BPK-S INTEGRATION

REVISION KNEE SYSTEM

SURGICAL TECHNIQUE

PETER BREHM
Die Präzision in Titan
für den Menschen

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BPK-S INTEGRATION

PRODUCT DESCRIPTION

BPK-S Integration
A single system for every indication

Introduction

The Unconstrained (UC) version with the „Fix“, „Mobile“ and „Deep Dish“ insert types predominantly used in primary indications has been amended by Semi-Constrained (SC), Rotating Hinge (RH) and Total Hinge (TH) designs. The intercondylar cam and spine mechanism provides varus/valgus stabilization in the presence of moderate medio-lateral instability.
With the Rotating and Total Hinge (RH/TH) systems, in addition two hinged knee variants for the treatment of high-grade instabilities are available.

The required degree of constraint is selected depending on the initial ligamentary situation and joint stability. Due to the uniform cutting geometry and outer contour of the femoral implant components, the primary and revision components are compatible and convertible to a large extent. Thus, the system can be adapted intraoperatively to the individual soft tissue and defect situation at any time during surgery. PETER BREHM GmbH supplies the implants of the BPK-S Integration system in a sterile condition. Sterile products are gamma sterilized in the final packaging.

! NOTE

- Do not use implants or instruments whose packaging is damaged.
- Do not use implants or instruments whose use-by date is exceeded.
- Check the use-by-date and the integrity of the sterile packaging.
- Do not resterilize and/or repack implants or instruments delivered sterile.
- Return products with expired use-by date to PETER BREHM GmbH.
- The implants and Single-Use Instruments are approved for single use only, do not re-use!

The hinge mechanism of the RH and TH systems has a modular design and is reproducibly secured intraoperatively with a torque of 25 Nm. Distraction of the joint during implantation or possible explantation is not necessary.

! NOTE

To ensure safe instrumentation when securing the implant components, the following instruments must be replaced after 15 applications by quality assurance of PETER BREHM GmbH.

- Torque Limiter 25±1 Nm
- Torque Key 25 Nm

If necessary, please contact a representative authorised by PETER BREHM.

Stabilising medullary stems, which are coupled to the joint components via a stem adapter, are required for secure implant anchorage with Semi-Constrained (SC), Rotating Hinge (RH) or Total Hinge (TH). The coupling of the stem adapters on the femoral components adjusts the implant in 6° of valgus. Various offset options enable to compensate patient-specific anatomical variances between bony structures close to the joint and the medullary cavity. The medullary stems and adapters are securely clamped intraoperatively with a defined torque of 25 Nm.

For the compensation of bony defects, the system offers a variety of different augment variants. While the joint components with or without augments require cement, the medullary stems are available in different lengths and diameters for dedicated cemented or cementless applications. While all cemented components are made of CoCr alloys, the cementless stems are made of Ti4Al6V. The surfaces of the cementless stems are rough blasted.

! NOTE

When using bone cement, user information of the cement manufacturer must be observed. Ensure, the bony implant site is fully cemented and the surface of the implant is dry and clean.

Implant variants and possible combinations are described in detail in the system overview (chapter III System information).

Preoperative planning

The most important goals in revision knee arthroplasty besides pain relief are the restoration of the desired alignment with correct rotation of the components, the functional stability of the joint, the preservation of the function of the extensor mechanism, a permanently secure anchorage of the implant components and the restoration of the joint line.

! NOTE

- The selection of the correct implant type is extremely important for the medical success of a treatment. The use of an implant type disproportionate for the specific situation may result in accelerated clinical failure, such as implant loosening, crack formation and fracture of the implant and/or bone.
- The BPK-S Integration knee system can only be combined with products approved by PETER BREHM GmbH.
- Only perform revisions after ceramic implant failure with all-ceramic implants.

As in all arthroplasties, preoperative planning is essential. This is done using A/P- and M/L-radiographs supplemented by a full-length standard view of the lower limb. Preoperative radiographs as well as radiographs of the contralateral side, which may not have had previous surgery, should also be consulted.

! NOTE

The correct selection of the implant type (size, shape, composition, etc.) can reduce risks such as loosening. Especially in case of using stem offset, preoperative planning by the use of analogue or digital X-Ray templates in 2 planes is essential to match offset settings to the anatomical bone structure.

Allowing for correct axial alignment of the stem within the medullary canal, one can use the lateral radiographs to estimate the size of the femoral component for the reconstruction of the posterior femoral offset and to determine whether posterior augments are indicated for this size of component. Selecting a shorter stem can shift the femoral component back from an overly anterior position and correct an excessively wide joint space in flexion.

Planning the correct position of the femoral joint line is often difficult. The measurements relative to the various landmarks that are discussed in the literature have the obvious disadvantage of varying greatly depending on size and gender. Therefore, certain groups of authors have proposed formulas for calculating the distance from various landmarks to the joint line. These have the advantage of allowing for size and gender-specific differences among patients[1,2]. The goal for restoring the joint line for the best possible functional results is specified in the literature as a range of ± 4 mm[3]. Appropriate distal augments are available for restoring the joint line.

[1] Maderbacher G. et al.: Accuracy of bony Landmarks for restoring the natural Joint Line in Revision Knee Surgery: an MRI Study. Int Orthop. 2014 Jun; 38(6): 1173-81
[2] Servien E. et al.: Reliability of bony landmarks for Restoration of the Joint Line in Revision Knee Arthroplasty. Knee Surg Sports Traumatol Arthrosc. 2008 Mar; 16(3): 263-9
[3] Hofmann AA et al.: Clinical and Radiographic Analysis of Accurate Restoration of the Joint Line in Revision Total Knee Arthroplasty. The Journal of Arthroplasty, Volume 21, Issue 8, December 2006, Pages 1154-1162

Similar information applies to planning the tibial component. Allowing for the axis of the stem, one can estimate the required component size and any required offset in both planes. The osteotomy planes can be planned and the necessity of medial and lateral augments to restore the tibial joint line can be estimated.

The thickness of the plateau (4.5 mm) and the minimum height of the insert (7 mm) must be taken into account for the tibial planning. The distal resection level for the BPK-S Integration FEMUR Components (UC, SC, and RH/TH) is 9 mm. Therefore, a minimal resection of about 9 mm is required on the distal femur when using an intramedullary technique in a primary procedure.

Approaches

! NOTE

No special positioning of the patient and no special access for the implant is required. The surgeon is free to choose his preferred access, but must follow the given surgical steps for implantation and modify them for his selected access.

Surgical technique

The following surgical technique describes the medullary guided technique for implantation of Semi-Constrained (SC) and Rotating or Total Hinge (RH and TH) components for both, revision and complex primary situations.

! NOTE

- Avoid surface damage such as scratches and impact points that could be caused by chisels, hammers, luers, clamps, etc., as well as contact or sparks from electrosurgical instruments.
- Ensure strict axial access to the medullary canal throughout the surgery to avoid transverse forces on the instruments.
- In the interest of reliable instrumentation, avoid placing shear forces on instruments during the entire operation. Lateral forces can damage instruments or impair their function - in particular on torque limiters.
- Observe correct handling of implant components and instruments.
- Do not use implants/trial implants/instruments with visible damage.
- Instruments and trial implants must be checked for fatigue fretting and correct handling/function prior to surgery.
- Use only implants/trial implants/instruments without visible contamination
- Handle implants/trial implants/instruments exclusively with sterile surgical gloves.
- Do not touch rough surfaces with cloths or any linting materials.
- Observe the right/left variants.

After opening and preparing the tibial and femoral medullary canal, cutting gauges are aligned via stably anchored reamers or reference stems and the sizes of the implants with offset setting and possible augments are determined.

! NOTE

If for positioning of the *Tibial Base Plate* or the *Femoral cutting block A/P* an offset is required, an Adapter with offset must also be used for the trial and the final implant as well. The offset range and setting is read from the *Centraliser Bushing* or the *Adapter Femur* and transferred to the trial or the final implant.

To perform the bone cuts, surgically invasive disposable *Saw blades* from PETER BREHM GmbH are connected to an active medical device (oscillating saw). To ensure usability, the *Saw blades* have common machine connections. All *Saw blades* are to be used only in the appropriate and suitable handpieces/drives according to the instructions of the handpiece/drive manufacturers.

! NOTE

Only use PETER BREHM GmbH Saw blades for bone resection, the thickness of the Saw blades is 1.18 ± 0.01 mm:

- *Saw blades* must only be used with the designated and properly fitting hand pieces/drives in accordance with the hand piece / drive manufacturers' Instructions for Use.
- Make sure the *Saw blades* are only mounted in technically and hygienically well-maintained and cleaned hand pieces / drives.
- To avoid damaging the instrument or causing injury to the patient / user and third parties, make sure that the *Saw blades* are always correctly inserted and tightened in accordance with the device manufacturer's instructions.
- The *Saw blades* must be activated before making any contact with the bone.
- The *Saw blades* must only be activated after its insertion into the resection guides. Strictly avoid tilting, levering or bending the *Saw blade* (risk of fracture) during the sawing process with the aid of resection guides.
- Excessive pressure forces on the *Saw blades* may lead to thermal necrosis, undesirable rough surfaces, shorten the lifespan or even fracture the *Saw blades*.
- Contact of the *Saw blade* cutting edge with the resection guide or other metallic objects must be strictly avoided. Any contact with such objects will result in damage to the instrument or resection guide.
- Damaged cutting teeth or chipped edges may also cause inadvertent injury to bones and surrounding tissue or fracture the *Saw blade*.
- Always keep appropriate *Saw blades* in reserve in order to avoid any delays during an ongoing surgery.
- Vulnerable patient areas must be protected adequately.
- To prevent the unwanted generation of heat, ensure sufficient cooling with a commercially available isotonic saline solution (NaCl) and suction.
- *Saw blades* with worn cutting teeth and/or blunt, bent or chipped teeth must not be used any further. Such devices may cause excessive generation of heat due to insufficient removal of bone leading to irreversible damage to bone tissue (thermal necrosis), fractured *Saw blades* and danger to the patient, user and third parties.
- The user and operating staff must use appropriate eye protection when using the *Saw blades*.
- Protect the patient's surrounding tissue during the operation.
- Dispose used *Saw blades* in accordance with the procedures commonly used at the hospital.

Key Features BPK-S Integration Revision

FEMUR Component	l Femur components with 6° valgus (connector for ADAPTER Femur and ANCHORING STEM Straight) l 4 femur sizes with integrated 3° external rotation l ~ 9 mm distal resection l Femoral distal augments (CoCr) up to 20 mm l Femoral posterior augments (CoCr) up to 10 mm l Onset patella wit 3 - 4 diameters
ANCHORING STEMS Straight	l Cementless (increments 1 mm) • 40, 80 mm, Ø 13 - 30 mm • 140 mm Ø 13 – 22 mm l Cemented (increments 2 mm) • 40, 80, 140 mm Ø 10 - 22 mm l Offset 0, 4 und 6 mm, 360° free adjustable l 3° adapter (adaption tibial slope; offset 0 mm)
PE-INSERT	l Insert heights (increments 2 mm) • SC: 7 – 17 mm • RH/TH: 7 – 25 mm
TIBIA Component	l 6 tibia sizes SC (0° tibial slope) l 4 tibia sizes RH/TH (0° tibiale slope) l ~ 4,5 mm proximal resektion l Tibial augments (CoCr) up to 3 x 5 mm L/R l Tibial metaphyseal cones (Ti6Al4V) 8 sizes

- l 3 constraint levels CCK (SC) and Hinge (RH/TH) with identical cutting geometry & outer contour (continuance of primary implants)
- l Intraoperative exchange SC to RH/TH without bony adaption – universal instruments
- l Change RH to TH without exchange of joint implants possible.

BPK-S INTEGRATION

SURGICAL TECHNIQUE

1 Determining the joint line

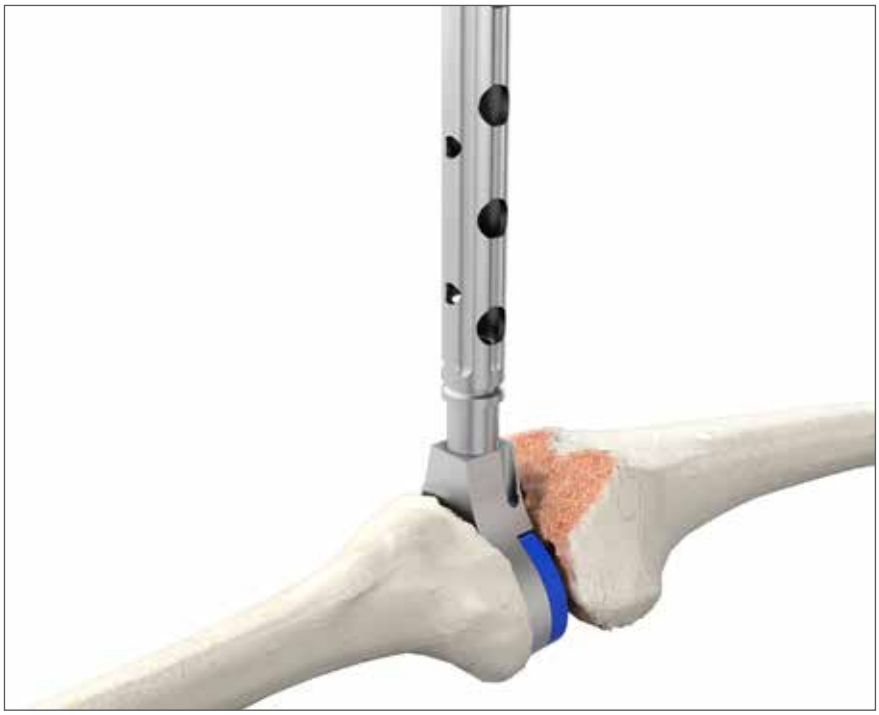
Evaluating joint space in extension and flexion during revision surgeries

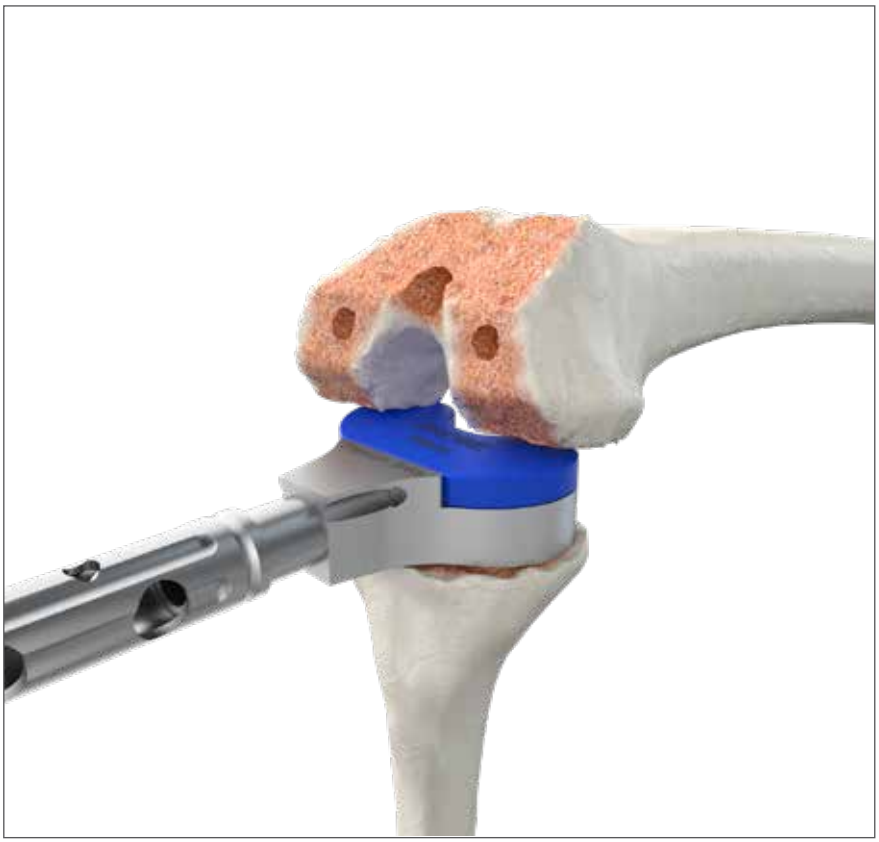
Before the implant components requiring revision are removed, a comparison can be made with the *Femoral Sizing Templates* or the *TRIAL Femoral Components SC / RH / TH* to determine the femoral size.

01

After the implant components have been removed, the surgeon estimates the required height of the entire implant construct (TIBIA Component, FEMUR Component, and PE-INSERT) with the aid of *Spacers* and determines a possible imbalance of flexion and extension gap.

Observe correct indication Flexion (left / right) or Extension:





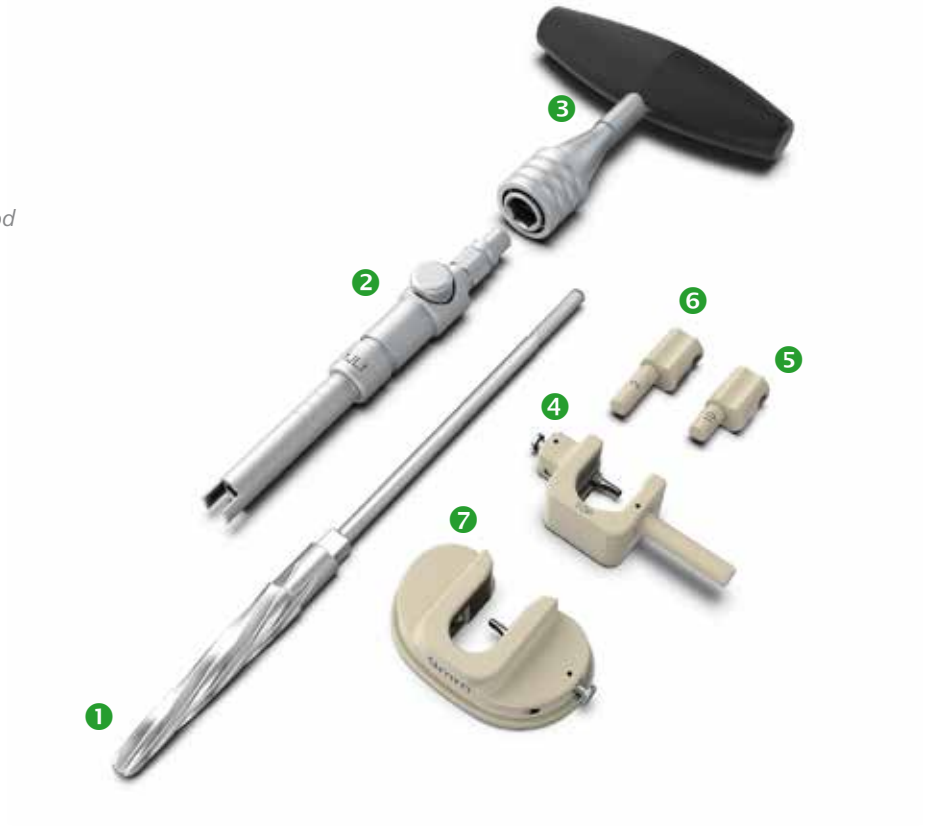
1 Determining the joint line

Opening the tibia and preparing the Reamers with Guide Rod

02

Assembling the *Reamer with Guide Rod* and *Joint Line Plate*

1. *Reamer with Guide Rod*
2. *Drive Shaft for Reamer with Guide Rod*
3. *Handle with AO Coupling short*
4. *Tibial Joint Line Plate, primary*
5. *Caliper for Tibial Joint Line Plate (10)*
6. *Caliper for Tibial Joint Line Plate (2)*
7. *Tibial Joint Line Plate*



The tibial medullary canal is opened in accordance with preoperative planning and reamed with successively larger *Reamers with Guide Rods* until cortical bone is reached.

In primary procedures, the medullary canal is opened with the *Drill for Intramedullary Access* and expanded in the area of the eminentia to such an extent, that the *Drive Shaft for Reamer with Guide Rod* can be placed appropriatetly deep in the tibia. The expansion of the medullary canal is performed using *Reamers with Guide Rod* of larger diameters than the initial drill.

03

The medullary canal is machined to the desired depth. The markings on the *Drive Shaft for Reamer with Guide Rod* represent the joint line (JL). The first marking below (JL) indicates possible bone loss of 10 mm. Each additional marking represents augment heights of 5 mm each.

Precise alignment of the implant requires stable seating of the Drive Shaft for *Reamer with Guide Rod.*

The maximum height of the tibial construct with augments is 15 mm.

1 Determining the joint line

Opening the tibia and preparing the Reamers with Guide Rod

04

The respective *Tibial Joint Line Plate* can be used to identify the joint line in primary procedures or in the presence of bone defects. The *Tibial Joint Line Plate, primary* indicates an insert height of 7 mm. The *Tibial Joint Line Plate* for bone defects indicates an insert height of 9 mm.

Tibial Joint Line Plate, primary secured

Tibial Joint Line Plate secured

Where stable seating of the construct cannot be achieved with the *Reamers with Guide Rod*, using the *Reference Stem straight* (item 5) is recommended.

If it is not possible to remove the *Reamer with Guide Rod* by hand, then disconnect the *Drive Shaft for Reamer with Guide Rod* and remove the *Reamer with Guide Rod* with aid of the *Knurled Screw S* on the rod by lightly tapping it with a hammer.

Referencing in a primary procedure

Referencing in a revision procedure (correcting a defect of about 13.5 mm with an insert height of 9 mm)

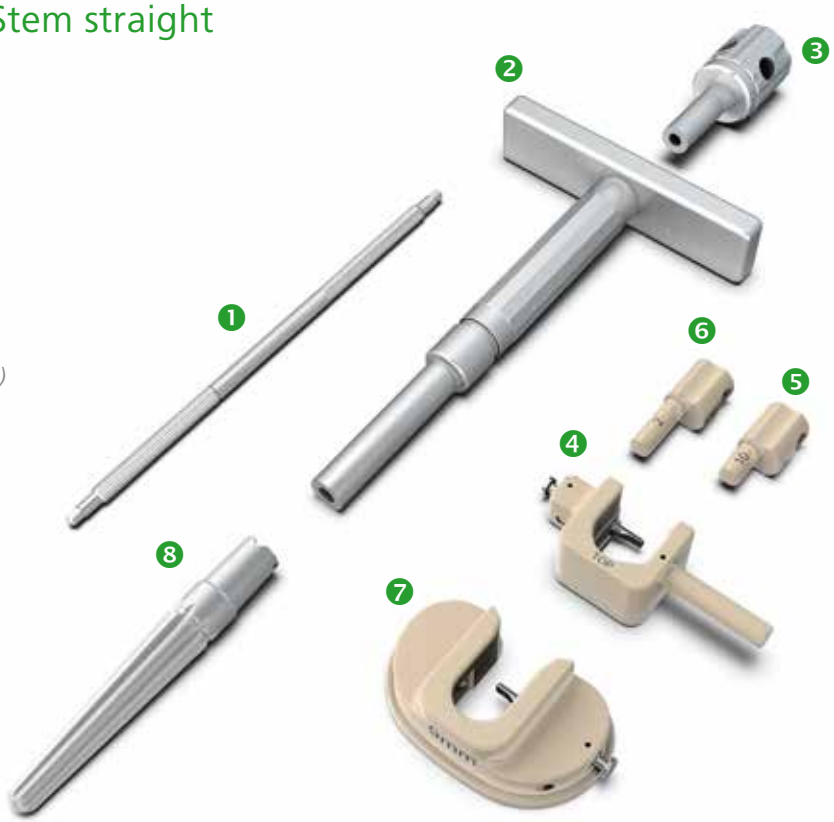
1 Determining the joint line

Preparing the Reference Stem straight

05

Assembling the *Reference Stem straight*

1. *Guide Rod*
2. *Handle Impactor / Extractor*
3. *Knurled Screw S*
4. *Tibial Joint Line Plate, primary*
5. *Caliper for Tibial Joint Line Plate (10))*
6. *Caliper for Tibial Joint Line Plate (2)*
7. *Tibial Joint Line Plate*
8. *Reference Stem straight*



Referencing in a primary procedure

Referencing in a revision procedure (correcting a defect of about 13.5 mm with an insert height of 9 mm)

1 **Determining the joint line**

Reconstruction of the tibial joint line with the Tibial Joint Line Plates

06

Next the *Reference Stem straight* is impacted with the *Tibial Joint Line Plate* or the *Tibial Joint Line Plate, primary* and the *Caliper for Tibial Joint Line Plate (10)* or the *Caliper for Tibial Joint Line Plate (2)* so that the joint line is in the desired position.

In a primary procedure, the more heavily damaged side of the tibial surface can be referenced with the *Caliper for Tibial Joint Line Plate (2)* to resect 2 mm of bone. The *Caliper for Tibial Joint Line Plate (10)* references a resection of 10 mm of bone and can be used on the less heavily damaged side of the tibial surface.

Where larger bone defects are present, there may be a gap between the *Joint Line Plate* and the tibia.

In the presence of extensive bone defects the following reference points will aid in restoring the joint line:

- Approximately 15-20 mm proximal to the fibular head
- Plane of the tibial osteotomy for the previous prosthesis
- Level of the patella

Choosing a different reamer or stem diameter changes the position of the joint line.

The figures show reconstruction of the joint line with the *Reference Stems straight*. The procedure for reconstructing the tibial joint line directly with the *Reamer with Guide Rod* is identical. Based on the natural anatomy, the implant system requires a minimum tibial resection of 11.5 mm (tibial plateau 4.5 mm, plus the insert height of 7 mm).

! NOTE

The *Reamer with Guide Rod* or *Reference Stem straight* must have a stable intramedullary anchorage.

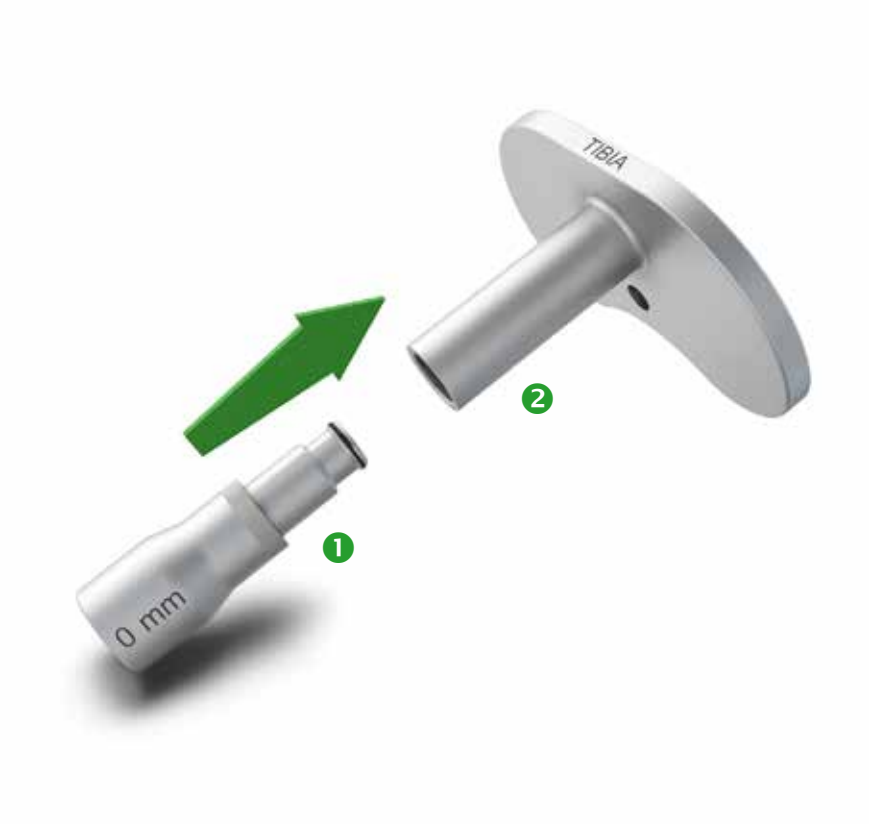
Once the desired joint level has been achieved, the *Handle Impactor / Extractor* and the respective *Joint Line Plate* are removed. Where *Reamer with Guide Rod* have been used, the *Drive Shaft for Reamer with Guide Rod* and *Handle with AO Coupling* short are removed.

1 Determining the joint line

Assembling and placing the Tibial Joint Line Plate during revision surgeries and use of the Reference Stems straight

07

The first step is to assemble the *Tibial reference plate.* To do this, the *Extension Sleeve 0 mm* (❶) is screwed all the way into the *Tibial reference plate* (❷). The end of the threading must allow for some clearance.



08

Next the assembled *Tibial reference plate* is slid over the *Guide Rod* onto the *Reference Stem straight,* and the *Guide Rod* is then unscrewed with the *Socket Wrench AF3,5.*

1 Determining the joint line

Assembling and placing the Tibial Joint Line Plate during revision surgeries and use of the Reference Stems straight

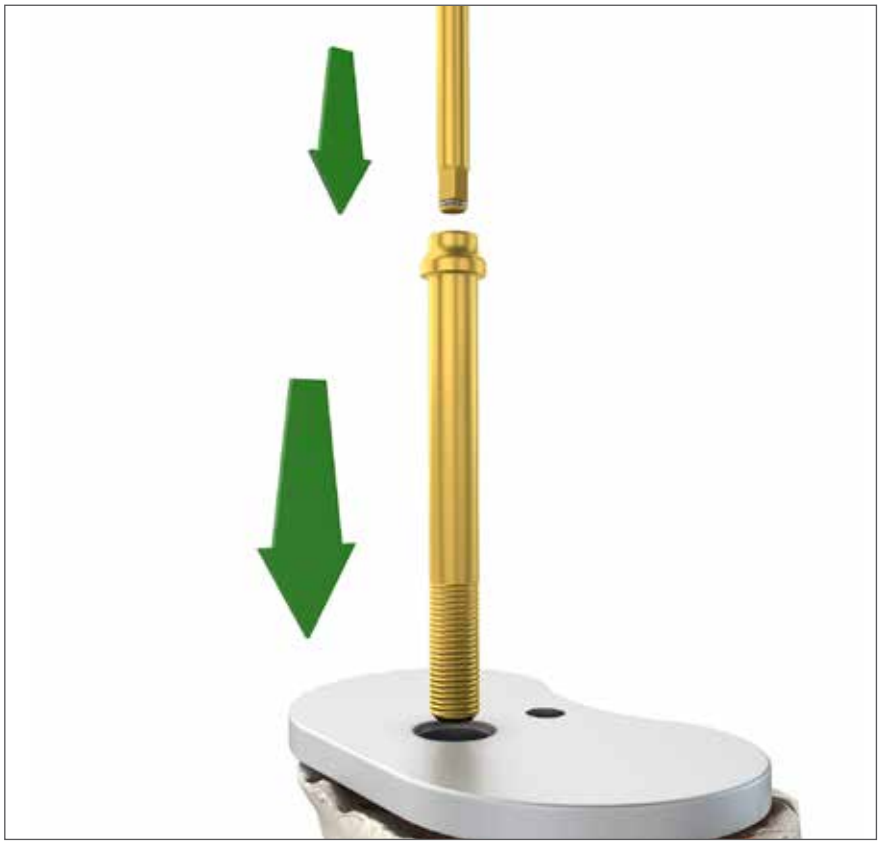
09

For correct position with respect to the joint line, the *Extension Sleeve 0 mm* must be seated on the taper of the *Reference Stem straight.*

10

The plateau is attached to the *Reference Stem straight* by hand tightening the gold *Clamp Screw M6/0 mm.*

The rotational alignment of the plateau is of no relevance at this stage.



1 Determining the joint line

Opening the femur and preparing the Reamers with Guide Rod

11

Assembling the *Reamer with Guide Rod* and *Femoral joint line plate*

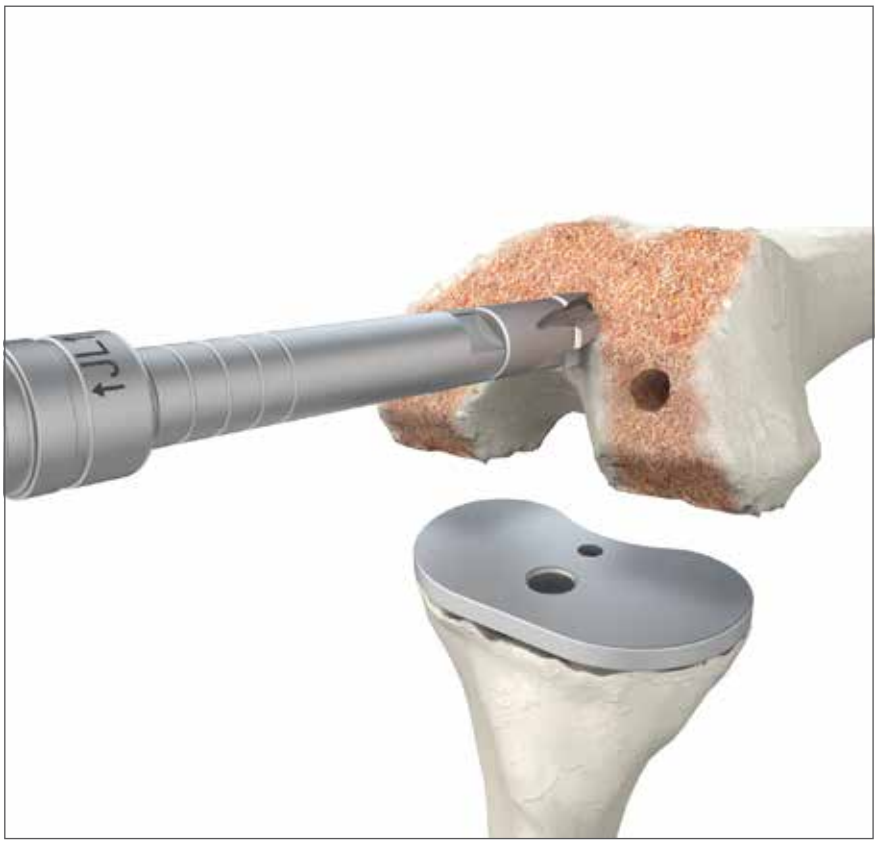
1. *Reamer with Guide Rod*
2. *Drive Shaft for Reamer with Guide Rod*
3. *Handle with AO Coupling short*
4. *Femoral joint line plate for bony Defects*
5. *Femoral joint line plate w/out bony Defects*

The distal femur is opened and reamed according to preoperative planning. Distinctive anatomic features such as the curvature of the femur must be taken into account.

In primary procedures, the medullary canal is opened with a *Drill for Intramedullary Access.*

The medullary canal is machined to the desired depth. The markings on the *Drive Shaft for Reamer with Guide Rod* represent the joint line (JL). The first marking below (JL) indicates possible bone loss of 10 mm. Each additional marking represents augment heights of 5 mm each.

Precise alignment and positioning of the implant requires stable seating of the *Reamer with Guide Rod.*



1 Determining the joint line

Opening the femur and preparing the Reamers with Guide Rod

13

After the *Femoral joint line plate w/out bony Defects* or the *Femoral joint line plate for bony Defects* has been attached to the *Drive Shaft for Reamer with Guide Rod*, it is secured with the pin.

Unsecured

Secured

12

Depending on the initial situation, the *Femoral joint line plate for bony Defects* or the *Femoral joint line plate w/out bony Defects* can be used.

The *Femoral joint line plate w/out bony Defects* or the *Femoral joint line plate for bony Defects* is turned on the handle of the *Drive Shaft for Reamer with Guide Rod* so that the correct side label (R or L) is visible anteriorly.

Where stable seating of the construct cannot be achieved with the *Reamers with Guide Rod*, using the *Reference Stem straight* (item 14) is recommended.

If it is not possible to remove the *Reamer with Guide Rod* by hand, then disconnect the *Drive Shaft for Reamer with Guide Rod* and remove the *Reamer with Guide Rod* with aid of the *Knurled Screw S* on the guide rod by lightly tapping it with a hammer.

Referencing in a primary procedure

Referencing in a revision procedure (defect of about 10 mm)

Left and right labeling on *Femoral joint line plate for bony Defects*

1 Determining the joint line

Preparing the Reference Stem straight

14

Assembling the *Reference Stem straight:*

1. *Guide Rod*
2. *Handle Impactor / Extractor*
3. *Knurled Screw S*
4. *Femoral joint line plate for bony Defects*
5. *Femoral joint line plate w/out bony Defects*
6. *Reference Stem straight*

Referencing in a primary procedure

Referencing in a revision procedure
(defect of about 10 mm)

1 Determining the joint line

Reconstruction of the femoral joint line with the Femoral Joint Line Plates

15

Next the *Reference Stem straight* is seated with the *Femoral joint line plate w/out bony Defects* or the *Femoral joint line plate for bony Defects* so that the joint line is at the desired position.

In primary procedures, the *Femoral joint line plate w/out bony Defects* is placed on the natural condyles to precisely restore the primary joint line.

The *Femoral joint line plate for Bony Defects* references a resection of 10 mm of bone. In revision procedures, there may be a gap between the *Femoral joint line plate for bony Defects* and the femur.

The following reference points will aid in restoring the joint line in the presence of extensive bone defects:

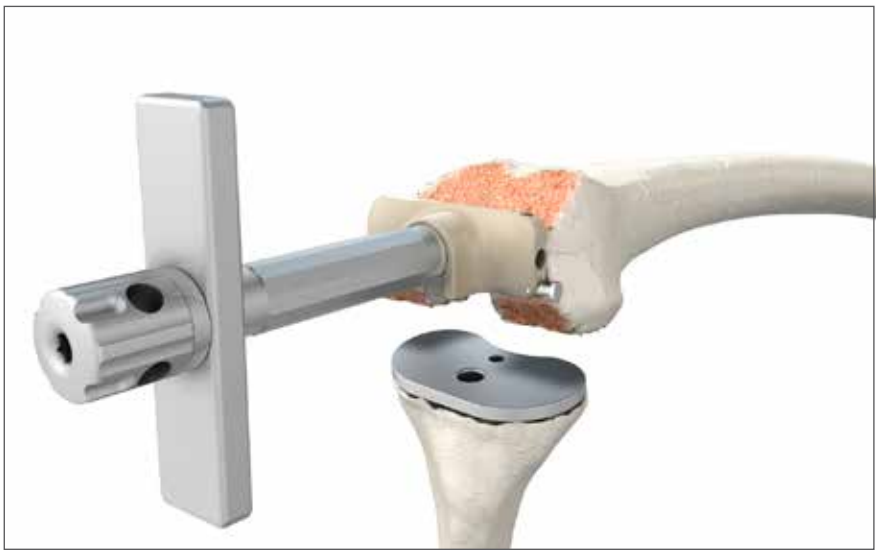
- Approximately 25-30 mm distal to the medial epicondyle
- Allow for the thickness of the revision implant
- Level of the patella

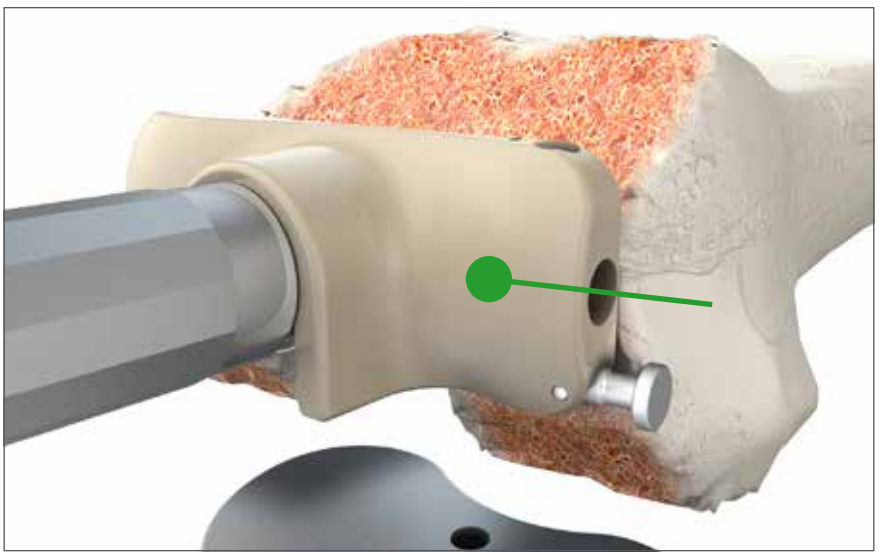
Choosing a different stem diameter can change the position of the joint line.

A change of 1 mm in stem diameter corresponds to about a 1-2 cm change in position depending on bone quality.

The distal crest (marking, picture right) of the *Femoral joint line plate for bony Defects* corresponds to the femoral joint line.

The procedure for reconstructing the femoral joint line directly with the *Reamer with the Guide Rod* is identical.



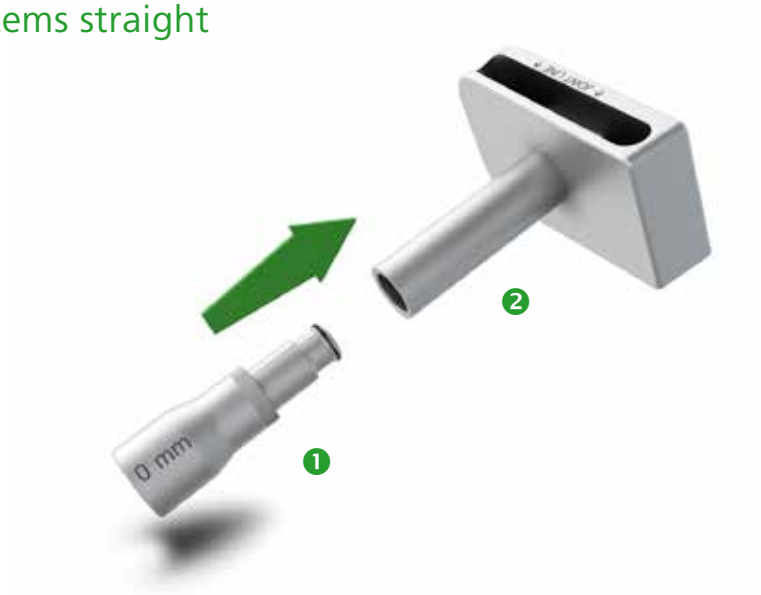


1 Determining the joint line

Assembling and placing the Femoral Valgus Plate 6° during revision surgery and use of the Reference Stems straight

16

The *Femoral Valgus Plate 6°* is assembled in the same manner as the *Tibial reference plate*. To do this, the *Extension Sleeve 0 mm* (❶) is screwed all the way into the *Femoral Valgus Plate 6°* (❷. The end of the threading must allow for some clearance.



17

After the *Handle Impactor / Extractor* and the *Femoral joint line plate* have been removed, the assembled *Femoral Valgus Plate 6°* is slid over the *Guide Rod* onto the *Reference Stem straight*, and the *Guide Rod* is then unscrewed with the *Socket Wrench AF3,5*. Verify proper right or left version.

For correct position with respect to the joint line, the *Extension Sleeve 0 mm* must be seated on the taper of the *Reference Stem straight*.

18

The *Femoral Valgus Plate 6°* is attached to the *Reference Stem straight* by hand tightening the *Clamp Screw M6 / 0 mm*.

1 Determining the joint line

Evaluating extension space during revision surgery and use of the Reference Stems straight

19

Joint space in extension can be determined with the *Spacer, 7 - 17 mm (SC / RH / TH) or 19 - 25 mm (RH / TH only).*

If extension space is too narrow, the position of the femoral and tibial stems must be evaluated and changed if necessary.

The joint line is located at the level of the marked edge on the *Femoral Valgus Plate 6°*.

The *Femoral Valgus Plate 6°* is removed by unscrewing the *Clamp Screw M6 / 0 mm* with the *Socket Head Wrench AF5 / AF3,5* and then removing the *Femoral Valgus Plate 6°*.

2 Tibial preparation

Preparing the tibial resection

20

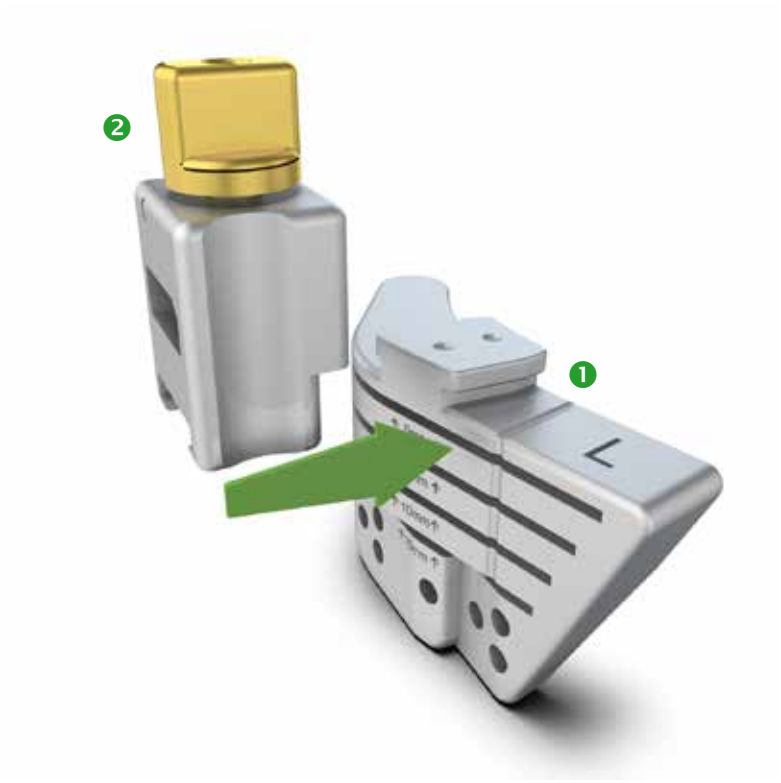
The *Tibial reference plate* must be removed before the *Tibial cutting block* can be placed, if applicable. This is done by unscrewing the gold *Clamp Screw M6/0 mm*. The *Guide Rod* is screwed into the *Reference Stem straight* and the *Handle* is screwed into the *Tibial reference plate*. Then the *Tibial reference plate* can be removed with the *Handle*.

2 Tibial preparation

Assembling the Tibial cutting block anatomic SC/RH/TH

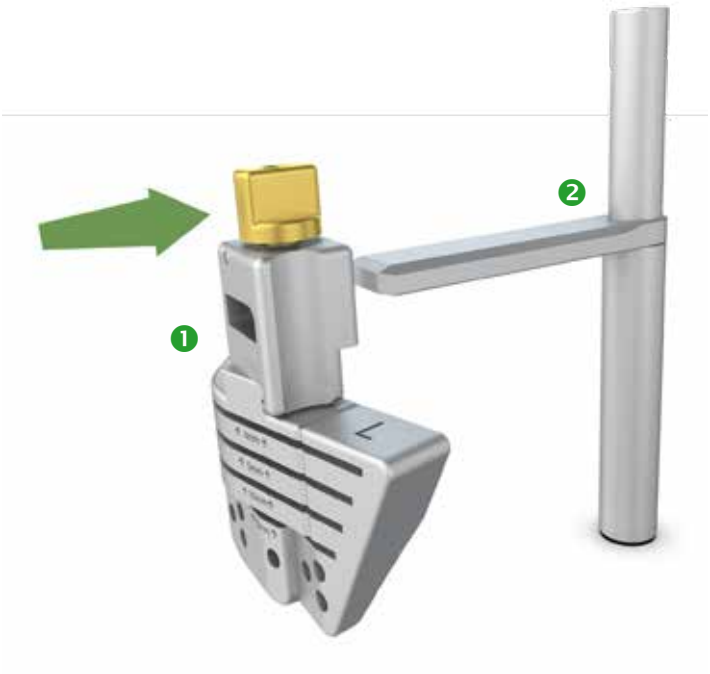
21

The *Tibial cutting block anatomic SC/RH/TH (right or left)* (❶) is then attached to the *Adapter for Tibial cutting block SC/RH/TH* (❷).



22

Next the assembled *Tibial cutting block anatomic SC/RH/TH (right or left)* (❶) is slid onto the *Outrigger for Tibial cutting block* (❷). The position of the *Tibial cutting block anatomic SC/RH/TH* is then secured with the gold screw.



2 Tibial preparation

Placing the Tibial cutting block anatomic SC/RH/TH and verifying the osteotomies

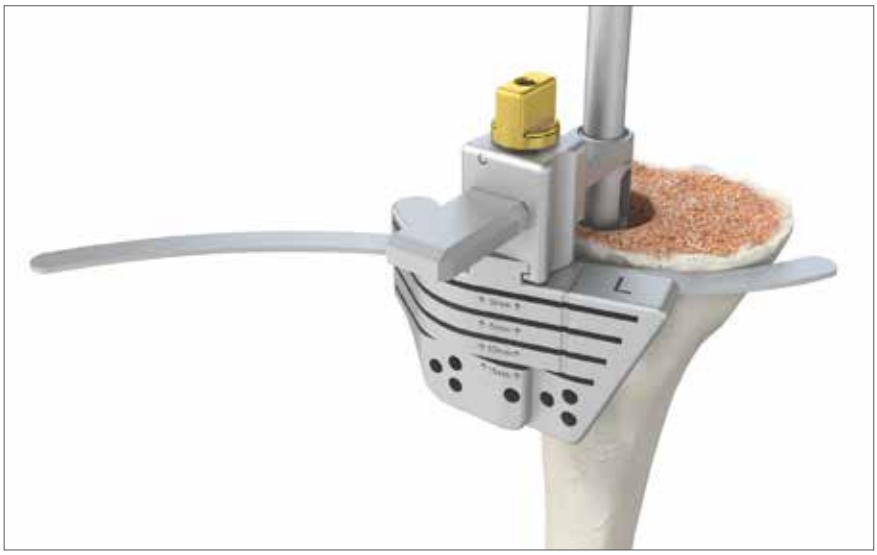
23

Next the assembled *Tibial cutting block anatomic SC / RH / TH* is positioned over the *Guide Rod* or the *Reamer with Guide Rod*. In primary procedures it may be necessary to remove some bone in the region of the intercondylar eminence of the tibia to allow the *Tibial cutting block* to rest on the *Reference Stem straight* or the *Reamer with Guide Rod*.

Then slide the *Tibial cutting block anatomic SC / RH / TH* onto the bone and secure it with the gold screw.

24

The tibial osteotomy including any necessary augments is then verified using the *Visualisation Guide S*. The tibial slope is 0°.



The maximum tibial augmentation height of 15 mm can be achieved using 5 mm medial and lateral augments. Augments of different sizes can be combined as needed.

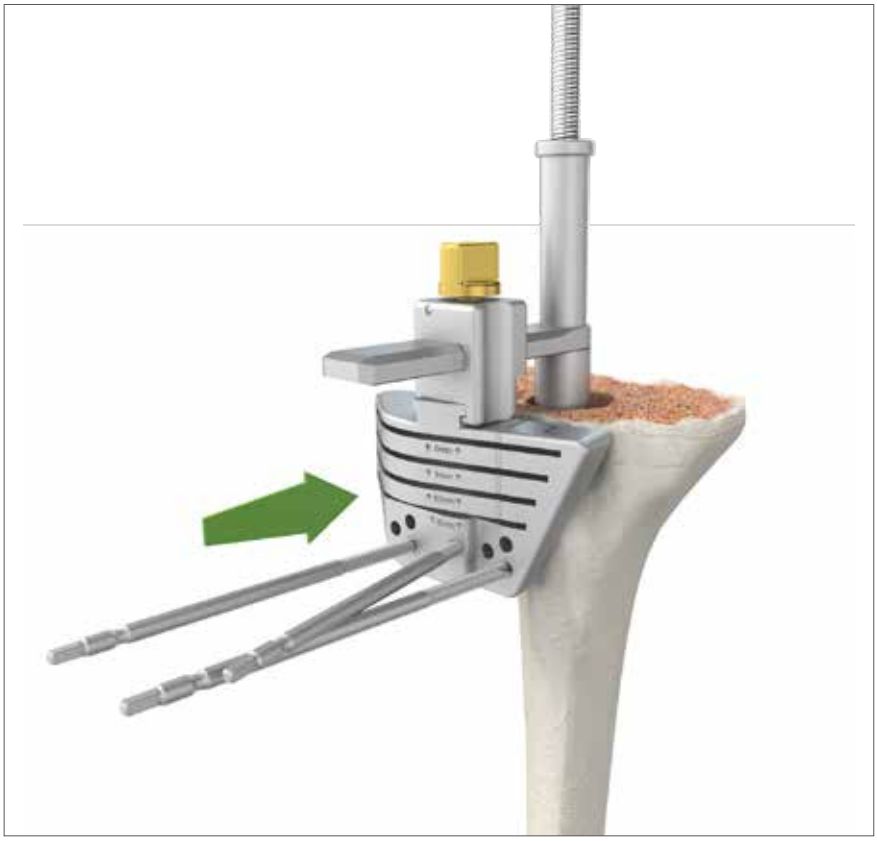
2 **Tibial preparation**

Securing the Tibial cutting block anatomic SC/RH/TH and performing the resection

25

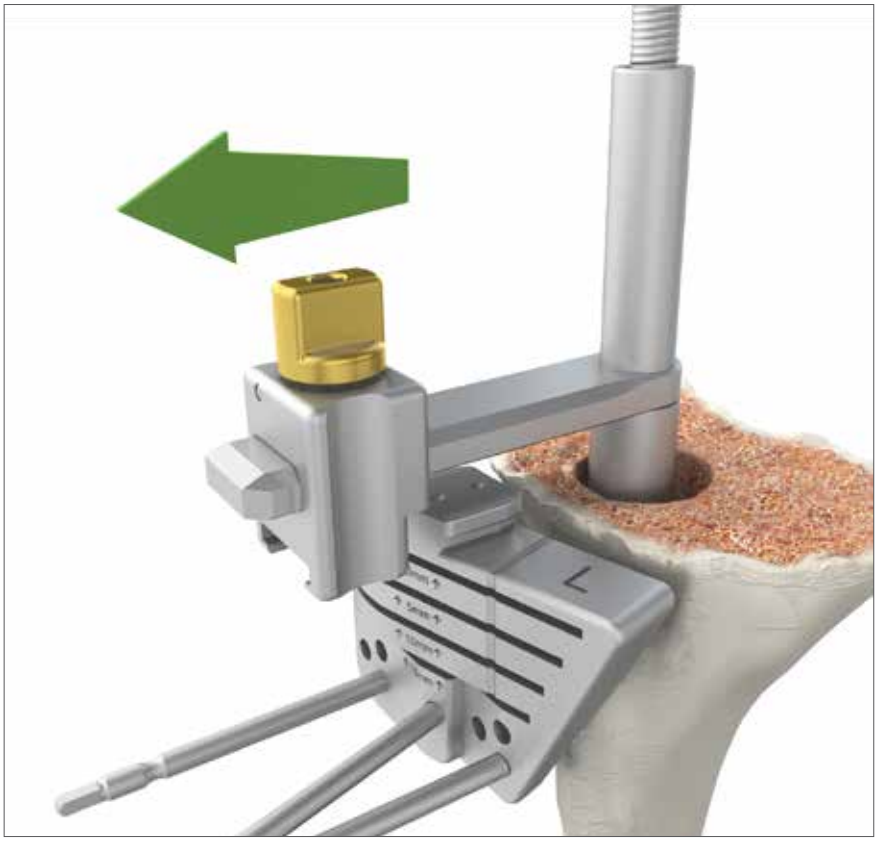
The *Tibial cutting block anatomic SC / RH / TH (right* or *left)* is secured in the desired position by two parallel *Pins with Corticalis Thread Size: Ø 3,15 x 70 mm* as well as by an oblique *Pin with Corticalis Thread Size: Ø 3,15 x 70 mm.*

Using the lowest pair of holes allows to change the position of the *Tibial cutting block anatomic SC / RH / TH (right* or *left)* by 2.5 or 5 mm.



26

Then the gold screw is unscrewed and only the *Adapter for Tibial cutting block SC / RH / TH* is removed.



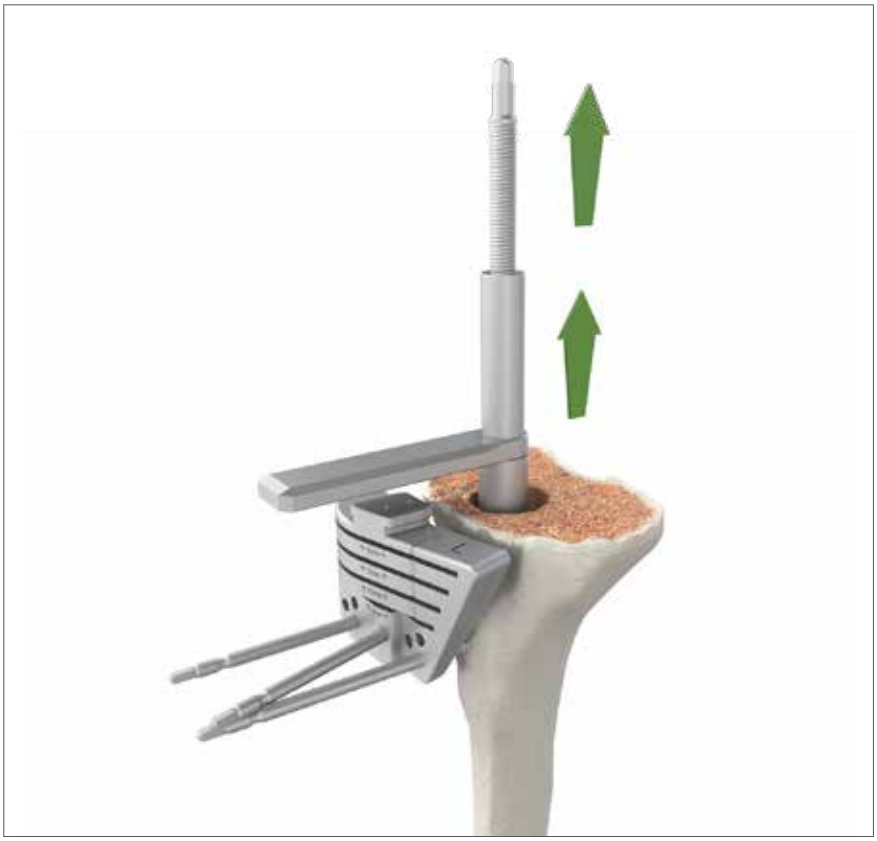
2 Tibial preparation

Securing the Tibial cutting block anatomic SC/RH/TH and performing the resection

27

The next step is to remove the *Outrigger for Tibial cutting block* and the *Guide Rod.*

The *Pins with Corticalis Thread Size: Ø 3,15 x 70 mm* possibly prevent removal of the *Reamer with Guide Rod.*



28

Now the osteotomy is performed and the oblique *Pin with Corticalis Thread Size: Ø 3,15 x 70 mm* and the *Tibial cutting block anatomic SC/RH/TH* is removed. The parallel *Pins with Corticalis Thread Size: Ø 3,15 x 70 mm* may remain in place until the resection level is ensured.

2 Tibial preparation

Determining the size of the TIBIA Component

29

The size of the TIBIA Component can be determined by placing *Tibial base plates.* The goal is to maximize cortical contact. If the resection allowed for augments, then *TRIAL Tibial Augments* must be attached to the *Tibial base plate* and secured with *Locking Pin for Tibial Augment.*

TRIAL Tibial Augments can be freely combined as needed with all sizes (maximum 3 x 5 mm) of *TRIAL TIBIAL Components* to achieve optimal cortical contact.

Assembling *TRIAL Tibial Augment*

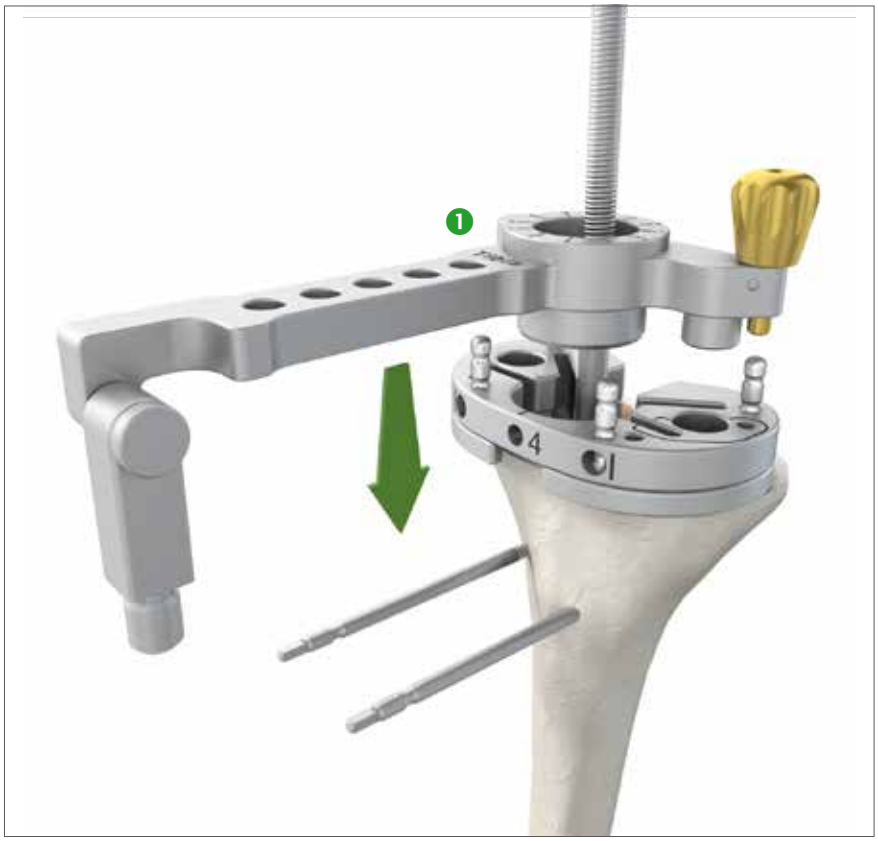
Assembled *TRIAL Tibial Augments*

2 Tibial preparation

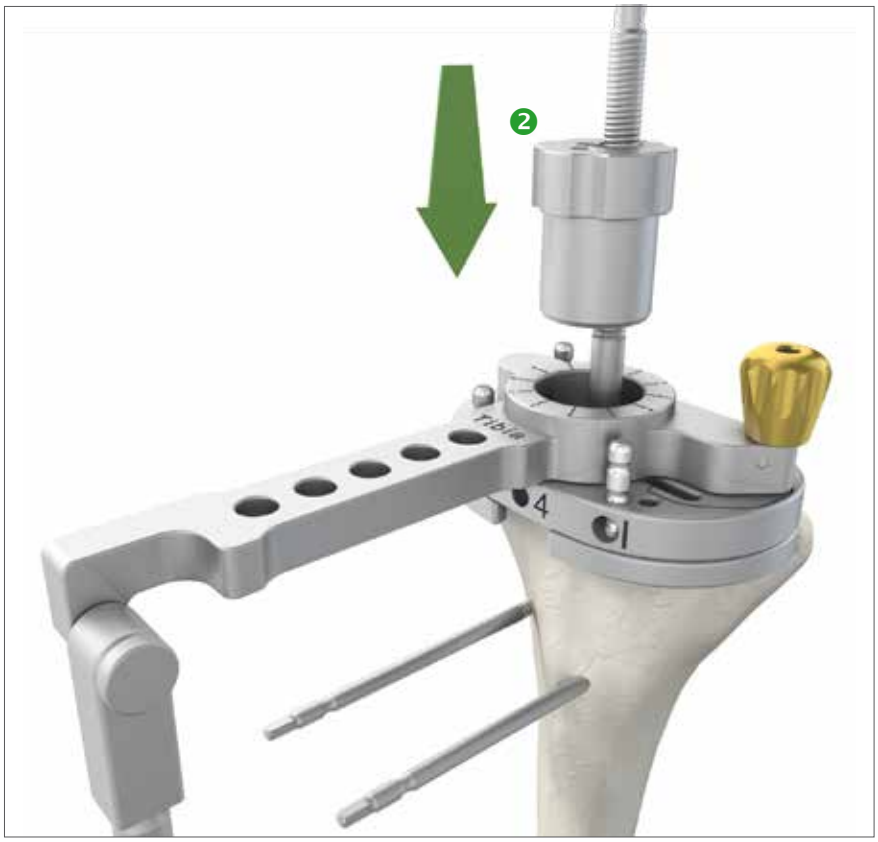
Assembling the Tibial base plate and adjusting the offset

30

After the *Guide Rod* has been inserted again if necessary, the *Tibial alignment guide* (❶) is secured to the top of the *Tibial base plate.*



In order to achieve the best cortical coverage, a *Centralizer Bushing* (❷) (0, 4, or 6 mm offset) is inserted over the *Guide Rod* or the *Reamer with Guide Rod* into the *Tibial alignment guide.*



2 Tibial preparation

Assembling the Tibial base plate and adjusting the offset

The alignment guide consisting of the *Alignment Rod* and the *Alignment Sleeve* is attached to the *Tibial alignment guide*. The pendulum pointer provides a means of verifying rotation against the ankle.

2 Tibial preparation

Assembling the Tibial base plate and adjusting the offset

31

Centralizer Bushings with Offset are rotated on the *Guide Rod* or the *Reamer with Guide Rod* with the *Socket Wrench AF3,5* until the best possible cortical coverage with satisfactory rotational alignment has been achieved.

Should the *Centralizer Bushing* that is being used fail to achieve satisfactory cortical contact, it has to be checked whether a different offset option might be more suitable.

The offset adjustment is noted to ensure it is correctly transferred to the implant.

2 Tibial preparation

Securing the Tibial base plate

32

To secure the *Tibial base plate*, first the *Pins with Corticalis Thread Size: Ø 3,15 x 70 mm* of the *Tibial cutting block anatomic SC / RH / TH* must be removed.

33

Then two *Pins with Corticalis Thread Size: Ø 3,15 x 70 mm* are screwed into the drill holes (❶) of the *Tibial base plate* for fixation.

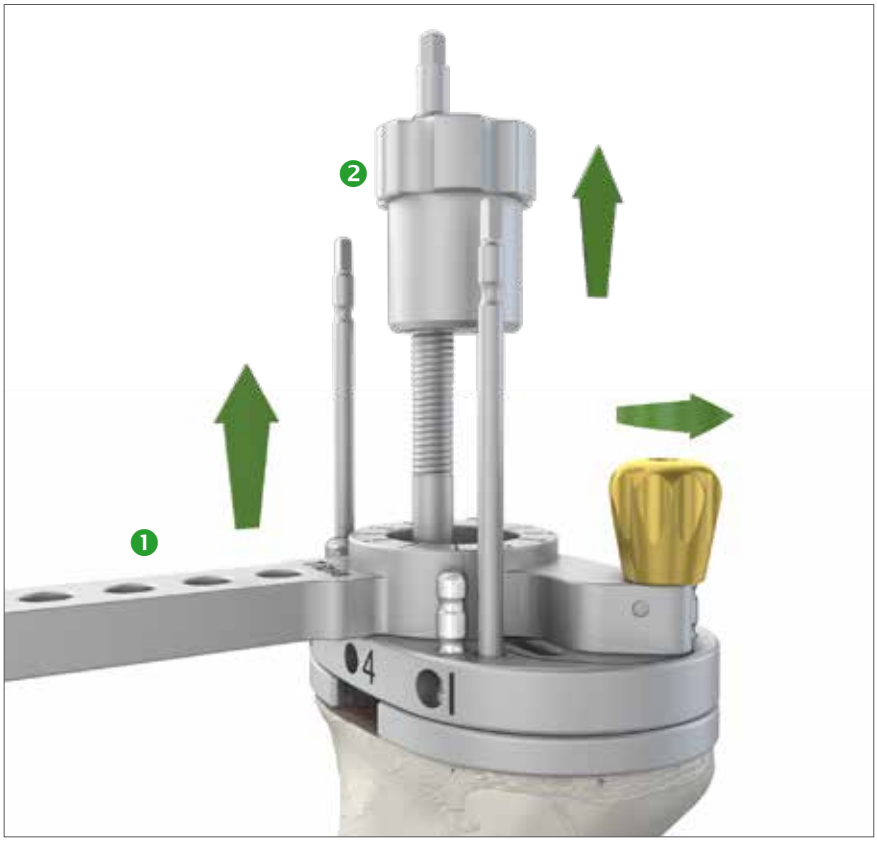
2 Tibial preparation

Disassembling the Tibial alignment guide

34

After the *Tibial base plate* has been attached, the *Tibial alignment guide* (❶) must be removed. This is done by removing the *Centralizer Bushing* (❷), unscrewing the screw on the *Tibial alignment guide* and removing it from the *Tibial base plate*. Then the *Guide Rod* or the *Reamer with Guide Rod* is removed.

If it is not possible to remove the *Reamer with Guide Rod* through the opening of the *Tibial base plate*, then the *Tibial base plate* must be removed with the *Tibial alignment guide* attached and then placed back in position using the remaining pins.



2 Tibial preparation

Preparing the tibial implant site

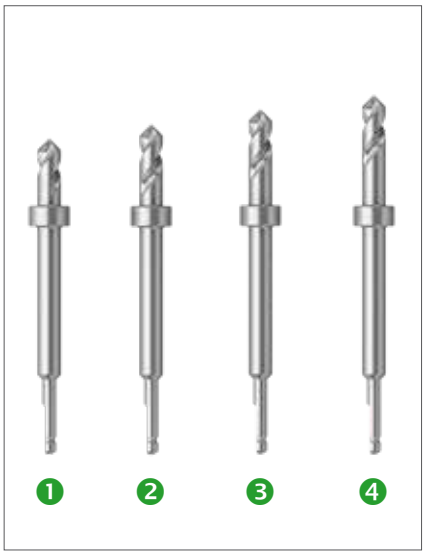
35

Precision preparation of the Tibial implant site begins with attaching the *Tibial reaming guide SC / RH / TH* to the *Tibial base plate*.

Then the *Tibial reaming guide SC / RH / TH* is secured with the gold screw.

36

Medial and lateral recesses of the proper depth are drilled using *Drill for Tibial Augment* that match the total height of the augments (without tibial augments (❶), 5 mm (❷), 10 mm (❸), 15 mm (❹) augments). The recesses are necessary to countersink the projecting heads of the augment screws into the bone.



37

The tibia is reamed to an inner taper up to the stop with the *Tibial Reamer SC / RH / TH.*

2 Tibial preparation

Preparing the tibial implant site

38

The *Tibial punch SC / RH / TH* is used to punch the keel and determine the rotational alignment.

Make sure that the *Tibial punch SC / RH / TH* is driven in until the stop on the *Tibial base plate* to allow for the depth of the ribs.

! NOTE

Strike in the *Cancellous Pusher* to the stop.

39

Subsequently all instruments are removed. If necessary, the *Guide Rod* is screwed into the *Reference Stem straight*, and the *Handle Impactor / Extractor* is slid over it and secured with the *Knurled Screw S*. Then the *Reference Stem straight* can be extracted.

3 TRIAL TIBIAL Component

Overview of the TRIAL Components

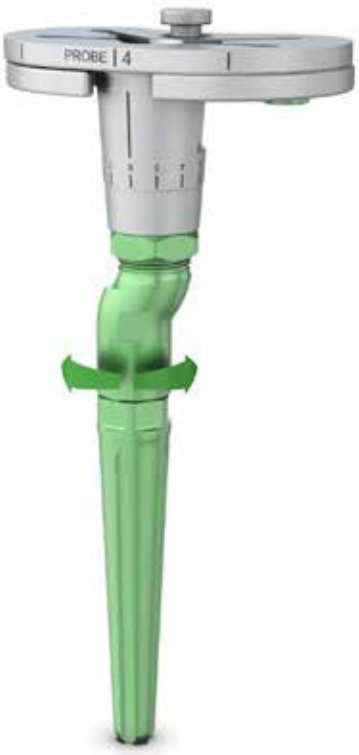
40

The tibial trial component is assembled from the *TRIAL TIBIAL Component, TRIAL Tibial Adapter (0, 4 and 6 mm, 3°) SC / RH / TH, TRIAL Counter Nut for Adapter,* and a *TRIAL Stem Straight* of the desired length.

41

The *TRIAL Tibial Adapter (0, 4, and 6 mm, 3°) SC / RH / TH* is universal and does not depend on the size of the *TRIAL TIBIAL Component.*

With the T*RIAL OFFSET ADAPTERS 4* or *6 mm*, the position of the offset can be adjusted by 360° femoral and tibial.



3 TRIAL TIBIAL Component

Assembling the TRIAL TIBIAL Component SC - assembly block (SC)

42

Two *Handles* can be screwed onto the sides of the *Assembling base plate* to stabilize the Assembly Block (SC) for later tightening the components.

43

The Assembly Block (SC) consists of the *Assembling base plate* and the *Tibial Impactor UC / SC*. To secure the *TRIAL TIBIAL Component SC* on the *Tibial Impactor UC / SC*, the locking sleeve (❶) is pushed forward and the *TRIAL TIBIAL Component SC* is pressed onto the *Tibial Impactor UC / SC*.

44

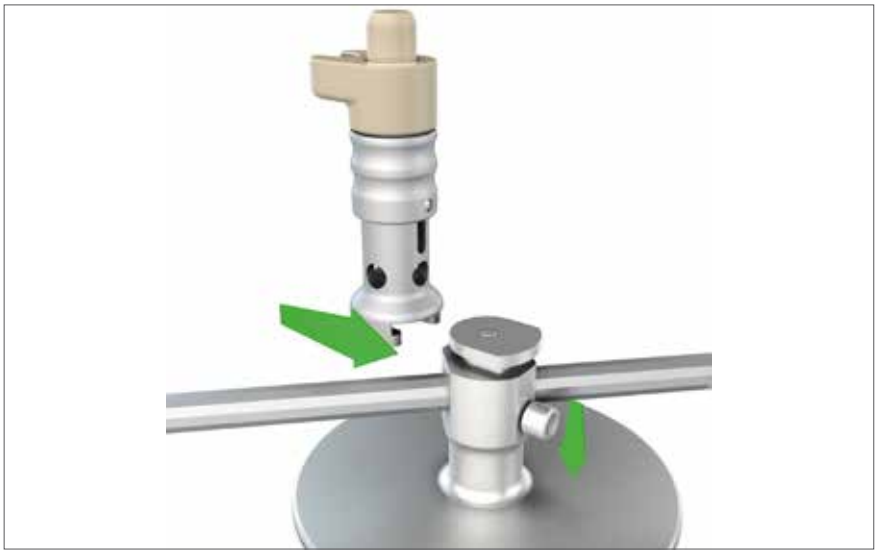
Pulling down the locking button allows to slide the *Tibial Impactor UC / SC* onto the *Assembling base plate* and secure it.

3 TRIAL TIBIAL Component

Assembling the TRIAL TIBIAL Component RH/TH - assembly block (RH/TH)

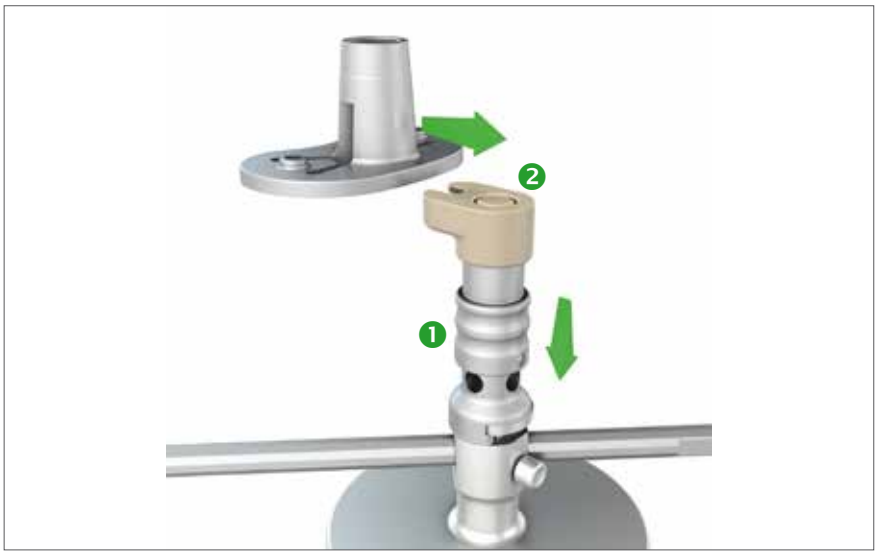
45

The Assembly Block RH / TH consists of the *Assembling base plate* and the *Tibial Impactor RH / TH.*



46

To secure the *TRIAL TIBIAL Component RH / TH* on the Tibial Impactor *RH / TH,* the locking bolt (❶) is drawn back and the *TRIAL TIBIAL Component RH / TH* is slid onto the *Tibial Impactor RH / TH* (❷). The *TRIAL TIBIAL Component RH/TH* is secured on the *Tibial Impactor RH / TH* with the locking bolt.



3 **TRIAL TIBIAL Component**

Final assembly of the TRIAL TIBIAL Component

47

If the resection considered augments, then the *TRIAL Tibial Augments* must be screwed on with the *TRIAL Clamp Screw for Tibial Augment* of the appropriate length before attaching the *TRIAL Stem Straight*.

The maximum augmentation height of 15 mm can be achieved by using multiple medial and lateral *TRIAL Tibial Augments* stacked one on top of each other. *TRIAL Tibial Augments* of different sizes can be combined as needed.

The length of the T*RIAL Clamp Screw for Tibial Augment* depends on the overall height of the *TRIAL Tibial Augments*.

3 **TRIAL TIBIAL Component**

Assembling the TRIAL Stem Straight and TRIAL Tibial Adapter

48

A *TRIAL Counter Nut for Adapter* is screwed onto the preselected *TRIAL Tibial Adapter (0, 4 or 6 mm, 3°)* all the way to the end of the threading.

49

Then the *TRIAL Stem Straight* of the appropriate length is screwed into the *TRIAL Tibial Adapter (0, 4 or 6 mm, 3°)* hand tight.

50

The gold *Socket Wrench AF3,5* is used to screw it in.

3 TRIAL TIBIAL Component

Assembling the TRIAL Stem Straight and TRIAL Tibial Adapter

51

The *TRIAL Stem Straight* together with the *TRIAL Tibial Adapter (0, 4, or 6 mm, 3°)* is screwed all the way into the *TRIAL TIBIAL Component* with the gold *Socket Wrench AF3,5* and secured with the *TRIAL Counter Nut for Adapter.*

The *TRIAL Tibial Adapter* does not depend on the size of the *TRIAL TIBIAL Component* used.

3 **TRIAL TIBIAL Component**

Assembling the TRIAL Tibial Adapter 4 or 6 mm

52

If a *Centralizer Bushing 4 or 6 mm* Offset was used in positioning the *Tibial base plate*, then an *TRIAL Tibial Adapter* with the offset determined under item 31 must also be used with the *TRIAL TIBIAL Component.*

Observe the following instructions when assembling the *TRIAL TIBIAL Component:*

- All threaded connections must be screwed tight.
- When using a *TRIAL Tibial Adapter 4* or *6 mm*, the predetermined offset position must be set (within one backward turn) and secured with a hand tightened *TRIAL Counter Nut for Adapter.*
- Verify proper transition of offset position.

3 TRIAL TIBIAL Component

Placing the TRIAL TIBIAL Component

53

To place the trial component, the *Assembling base plate* is removed and the *Handle for Impactor / Extractor* is connected.

54

When placing the *TRIAL TIBIAL Components*, a sufficient cortical coverage and a secure seating have to be verified. If necessary, different sizes of trial components can be used.

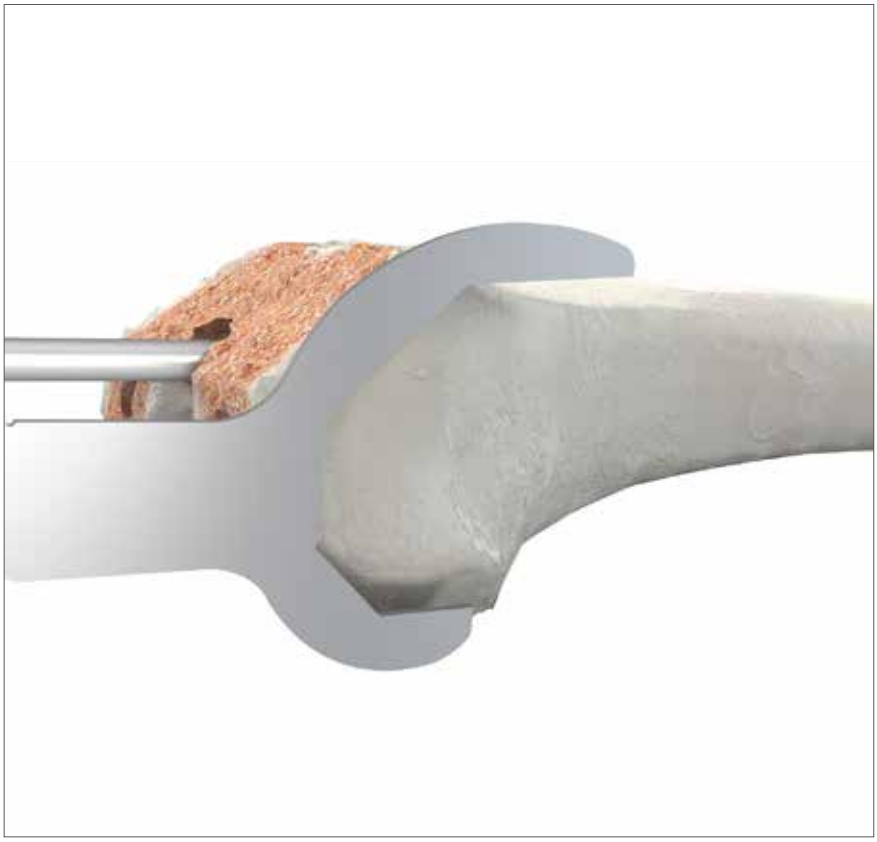
If the *TRIAL TIBIAL Component* is not completely in contact with the osteotomy surface, then the recesses for the heads of the *TRIAL Clamp Screw for Tibial Augments* should be enlarged with the *Extension Drill Ø 11 mm for Augment Screws Tibia*.

4 **Femoral preparation**

Determining the size of the FEMUR Component

55

The femoral osteotomies and the size of the FEMUR Component should be determined using the *Femoral Sizing Templates.*



56

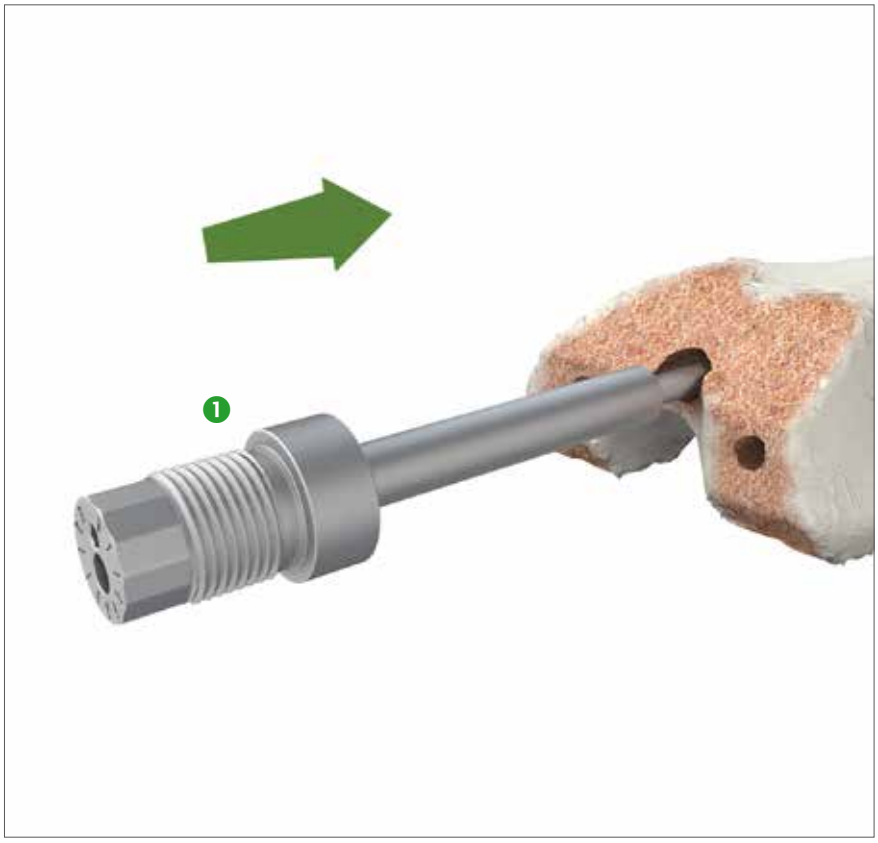
The dimensions of any previously removed implant will also be helpful in determining component size. They can be compared with the contralateral *TRIAL FEMORAL Components SC / RH / TH.*

4 Femoral preparation

Assembly for the femoral dissection

57

First the *Adapter Femur* with the desired offset (❶) (0, 4, or 6 mm) is advanced over the *Guide Rod* or the *Reamer with Guide Rod* into the medullary canal until it is in contact with the *Reference Stem straight* or the *Reamer with Guide Rod.*



Then the *Femoral cutting block A / P* (❷) of the preselected size (see items 55 and 56) is placed on the *Adapter Femur*. Be sure to use the proper right or left option on the *Femoral cutting block A / P.*

! NOTE

Observe the right / left variants at the *Femoral cutting block A / P.*

4 **Femoral preparation**

Assembly for the femoral dissection

The construct is stabilized by hand tightening the *Hexagonal clamping nut PEEK* (❸).

58

To verify proper rotational alignment, the *Adapter Epicondyle Feeler* (❶) with the *Guide Epicondyle Feeler* (❷) and the *Epicondyle Feeler* (❸) is attached to one of the posterior osteotomy guides on the *Femoral cutting block AIP.*

4 Femoral preparation

Assembly for the femoral dissection

The *Femoral stylus* is set to the size of the *Femoral cutting block A / P* and attached to the anterior osteotomy guide.

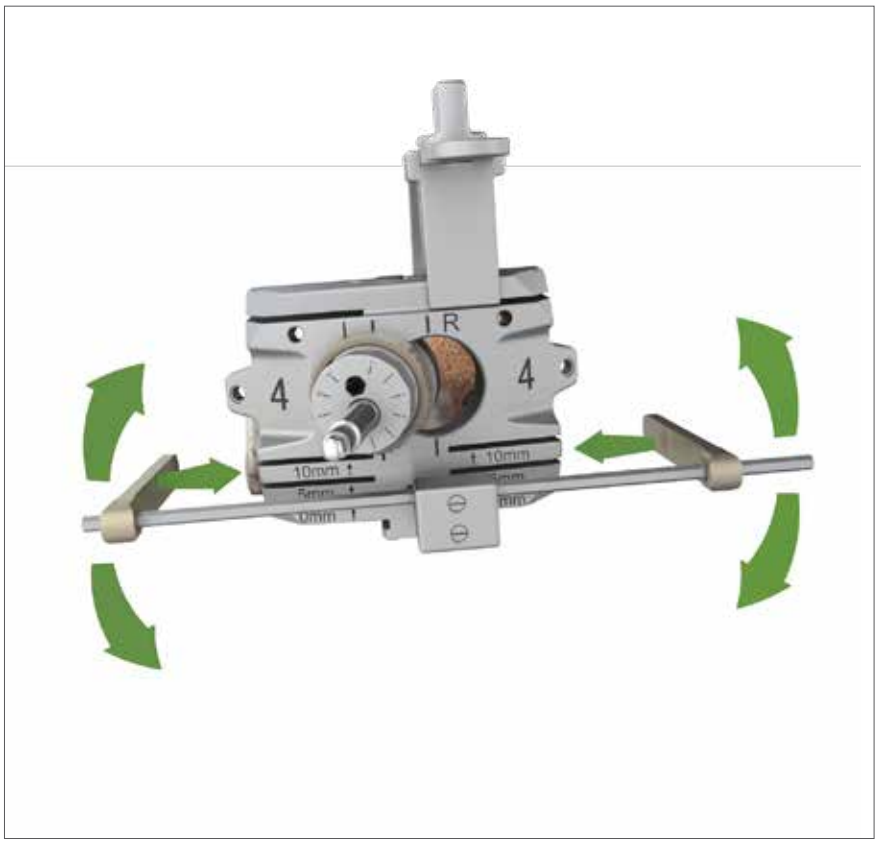
4 **Femoral preparation**

Adjusting and securing rotational alignment and offset

59

M/L alignment can be estimated from the width of the *Femoral cutting block A/P*, as the M/L dimension of the *Femoral cutting block A/P* corresponds to the respective implant size.

When aligning the *Femoral cutting block A / P,* make sure the femoral resection depth guide is in contact with the anterior lateral cortex of the femur.



The Epicondyle Feeler Gauge is used to verify rotational alignment with respect to the femoral epicondyles.

4 Femoral preparation

Adjusting and securing rotational alignment and offset

60

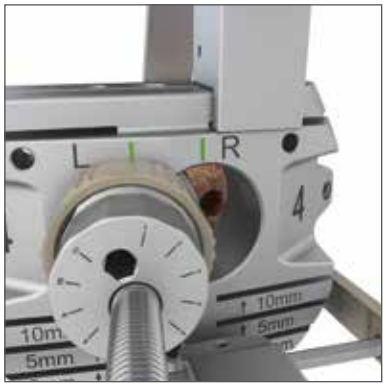
Should the used *Adapter Femur* fail to achieve satisfactory alignment, then check whether a better result can be achieved using other offset options (reassemble the construct starting with item 57).

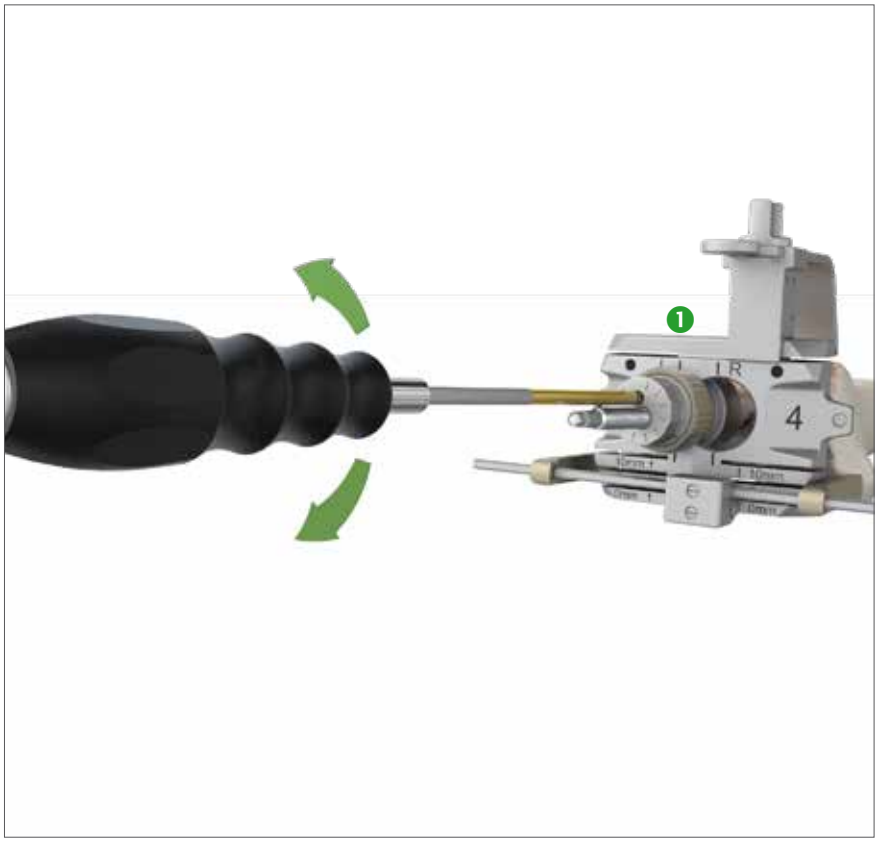
Offset options

Adapters Femur 4 or *6 mm* are rotated with the *Socket Wrench AF3,5* until the best possible A / P and M / L alignment with satisfactory rotational alignment and anterior position of the *Femoral stylus* have been achieved.

The offset adjustment is noted to ensure it is correctly transferred to the implant.

The anterior vertical marking (❶) on the *Femoral cutting block A / P* indicates the offset on the *Adapter Femur.*



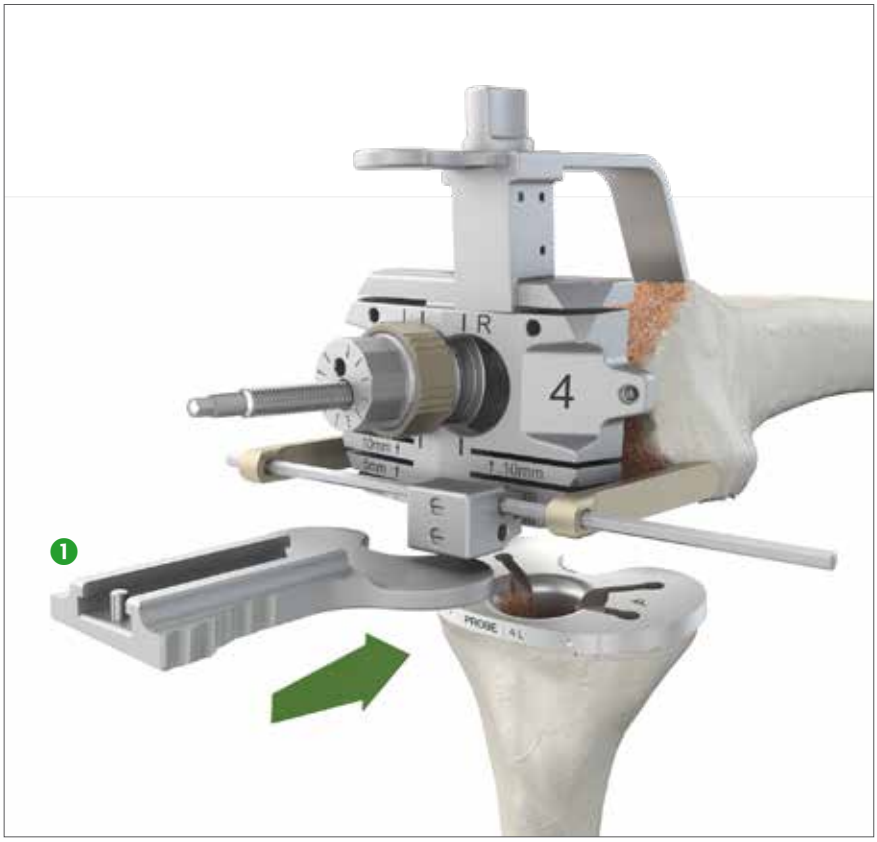


4 **Femoral preparation**

Evaluating flexion space

61

The *Shoe* (❶) for the respective side (right or left) is inserted to evaluate the flexion space. Flexion stability for a specific femoral size can be determined with Spacers (❷) 7 - 17 mm (SC and RH/TH), and 19 - 25 mm (RH/TH only).



62

Now it is checked whether the lowest insert height of 7 mm can be used, respectively how much the extension space differs from the flexion space.

Differences between extension space and flexion space can be corrected by changing the diameter of the *Reference Stem straight* or the *Reamer with Guide Rod*, or by using a FEMUR Component of a different size.

If a *TRIAL TIBIAL Component RH/TH* has been used, make sure when placing the *Shoe* that it is not in contact with the rotation pin of the *TRIAL TIBIAL Component RH/TH*.

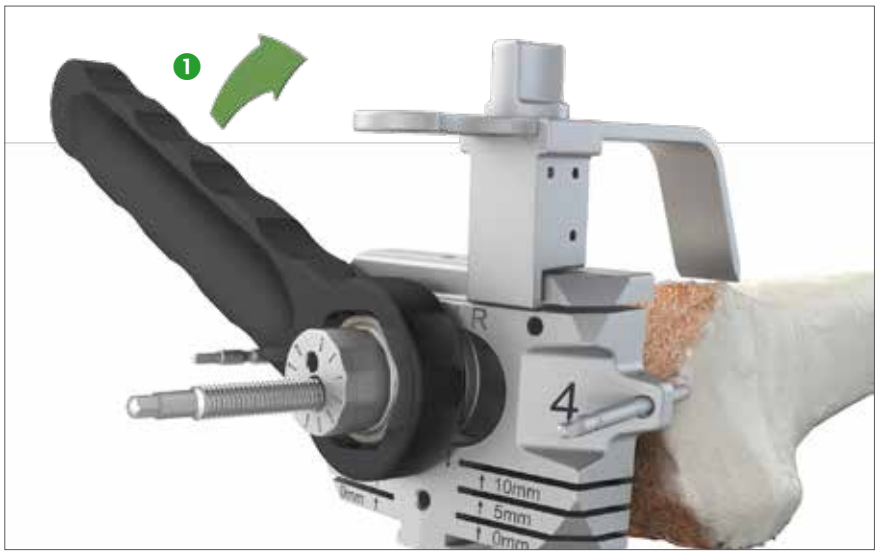
4 Femoral preparation

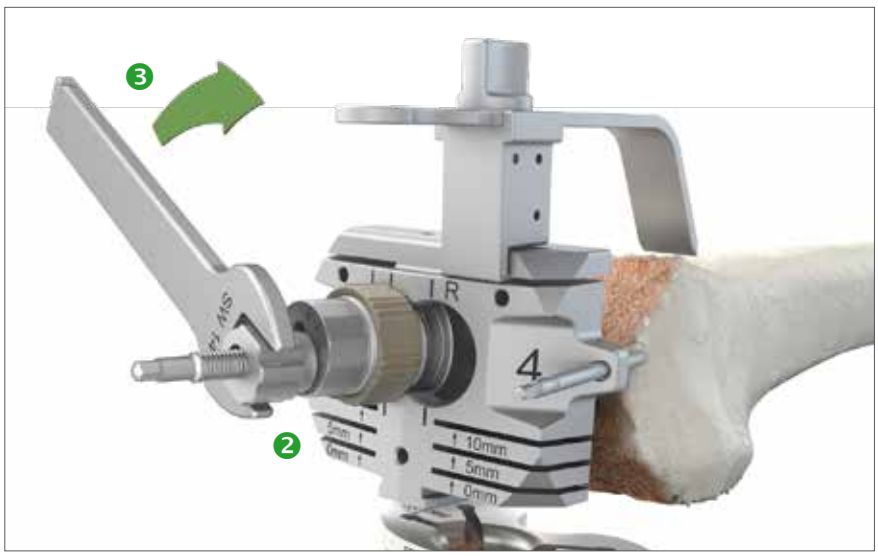
Verifying the A/P resections, securing, and performing the osteotomies

63

After the construct has been aligned, it is secured by oblique *Pins with Corticalis Thread Size: Ø 3,15 x 70 mm* and the Epicondylar Feeler Gauge is removed.

Additionally, the *Hexagonal clamping nut PEEK* can be secured with the *Ring-Wrench for Hexagonal Clamping Nut* (❶), and the *Clamping nut* (❷) can be secured with the *Flat Wrench AF14* (❸).





4 **Femoral preparation**

Verifying the A/P resections, securing, and performing the osteotomies

64

Then the A/P osteotomies are verified with the *Visualisation Guide S* and the instruments for adjusting rotational alignment as well as the *Femoral stylus* is removed.

! NOTE

Posterior augments are not compatible to 15 or 20 mm distal augments.

Now the A/P osteotomies are performed.

Posterior resection guide 0 mm, and for augments 5 mm and 10 mm.

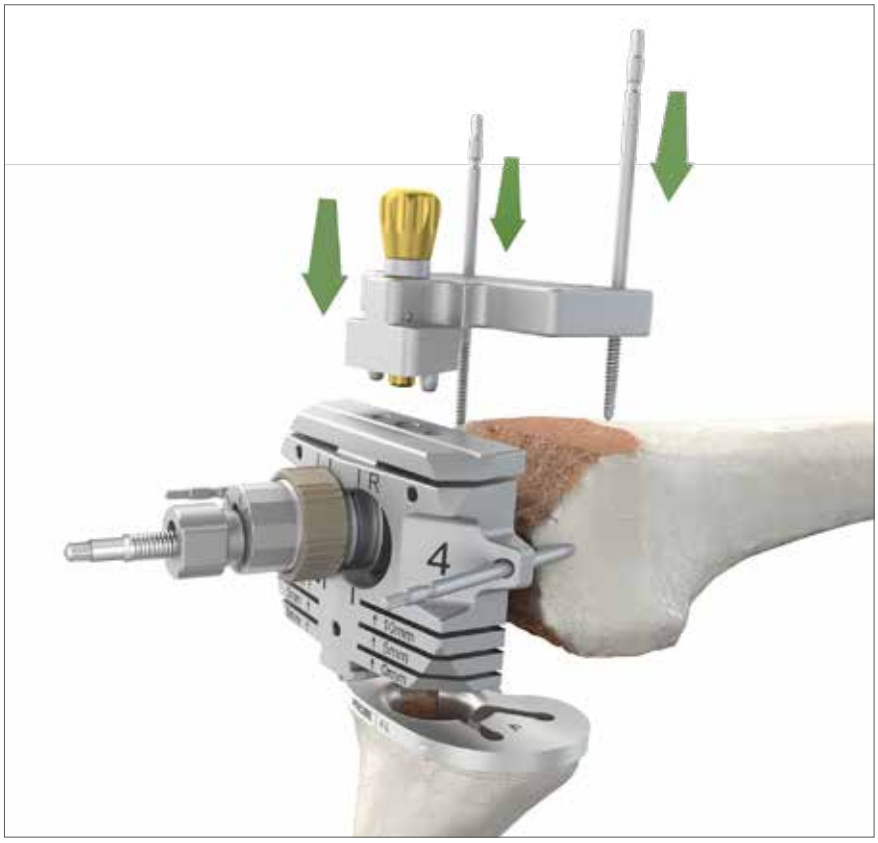
In case of 15 or 20 mm distal augments, posterior defects are to be stabilised with commercial bone cement.

4 Femoral preparation

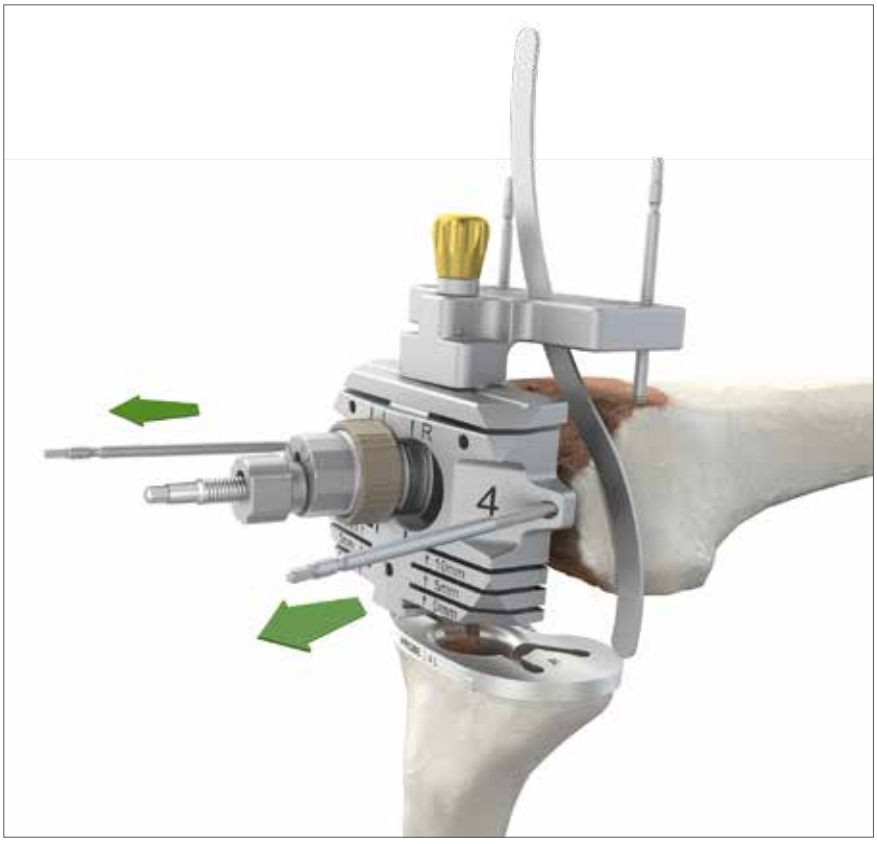
Assembling and securing the Femoral cutting block distal

65

Then the *Femoral cutting block distal* is attached to the *Femoral cutting block A / P* and secured with 2 *Pins with Corticalis Thread Size: Ø 3,15 x 70 mm.*



The pins on the *Femoral cutting block A/P* are removed and the distal osteotomy is checked with the *Visualisation Guide S.*

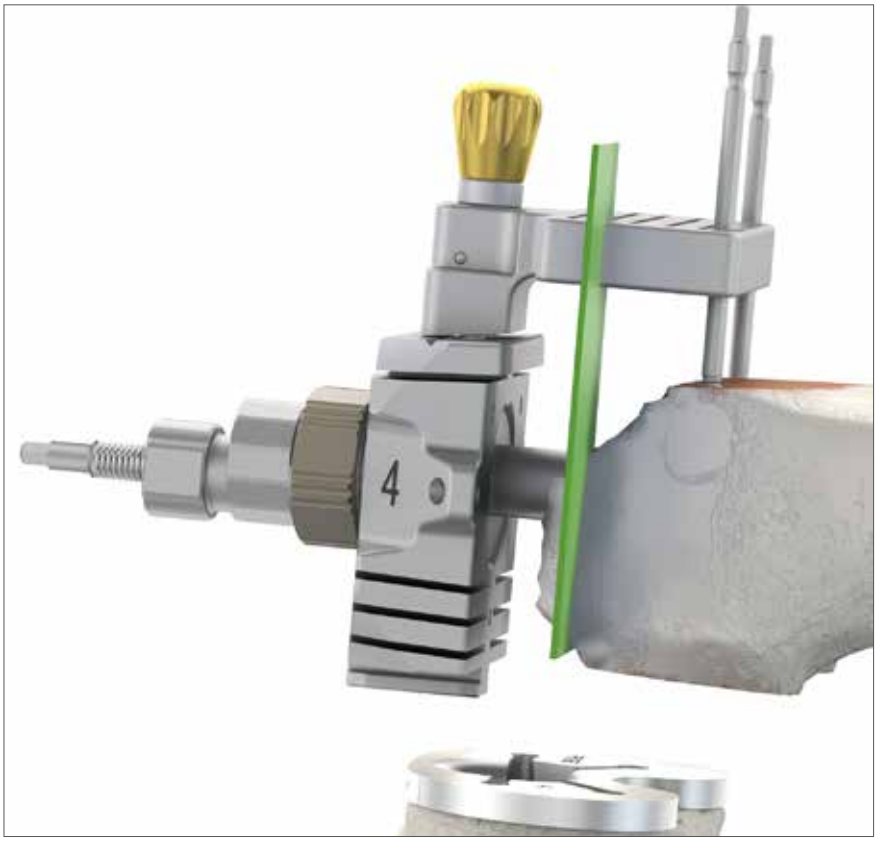


4 **Femoral preparation**

Assembling and securing the Femoral cutting block distal

66

Now the distal osteotomy is performed.



Distal resection guide 0 mm, and for augments 5, 10, 15 and 20 mm.

4 Femoral preparation

Assembling and placing the Box preparation

67

If the resection considered augments, then the appropriate *Box-Augment distal* and *posterior* must be inserted into the *Box preparation.*

68

The following box augments are available:

- Posterior: 5 mm, 10 mm
  (Not compatible to distal augments 15 or 20 mm)
- Distal: 5 mm, 10 mm, 15 mm, 20 mm

Box-Augments distal

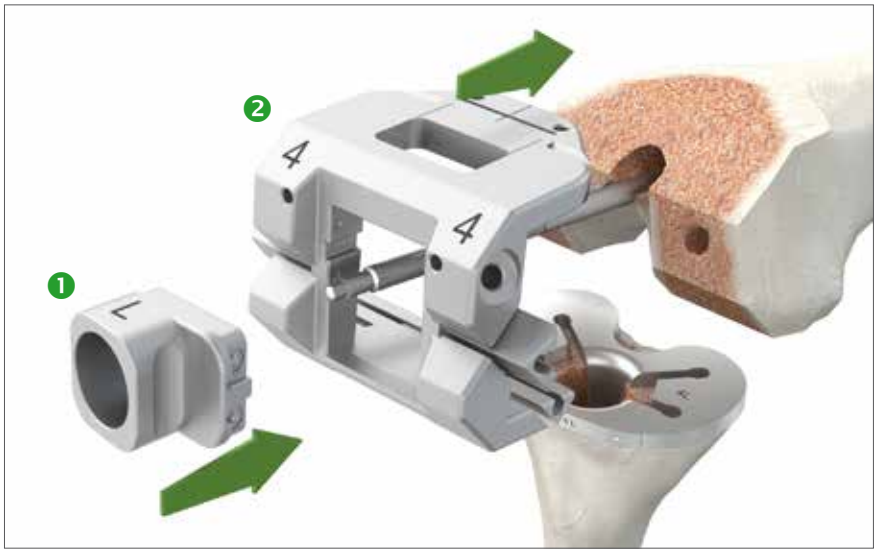
Box-Augments posterior

4 Femoral preparation

Assembling and placing the Box preparation

69

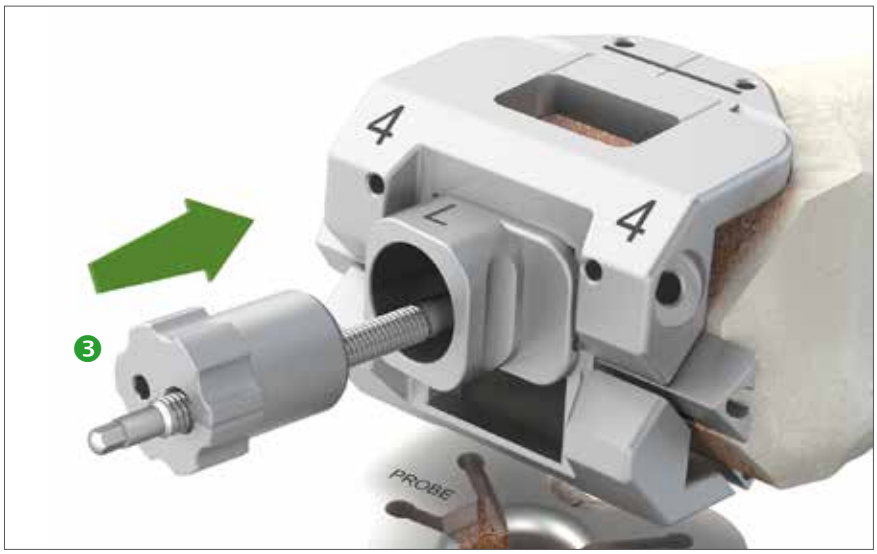
The *Drill Guide Ø 19 mm for Box preparation* (❶) is inserted into the *Box preparation* (❷) of the appropriate size and mounted on the distal femur guided by the *Guide Rod* or the *Reamer with Guide Rod*. Ensure to use the proper right "R" or left "L" position marked on the *Drill Guide Ø 19 mm for Box preparation*. The label on the instrument indicating the position must be visible anteriorly.



! NOTE

Observe right / left application of *Drill Guide Ø 19 mm for Boxpreparation.*

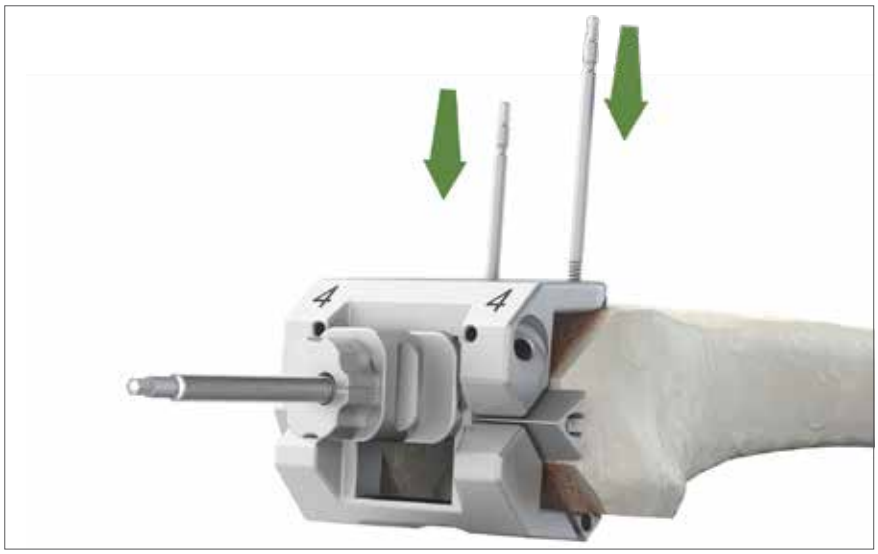
Then the *Centralizer bushing* (❸) with the offset determined in item 60 is slid over the *Guide Rod* or the *Reamer with Guide Rod* into the *Drill Guide Ø 19 mm for Box preparation* to obtain the desired M / L alignment.



! NOTE

Align and secure the position of the *Box preparation* at the *Guide Rod.*

The *Box preparation* is secured with 2 *Pins with Corticalis Thread Size: Ø 3,15 x 70 mm*. Then the *Centralizer bushing*, the *Drill Guide Ø 19 mm for Box preparation,* and the *Guide Rod* or the *Reamer with Guide Rod* are removed.



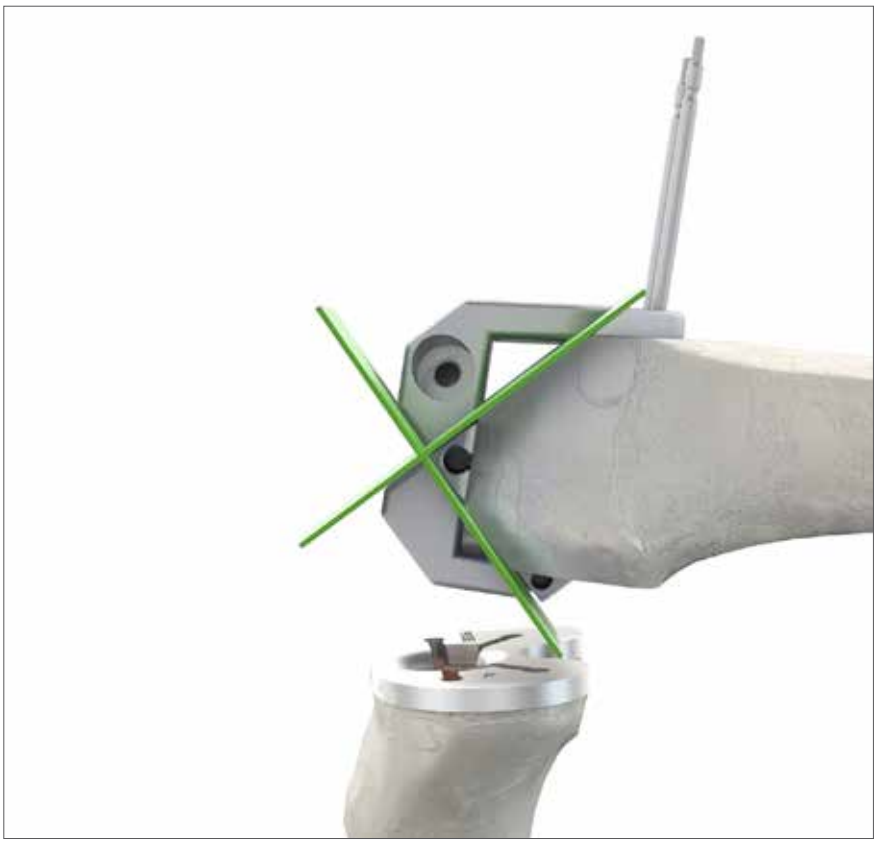
If it is not possible to remove the *Reamer with Guide Rod* through the opening of the *Box preparation*, then the *Box preparation* must be removed with it. Distally inserted *Pins with Corticalis Thread Size: Ø 3,15 x 70 mm* or an anterior marking can be used to ensure reliable repositioning.

4 Femoral preparation

Oblique osteotomies and preparing the femoral box

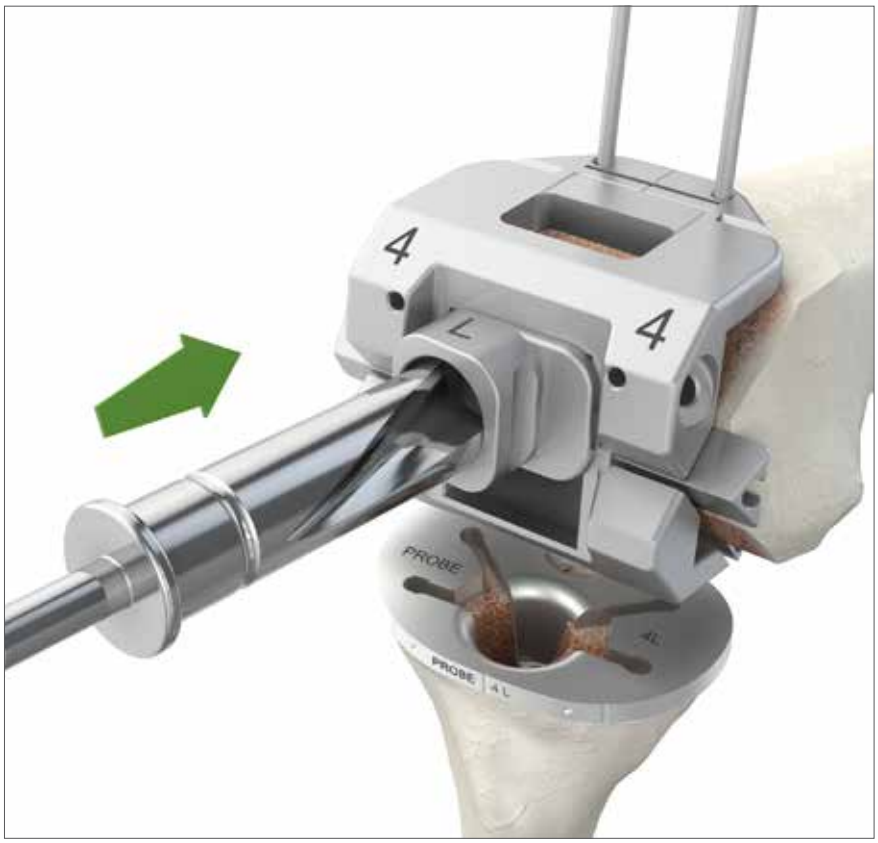
70

Now the oblique osteotomies are performed.



71

After the *Drill Guide Ø 19 mm for Box preparation* has been reinserted, the femur is drilled with the *Drill Size: Ø 19 mm.*

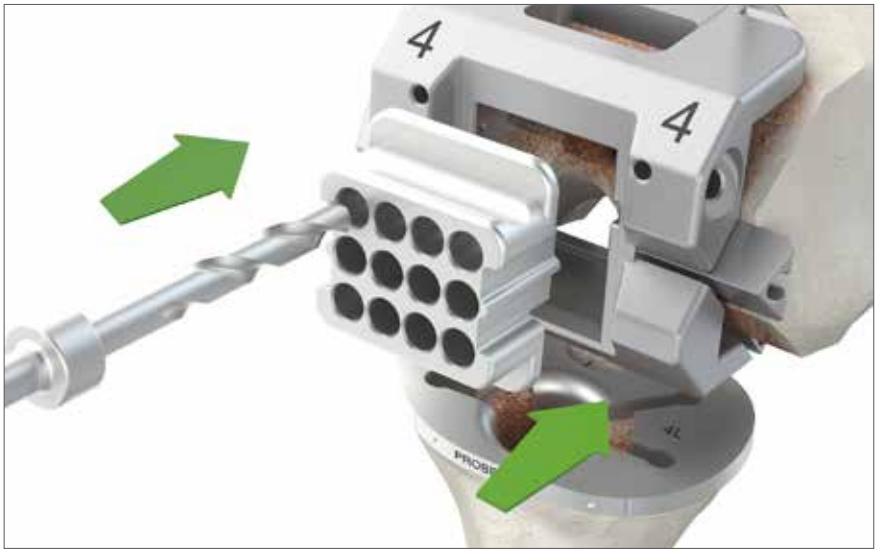


4 **Femoral preparation**

Preparing the femoral box (alternative 1)

72

The *Drill Guide Ø 6 mm* and the *Drill AO Coupling Size: Ø 6 mm* can be used to remove excess bone in the box.



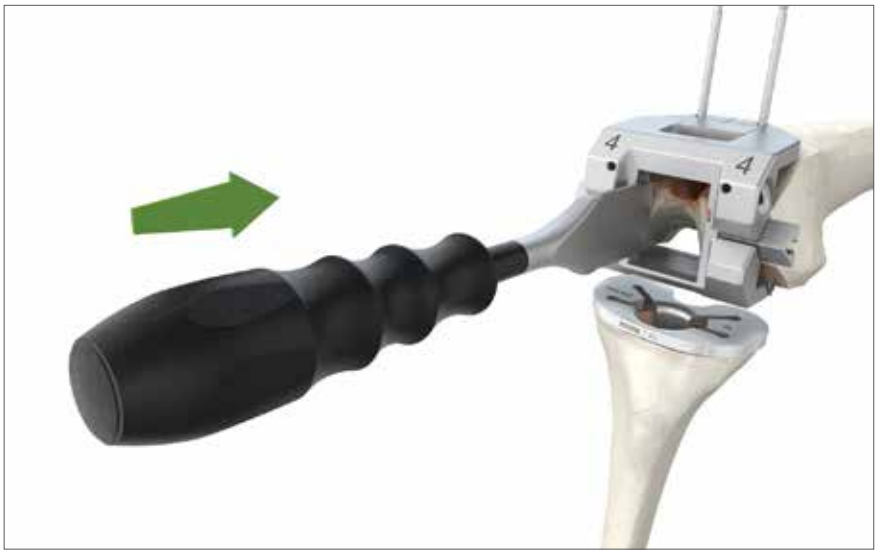
73

The edges of the box can be created with the *Box Chisel*. The *Handle for Impactor / Extractor* is attached to the *Box Chisel* for this purpose.

! NOTE

Ensure that the marking "anterior" on the *Box Chisel* is legible from anterior.

The *Cutting chisel* is used to remove any remaining structures. The inner wall of the *Box preparation* acts as a guide whereas the stop on the *Cutting chisel* ensures the necessary dissection depth. The posterior structures must hereby be taken into account.

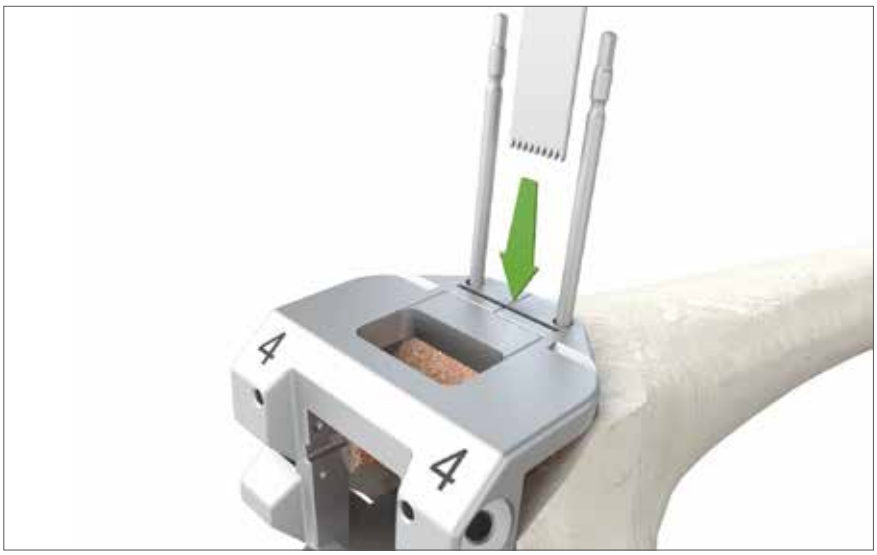


4 Femoral preparation

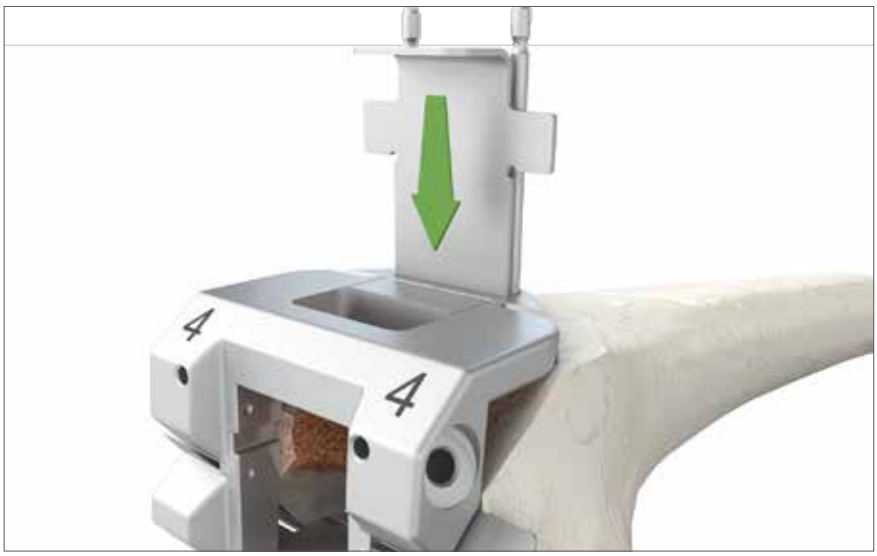
Preparing the femoral box (alternative 2)

74

Alternatively, the box can be dissected with an oscillating saw. First the distal resection is performed through the anterior slot in the *Box preparation.* Be careful to maintain proper axial alignment during the resection.



After the *Depth Stop for Box Preparation* has been inserted, a distal osteotomy is carried as far as the *Depth Stop for Box preparation* to mobilize the block of bone. The inner wall of the *Box preparation* acts as a guide for the saw blade.



4 **Femoral preparation**

Evaluating the box resection

75

The *Depth gauge for Box preparation* is used to determine the width and depth of the box osteotomy, before all instruments are removed.

4 Femoral preparation

Evaluating the femoral resection

76

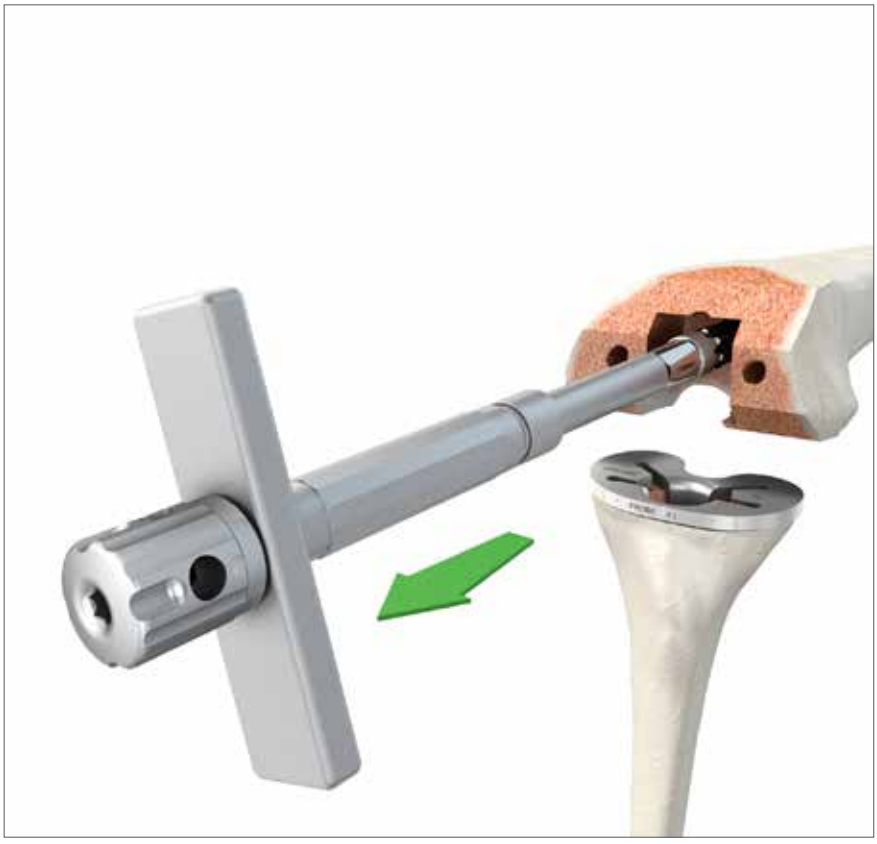
All instruments are removed except for the *Reference Stem Straight*, if applicable. The *TRIAL Femoral Component SC / RH / TH* can then be placed to evaluate the osteotomies and the femoral box.

If the resection considered *TRIAL AUGMENTS Femur SC / RH / TH,* then they must first be inserted into the *TRIAL Femoral Component SC / RH / TH.*

The size of the augment depends on the size of the femur.

77

If necessary, the *Guide Rod* is screwed into the *Reference Stem straight*, and the *Handle Impactor / Extractor* is slid over it and secured with the *Knurled Screw S.* Then the *Reference Stem straight* can be extracted.



5 **TRIAL FEMORAL Component**

Assembling the TRIAL Femoral Component RH/TH

78

The *TRIAL Femoral Component SC / RH / TH* is assembled by inserting the *TRIAL Yoke for Femur RH / TH* into the intercondylar box.

The axis holes on the *TRIAL Femoral Component SC / RH / TH* and *TRIAL Yoke for Femur RH / TH* are aligned superposable and the *Trial Hinge* is inserted.

The size of the *TRIAL Yoke for Femur RH / TH* depends on the size of the *TRIAL Femoral Component SC / RH / TH.*

5 TRIAL FEMORAL Component

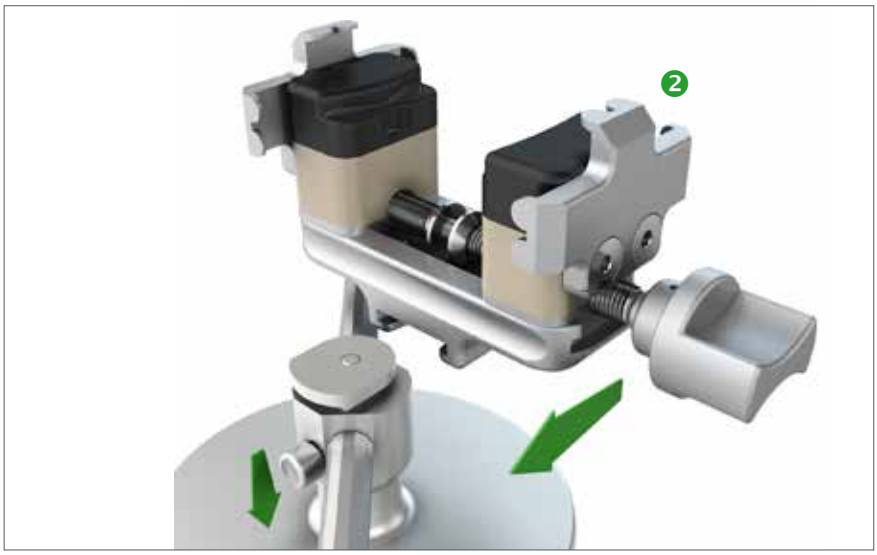
Attaching the TRIAL Femoral Components SC and RH/TH to the Assembling base plate and placing TRIAL Augments

79

Two *Handles* can be screwed onto the sides of the *Assembling base plate* to stabilize the Femoral Assembly Block for later tightening the components.

80

The Femoral Assembly Block consists of the *Assembling base plate* (❶) and the *Femoral Impactor / Extractor* (❷). Pressing down the locking button allows to slide the *Femoral Impactor / Extractor* onto the *Assembling base plate* and to secure it.



81

The *TRIAL Femoral Component SC / RH / TH* is mounted on the *Femoral Impactor / Extractor* for assembly.

If the resection considered augments, then the *Trial AUGMENTS Femur* must be inserted into the *TRIAL Femoral Component SC / RH / TH.*

5 **TRIAL FEMORAL Component**

Assembling the TRIAL Stem Straight and TRIAL Adapter Femur

82

To assemble the *TRIAL Stem Straight,* a *TRIAL Counter Nut for Adapter* is screwed onto the preselected *TRIAL femoral adapter SC / RH / TH (0, 4,* or *6 mm offset)* all the way to the end of the threading.

The size of the *TRIAL Adapter Femur* depends on the size of the *TRIAL Femoral Component SC / RH / TH.*

83

Now the *TRIAL Stem Straight* of the selected length is screwed into the *TRIAL Adapter Femur* hand tight.

5 TRIAL FEMORAL Component

Assembling the TRIAL Stem Straight and TRIAL Adapter Femur

84

For screwing in the gold *Socket Wrench AF3,5* can be used.

85

The *TRIAL Stem Straight* together with the *TRIAL Adapter Femur* is screwed all the way into the *TRIAL Femoral Component SC / RH / TH* and secured with the *TRIAL Counter Nut for Adapter.*

5 **TRIAL FEMORAL Component**

TRIAL Adapter Femur 4 mm and 6 mm Offset for TRIAL Femoral Components SC and RH/TH

86

If an offset was used when adjusting the *Femoral cutting block A / P*, then the corresponding sizes of the *TRIAL Femoral Component SC / RH / TH* and *TRIAL Adapter Offset Femur* must also be used.

The following rules should be observed when assembling the trial implants:

- All threaded connections must be screwed tight.
- When using a *TRIAL Adapter Offset Femur,* the predetermined offset position must be set within one backward turn and secured with the hand tightened *TRIAL Counter Nut for Adapter*.
- Ensure proper transition of offset position.

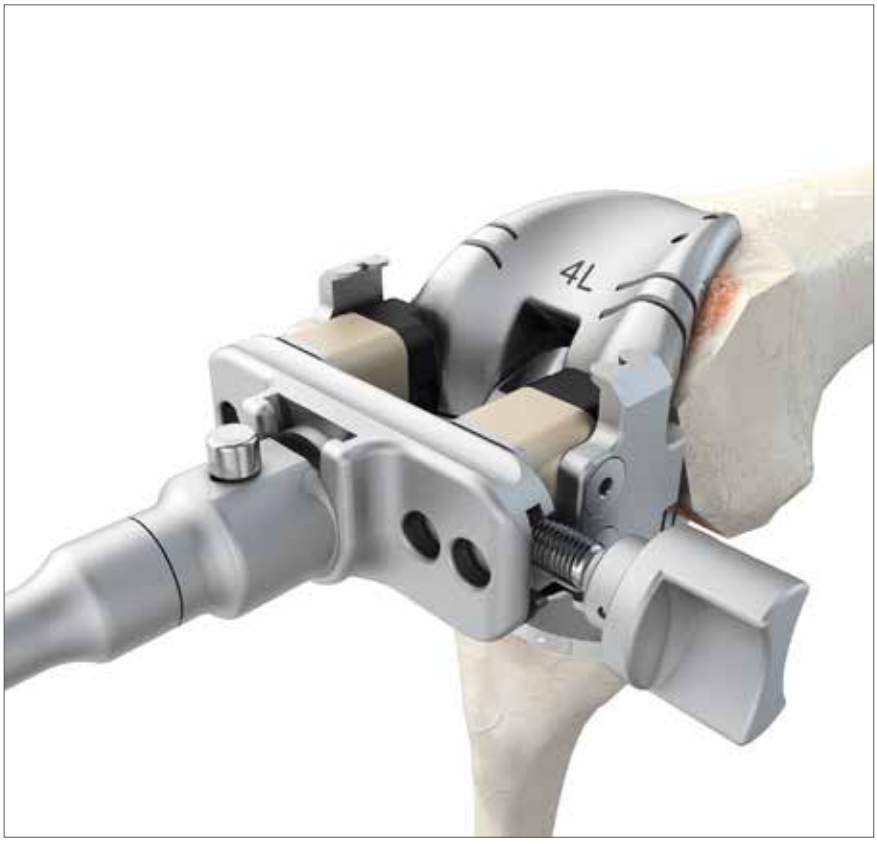
5 TRIAL FEMORAL Component

Placing the TRIAL Femoral Component

87

To place the *TRIAL Femoral Component SC / RH / TH*, the *Assembling base plate* is removed and the *Handle for Impactor/Extractor* is connected.

Place the *TRIAL Femoral Component SC / RH / TH.*

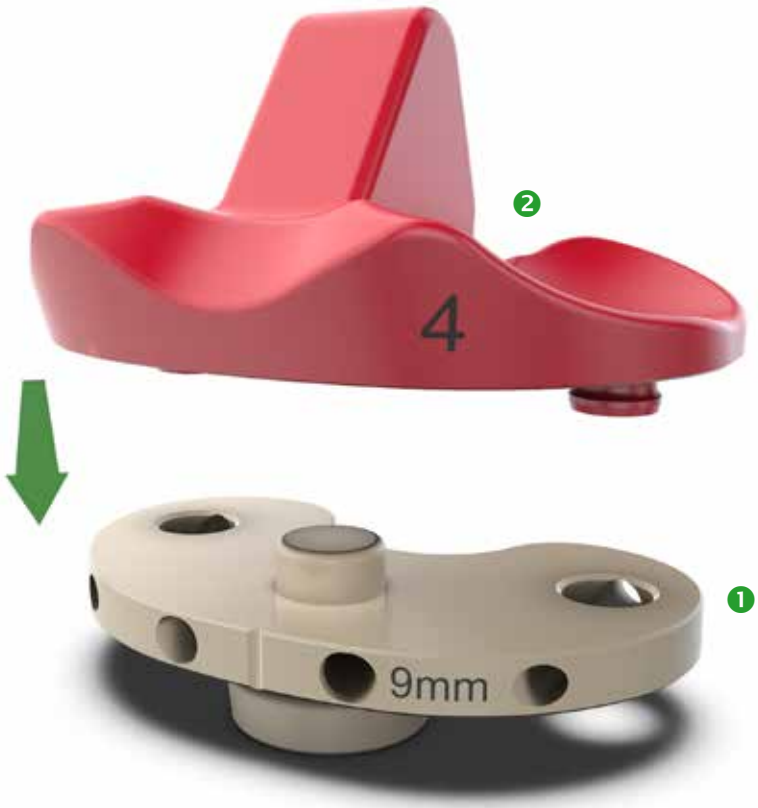


5 **TRIAL FEMORAL Component**

Assembling the TRIAL INSERT

88

The size of the *TRIAL INSERT SC or RH / TH* (❷) should be selected according to the size of the FEMUR Component. The *TRIAL INSERT Adapter UC / SC* or *TRIAL TIBIAL Base Plate RH / TH* (❶) is selected according to the insert height determined by evaluating joint space in flexion and extension. The two components are pressed together for the trial reduction.



Assembling the *TRIAL INSERT SC*

89

The *TRIAL INSERT Adapter UC / SC* or *TRIAL TIBIAL Base Plate RH / TH* is independent of the size of the FEMUR Component and available in the heights of 7 - 17 mm (SC / RH / TH) and 19 - 25 mm (RH / TH only).

Assembling the *TRIAL INSERT RH / TH*

5 TRIAL FEMORAL Component

Placing the TRIAL INSERT SC

90

The *Trial Insert Holder* is used to place the *TRIAL INSERT Adapter UC / SC* together with the assembled *TRIAL INSERT SC* into the joint space.

91

The joint should now be moved through its range of motion to evaluate stability and function. If necessary, different heights of PE-INSERTS can be used.

! NOTE

- Use trial Implants exclusively for the selection of corresponding final implants.
- Ensure that trial Implants are not implanted.

5 TRIAL FEMORAL Component

Placing the TRIAL INSERT RH/TH and TRIAL YOKE RH

92

The *TRIAL INSERT RH/TH* is slid over the pin of the *TRIAL TIBIAL Component RH/TH.*

93

The *Yoke sling* (❶) is screwed into the *TRIAL COUPLING PIN for PE-INSERT* (❷) of the appropriate height. The *Yoke assembling device* (❸) can be used for this purpose.

94

When placing the *TRIAL COUPLING PIN for PE-INSERT,* make sure that the loop of the *Yoke sling* faces forward and is not be bent or damaged.

The *TRIAL COUPLING PIN for PE-INSERT* should be selected according to the height of the *TRIAL INSERT RH/TH.*

5 TRIAL FEMORAL Component

Connecting the TRIAL YOKE RH

95

The loop of the Yoke sling is now visible through the *TRIAL Yoke for Femur RH/TH.*

Moving the knee through its range of motion makes it easier to center the *TRIAL Yoke for Femur RH/TH* over the *TRIAL COUPLING PIN for PE-INSERT.*

96

The hook of the *Yoke assembling device* is hooked into the loop of the *Yoke sling*.

5 TRIAL FEMORAL Component

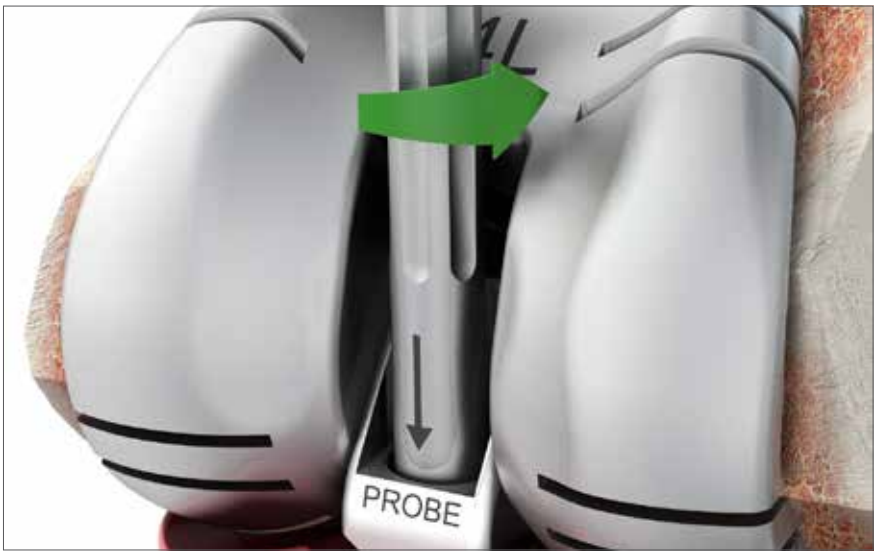
Coupling the TRIAL Component RH/TH

97

To pull the *TRIAL COUPLING PIN for PE-INSERT* into the *TRIAL Yoke for Femur RH / TH* you must now use the *Yoke assembling device* as a lever to pry the *Yoke sling* upwards.

98

The *Yoke sling* is then unscrewed with the *Yoke assembling device.*



99

The last step is to remove the *Yoke sling.*

5 TRIAL FEMORAL Component

Coupling the TRIAL Component RH/TH

100

The *TRIAL COUPLING PIN for PE-INSERT* is secured in the *TRIAL Yoke for Femur RH / TH* with an additional *TRIAL Clamp Screw M6 x 0,5* which is tightened with the *Socket Head Wrench AF5.*

101

The joint is now moved through its range of motion to evaluate the stability and function of the complete trial construct. If necessary, different heights of inserts can be used.

! NOTE

- Use trial Implants exclusively for the selection of corresponding final implants.
- Ensure that trial Implants are not implanted.

5 **TRIAL FEMORAL Component**

Removing the TRIAL Component SC

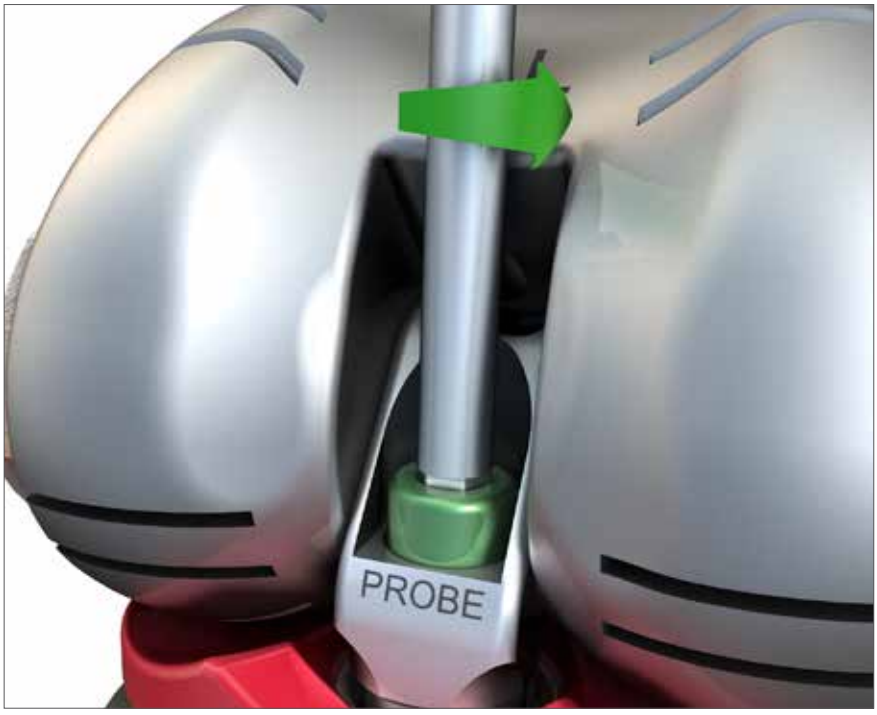
102

The *TRIAL INSERT SC* is lifted with the *Trial Insert Holder* so that it can be pulled out anteriorly.

Disconnecting the TRIAL YOKE RH

103

The TRIAL assembly is disconnected by unscrewing the *TRIAL Clamp Screw M6 x 0,5* with the *Socket Head Wrench AF5.*

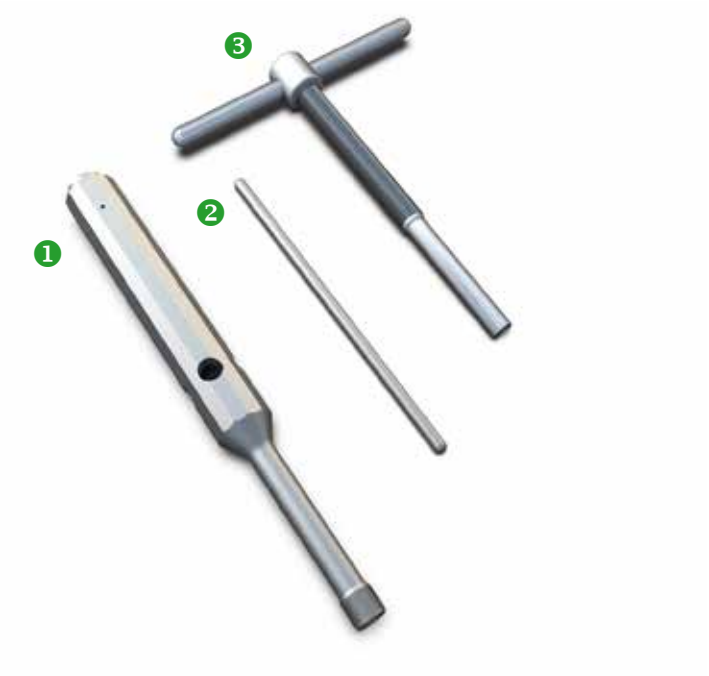


5 TRIAL FEMORAL Component

Disconnecting the TRIAL YOKE RH

104

Next the *Removing Handle* (❶) is screwed into the *TRIAL Yoke for Femur RH / TH* and the *Removing Rod* (❷) is inserted from above. Then the *Removing Mandril* (❸) is screwed into the *Removing Handle* and turned clockwise until the taper connection separates.



5 TRIAL FEMORAL Component

Removing the TRIAL YOKE RH

105

To remove the *TRIAL Yoke RH / TH*, screw in the *Yoke sling* using the *Yoke assembling device* and remove it together with the *TRIAL Yoke for Femur RH / TH.*

106

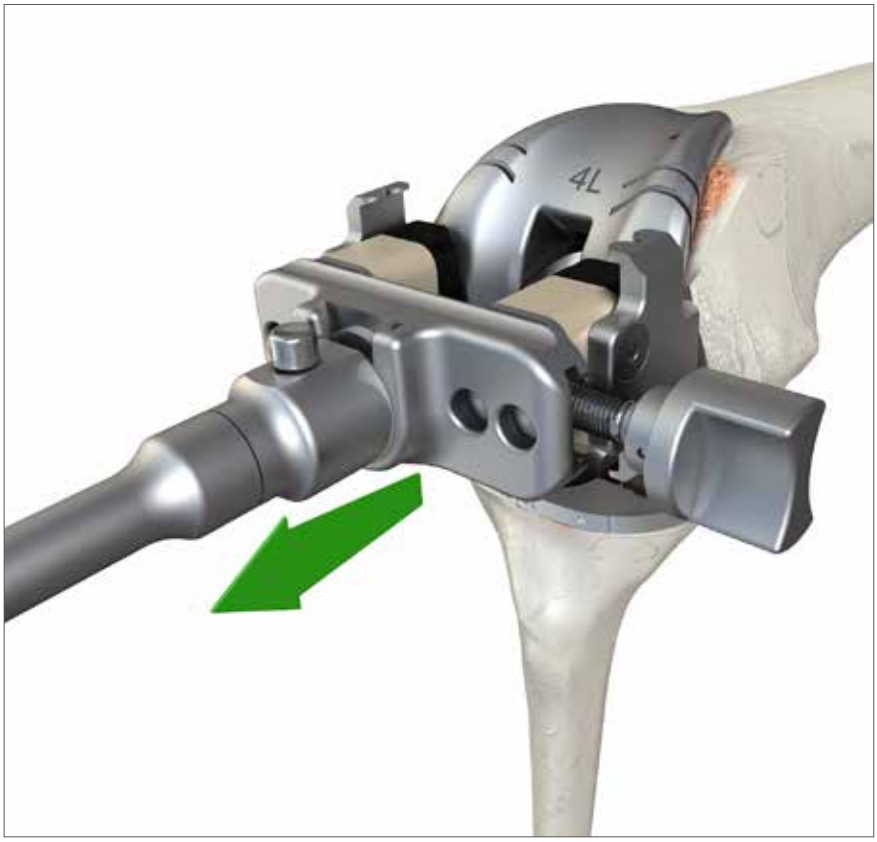
The *TRIAL INSERT* is removed anteriorly.

5 TRIAL FEMORAL Component

Removing the TRIAL Femoral and Tibial Components

107

The *Femoral Impactor / Extractor* and *Tibial Impactors* (see items 53 and 54) are attached to the *TRIAL Components* and the *TRIAL Components* are removed.



108

In case of tightly pressed *TRIAL ANCHORING Stems*, the *TRIAL TIBIAL Component SC* or *RH / TH* is extracted with *Mandril Extractor TRIAL Tibia SC* (❶) and the *Handle Extractor TRIAL Tibia SC* (❷) or with the *Extractor RH / TH Tibia* (❸) resepctively.

! NOTE

Tibial Impactor UC / SC, or *Tibial Impactor RH / TH* shall not be used to remove *TRIAL TIBIAL Components* with tightly pressed *TRIAL ANCHORING Stems*.

6 Assembling the tibial implant

Assembling the AUGMENTS Tibia

109

The TIBIA Component is clamped in the *Assembling base plate* in the same manner as the *TRIAL TIBIAL Component* (items 42 - 47). If AUGMENTS Tibia are used, they are then attached to the TIBIAL Component with the appropriate CLAMP SCREW for Augments and hand tightened with the *Socket Head Wrench AF3,5.*

The maximum augmentation height of 15 mm can be achieved using multiple medial and lateral AUGMENTS Tibia stacked one on top of the other. AUGMENTS Tibia of different sizes can be combined as needed.

The length of the Clamp Screw depends on the height of the respective compartment.

Stacking AUGMENTS Tibia

6 **Assembling the tibial implant**

Assembling the ADAPTER Tibia and ANCHORING STEM Straight

110

The ANCHORING STEM Straight and the ADAPTER Tibia are assembled in the same way as *TRIAL Stem Straight* and the *TRIAL Tibial Adapter* (items 48-51).

! NOTE

- TIBIA and FEMUR Component SC and RH/TH are to be used with ADAPTER and ANCHORING STEM Straight only.
- Before coupling, check implant components for contaminations and clean it up thoroughly if applicable.

Assembling the OFFSET ADAPTER Tibia

111

When an OFFSET ADAPTER Tibia is used, the offset is adjusted in the same manner as for the *TRIAL Tibial Adapter* (item 52).

! NOTE

Make sure that the position of the offset adapter corresponds to the position read off previously when transferring to the Implant.

6 **Assembling the tibial implant**

Tightening the tibial implants

! NOTE

- Secure LOCK NUT for Adapter and ANCHORING STEM Straight with *Torque Key 25 Nm*.
- Make sure that the *Torque Key 25 Nm* is guided with the right hand and that the torque scale can be read from above.
- Ensure that the limiting mechanism of the *Torque Key 25 Nm* is triggered by an audible "klick".
- Do not use *Torque Key 25 Nm* to loosen screw connections.

6 Assembling the tibial implant

Tightening the tibial implants

112

For tightening the ANCHORING STEM Straight and the ADAPTER Tibia, insert the *Flat Wrench AF14 for Torque Key* into the *Torque Key 25 ± 1 Nm* and place it on the ANCHORING STEM Straight.

A *Flat Wrench AF14* placed on the ADAPTER Tibia acts as a brace. Then the two implants are tightened until you hear an audible click.

113

To tighten the LOCK NUT for Adapter, insert the *Flat Wrench AF17 for Torque Key* into the *Torque Key 25 Nm* and place it on the LOCK NUT for Adapter. A *Flat Wrench AF14 for Torque Key* placed on the ADAPTER Tibia acts as a brace. The offset position is again verified. Then the LOCK NUT for Adapter is tightened until you hear an audible click. The final step is to verify the correct stem position again.

6 **Assembling the tibial implant**

Assembling the Tibial Impactor

114

After the assembled TIBIA Component has been removed from the *Assembling base plate*, the *Handle for Impactor / Extractor* is connected.

RH / TH

SC

7 Assembling the femoral implant

Placing the CEMENT PROTECTION for Femur Component SC

115

The *CEMENT PROTECTION for Femur Component SC* must now be placed. The *Trial Insert Holder* (❶) can be used for this purpose.

! NOTE

Make sure that the *CEMENT PROTECTION for Femur Component* completely seals the open femoral box until full hardening of the bone cement is achieved.

Correctly positioned *CEMENT PROTECTION for Femur Component SC cemented*

Incorrectly positioned *CEMENT PROTECTION for Femur Component SC cemented*

7 Assembling the femoral implant

Placing the CEMENT PROTECTION for Femur Component RH/TH

116

The *CEMENT PROTECTION for Femur Component RH / TH* must now be placed to protect the femoral box. The *Trial Insert Holder* (❶) can be used for this purpose. The *CEMENT PROTECTION for Femur Component RH/TH* is pulled down and over the *YOKE Neck RH / TH*, which is in extension, with the T*rial Insert Holder*.

! NOTE

Make sure that the *CEMENT PROTECTION for Femur Component* completely seals the open femoral box until full hardening of the bone cement is achieved.

Correctly positioned *CEMENT PROTECTION for Femur Component RH / TH.*

Incorrectly positioned *CEMENT PROTECTION for Femur Component RH / TH.*

7 Assembling the femoral implant

Assembling the AUGMENTS Femur

117

The FEMUR Components are assembled in the *Assembling base plate* in the same manner as the T*RIAL FEMORAL Components* (items 79 - 81). The appropriate AUGMENTS Femur are screwed onto the FEMUR Component with the *Cardan Screw Driver AF3,5* or the *Socket Head Wrench AF 3,5* and hand tightened.

The size of the AUGMENT Femur depends on the size of the FEMUR Component.

Assembling the ANCHORING STEM Straight and ADAPTER Femur

! NOTE

- TIBIA and FEMUR Component SC and RH/TH are to be used with ADAPTER and ANCHORING STEM Straight only.
- Before coupling, check implant components for contaminations and clean it up thoroughly if applicable.

118

The ANCHORING STEM Straight and the ADAPTER Femur are assembled in the same way as *TRIAL Stem Straight* and the *TRIAL Adapter Femur* (items 82-85).

7 Assembling the femoral implant

Assembling the OFFSET ADAPTER Femur SC/RH/TH

119

When the OFFSET ADAPTER Femur is used, the offset is adjusted in the same manner as for the *TRIAL Adapter Offset for Femur* (see item 86).

If a *TRIAL Adapter Offset for Femur* was used, then a OFFSET ADAPTER Femur must also be used with the implant. The setting is read off the *TRIAL Adapter Offset for Femur* and transferred.

The size of the OFFSET ADAPTER Femur depends on the size of the FEMUR Component.

! NOTE

Make sure that the position of the offset adapter corresponds to the position read off previously when transferring to the Implant.

7 Assembling the femoral implant

Tightening the FEMUR Component

! NOTE

- Secure LOCK NUT for Adapter and ANCHORING STEM Straight with *Torque Key 25 Nm*.
- Make sure that the *Torque Key 25 Nm* is guided with the right hand and that the torque scale can be read from above.
- Ensure that the limiting mechanism of the *Torque Key 25 Nm* is triggered by an audible "klick".
- Do not use *Torque Key 25 Nm* to loosen screw connections.

120

The FEMUR Component is tightened in the same manner as the TIBIA Components (see items 112-113). Both the ANCHORING STEM Straight and the FEMUR Component must be tightened with the ADAPTER Femur.

7 Assembling the femoral implant

Assembling the Femoral Impactor

121

Then the *Femoral Impactor / Extractor* is disconnected from the *Assembling base plate* and connected to the *Handle for Impactor / Extractor.*

8 **Placing the implants**

Placing the medullary cement lock

! NOTE

- PETER BREHM GmbH recommends determining the correct positioning of the implant with intraoperative X-rays as well as discovering any fractures with immediate treatment options if necessary.
- Carry out implantation carefully (setting cerclages, screws or plates if necessary).
- Ensure that there is no contact between the bone cerclage or osteosynthesis screw and the prosthesis.

The BPK-S Integration system does not provide standard equipment for placing medullary cement lock. When third-party systems are used, it is important to compare the length of the seating instrument to the length of the implant.

Follow the instructions in the manufacturer's manual.

Those portions of the bone where cement will be used to fix implants are carefully cleaned of contaminants such as residues from reaming, blood, and medullary fat using suitable irrigation instruments (brush, jet lavage) and then dried. The cleaner the surface is, the farther the bone cement can penetrate into the cancellous bone. Drying prevents formation of a parting layer of liquid between the cement and cancellous bone.

After preparation of the bone cement, the medullary canal is filled in retrograde fashion with the aid of a cement syringe.

Placing the TIBIA Component SC

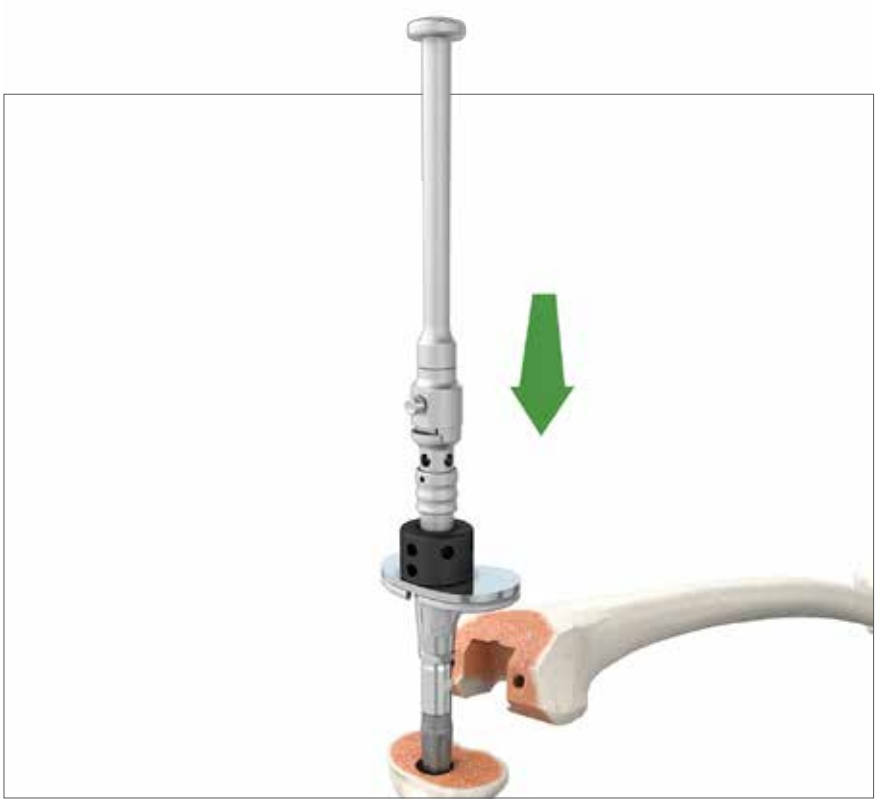
Order of implantation
1. TIBIA Component
2. PE-INSERT
3. FEMUR Component
4. Secure PE-INSERT with Locking Pin

All bone interfering components of the implant system must be cemented except the ANCHORING STEMS Straight cementless. They must be dry and clean when placed.

122

The TIBIAL Component SC is inserted with the *Tibial Impactor UC / SC.*

For greater clarity, the following figures do not show the bone cement.



8 **Placing the implants**

Placing the FEMUR Component SC

123

Placing the FEMUR Component SC.

124

After the FEMUR Component SC has been placed, the *CEMENT PROTECTION for Femur Component SC* and any residual cement must be removed. Particular attention should be paid to the open femoral box.

Thoroughly clean the implant components to remove any foreign bodies (such as residual cement, tissue, bone) from the implants.

8 Placing the implants

Placing the PE-INSERT SC Mobile

125

Once the cement has hardened, the PE-INSERT is placed.

8 **Placing the implants**

Securing PE-INSERT SC Mobile

126

The *Impactor for Locking Bolt* is screwed onto the Locking Pin.

127

The *Impactor for Locking Bolt* is driven in with the *Hammer 700g* to secure the PE-INSERT.

Make sure that the Locking Pin snaps into place within the TIBIA Component SC.

Finally, the wound closure of the knee joint is carried out in the usual manner.

8 Placing the implants

Placing the implant components RH/TH

The TIBIA and FEMUR Components RH/TH are implanted in the same manner as the TIBIA and FEMUR Components SC (see items 122 and 124).

All bone interfering components of the implant system must be cemented except the ANCHORING STEMS Straight cementless. They must be dry and clean when placed.

128

After the FEMUR Component RH/TH has been placed, the *CEMENT PROTECTION for Femur Component RH/TH* and any residual cement are removed. Particular attention should be paid to the open femoral box.

When removing residual cement, take care to ensure that no cement interferes with or blocks the YOKE RH/TH.

Thoroughly clean the implants to remove any foreign bodies (such as residual cement, tissue, bone) from them.

8 **Placing the implants**

Placing the PE-INSERT RH/TH and the COUPLING PIN for PE-INSERT

! NOTE

- Carefully clean (rinse with NaCl 0.9%) and dry prior to assembly of the morse taper junction.
- Before coupling, check implant components for contaminations and clean it up thoroughly if applicable.

129

The PE-INSERT RH/TH of the selected height is slid over the pin of the TIBIA Component RH/TH.

130

The *Yoke sling* is screwed into the COUPLING PIN for PE-INSERT, which is then inserted into the TIBIA Component RH/TH.

The COUPLING PIN for PE-INSERT should be selected according to the height of the PE-INSERT.

131

When placing the COUPLING PIN for PE-INSERT, make sure that the loop of the *Yoke sling* faces forward and is not be bent or damaged.

8 Placing the implants

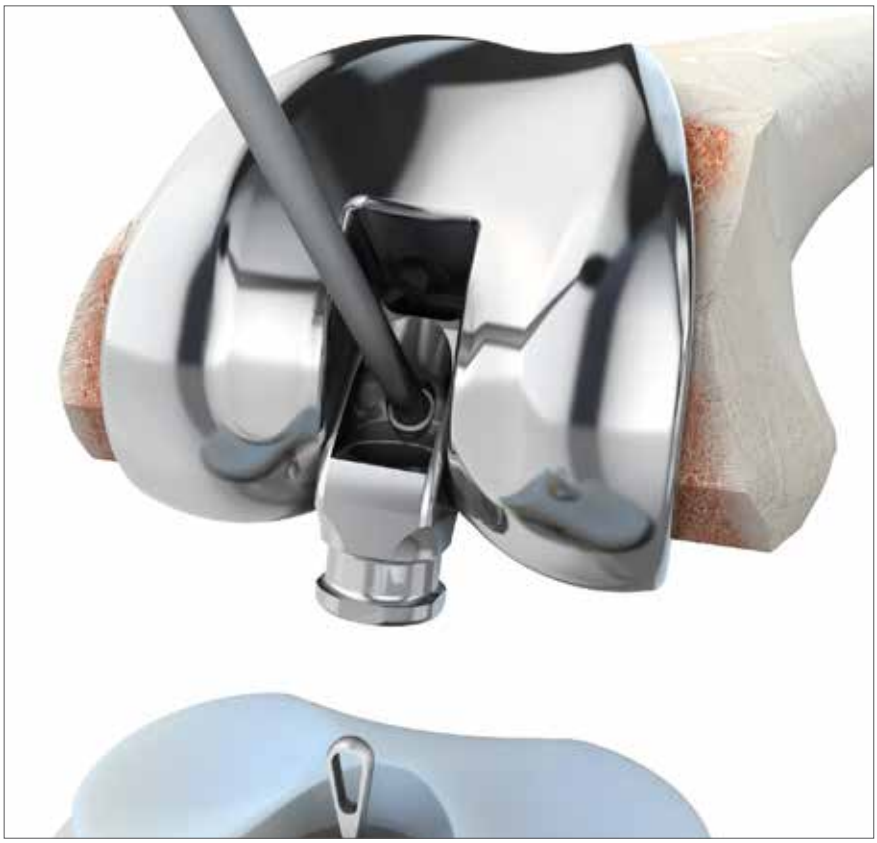
Disassembling the AXIS LOCK

132

Before the YOKE RH/TH and COUPLING PIN for PE-INSERT can be connected, the AXIS LOCK must be temporarily removed from the preassembled FEMUR Component RH/TH. This is done with the aid of the *Socket Head Wrench AF5/AF3,5.*

133

The AXIS LOCK is reinserted once the components have been joined together and tightened (see item 140).



8 **Placing the implants**

Connecting the COUPLING PIN for PE-INSERT

134

The FEMUR Component RH/TH is positioned on the PE-INSERT so that the YOKE RH/TH is centered over the COUPLING PIN for PE-INSERT.

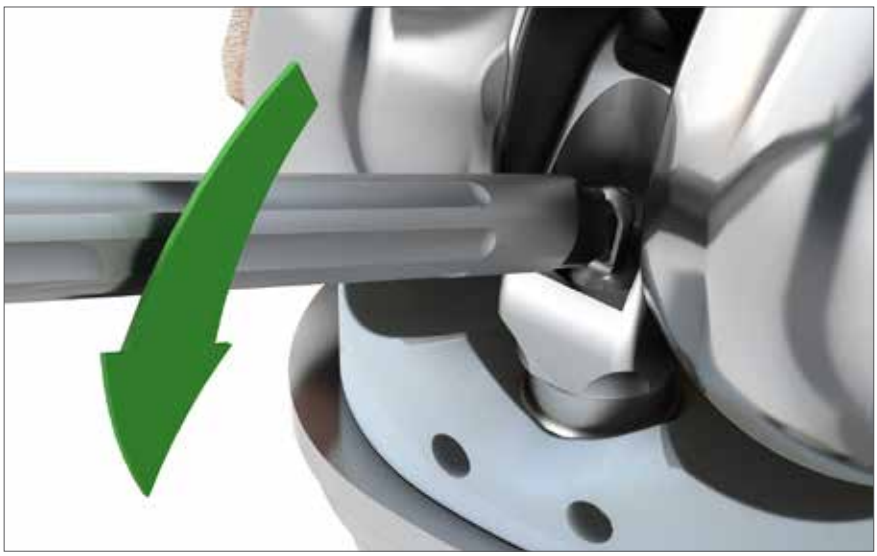
Moving the knee through its range of motion makes it easier to center the YOKE RH/TH above the COUPLING PIN for PE-INSERT.

135

The loop of the *Yoke sling* will now be visible.

136

To pull the COUPLING PIN for PE-INSERT into the YOKE RH/TH the *Yoke assembling device* has to be used as a lever to pry the *Yoke sling* upwards.



8 Placing the implants

Removing the Yoke Sling

137

After the connection is made, the *Yoke Sling* is unscrewed with the *Yoke assembling device* and removed.

8 **Placing the implants**

Securing and tightening the COUPLING PIN for PE-INSERT

138

The COUPLING PIN for PE-INSERT is secured in the YOKE RH / TH by the CLAMPING SCREW which is screwed in and tightened with the *Socket Head Wrench AF5*.

139

To tighten the CLAMPING SCREW, the *Counter Holder* is placed on the FEMUR Component RH / TH.

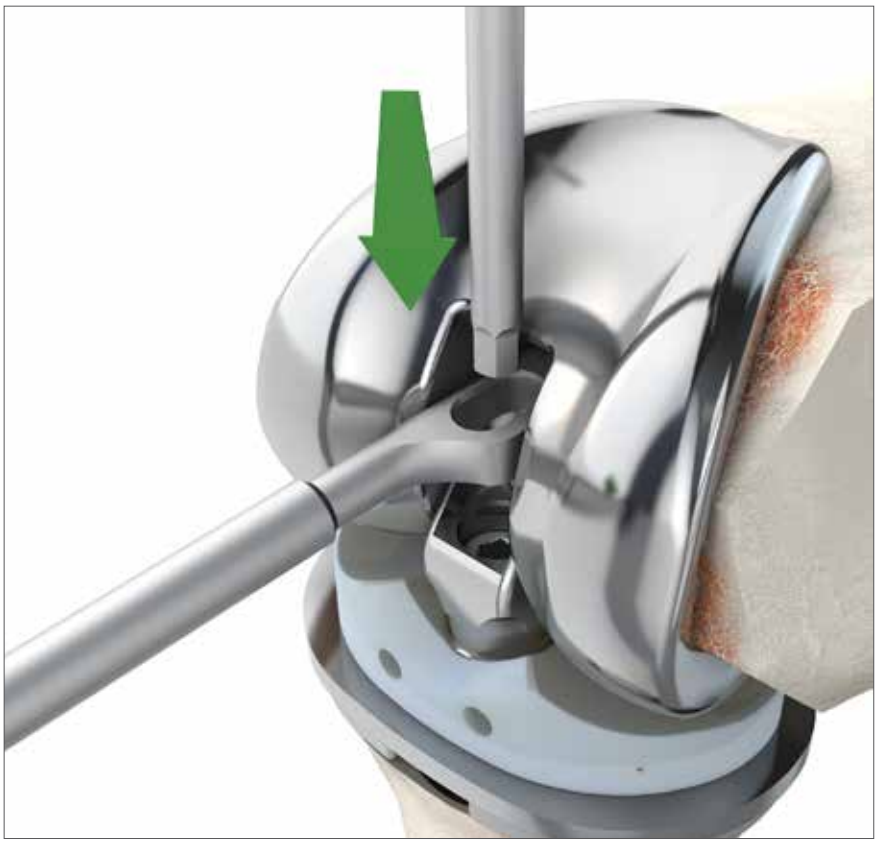
8 Placing the implants

Securing and tightening the COUPLING PIN for PE-INSERT

! NOTE

- Secure CLAMP SCREW with the *Torque Limiter 25±1 Nm.*
- Ensure that the limiting mechanism of the *Torque Limiter 25±1 Nm* is triggered by an audible "klick".
- Do not use *Torque Limiter 25±1 Nm* to loosen screw connections.

The *Socket Head Wrench AF5* (with the socket head wrench connection) is placed in the CLAMP SCREW. Then the *Torque Key 25 ± 1 Nm* and the *Tommy Bar for Socket Head Wrench AF 6* are attached.



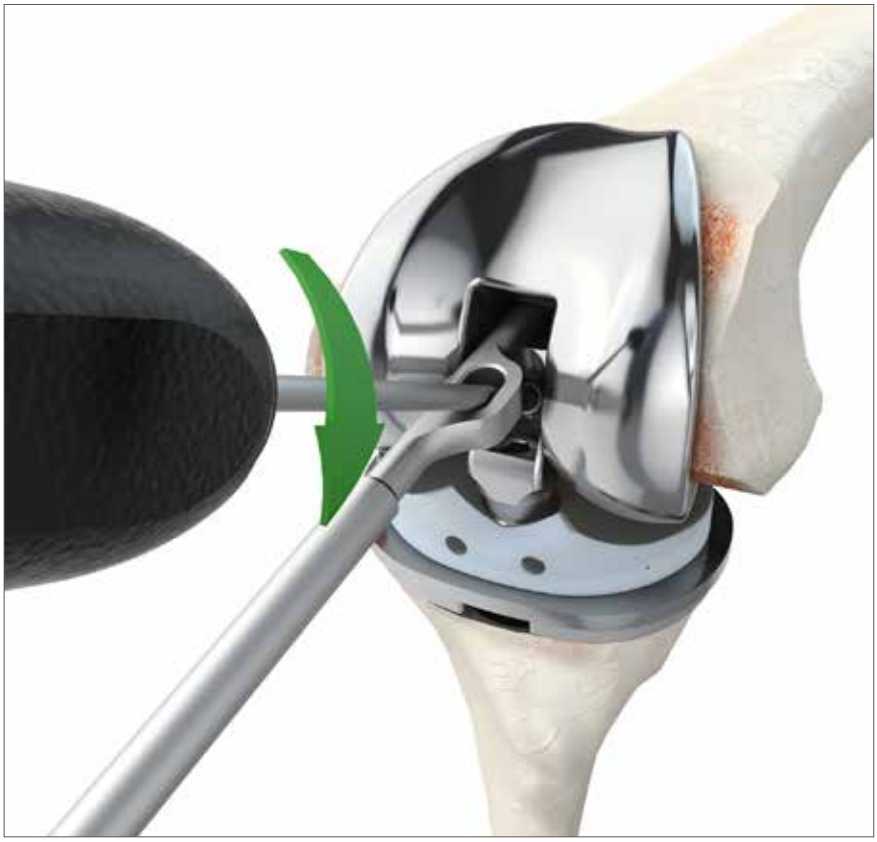
Then the CLAMP SCREW is tightened to a defined torque with the *Torque Key 25 ± 1 Nm.*

8 **Placing the implants**

Assembling the AXIS LOCK

140

The AXIS LOCK, which had been temporarily removed, is reinserted once the implants have been joined together and tightened (see item 133). The *Socket Head Wrench AF5 / AF3,5 with snap ring* is used for this, the screw is hand tightened. Then the *Counter Holder* can be withdrawn again.

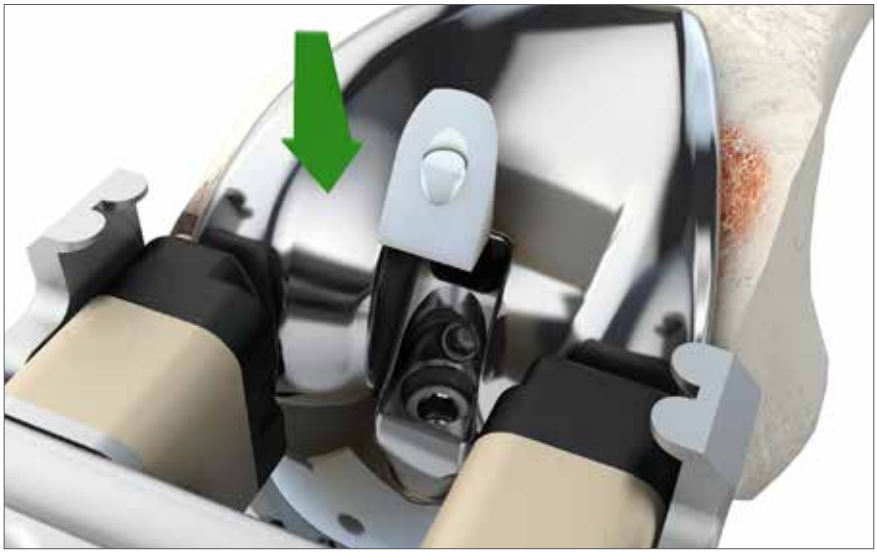


8 Placing the implants

Placing and securing the BUMPER for Femur

141

The *BUMPER for Femur RH / TH* is placed by hand.



The *BUMPER for Femur RH / TH* is pressed in and locked with the narrow side of the *Socket Head Wrench AF5 / AF3,5*.

Wrong

Right

142

Finally, the wound closure of the knee joint is carried out in the usual manner.

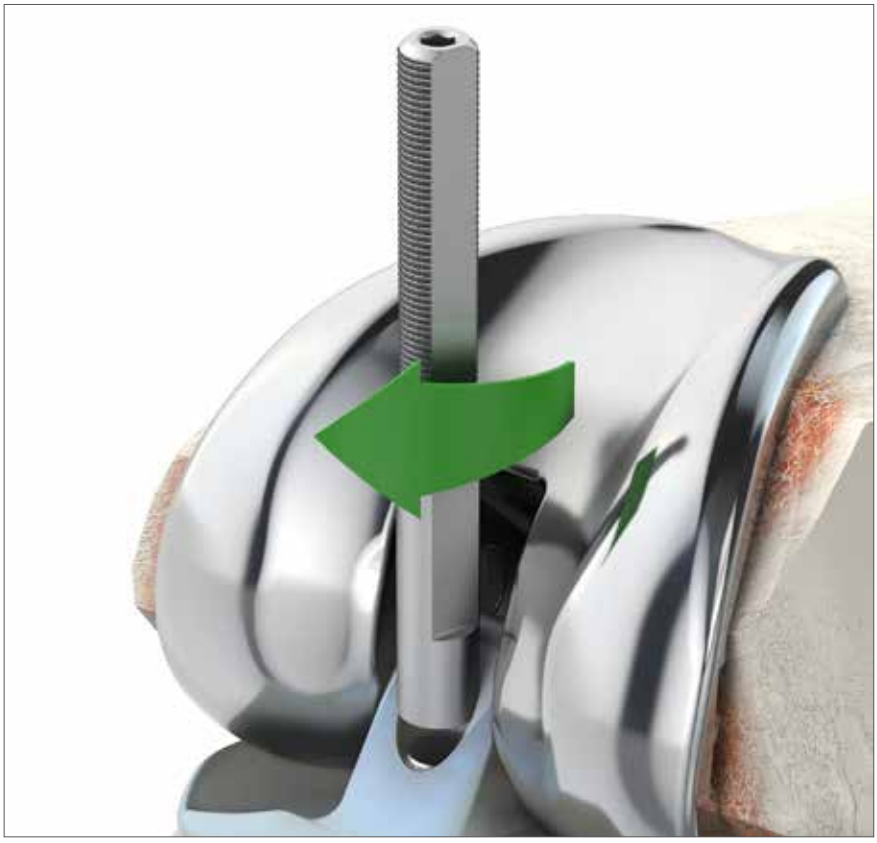
9 **Appendix**

Replacing the PE-INSERT SC Mobile

143

In order to replace the PE-INSERT SC Mobile, the Locking Bolt must be removed with the removal device.

To do this, the inner section of the *Extractor for Locking Bolt (inner)* is first screwed onto the Locking Bolt.



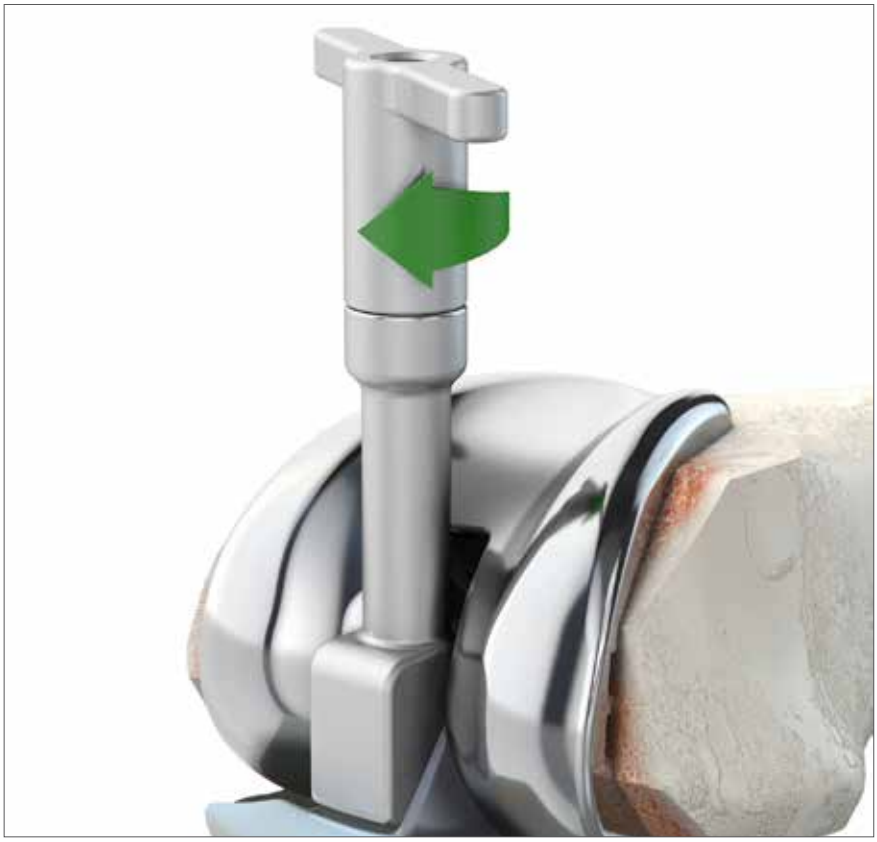
The *Extractor for Locking Bolt (outer)* is slid over it. Then the *Extractor for Locking Bolt (Knob)* is attached.

9 **Appendix**

Replacing the PE-INSERT SC Mobile

144

The Locking Bolt can then be removed by turning it clockwise.



145

A new Locking Bolt must be used whenever the PE-INSERT is replaced.

9 **Appendix**

Disconnecting the COUPLING PIN for PE-INSERT

To disconnect the COUPLING PIN for PE-INSERT, first remove the *BUMPER for Femur* using a flat instrument like an osteotome. Then the AXIS LOCK is unscrewed using the *Socket Head Wrench AF5 / AF3,5.*

146

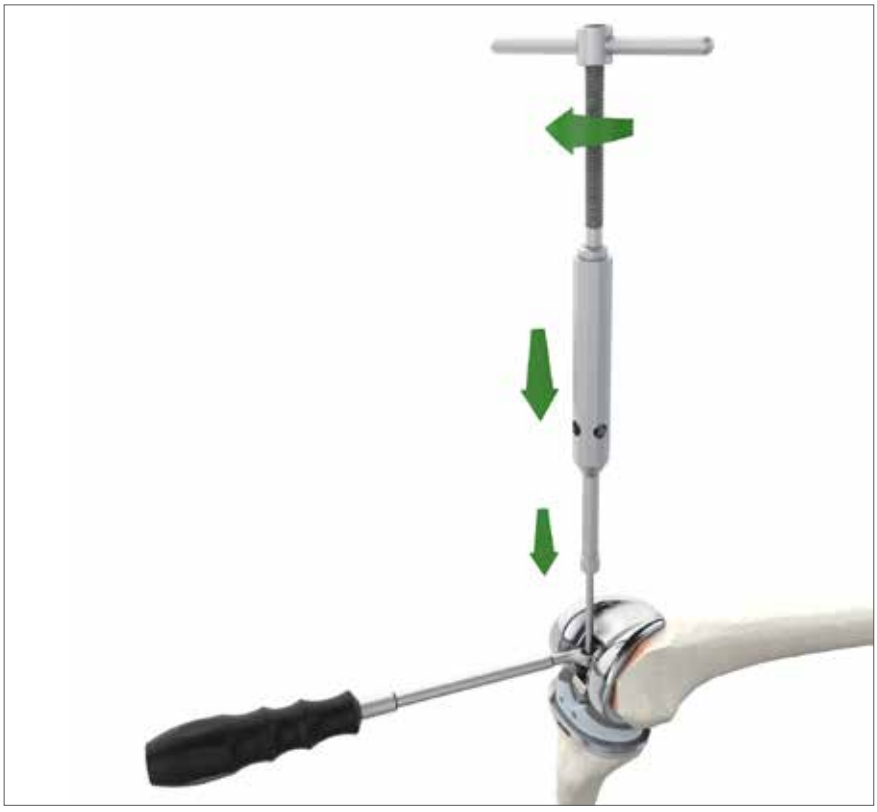
To remove the CLAMP SCREW, attach the *Socket Head Wrench AF5* and the *Tommy Bar for Socket Head Wrench AF 6* and unscrew the CLAMP SCREW. To remove the CLAMP SCREW, the *Counter Holder* is placed on the FEMUR Component RH / TH.

! NOTE

- When loosening the CLAMP SCREW, always use the *Counter Holder* to prevent the transfer of rotational forces to the bone.
- Do not use *Torque Limiter 25±1 Nm* to loosen screw connections.

147

To release the COUPLING PIN for PE-INSERT from the taper connection, the *Removing Handle* is screwed into the YOKE RH / TH, the *Removing Rod* is inserted, and the *Removing Mandril RH / TH* is screwed in until the taper connection separates. The *Counter Holder* is also used for separating the taper connection.



! NOTE

Always use *Counter Holder* when working with the removing instruments or the *Torque Limiter 25±1 Nm* - also when screws are to be removed! -, to prevent transfer of rotational forces to the bone.

9 Appendix

Removing the COUPLING PIN for PE-INSERT and PE-INSERT

148

After the separating instrument has been removed, the COUPLING PIN for PE-INSERT can be removed from the TIBIA Component RH / TH with the aid of a clamp and the PE-INSERT RH / TH can be pushed off anteriorly.

A new CLAMP SCREW and a new COUPLING PIN for PE-INSERT must be used whenever the PE-INSERT is replaced.

BPK-S INTEGRATION

SYSTEM INFORMATION

! NOTE

- Observe possible size combinations of FEMUR / TIBIA / PE-INSERT and PATELLA.
- Take care of size specific application of CEMENT PROTECTION, COUPLING PIN, YOKE RH + TH, BUMPER, AXIS LOCK, CLAMP SCREW for Augment and Locking Pin.

Size combinations for FEMUR and TIBIA Components (Revision)

	Tibia size						
Femur size		3	4	5	6	7[1]	8[1]
	3						
	4						
	5						
	6						

[1] The TIBIA Components in sizes 7 and 8 are only available as UC / SC versions (not augmentable, 3° tibial slope) and SC versions.

Size combinations for FEMUR Components and PATELLA (Revision)

	Patella	Diameter			
Femur size		24	28	32	36
	3				
	4				
	5				
	6				

The patellar preparation is described in the surgical technique BPK-S Integration primary.

Overview ANCHORING STEMS BPK-S Integration

	Length (mm)					
	40		80		140	
Diameter (mm)	cemented	cementless	cemented	cementless	cemented	cementless
10	■		■		■	
11						
12	■		■		■	
13		■		■		■
14	■	■	■	■	■	■
15		■		■		■
16	■	■	■	■	■	■
17		■		■		■
18	■	■	■	■	■	■
19		■		■		■
20	■	■	■	■	■	■
21		■		■		■
22	■	■	■	■	■	■
23		■		■		
24		■		■		
25		■		■		
26		■		■		
27		■		■		
28		■		■		
29		■		■		
30		■		■		

Implants corresponding to the size of the FEMUR Component (Revision)

The sizes of the following implants and instruments are based on the size of the FEMUR Components SC and RH / TH:

- PATELLA (without figure)
- PE-INSERT (without figure)
- CEMENT PROTECTION (without figure)
- ADAPTER Femur (without figure)
- AUGMENT Femur (without figure)
- YOKE RH + TH (❶)
- BUMPER for Femur RH + TH (❷)
- AXIS LOCK (❸)

The length of the Locking Pin and the COUPLING PIN RH (❹) or TH (❺) corresponds to the height of the PE-INSERT used.

UC/SC and SC Components

1 FEMUR Component SC cemented
- Size 3, 4, 5, 6 left / right
- Valgus angle 6° (connector for ADAPTER Femur and ANCHORING STEM Straight)

2 AUGMENT Femur SC/RH/TH
- Distal 5 mm, 10 mm, 15 mm, 20 mm
- Posterior 5 mm, 10 mm
  (Not compatible to distal augments 15 or 20 mm)
- Distal/posterior 5 mm, 10 mm

3 ADAPTER Femur
- 0 mm, 4mm, 6 mm Offset

4 ANCHORING STEM Straight
- Cementless
  - Ø 13 …. Ø 22 mm (1 mm increments); Length 40, 80, 140 mm
  - Ø 23 …. Ø 30 mm (1 mm increments); Length 40, 80 mm
- Cemented
  - Ø 10 …. Ø 22 mm (2 mm increments); Length 40, 80, 140 mm

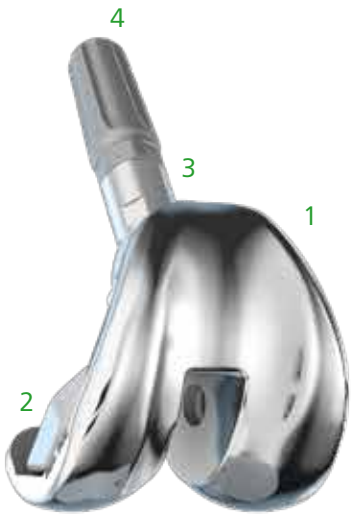
5 PE-INSERTS SC Mobile
- Height 7 - 17 mm (2 mm increments)

6 Locking Pin
- Size: 7, 9, 11, 13, 15, 17 mm

7 TIBIA Component UC/SC cemented
- Size 3, 4, 5, 6, 7, 8 left/ right
- Asymmetrical tibial component
- 3° posterior slope
- NOT augmentable

8 ADAPTER Tibia
- 0 mm, 4 mm, 6 mm Offset, 3°

9 PATELLA cemented
- Size 3, 4, 5, 6
- Ø 24/8 mm, 28/8 mm, 32/8 mm, 36/8 mm



SC Components

1 FEMUR Component SC cemented
- Size 3, 4, 5, 6 left / right
- Valgus angle 6° (connector for ADAPTER Femur and ANCHORING STEM Straight)

2 AUGMENT FEMUR SC / RH / TH
- Distal 5 mm, 10 mm, 15 mm, 20 mm
- Posterior 5 mm, 10 mm (Not compatible to distal augments 15 or 20 mm)
- Distal / posterior 5 mm, 10 mm

3 ADAPTER Femur
- 0 mm, 4 mm, 6 mm Offset

4 ANCHORING STEM Straight
- Cementless
  - Ø 13 …. Ø 22 mm (1 mm increments); Length 40, 80, 140 mm
  - Ø 23 …. Ø 30 mm (1 mm increments); Length 40, 80 mm
- Cemented
  - Ø 10 …. Ø 22 mm (2 mm increments); Length 40, 80, 140 mm

5 PE-INSERT SC Mobile
- Height 7 - 17 mm (2 mm increments)

6 Locking Pin
- Size: 7, 9, 11, 13, 15, 17 mm

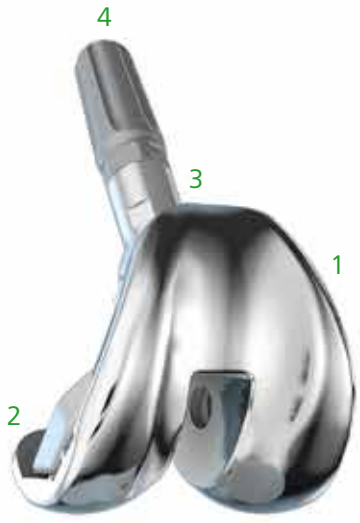
7 TIBIA Component SC cemented
- Size 3, 4, 5, 6, 7, 8 left / right
- Symmetrical tibial component
- 0° posterior slope
- Augmentable

8 AUGMENT Tibia SC
- Medial 5 mm, 10 mm, 15 mm
- Lateral 5 mm, 10 mm, 15 mm

9 TIBIAL CONE Metaphyseal (A-P / M-L)
(Combination with AUGMENTS TIBIA not possible)
- Variant A: 31 / 30, 36 / 30, 41 / 30, 46 / 30
- Variant B: 51 / 30, 56 / 30, 61 / 30, 66 / 30

10 ADAPTER Tibia
- 0 mm, 4 mm, 6 mm offset, 3°

11 PATELLA cemented
- Size 3, 4, 5, 6
- Dia. 24 / 8 mm, 28 / 8 mm, 32 / 8 mm, 36 / 8 mm



RH/TH Components

1 FEMUR Component RH/TH cemented
- Size 3, 4, 5, 6 left/right
- Valgus angle 6° (connector for ADAPTER Femur and ANCHORING STEM Straight)

2 AUGMENT Femur SC/RH/TH
- Distal 5 mm, 10 mm, 15 mm, 20 mm
- Posterior 5 mm, 10 mm (Not compatible to distal augments 15 or 20 mm)
- Distal/posterior 5 mm, 10 mm

3 ADAPTER Femur
- 0 mm, 4 mm, 6 mm Offset

4 ANCHORING STEM Straight
- Cementless
  - Ø 13 …. Ø 22 mm (1 mm increments); length 40, 80, 140 mm
  - Ø 23 …. Ø 30 mm (1 mm increments); length 40, 80 mm
- Cemented
  - Ø 10 …. Ø 22 mm (2 mm increments); length 40, 80, 140 mm

5 AXIS

6 YOKE RH/TH
- Size: 3, 4, 5, 6

7 COUPLING PIN for PE-INSERT
- Height 7 - 25 mm (2 mm increments)

8 PE-INSERT RH/TH
- Height 7 - 25 mm (2 mm increments)

9 TIBIA Component RH/TH cemented
- Size 3, 4, 5, 6
- Symmetrical tibial component
- 0° posterior slope
- Augmentable

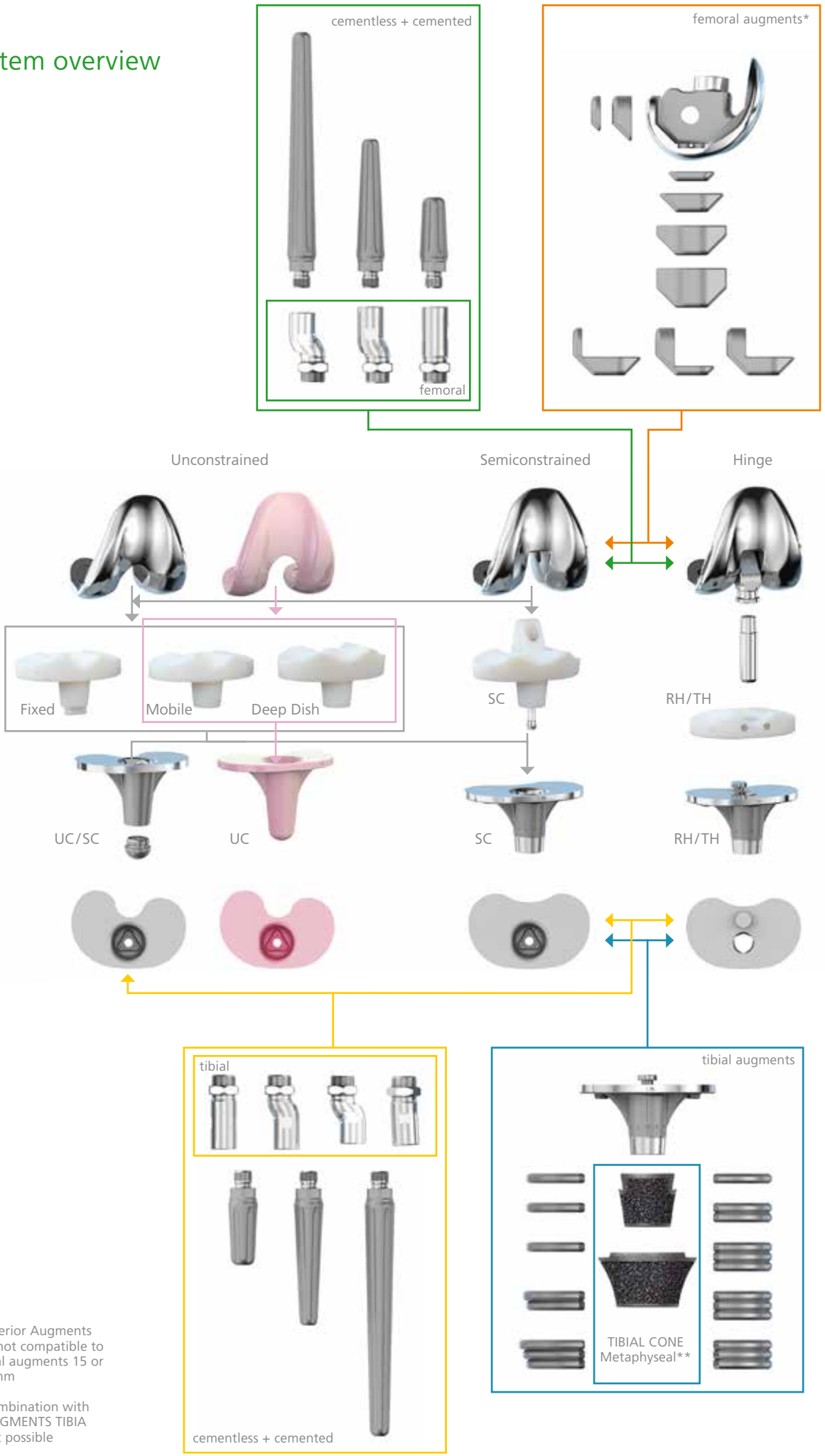
10 AUGMENT Tibia SC/RH/TH
- Medial 5 mm, 10 mm, 15 mm
- Lateral 5 mm, 10 mm, 15 mm

11 TIBIAL CONE Metaphyseal (A-P/M-L) (Combination with AUGMENTS TIBIA not possible)
- Variant A: 31/30, 36/30, 41/30, 46/30
- Variant B: 51/30, 56/30, 61/30, 66/30

12 ADAPTER Tibia
- 0 mm, 4 mm, 6 mm offset, 3°

13 PATELLA cemented
- Size 3, 4, 5, 6
- Ø 24/8 mm, 28/8 mm, 32/8 mm, 36/8 mm

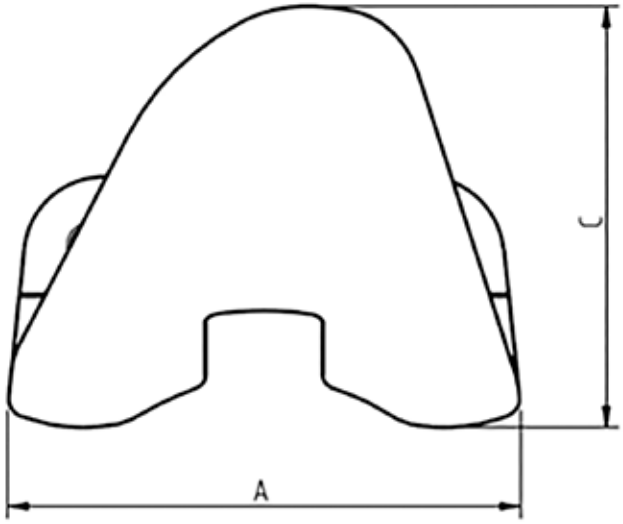
System overview

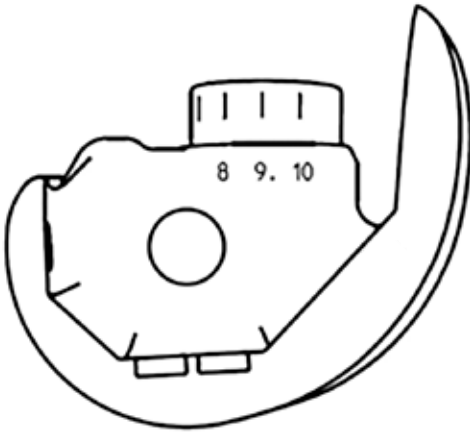


* Posterior Augments are not compatible to distal augments 15 or 20 mm

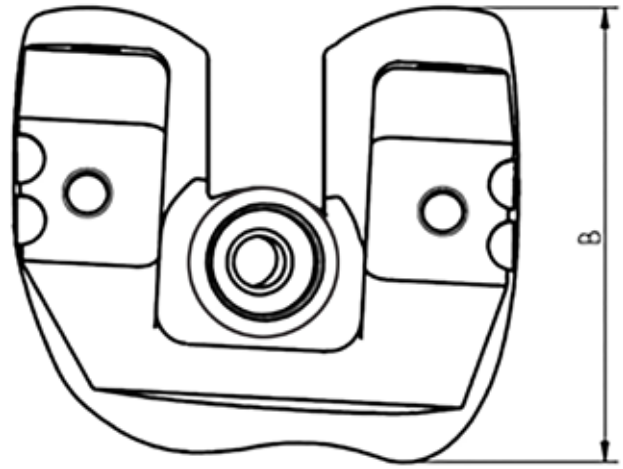
** Combination with AUGMENTS TIBIA not possible

Dimensions - FEMUR Components SC and RH/TH (all measurements rounded)





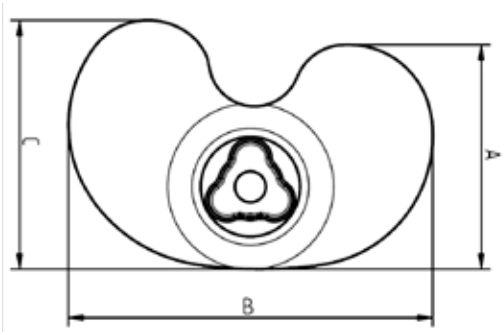
Size	A [mm]	B [mm]	C [mm]
3	61.5	55.4	50.4
4	65.5	59.4	53.6
5	70.8	64.2	57.9
6	77.2	70.2	63



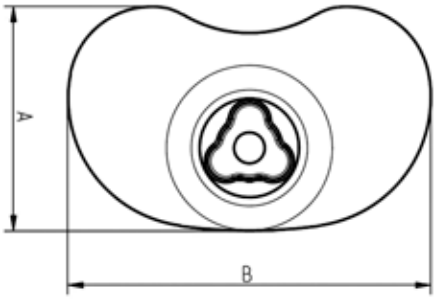
* Measurements are specified in mm. Illustrations are not drawn to scale.

Dimensions – TIBIA Components (all measurements rounded)

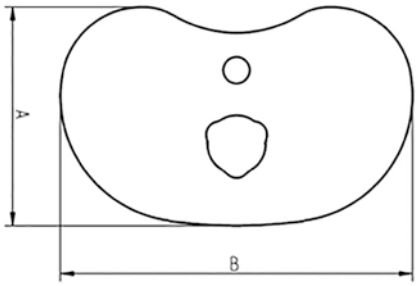
UC/SC



SC



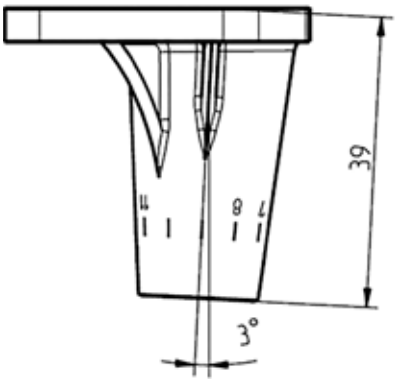
RH/TH

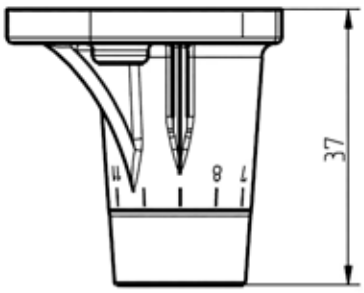


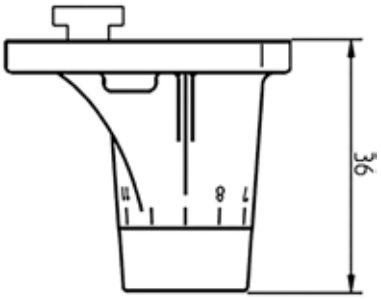
Size	A [mm]	B [mm]	C [mm]
1	36.9	60	40.9
2	38.8	63.2	43
3	41.1	66.5	45.3
4	43.3	70	47.7
5	45.9	74.2	50.5
6	48.6	78.7	53.5
7	51.6	83.4	56.8
8	54.7	88.4	60.2

Size	A [mm]	B [mm]
3	41.1	66.5
4	43.3	70
5	45.9	74.2
6	48.6	78.7
7	51.6	83.4
8	54.7	88.4

Size	A [mm]	B [mm]
3	41.1	66.5
4	43.3	70
5	45.9	74.2
6	48.6	78.7

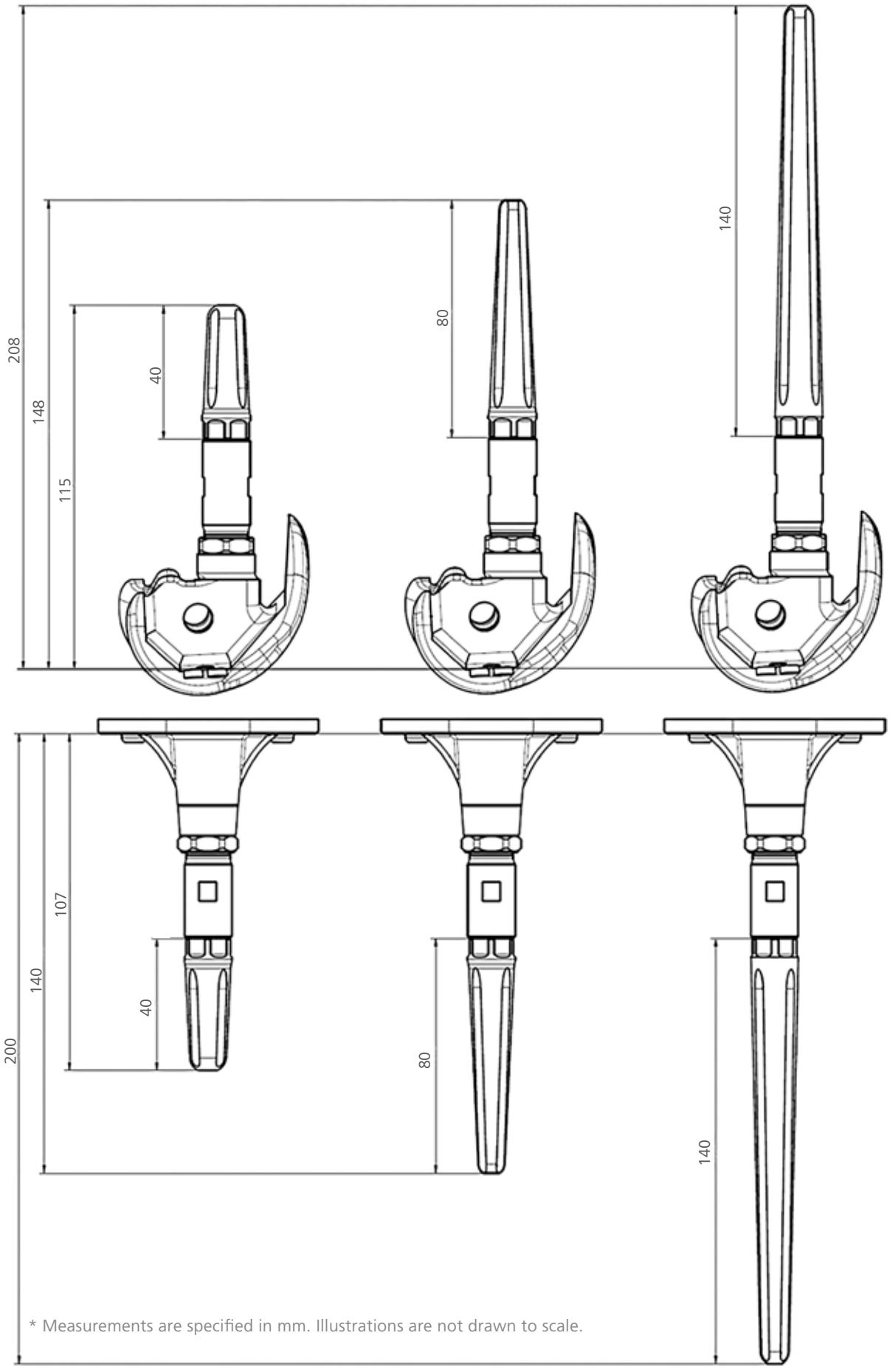






* Measurements are specified in mm. Illustrations are not drawn to scale.

Construct lengths (all measurements rounded)



* Measurements are specified in mm. Illustrations are not drawn to scale.

Notes

! NOTE

This brochure is intended for physicians only and is not suitable as a source of information for laypersons. The information about the products and/or procedures described in this brochure is of a general nature and does not represent a medical advice or a medical recommendation. The information provided here does not in any way represent an opinion on the diagnosis or treatment of any specific medical case. The respective patient must be examined individually and advised accordingly. This brochure can neither completely nor partially substitute these measures.

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