

MEDIN
ORTHOPAEDIC
IMPLANTS



NAIL ELASTIC

STEEL

TITANIUM

→ IMPLANT SYSTEM



The nail is designed for the treatment of fractures of long bones in pediatric patients and adolescents.

In the area of the lower limb, the nail is intended for the treatment of fractures in pediatric patients weighing up to 50 kg.

Age limit for use of the nail depends on the biological development of the child (3–15 years of age at the child's average stature).

The nail is made of steel or titanium alloy.



MEDIN IMPLANTS FOR PRECISE CARE

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Caution



Note



Instruments



X-ray check



IMPLANT SYSTEM FEATURES

- > The proximal end of the elastic nail is atraumatically rounded.
- > The system is manufactured from implant steel 1.4441 (ISO 5832-1) and titanium alloy Ti6Al4V-ELI (ISO 5832-3, ASTM F136).
- > Nail lengths are 400 mm, 440 mm, 450 mm or 500 mm.
- > Nail diameters are 2 mm, 2.5 mm, 3 mm, 3.5 mm or 4 mm.



INDICATIONS

1. Based on the type of fracture:
 - Transverse fractures.
 - Short oblique or transverse fractures with a wedge fragment.
 - Long oblique fractures with the possibility of a cortical supporting point.
 - Multifragmentary or bifocal fractures.
 - Spiral fractures.
 - Pathological diaphyseal fractures in juvenile bone cysts.
2. According to fracture location:
 - Femur: diaphysis.
 - Distal femur: metaphysis.
 - Femur: subtrochanteric.
 - Tibia and fibula: diaphysis.
 - Tibia and fibula: distal metaphysis.
 - Humerus: diaphysis and subcapital.
 - Humerus: supracondylar.
 - Radius and ulna: diaphysis.
 - Radius: head and collum.



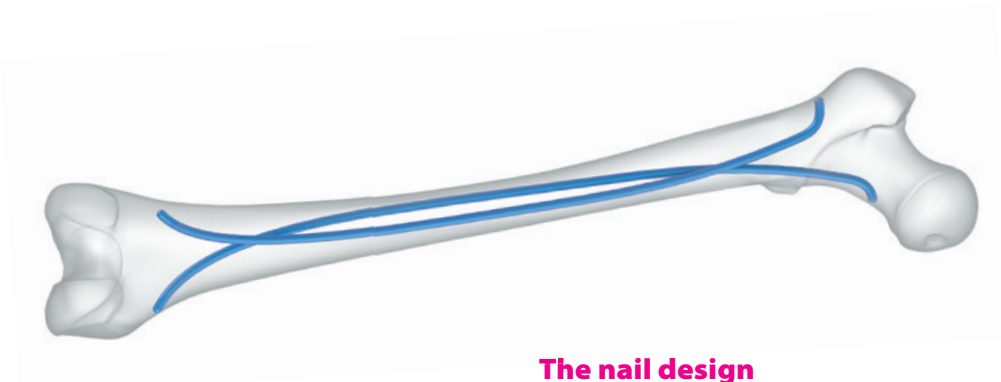
CAUTION!

1. This Surgical Technique does not contain enough information necessary for immediate use of the implant! Always get acquainted with all information on product label and in the Instructions for Use manual supplied by the manufacturer before using any MEDIN, a.s., products.
2. The use of this device is intended exclusively for physicians specialized in traumatology, orthopedy, and surgery, who went through the professional training for the device provided by MEDIN, a.s.
3. In addition to the nail itself, the implant system includes a set of instruments for insertion and extraction. The catalogue of all accessories and instruments intended for use together with the nail is given in the appropriate section of this surgical technique. The compatibility of respective implants and instruments have been tested and certified. Use of the nail in combination with implants or instruments of other manufacturers is not permitted as it may result in damage to the implants or the patient.
MEDIN, a.s., is not responsible for potential complications resulting from non-compliance with this instruction.
4. We recommend performing the surgery under X-ray control to check the position of the nail.

Note

Whenever the X-ray symbol is displayed ☸ perform an X-ray check in multiple projections.

5. Implants are supplied non-sterile and are intended to be sterilised before use. Instructions necessary for the preparation of the implants can be found in the Instructions for Use manual.
6. Make sure the instruments have an undamaged surface and are properly adjusted and functioning. Do not use instruments that are badly damaged, have illegible markings, show signs of corrosion or have dull blades. Dispose of such instruments. Your MEDIN, a.s., sales representative will provide you with further detailed instructions regarding functionality testing. Only the manufacturer is authorized to carry out service maintenance.



The nail design

is developed in a way to minimize soft tissue injury during insertion and to allow minimally invasive access and insertion outside the growth plate.

↓ **BIOMECHANICAL PRINCIPLE OF ESIN**

- > ESIN – elastic stable intramedullary nailing.
- > Elastic nails are bent and inserted into the medullary cavity.
- > This elastic deformation in the medullary cavity creates a bending moment and thus a support that is not rigid but stable enough for reduction and fixation of the fracture.
- > This method of osteosynthesis provides the following benefits:
 - bending stability,
 - axial loading,
 - rotational stability.



↓ **ENTRY POINTS AND RECOMMENDED NAIL DIAMETERS FOR EACH INDICATION**

→ FEMUR

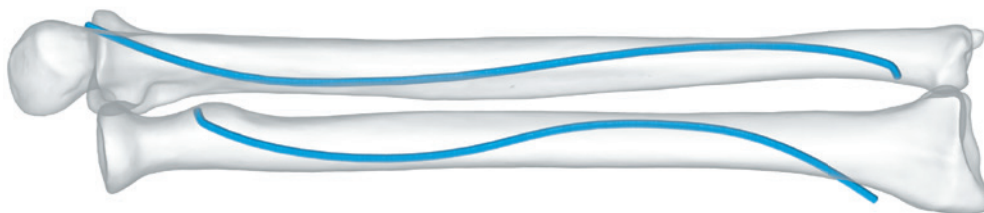
- > Nail diameter: 3.0–4.0 mm
- > Femur fractures are usually surgically treated with two incisions at the distal end or one incision and two entry holes at the proximal end.

→ TIBIA

- > Nail diameter: 2.5–4.0 mm
- > Tibial fractures are surgically treated from the proximal end with two incisions.

→ HUMERUS

- > Nail diameter: 2.5–3.5 mm
- > Humerus fractures are surgically treated from the distal end with two incisions or one incision with two entry holes.



→ FOREARM

→ FOREARM

- > Nail diameter: 2.0–3.0 mm
- > In forearm osteosynthesis with an elastic nail, typically only one nail is used. In case of the radius, access is from the distal end, in case of the ulna from the proximal end.

01

IMPLANT SELECTION

- > The surgeon must choose the appropriate type and size of implant according to the specifics of the osteosynthesis being performed.
- > Choosing the appropriate implant significantly increases the likelihood of successful osteosynthesis and reduces the risk of complications during fracture treatment.
- > The required length of the nail is determined by measuring the bone on X-ray or by placing the implant next to the extremity. When comparing bone and implant lengths, the nearest shorter implant length should be chosen.
- > The choice of nail size depends on the anatomy and age of the patient. The age limit for the use of the nail depends on the biological development of the child (it varies between 3 and 15 years of age at the average child's stature).
- > The nail diameter is determined based on the narrowest point of the medullary cavity so that the nail or nails fill approximately 2/3 of the medullary cavity (1 nail in the forearm, 2 nails in the other long bones). The correct diameter of the nail should be no more than 40 % of the width of the medullary cavity.

⚠ Caution

If performing an osteosynthesis with two nails, choose both nails of the same diameter to balance their bending forces and avoid axial deformation.

02

NAIL PRE-BENDING

- > It is recommended to pre-bend the nails before use. The curve of the nail should correspond with the curve of its tip.
- > To ensure good three-point support of the elastic nail in the bone and good contact of the nail with the inside of the cortical surface, it is recommended to bend the nail along its entire length with a radius three times larger than the radius of the medullary cavity.

⚠ Caution

Take good care when bending the nail, a sharp bend could reduce the effectiveness of the nail in the medullary cavity.

i Note

The steel nail is approximately twice as rigid as the titanium nail. This fact should be considered when contouring and inserting the steel nail.

03

OPENING OF MEDULLARY CAVITY

- > Open the medullary cavity with the perforator D 9 mm, 73 mm.
- > First, place the perforator perpendicular to the bone and make a dent. [fig. 3.1a]
- > Next, tilt the perforator in the direction approximately identical to the direction of insertion of the nail to create the actual entry point into the medullary cavity. [fig. 3.1b]
- > The opening should be only slightly wider than the diameter of the chosen nail.
- > If the entry hole cannot be created manually with the perforator, use a 4.5x120 mm drill guided through a 7/4.6x40 mm drill sleeve to open the medullary cavity. [fig. 3.2]

→ INSTRUMENTS



REF	Name
397 129 69 1670	Perforator; D 9 mm, 73 mm
397 129 79 8990	Drill sleeve; 7/4.6x40 mm
397 129 79 8542	Drill; 4.5x120 mm, triangular coupling

→ fig. 3.1a



→ fig. 3.1b



→ fig. 3.2



04

IMPLANT INSERTION

- > Fix the straight end of the nail into the hand chuck.
- > Insert the implant through the entrance hole into the medullary cavity by moving it in an oscillatory motion. Keep checking the correct angle of the tip of the nail relative to the diaphysis of the bone. [fig. 4.1]

→ INSTRUMENTS



REF	Name
397 129 79 3990	Hand chuck; 116 mm

→ fig. 4.1



05

NAIL SHORTENING

- > Check the position of the nail before cutting it.
- > It is recommended to bend the end of the nail approximately 10-15° away from the bone so that the protruding end of the nail is pointed slightly away from the cortex to allow easy extraction, while minimizing the risk of soft tissue injury.

⚠ Caution

Protrusion of the nail from the bone facilitates future extraction. Otherwise, there is a potential risk of complications with the extraction of the nail.

- > Use X-ray to check the position of the nail. The nail is in the correct position if its end protrudes 10–20 mm from the bone at an angle of 10–15°.
- > If the nail is in the correct position, cut it with the HERCULES wire cutter.

⚠ Caution

Nails that are too long can inflict soft tissue irritation, pain, or damage or tear the skin. Do not leave the end of the nail too long.

→ INSTRUMENTS



REF	Name
BOL6202801	GOLD-CUT HERCULES WIRECUT. 28 cm 2.0 mm–3.5 mm ST. WIRE

06

POSTOPERATIVE CARE

- > Postoperative follow-up of elastic nail osteosynthesis should include X-ray monitoring.
- > Anatomical reduction of the fracture should be verified by postoperative X-ray.
- > The nails should be in the correct position with good distal and proximal fixation.
- > Depending on the age of the patient, passive movement under the supervision of a physiotherapist should be started immediately. In the case of lower limb surgery, mobilisation with crutches may be started on the second day (depending on the pain) with only one leg loaded.
- > The patient is usually discharged after 3–5 days.
- > The first postoperative X-ray should be taken 4–5 weeks after surgery. Full loading of the limb may be allowed depending on the bone callus that has been formed.
- > Regular and sporting activities can usually be resumed 6 to 8 weeks after surgery. The next check up is carried out after 4 to 6 months.

07

NAIL EXTRACTION

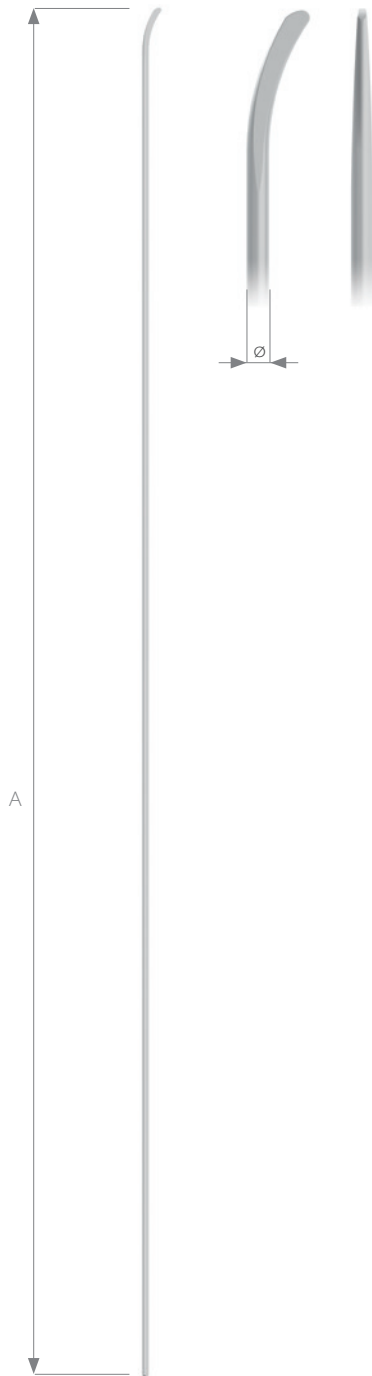
- > Make incisions in the same places as for the osteosynthesis and expose the ends of the nails.
- > First bend the end of the nail outside the formed bone callus and then extract the nail using the extraction forceps.

→ INSTRUMENTS



REF	Name
397 117 09 0270	Bartl elastic nail extraction forceps; 21.5 cm, fine

→ ELASTIC NAILS



Elastic nails

REF	Variant	Nail diameter ø [mm]	Nail length A [mm]
397 129 09 6460	2.5x500mm	2.5	500
397 129 09 6470	3.0x500mm	3.0	500
397 129 09 6480	3.5x500mm	3.5	500

Elastic nails Ti

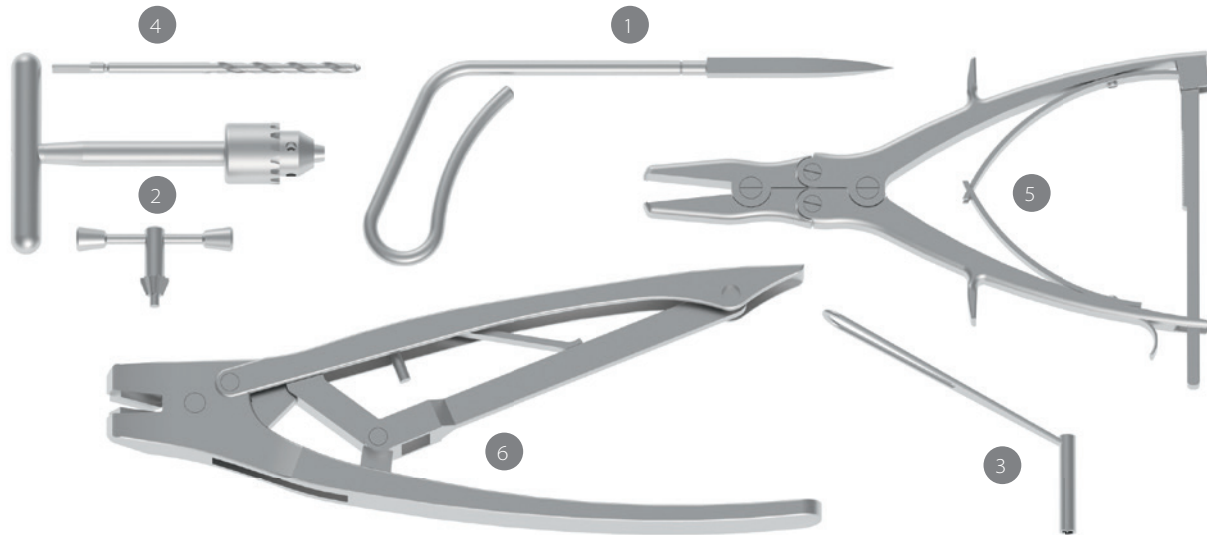


REF	Variant	Nail diameter ø [mm]	Nail length A [mm]	Nail colour
397 129 77 5313	2.0x400mm	2.0	400	Light blue
397 129 99 1266	2.0x440mm	2.0	440	Light blue
397 129 77 5323	2.5x400mm	2.5	400	green
397 129 99 1267	2.5x440mm	2.5	440	green
397 129 99 1268	3.0x440mm	3.0	440	yellow
397 129 77 5333	3.0x450mm	3.0	450	yellow
397 129 99 1269	3.5x440mm	3.5	440	blue
397 129 77 5343	3.5x450mm	3.5	450	blue
397 129 99 1270	4.0x440mm	4.0	440	purple
397 129 77 5353	4.0x450mm	4.0	450	purple
397 129 77 5363	4.0x500mm	4.0	500	purple

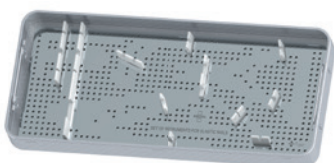


REF	Basket type	pcs
397 129 68 1910	Basket; for Elastic nails 540x240x50 mm without implants	1

→ INSTRUMENTS FOR ELASTIC NAILS



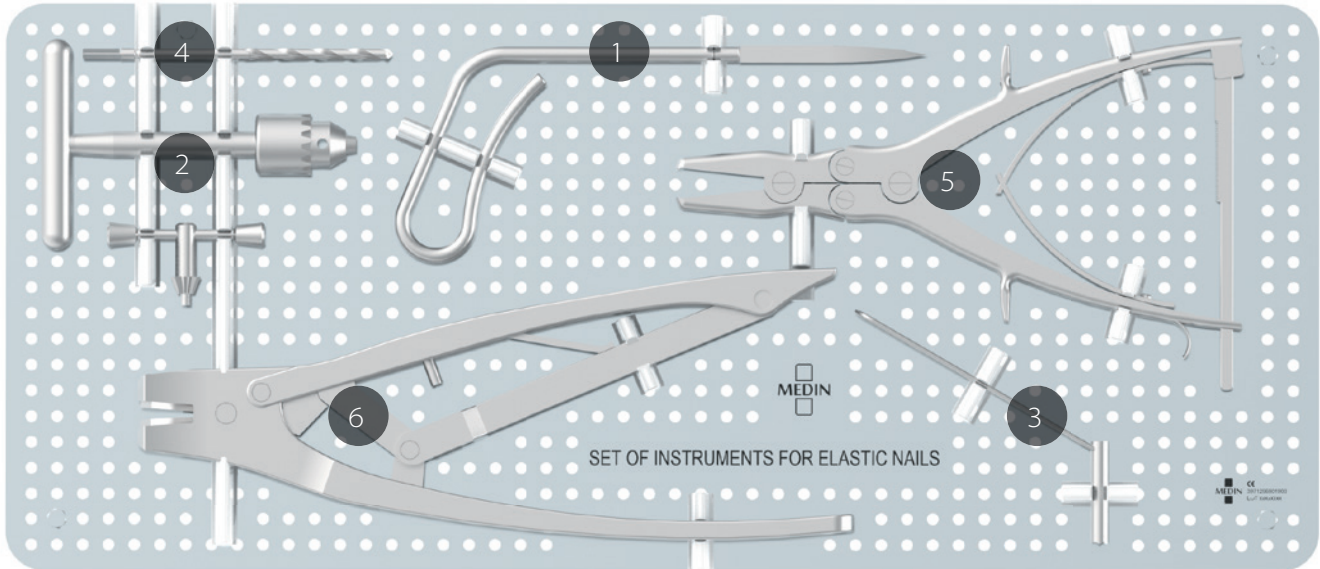
No.	REF	Name	pcs
397 139 09 1130 Set of instruments for elastic nails			1
1	397 129 69 1670	Perforator; D 9 mm, 73 mm	1
2	397 129 79 3990	Hand chuck; 116 mm	1
3	397 129 79 8990	Drill sleeve; 7/4.6x40 mm	1
4	397 129 79 8542	Drill; 4.5x120 mm, triangular coupling	1
5	397 117 09 0270	Bartl elastic nail extraction forceps; 21.5 cm, fine	1
6	BOL6202801	GOLD-CUT HERCULES WIRECUT. 28 cm 2.0mm-3.5mm ST.WIRE	1



REF	Basket type	pcs
397 129 68 1900	Basket; for instruments for elastic nails 540x240x50 mm without implants	1

→ INSTRUMENTS DIAGRAM

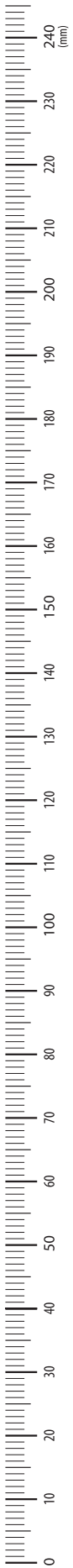
BASKET



→ INSTRUMENTS

No.	Name
1	Perforator; D 9 mm, 73 mm
2	Hand chuck; 116 mm
3	Drill sleeve; 7/4.6x40 mm
4	Drill; 4.5x120 mm, triangular coupling
5	Bartl elastic nail extraction forceps; 21.5 cm, fine
6	GOLD-CUT HERCULES WIRECUT. 28 cm 2.0 mm-3.5mm ST.WIRE

REF	UDI-DI	Name
> Elastic nail		
397 129 09 6460	8591712026584	2.5x500mm
397 129 09 6470	8591712026591	3.0x500mm
397 129 09 6480	8591712026607	3.5x500mm
> Elastic nail Ti		
397 129 77 5313	8591712144011	2.0x400mm
397 129 99 1266	8591712269066	2.0x440mm
397 129 77 5323	8591712144028	2.5x400mm
397 129 99 1267	8591712269073	2.5x440mm
397 129 99 1268	8591712269080	3.0x440mm
397 129 77 5333	8591712144035	3.0x450mm
397 129 99 1269	8591712269097	3.5x440mm
397 129 77 5343	8591712144042	3.5x450mm
397 129 99 1270	8591712269103	4.0x440mm
397 129 77 5353	8591712144059	4.0x450mm
397 129 77 5363	8591712223389	4.0x500mm



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A series of horizontal lines for writing notes, extending from the ruler area across the page.

MEDIN ORTHOPAEDIC IMPLANTS



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SYS_OP056_R00_2022-03-30_EN



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