merete®

OsteoBridge™

Merete® Limb Salvage Systems

Diaphysis

Surgical technique and Ordering information

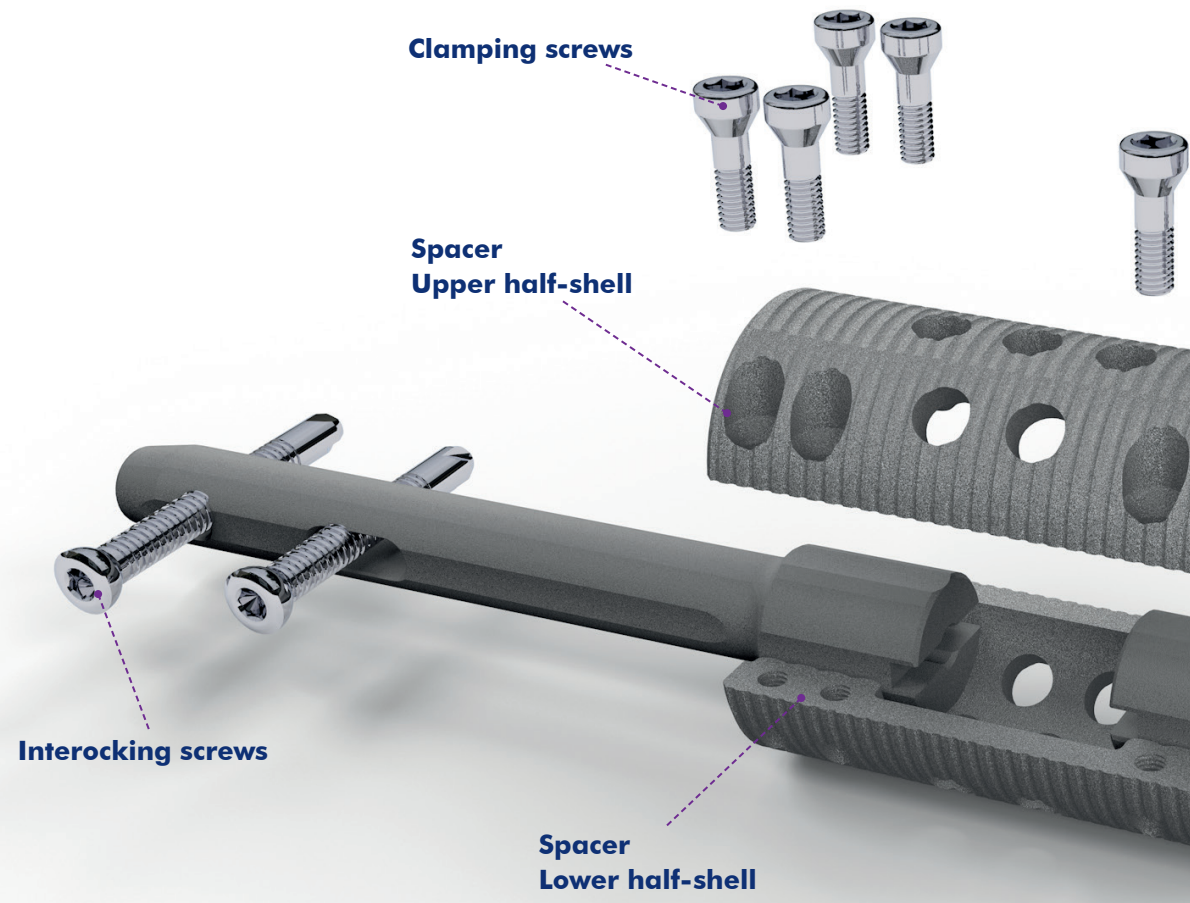
Table of Contents

Description

The OsteoBridge™ diaphyseal implant is a resection endoprosthesis system for use in long-term surgical stabilisation of major defects of the long bones, such as the humerus, femur or tibia.

The OsteoBridge™ is comprised of two cylindrical half-shells that combine to form the resection element, the spacer. The spacer is anchored into place using eight clamping screws on two intramedullary nails. The spacer and the intramedullary nails are available in different dimensions, to accommodate different sizes of bones and bone defects. Reducing bushing bridge the gap created by differences in diameter between the nails and the spacer when the nails selected have clamping areas whose outer diameters are smaller than the inner diameters of the spacer.

The spacer has an outer diameter of either 20 mm (humerus), 25 mm (tibia) or 34 mm (femur). Spacers are available in lengths of 40, 50, 60 and 70 mm. If a longer section of bone needs to be bridged, two spacers may be used in combination with a coupling unit. Intramedullary nails are available in lengths 60 mm to 200 mm, with diameters of 7 mm to 20 mm. The nails may be used with cemented or cementless anchoring. All OsteoBridge™ system implants are made of TiAl6V4 ELI titanium alloy.



All components are made of:

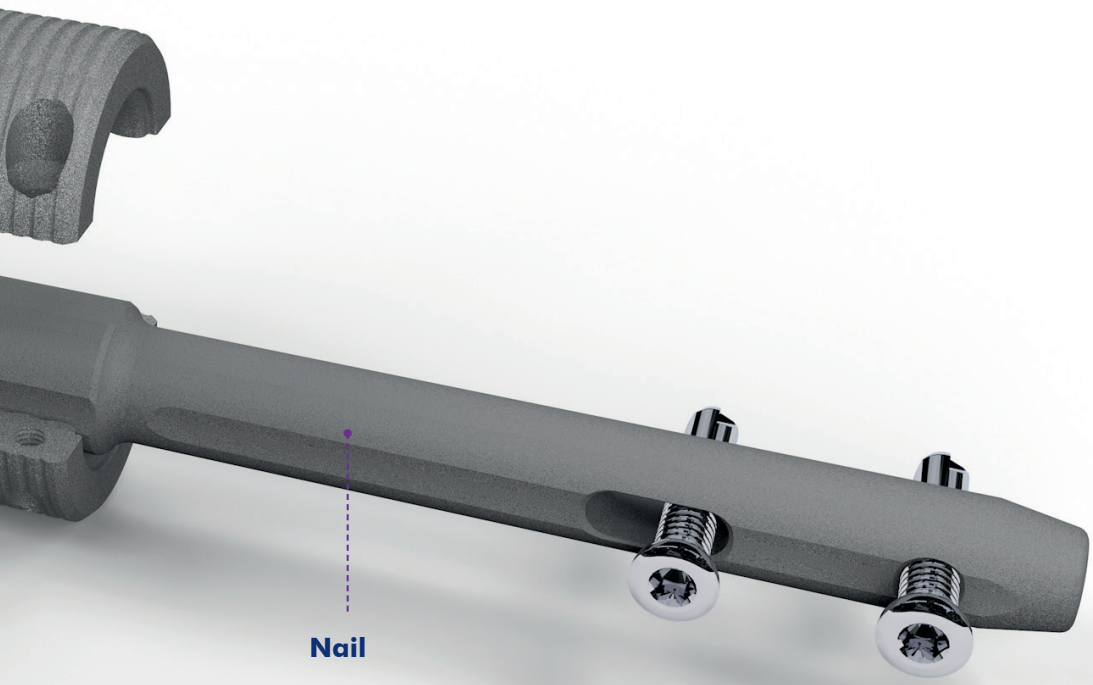
TiAl6V4
Titanium
Alloy

Indications

- Long-term stabilisation of major bone defects resulting from
  - pathological fractures
  - bone resections following metastases or infections
  - comminuted fractures
- For use only in the diaphyseal region of the bone

Contraindications

- Ongoing local or systemic infections
- Severe muscular, nervous, or vascular conditions that endanger the affected extremities
- Insufficient bone structure, preventing good fixation of the implant
- Any accompanying conditions that could potentially endanger the functionality or success of the implant
- Patients with mental or neurological illnesses, or patients who are not capable of following instructions as regards necessary post-operative treatment

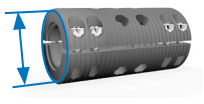


System compatibility

CAUTION: The 20 mm, 25 mm and 34 mm diameter spacers have different inner diameters. Corresponding reducing bushing are provided for the 20 mm and 25 mm diameter spacers, so that the nails will fit the spacers. The clamping areas of the nails are fitted to the inner diameters of the 34 mm diameter spacer. It is important to use the correct combination of **SPACER REDUCING BUSHING → SLEEVE → NAIL** . Product boxes are colour-coded to indicate whether they are for humerus, tibia or femur models.

Humerus:

20 mm diameter spacer
Including clamping screws / sterile
(Inner diameter 10 mm)



Length	Ref. sterile
40 mm	GB02004
50 mm	GB02005
60 mm	GB02006
70 mm	GB02007

Can be combined with
7, 8, 9 and 10 mm diameter nails

Corresponding reducing bushing / sterile

Nail diam. / Spacer diam.	For nails	Ref. sterile
7/20	7 mm	GB21007
8/20	8 mm	GB21008
9/20	9 mm	GB21009
10/20	10 mm	No sleeve

Tibia:

25 mm diameter spacer
Including clamping screws / sterile
(Inner diameter 14 mm)

Length	Ref. sterile
40 mm	GB02504
50 mm	GB02505
60 mm	GB02506
70 mm	GB02507

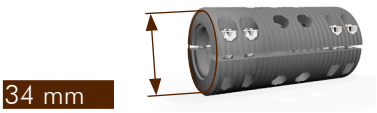
Can be combined with
8, 9, 10, 12 and 14 mm diameter nails

Corresponding reducing bushing / sterile

Nail diam. / Spacer diam.	For nails	Ref. sterile
8/25	8 mm	GB21408
9/25	9 mm	GB21409
10/25	10 mm	GB21410
12/25	12 mm	GB21412
14/25	14 mm	No sleeve

Femur:

34 mm diameter spacer
Including clamping screws / sterile
(inner diameter 16 mm)



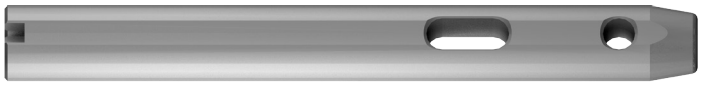
Length	Ref. sterile
40 mm	GB03404
50 mm	GB03405
60 mm	GB03406
70 mm	GB03407

Can be combined with
10, 12, 14, 16, 18 and
20 mm diameter nails

Humerus

Tibia

Femur



Nails / sterile

For humerus: 20 mm diameter spacer

For tibia: 25 mm diameter spacer

Length	7 mm	8 mm	9 mm	10 mm	12 mm	14 mm
60 mm	GB10706S	GB10806S	GB10906S	GB11006S	/	/
70 mm	GB10707S	GB10807S	GB10907S	GB11007S	GB11207S	/
90 mm	GB10709S	GB10809S	GB10909S	GB11009S	GB11209S	GB11409S
110* mm	/	/	/	GB11011S	GB11211S	GB11411S
130* mm	/	/	/	GB11013S	GB11213S	GB11413S
150* mm	/	/	/	/	GB11215S	GB11415S
200* mm	/	/	/	/	/	GB11420S

Small locking screws / sterile

Diameter 3.8 mm**
For 7 mm and 8 mm diameter nails

Large locking screws / sterile

Diameter 5.0 mm***
For 9, 10, 12, and 14 mm diameter nails

Nails / sterile

For femur: 34 mm diameter spacer

Length	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm
60 mm	GB31006S	/	/	/	/	/
70 mm	GB31007S	GB31207S	/	/	/	/
90 mm	GB31009S	GB31209S	GB31409S	/	GB11809	GB12009
110 mm*	GB31011S	GB31211S	GB31411S	GB11611S	GB11811	GB12011
130 mm*	GB31013S	GB31213S	GB31413S	GB11613S	/	/
150 mm*	/	GB31215S	GB31415S	GB11615S	/	/
200 mm*	/	/	GB31420S	GB11620S	/	/

Large locking screws / sterile

Diameter 5.0 mm***
For 10, 12, 14, 16, 18, and 20 mm diameter nails

* Dynamisation ** Drill diameter 3.2 mm *** Drill diameter 4.5 mm

Surgical technique

Please note:
Use only the OsteoBridge™ instruments included in delivery when implanting OsteoBridge™ Diaphysis components.

OsteoBridge™ Diaphysis is a disposable product and must not be re-used. Do not use parts that are damaged, have damaged packaging, or whose intended use is unclear.

▶ Pre-operative planning

The surgical technique shown here serves as an example to help illustrate the basic procedure for implanting the OsteoBridge™ system. Merete GmbH, manufacturer of this medical product, does not stipulate that this or any other treatment method is to be used for any specific patient. The responsibility for selecting a suitable method of treating a patient lies with that patient's operating physician. Patient information is to be provided in accordance with the product information sheet.

Pre-operative planning has a significant influence on the success of the operation. Correct implant selection depends upon it. Merete GmbH provides support in this regard. X-ray templates are available for pre-operative planning purposes. They can be used to determine correct nail and spacer lengths and diameters prior to surgery.

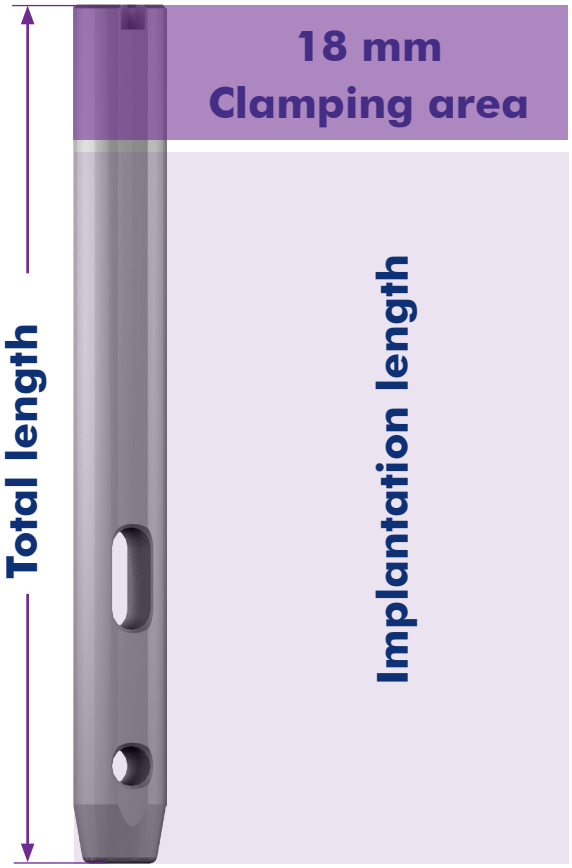


Figure 1 Nail length

When selecting nails, remember to subtract the 18 mm clamping region from the selected nail length (Fig. 1). This shortens the nail's implantation length (see Table 1).

Total length	Implantation length
60 mm	42 mm
70 mm	52 mm
90 mm	72 mm
110 mm	92 mm
130 mm	112 mm
150 mm	132 mm
200 mm	182 mm

Table 1

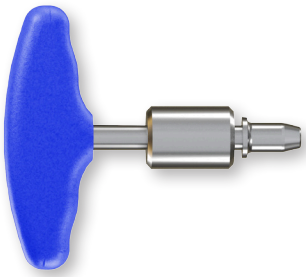
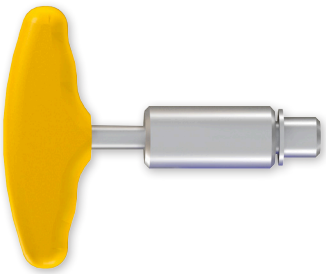
Please note the following when using the instruments:

Use the ratchet screwdriver with **3.8 mm and 5.0 mm diameter locking screws**.

Nails: 7 mm and 8 mm diameter	Nails: 9, 10, 12, 14, 16, 18 and 20 mm diameter
Locking screw	Locking screw
3.8 mm diameter (Ref. GB33818S - GB33832S)	**5.0 mm diameter** (Ref. GB35020S - GB35065S)
Ref. GB90209 	**Ref. GB90204** 
Ref. GB90213 	

When using **3.5 mm diameter clamping screws** (20 mm diameter humerus spacer + 25 mm diameter tibia spacer), use the instruments with the blue handles.

When using 5.0 mm diameter clamping screws (34 mm diameter femur spacer), use the instruments with the yellow handles.

Spacer: 20 and 25 mm diameter	Spacer: 34 mm diameter
Clamping screws	Clamping screws
3.5 mm	**5.0 mm**
Ref. GB90204 	**Ref. GA90024** 
Ref. GB90213 	**Ref. GB90210** 
Ref. GB90205 	**Ref. GA90026** 

Preparing the defect to be treated

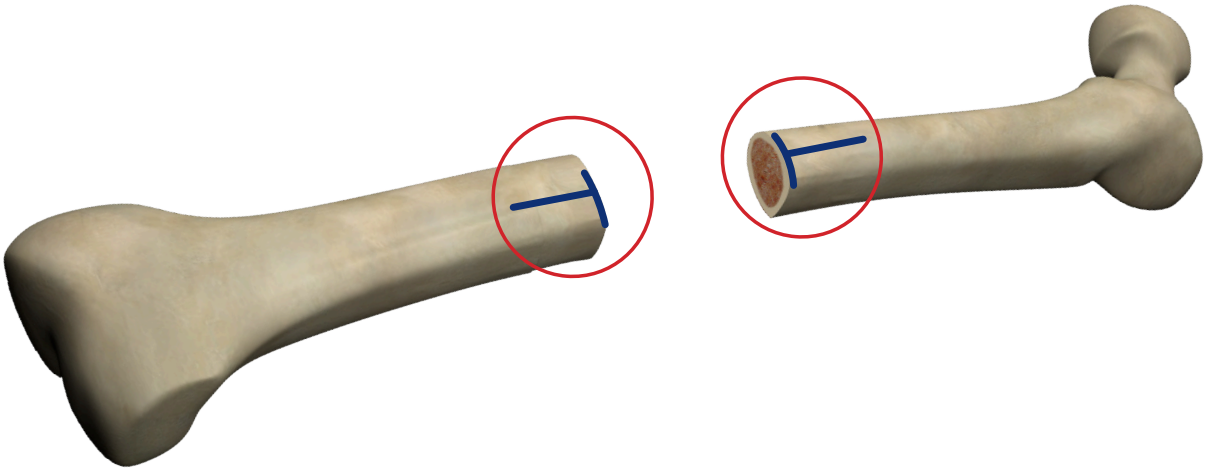


Figure 2 Marked bone

1 Mark beside the bone segment to be resected (e.g., with a SteriPen™ or two K-wires), so that the bone can be aligned along its original axis following resection (Fig. 2).

Only resect after the markings are in place!

The bone defect can now be resected and the defect zone prepared for the spacer. Be sure to saw away the bone section being replaced in a straight line, in order to maintain a good surface for the spacer. Measure the resected bone using the steel ruler (Ref. AI90300) and select a spacer whose length approximately matches that of the resected bone. Selecting a slightly shorter spacer will make it easier to fit. The diameter of the spacer depends on the limb being operated upon.

2 For the operation to succeed, it is important to prepare the medullary cavity carefully, in accordance with the following instructions. Prepare the medullary cavity by reaming it proximally and distally to the desired diameter (Fig. 3), ideally using a flexible intramedullary reamer (not included). **The medullary cavity should be reamed in 0.5 mm steps until contact with the corticalis has been made.** Make sure there is at least 5 cm of cortical bone contact, in order to ensure stable anchorage of the nail within the bone. Correct nail length can be determined based on the length of intramedullary reamer guide wire inserted.

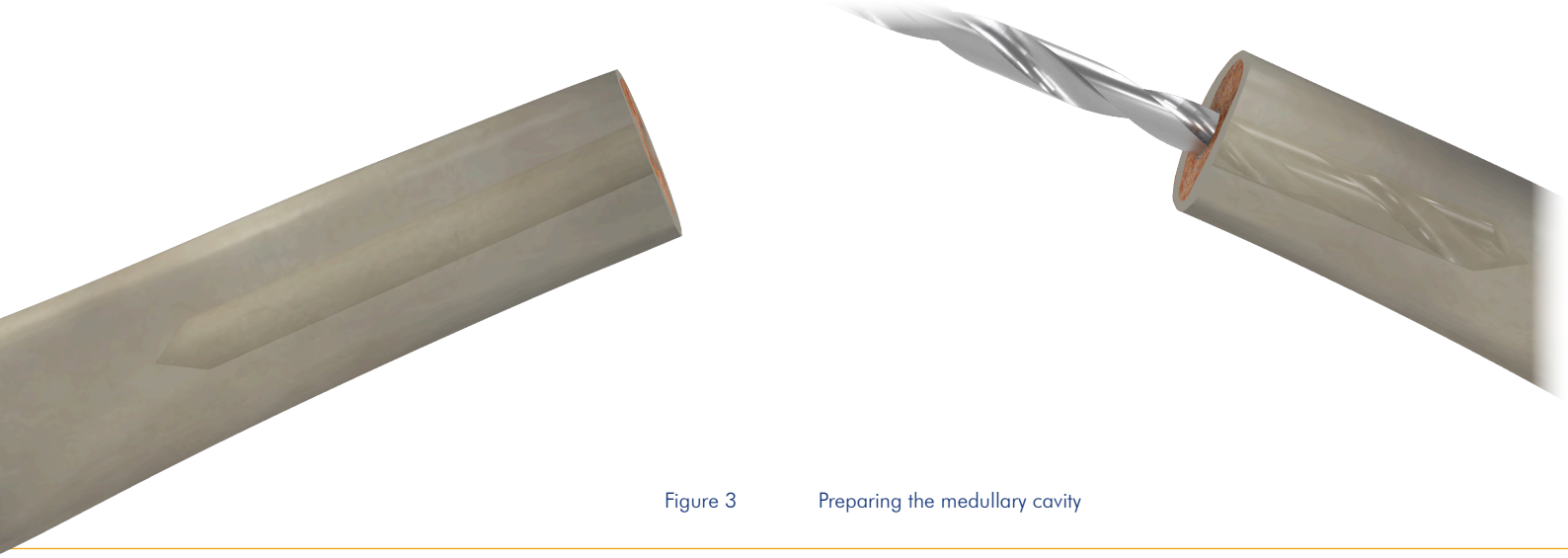


Figure 3 Preparing the medullary cavity

Cementless implantation

Ream the medullary cavity in accordance with the following table (Table 2). Exact preparation of the medullary cavity is necessary to ensure proper PressFit fixation.

Nail diameter	Reamer diameter
7 mm	7 mm
8 mm	8 mm
9 mm	9 mm
10 mm	10 mm
12 mm	12 mm
14 mm	14 mm
16 mm	16 mm
18 mm	18 mm
20 mm	20 mm

Table 2

Cemented implantation

For cemented implantation, the medullary canal should have a diameter at least 2 mm greater than the desired nail diameter. This will permit a cement coating thickness of 1 mm. Make sure that the thickness of the cement coating does not exceed 2 mm (Table 3) .

Nail diameter	Reamer diameter
7 mm	9 mm
8 mm	10 mm
9 mm	11mm
10 mm	12 mm
12 mm	14 mm
14 mm	16 mm
16 mm	18 mm
18 mm	20 mm
20 mm	22 mm

Table 3

Caution:
Do not additionally lock the nails after cementation.

Implant selection

Trial nails (Ref. GB90706 - GB92011) can be used to check the appropriate nail diameters and lengths (Fig. 4). Different nail lengths and diameters may be used in the proximal and distal sections of the bone.

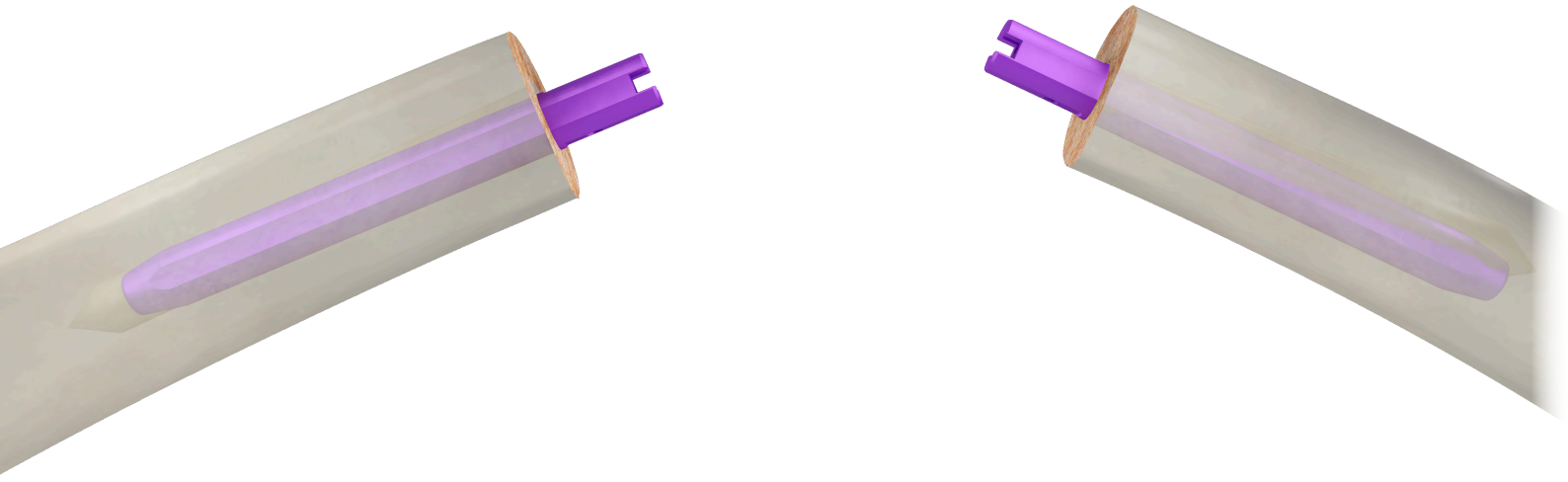


Figure 4 Using the trial nails

Use the spacer gauge (Ref. GB90212) to determine the spacer length required (Fig. 5). With bone defects larger than 70 mm, the steel ruler (Ref. AI90300) may be used as well.

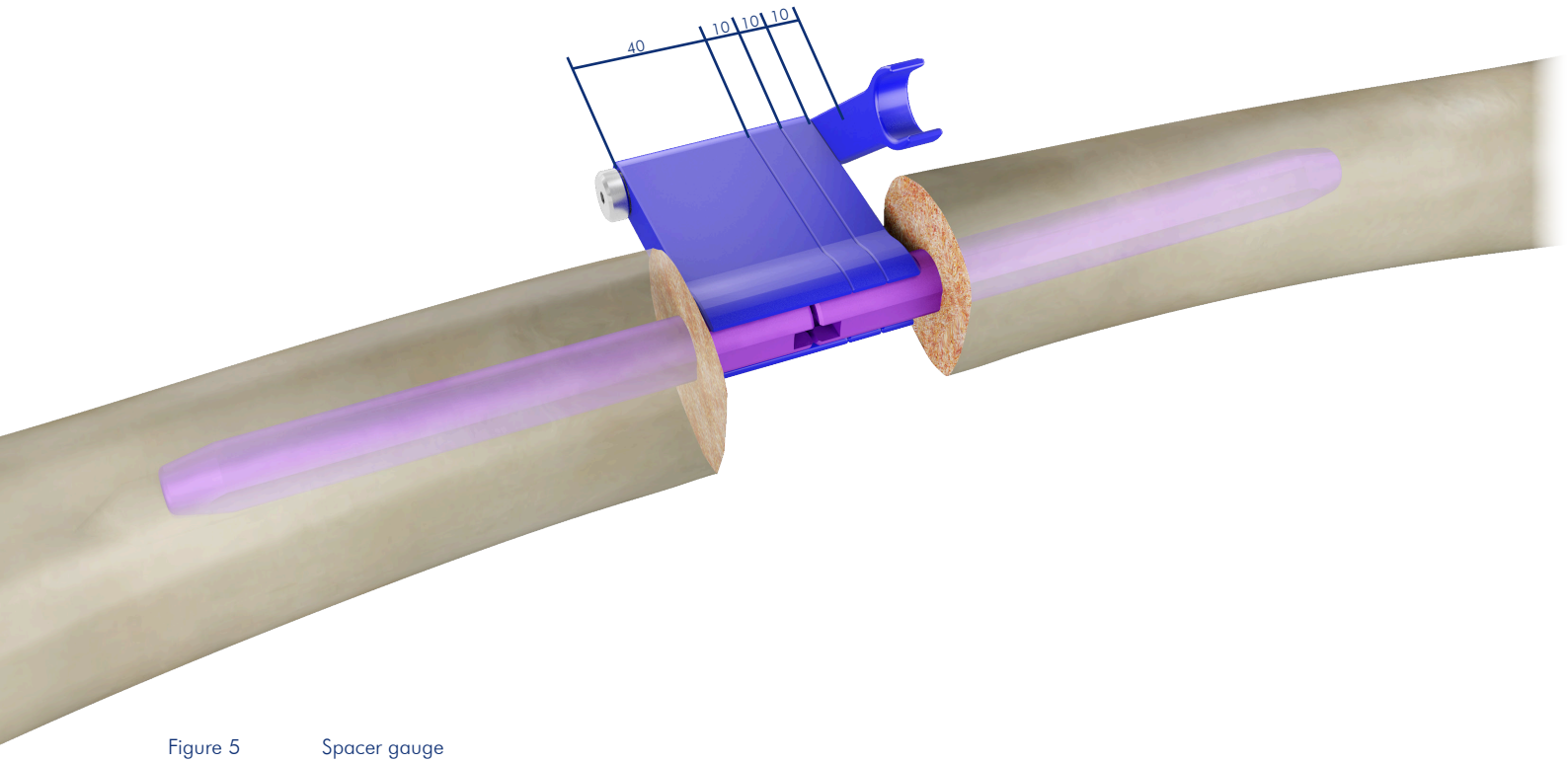


Figure 5 Spacer gauge

Use the extractor for trial nails (Ref. GB90211) and the slotted hammer (Ref: AI00048) to remove the trial nails. To do this, screw the extractor into the proximal bore of the nail (Fig. 6).

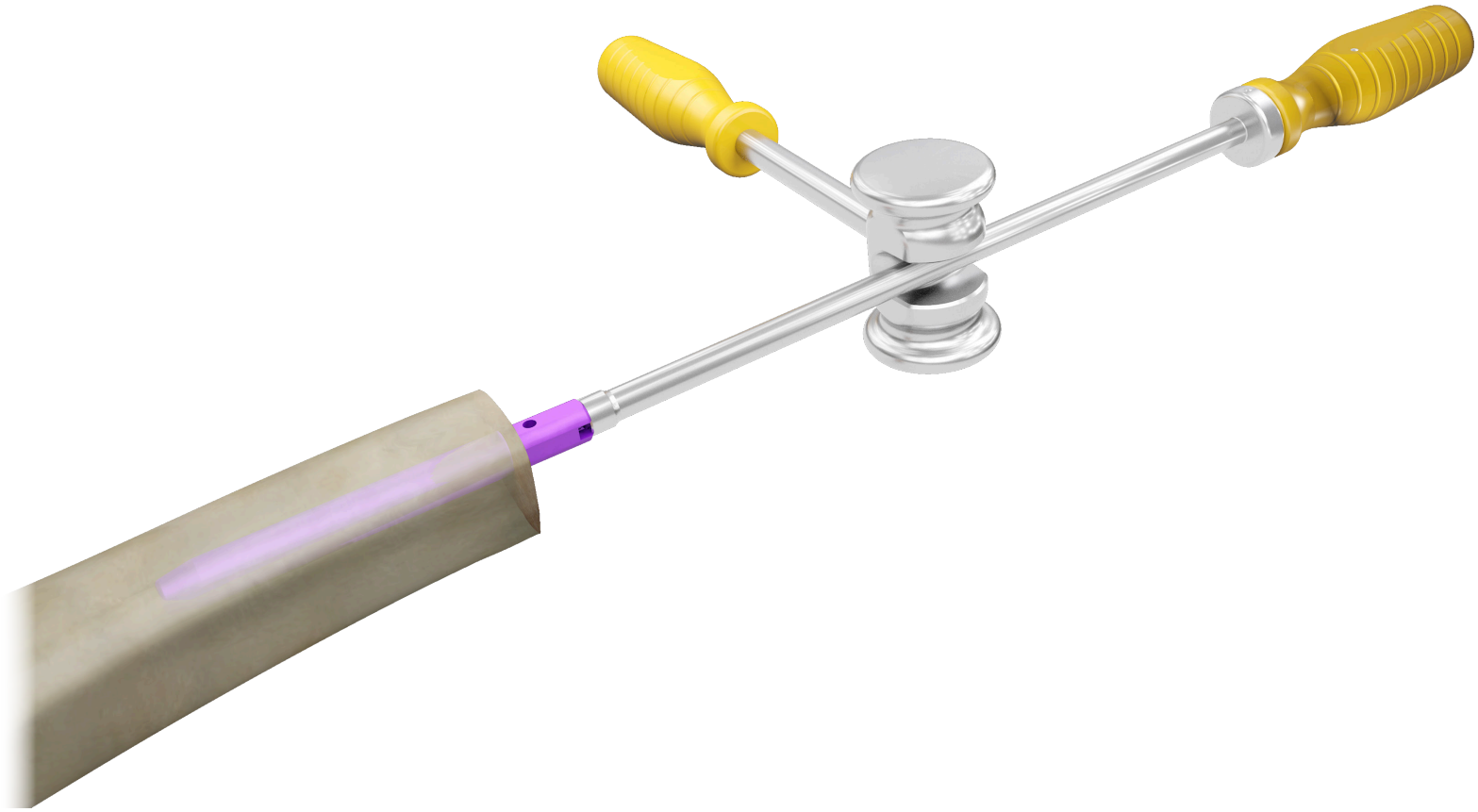


Figure 6 Extracting the trial nail

Instructions for fitting the nails with four grooves in the unclamped section

Implantation variants:

The nails can be offset to one another by 90°, but the grooves in the nails should be lined up (Fig. 7). The nails and spacer need not be lined up exactly A/P or L/M when combined, so that the spacer half-shells can be screwed in / the nails can be locked in place.

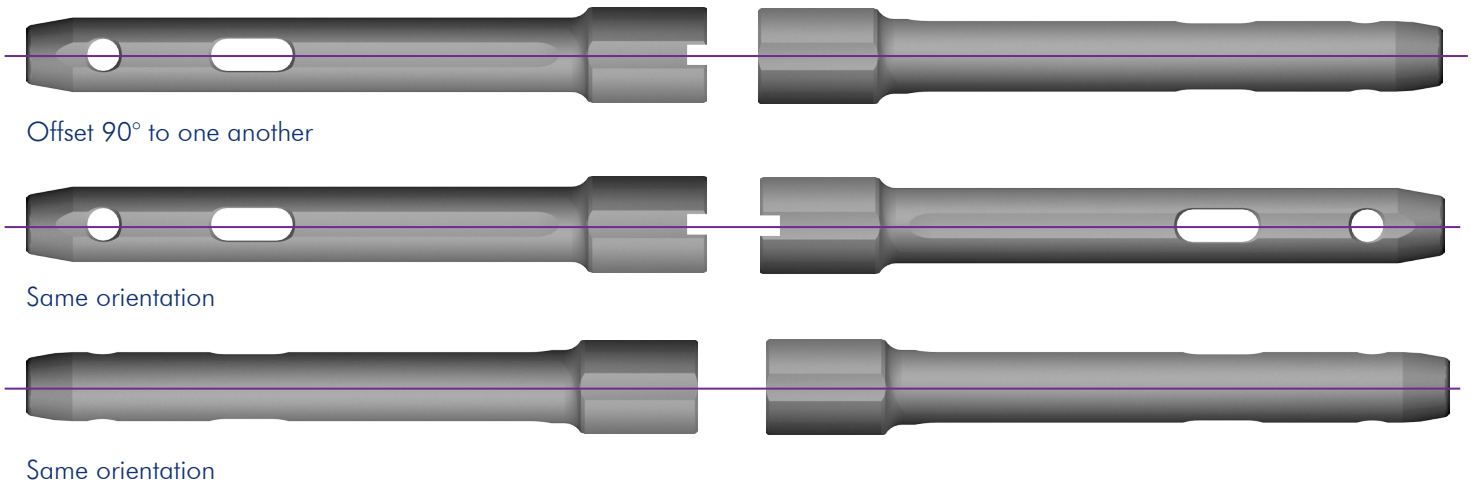
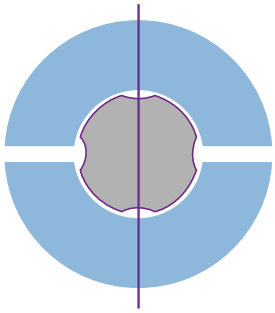


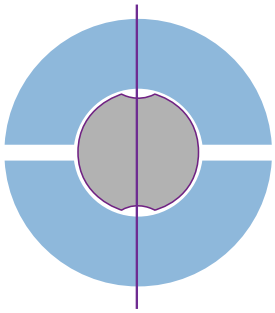
Figure 7 Possible positions of nails relative to one another

Spacer / nails assembly orientation



When using nails with four grooves, make sure to fit the spacer half-shells such that they are in line with the grooves (Fig. 8).

Figure 8 Nails and spacer half-shells in line



Correct orientation is also important when using nails with two grooves (Fig. 9). When using nails without grooves in the clamping area (18 and 20 mm diameters), the nails may be implanted with any orientation.

Figure 9 Correct orientation of spacer half-shells and nails having two grooves

Cementless insertion and locking of intramedullary nails

3 Use the trial nails (Ref. GB90706 - GB 92011) to determine the appropriate nail sizes to use based on the location of the defect and the size of the bone in question. Two different sized nails may be used as well (consult the allocation tables (SIN0018), which are included with the instruments as laminated sheets).

To insert a nail into the bone, place it onto the nail guiding impacting instrument (NGI) (Ref. GA90100), and then tighten the connection screw so that the nail is seated firmly on the NGI (Fig. 10).

Figure 10 NGI with nail

4 Tap the connection screw on the NGI with a hammer to drive the nail into the bone until the spacer (the wedge on the NGI, Fig. 11) is flush with the bone.

Caution:
Do not drive the nail any further into the bone, as the nail's clamping area must be at least 18 mm in length for it to be clamped securely with the spacer!

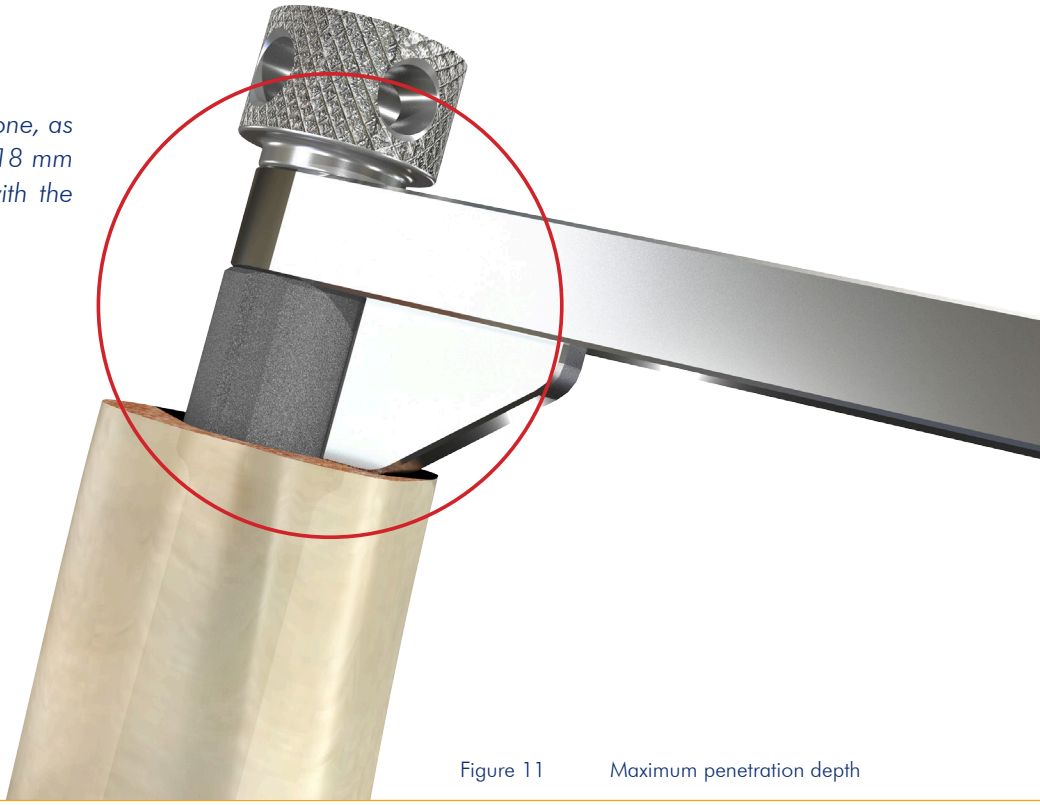


Figure 11 Maximum penetration depth

5 Place the static locking screw first, followed by the dynamic locking screw. Place the tissue protection sleeve (Ref. GB90101) into the NGI drill hole corresponding to the nail length (note labelling on NGI); use the tip of the trocar (Ref. GB90102) to centre-punch a hole for the locking screw (Fig. 12).

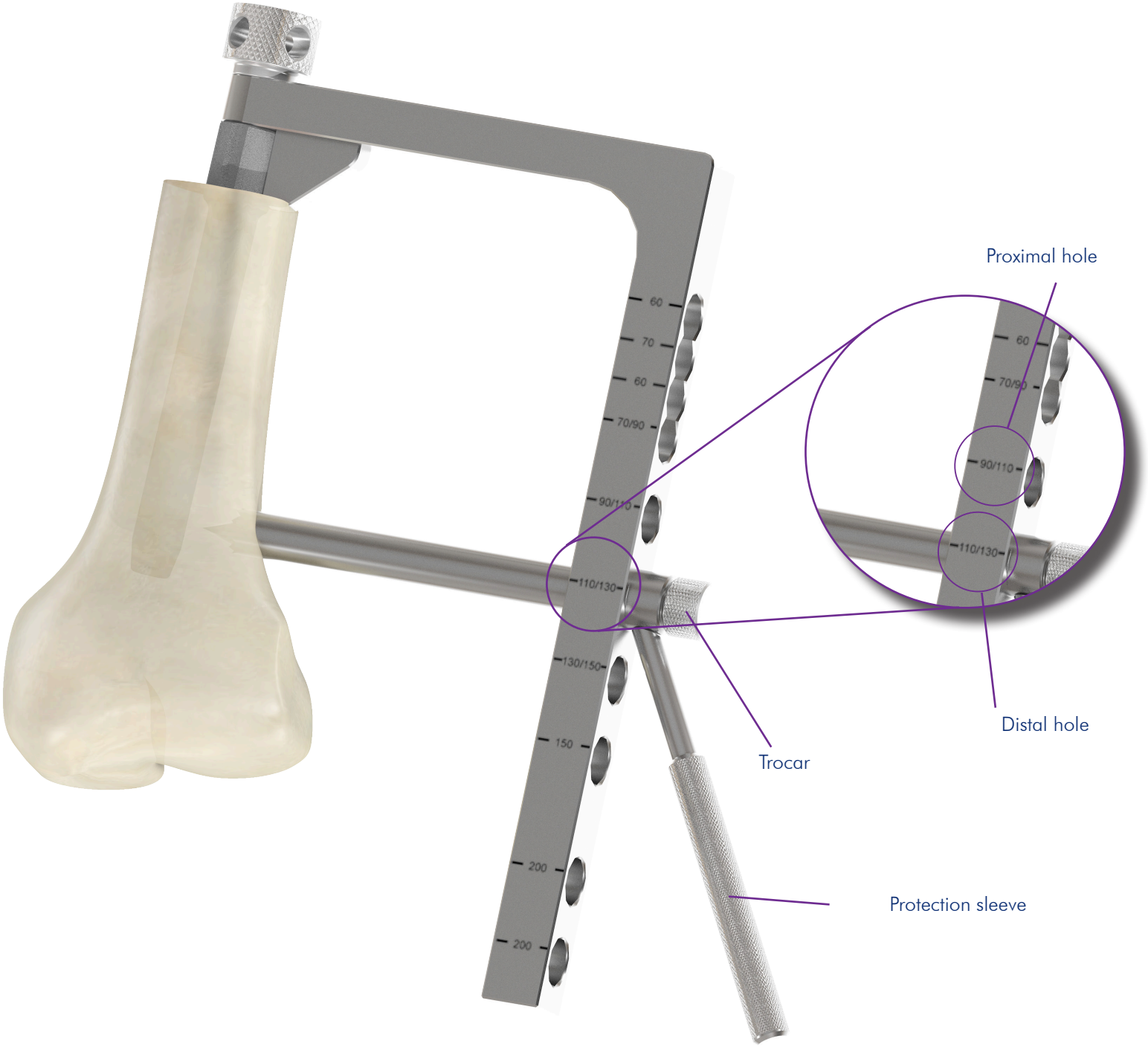


Figure 12 Distal and proximal holes for 110 mmlong nail

6 Drill a bicortical locking hole with the help of the appropriate spiral drill. Use the corresponding drill sleeve (Ref. GB90132/GB90145) as a guide (Fig. 13).

- 3.2 mm diameter drill (Ref. GB90232) for 3.8 mm diameter locking screws
- 4.5 mm diameter drill (Ref. GB90245) for 5.0 mm diameter locking screws

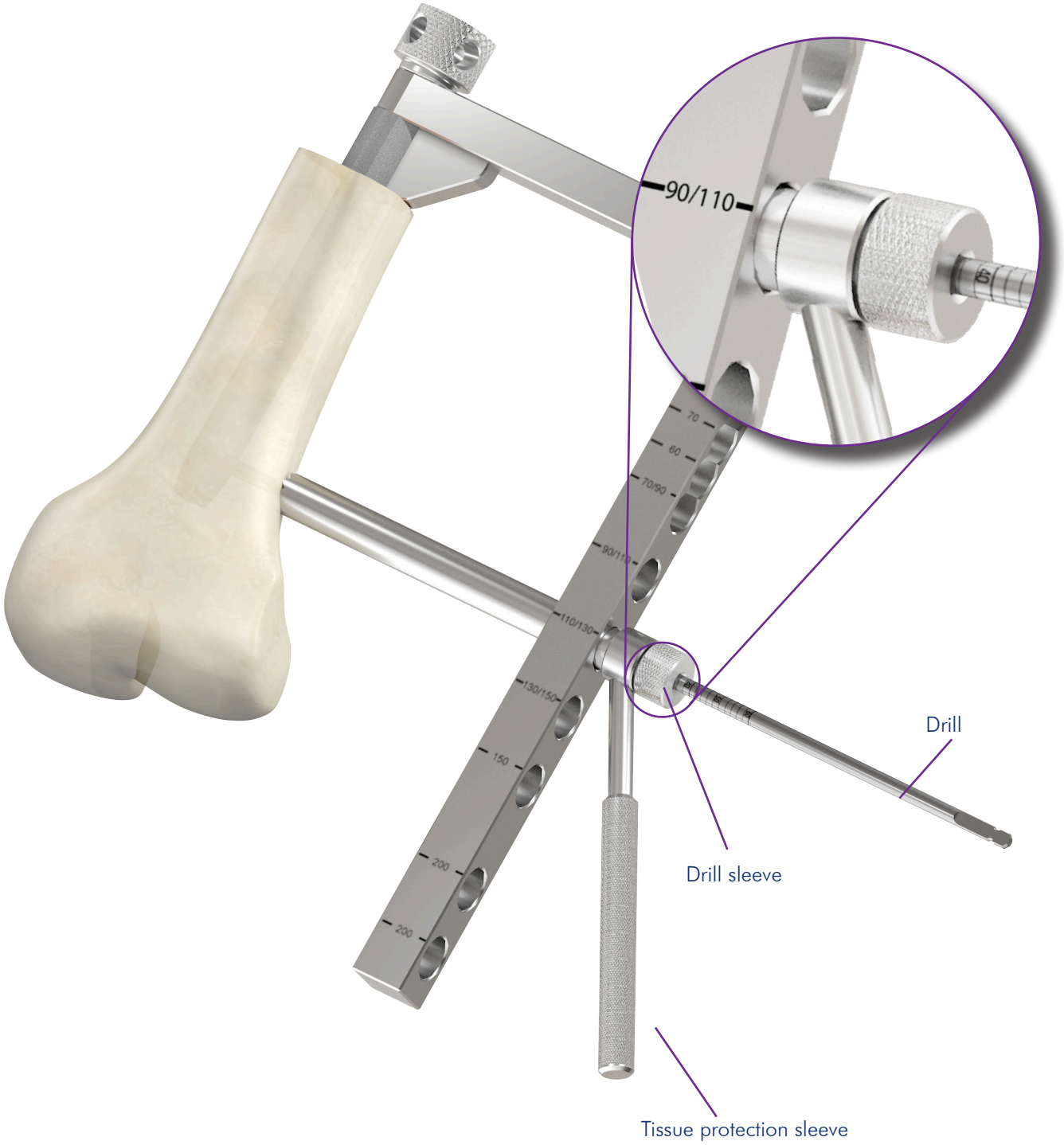
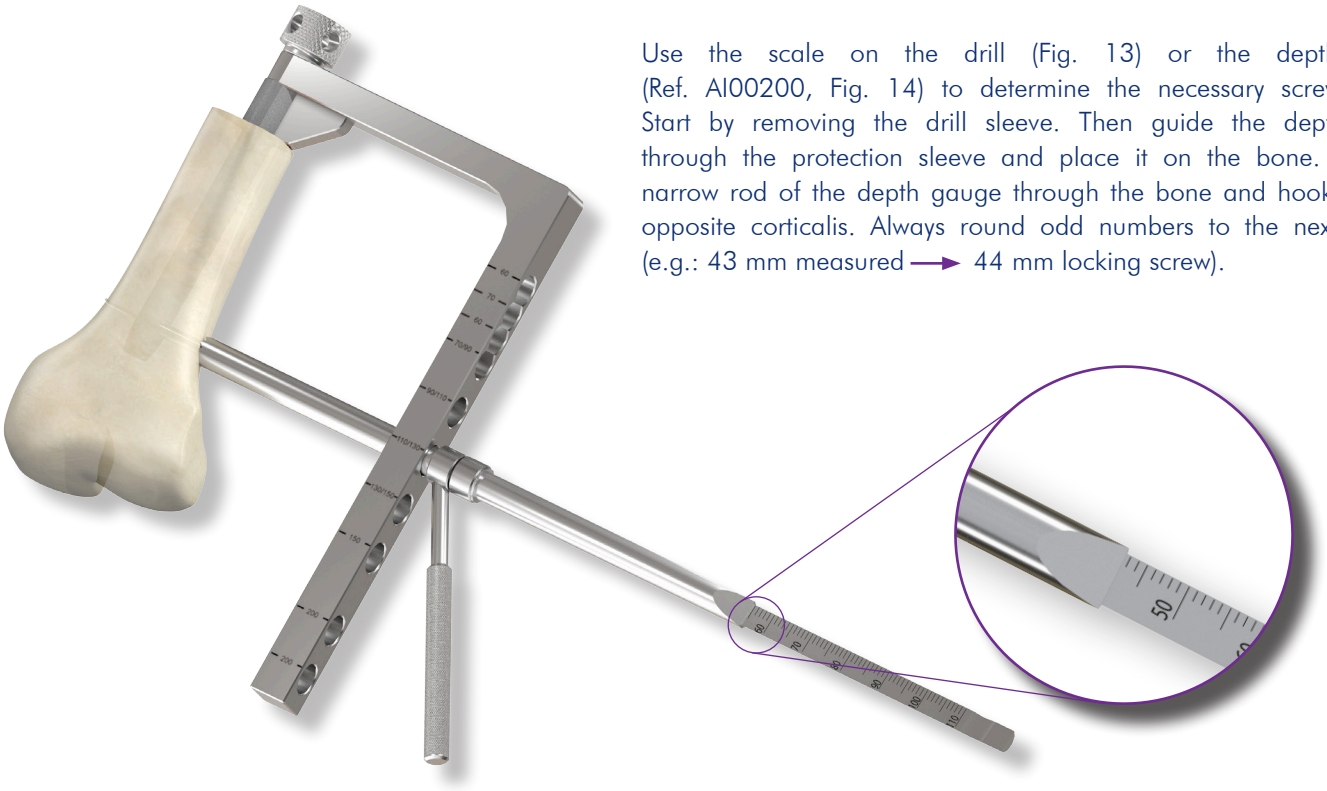


Figure 13 Drilling the locking holes with the help of the drill sleeve



Use the scale on the drill (Fig. 13) or the depth gauge (Ref. AI00200, Fig. 14) to determine the necessary screw length. Start by removing the drill sleeve. Then guide the depth gauge through the protection sleeve and place it on the bone. Push the narrow rod of the depth gauge through the bone and hook it to the opposite corticalis. Always round odd numbers to the next size up (e.g.: 43 mm measured → 44 mm locking screw).

Figure 14 Depth gauge for determining screw length

Guide the correct locking screw through the tissue protection sleeve and tighten it using the included screwdriver. To do this, connect the correct screwdriver to its ratcheted hand grip (see page 9).

7 Insert the second locking screw using the same procedure described above. Once the holes have been placed and the screws have been inserted, the NGI can be removed (Fig. 15). Do not begin locking the second nail until the first nail is completely locked into the bone.

All nails have two holes so that they can be double-locked. On nails 110 mm or longer, the second hole is elongated for optional dynamisation, which entails removing the distal screw several weeks after the operation.

Note:
Dynamisation of the nails is a decision left to the discretion of the operating physician.

Figure 15 Distal bone with locked nail

Cemented insertion of intramedullary nails

8 Choose the appropriate nail sizes to use based on the location of the defect and the size of the bone in question. Two different sized nails may be used as well (consult the allocation tables, which are included with the instruments as laminated sheets).

To insert a nail into the bone, place it onto the nail guiding/impacting instrument (NGI) (Ref. GA90100), and then tighten the connection screw so that the nail is seated firmly on the NGI (Fig. 16).

Figure 16 NGI with nail

Caution:
Do not additionally lock the nails after cementation.

9 Once the medullary canal has been dissected, cleaned and dried, insert the bone cement. Tap the connection screw on the NGI with a hammer to drive the nail into the bone until the spacer (the wedge on the NGI, Fig. 17) is in contact with the bone. Do not drive the nail any further into the bone, as the nail's clamping area must be at least 18 mm in length for it to be clamped securely with the spacer! Wait until the bone cement has completely hardened before proceeding with the remaining steps.

Caution:
Make sure that the clamping surface of the nail within the spacer remains free of bone cement!

Figure 17 Maximum insertion depth

Mounting the spacer

10 Once the nails have been inserted (and the reducing bushings have been placed, if necessary), the spacer can be mounted onto the two nails. Start by placing the thread-guiding half-shell onto the nails dorsally (Fig. 18). At this point, it will no longer be possible to move the nails to adjust their length within the medullary cavity. The spacer is flush with the clamping areas of the nails (Fig 19)

Caution:
Note page 26 if using reducing bushing!

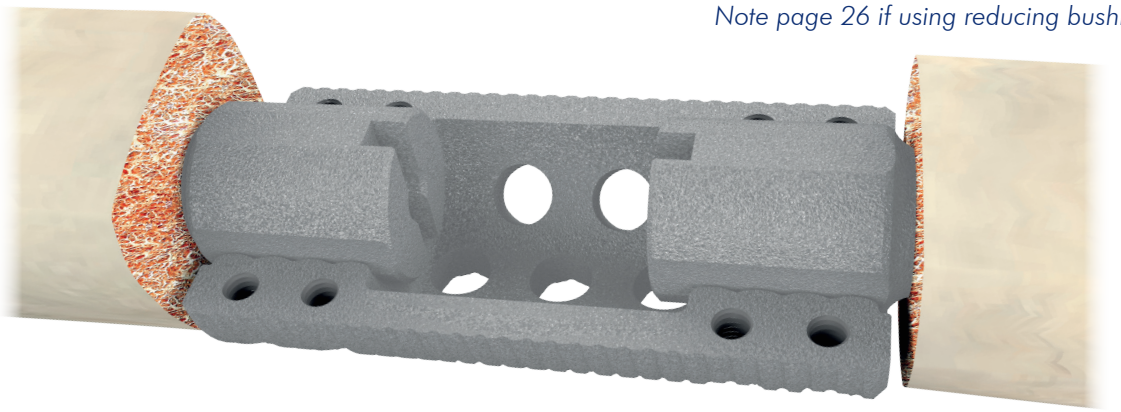


Figure 18 Preparing to mount the spacer

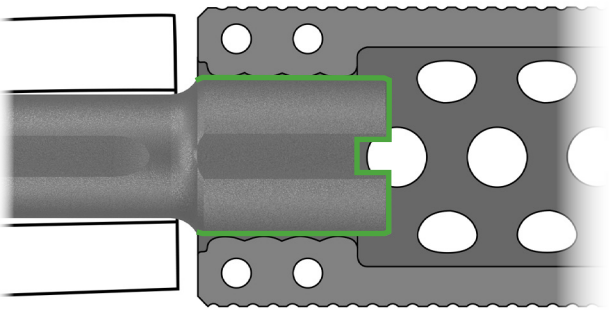


Figure 19 Nail with clamping area completely inside spacer

Caution:
When using 18 mm and 20 mm diameter nails, be sure to leave a gap between the nail and the edge of the spacer (Fig. 20).

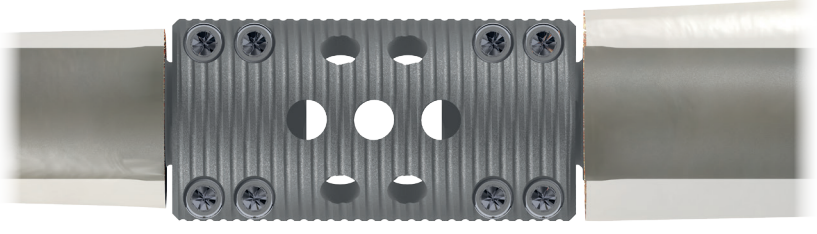
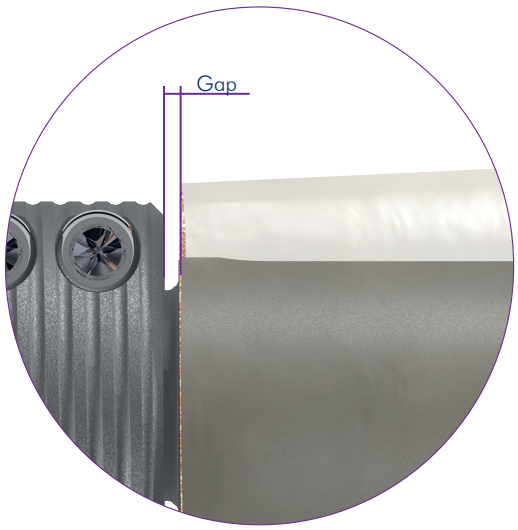


Figure 20 Gap between bone and spacer



11 Four guiding pins are included with the instruments for use in centering the spacer half-shells. Screw all four guiding pins into the outer set of threaded holes on the dorsal half-shell (Fig. 21). This is easiest when the thread-guiding half-shell has already been placed on the nails dorsally.

Guiding pins		
Tibia Humerus	M 3.5	Ref. GB90200 (Instrument basket GB90010)
Femur	M 5.0	Ref. GA90003 (Instrument basket GB90011)

Table 4

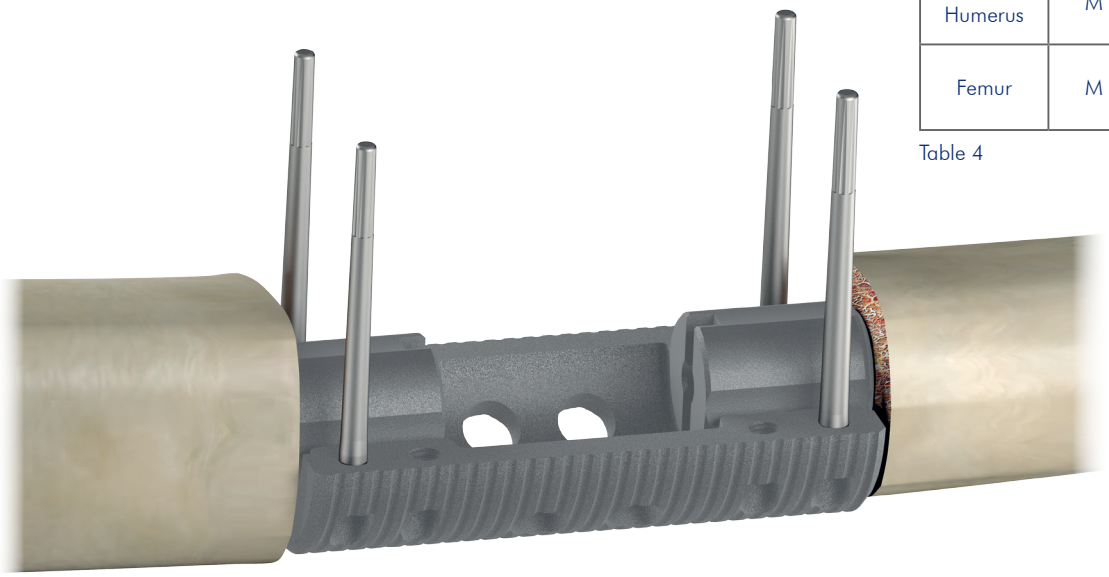


Figure 21 Guiding pins for centring the spacer half-shells

Use the Guiding pins to place the upper spacer half-shell on the nails (Fig. 22).

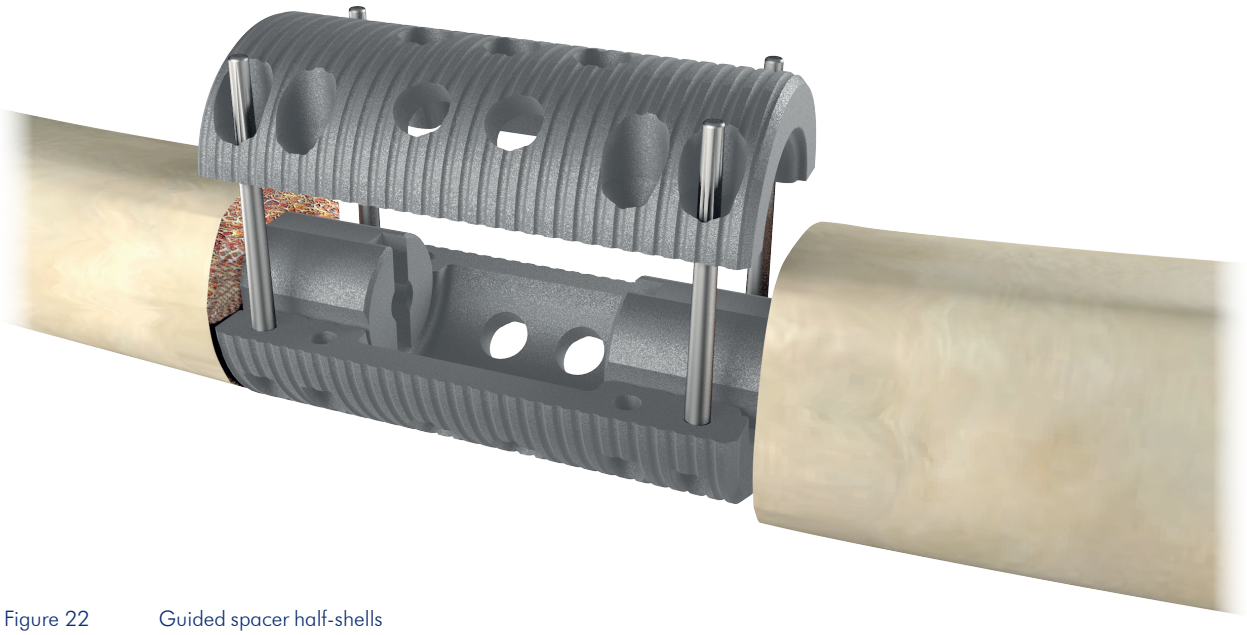


Figure 22 Guided spacer half-shells

12 The spacer can be clamped into the correct position using the included spacer clamp (Ref. GB90208). Insert the inner four clamping screws and tighten them slightly with the corresponding screwdriver (see page 9). Then remove the guiding pins and screw in the four remaining clamping screws (see page 24). Each spacer includes the eight required clamping screws as well as two reserve clamping screws.

Make sure that the markings made on the bone at the beginning are opposite one another again.

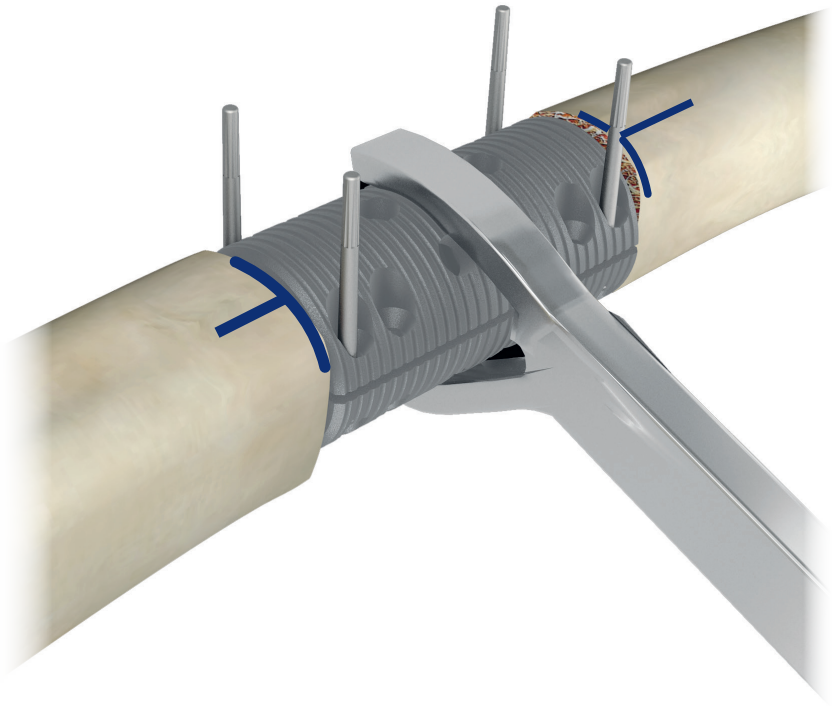


Figure 23 Secured spacer

Caution:
To position the spacer correctly using the the spacer clamp, make sure the clamp is centred on the spacer.

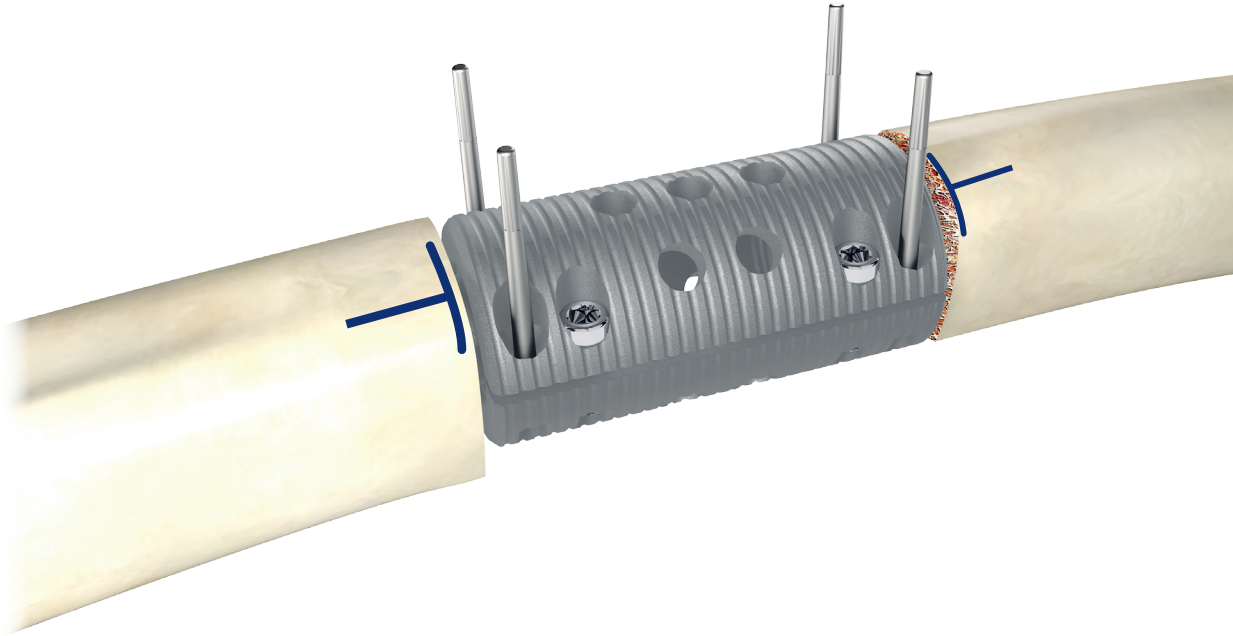


Figure 24 Using the markings to align the bone

13 The spacer half-shells must be parallel to one another. Make sure they are exactly parallel (uniform gap on both sides) before tightening the screws to the same slight extent (Figs. 25 and 26).

Note:
Accumulation of bone material on the spacer is advisable to facilitate bone bridge growth.

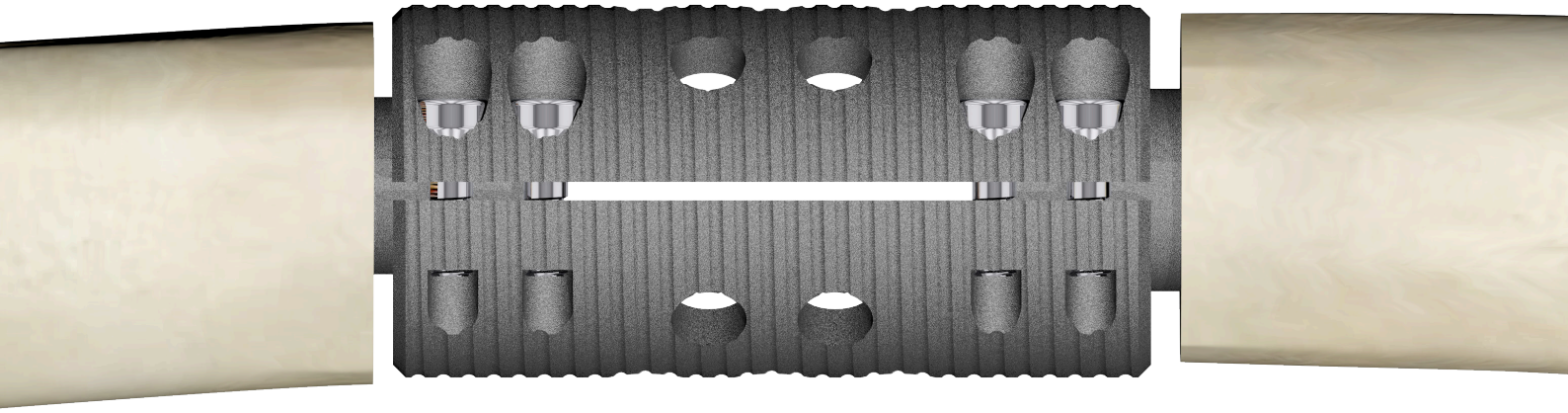


Figure 25 Correctly positioned spacer

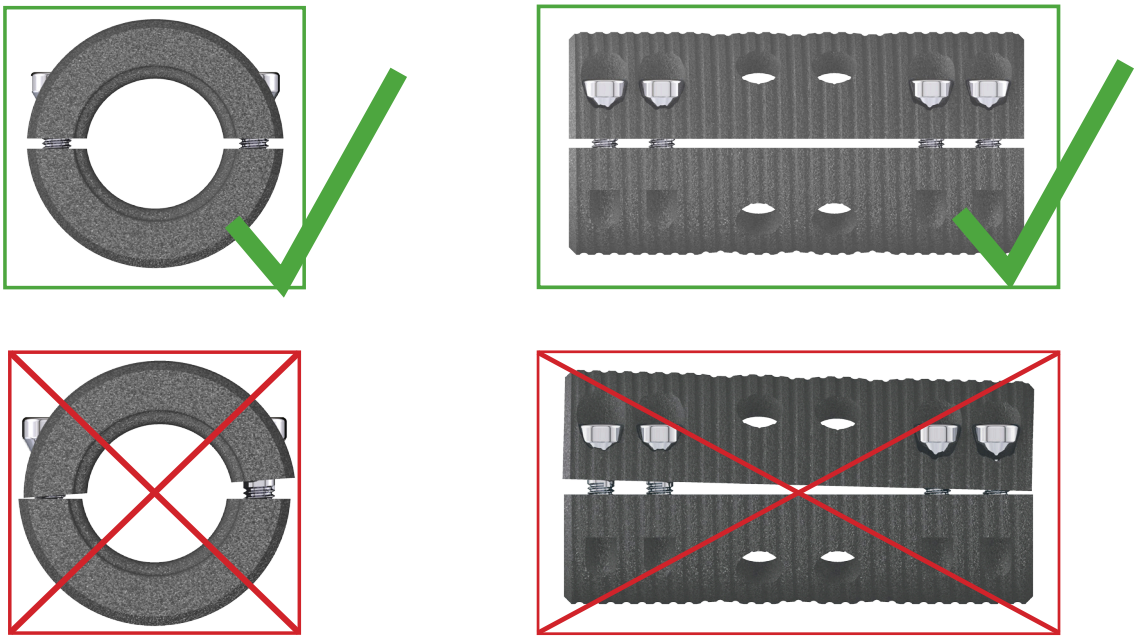


Figure 26 Correctly positioned spacer

IMPORTANT INFORMATION: TIGHTENING THE CLAMPING SCREWS

14 The clamping screws must be tightened into their final position with the corresponding torque limiter (see page 9) in accordance with the schema below, in order to ensure even spacer clamping (Fig. 27):

Figure 27 Using the torque limiter

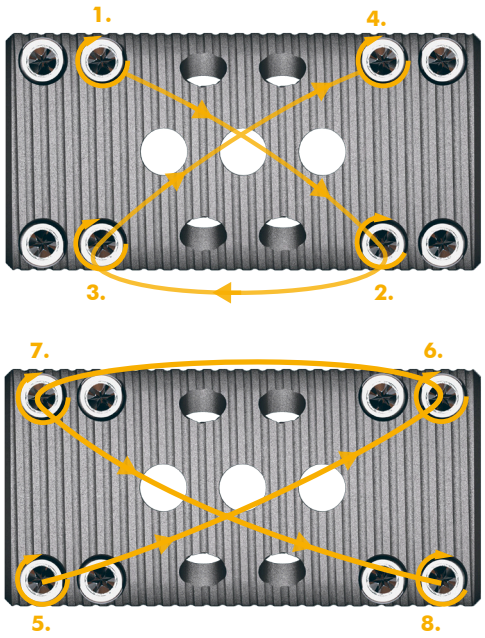


Figure 28 Sequence for tightening clamping screws

The torque limiter consists of two parts—a T-handle and a hex screwdriver—connected to one another with an AO-connector. Starting on the inside with Clamping Screw 1, tighten the screws in order crosswise (see Fig. 28). When the correct torque is reached, the torque limiter will overtwist with a "pop".

Tighten all eight screws three times in the order shown above until the correct torque has been reached.

Wound closure and post-operative care

Before closing the wound, perform and document an intra-operative X-ray check to ascertain that the implant is correctly seated (Fig. 29).

Post-operatively, it is important to ensure load reduction on the affected limb in accordance with its healing progression.

Source: Prof. C. Lohmann, University Clinic of Magdeburg

Figure 29 X-ray image of a spacer with bone overgrowth

Using reducing bushing

Nails whose outer diameters are smaller than the inner diameters of the spacer within the clamping area must be used with reducing bushing to bridge the difference in size. Reducing bushings are available for a variety of inner diameter-outer diameter combinations. Parts are colour coded to indicate how they are categorised (see pages 6-7).

Push the reducing bushing onto the clamping area of the nail (Fig. 30).

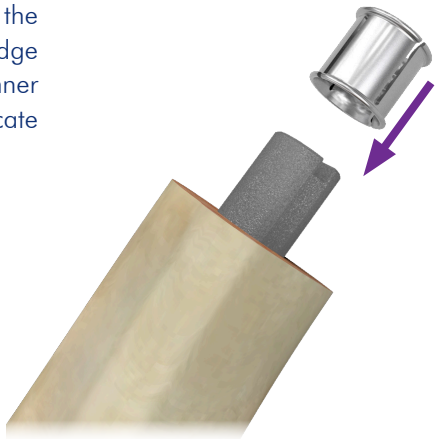


Figure 30 Using reducing bushing

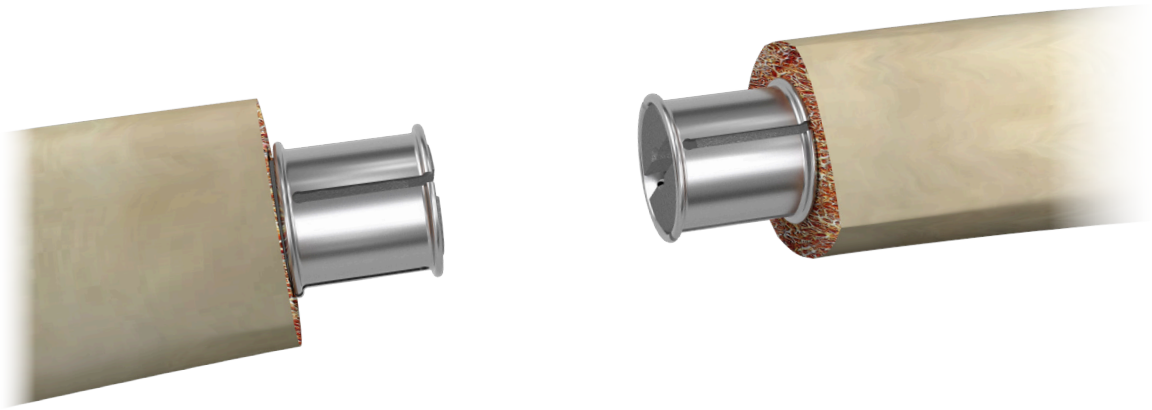


Figure 31 Reducing bushing in place

Caution:
The reducing bushing must be positioned precisely on the clamping area of the spacer, such that the edges enclose the clamping surface (Fig. 32).

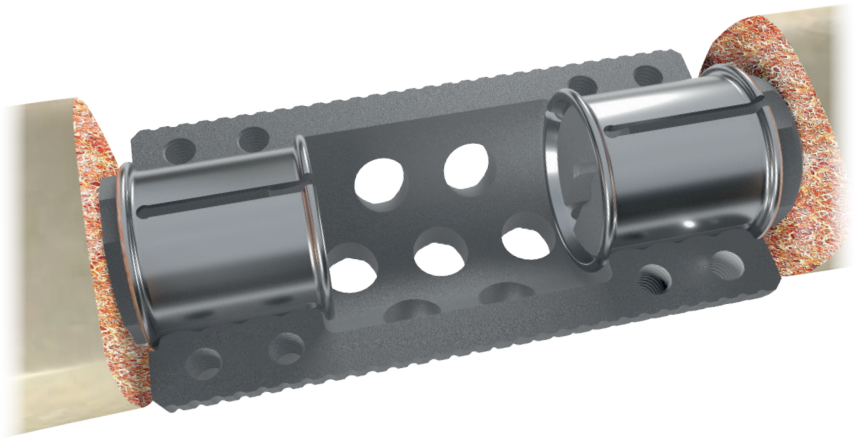


Figure 32 Reducing bushing with lower spacer half-shell

Additional surgical technique

When bridging a bone defect larger than 70 mm, two spacers may be used in combination with a **spacer connector**. Place the spacer half-shells on the connector and tighten the screws as described above (Fig. 33). The connectors are adapted to the spacers' respective inner diameters. Use the colour coding to determine the correct connector. It is advisable to screw one spacer into place completely, and then begin fitting the second spacer.

Figure 33 Two spacers connected by a spacer connector

OsteoBridge™ Diaphysis system revision

Revision of the OsteoBridge™ Diaphysis system requires basket GB90006. Start by removing all clamping screws from the spacer (Fig. 34), and then remove the upper and lower spacer half-shells (Fig. 35).

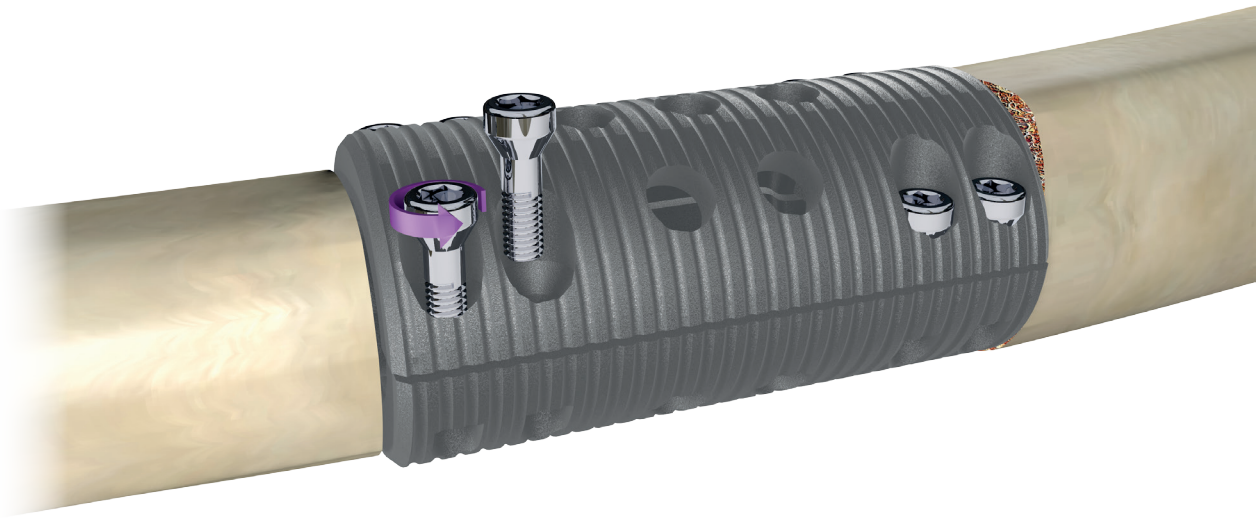


Figure 34 Removing the clamping screws

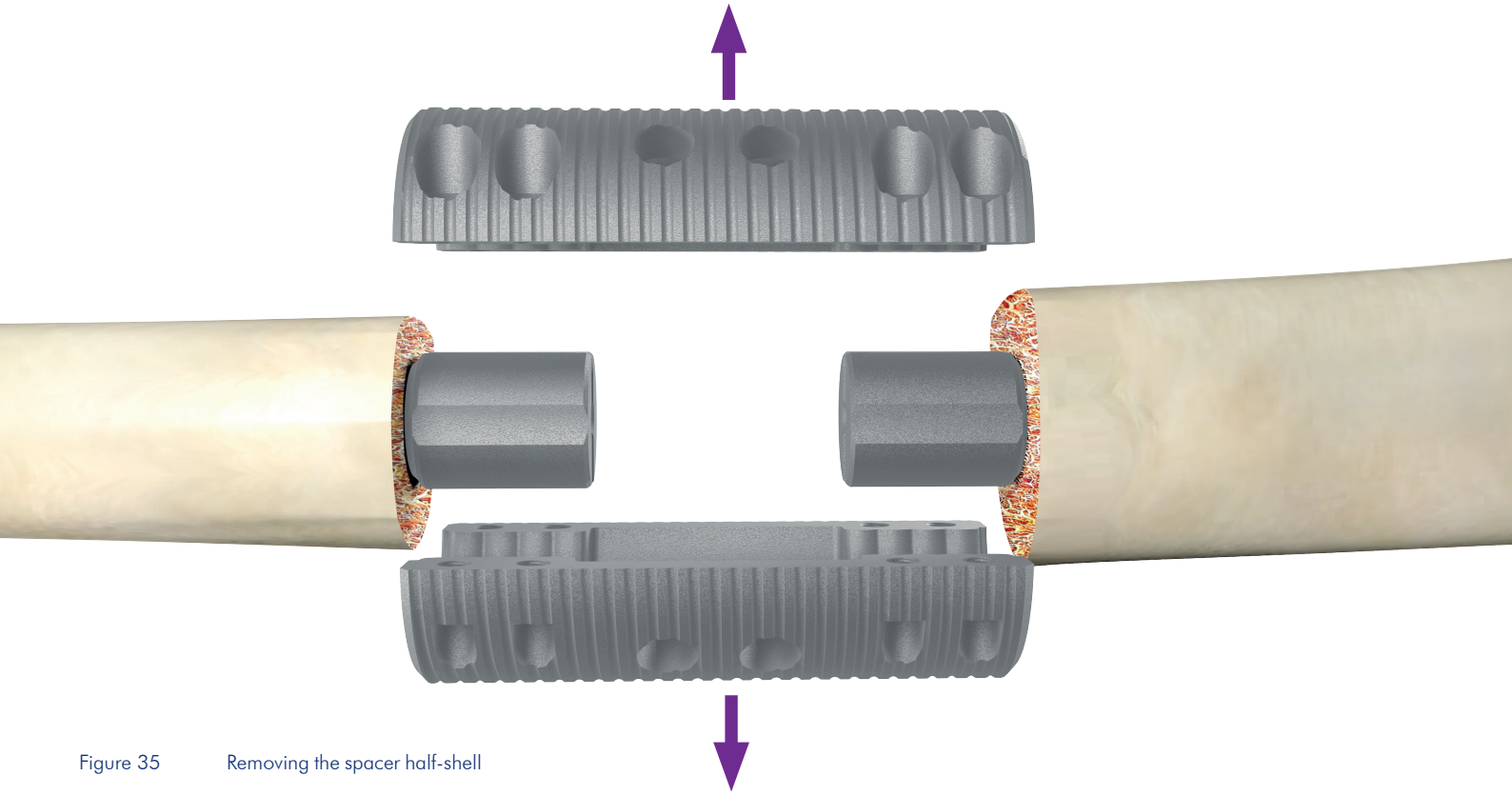


Figure 35 Removing the spacer half-shell

Before extracting the implanted nails, it is important to remove all of the locking screws (Fig. 36). After that, screw the extractor (Ref. GB90203) into each nail (Fig. 41) and tap it out with the slotted hammer (Ref. AI00048) to remove it (Fig. 38).

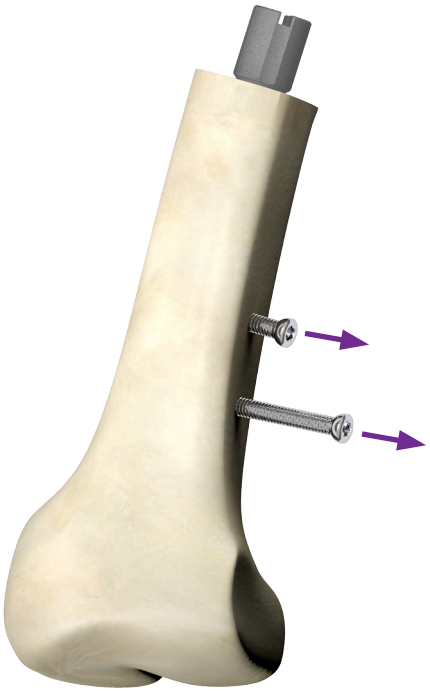


Figure 36 Removing locking screws

Caution:
Use only the implant extractor (Ref. GB90203) to extract implanted nails.

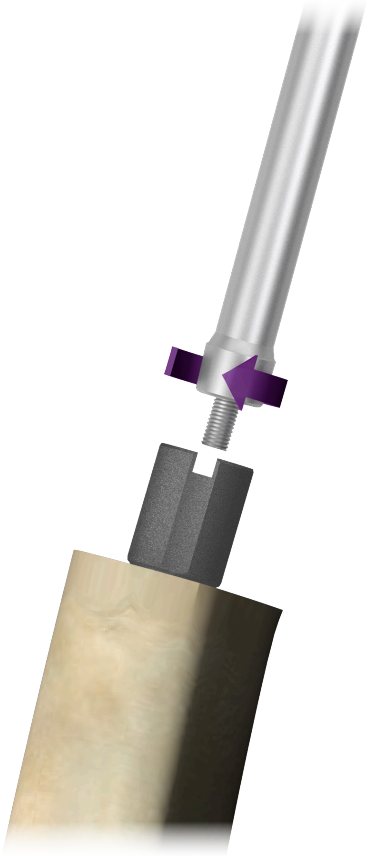


Figure 37 Screwing in the extractor

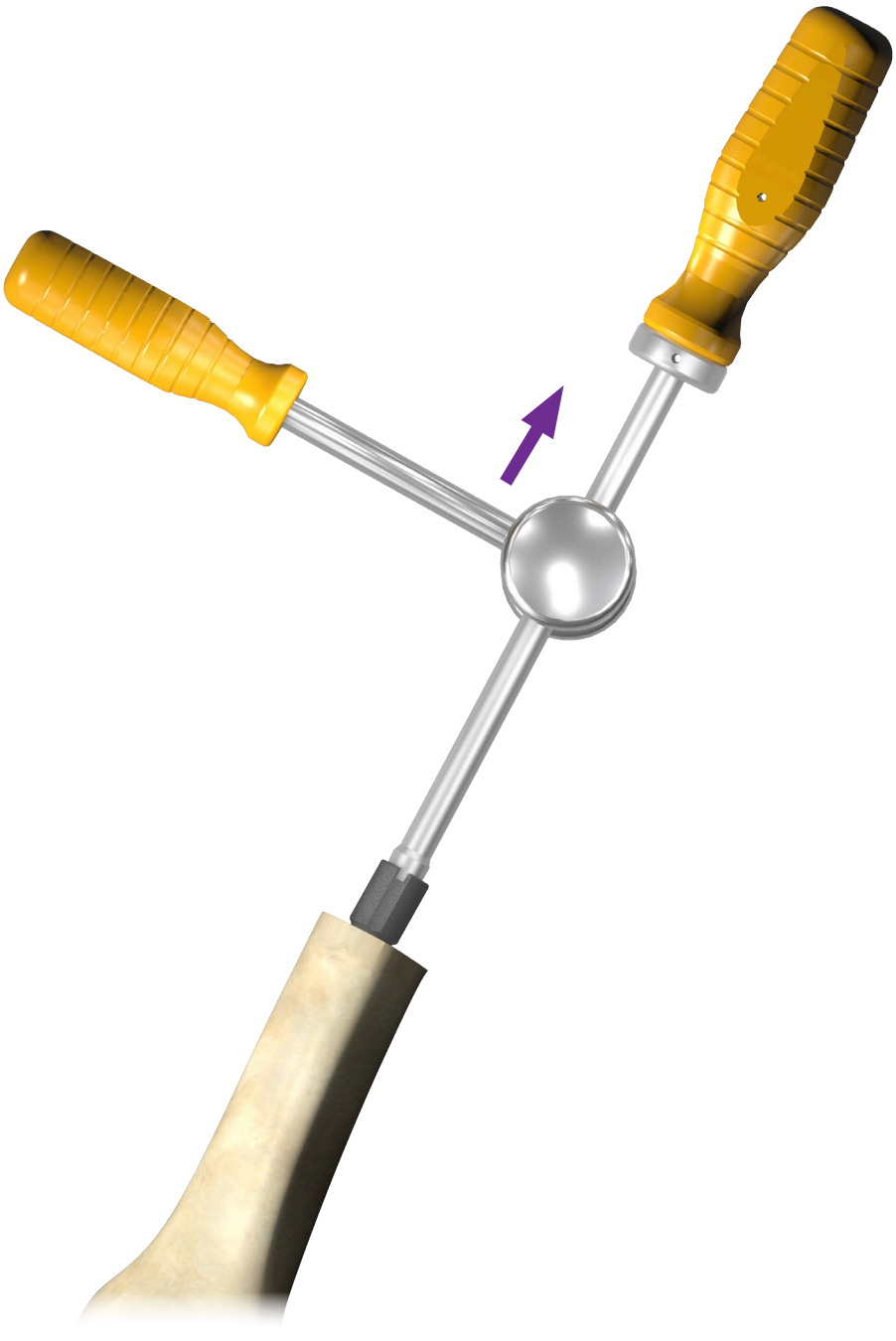
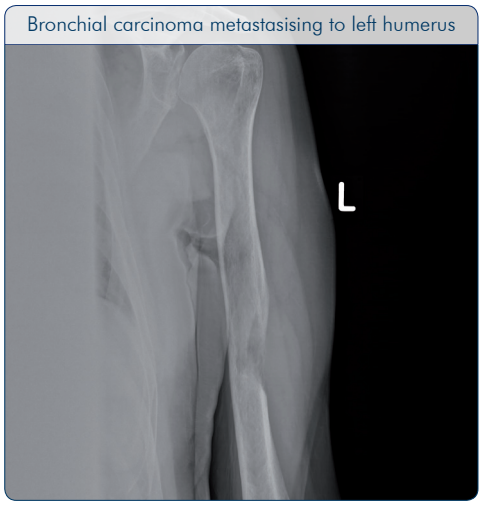


Figure 38 Extracting the nails

Case studies

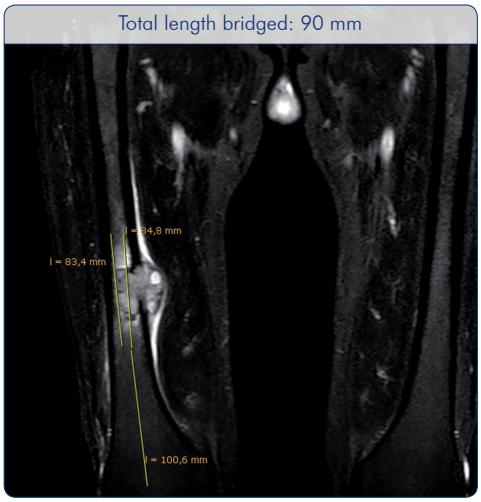
- Case studies - Tumours / Trauma

Case 1



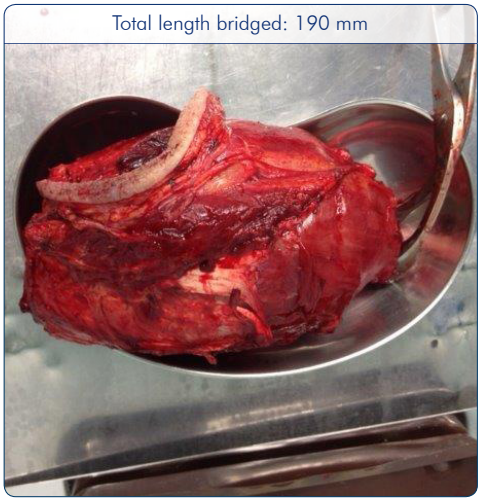
Merete GmbH would like to thank **Dr. med. Jens Dargel, University Hospital of Cologne**, for kindly providing X-ray images

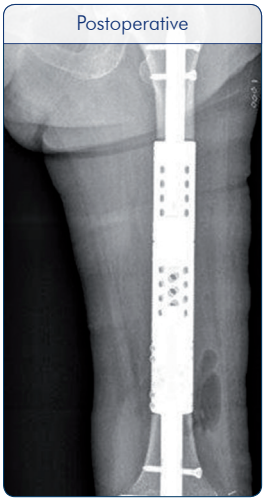
Case 2



Merete GmbH would like to thank **Univ. Prof. Dr. med. Dieter C. Wirtz, University Hospital of Bonn**, for kindly providing X-ray images

Case 3





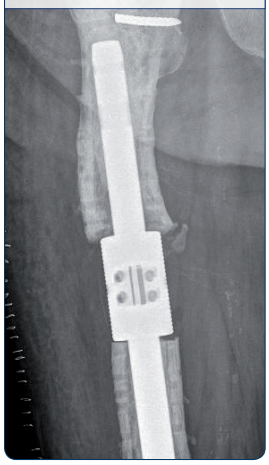
Merete GmbH would like to thank **Dr. med. Marcus Tonak, University Hospital of Mannheim**, for kindly providing X-ray images

- Case studies - Infection

Case 1

Pseudarthrosis, treatment using nails and plate osteo-synthesis (broken)

Postoperative, proximal

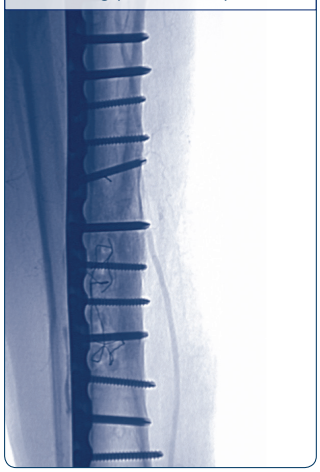


Postoperative, distal

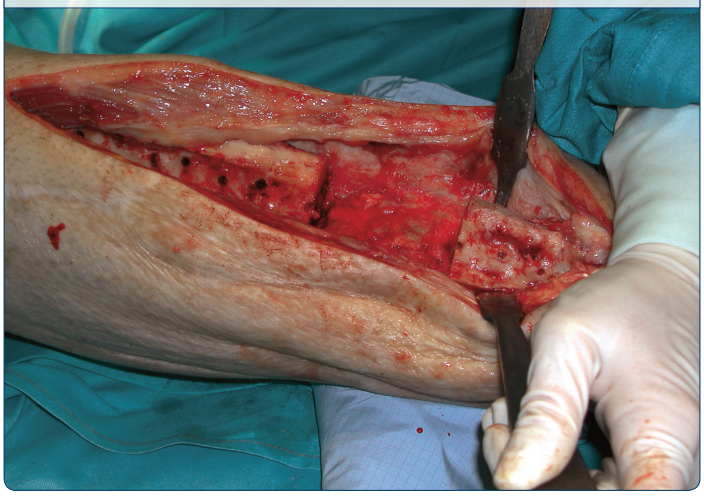
Merete GmbH would like to thank **PD. Dr. med. Reiner Wirbel, Bernkastel / Wittlich Hospital Association** , for kindly providing X-ray images**.**

Case 2

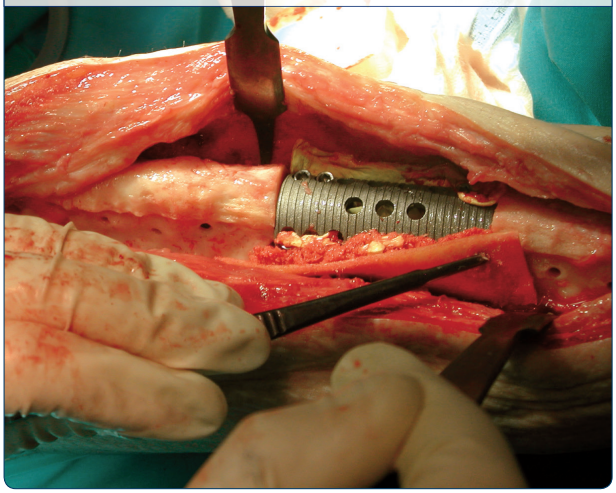
Osteomyelitis of the lower leg following plate osteosynthesis



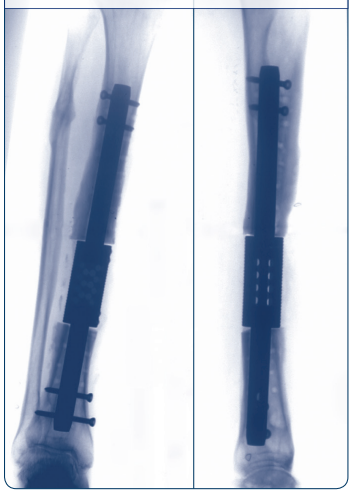
Resection of the affected area



70 mm spacer to bridge the defect



1 year postoperative



Merete GmbH would like to thank **Dr. med. Reinhold A. Laun, Vivantes Hospital of Neukölln** , for kindly providing X-ray images**.**

References

Benevenia, J., B. Himpe, M. Friedrich, M. J. Palma, K. S. Beebe, F. R. Patterson and R. Kirchner (2013). Early Results of Modular Intercalary Endoprosthesis used in Musculoskeletal Tumors. MSTS. San Francisco. **25**.

Benevenia, J., R. Kirchner, F. Patterson, K. Beebe, D. C. Wirtz, S. Rivero, M. Palma and M. J. Friedrich (2015). "Outcomes of a Modular Intercalary Endoprosthesis as Treatment for Segmental Defects of the Femur, Tibia, and Humerus." Clin Orthop Relat Res.

Calabrò, T., G. Drago, A. F. Mavrogenis, M. Romantini, G. Ussia, P. Ruggieri and M. Mercuri (2010). "Oral Communications." Journal of Orthopaedics and Traumatology **11**(1): 1-20.

Chou, K. (2010). The evaluation of the intercalary prosthetic device in musculoskeletal oncology: a retrospective analysis. K. Beebe and J. C. Neilson. New Jersey, New Jersey Medical School Cancer Summer Student Research Program

Friedrich, M. J., J. Schmolders, G. Lob, T. M. Randau, S. Gravius, D. C. Wirtz and P. H. Pennekamp (2015). "[Intercalary reconstruction for diaphyseal bone defects with a modular replacement system: Clinical results]." Oper Orthop Traumatol **27**(5): 455-462.

Friedrich, M. M., G. M. Lob, S. M. Gravius, D. M. Wirtz and P. M. Pennekamp (2014). Clinical Results of Intercalary Reconstruction Used in Musculoskeletal Tumors. MSTS Annual Meeting. Houston, Texas.

Heppert, V., P. Herrmann, P. Thoele, M. Pelzer and C. Wagner (2009). "Weichteilmanagement und knöcherne Rekonstruktion." Trauma und Berufskrankheit **11 [Suppl 2]**: 211-216.

Heppert, V., D. Kotsougiani, L. Kolios and M. Lehnhardt (2012). "Curse or blessing: how much reconstruction and when amputation?" Trauma und Berufskrankheit **14**(2): 128-136.

Lob, G., V. Heppert, R. Laun, T. Lob and L. Rabenseifner (2009). "Bridging of Diaphyseal Bone Defects with a Modular Intermedullary Spacer System." Journal of Bone & Joint Surgery, British Volume **91-B**(SUPP I): 21.

Mavrogenis, A. F., V. I. Sakellariou, H. Tsibidakis and P. J. Papagelopoulos (2009). "Adamantinoma of the tibia treated with a new intramedullary diaphyseal segmental defect implant." J Int Med Res **37**(4): 1238-1245.

Mietzner, J. (2004). Biomechanische Analyse eines Diaphysenresektionsimplantats. Diplom-Ingenieur, Fachhochschule Lübeck.

Quinn, R. H., R. L. Randall, J. Benevenia, S. H. Berven and K. A. Raskin (2013). "Contemporary Management of Metastatic Bone Disease: Tips and Tools of the Trade for General Practitioners." The Journal of Bone & Joint Surgery **95**(20): 1887-1895.

Ruggieri, P., T. Calabrò, J. D. Valencia, A. Mavrogenis, M. Romantini, G. Guerra and M. Mercuri (2012). "Humeral Metastases Treated with Resection and Prosthetic Reconstruction: A Prognostic and Functional Analysis of 67 Patients." Journal of Bone & Joint Surgery, British Volume **94-B**(SUPP XXXVII): 187.

Ruggieri, P., A. F. Mavrogenis, G. Bianchi, V. I. Sakellariou, M. Mercuri and P. J. Papagelopoulos (2011). "Outcome of the intramedullary diaphyseal segmental defect fixation system for bone tumors." J Surg Oncol **104**(1): 83-90.

Ruggieri, P., E. Pala, T. Calabrò, C. Romagnoli, M. Romantini, R. Casadei, C. Abati and M. Mercuri (2012). "Surgical Treatment of the Femur for Metastases: An Analysis of Implant and Oncological Survival Comparing Nailing Versus Prosthetic Replacement." Journal of Bone & Joint Surgery, British Volume **94-B**(SUPP XXXVII): 181.

Ruggieri, P., E. Pala and M. Mercuri (2012). "Prosthetic Reconstruction of the Extremities in Musculoskeletal Oncology: The Experience of the Istituto Rizzoli." Journal of Bone & Joint Surgery, British Volume **94-B**(SUPP XXV): 196-196.

Sakellariou, V. I., A. F. Mavrogenis, G. C. Babis, P. N. Soucacos, E. A. Magnissalis and P. J. Papagelopoulos (2012). "Comparison of four reconstructive methods for diaphyseal defects of the humerus after tumor resection." J Appl Biomech **28**(5): 568-578.

Sakellariou, V. I., A. F. Mavrogenis and P. J. Papagelopoulos (2008). "Limb salvage surgery using the intramedullary diaphyseal segmental defect fixation system." J Long Term Eff Med Implants **18**(1): 59-67.

Sakellariou, V. I., A. F. Mavrogenis and P. J. Papagelopoulos (2009). Intramedullary Diaphyseal Segmental Fixation System for Limb Salvage after Tumour Resection. MSTS Annual Meeting. Boston.

Unger A, S. B., Kirchner R. (2011). "Ein neuartiges modulares diaphysäres Verriegelungs-Spacer System (Osteobridge) zur operativen Therapie bei der Behandlung von Metastasen langer Röhrenknochen – Zwei Fallberichte." 128. Kongress der Deutschen Gesellschaft für Chirurgie.

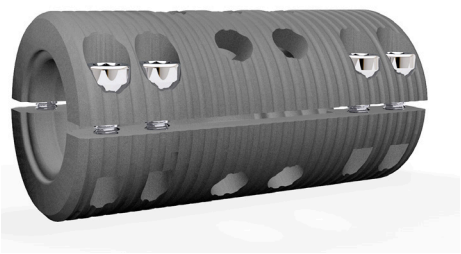
Yang, C., K. Templeton, P. Moodie and T. McIff (2011). Biomechanical Testing of Implants for Segmental Defects of the Humeral Diaphysis: Intercalary Spacers vs. Intramedullary Nails. ORS - Annual Meeting. Long Beach, CA.

Yildiz, C., K. Koca, Y. Yurttas, T. Ege and H. Özkan (2013). "Successful management of femur pseudarthrosis with OsteoBridge spacer system: a case report." Injury, Int. J. Care Injured **44S2**: 37-46.

Zißelsberger, M. (2006). Biomechanisch-experimentelle Untersuchungen von Diaphysenresektionsimplantaten. Diplom-Ingenieur, Fachhochschule München.

Ordering information

▶ OsteoBridge™ Diaphysis Implants



Spacer (incl. 8+2 Screws), sterile			
Length	**20 mm diameter**	**Ø25 mm diameter**	**Ø34 mm diameter**
40 mm	GB02004	GB02504	GB03404
50 mm	GB02005	GB02505	GB03405
60 mm	GB02006	GB02506	GB03406
70 mm	GB02007	GB02507	GB03407

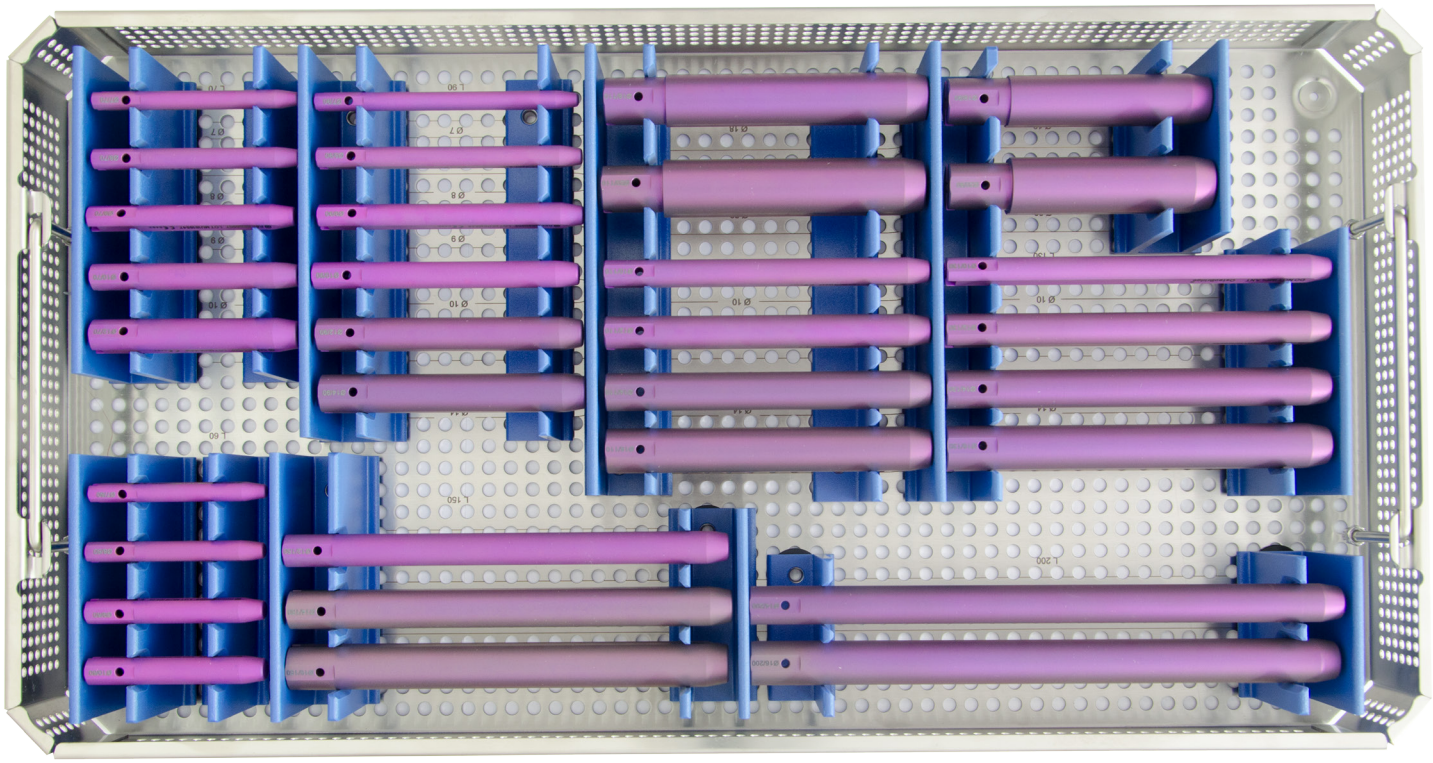
Reducing bushing, sterile		
Nail diam./Spacer diam.	**Für Nail diam.**	**Ref.**
7/20	7 mm	GB21007
8/20	8 mm	GB21008
9/20	9 mm	GB21009
8/25	8 mm	GB21408
9/25	9 mm	GB21409
10/25	10 mm	GB21410
12/25	12 mm	GB21412

Spacer Connector for Spacer, sterile	
Diameter	**Ref.**
20 mm	GB40020
25 mm	GB40025
34 mm	GB40034

Interlocking screw 3.8 mmdiamter, sterile	
Length	**Ref.**
18 mm	GB33818S
20 mm	GB33820S
22 mm	GB33822S
24 mm	GB33824S
26 mm	GB33826S
28 mm	GB33828S
30 mm	GB33830S
32 mm	GB33832S

Interlocking screw 5.0 mmdiamter, sterile	
Length	**Ref.**
20 mm	GB35020S
22 mm	GB35022S
24 mm	GB35024S
26 mm	GB35026S
28 mm	GB35028S
30 mm	GB35030S
32 mm	GB35032S
34 mm	GB35034S
36 mm	GB35036S
38 mm	GB35038S
40 mm	GB35040S
42 mm	GB35042S
44 mm	GB35044S
46 mm	GB35046S
48 mm	GB35048S
50 mm	GB35050S
52 mm	GB35052S
54 mm	GB35054S
56 mm	GB35056S
60 mm	GB35060S
65 mm	GB35065S

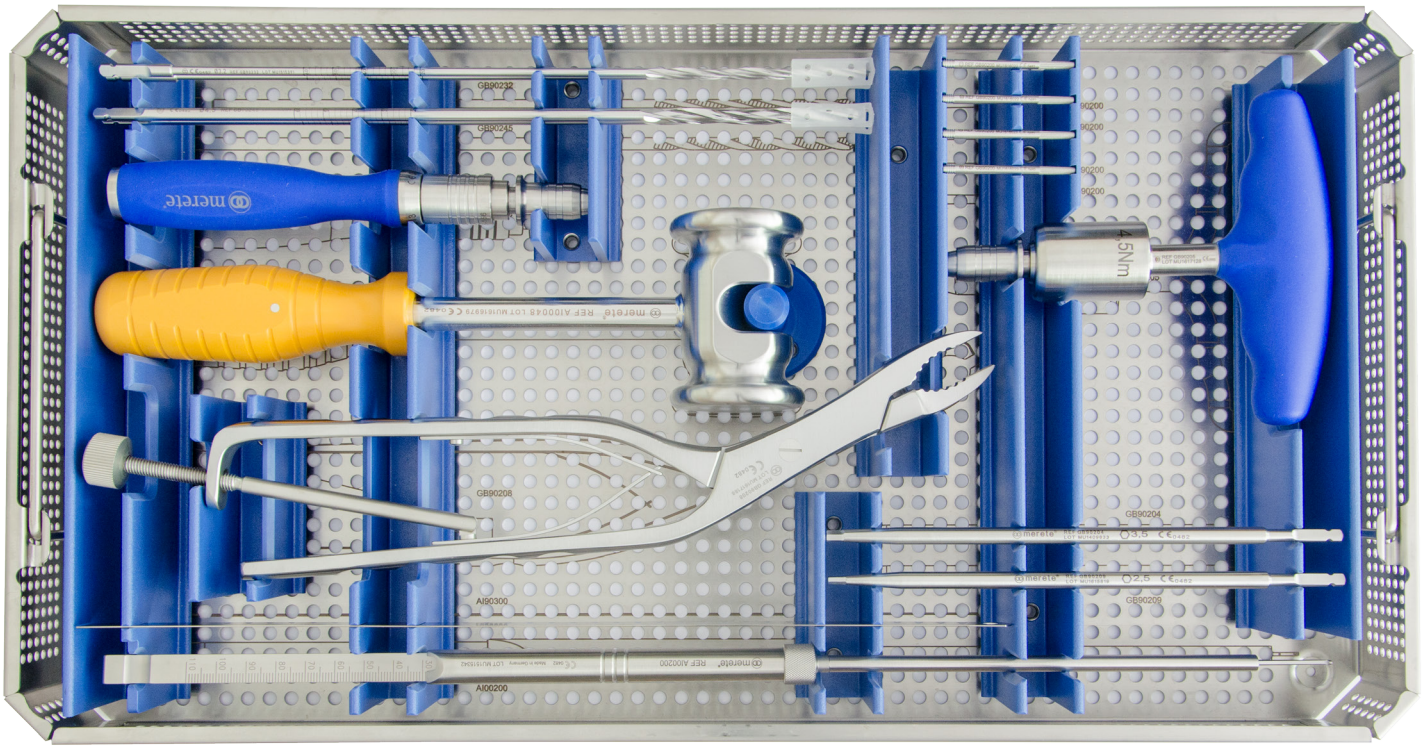
OsteoBridge™ Diaphysis Trial nails



Ref.	Description
GB90008	**OsteoBridge™ Trial Nail Tray**

Diameter /Length	7 mm diam.	8 mm diam.	9 mm diam.	10 mm diam.	12 mm diam.	14 mm diam.	16 mm diam.	18 mm diam.	20 mm diam.
60 mm	GB90706	GB90806	GB90906	GB91006	-	-	-	-	-
70 mm	GB90707	GB90807	GB90907	GB91007	GB91207	-	-	-	-
90 mm	GB90709	GB90809	GB90909	GB91009	GB91209	GB91409	-	GB91809	GB92009
110 mm	-		-	GB91011	GB91211	GB91411	GB91611	GB91811	GB92011
130 mm	-		-	GB91013	GB91213	GB91413	GB91613	-	-
150 mm	-		-	-	GB91215	GB91415	GB91615	-	-
200 mm	-		-	-	-	GB91420	GB91620	-	-

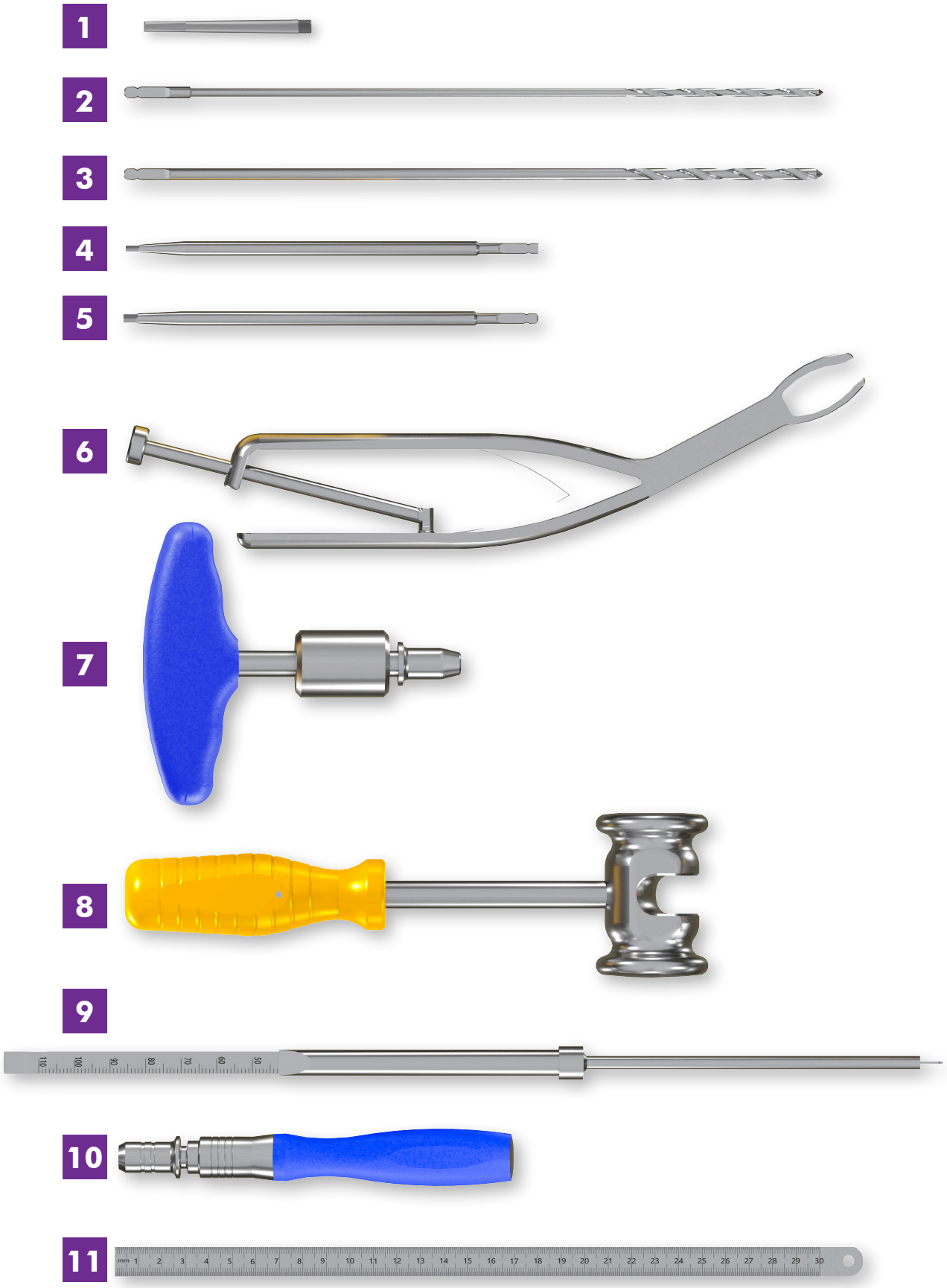
OsteoBridge™ Diaphysis Instrument tray

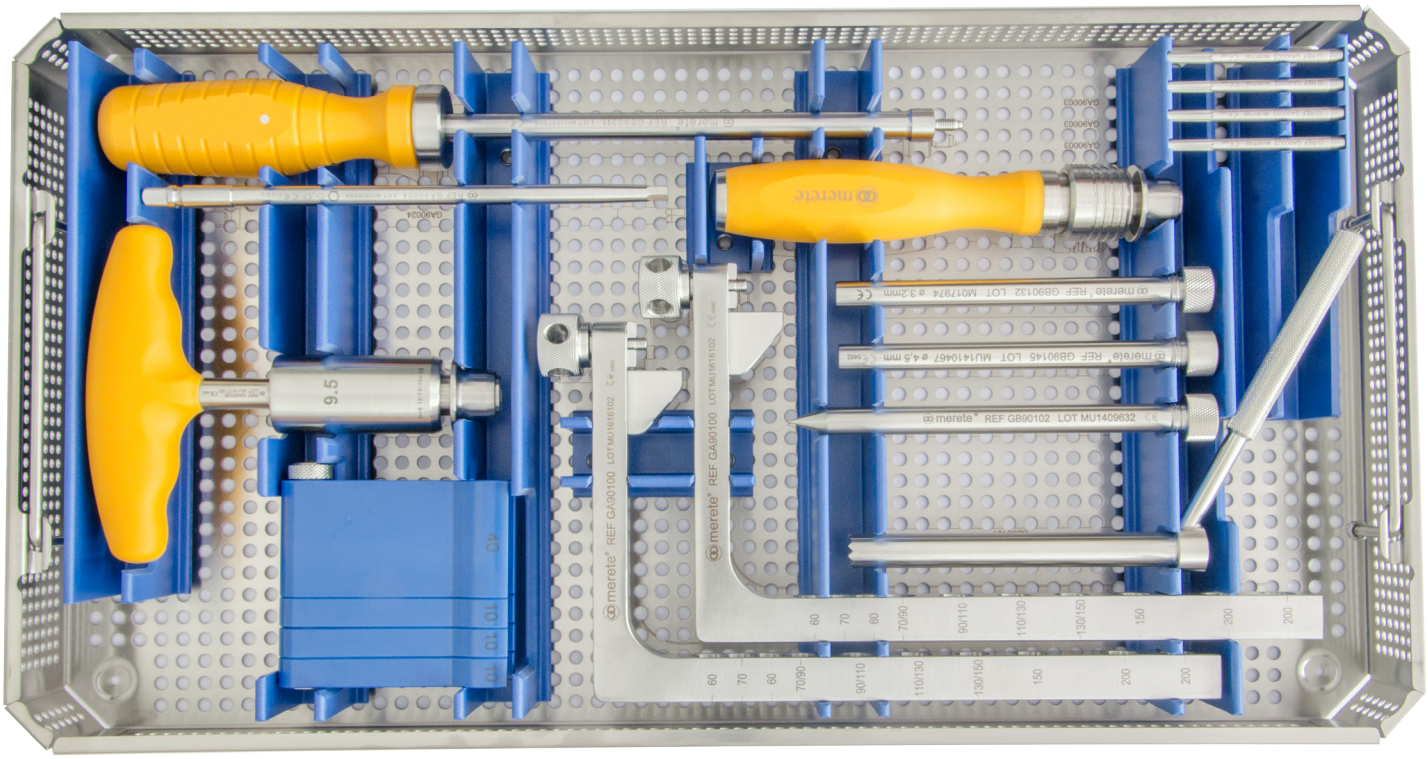


Ref.	Description
GB90010	**OsteoBridge™ Diaphyse Instrument tray 1**

Nr.	Ref.	Description	Qty.
1	GB90200	Guiding Pin M3.5	4
2	GB90232	3.2 mm diam. Drill with AO-connector for 3.8 mm diam. Interlocking screws 5.0 mm diam.	2
3	GB90245	4.5 mm diam. Drill with AO-Anschluss for 5.0 mm diam. Interlocking screws and Clamping screws	2
4	GB90204	Hex 3.5 mm Screwsdriver with AO-connector for 3.5 mm diam. Clamping screws	1
5	GB90209	Hex 2.5 mm Screwsdriver with AO-connector for 3.8mm diam. Interlocking screws	1
6	GB90208	Spacer clamp	1
7	GB90205	Torque Limiter with T-handle and AO-connector 4.5 Nm for Clamping screws 3.5 mm diam.	1
8	AI00048	Slotted hammer	1
9	AI00200	Depth Gauge	1
10	GB90213	Handle with ratchet and AO-connector small for Hex. 2.5 mm and Hex. 3.5 mm Screwdriver	1
11	AI90300	300 mm Steel ruler	1

Please have intramedullary reamer ready at hand, if needed


1
2
3
4
5
6
7
8
9
10
11



Ref.	Description
GB90011	**OsteoBridge™ Diaphyse Instrument tray 2**

Nr.	Ref.	Description	Anzahl
1	GA90100	Nail Guiding / Impacting Instrument	2
2	GB90101	Protection Sleeve	1
3	GB90212	Spacer Gauge	1
4	GB90211	Extractor short for Trial Nails	1
5	GB90132	Drill Sleeve for 3.2 mm diam. drill	1
6	GB90145	Drill Sleeve for 4.5 mm diam. drill	1
7	GB90102	Trocar	1
8	GB90210	Handle with ratchet and 1/4"-connector for Hex. 5.0 mm Screwdriver	1
9	GA90003	Guiding Pin M5.0	4
10	GA90024	Hex 5.0 mm Screwsdriver with 1/4"-connector for 5.0 mm diam. Clamping Screws	1
11	GA90026	Torque Limiter with T-handle and 1/4"-connector 9.5 Nm for 5.0 Clamping Screws	1


1
2
3
4
5
6
7
8
9
10
11

merete®

HDB0038-1116, Subject to alterations

Merete GmbH
Alt-Lankwitz 102
12247 Berlin, Germany
Tel.: +49 (0)30 77 99 80 - 0
Fax: +49 (0)30 76 68 03 61
Email: service@merete.de
www.merete-medical.com

Version: 11/2016 Subject to change