAL NAILS

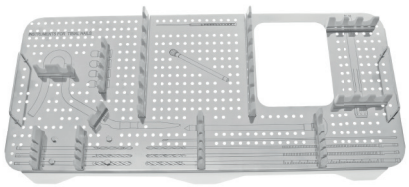


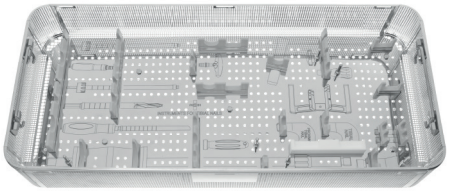
397 139 09 0375 Set of instruments for tibial nails
540 × 240 × 90 mm
instruments included

397 139 09 0370 set

			pcs
1	**397 129 68 1040**	Pre-drilling cutter of Ø 9/12 x 180 mm	1
2	**397 129 68 1050**	Protection sleeve of Ø 12 mm	1
3	**397 129 68 1060**	Cannulated perforator chisel of Ø 12 mm	1
4	**397 129 68 1020**	Screwdriver 6HR 3.5 × 200 mm with locking	1
5	**397 129 68 1030**	Screwdriver 6HR 5 × 200 mm with locking	1
6	**397 129 69 5670**	Mallet	1
7	**397 129 69 5660**	Impactor	1
8	**397 129 69 6100**	Wrench rod	1
9	**BD23-110-AO**	Handle AO; 30 × 151 mm	1
10	**BT19-095-AO**	T-handle AO; 95 × 81 mm	1
11	**397 129 69 7320**	Reduction M12/M8 × 1	1
12	**397 129 69 6400**	Sleeve of Ø 10/8 x 155 mm	3
13	**397 129 68 1100**	Depth gauge	1
14	**397 129 68 1090**	Cannulated curved perforator of Ø 13 mm	1
15	**397 129 69 6420**	Sleeve of Ø 8/3.5 x 171 mm	2
16	**397 129 69 9781**	Drill of Ø 3.5×150 mm	1
17	**397 129 69 6631**	Drill of Ø 3.5×320 mm	2
18	**397 129 69 6430**	Sleeve of Ø 8/4.4 x 171 mm	2
19	**397 129 69 6641**	Drill of Ø 4.4×320 mm	2
20	**397 129 69 9771**	Drill of Ø 2.9/150 mm	1
21	**397 129 69 6440**	Sleeve of Ø 8/2.9 x 171 mm	1
22	**397 129 69 6460**	Sleeve of Ø 8/2.5 x 171 mm	1
23	**397 129 69 6470**	Trocar of Ø 8 x 182 mm	1
24	**397 129 69 6621**	Drill of Ø 2.9×320 mm	2
25	**397 129 69 7210**	Plug Ø 10 x 30 mm	4
26	**397 129 69 9791**	Drill of Ø 4.4×150 mm	1
27	**397 129 09 2570**	K-wire MEDIN of Ø 2 x 300 mm	3
28	**397 129 69 5780**	Tibial aiming device	1

INSTRUMENTATION FOR TIBIAL NAILS





397 129 69 6610 Sieve for instrumentation for the proximal tibial nails
540 × 240 × 90 mm
excluding instruments

397 129 69 6570 Stand for the locking screws 2.5 and 3.5 mm
212 × 154 × 98 mm
without the implants

hreb_tibialni_proximalni_OP016EN-R02_2017-09-18


2017