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GMK® PRIMARY

GLOBAL MEDACTA KNEE

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Surgical Technique

Joint | Spine | Sports Med

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INDEX

1. INTRODUCTION

This brochure describes the Surgical Technique to implant the GMK Primary. This technique is designed to be used with arthritic knees that do not have significant bone loss, major contractures or soft tissue laxity.
This technique focuses on knee alignment and in setting tibial and femoral resections based on bone references. Soft tissues are then managed "around" the resections. The technique can be used in both tibia first and femur first approaches.
The surgical technique involves extramedullary (EM) alignment for the tibial cut and intramedullary (IM) alignment for the femoral cut. The distal femoral resection is made with respect to the intramedullary canal. The surgeon has the option of making the distal cut with different degrees of valgus relative to the anatomical axis of the femur, in accordance with the patient's anatomy. The A/P 4in1 cutting block positioning can be based on a choice of anatomical references (posterior condyles, epicondyles or Whiteside's line).

CAUTION
Some instruments are fixed to the bone using dedicated pins. Before using the pins, ensure that they are intact and fully functional. BENT OR DEFECTIVE PINS CAN NOT BE USED AND MUST BE REPLACED BY NEW ONES. When extracting pins it is important not to bend them. This is achieved by ensuring axial alignment between the pin and the dedicated extractor. It is strongly recommended not to impact or hammer on any instruments unless otherwise specified in the surgical technique. For detailed instructions contact your local Medacta sales representative.

Please note
In the surgical technique described hereafter, the resections are performed in the following order:

A. Tibial resection

B. Distal femoral resection

C. A/P femoral resections and chamfers

Nevertheless, the surgeon can change the order of the resections, choosing the following sequence:

A. Distal femoral resection

B. A/P femoral resections and chamfers

C. Tibial resection

It is compulsory to perform the distal femoral resection before the A/P resection and chamfers.

1.1 INDICATIONS

The GMK Primary is designed for cementless and cemented use in total knee arthroplasty, if there is evidence of sufficient sound bone to seat and support the components.

This knee replacement system is indicated in the following cases:

- Severely painful and/or disabled joint as a result of arthritis, traumatic arthritis, rheumatoid arthritis or polyarthritis.
- Avascular necrosis of femoral condyle.
- Post traumatic loss of joint configuration.
- Primary implantation failure.

1.2 CONTRAINDICATIONS

GMK Primary knee replacement is contraindicated in the following cases:

- Progressive local or systemic infection.
- Muscular loss, neuromuscular disease or vascular deficiency of the affected limb, making the operation unjustifiable.
- Severe instability secondary to advanced destruction of condralar structures or loss of integrity of the medial or lateral ligament.

Mental or neuromuscular disorders may create an unacceptable risk to the patient and can be a source of postoperative complications. It is the surgeon's responsibility to ensure that the patient has no known allergy to the materials used.

1.3 PREOPERATIVE PLANNING

Radiological planning
This is performed from the scanogram, anterior-posterior, lateral and sunrise knee radiographs. The goals are to determine the angle formed by the anatomical axis and the mechanical axis, to determine the tibial slope, to trace and measure bone resections, to establish the intramedullary guide introduction points, to assess the sizes of the femoral and tibial components, the height of the tibial insert, the thickness of patella to be resected, to study the topography of the operative site (localization of osteophytes and particularly posterior osteophytes).

Clinical planning
The goal is to assess the range of motion of the joint and patellar centring and to assess whether deformities and ligamentous instability exist or not.

1.4 SURGICAL APPROACH

The most common surgical approach is the vertical midline skin incision and a medial parapatellar approach. Other approaches may be used depending on the surgeon's preferences. After exposing the joint via elevation of the medial retinaculum, flex the knee. Prior to any bone resection define the normal bony architecture by removing the osteophytes (including those at the intercondylar notch) as collectively these contribute to the maintenance of any malalignment and conceal the true bone size. Additionally both cruciate ligaments are resected which also aids exposure by permitting easier subluxation of the tibia for its subsequent osteotomy.

CAUTION
If a cruciate retaining insert (CR Insert) is used, the posterior cruciate ligament must be preserved.

During all procedures it is the intention to replace the bone and cartilage, that has been lost secondary to the arthritic process and resected as part of the arthroplasty, with a similar thickness of polyethylene and metal provided by the prosthetic components.

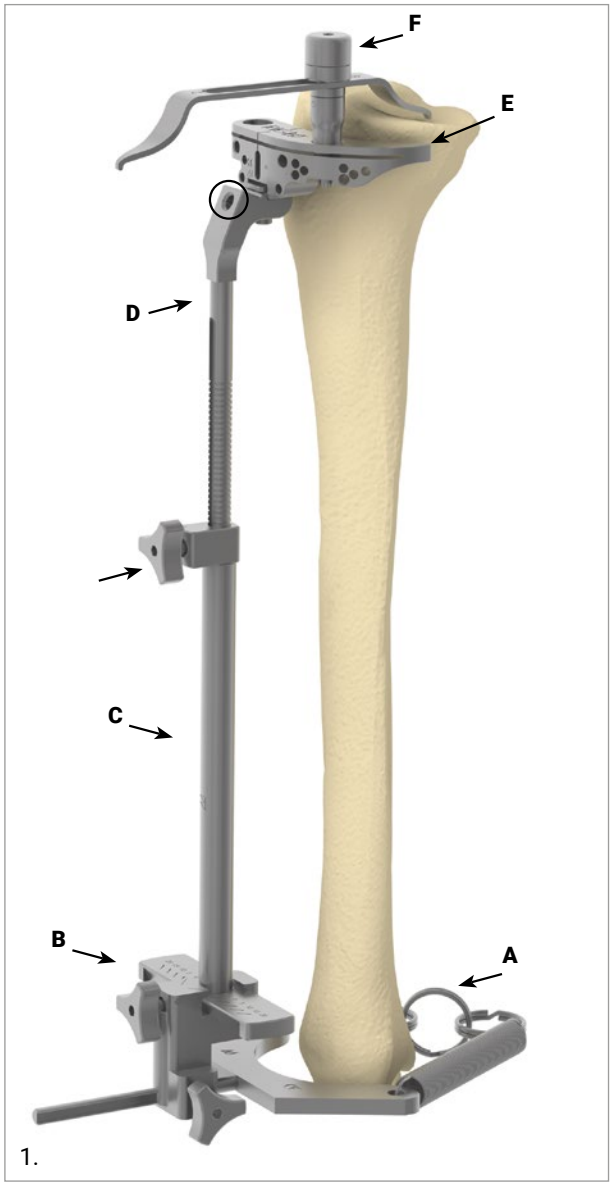
2. TIBIAL RESECTION

The tibia requires only one cut, which is flat. The tibial resection can be performed using the extramedullary alignment guide.

2.1 ASSEMBLING THE EXTRAMEDULLARY GUIDE

The extramedullary guide consists of the following components:

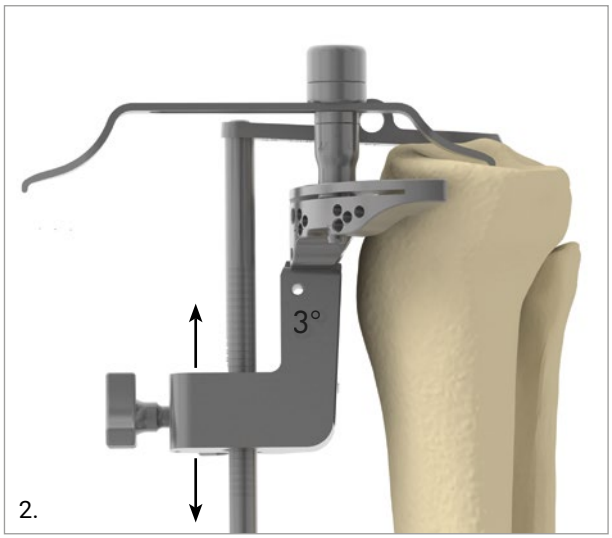
- Malleolar clamp (A)
- Malleolar clamp support (B)
- Tibial resection guide distal part (C)
- Extramedullary superior guide (D)
- Tibial slotted cutting guide (E)
- Tibial stylus (F)



1.

Select the tibial slotted cutting guide for the correct side (left or right as marked on the block) and fix it to the extramedullary superior guide using the screw provided (black circle). Insert the malleolar clamp (A) into the malleolary clamp support (B), slide the distal part of the tibial resection guide (C) into the malleolar clamp support. Then slide the extramedullary superior guide (D) into the distal part of the tibial resection guide.
Secure the malleolar clamp around the ankle and centre the tibial resection guide over the ankle given by the mid point of the two malleoli.
Then position the assembly on the tibia, eyeballing the frontal rotation. Adjust the distance of the rods to the length of the patient's tibia and fix with the knob provided (black arrow). A stylus (F) is provided to check the tibial resection level.

OPTION
The slotted tibial cutting guide can be mounted on a spiked rod to achieve tibial spine fixation. In this configuration a 3° support is required.



2.

2.2 SETTING THE TIBIAL VARUS/VALGUS WITH THE EXTRAMEDULLARY GUIDE

To ensure neutral tibial rotation, the centre of the tibial cutting block must be exactly opposite the medial third of the tibial tubercle. The flat anterior border of the cutting block should be parallel to the transverse mediolateral plane of the tibia.

CAUTION
It is important that the cutting block is centred carefully to prevent any varus or valgus deviation when making the resection.

In order to make the tibial cut perpendicular to the mechanical axis, make sure that the malleolar clamp support is on the centre of the ankle. By translating the distal part of the alignment guide on the malleolar clamp support, it is possible to adjust the varus/valgus of the tibial resection in the frontal plane.

3.

2.3 SETTING THE TIBIAL SLOPE WITH THE EXTRAMEDULLARY GUIDE

The posterior slope can be adjusted by sliding the distal part of the malleolar clamp support along the malleolar clamp rod. Moving the support backwards will increase the posterior slope.

4.

When changing the slope it is very important that the cutting guide is centred directly over the anterior aspect of the tibia to avoid unwanted varus or valgus in the tibial cut.

CAUTION

It is recommended to avoid any excessive posterior slope. Whatever the surgeon's preference, it is important that no anterior slope is introduced.

CAUTION

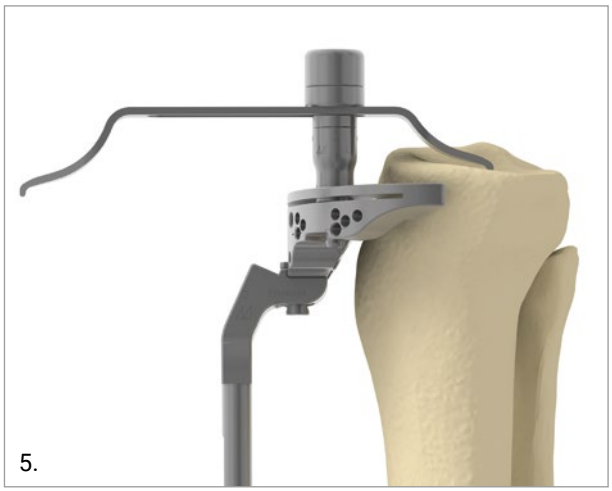
The cutting block does not have a built-in slope so, when the extramedullary jigs are aligned with the tibial axis, the system provides a slope of 0°.

CAUTION

When using the 3° support, the support provides 3° of slope on the tibial cut when the tibial extramedullary rod is parallel to the tibial axis.

2.4 SETTING THE TIBIAL RESECTION LEVEL WITH THE EXTRAMEDULLARY GUIDE

The surgeon will be able to evaluate whether the flexion gap is tighter or looser than average. If it seems looser, the surgeon may wish to resect less bone from the tibia. It is obvious that no two tibiae are exactly the same and, therefore, some judgment is necessary at this stage to decide whether any laxity identified is due to loss of bone or stretching of the soft tissue restraints. It is best to err on the conservative side since more bone can always be resected if necessary. Fix the tibial stylus into the dedicated hole on the cutting guide. One side to make a standard cut, 8 mm from the less worn tibia plateau, and the other side to make a conservative cut, 2 mm under the most worn plateau.



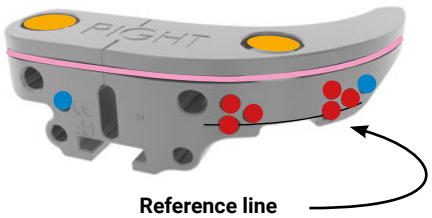
5.

Verify the level of the cut using the angel wing. When a satisfactory position has been reached, pin the cutting block using two parallel pins. Use the row marked with a line.

2.5 FIXATION OF THE TIBIAL CUTTING BLOCK

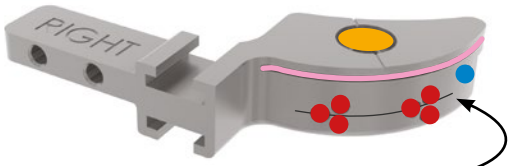
Before fixing the tibial cutting block, it is recommended to check the cut height and the posterior slope using the angel wing.

Tibial slotted cutting block - right side



6. **Reference line**

MIS tibial cutting block - right side



7. **Reference line**

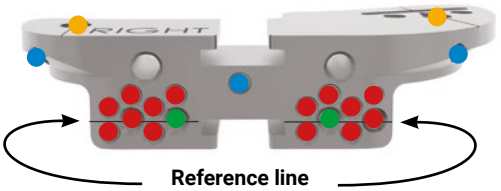
Tibial cutting block holes (right knee)

- Parallel positioning holes
- Oblique fixation holes
- Tibial stylus holes
- Sawblade slot

OPTION

The green pin holes are compatible with the unslotted tibial guides.

Tibial unslotted cutting block



8. **Reference line**

Tibial slotted cutting block

9.

Tibial unslotted cutting block holes (right knee)

- Parallel positioning holes
- Oblique fixation holes
- Tibial stylus holes
- Compatible holes

OPTION

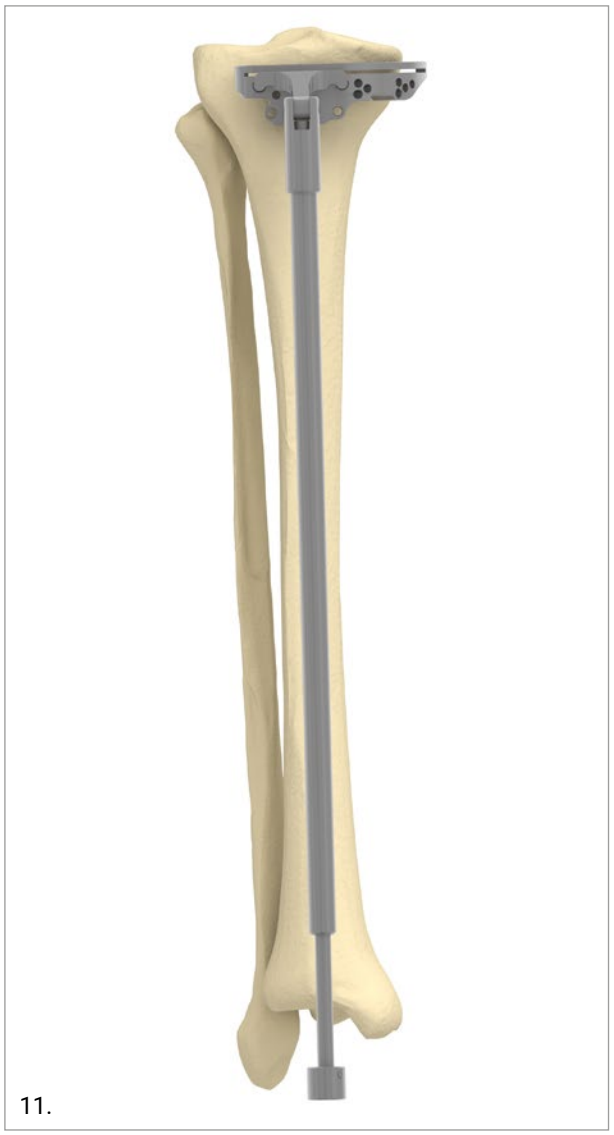
Once the tibial slotted cutting block is positioned on the tibia, insert a pin into the central slot to stabilise it. Inserting this pin will still allow adjustment of the tibial slope and varus/valgus.

10. **Central Slot**

After pre-drilling, pin the block to the tibia by using the two parallel positioning holes marked with a line and one oblique fixation hole.

If required the tibial cut can be increased at a later stage by 2 or 4 mm using the pin holes provided.

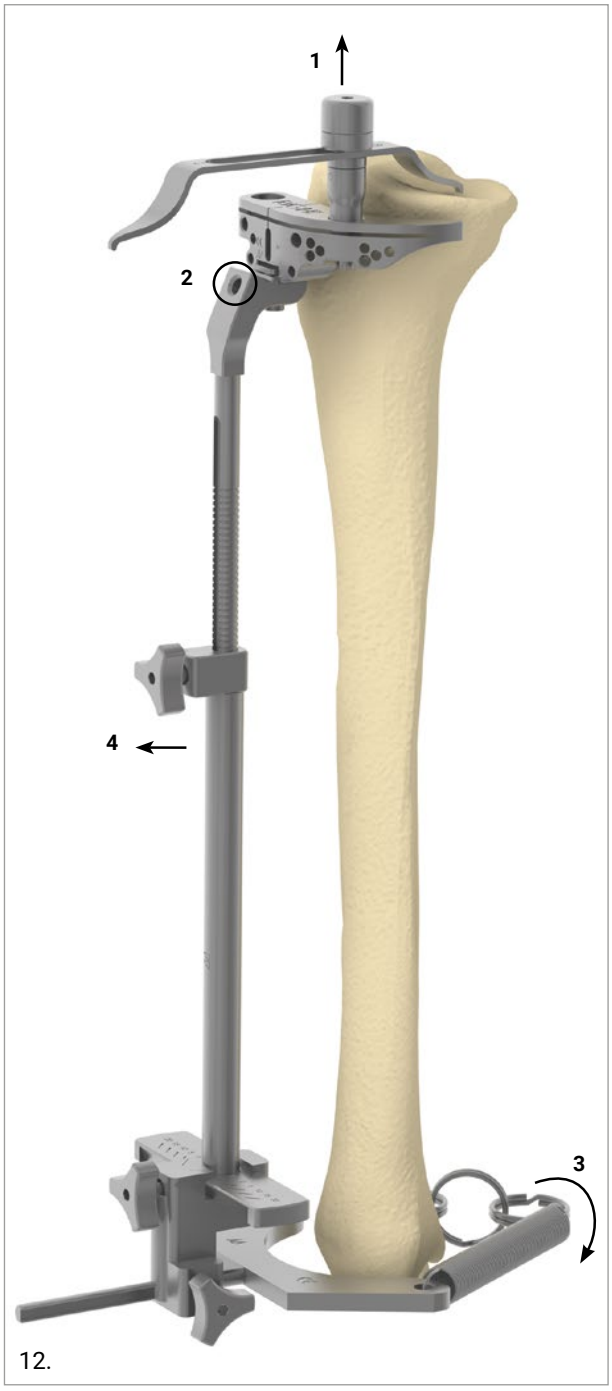
To check the frontal alignment of the cutting block it is possible to assemble the telescopic alignment rod onto the slotted cutting block to see if it points to the centre of the ankle.



11.

2.6 REMOVING THE EXTRAMEDULLARY GUIDE

Remove the stylus (1) by pulling it upwards and unlock the frontal screw of the eyeballing superior guide (2). Open the malleolar clamp (3) and remove all the construct from the patient (4).



12.

2.7 TIBIAL RESECTION

Bring the tibial cutting guide into contact with the tibia by sliding it along the pins. If an increase in stability is required, a third oblique pin can be introduced through the oblique hole of the tibial slotted cutting block or through the medial hole of the MIS cutting block.

13.

MIS

14.

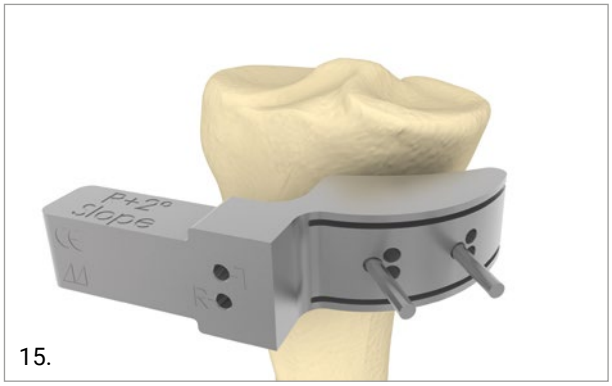
Finally, perform the tibial proximal resection by cutting through the slot built into the guide.

Slide the tibial cutting block over its two parallel pins and remove it. The parallel pins should remain in position in case a tibial recut is required.

CAUTION

Ensure the rotation and varus/valgus of the tibial cutting guide has not changed during disassembly of the guides before performing the resection.

If necessary, two additional cutting blocks are available, in order to correct the alignment (+2° varus/valgus) and the posterior slope (+/- 2°) of the performed tibial resection. Ensure that the correction cutting blocks are positioned on the same row of holes used to perform the initial tibial resection.

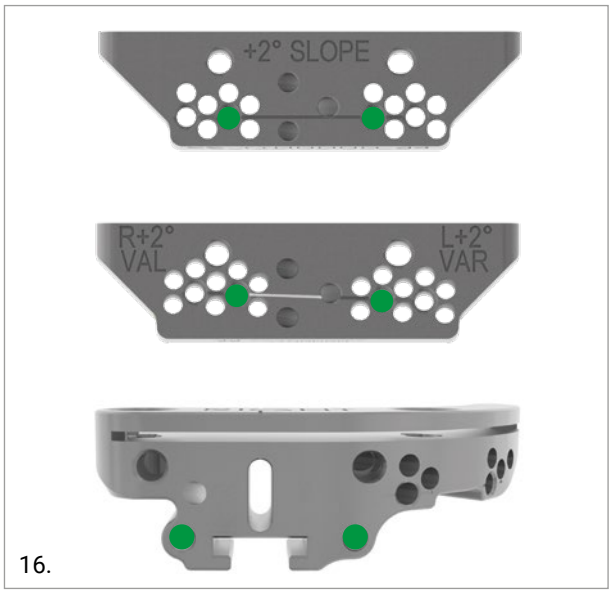


15.

The recut guides are compatible with both slotted standard and MIS tibial cutting blocks.

OPTION

The green pin holes are compatible with the unslotted recut guides.



16.

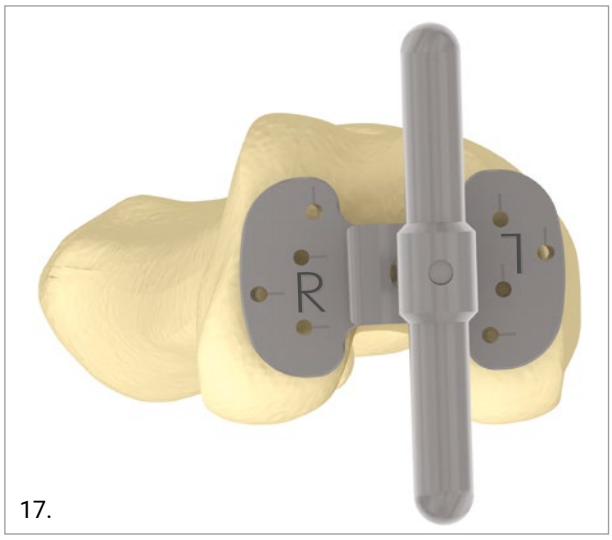
Please see Annex 1 (§11) for the Ligament Balancing Option (LBS) option.

3. DISTAL FEMORAL RESECTION

3.1 PLACING THE INTRAMEDULLARY ROD

Make an entry hole in the distal femur just anterior to the intercondylar notch immediately above the site of attachment of the posterior cruciate ligament. Use the 9 mm drill bit and wobble it slightly to enlarge the entry hole to allow for decompression of the intramedullary canal when inserting the intramedullary rod. This hole should be positioned so that the alignment rod will be placed in the centre of the femoral canal in the AP and medio-lateral plane.

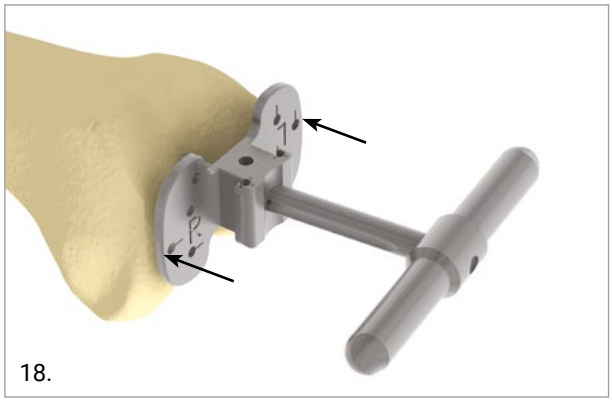
Assemble the distal cut positioner on the intramedullary rod and insert the rod into the canal. The distal cut reference has 6° correction from the anatomical axis: be sure that the "L" or "R" corresponding to the side being operated on is viewed upright.



17.

OPTION
The distal cut reference is available in 0 to 9 degrees with a 1 degree step.

Advance the distal cut reference with the intramedullary rod until it contacts one or both femoral condyles.

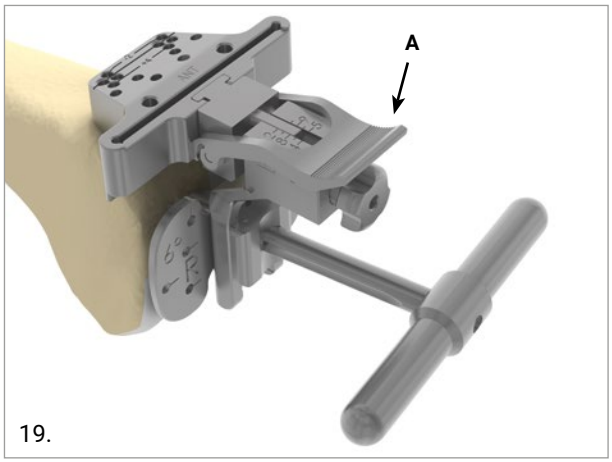

18.

OPTION
If needed, the distal plate can be stabilised using pins inserted into the dedicated holes. Pin holes are available either on the medial or lateral side.

3.2 POSITIONING THE DISTAL CUTTING GUIDE

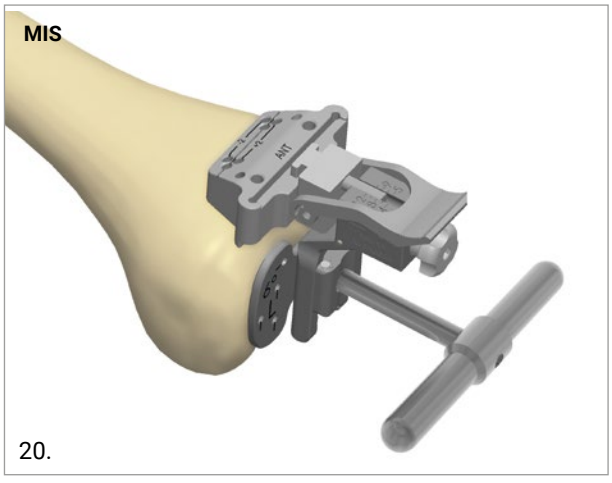
Slide the Micrometric slotted distal cut positioner onto the Distal cut reference. Connect the block on the Micrometric slotted distal cut positioner then secure the connection by pushing the lever (A) down.

CAUTION
The slotted distal cutting guide is NOT compatible with the Micrometric Distal Cut Positioner unslotted version (ref. 02.07.10.0185).



19.

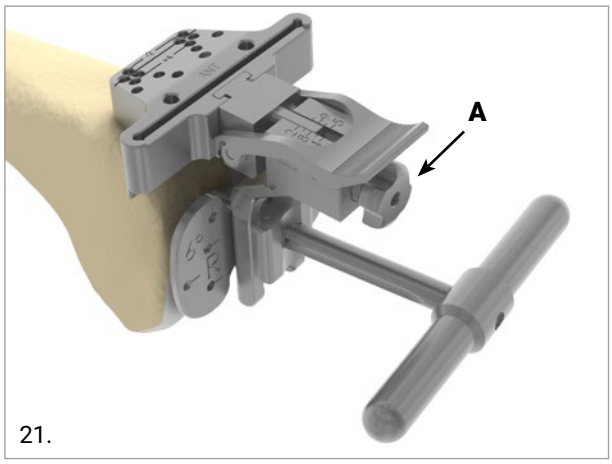
MIS: The MIS distal cutting block is intended for both left and right knees. Check that the correct side, corresponding to the knee to be operated on, can be read on the anterior surface.



20.

3.3 SETTING THE DISTAL FEMORAL RESECTION LEVEL

The femoral distal resection, routinely planned at 8 mm (corresponding to the thickness of the distal condyles of the femoral component), can be adjusted by turning the screw (A) on the distal cut positioner in a range of 4 mm to 12 mm. Ensure it is set to the correct distal resection before commencing the osteotomy.

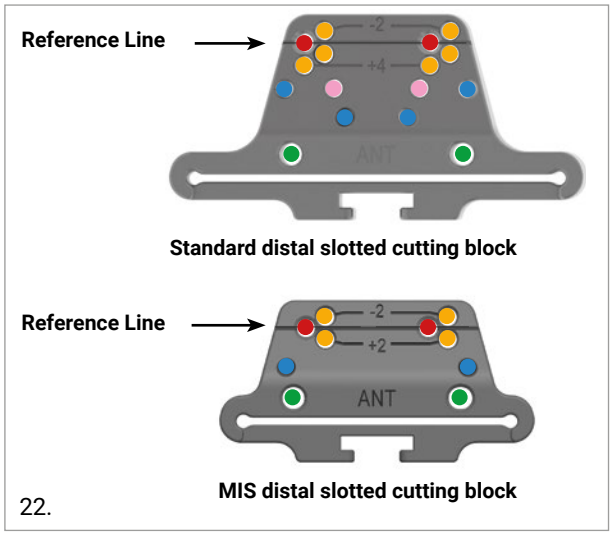


21.

OPTION

Alternatively, a distal cut positioner fixed at 8 mm is available. The distal resection level can be adjusted later on by moving the cutting block on the pins.

Fix the distal cutting block by inserting 2 pins in the parallel positioning holes marked in red and one in the oblique hole and then remove everything except the distal cutting block by releasing the lever.



22.

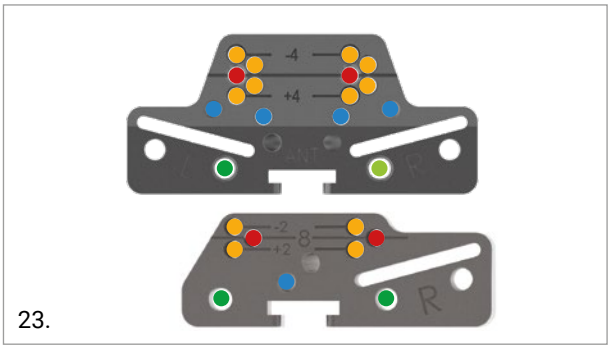
Distal cutting block holes (right knee)

- Parallel positioning holes
- Oblique fixation holes
- Alignment rod holes
- Parallel repositioning holes
- Additional fixation holes

If needed the cutting block can be moved distally or proximally in 2 mm or 4 mm increments using the repositioning holes. Before performing the resection, check the cutting block position with the angel wing.

OPTION

Alternatively, the MIS and Standard unslotted distal guide are available.



23.

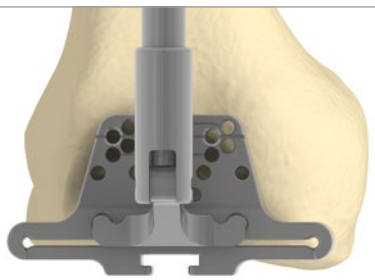
The unslotted cutting guide is compatible only with the unslotted distal cut positioner (ref. 02.07.10.0185).

Distal unslotted cutting blocks holes:

- Parallel positioning holes
- Oblique fixation holes
- Saw blade guide holes / alignment rod holes
- Parallel repositioning holes

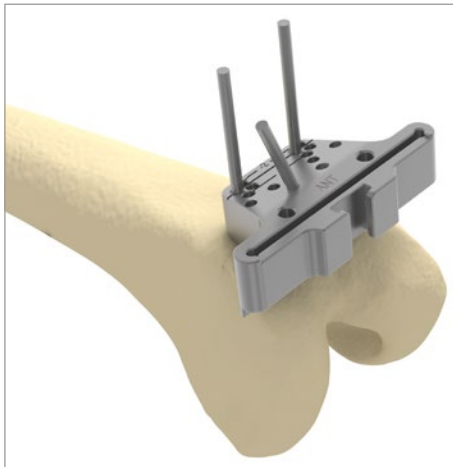
In order to check the correct alignment of the distal cutting block, insert the telescopic alignment rod into the dedicated holes of the cutting block and verify that it points to the centre of the femoral head.

24.



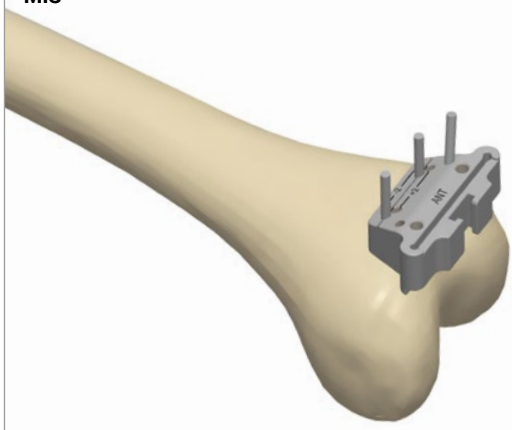
25.

Finally, check the resection level using the angel wing and perform the distal cut through the slot built into the guide. Once the resection is performed, remove the pins. Should a re-cut be necessary, the pin holes can be readily located again.



26. **Standard distal slotted cutting block**

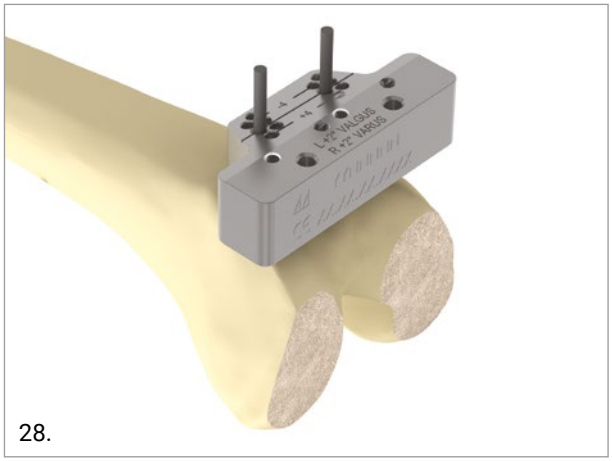
MIS



27. **MIS distal slotted cutting block**

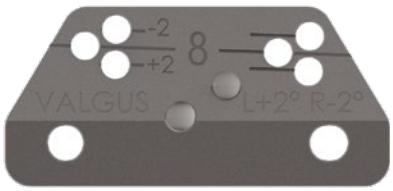
OPTION

To correct the distal cut varus/valgus, Standard and MIS recut blocks are available.



28.

MIS



29.

CAUTION

The slotted distal cutting guide is compatible only with the Standard unslotted re-cut block but not with the MIS one.

4. EXTENSION GAP CHECK

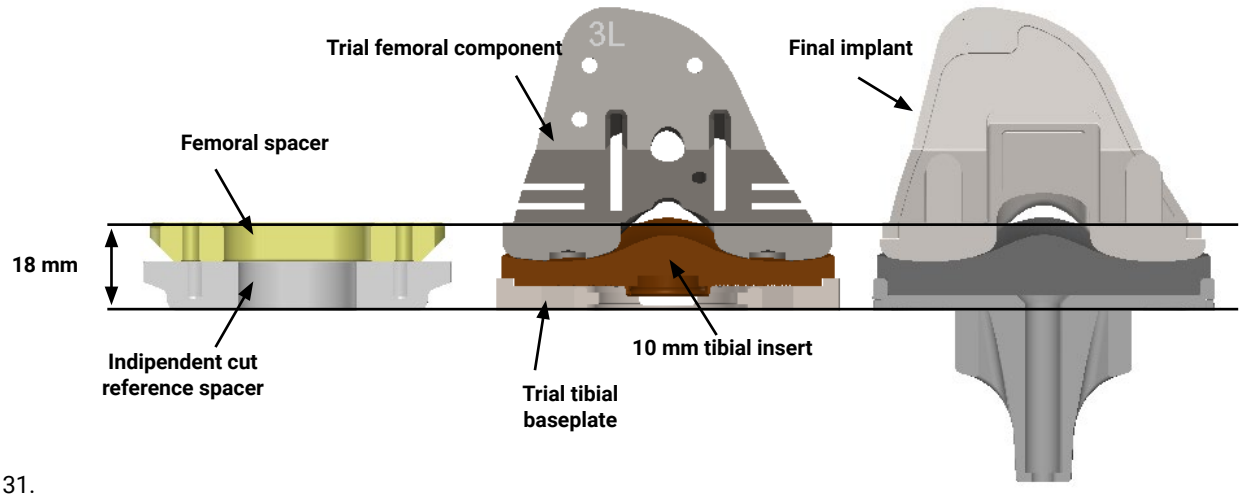
In order to check the tibial and distal femoral cuts, use the independent cut reference spacer assembled with the dedicated femoral and tibial spacers. The femoral spacer is available in 2 different widths, suitable for sizes 1-3 and 4-6.

30.

The femoral spacer simulates the thickness of the femoral component, while the independent cut reference spacer simulates the minimum thickness of the tibial component. Therefore the thickness of the independent cut reference spacer assembled with the femoral spacer equate to the total prosthesis thickness given by the tibial baseplate, the PE insert and the femoral component. With the knee in extension, introduce into the joint the independent cut reference spacer complete with the femoral and tibial spacers assembled with the removable handle.

The femoral spacer has to be fixed to the reference spacer on the side marked "FEMORAL". In case of laxity, the thickness of the reference spacer can be increased by adding a tibial spacer. Tibial spacers are available in different thicknesses simulating the different tibial inserts (12, 14, 17 and 20 mm). The tibial spacers have to be fixed to the reference spacer on the side with the "TIBIAL" marking.

If it is not possible to introduce the reference spacer into the joint, the tibial resection can be changed by re-positioning the tibial cutting block on the two pins left in place. An additional 2 mm or 4 mm of bone may be resected. If, despite a posterior release, the tests indicate incomplete extension, this would require a further 2 mm distal femoral cut.



31.

5. ANTERIOR CUT, POSTERIOR CUT AND CHAMFERS

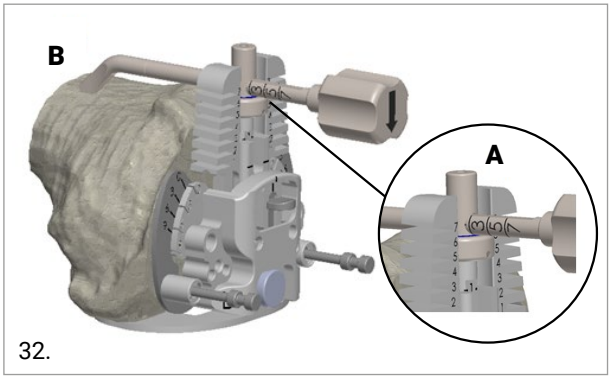
There are 7 sizes available, which have a difference of 4mm symmetrically both in anterior-posterior and in mediolateral plane. There are also 7 Narrow sizes which have the same anterior-posterior length of the corresponding standard sizes, but they are 2 mm narrower in medio-lateral

5.1 POSTERIOR REFERENCING FEMORAL SIZING AND EXTERNAL ROTATION ADJUSTMENT

The posterior referencing femoral sizer must be positioned in contact with the distal cut surface, with both the posterior condyles well applied on its base.

Refine the positioning of the sizer, by selecting the size of the femur on the anterior palpator (A).

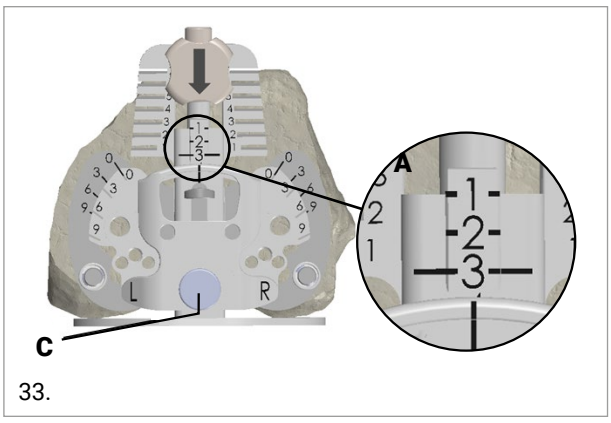
Close the sizer until the anterior palpator touches the anterior cortex (B).



32.

The size of the femur can be read on the femoral sizer (A).

Set the external rotation (0°, 3°, 6°or 9°) turning the central part of the sizer pushing the lever (C) according to the side to be operated on.



33.

The external rotation can also be checked considering the alignment to the epicondylar axis, using the epicondylar axis reference.

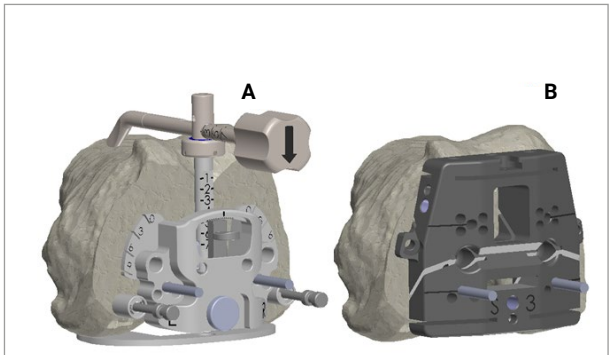
5.2 POSTERIOR REFERENCING: 4IN1 CUTTING BLOCK POSITIONING

Option 1: central pins
Once the position of the sizer is satisfactory, pre-drill and insert 2 pins in the holes identified by a line (A).

CAUTION
While inserting the pins, ensure a continuous contact between the femoral sizer and the distal resection.

Remove the femoral sizer sliding it along the two pins.

Select the 4in1 cutting block of the selected size and apply it on the distal resection choosing the holes row belonging to the posterior group and marked by a line (B).



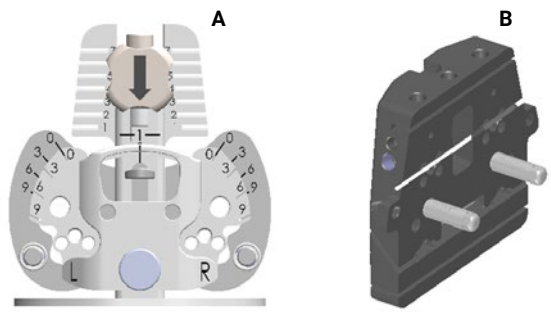
34.

If necessary, the cutting block can be moved 2 mm anteriorly, using the holes just below the reference line. Finally, fix the 4in1 cutting block using two headed pins inserted in the lateral oblique fixation holes. Remove the central positioning pins.

Option 2: pegs
As an alternative to positioning through the central pins, the 4in1 cutting block can be positioned through two pegs. Once the adjustment of the femoral sizer is satisfactory, drill the peg holes through the dedicated holes of the femoral sizer (A).

CAUTION
While drilling, ensure a continuous contact between the femoral sizer and the distal resection.

Finally, remove the femoral sizer, assemble the pegs on the 4in1 cutting block of the chosen size and apply it on the distal resection (B).

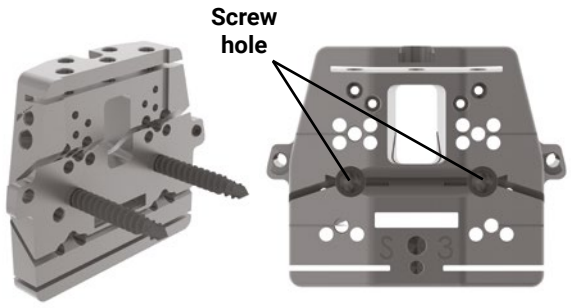


35.

Ensure the complete contact between the 4in1 cutting block and the distal resection, using the femoral impactor.

OPTION

Alternatively or together with the fixation by means of the lateral pins, the 4 in 1 cutting block may be fixed to the bone using two cancellous bone screws inserted through the dedicated holes by means of the dedicated screwdriver. This option is not available for femoral size 0.



36.

When the 4in1 cutting block has been stabilized, perform the femoral resections as follows:

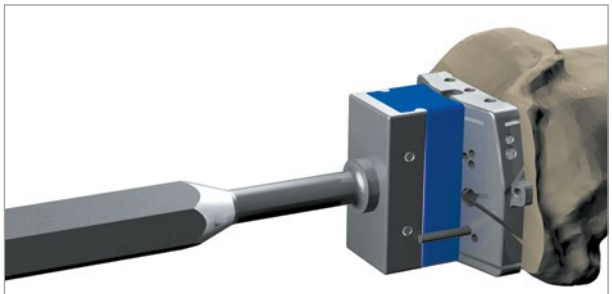
- Anterior femoral resection
- Posterior femoral resection
- Posterior chamfer
- Anterior chamfer

CAUTION

All femoral resections have to be performed by means of a 13 mm wide and up to 1.27 mm thick sawblade.

CAUTION

It is strongly recommended not to impact or hammer on the 4in1 guide. If the surgeon considers it necessary, do not impact directly on the guide but rather use the femoral impactor as described in the picture below.

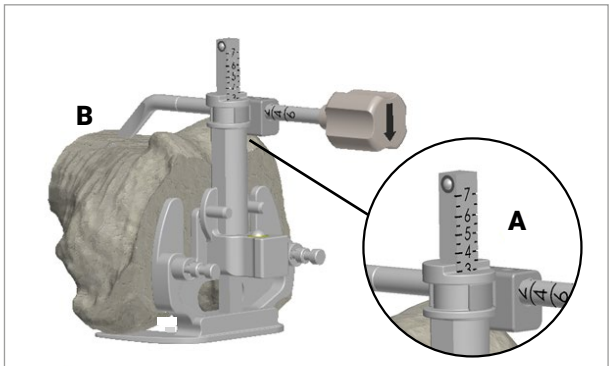


37.

5.3 ANTERIOR REFERENCING: FEMORAL SIZING AND EXTERNAL ROTATION ADJUSTMENT

The anterior referencing femoral sizer must be positioned in contact with the distal cut surface.

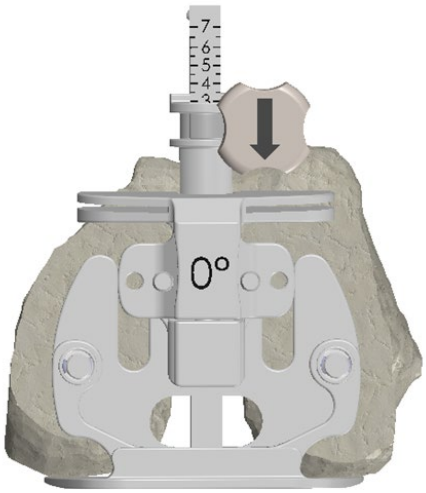
The size of the femur can be read on the femoral sizer.



38.

Refine the positioning of the sizer, by selecting the size of the femur on the anterior palpator (A).

Place the anterior palpator in contact with the anterior cortex. Close the sizer until its base touches the posterior condyles (B).



39.

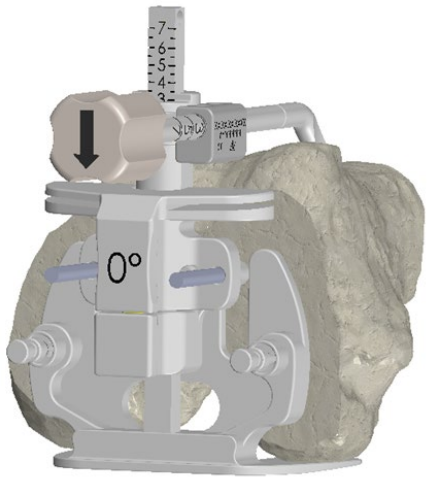
Select the right ("R") or left ("L") rotational guide according to the side to be operated on. Select the guide that will provide the desired external femoral rotation (0°, 3°, or 5°). Connect the selected rotational guide to the anterior referencing femoral sizer by sliding it onto the driven pins.

CAUTION

Do not hammer the 4in1 cutting block directly, use the femoral impactor.

Anterior referencing: 4in1 cutting block positioning

Once the position of the sizer is satisfactory, pre-drill and insert 2 pins in the holes identified by a line.



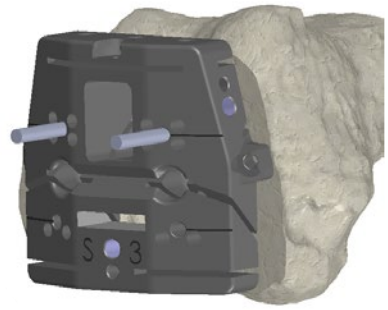
40.

CAUTION

While inserting the pins, ensure a continuous contact between the femoral sizer and the distal resection.

Remove the femoral sizer sliding it along the two pins.

Select the 4in1 cutting block of the selected size and apply it on the distal resection choosing the holes row belonging to the anterior group and marked by a line.



41.

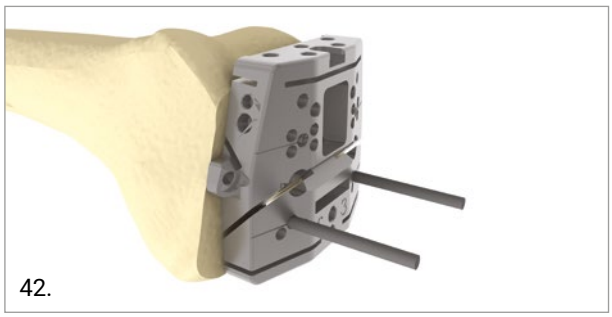
If necessary, the cutting block can be moved 2 mm up or down, using the holes just below or above the reference line.

Finally, fix the 4in1 cutting block using two headed pins inserted in the lateral oblique fixation holes. Remove the central positioning pins.

6. FEMORAL UPSIZING/DOWNSIZING

6.1 POSTERIOR REFERENCING: UPSIZING/DOWNSIZING

Option 1: central pins
If the 4in1 cutting block was positioned by means of the central parallel pins, replace it with the cutting guide of more suitable size using the same row of holes.



42.

CAUTION
In case of downsizing, the anterior resection level is moving 4 mm posteriorly. Make sure that there is no anterior notching and, if necessary, move the guide on to the lower pin holes.

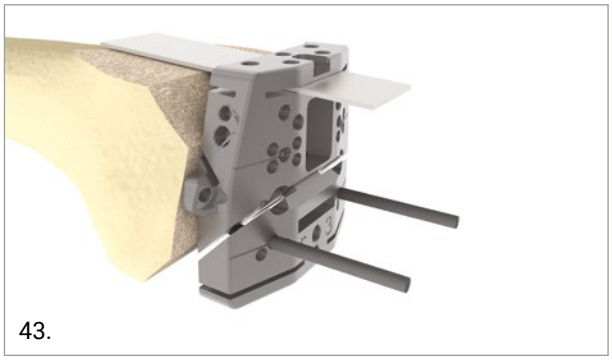
Option 2: pegs
If the 4in1 cutting block was positioned by means of the pegs, replace it with the cutting guide of more suitable size using the same peg holes.

CAUTION
In case of downsizing, the anterior resection level is moving 4 mm posteriorly. Make sure that there is no anterior notching.

If it is necessary to move up the guide, position two central pins on the holes' row marked with a line, remove the cutting block sliding it along the pins, withdraw the two pegs and reposition the pin holes just below the reference line.

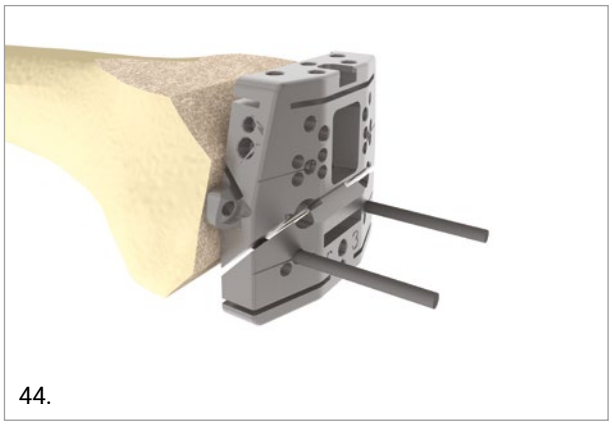
6.2 POSTERIOR REFERENCING: DOWNSIZING AFTER THE FEMORAL RESECTIONS

If it is necessary to downsize the femoral component after having performed the femoral resections, insert a saw blade into the slot of the anterior resection, apply the 4in1 cutting block on the distal cut, ensure that the saw blade is perfectly in contact with the anterior resected surface, and insert two pins in the row of holes belonging to the posterior holes group and marked with a line.



43.

Replace the cutting guide with that of the inferior size. Fix the cutting block following the procedure described in pages 16 (Posterior referencing: 4in1 cutting block positioning) and 18. Perform the femoral resections.



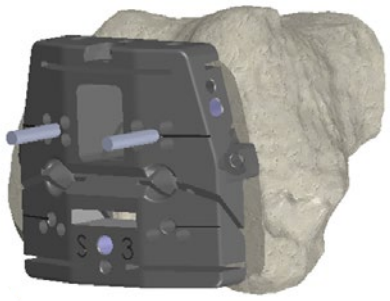
44.

CAUTION
The anterior resection level is moving 4 mm posteriorly. Make sure that there is no anterior notching.

6.3 ANTERIOR REFERENCING: UPSIZING/ DOWNSIZING

Replace the 4in1 cutting block with that of more suitable size using the same row of holes.

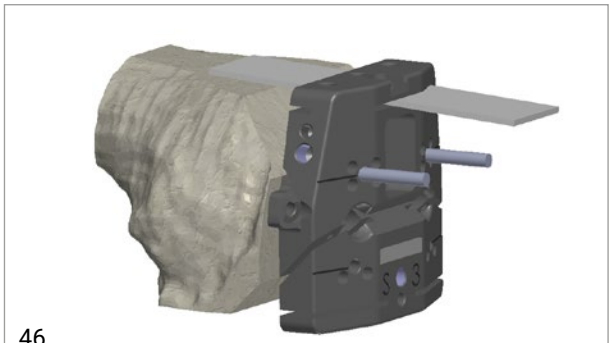
In case of downsizing, the posterior resection level is moving 4 mm anteriorly. If necessary, the guide can be moved on to the other rows of holes (2 mm modifications).



45.

6.4 ANTERIOR REFERENCING: DOWNSIZING AFTER THE FEMORAL RESECTIONS

If it is necessary to downsize the femoral component after having performed the femoral resections, insert a saw blade in the slot of the anterior resection, apply the 4in1 cutting block on the distal cut, ensuring that the saw blade is perfectly in contact with the anterior resected surface, and insert two pins in the row of holes belonging to the anterior holes group and marked with a line.



46.

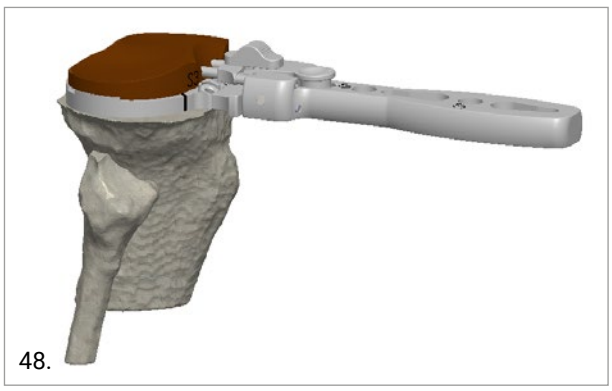
Replace the cutting guide with that of the inferior size. Fix the cutting block following the procedure described on pages 18 (Anterior referencing: 4in1 cutting block positioning) and 19.

47.

7. TRIAL REDUCTION

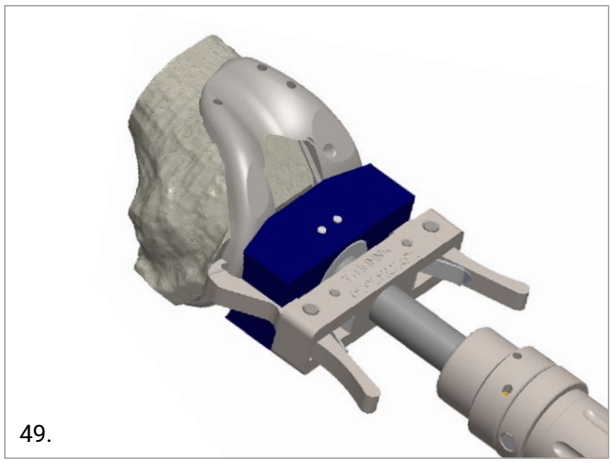
All of the major bone cuts have now been made. The osteotomies described will render the knee stable in flexion and extension when the appropriate components are selected. This must be confirmed. Blocks of varying thickness may be used to evaluate the flexion and extension gaps but misuse could damage the prepared bone surfaces. A better option is to perform a trial reduction. The only change that can be made without altering the bone cuts is the thickness of the tibial component. Therefore tibial trials must be available that are equal in thickness to all the actual components.

In order to perform the trial reduction, position the tibial trial and the femoral trial on the resected bones.



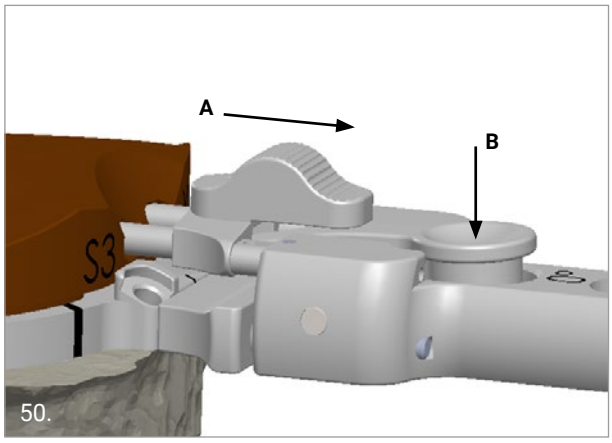
48.

To position the tibial trial, attach the tibial trial insert of the correct thickness on the appropriately sized tibial trial. Connect the removable handle and place the tibial trial on the tibia resection. The tibial baseplate is asymmetrical. Rotate the baseplate until the best coverage of the tibial cortical bone is achieved.



49.

Assemble the femoral impactor/extractor on the slide hammer and impact the appropriate size trial femur centring it on the anatomical notch. Ensure overhanging medially or laterally is minimised.



50.

To change the thickness of the tibial trial insert, pull the lever A and substitute the trial insert.

Remove the handle by pressing the button B and reduce the patella. Test the knee with its full range of motion and ensure that the optimal tracking of the components is occurring.

If the knee is stable and well-aligned in flexion and extension, nothing else is required. This outcome should be expected in knees that are initially stable, or unstable but are capable of being placed in normal alignment after a generous medial exposure. Such knees are rarely unstable or lacking full flexion and extension with the correct thickness of tibial trial prosthesis in place.

If the knee is unstable or misaligned, the remedy can be determined, as described here, during the Trial Reduction:

- If the knee is lax in both flexion and extension, a thicker tibial component should be used.
- If the knee is tight in both flexion and extension and if the thinnest tibial trial is being used, more bone must be resected from the tibia.

It is rare that the flexion and extension gaps are noticeably different. Then:

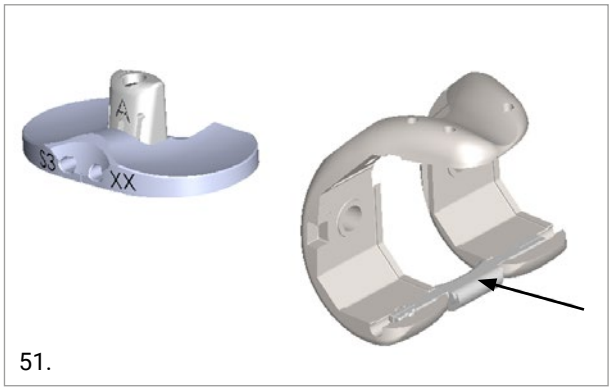
- If it is tight in extension and unacceptably lax in flexion, the option is to cut more bone off the distal femur and revise the chamfer cuts. This creates extra space in the Extension Gap so that a thicker tibial component can be used to stabilise the knee in flexion.
- If the knee is tight in flexion but loose in extension, the option is to use a smaller femoral component. Using a smaller femoral component will require revision of the femoral posterior and chamfer cuts and may involve a loss of flexion because the tibial component may impinge on the femur just proximal to the posterior condyles.

OPTION

For a posterior stabilized implant, the trial has to be performed after the femoral finishing (see §12 FEMORAL FINISHING).

Assemble the PS trial peg on the fixed tibial insert and the trial PS cam on the trial femur.

In order to avoid being hindered by the presence of the PS peg, assemble the trial PS Insert after the impaction of the femoral component.



51.

OPTION

In case a Full PE baseplate will be used, the trials have to be performed using the trial UC or PS insert, according to the Full PE implant type (UC or PS).

8. TIBIA AND FEMUR FINISHING

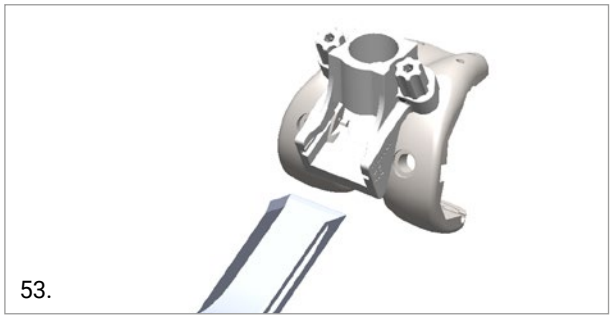
8.1 FEMORAL FINISHING

Once the medio-lateral position of the trial femoral component is defined, insert a pin into the anterior holes of the trial femoral component to ensure additional stability during the femoral finishing.

52.

Prepare the holes for the femoral pegs with the dedicated drill.

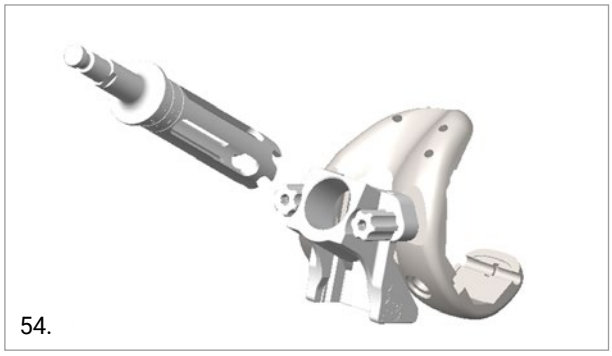
Assemble the femoral box cutting guide on the trial femoral component and finish the trochlea using the box resection chisel.



53.

OPTION

For a posterior stabilized implant, prepare the intercondylar notch using the PS resection chisel through the dedicated hole of the femoral box cutting guide.



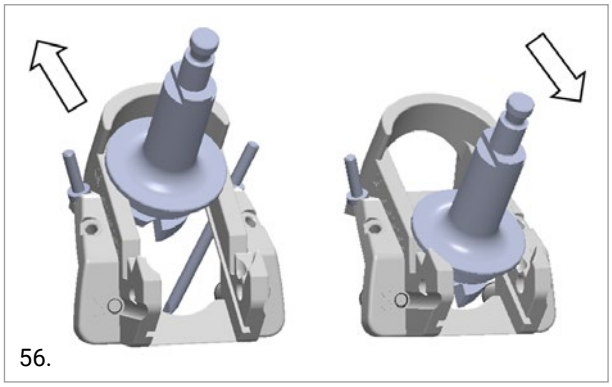
54.

Finally, assemble the trial trochlea of suitable size to the trial femoral component, reduce the patella and test the knee through its full range of motion.

55.

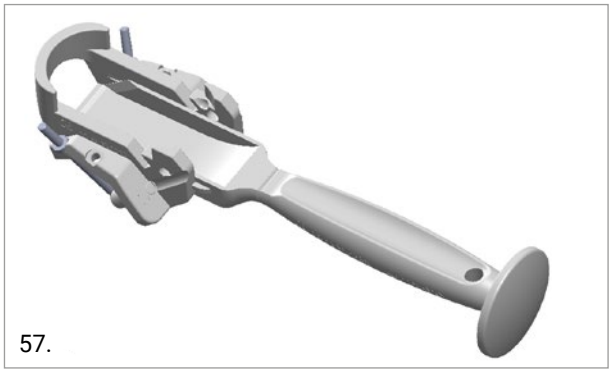
OPTION

Prepare the trochlear finishing with the reamer provided.



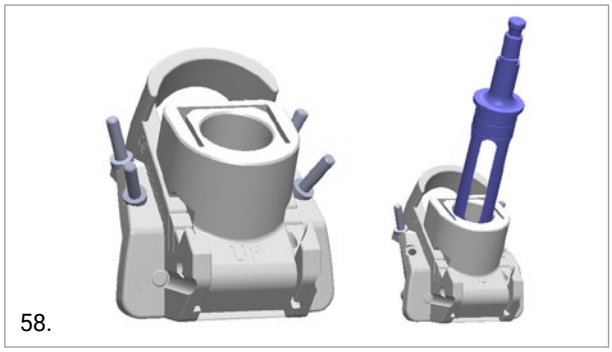
56.

The trochlear finishing can also be performed using the osteotome provided.



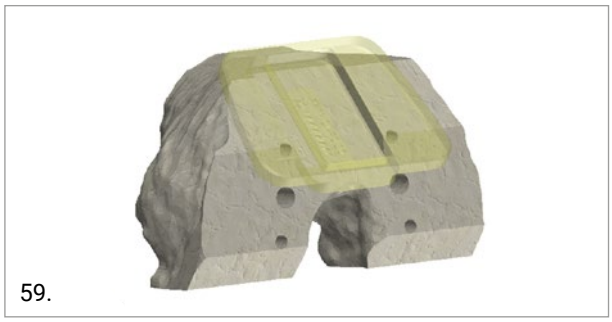
57.

The dedicated PS reamer guide must be clipped onto the femoral box cutting guide and the PS finishing can be carried out using the PS reamer.



58.

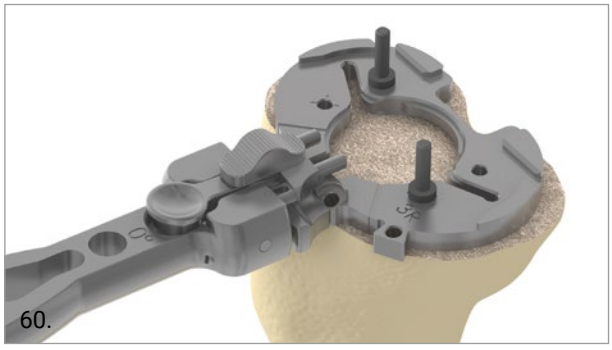
After the removal of the femoral box cutting guide, the resections should be checked using the box cut verifier.



59.

8.2 TIBIAL FINISHING

It is important that the rotation of the tibial component matches the orientation of the femoral component to track the patella. It is a serious error to internally rotate the tibial baseplate. Generally the centre of the baseplate anteriorly will be positioned over the junction of the medial and middle third of the tibial tubercle. The tibial tubercle is itself a slightly laterally positioned structure. Fine adjustment of the position of the tibial baseplate can be made with the femoral and tibial trials in place to obtain the best tracking as the knee is flexed and extended. Use two pins to fix the tibia trial.



60.

The pins should always be placed in the opposite position: one anteriorly and one posteriorly on tibial surface.

Alternatively, the tibia trial can be fixed using two frontal pins which can be inserted with the trial insert in place.

61.

OPTION

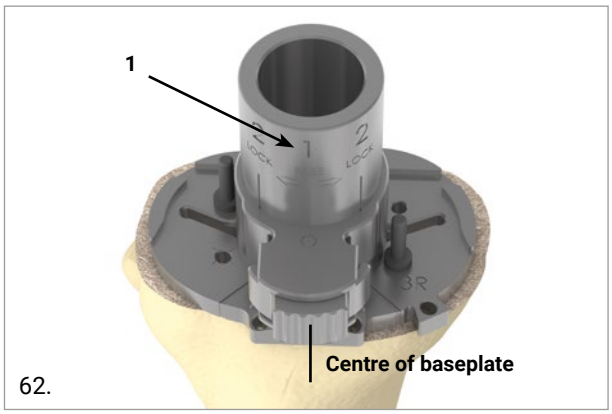
Full PE

In case the Full PE Tibial component will be implanted, assess the tibial size and position using the dedicated template. Once the position of the tibial component is adjusted, fix it using two pins.
Remove the tibial template and position the trial tibial baseplate on the two pins left in place.

In order to help identify the correct position of the tibial baseplate two lines are marked on the anterior wall of the tibial implant, corresponding to the alignment lines on the trial tibial baseplate. Once the trial baseplate is fixed, identify the position of these two lines on the tibia by electrodiathermy.

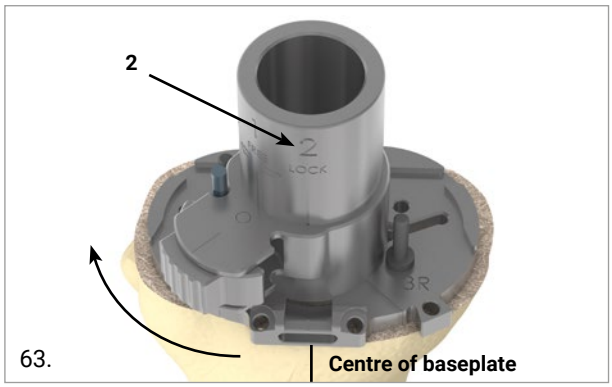
Assemble the reamer guide to the trial tibial baseplate following the marked numbers:

- Position the reamer guide on the trial tibial baseplate aligning mark (1) to the centre of the baseplate.



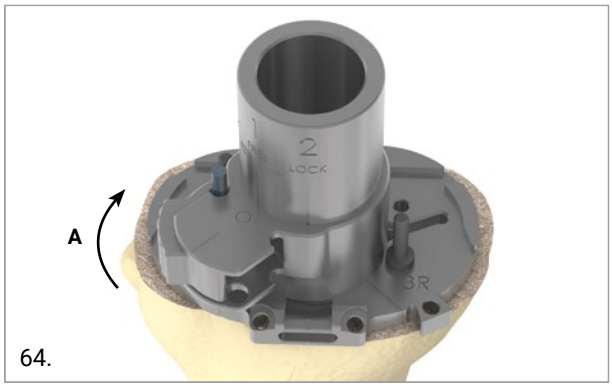
62.

- Turn the reamer guide aligning mark (2) to the centre of the baseplate.



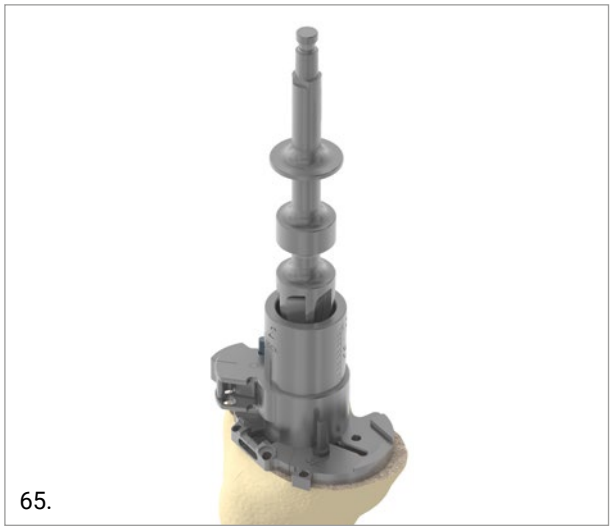
63.

- Push button (A) to fix the barrel onto the pin.



64.

Once the barrel is firmly locked to the pin, proceed to the tibial reaming using the conical reamer provided. Insert the dedicated reamer into the guide and prepare the keel hole parallel to the axis of the bone until the depth stop is reached. To remove bone use the reamer clockwise, to compact bone use the reamer counter clockwise (no bone is excised).


65.

Remove the reamer guide by turning it to the unlocked position. Assemble the trial keel with the handle and impact it through the dedicated hole of the trial baseplate, in order to finish the keel preparation.
Remove the trial handle.

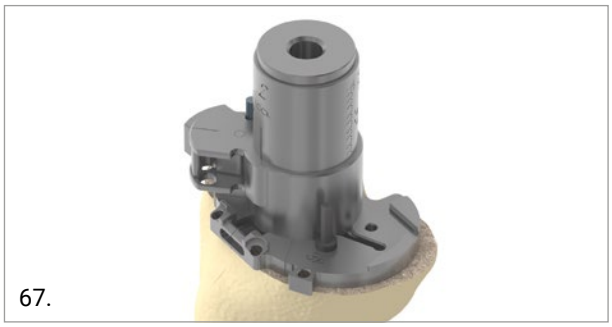

66.

8.3 TIBIAL STEM EXTENSION

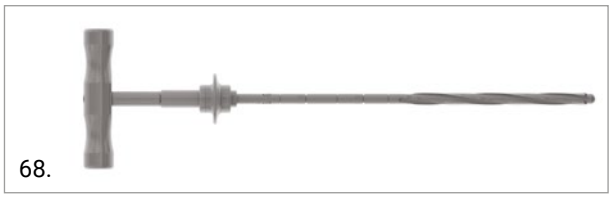
For additional tibial baseplate stability (if required) a stem extension can be added to the tibial keel.

CAUTION
In order to avoid the risk of cortical infraction, carefully plan preoperatively the positioning of the stem extension with the help of the X-ray template.

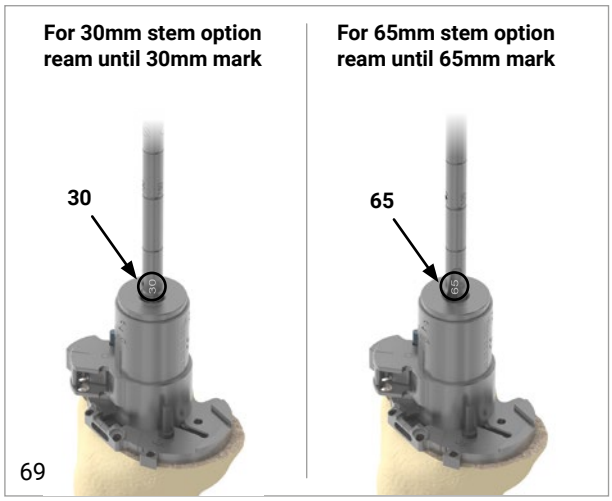
Remove the trial keel from the bone. Assemble the reamer guide on the trial tibial baseplate and insert the 11 mm reduction bush in it. Open the intramedullary canal with the help of the 9mm drill bit, if needed.


67.

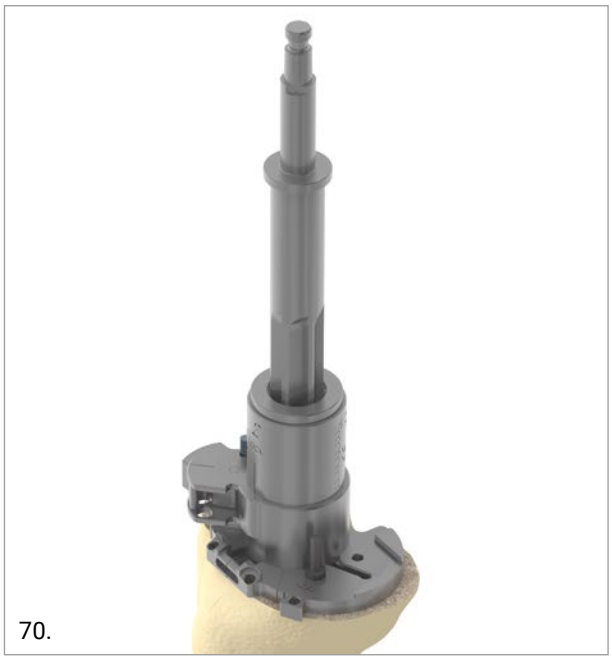
Assemble the T-handle with the 11 mm reamer.


68.

Ream the canal until the correct depth is reached.



Remove the 11 mm reduction bush and insert the 15.5 mm reduction bush in the reamer guide assembled on the trial baseplate and finish the keel preparation using the15.5mm reamer.



Remove the reamer guide, assemble the extension stem on the trial keel and impact it through the trial baseplate with the help of the handle.

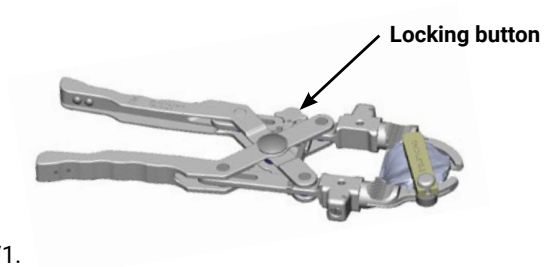
9. PATELLA

There are two options when dealing with the patella. The patella can be either resurfaced or denervated. Both techniques appear to give good results. The disadvantage of resurfacing the patella is that the patella is weakened because of the amount of bone that is necessarily removed to accommodate an implant. This results in a patella that is more prone to fracture than a non- resurfaced patella and repairing such fractures can be difficult. However, whether or not the surgeon resurfaces the patella it is essential that the patella tracks correctly in the trochlear groove of the femoral component. There are occasions when the loss of patellar bone is such that correct tracking of the patella can only be obtained when the patella is resurfaced. However the surgeon must understand that if patellar maltracking is present it is more likely to be due to tightness of the lateral patellar retinaculum which should be corrected by an appropriate release. To treat the patella two alternative options are available: resurfacing or inset patella.

All GMK Patellae can be implanted with all the sizes of GMK Primary femurs.

Option 1: Resurfacing Patella
Insert the patella resection guides into the patella clamp. After carefully releasing the periphery of the patella, position the resection guides at the appropriate resection level, with the assistance of the patellar stylus assembled in one slot of the resection guide. The stylus should be in contact with the top of the patella dome allowing for a 10 mm fixed cut.

Then close the clamp handle until contact between the resection guides and the patella bone is made and lock the clamp with the button provided.



71.

CAUTION
Check that at least 13 mm of bone remains after resection.

Perform the patellar resection through the slots of the resection guides.

Open the patellar clamp, remove the two resection guides and position the spike jaw and drilling guide.

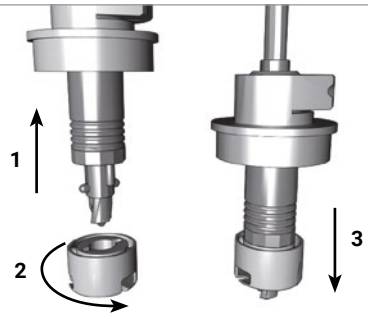

72.

CAUTION
To correctly position the patellar component, its single peg has to be positioned on the lateral facet of the patella and the other two pegs on the medial facet once the patella is in place i.e. not luxated.

Apply the drilling guide on the resected surface of the patella and drill the three holes using the patellar pegs drill. Pressurise the trial resurfacing patella of the appropriate size, reduce the patella and test the knee through its full range of motion.

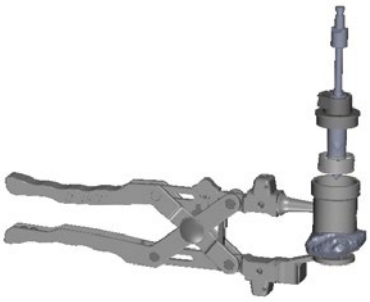
Option 2: Inset patella
Choose the size of the patella using the different reamer guides or the dedicated template set. Assemble the reamer guide of the chosen size and the spike jaw on the patellar clamp.

To assemble the reamer of the suitable size to the reamer holder, pull up the locking mechanism of the reamer holder, insert the reamer, turn it 90° and release the locking mechanism, make the reamer is firmly fixed.



73.

Insert the reamer into the reamer guide and drill until the depth gauge touches the reamer guide.

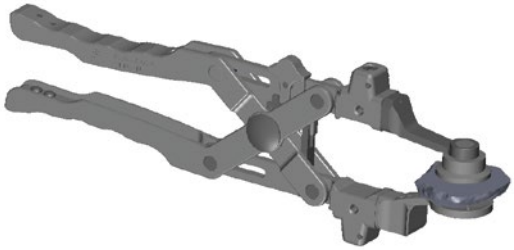


74.

CAUTION
The hole should be shallow enough to leave a minimum wall thickness of 13 mm.

Pressurise the trial inset patella of the appropriate size, reduce the patella and test the knee through its full range of motion.

Finally, cement the patella implant using the clamp and the provided squeezer.



75.

10. SELECTION OF THE PROSTHETIC COMPONENTS - SIZE MATCHING

10.1 MOBILE VERSION

Mobile tibial inserts (STD and UC) have to be matched with femoral components of the same size. Mobile tibial trays size X can be matched with mobile tibial inserts (STD and UC) of the same size and from size X-1, X-2 and X+1. The matching capabilities are shown in tables 1 and 2.

		MOBILE TIBIAL INSERTS (STD AND UC)						
FEMORAL COMPONENTS	SIZE	1	2	3	4	5	6	7
	1 1N	✓	×	×	×	×	×	×
	2 2N	×	✓	×	×	×	×	×
	3 3N	×	×	✓	×	×	×	×
	4 4N	×	×	×	✓	×	×	×
	5 5N	×	×	×	×	✓	×	×
	6 6N	×	×	×	×	×	✓	×
	7 7N	×	×	×	×	×	×	✓

Table 1: Matching capabilities for mobile tibial inserts and STD and UC femoral components.

		MOBILE TIBIAL INSERTS (STD AND UC)						
MOBILE TIBIAL TRAYS	SIZE	1	2	3	4	5	6	7
	1	✓	✓	×	×	×	×	×
	2	✓	✓	✓	×	×	×	×
	3	✓	✓	✓	✓	×	×	×
	4	×	✓	✓	✓	✓	×	×
	5	×	×	✓	✓	✓	✓	×
	6	×	×	×	✓	✓	✓	✓

Table 2: Matching capabilities for mobile tibial inserts and mobile tibial trays.

10.2 FIXED VERSION

Fixed tibial inserts STD and UC have to be matched with fixed tibial trays from the same size.

STD femoral components size X can be matched with fixed tibial inserts (STD and UC) from size X-1, size X and X+n.

Fixed tibial inserts PS have to be matched with fixed tibial trays from the same size.

PS femoral components size X can be matched with PS fixed tibial inserts from size X-1, size X and X+n. The matching capabilities are shown in tables 3 and 4.

		FIXED TIBIAL INSERTS (STD, PS AND UC)					
FIXED TIBIAL TRAYS	SIZE	1	2	3	4	5	6
	1	✓	×	×	×	×	×
	1+	✓	×	×	×	×	×
	2	×	✓	×	×	×	×
	2+	×	✓	×	×	×	×
	3	×	×	✓	×	×	×
	3+	×	×	✓	×	×	×
	4	×	×	×	✓	×	×
	4+	×	×	×	✓	×	×
	5	×	×	×	×	✓	×
	5+	×	×	×	×	✓	×
	6	×	×	×	×	×	✓

Table 3: Matching capabilities for fixed tibial inserts and fixed tibial trays.

		FIXED TIBIAL INSERTS (STD, PS AND UC)					
FEMORAL COMPONENTS	SIZE	1	2	3	4	5	6
	0	✓	✓	✓	✓	✓	✓
	1 1N	✓	✓	✓	✓	✓	✓
	2 2N	✓	✓	✓	✓	✓	✓
	3 3N	×	✓	✓	✓	✓	✓
	4 4N	×	×	✓	✓	✓	✓
	5 5N	×	×	×	✓	✓	✓
	6 6N	×	×	×	×	✓	✓
	7 7N	×	×	×	×	×	✓

Table 4: Matching capabilities for fixed tibial inserts and femoral components.

10.3 FULL PE VERSION

STD femoral components size X can be matched with Full PE UC tibial component from size X-1, size X and X+n.

PS femoral components size X can be matched with Full PE PS tibial component from size X-1, size X and X+n.

		FULL PE UC OR PS TIBIAL COMPONENTS					
FEMORAL COMPONENTS	SIZE	1	2	3	4	5	6
	0	✓	✓	✓	✓	✓	✓
	1 1N	✓	✓	✓	✓	✓	✓
	2 2N	✓	✓	✓	✓	✓	✓
	3 3N	×	✓	✓	✓	✓	✓
	4 4N	×	×	✓	✓	✓	✓
	5 5N	×	×	×	✓	✓	✓
	6 6N	×	×	×	×	✓	✓
	7 7N	×	×	×	×	×	✓

Table 5: Matching capabilities for Full PE tibial components and femoral components.

All GMK Fixed Tibial Trays can be implanted with or without the extension stem.

11. FINAL IMPLANT

11.1 TIBIAL BASEPLATE

CEMENTLESS TIBIAL BASEPLATE

The tibial implant should be positioned manually, ensuring that there is no conflict between the posterior edge of the baseplate and the femur, which may result in femoral injury or tibial malrotation. The resected bone surface should be thoroughly cleaned using pulse lavage or similar.The final impaction is performed using the baseplate impactor, assembled on the slide hammer. If a stem extension is used, pre-assemble this by removing the plastic plug of the tibial keel; impact the stem onto the keel and finally, secure the stem with a screw inserted through the tibial keel.

CAUTION

To avoid damaging the stem, protect it during impaction. A screwdriver can be inserted in the hexagonal hole of the stem and the impaction can be performed hammering on the screwdriver.

CAUTION

The tibial stem extension must not be coupled with the Full PE tibial baseplate.

CEMENTED TIBIAL BASEPLATE
The bone cement must be prepared according to the related instructions for use, provided by the cement manufacturer. As soon as the mixing phase has finished, apply the cement to the undersurface of the tibial implant, making sure that it doesn't touch the upper surface. Once the cement reaches the right viscosity, it can be applied to the bone. The tibial implant should be positioned manually, ensuring that there is no conflict between the posterior edge of the baseplate and the femur, which may result in femoral injury or tibial malrotation. The final impaction is performed using the baseplate impactor, assembled with the slide hammer. If a stem extension is used, pre-assemble it by removing the plastic plug of the tibial keel, impacting the stem on the keel and, finally, fixing it with a screw inserted through the tibial keel. Once the tibial implant has been fully inserted using the dedicated impactor, the extruded cement is cleared from the tibia, carefully checking that no cement remains in the joint.

FULL PE
In case the Full-PE tibial component is used, proceed with spreading cement on the undersurface of the component and on the keel, as well as on the tibial bone previously cleaned. Please make sure that the prepared central hole is well filled with cement. At the prescribed time, the implant should be impacted on the bone, using the dedicated impactor (ref. 02.09.10.9017, available on request), taking care to thoroughly remove all excess cement.

11.2 PE INSERT

CAUTION
The Full PE tibial component is monoblock, therefore no PE insert has to be clipped on it.

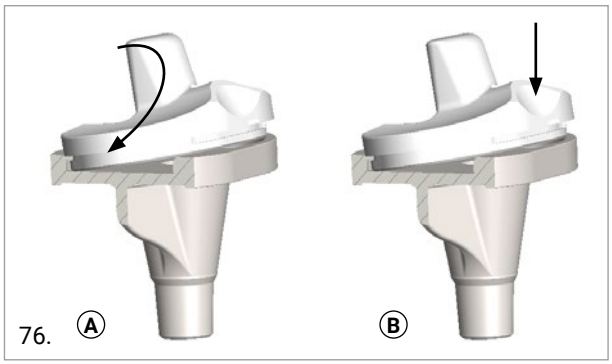
FIXED INSERT
Place the insert on the tibial baseplate according to the following steps:

Make sure that the metallic upper surface of the tibial baseplate is perfectly clean and that no small debris can get interposed between tray and insert during assembly.

Engage the posterior lips of the insert in the posterior part of the tibial baseplate.(A)

Clip the anterior part of the insert, by exerting pressure on it manually.(B)

CAUTION
When the posterior lips of the insert are fully engaged in the posterior part of the tibial baseplate, it is always possible to clip it manually. When the manual clipping is not possible, reposition the insert. A 'click' will be heard or felt when the insert is correctly connected.



OPTION
To perform a final control of the height of the insert, before implanting the definitive PE insert, the trial insert can be positioned on the final baseplate.

OPTION
The PS insert has to be positioned after the femoral component, in order not to be hindered by the presence of the posterior stabilization peg. Using the screwdriver, fix the PS insert to the tibial tray with the screw packaged with the insert.

WARNING
The torque limiter screwdriver 3,5 Nm must be used to guarantee that the optimal locking of the screw is achieved.

MOBILE INSERT
With the tibia anteriorly dislocated, insert the polyethylene insert (STD or UC) into the tibial baseplate of the size and height validated during the trials.

11.3 FEMORAL COMPONENT

CEMENTLESS FEMORAL COMPONENT
Attach the femoral impactor to the slide hammer. Open the jaws of the femoral impactor and attach it to the femoral component; the jaws fitting into the two lateral slots of the femoral component. Secure the connection by turning the handle firmly. The resected bone surface should be thoroughly cleaned using pulse lavage or similar. If the intramedullary canal has been violated it should be closed with cancellous bone. Position the femoral implant over the previously drilled peg holes for correct alignment and impact with the hammer.

CEMENTED FEMORAL COMPONENT
The bone cement must be prepared according to the cement manufacturer's instructions. Once the cement reaches the right viscosity, it must be applied to the internal surface of the femoral implant into the corresponding cement pockets. The resected bone surface should be thoroughly cleaned by pulse lavage and the intramedullary canal closed by cancellous bone. Position the femoral implant using the previously drilled peg holes for correct alignment and finish by impacting with the hammer. Once the femoral implant has been fully inserted with the dedicated impactor, the extruded cement is cleared from the femur, ensuring that no cement remains on the articular surface, on the intercondylar notch and in the joint, in order to avoid excessive UHMWPE wear.

12. ANNEX 1 LBS OPTION

In this chapter a soft tissue referencing option is described. This option facilitates accurate soft tissue balancing thanks to the specifically designed Ligament Balancing System (LBS) representing a virtual distal femoral resection.

The LBS is used in extension to position the distal cutting block and to simulate:

- Leg axis and the extension gap
- Distal femoral resection

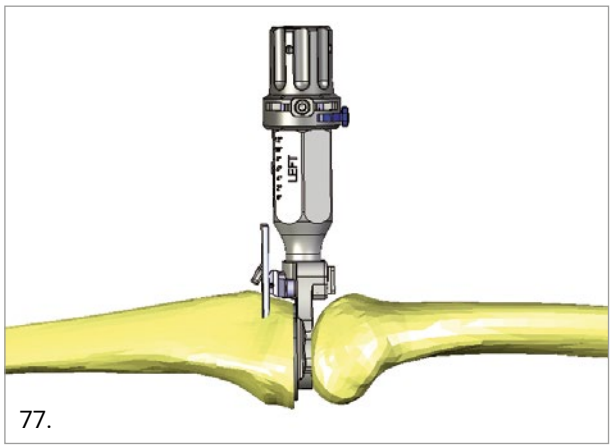
Through the Rotation Guide the position of the A/P 4-in-1 block is automatically adjusted, with respect to the ligament tensioning and the flexion and extension gaps.

12.1 TIBIAL CUT

Please refer to chapter §2.

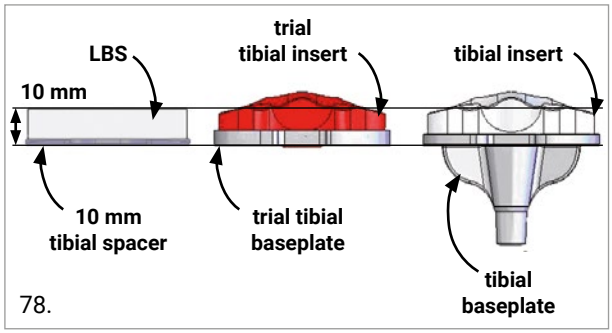
12.2 TIBIAL RESECTION CHECK

To check the performed tibia resection, put the knee in extension and insert the LBS in the joint, so that the "TIBIAL" marking is facing the tibial spacer.



77.

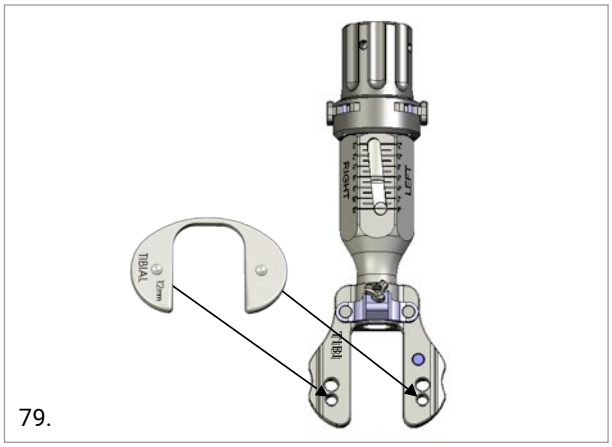
The LBS and the tibial spacer simulate the minimum tibial thickness (10 mm), that is the thickness of the tibial baseplate and the corresponding PE insert.



78.

If it is not possible to insert the LBS in the joint, the height of the tibial resection can be changed by dropping the tibial cutting block to the two tibial pins left in place for this purpose, using the rows of holes above the reference line (each row is +2 mm correction).

In case of laxity, a tibial spacer can be added on the tibial side of the LBS, simulating the thickness of the different PE inlays (12, 14, 17 and 20 mm).



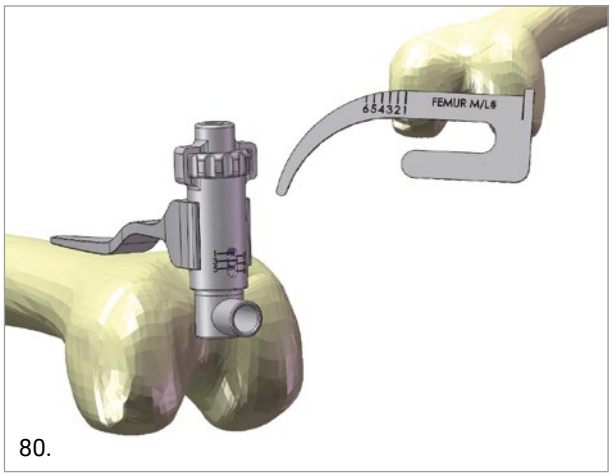
79.

12.3 LIGAMENT BALANCING SYSTEM

Open the intramedullary canal by means of the 9 mm drill. It is recommended to toggle the drill tip to allow venting of the intramedullary canal.

The intramedullary drill bit can be driven by the IM hole gauger. The medio-lateral width of the femur can be double-checked by means of the sickle finger.

Select the femoral size on the femoral intramedullary hole gauger and position this in the middle of the trochlea while in contact with the anterior cortex. This will identify the intramedullary canal according to the femoral size.

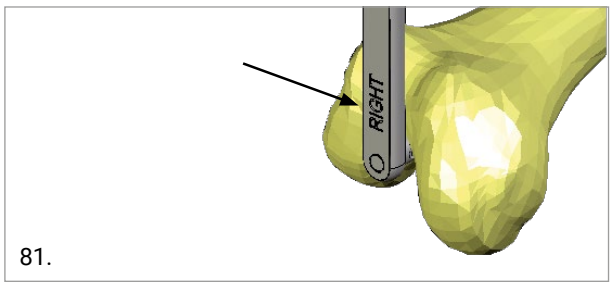


80.

Put the knee in flexion and insert the LBS IM rod in the intramedullary canal.

CAUTION

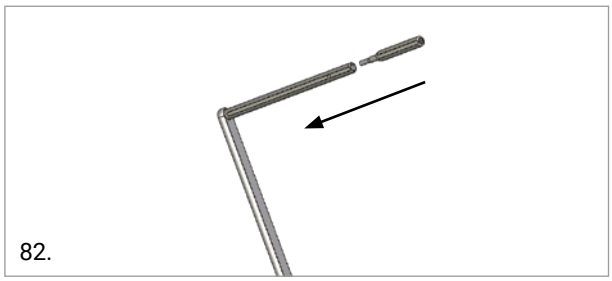
The LBS IM rod is available in two versions, left and right. Please ensure that the correct one is inserted according to the side being operated on.



81.

To improve the accuracy of the alignment, it is suggested to add to the proximal part of the IM rod an extension stem of 50 mm.

Please note that the insertion of the IM rod without any extension stem can lead to wrong alignment.

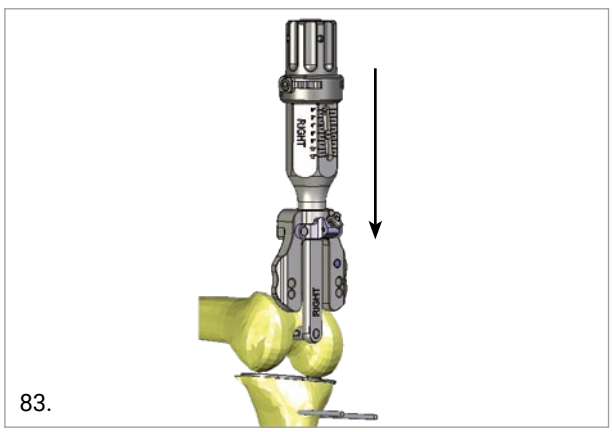


82.

Keeping the knee in flexion (90°), insert the LBS on the LBS IM rod, without pushing it all the way.

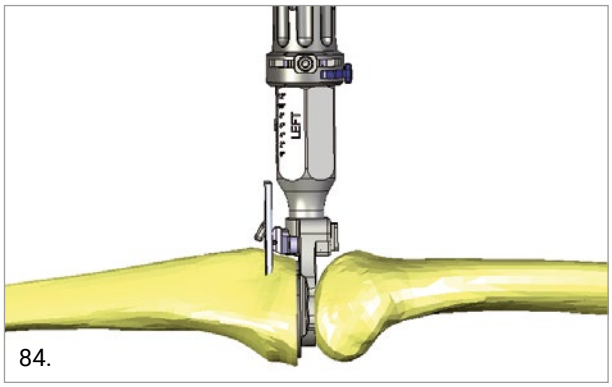
CAUTION

Make sure that the correct spacer is still assembled to the LBS.



83.

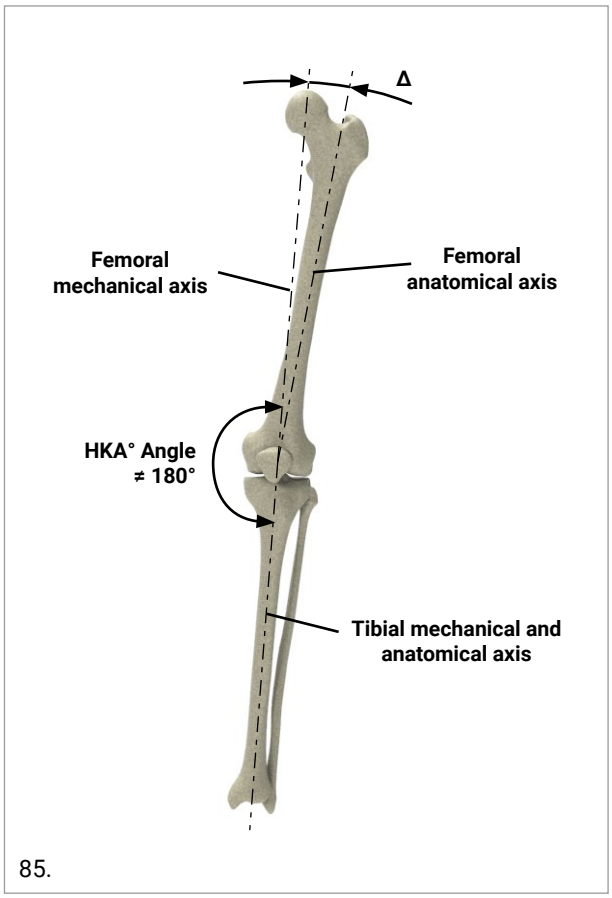
Extend the knee and insert the LBS completely in the joint.



84.

As the tibial cut has been performed perpendicular to the tibial mechanical axis, the residual deformity (if given) should be checked and corrected acting on the distal resection and the ligament balancing.

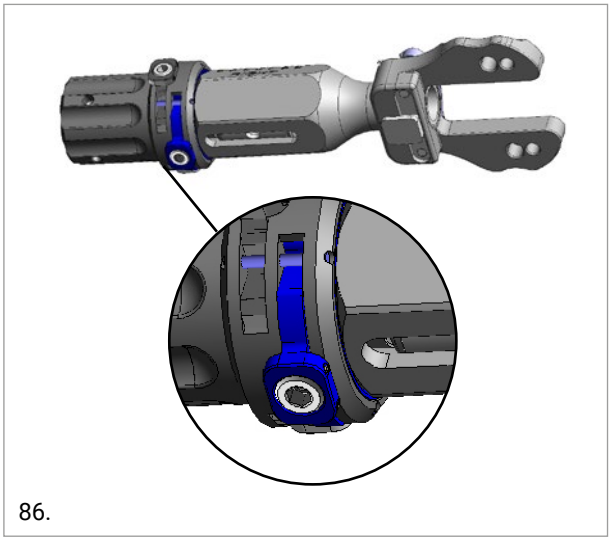
The value of the Δ° angle between the femoral anatomical and mechanical axis, has to be estimated pre-operatively via X-Ray planning.



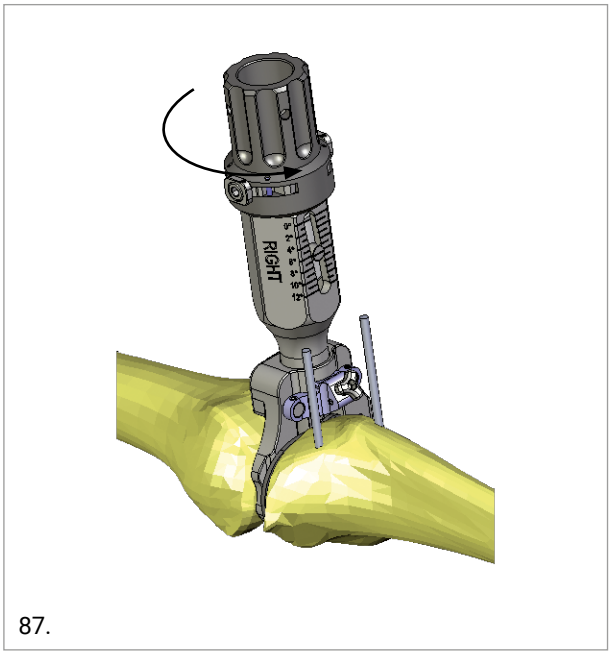
85.

The Δ° angle must then be set on the LBS, by unlocking the screw and turning the upper washer according to the marked scale relating to the side to be operated on.

By means of this adjustment, the LBS allows reduction of the joint and simulation of the planned HKA.



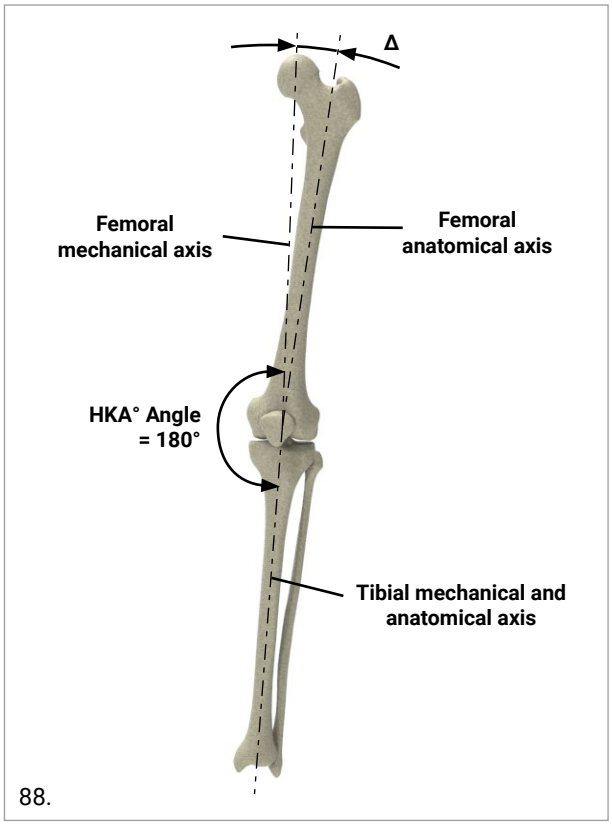
86.



87.

OPTION

If pre-operative X-Rays are not available, it is recommended to pre-set the value at 6° and then to adjust it according to the ligament balance in extension and the HKA alignment rod.



88.

It is always recommended to check the limb alignment using the HKA alignment rod. The rod is assembled on the top of the LBS: the proximal tip of the latter should point to the centre of the hip, while the distal tip should point to the second metatarsal bone.

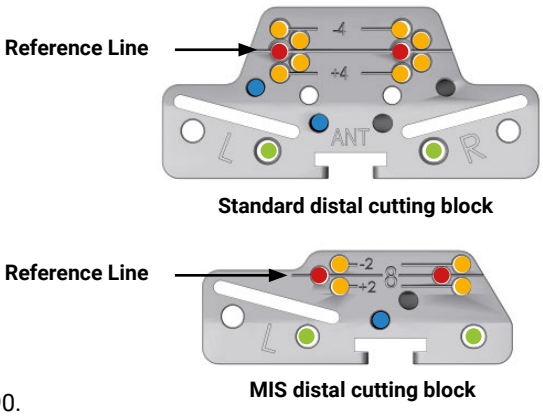
89.

With the LBS in place it is possible to check the ligament balance. If there is any instability, add a thicker tibial spacer to the LBS, simulating a thicker PE insert.

If the joint is constrained, it is possible to reduce the thickness of the tibial spacer, which simulates a higher tibia resection or a release. These choices depend on the patient's anatomy, on the surgery and on the surgeon's judgement.

Once the knee joint has been considered well balanced and the mechanical axis is deemed satisfactory, proceed with the distal resection.

12.4 FEMORAL DISTAL RESECTION

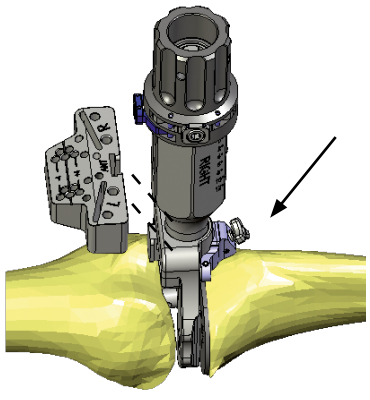


90.

Distal cutting block holes (left knee)

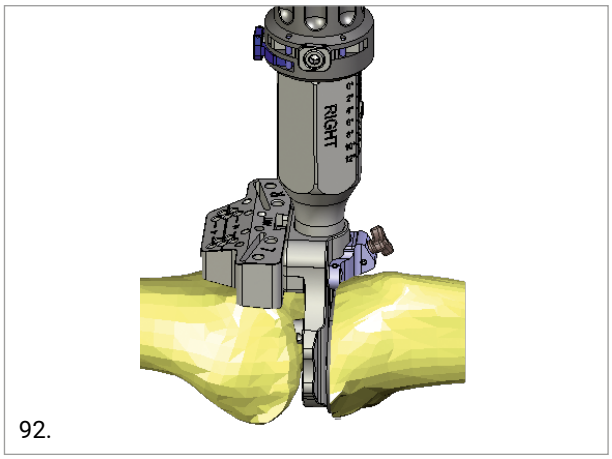
- Parallel positioning holes
- Oblique fixation holes
- Sawblade guide / alignment rod holes
- Parallel repositioning holes

With the leg in extension and the LBS still in place, slide the distal cutting block in the LBS rail, by pushing the button on the back of LBS.



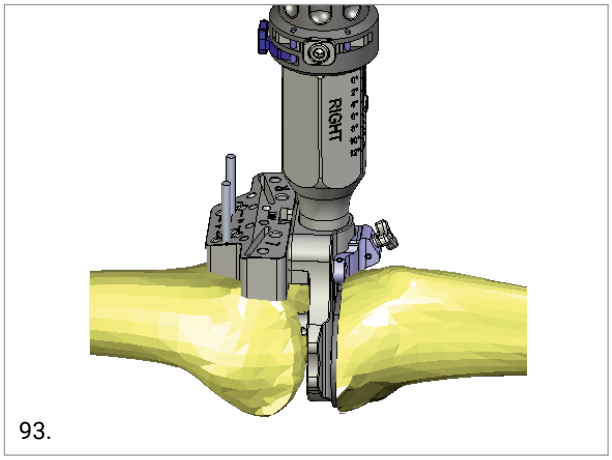
91.

Firmly tighten the LBS screw (red highlighted in the picture on the right) in order to secure the cutting block to the LBS.

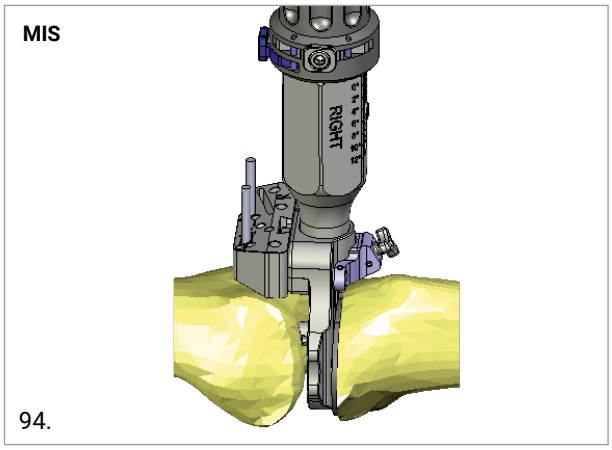


92.

Fix the distal cutting block to the bone inserting two pins in the holes marked by the reference line (8 mm resection, corresponding to the thickness of the distal condyles of the femoral component).

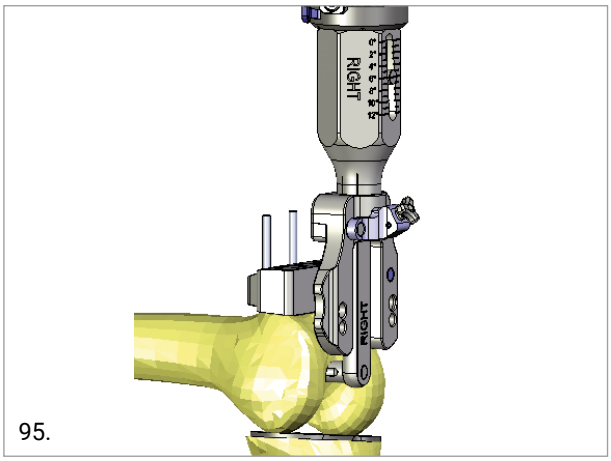


93.



94.

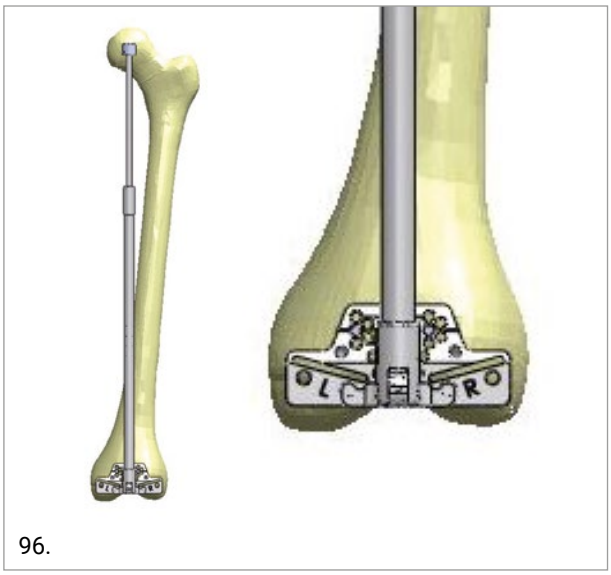
Once the guide has been fixed, release the LBS from the cutting block, unscrewing the locking screw and pushing the button on the back, and remove it from the IM rod holding the knee in extension and pulling it up. Flex the knee and remove the LBS IM Rod.



95.

Before performing the resection, check the cutting block position with the sickle finger.

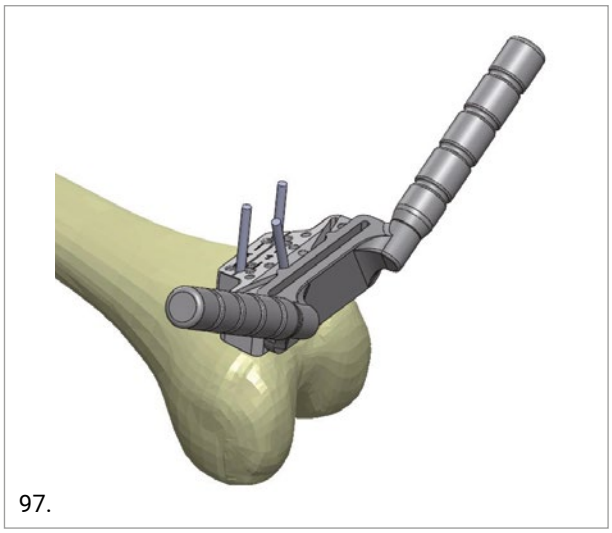
In order to double-check the correct alignment of the distal cutting block the telescopic alignment rod can be inserted into the dedicated holes of the cutting block. Verify that it points in the direction of the centre of the femoral head.



96.

Once the distal cutting block position is adjusted, it is recommended to add an additional oblique pin in the dedicated hole, to stabilize the guide.

Place the saw blade guide and perform the distal resection.

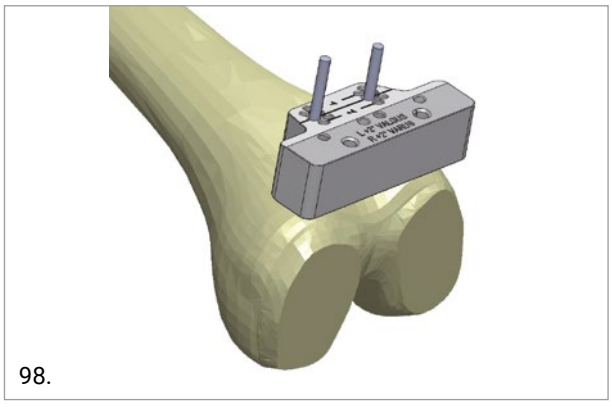


97.

Once the resection is performed, remove the oblique pin and the distal cutting block. The parallel pin should be left in place in case distal recut is required.

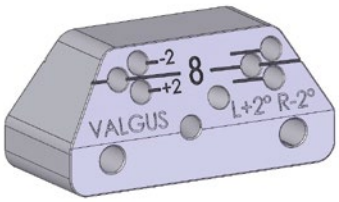
OPTION

An additional cutting block allows the correction of the varus/valgus of the distal resection (+2° varus/valgus). Ensure that the correction cutting blocks are positioned on the same holes row used to perform the distal cut.



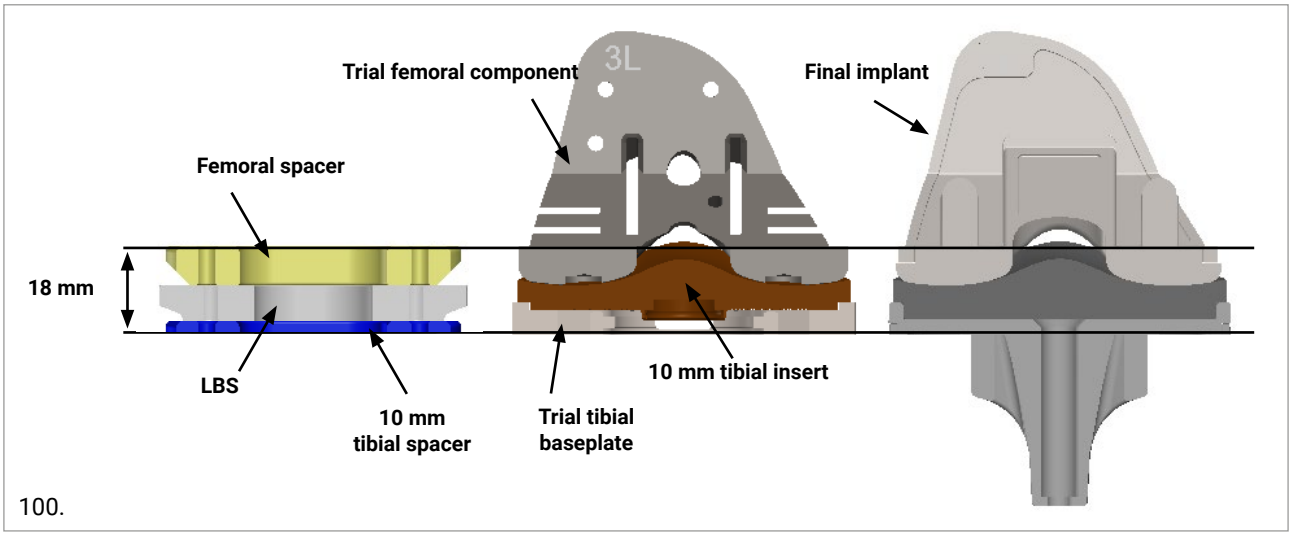
98.

MIS



99.

12.5 EXTENSION GAP CONTROL



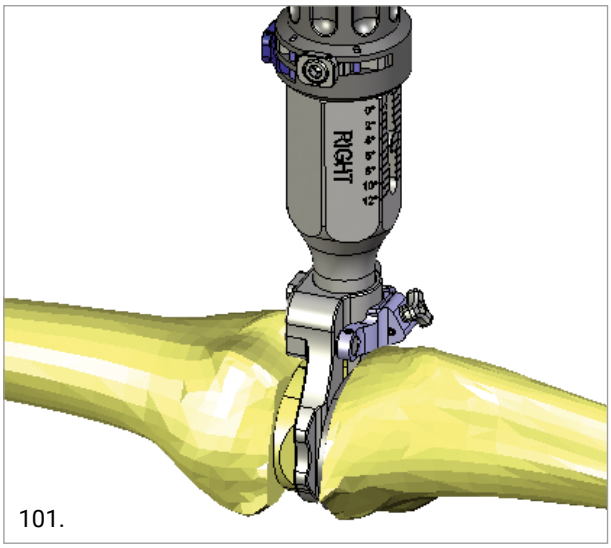
100.

In order to check the performed femoral distal resection, the LBS assembled with the femoral spacer will be used.

The femoral spacer simulates the thickness of the femoral component (8 mm) and is available in 2 different widths, suitable for sizes 1-3 and 4-6. Therefore, the thickness of the LBS, assembled with the femoral spacer and a tibial spacer, corresponds to the total prosthesis thickness given by the tibial baseplate, the PE insert and the femoral component.

With the knee in extension, insert into the joint the LBS endowed with the femoral spacer and, with the suitable tibial spacer used during the distal cutting block positioning (§7 - LIGAMENT BALANCING SYSTEM).

Verify that the knee is stable and correctly balanced in extension.



101.

Once the extension gap has been checked and considered satisfactory, it is possible to remove the parallel pins of the distal cutting block, left in place in case any distal recut is required.

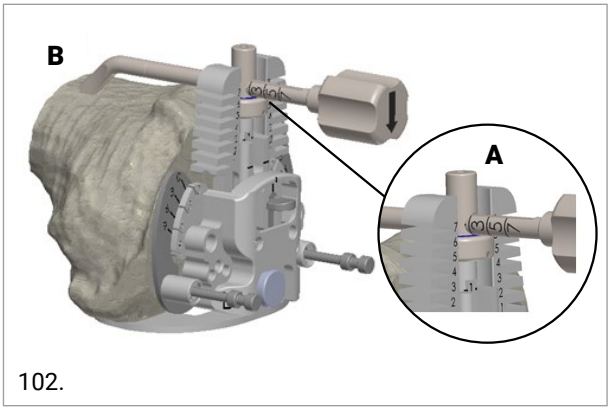
12.6 ANTERIOR CUT, POSTERIOR CUT AND CHAMFERS

Femoral size evaluation

The posterior referencing femoral sizer must be positioned in contact with the distal cut surface, with both the posterior condyles well applied on its base.

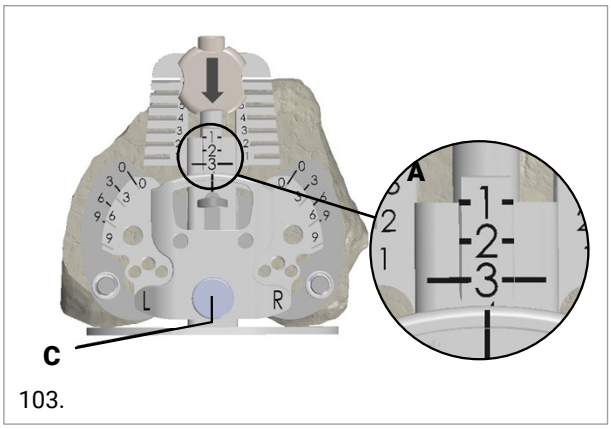
Refine the positioning of the sizer, by selecting the size of the femur on the anterior palpator (A).

Close the sizer until the anterior palpator touches the anterior cortex (B).



102.

The size of the femur can be read on the femoral sizer (A).

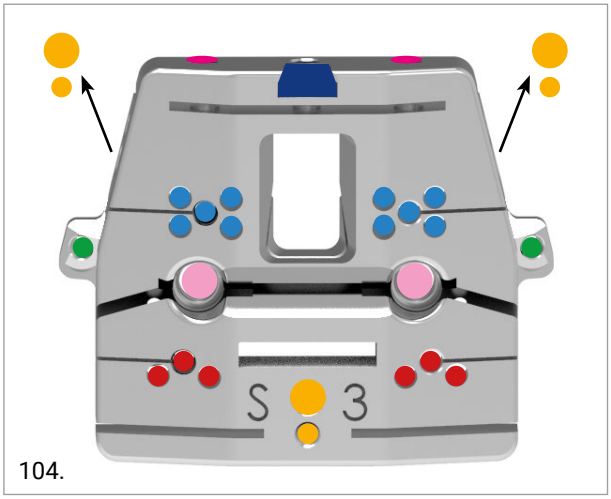


103.

12.7 4IN1 FEMORAL CUTTING BLOCK POSITIONING

The femoral anterior, posterior and chamfers resections are performed with the 4in1 femoral cutting block.

CAUTION
All femoral resections have to be performed by means of a 13 mm wide and up to 1.27 mm thick sawblade.



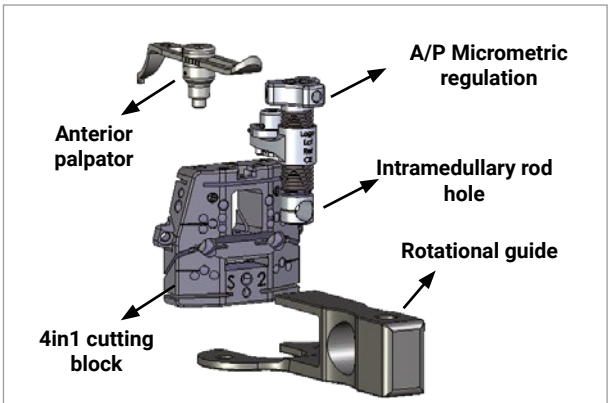
104.

4in1 cutting block holes

- Parallel positioning holes (Posterior Referencing)
- Parallel positioning holes (Anterior Referencing)
- Handle holes
- Oblique fixation holes
- Cancellous bone screw holes
- Anterior palpator holes
- A/P micrometric regulation holes

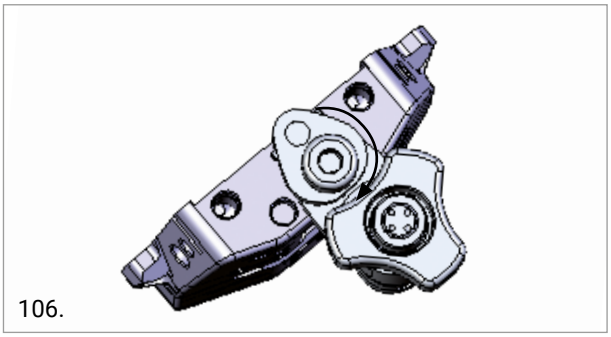
The 4in1 cutting block must be assembled with the following components:

- Anterior palpator
- A/P micrometric regulation
- Rotational guide



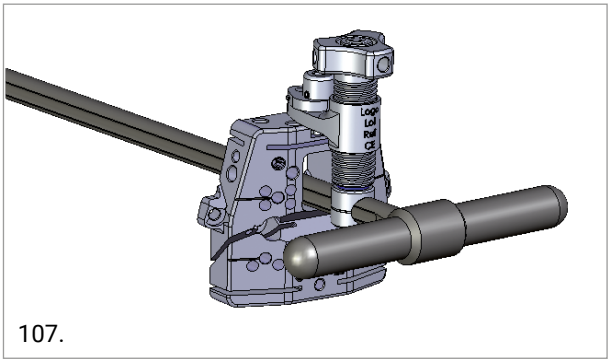
105.

Assemble the A/P micrometric regulation on the 4in1 cutting block and fix it by turning its fixation screw, so that the two laser-marked lines are perpendicular.

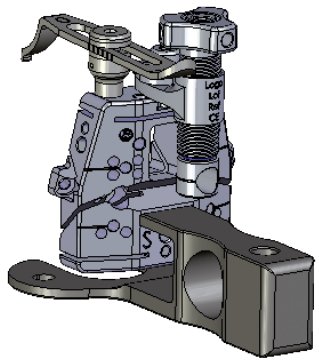

106.

Adjust the position of the A/P micrometric regulation as far down as possible turning the upper screw; this will simplify the positioning of the 4in1 cutting block to the bone.

Ensure that the intramedullary rod can be inserted through the holes of both the A/P micrometric regulation and the 4in1 cutting block.


107.

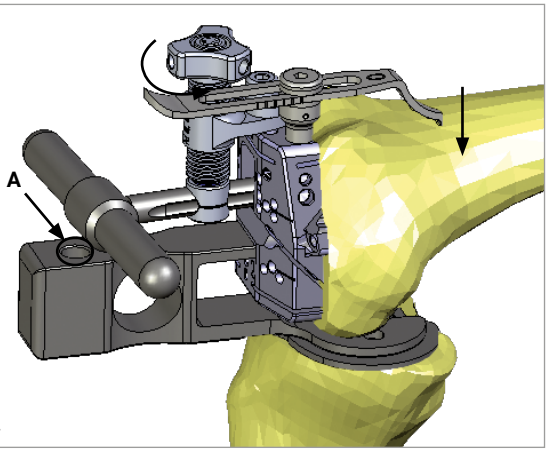
Insert the rotational guide in the dedicated slot and screw the anterior palpator on the 4in1 cutting block.



108.

Flex the knee and position the cutting block flush to the distal cut, whilst introducing the intramedullary rod through the A/P micrometric regulation into the intramedullary canal.

With the knee at 90°, position the rotation guide on the tibial cover plate.



109.

OPTION

Should the positioning of the rotation guide be hindered by the dimension of the posterior condyles, a pre-cut of the posterior condyles is suggested.

CAUTION

Remember to assemble to the rotation guide the same tibial spacer used during the evaluation of the extension gap.

Turn the A/P micrometrical regulation until the anterior palpator touches the femoral anterior cortex.

OPTION

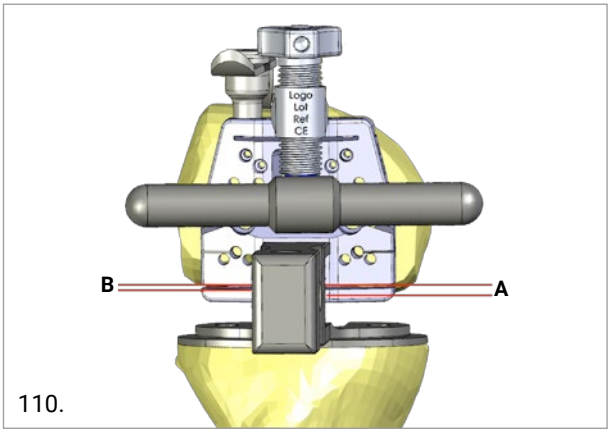
In order to better adjust the femoral rotation it is possible to introduce a screwdriver in the hole (A in the picture above) of the rotational guide to force it.

CAUTION

It is advisable to compare the automatic adjustment of the rotation of the cutting block given by the rotation guide with the conventional anatomical references (Whiteside's line and the epicondylar axis) or with the cutting plane created by the posterior condyles.

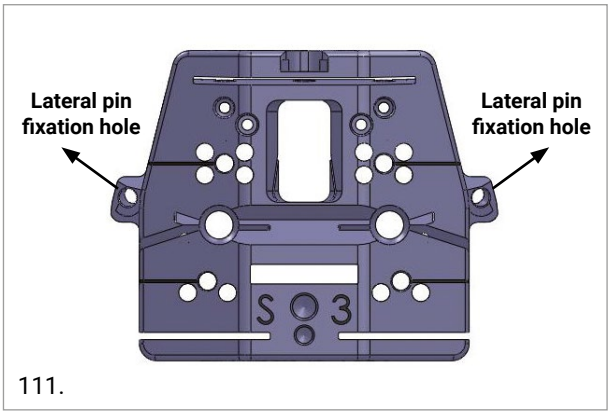
External rotation = medial cut (A) > lateral cut (B)

Avoid any internal rotation and excessive external rotation. An excessive external rotation (A>>B) may be caused by inadequate medial ligament release or by a wrong rotational placement of the cutting block.



110.

Once the positioning of the 4in1 cutting block has been adjusted, fix the block to the bone inserting two pins in the lateral holes of the 4in1 cutting block.



111.

Please refer to chapters §6 to §10 for size change options, finishing and final implantation.

13. IMPLANTS NOMENCLATURE

FEMUR STD CEMENTED

REF. LEFT	SIZE	REF. RIGHT
02.07.2000L	0	02.07.2000R
02.07.2001L	1	02.07.2001R
02.07.2002L	2	02.07.2002R
02.07.2003L	3	02.07.2003R
02.07.2004L	4	02.07.2004R
02.07.2005L	5	02.07.2005R
02.07.2006L	6	02.07.2006R
02.07.2007L	7	02.07.2007R

FEMUR PS CEMENTED

REF. LEFT	SIZE	REF. RIGHT
02.07.2200L	0	02.07.2200R
02.07.2201L	1	02.07.2201R
02.07.2202L	2	02.07.2202R
02.07.2203L	3	02.07.2203R
02.07.2204L	4	02.07.2204R
02.07.2205L	5	02.07.2205R
02.07.2206L	6	02.07.2206R
02.07.2207L	7	02.07.2207R

FEMUR STD CEMENTLESS

REF. LEFT	SIZE	REF. RIGHT
02.07.2300L	0	02.07.2300R
02.07.2301L	1	02.07.2301R
02.07.2302L	2	02.07.2302R
02.07.2303L	3	02.07.2303R
02.07.2304L	4	02.07.2304R
02.07.2305L	5	02.07.2305R
02.07.2306L	6	02.07.2306R
02.07.2307L	7	02.07.2307R

FEMUR PS CEMENTLESS

REF. LEFT	SIZE	REF. RIGHT
02.07.2100L	0	02.07.2100R
02.07.2101L	1	02.07.2101R
02.07.2102L	2	02.07.2102R
02.07.2103L	3	02.07.2103R
02.07.2104L	4	02.07.2104R
02.07.2105L	5	02.07.2105R
02.07.2106L	6	02.07.2106R
02.07.2107L	7	02.07.2107R

GMK SensiTiN FEMUR STD CEMENTED

REF. LEFT	SIZE	REF. RIGHT
02.07.2700L	0	02.07.2700R
02.07.2701L	1	02.07.2701R
02.07.2702L	2	02.07.2702R
02.07.2703L	3	02.07.2703R
02.07.2704L	4	02.07.2704R
02.07.2705L	5	02.07.2705R
02.07.2706L	6	02.07.2706R
02.07.2707L	7	02.07.2707R

GMK SensiTiN FEMUR PS CEMENTED

REF. LEFT	SIZE	REF. RIGHT
02.07.2900L	0	02.07.2900R
02.07.2901L	1	02.07.2901R
02.07.2902L	2	02.07.2902R
02.07.2903L	3	02.07.2903R
02.07.2904L	4	02.07.2904R
02.07.2905L	5	02.07.2905R
02.07.2906L	6	02.07.2906R
02.07.2907L	7	02.07.2907R

FEMUR STD CEMENTED - NARROW

REF. LEFT	SIZE	REF. RIGHT
02.07.2011L	1N	02.07.2011R
02.07.2012L	2N	02.07.2012R
02.07.2013L	3N	02.07.2013R
02.07.2014L	4N	02.07.2014R
02.07.2015L	5N	02.07.2015R
02.07.2016L	6N	02.07.2016R
02.07.2017L	7N	02.07.2017R

FEMUR PS CEMENTED - NARROW

REF. LEFT	SIZE	REF. RIGHT
02.07.2211L	1N	02.07.2211R
02.07.2212L	2N	02.07.2212R
02.07.2213L	3N	02.07.2213R
02.07.2214L	4N	02.07.2214R
02.07.2215L	5N	02.07.2215R
02.07.2216L	6N	02.07.2216R
02.07.2217L	7N	02.07.2217R

FEMUR STD CEMENTLESS - NARROW

REF. LEFT	SIZE	REF. RIGHT
02.07.2311L	1N	02.07.2311R
02.07.2312L	2N	02.07.2312R
02.07.2313L	3N	02.07.2313R
02.07.2314L	4N	02.07.2314R
02.07.2315L	5N	02.07.2315R
02.07.2316L	6N	02.07.2316R
02.07.2317L	7N	02.07.2317R

GMK SensiTiN FEMUR STD CEMENTED NARROW

REF. LEFT	SIZE	REF. RIGHT
02.07.3401L	1N	02.07.3401R
02.07.3402L	2N	02.07.3402R
02.07.3403L	3N	02.07.3403R
02.07.3404L	4N	02.07.3404R
02.07.3405L	5N	02.07.3405R
02.07.3406L	6N	02.07.3406R
02.07.3407L	7N	02.07.3407R

TIBIAL COMPONENT MOBILE CEMENTED

REF. LEFT	SIZE	REF. RIGHT
02.07.1001L	1	02.07.1001R
02.07.1002L	2	02.07.1002R
02.07.1003L	3	02.07.1003R
02.07.1004L	4	02.07.1004R
02.07.1005L	5	02.07.1005R
02.07.1006L	6	02.07.1006R

TIBIAL COMPONENT MOBILE CEMENTLESS

REF. LEFT	SIZE	REF. RIGHT
02.07.1101L	1	02.07.1101R
02.07.1102L	2	02.07.1102R
02.07.1103L	3	02.07.1103R
02.07.1104L	4	02.07.1104R
02.07.1105L	5	02.07.1105R
02.07.1106L	6	02.07.1106R

FEMUR PS CEMENTLESS - NARROW

REF. LEFT	SIZE	REF. RIGHT
02.07.2111L	1N	02.07.2111R
02.07.2112L	2N	02.07.2112R
02.07.2113L	3N	02.07.2113R
02.07.2114L	4N	02.07.2114R
02.07.2115L	5N	02.07.2115R
02.07.2116L	6N	02.07.2116R
02.07.2117L	7N	02.07.2117R

GMK SensiTiN FEMUR PS CEMENTED NARROW

REF. LEFT	SIZE	REF. RIGHT
02.07.3301L	1N	02.07.3301R
02.07.3302L	2N	02.07.3302R
02.07.3303L	3N	02.07.3303R
02.07.3304L	4N	02.07.3304R
02.07.3305L	5N	02.07.3305R
02.07.3306L	6N	02.07.3306R
02.07.3307L	7N	02.07.3307R

TIBIAL COMPONENT FIXED CEMENTED

REF. LEFT	SIZE	REF. RIGHT
02.07.1201L	1	02.07.1201R
02.07.12015L	1+	02.07.12015R
02.07.1202L	2	02.07.1202R
02.07.12025L	2+	02.07.12025R
02.07.1203L	3	02.07.1203R
02.07.12035L	3+	02.07.12035R
02.07.1204L	4	02.07.1204R
02.07.12045L	4+	02.07.12045R
02.07.1205L	5	02.07.1205R
02.07.12055L	5+	02.07.12055R
02.07.1206L	6	02.07.1206R

TIBIAL COMPONENT FIXED CEMENTLESS

REF. LEFT	SIZE	REF. RIGHT
02.07.1301L	1	02.07.1301R
02.07.13015L	1+	02.07.13015R
02.07.1302L	2	02.07.1302R
02.07.13025L	2+	02.07.13025R
02.07.1303L	3	02.07.1303R
02.07.13035L	3+	02.07.13035R
02.07.1304L	4	02.07.1304R
02.07.13045L	4+	02.07.13045R
02.07.1305L	5	02.07.1305R
02.07.13055L	5+	02.07.13055R
02.07.1306L	6	02.07.1306R

GMK SensiTiN TIBIAL COMPONENT MOBILE CEMENTED

REF. LEFT	SIZE	REF. RIGHT
02.07.2811L	1	02.07.2811R
02.07.2812L	2	02.07.2812R
02.07.2813L	3	02.07.2813R
02.07.2814L	4	02.07.2814R
02.07.2815L	5	02.07.2815R
02.07.2816L	6	02.07.2816R

GMK SensiTiN TIBIAL COMPONENT FIXED CEMENTED

REF. LEFT	SIZE	REF. RIGHT
02.07.2801L	1	02.07.2801R
02.07.28015L	1+	02.07.28015R
02.07.2802L	2	02.07.2802R
02.07.28025L	2+	02.07.28025R
02.07.2803L	3	02.07.2803R
02.07.28035L	3+	02.07.28035R
02.07.2804L	4	02.07.2804R
02.07.28045L	4+	02.07.28045R
02.07.2805L	5	02.07.2805R
02.07.28055L	5+	02.07.28055R
02.07.2806L	6	02.07.2806R

FULL PE UC TIBIAL COMPONENT*

REF.	SIZE	THICKNESS (mm)	REF.	SIZE	THICKNESS (mm)
02.07.0110APUC	1	10	02.07.0410APUC	4	10
02.07.0112APUC		12	02.07.0412APUC		12
02.07.0114APUC		14	02.07.0414APUC		14
02.07.0117APUC		17	02.07.0417APUC		17
02.07.0210APUC	2	10	02.07.0510APUC	5	10
02.07.0212APUC		12	02.07.0512APUC		12
02.07.0214APUC		14	02.07.0514APUC		14
02.07.0217APUC		17	02.07.0517APUC		17
02.07.0310APUC	3	10	02.07.0610APUC	6	10
02.07.0312APUC		12	02.07.0612APUC		12
02.07.0314APUC		14	02.07.0614APUC		14
02.07.0317APUC		17	02.07.0617APUC		17

FULL PE PS TIBIAL COMPONENT*

REF.	SIZE	THICKNESS (mm)	REF.	SIZE	THICKNESS (mm)
02.07.0110APPS	1	10	02.07.0410APPS	4	10
02.07.0112APPS		12	02.07.0412APPS		12
02.07.0114APPS		14	02.07.0414APPS		14
02.07.0117APPS		17	02.07.0417APPS		17
02.07.0210APPS	2	10	02.07.0510APPS	5	10
02.07.0212APPS		12	02.07.0512APPS		12
02.07.0214APPS		14	02.07.0514APPS		14
02.07.0217APPS		17	02.07.0517APPS		17
02.07.0310APPS	3	10	02.07.0610APPS	6	10
02.07.0312APPS		12	02.07.0612APPS		12
02.07.0314APPS		14	02.07.0614APPS		14
02.07.0317APPS		17	02.07.0617APPS		17

* Full PE PS or UC tibial component must not be coupled with any stem extension.

TIBIAL INSERT STD FIXED

REF.	SIZE	THICKNESS (mm)	REF.	SIZE	THICKNESS (mm)
02.07.0110SF	1	10	02.07.0410SF	4	10
02.07.0112SF		12	02.07.0412SF		12
02.07.0114SF		14	02.07.0414SF		14
02.07.0117SF		17	02.07.0417SF		17
02.07.0120SF		20	02.07.0420SF		20
02.07.0210SF	2	10	02.07.0510SF	5	10
02.07.0212SF		12	02.07.0512SF		12
02.07.0214SF		14	02.07.0514SF		14
02.07.0217SF		17	02.07.0517SF		17
02.07.0220SF		20	02.07.0520SF		20
02.07.0310SF	3	10	02.07.0610SF	6	10
02.07.0312SF		12	02.07.0612SF		12
02.07.0314SF		14	02.07.0614SF		14
02.07.0317SF		17	02.07.0617SF		17
02.07.0320SF		20	02.07.0620SF		20

TIBIAL INSERT UC FIXED

REF.	SIZE	THICKNESS (mm)	REF.	SIZE	THICKNESS (mm)
02.07.0110FUC	1	10	02.07.0410FUC	4	10
02.07.0112FUC		12	02.07.0412FUC		12
02.07.0114FUC		14	02.07.0414FUC		14
02.07.0117FUC		17	02.07.0417FUC		17
02.07.0120FUC		20	02.07.0420FUC		20
02.07.0210FUC	2	10	02.07.0510FUC	5	10
02.07.0212FUC		12	02.07.0512FUC		12
02.07.0214FUC		14	02.07.0514FUC		14
02.07.0217FUC		17	02.07.0517FUC		17
02.07.0220FUC		20	02.07.0520FUC		20
02.07.0310FUC	3	10	02.07.0610FUC	6	10
02.07.0312FUC		12	02.07.0612FUC		12
02.07.0314FUC		14	02.07.0614FUC		14
02.07.0317FUC		17	02.07.0617FUC		17
02.07.0320FUC		20	02.07.0620FUC		20

TIBIAL INSERT STD MOBILE

REF.	SIZE	THICKNESS (mm)	REF.	SIZE	THICKNESS (mm)
02.07.0110SM	1	10	02.07.0510SM	5	10
02.07.0112SM		12	02.07.0512SM		12
02.07.0114SM		14	02.07.0514SM		14
02.07.0117SM		17	02.07.0517SM		17
02.07.0120SM		20	02.07.0520SM		20
02.07.0210SM	2	10	02.07.0610SM	6	10
02.07.0212SM		12	02.07.0612SM		12
02.07.0214SM		14	02.07.0614SM		14
02.07.0217SM		17	02.07.0617SM		17
02.07.0220SM		20	02.07.0620SM		20
02.07.0310SM	3	10	02.07.0710SM	7	10
02.07.0312SM		12	02.07.0712SM		12
02.07.0314SM		14	02.07.0714SM		14
02.07.0317SM		17	02.07.0717SM		17
02.07.0320SM		20	02.07.0720SM		20
02.07.0410SM	4	10			
02.07.0412SM		12			
02.07.0414SM		14			
02.07.0417SM		17			
02.07.0420SM		20			

TIBIAL INSERT UC MOBILE

REF.	SIZE	THICKNESS (mm)	REF.	SIZE	THICKNESS (mm)
02.07.0110MUC	1	10	02.07.0510MUC	5	10
02.07.0112MUC		12	02.07.0512MUC		12
02.07.0114MUC		14	02.07.0514MUC		14
02.07.0117MUC		17	02.07.0517MUC		17
02.07.0120MUC		20	02.07.0520MUC		20
02.07.0210MUC	2	10	02.07.0610MUC	6	10
02.07.0212MUC		12	02.07.0612MUC		12
02.07.0214MUC		14	02.07.0614MUC		14
02.07.0217MUC		17	02.07.0617MUC		17
02.07.0220MUC		20	02.07.0620MUC		20
02.07.0310MUC	3	10	02.07.0710MUC	7	10
02.07.0312MUC		12	02.07.0712MUC		12
02.07.0314MUC		14	02.07.0714MUC		14
02.07.0317MUC		17	02.07.0717MUC		17
02.07.0320MUC		20	02.07.0720MUC		20
02.07.0410MUC	4	10			
02.07.0412MUC		12			
02.07.0414MUC		14			
02.07.0417MUC		17			
02.07.0420MUC		20			

TIBIAL INSERT PS FIXED

REF.	SIZE	THICKNESS (mm)	REF.	SIZE	THICKNESS (mm)
02.07.0110PSF	1	10	02.07.0410PSF	4	10
02.07.0112PSF		12	02.07.0412PSF		12
02.07.0114PSF		14	02.07.0414PSF		14
02.07.0117PSF		17	02.07.0417PSF		17
02.07.0120PSF		20	02.07.0420PSF		20
02.07.0210PSF	2	10	02.07.0510PSF	5	10
02.07.0212PSF		12	02.07.0512PSF		12
02.07.0214PSF		14	02.07.0514PSF		14
02.07.0217PSF		17	02.07.0517PSF		17
02.07.0220PSF		20	02.07.0520PSF		20
02.07.0310PSF	3	10	02.07.0610PSF	6	10
02.07.0312PSF		12	02.07.0612PSF		12
02.07.0314PSF		14	02.07.0614PSF		14
02.07.0317PSF		17	02.07.0617PSF		17
02.07.0320PSF		20	02.07.0620PSF		20

RESURFACING PATELLA

SIZE	REF.
1	02.07.0033RP
2	02.07.0034RP
3	02.07.0035RP
4	02.07.0036RP

INSET PATELLA

SIZE	REF.
1	02.07.0040IP
2	02.07.0041IP
3	02.07.0042IP
4	02.07.0043IP

STEM EXTENSION

REF.	Ø (mm)	L (mm)
02.07.F11030	11	30
02.07.F11066	11	65

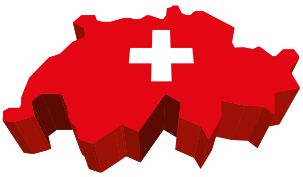
RESURFACING PATELLA E-CROSS

Size	Ref.
1	02.12.E001RP
2	02.12.E002RP
3	02.12.E003RP
4	02.12.E004RP

Part numbers subject to change.

NOTE FOR STERILISATION

The instrumentation is not sterile upon delivery. It must be cleaned before use and sterilised in an autoclave in accordance with the regulations of the country, EU directives where applicable and following the instructions for use of the autoclave manufacturer. For detailed instructions please refer to the document “Recommendations for cleaning decontamination and sterilisation of Medacta International orthopaedic devices” available at www.medacta.com.



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