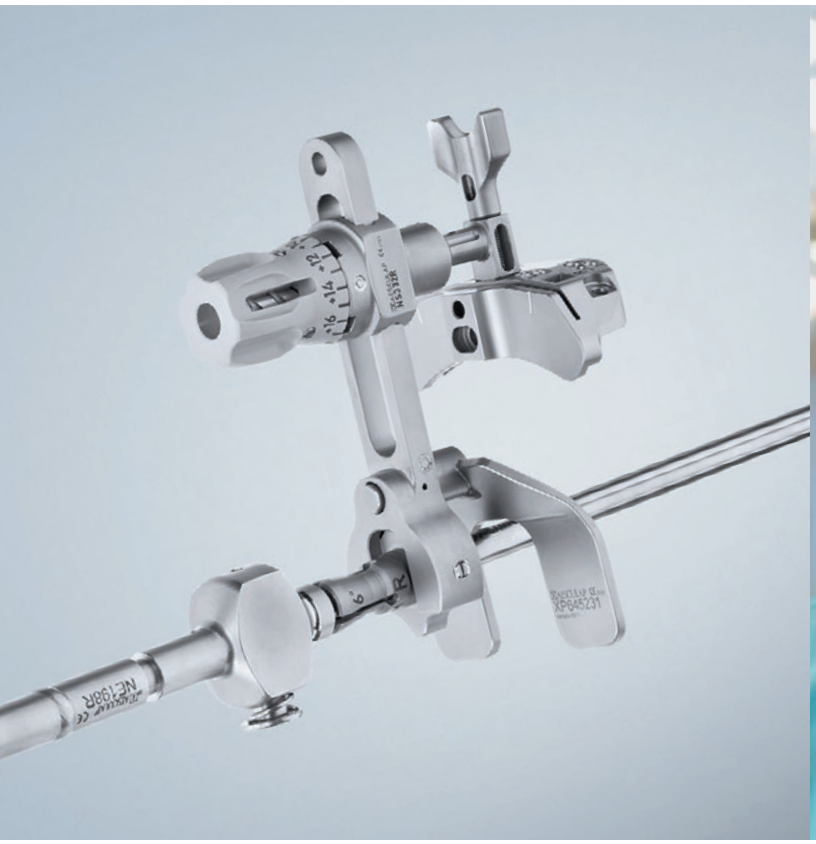
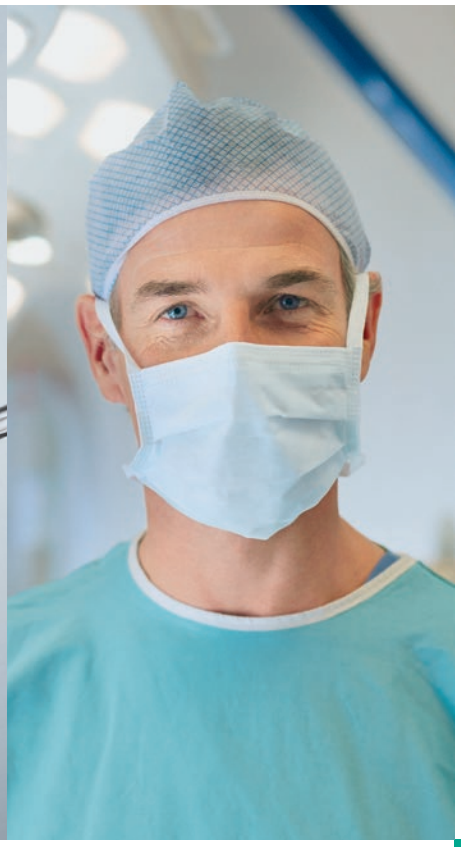
B BRAUN
SHARING EXPERTISE





ORTHOPAEDIC
SURGERY

AESCULAP® Columbus®

KNEE ARTHROPLASTY

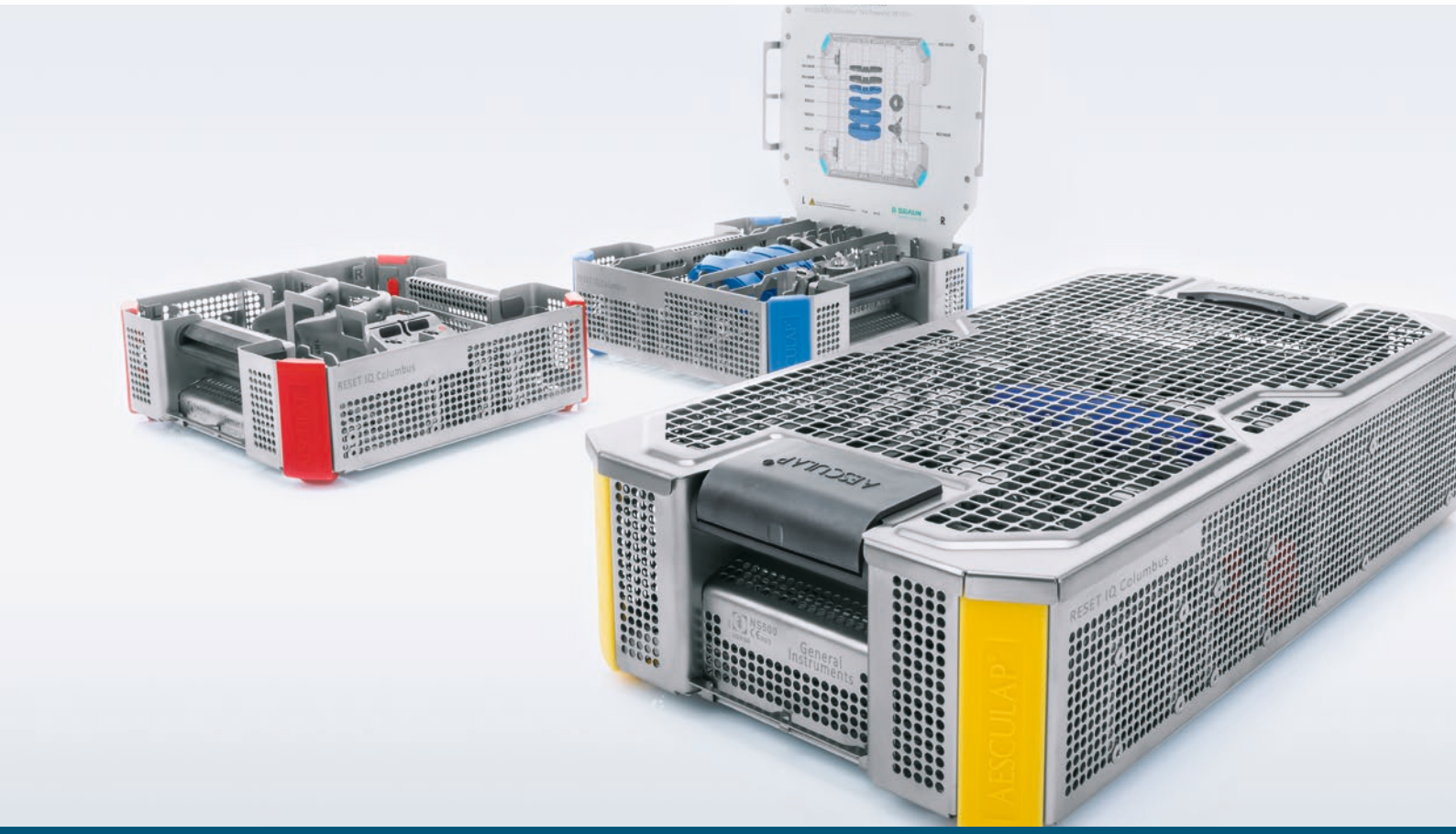
Operating Technique with IQ Instruments

AESCULAP® Columbus®

1 | CONTENT

AESCULAP® Columbus®

2 | THE IQ INSTRUMENTS



THE IQ INSTRUMENTATION

The IQ Columbus® instrumentation has been designed to facilitate the workflow not only for the surgeon, but the operating room (OR) team as a whole, by enhancing ergonomics and operative efficiency. IQ stands for "Intuitive and Quick". The system offers multiple options covering different implantation philosophies that allow each surgeon to follow his/her preferred surgical technique.

- Precise and less instruments,
- quick couplings,
- ergonomic handles and
- colour coding

are some aspects that will facilitate the surgical process in the operating room.

IQ – INTUITIVE & QUICK
LESS IS MORE

The instruments as well as the instrument trays are colour coded to enease instrumentation and organization during the complete workflow:

- red = femur
- blue = tibia
- yellow = general instruments
- grey = patella

The IQ Columbus® instruments are stored in the specially developed Aesculap OrthoTray®s. Both together, the IQ instruments plus Aesculap OrthoTray® offer a high end reprocessing solution. The trays not only store the instruments in a secure and safe manner but also clearly facilitate the reprocessing procedure for the CSU (Central Sterilization Unit) as the instruments can remain in the tray during the washing process. This time saving solution generates an economic advantage and eliminates a potential source of error as complete set reassembling is needless.[1]

Aesculap Reset®

Aesculap Reset® is an intelligent improvement of the Aesculap OrthoTray® configuration. All size-specific instruments are packed such that only the sizes desired by the surgeon are used. Thus, the instrument and tray volumes in the entire instrument cycle are reduced by more than 50 %.[1] Aesculap Reset® facilitates, as size-specific storage and washing system, the work of all the participants in the entire process.

NOTE

This wash tray system is only approved for the use with the cleaning validated instruments from Aesculap. Complex instruments, e.g. cutting guides or instruments that are introduced in the intramedullary (IM) canal during the procedure as drills and reamers require a manual pre-cleaning according to standard requirements.

AESCULAP® Columbus®

3 | INDICATIONS | PATIENT SELECTION

mobile	fixed	fixed *Revision*
 *cemented/cementless*	 *cemented/cementless*	 *cemented*
 RP	 *UCR*	 *CR DD*
		 *UC*
		 *PS*
 *cemented/cementless*	 *APT Columbus® cemented*	 *cemented/cementless*
 *cemented*		 *cemented*
		

The Columbus® knee system offers a wide implant range which enables the surgeon to choose a fitting option per case. All components are also available with the AS multi-layer coating.

For more information about indications and contra-indications, please refer to the instructions for use TA016100.

THE FITTING OPTION FOR MANY PATIENTS

4 | PREOPERATIVE PLANNING

For every Total Knee Arthroplasty, careful preoperative X-ray planning is recommended in order to determine precisely the following parameters:

- Varus/valgus deformity
- Angle between the anatomical and mechanical femoral axes
- Entry point(s) of the intramedullary alignment rods (manual IM technique)
- Joint line level
- Femur resection heights
- Tibia resection heights
- Component sizing
- Implant positioning
- Potential areas of bone losses and location of osteophytes

The following X-ray images are required to conduct the radiographic analysis:

- Knee joint in A/P projection: knee extended, centered over the distal patella.
- Knee joint in lateral projection: knee in 30° flexion, centered above the distal patella.
- Image of the whole leg (from hip to ankle) in monopodal stance.
- Patella-tangential image (Merchant View) with the knee at 30° flexion.

The angle between the mechanical and anatomical femur axes is measured with the combination template for axis measurements. The center of the joint, the joint line and the mechanical femur axis can be measured. To determine the tibia resection, the template showing representations of the tibial components is superimposed over and aligned with the X-ray image. The resection height is given at a 10-20 mm graduation. A complete set of radiographic templates can be ordered for the preoperative determination of the appropriate implant sizes. The localization of the osteophytes facilitates their removal, improving the mobility of the joint.

The Columbus® knee system provides a complete set of radiographic templates in different scales (1.1 and 1.15).

The results of the preoperative planning should be documented in the patient's file and available during the operative procedure for reference.

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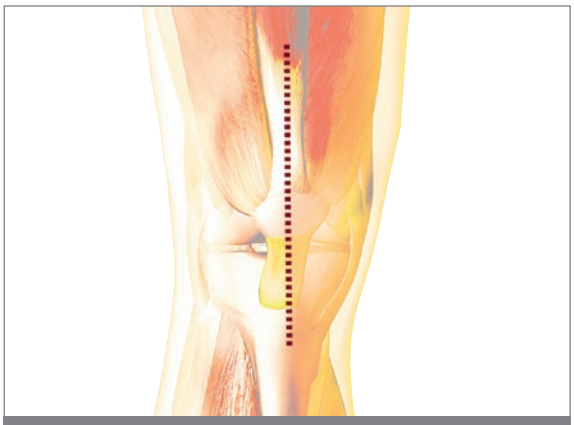
5 | APPROACH

The Columbus® IQ instrumentation is designed for use with or without the OrthoPilot® Navigation, for both conventional and less invasive approaches to the knee.

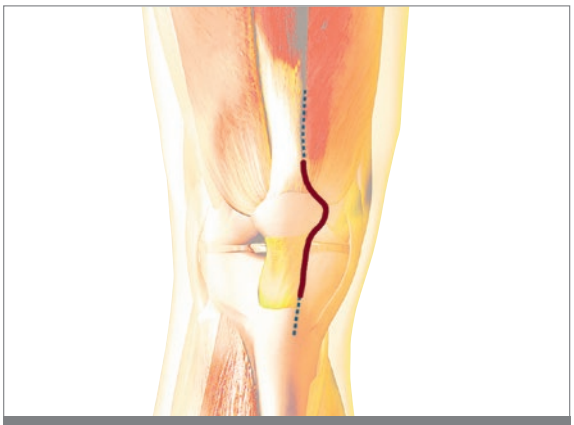
The initial skin incision is a straight midline or slightly oblique parapatellar skin incision starting 2 to 4 cm proximal to the superior pole of the patella and extending distally to the medial aspect of the tibial tubercule. The surgeon should decide on a patient basis which length of an incision is necessary for proper visualization of the knee anatomy. A parapatellar skin incision will be of benefit to patients when attempting to kneel after the operation.

The length range of the incision is generally between 8 and 14 cm symmetrically distributed above and below the joint line. Extension of the skin incision may be necessary during the procedure depending on the patient anatomy, the soft tissues and the skin tension.

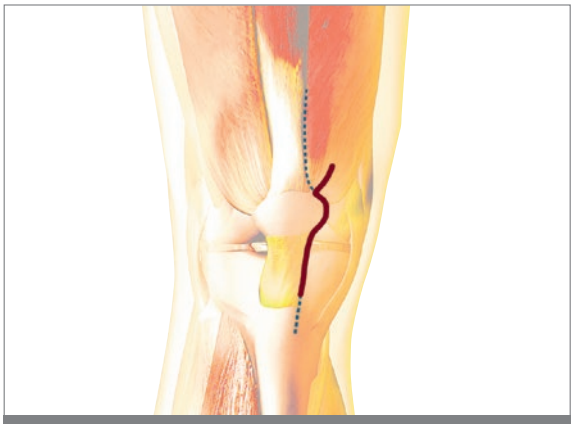
Three basic types of arthrotomies are recommended for use to carry out the intra-articular exposure: the medial parapatellar, the mid-vastus or the sub-vastus.[2,3]



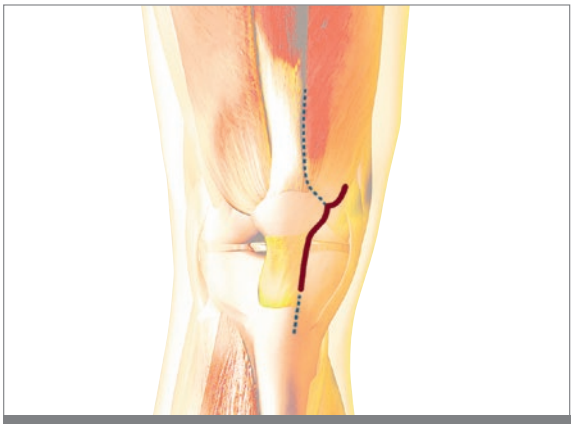
Skin incision



Medial parapatellar arthrotomy



Mid-vastus arthrotomy



Sub-vastus arthrotomy

Medial parapatellar arthrotomy

With the knee in flexion or extension, the arthrotomy is performed starting proximal to the superior pole of the patella, incising the rectus femoris tendon longitudinally. Continuing the arthrotomy distally around the medial aspect of the patella, and ending medial to the tibial tubercule is then carried out.

Mid-vastus arthrotomy

With the knee in flexion, the arthrotomy is performed starting by a split of the fibers from the vastus medialis oblique (VMO), continuing distally around the medial aspect of the patella, and ending medial to the tibial tubercule.

Sub-vastus arthrotomy

With the knee in flexion, the arthrotomy is performed starting with a 4 to 6 cm incision of the fascia at the inferior border of the VMO, running horizontal to the medial aspect of the patella, continuing and ending distally medial to the medial tubercule.

Final exposure

A fat pad excision is performed in order to facilitate the exposure and to improve the patella mobility. Perform the necessary medial release at this time that corresponds to the deformity. The patella can then be everted or sub-luxated laterally.

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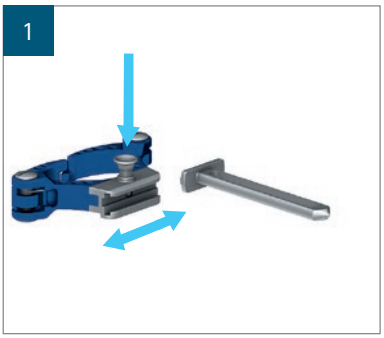
6 | ASSEMBLY INSTRUCTIONS AND INSTRUMENT HANDLING

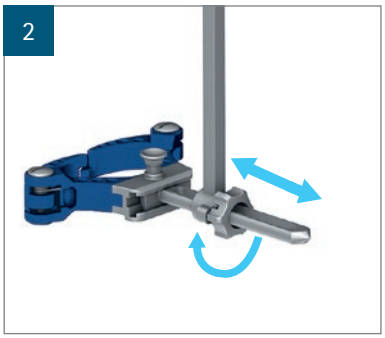
A | TIBIA EXTRA-MEDULLARY ALIGNMENT

1



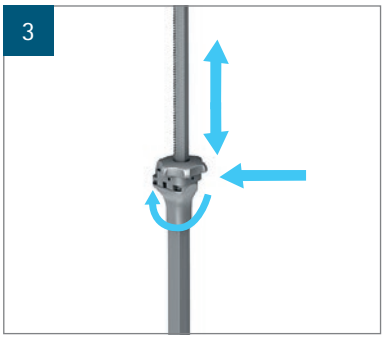
- Press the upper button on the bimalleolar clamp.
- Engage the support in the groove.
- When the neutral position is reached, release the button.

2



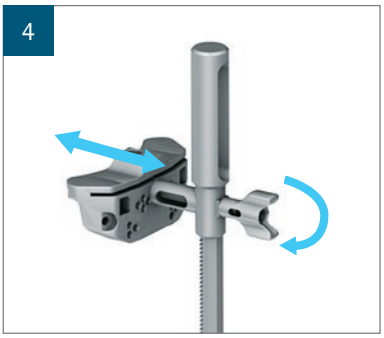
- Turn the wheel of the tibial alignment handle to the open position, "OP-EN" will be displayed.
- Engage the handle onto the bimalleolar support.
- Adjust to the neutral position.

3



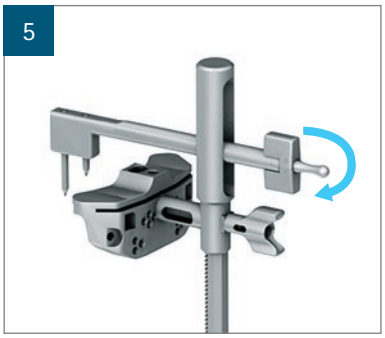
- Push on the handle adjusting wheel to release the locking mechanism.
- Engage the holding rod in the handle.
- Release the wheel when the desired level is reached.
- Turning the wheel will allow a fine adjustment on the height.

4



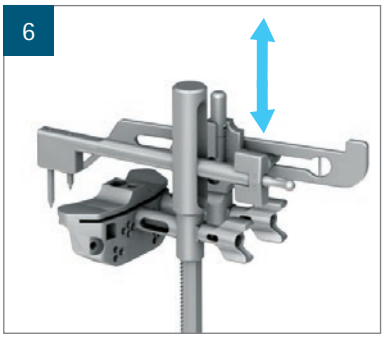
- Engage the holding rod in one of the connection squares of the tibial/distal cutting guide.
- Lock the assembly by turning the frontal wheel.

5



- The proximal fixation is set through the proximal opening of the holding rod.
- Turn the tab into a horizontal position to fix the assembly.

6



- The connection square of the stylus is engaged in one of the connection squares of the tibial/distal cutting guide.
- The connection is fixed by locking the wheel on the stylus.
- The resection height is adjusted to the desired bone cut level.
- The stylus can be placed over the proximal fixation.

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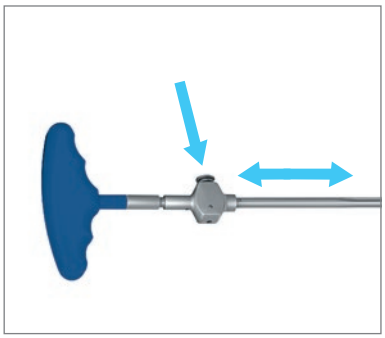
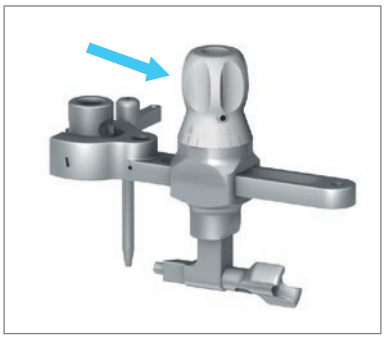
B | TIBIA INTRA-MEDULLARY ALIGNMENT



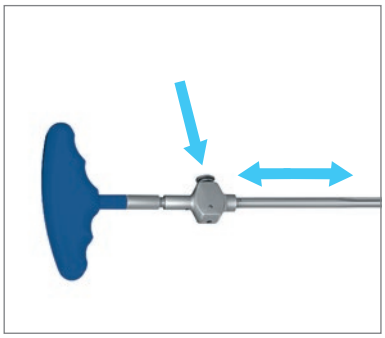
- Push on the button of the T-handle to release the locking mechanism.
- Couple the T-handle to the IM rod.
- Release the button to lock the assembly.



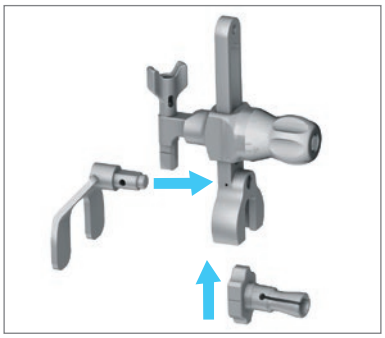
- Choose the IM orientation sleeve corresponding to the desired posterior slope resection of the tibia (default is 0° sleeve; sleeves with 3°, 5° and 7° posterior slope are available).
- Connect the sleeve to the IM alignment system.

- Mount the assembly into the alignment block.
- Connect the alignment system to the tibial / distal cutting guide in one of its connection squares.
- Fix the connection by locking the wheel.

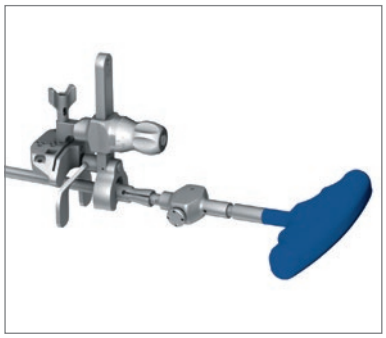
C | FEMUR INTRA-MEDULLARY ALIGNMENT



- Push on the button of the T-handle to release the locking-mechanism.
- Couple the T-handle to the IM rod.
- Release the button to lock the assembly.

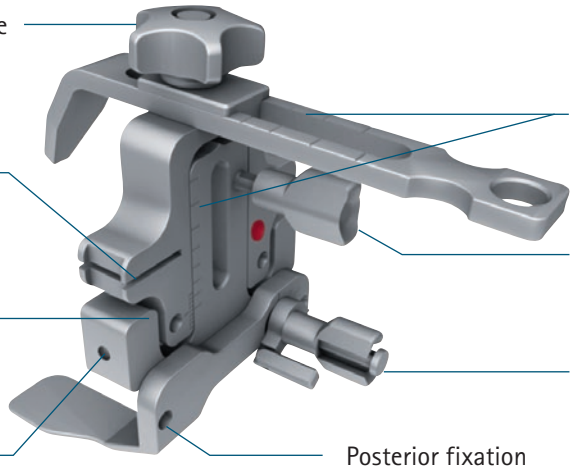


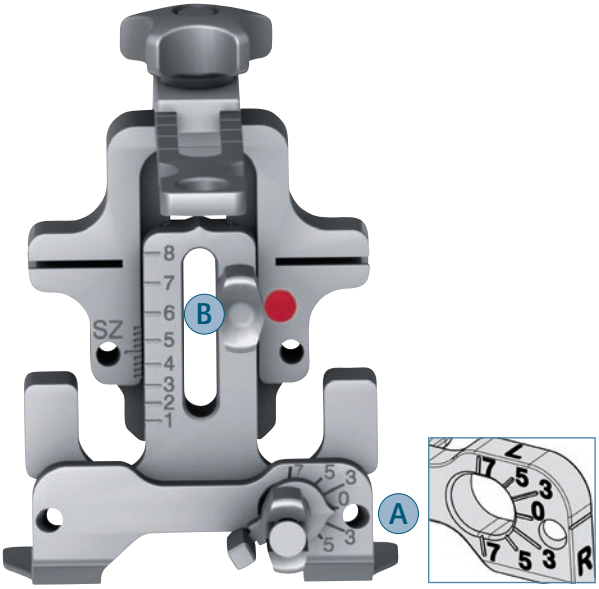
- Choose the IM orientation sleeve corresponding to the desired valgus alignment (standard 5°, 6° or 7°; optionally available 8° and 9°).
- Connect the sleeve to the IM alignment system.
- Connect a distal femur contact plate, standard: large (small optionally available).



- Mount the assembly into the alignment system.
- Connect the alignment system to the tibial / distal cutting guide in the central connection square.
- Fix the connection by locking the wheel.

D | A/P AND ROTATION ALIGNMENT BLOCK





- **Option 1:** the rotation (0°-7°) is pre-fixed to a desired value before the block is put in place. The upper scale (marked with "L") is used for a left leg, the lower scale (marked with "R") is used for a right leg. (A)
- **Option 2:** the rotation is free and the block is placed in contact with the distal femur and the posterior condyles; the rotation can be tuned by turning the posterior wheel, checking the alignment of the A/P window with the femur A/P plane (Whiteside line). (B)
- Due to the fixed distance between the pin placement holes and the anterior cortex stylus, the placed pins can be used for any femoral size chosen by the surgeon. Oversizing or downsizing the femur is achieved simply by choosing a different 4-in-1 cutting block size and placing on the same previously placed pins. As the reference is anterior, the change is only in the dorsal resection height.

TIP

Pre-fix both parts of the alignment block on size 8 with screw "B" before the instrument is passed to the surgeon. Only release the screw when the alignment block is placed on the bone. Then the size measurement and rotation alignment can be performed. The pre-fixation avoids that one of the instrument parts can fall down.

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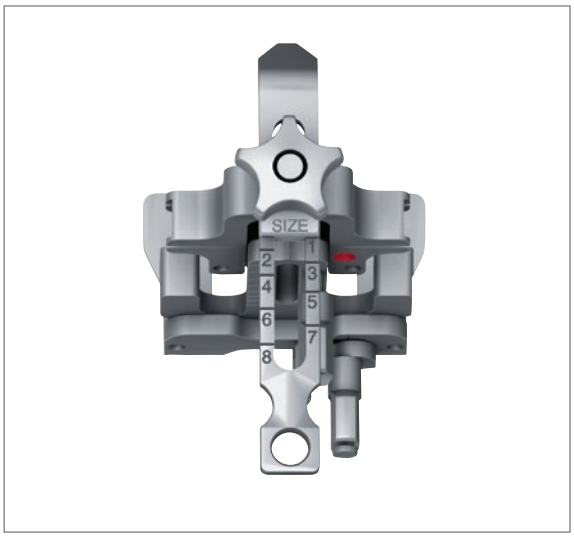
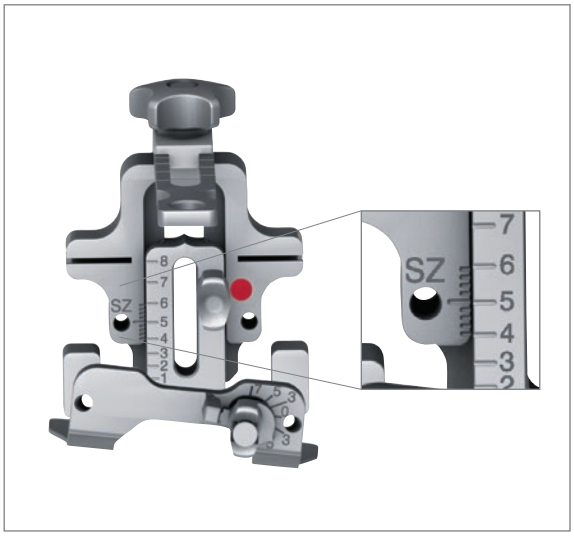
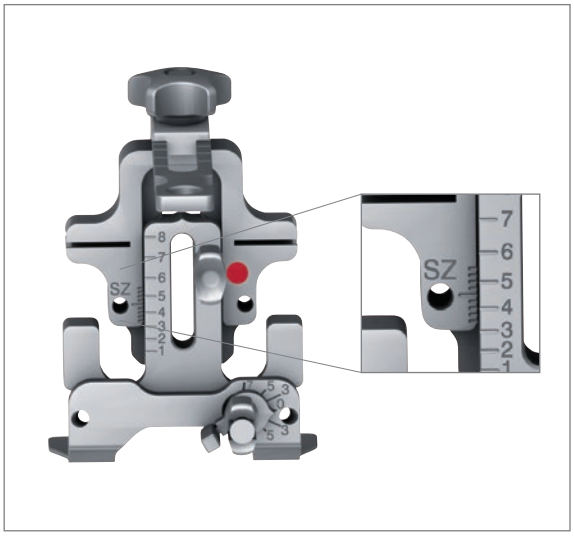
D | A/P AND ROTATION ALIGNMENT BLOCK



- The anterior point to be palpated is located on the lateral anterior cortex, avoiding the risk of anterior notching.
- If the palpation is done at the middle of the anterior femur, the grand piano sign will be bigger providing a larger surface of contact.
- The stylus can be adjusted in the caudo-cranial direction in order to get a congruence between the A/P sizing and the proximo-distal sizing determined by the scale on the upper part of the stylus.



- After defining the right axial rotation of the block, if an exact femoral size is measured like in the example on the left, fix the A/P sliding by tightening the corresponding screw, place two headless pins in the placement holes.
- By loosening the screws, and, if used, removing the posterior enhanced fixation pins, remove the orientation block.



- After defining the right axial rotation of the block, if the measured size is in between two exact sizes like in the example on the left, fix the A/P sliding by tightening the corresponding screw, place two headless pins in the placement holes.
- By loosening the screws, and, if used, removing the posterior enhanced fixation pins, remove the orientation block.
- In this case, choose the direct upsize or downsize based on the assessment of the medio-lateral dimension and the flexion-extension gap situation. A smaller size will enlarge the flexion gaps; a bigger size will reduce the flexion gaps.

Distal resection or tibial resection with a standard approach

- The connection to the alignment system to be used is the central one marked "C", denoted by the green square in the right picture.
- The fixation holes for the headless pins to be used correspond to the groups marked "C", shown by the red circles in the right picture.
- Enhanced fixation is achieved with one or two converging pins in the holes marked with the blue circles.

Right knee tibial resection with a less invasive approach

- The connection to the alignment system to be used is the one marked "R", shown by the green square in the right picture.
- The fixation holes for the headless pins to be used correspond to the groups marked "R", shown by the red circles in the right picture.
- Enhanced fixation is achieved with one converging pin in the hole marked with the blue circle.

Left knee tibial resection with a less invasive approach

- The connection to the alignment system to be used is the one marked "L", shown by the green square in the right picture.
- The fixation holes for the headless pins to be used correspond to the groups marked "L", shown by the red circles in the right picture.
- Enhanced fixation is achieved with one converging pin in the hole marked with the blue circle.

NOTE

For minimal invasive approach or less space in the operation field, medialised cutting guides are optionally available (see §18 Optional instruments, page 68/69).

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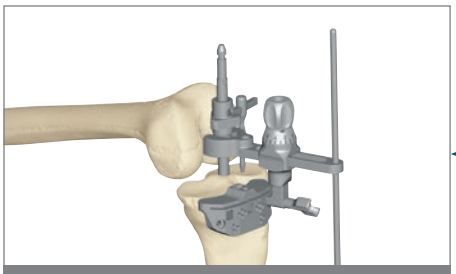
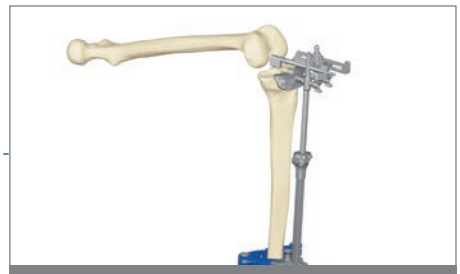
7 | WORKFLOW SYNOPSIS – TIBIA FIRST

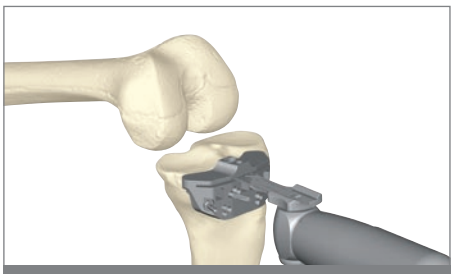


1b Tibia IM alignment

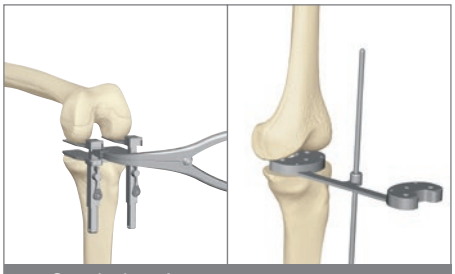
or



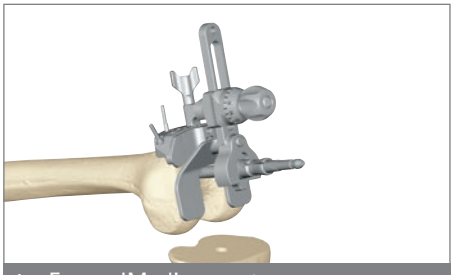
1a Tibia EM alignment



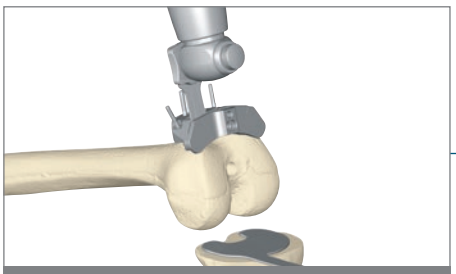
2 Tibia resection



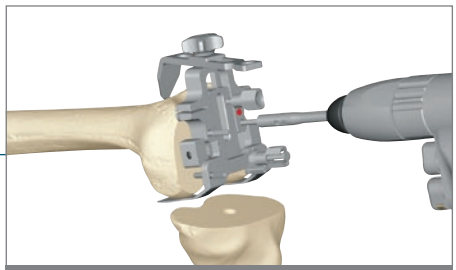
3 Gap balancing



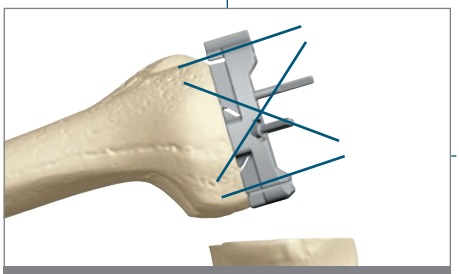
4 Femur IM alignment



5 Distal resection

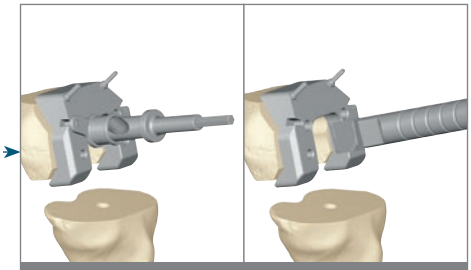


6 Femur A/P sizing and rotation

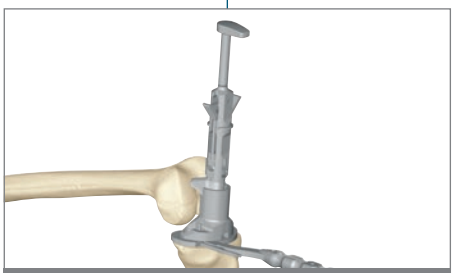


7 Femur APC resections

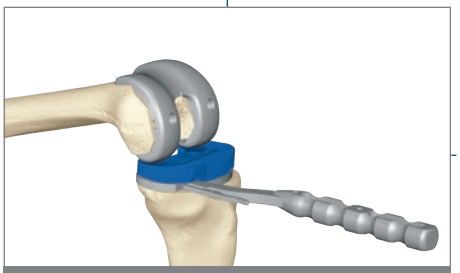
optional



8 PS box preparation

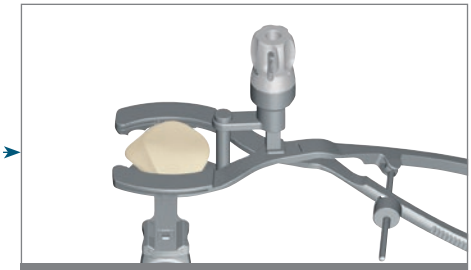


9 Tibia keel and/or stem preparation

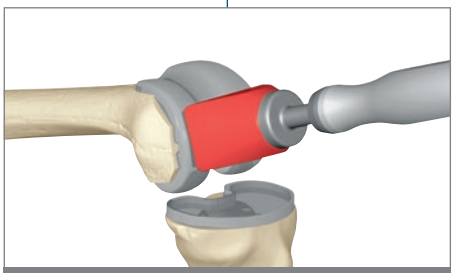


10 Trial reduction

optional



11 Patella preparation



12 Component implantation

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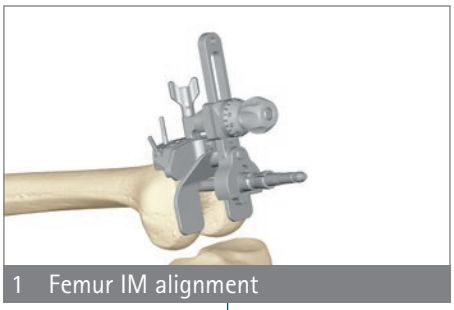
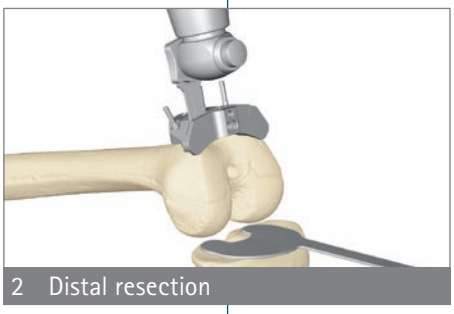
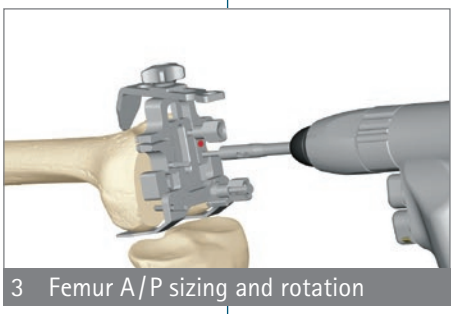
7 | WORKFLOW SYNOPSIS – FEMUR FIRST



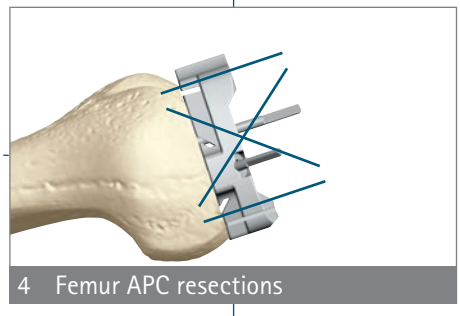
1 Femur IM alignment



2 Distal resection

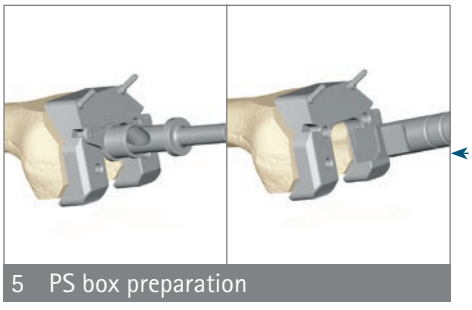


3 Femur A/P sizing and rotation

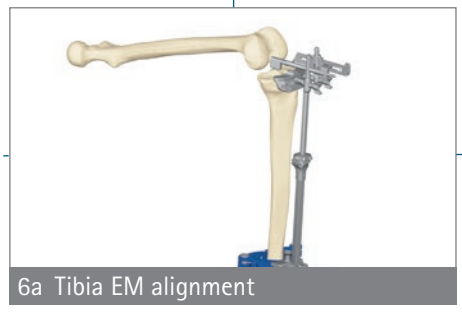


4 Femur APC resections

optional

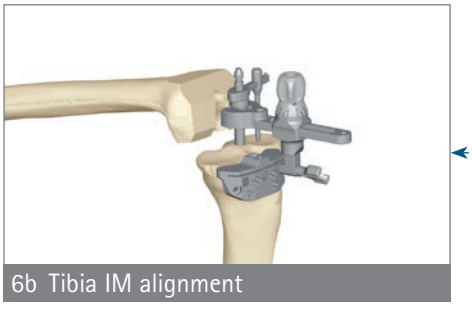


5 PS box preparation

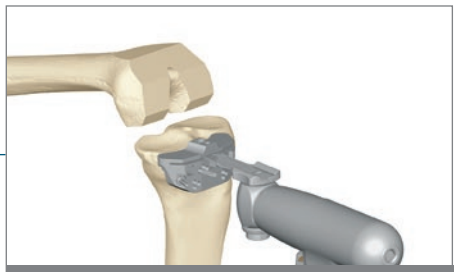


6a Tibia EM alignment

or

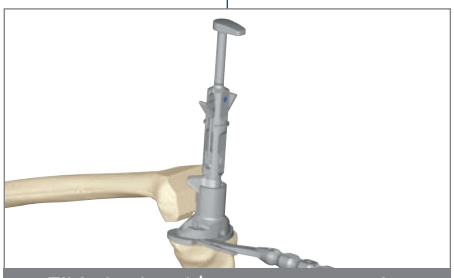


6b Tibia IM alignment

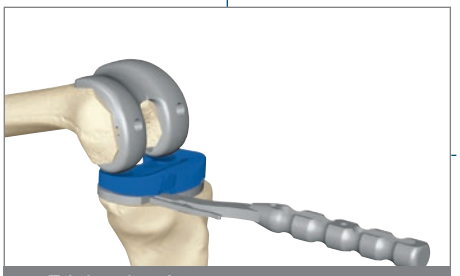


7 Tibia resection

8 Gap balancing

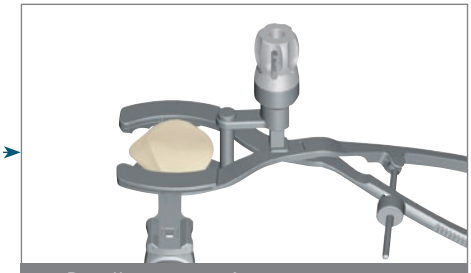


9 Tibia keel and / or stem preparation

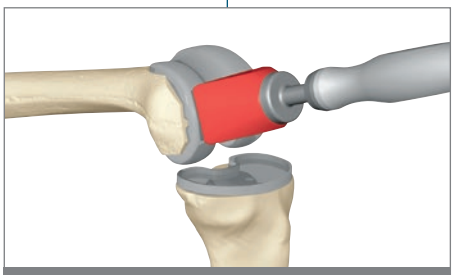


10 Trial reduction

optional



11 Patella preparation



12 Component implantation

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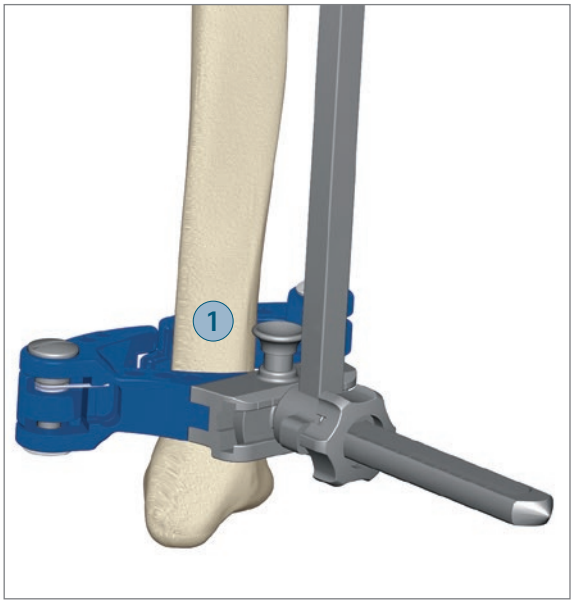
8 | TIBIA PREPARATION

8.1 Extramedullary (EM) referencing

- The EM alignment system assembly is placed in a parallel fashion with the frontal tibia with the leg positioned in flexion.
- The bimalleolar clamp, previously set in a neutral position, is fixed around the lower limb just above the ankle joint and centered on the tibio-tarsian joint.
- Proximally, the EM alignment system can be stabilized with the proximal fixation first by engaging the longest spike between the tibia spines.
- When the rotation has been adjusted to the mid-third of the tibial tuberosity and the second toe axis (or according to the patients individual anatomy since these landmarks may not be in line with the mechanical axis of the tibia), the second spike can be impacted defining the final tibia rotation.



Varus/valgus alignment

Pushing the knob (1) at the bimalleolar clamp, and sliding the alignment system medially or laterally allows to adjust the varus/valgus of the proximal tibia resection. The distance between the laser marked lines on the scale corresponds to a 1° adjustment for a 40 cm long tibia.

INSTRUMENTS


Bimalleolar clamp NS345R


Bimalleolar clamp support NS344R


Alignment system handle NS342R

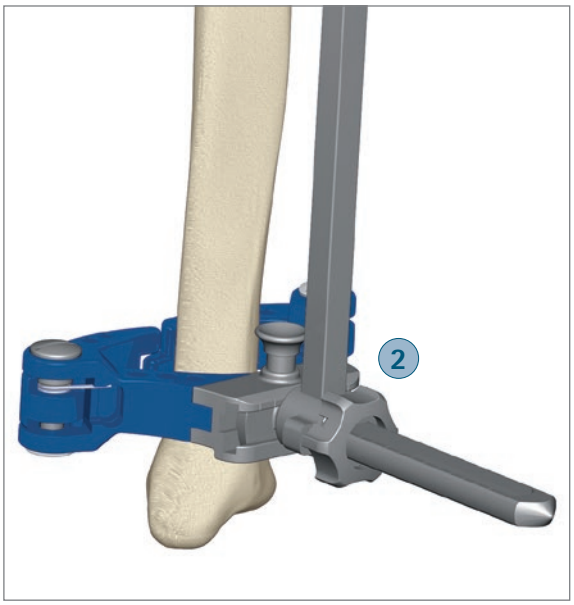

Holding rod for cutting guide NS341R


Tibial/distal cutting guide NS334R


Proximal fixation NS343R

Tibia slope alignment

Releasing the fixation wheel (2) at the bottom part of the alignment system (by aligning OP-EN), the alignment system can be shifted anteriorly in order to increase the slope of proximal tibia resection. The distance between the laser marked lines on the scale corresponds to a 1° adjustment for a 40 cm long tibia.



NOTE

A 3° dorsal slope is integrated in the gliding surfaces. Therefore a 90° tibia resection is recommended.

Big tibia slope may create an anterior cortex conflict when (long) extension stems are used!

Tibia stylus NS347R

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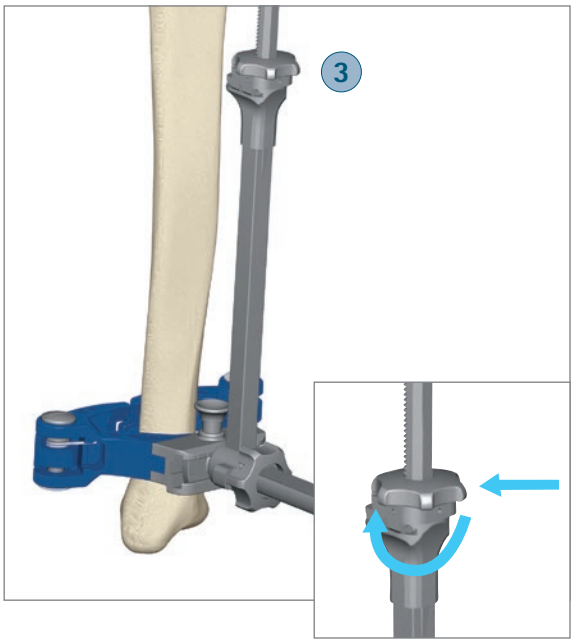
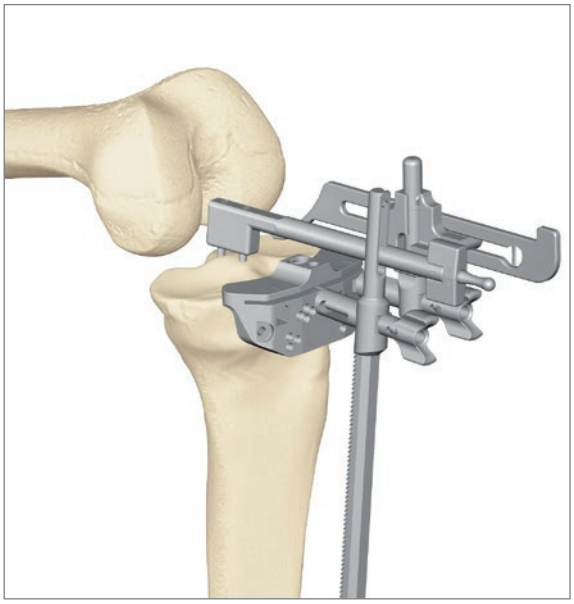
8 | TIBIA PREPARATION



Height adjustment (3)

- The resection height is determined in preoperative planning. The aim is to remove any defect on the tibial joint surface as completely as possible in order to create a bed for the tibia plateau on intact bone for optimal support of the implant.



- The planned value is set on the stylus, which is then mounted into the tibial/distal cutting guide. The extra-medullary alignment instrument is then lowered until the stylus comes into contact with the chosen point (push = rough adjustment; turn = fine adjustment).
- Referencing the healthy tibia plateau is helpful to determine the level of the joint line. Referencing the deepest point of the worn side of the tibia helps to reduce the cut by resecting only 2 mm. Preoperative planning and surgeon preference are used to determine which reference to use.

NOTE

The thinnest tibia height is 10 mm (metal tray + PE). Heights are growing in 2 mm steps.

INSTRUMENTS


Bimalleolar clamp NS345R


Bimalleolar clamp support NS344R

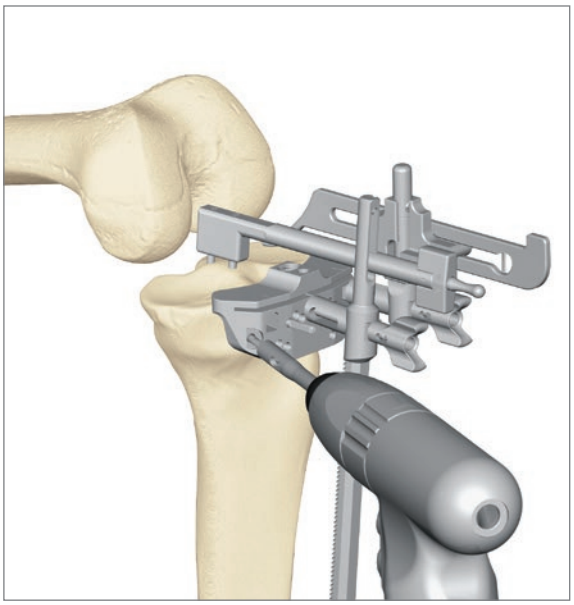

Alignment system handle NS342R


Holding rod for cutting guide NS341R


Tibial/distal cutting guide NS334R

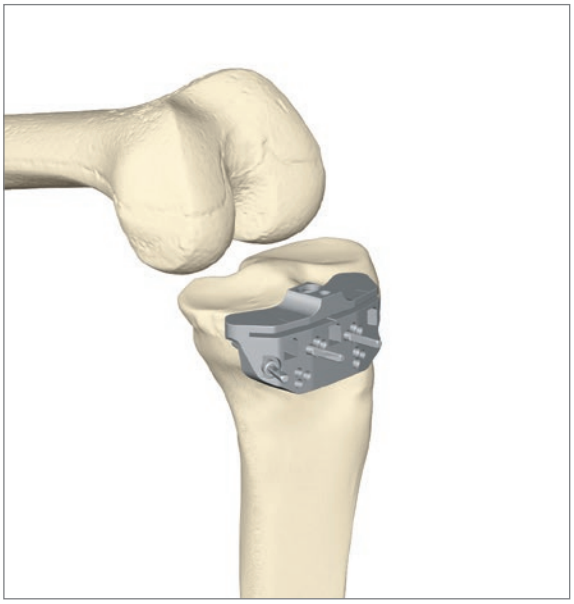

Proximal fixation NS343R

- The cutting block is fixed with two headless pins in position "0". The +/-2 mm pinholes are available on the resection blocks to further adjust the resection level if needed. To avoid movements during the resection, additional pins are set in convergent holes as marked.



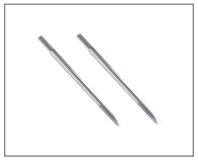
NOTE

When using the "-2" pin holes in the top set of the cutting block, please make sure to use - as corresponding cross pin - only the short headed pin NP585R. Other cross pin solutions would cause a conflict with the pin in the "-2" pin hole.
Alternatively, the pin hole group C can be used. Then, a medialization of the cutting block is not possible.

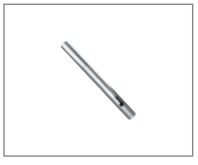


- The EM tibia alignment system is then disconnected from the tibial/distal cutting guide by turning the connecting wheel anti-clockwise. The proximal fixation can be removed by disengaging the spike from the tibial spine.

Tibia stylus NS347R



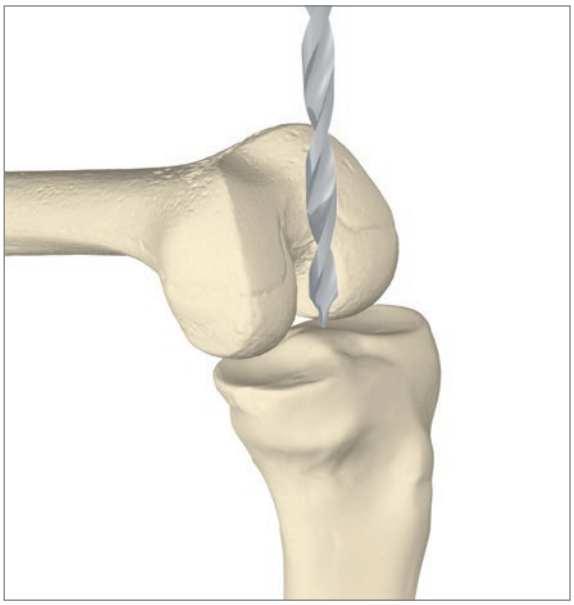
Headless pins 63 mm
NP583R



Pin driver NP613R

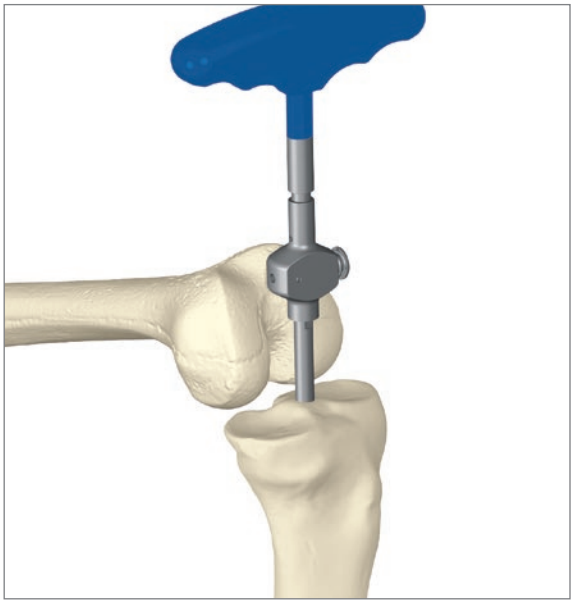
Acculan drill*

* Please refer to the article numbers of the Acculan drill and saw blade portfolio in brochure no. 031002.



8.2 Intramedullary (IM) referencing

- The medullary canal of the tibia is opened with the Ø 9 mm starting drill bit. The surgeon has to pay close attention of the drilling direction in order to avoid cortical violation of the posterior metaphysis.



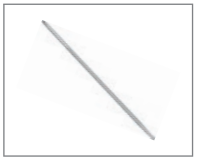
- The intramedullary rod is inserted into the prepared canal, after the contents are irrigated and suctioned, with the help of the T-handle. Once the T-handle is removed, the intramedullary alignment system is mounted on the rod with the chosen posterior slope angle sleeve (0° standard, 3°, 5° or 7° optional) and the cutting guide.

ATTENTION
Big tibia slope may create an anterior cortex conflict when (long) extension stems are used!

INSTRUMENTS


Drill Ø 9 mm NS330R


T-handle NE198R

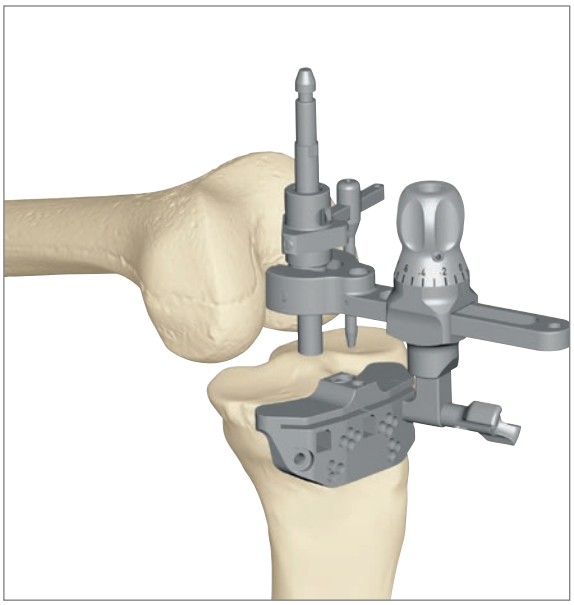

IM alignment rod NS331R


IM alignment system NS332R


Tibial/distal cutting guide NS334R


Tibia IM stylus for orientation sleeves NS847R

- The stylus is set on the deepest point of the tibia plateau to define the 0-level cut. The height of the cut is then adjusted by turning the tuning wheel to the desired amount of resection in millimeters.

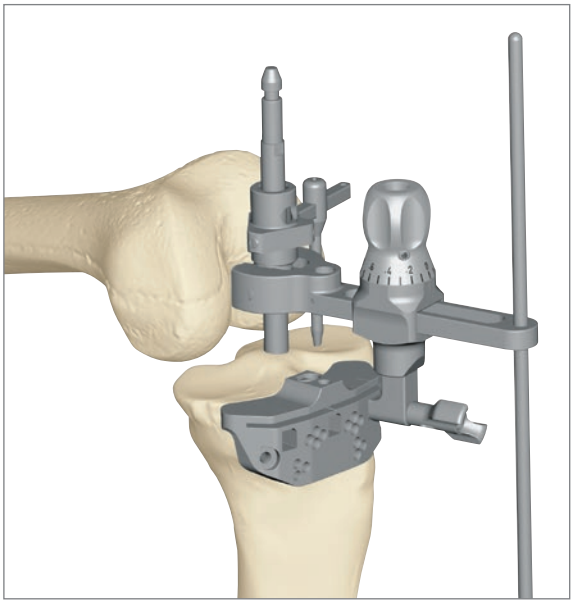


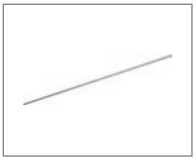
NOTE

A 3° dorsal slope is integrated in the gliding surfaces. Therefore a 90° tibia resection is recommended.

The thinnest tibia height is 10 mm (metal tray + PE). Heights are growing in 2 mm steps.

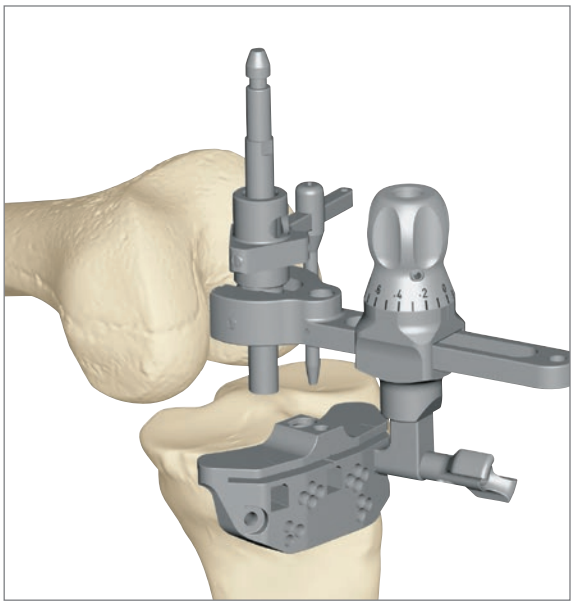
- The alignment of the cutting block can be checked with the alignment rod.



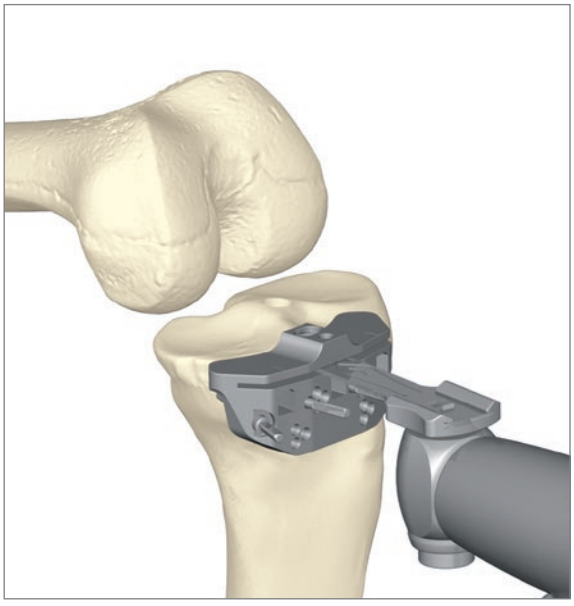


Alignment rod long
NP471R

Tibia orientation sleeve
0°, 3°, 5°, 7°
NS843R-NS846R



- The cutting block is fixed with two headless pins in position "0". The +/-2 mm pinholes are available on the resection blocks to further adjust the resection level if needed. In order to avoid movements during the resection, additional pins are set in convergent holes.
- The IM tibia alignment system is removed in one step with the T-handle after unlocking the cutting block from the alignment system by turning the locking wheel in a anti-clockwise direction.



8.3 Tibia resection

- Once the cutting block is positioned and fixed, the proximal tibial resection is performed. (See NOTE)
- After performing the proximal tibial resection the block is removed and the resected bone taken away. A careful inspection of the peripheral resection is mandatory in order to check that no remaining bone stock is present. Further removal of meniscal remnants and osteophytes that affect the posterior capsule is then performed.

NOTE

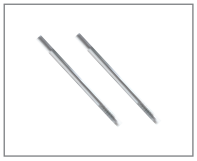
The protection of the surrounding soft tissue sleeve of the knee joint is paramount. A special attention has to be paid: use of Hohmann retractors, collaterals retractors, PCL retractor is recommended in order to protect them during the resection.

INSTRUMENTS

IM alignment system NS332R

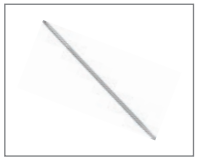
Tibia IM stylus for orientation sleeves NS847R

Tibial/distal cutting guide NS334R



Headless pins 63 mm NP583R

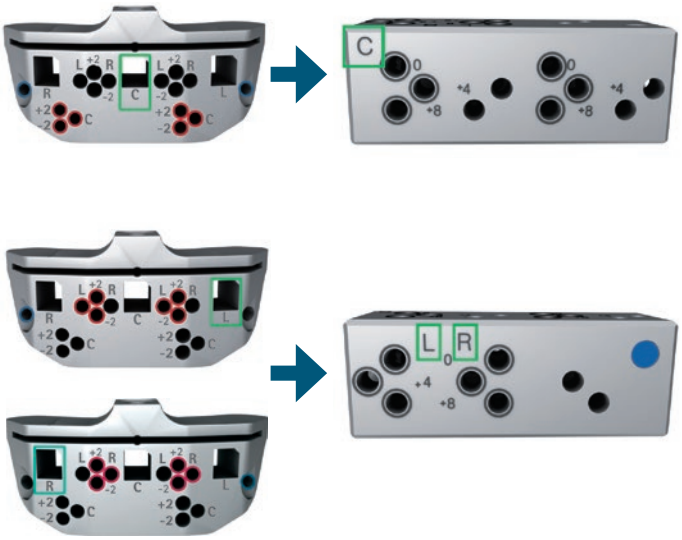
Tibia orientation sleeve 0°, 3°, 5°, 7° NS843R-NS846R



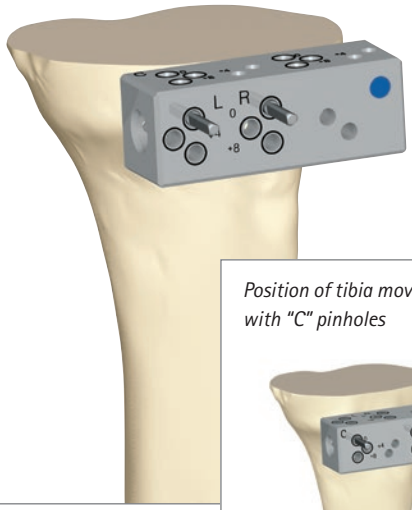
IM alignment rod NS331R

8 | TIBIA PREPARATION – OPTION: HEMI SPACER FOR TIBIA AUGMENTATION

- For small defects of the tibia plateau the Columbus® knee system offers hemi spacers in heights of 4 mm and 8 mm.
- After the standard resection the tibial/distal cutting guide is removed. Depending on the used holes of the tibial/distal cutting guide, the tibia move block is placed over the two headless pins with frontal side "C" or "L/R" (see picture below). Two additional headless pins are inserted in the requested depth. After removing the move block and the first two parallel pins, the tibial/distal cutting guide can be placed over the new drilled pins. When the cutting guide is fixed with two convergent pins, the hemi spacer resection can be performed.

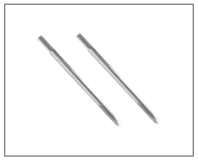


Position of tibia move block with "L/R" pinholes



Position of tibia move block with "C" pinholes

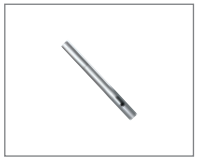
Tibial/distal cutting guide
NS334R



Headless pins 63 mm
NP583R

Tibia move block
NQ1078R

Acculan drill



Pin driver NP613R

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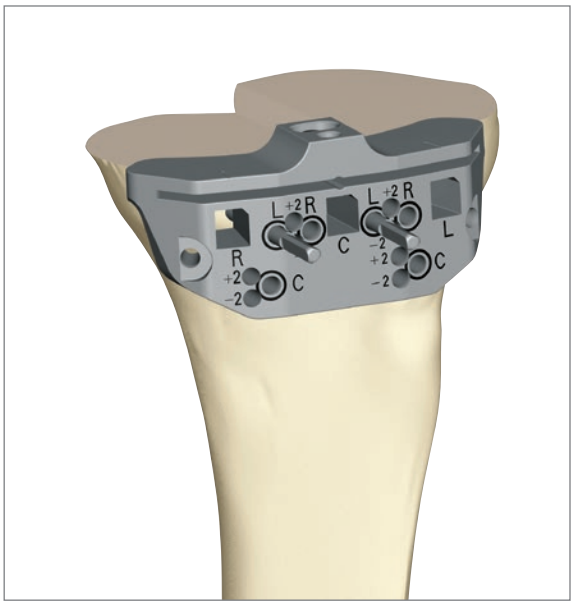
8 | TIBIA PREPARATION – OPTION: HEMI SPACER FOR TIBIA AUGMENTATION



- Please note: For tests with the trial implants the correct hemi spacer has to be clicked under the trial tibia plateau. During measuring of extension and flexion gap the height of the hemi spacer is added at the cut tibia side. A Columbus® CRA/PSA tibia plateau which offers the possibility to screw hemi spacer has to be used for definitive implantation (see picture below).

INSTRUMENTS

Tibial/distal cutting guide NS334R

Headless pins 63 mm NP583R

Acculan saw

Screw driver NQ1070R

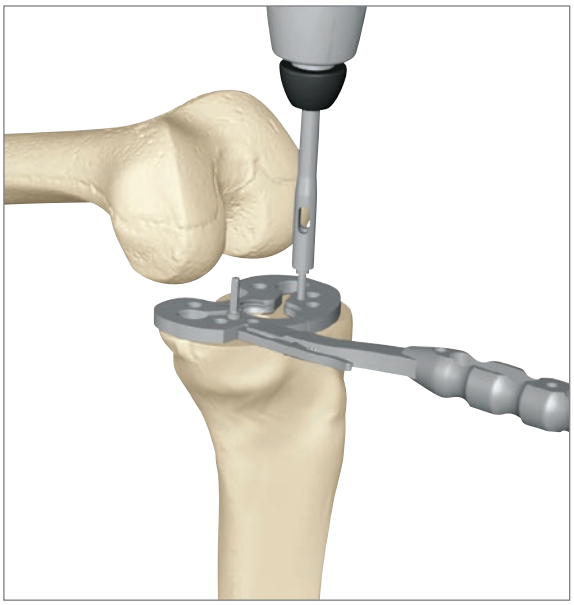
Tibia trial/preparation plateau NQ1079R-NQ1089R

Trial hemi spacer NQ1160-NQ1196

Plug remover for final CRA/PSA tibia plateau NP744R

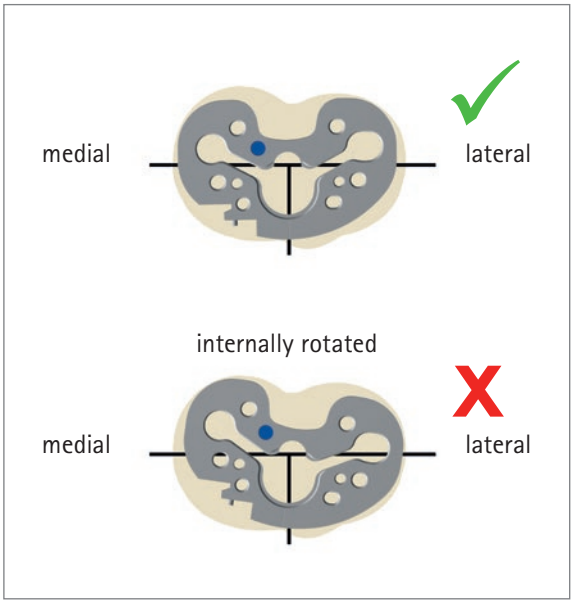
8.4 Tibia keel preparation

- The size of the tibia is determined by superposing the different tibia preparation plateau sizes onto the created surface trying to reach a proper transverse rotational alignment of the trial baseplate while avoiding ML and A/P overhang.
- The chosen tibia trial preparation is placed flush onto the tibia resection and the rotation is assessed with the help of the EM rod placed through the holder. References for the rotation are the mid-third of the anterior tuberosity and the second toe axis of the leg. These two landmarks are often not coincident with mechanical axis of the tibia and the surgeon should consider the rotation with respect to the tubercle to maintain extensor mechanism alignment. The plateau is fixed by the short headed pins in the marked holes.
- Another option consists in building the tibia and femur trial implant with the adequate trial gliding surface. By exercising flexion extension movements combined with slight rotational stresses, the tibia plateau will find a natural position under the femur trial. This position is marked anteriorly using the electric cautery right where the plateau has a central anterior laser marking. Care should be taken to assess the stability of the extensor mechanism before accepting this "free float" alignment of the tibial baseplate.



NOTE

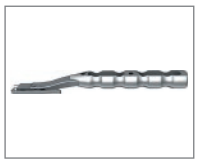
Columbus® implants have a symmetric tibia plateau. Therefore it is essential to reach a good transverse rotational alignment. A perfect bony coverage is not aspired (see picture beside).



- For preparation of the Columbus® All Poly Tibia including instruments and implant overview, please refer to the surgical technique addendum 083602.

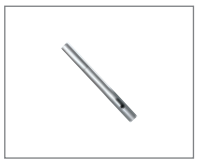
Acculan drill

Tibia trial/preparation plateau NQ1079R-NQ1089R



Tibia trial/preparation plateau holder NQ378R

Headed pins 30 mm NP585R



Pin driver NP613R

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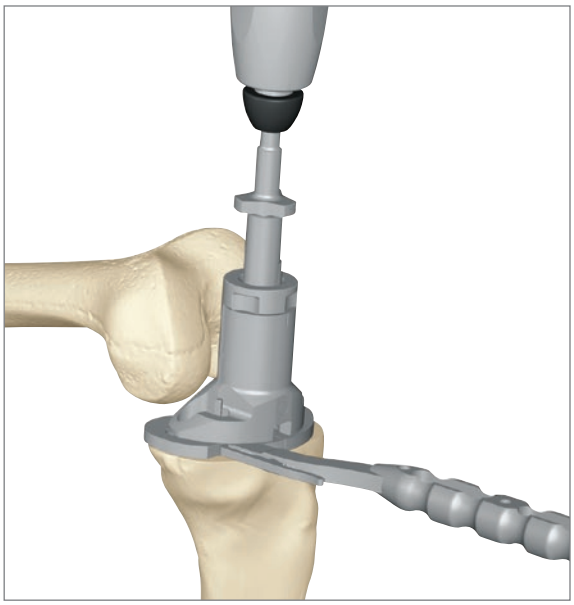
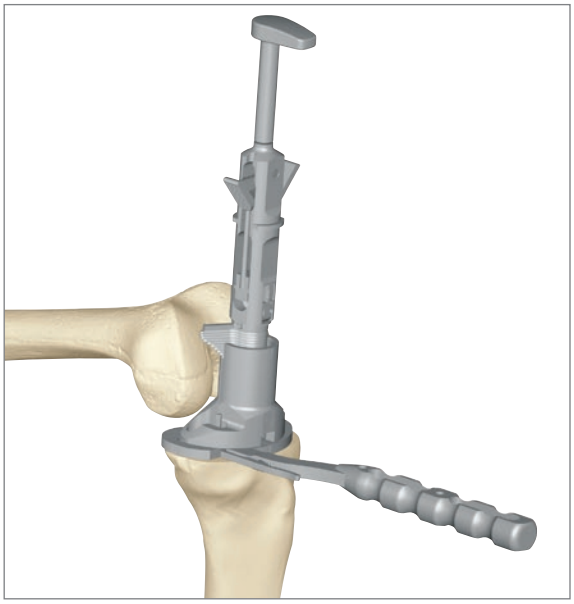
8 | TIBIA PREPARATION



- The holder is removed. The guiding tower is placed on the tibia plateau by engaging the posterior teeth first. The anterior part can be maintained steady by replacing and locking the holder back in place.
- According to the planned tibia size, the corresponding tibia drill sleeve is placed on the guiding tower.
- The drill with stop is first used to prepare the bone for the winglet chisel. The drill is available in 12 mm as standard for sizes T0-T3+, in 14 mm as standard for sizes T4-T5.
- After having drilled, the tibia drill sleeve has to be removed from the guiding tower.



- The wing stem preparation is performed by using the winglet chisel connected to its handle through the guiding tower down to the stop. If necessary, it is removed using the slap hammer or if no stem preparation is utilized the handle is removed.
- For every tibia size there is an own winglet chisel, as the tibia wing stem of the final implant is growing by size.

NOTE

The Columbus® UCR tibia has a keel length of 28 mm for all tibia sizes. For UCR tibia preparation, the tibia drill sleeves T0-T1+ (NQ1111R, NQ1121R) have to be used.
The drill sleeves are additionally marked with "UCR".
Furthermore, there are special UCR winglet chisels / trial keels in the sets NQ1025 and NQ1027. Please do not use the trial keels from standard IQ set for UCR tibia preparation!

INSTRUMENTS

Tibia trial / preparation plateau NQ1079R-NQ1089R

Headed pins 30 mm NP585R

Guide for winglet chisel NQ1096R

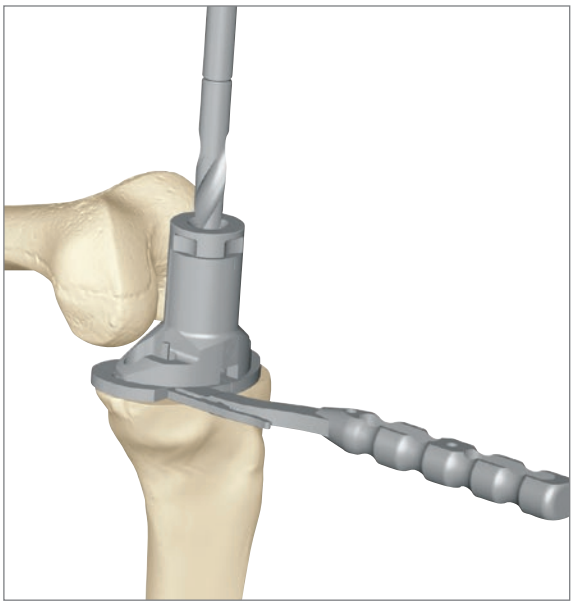
Drill with stop NQ1116R, NQ1126R

Acculan drill

Tibia drill sleeve NQ1111R-NQ1113R, NQ1124R-NQ1125R

Tibia trial / preparation plateau holder NQ378R

8.5 Tibia stem preparation



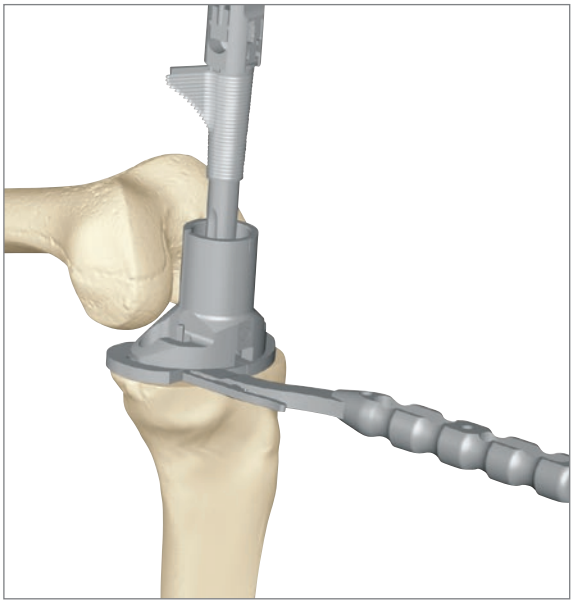
- In case of poor bone quality, the primary fixation can be enhanced by using a stem extension. According to the surgeon's philosophy, a cemented stem or a cementless stem can be chosen.

Option 1: priority to the tibia resection

Please note that this option is indicated for cemented stems. In this case, the tibia preparation is performed following the steps described previously (§ 8.1 to § 8.4). At the last stage, instead of using the drill with stop, a long drill is used for preparing the site of the future stem.

NOTE

Big tibia slope may create an anterior cortex conflict when (long) extension stems are used!



Length and diameter of this long drill should be assessed on the pre-operative X-rays. The drilling is performed through the tibia drill sleeve on the guiding tower and the diameter (Ø 12, 14 or 16 mm) corresponds to the trial stem diameter. Two laser markings are available on the drill in order to define the right depth for short or long stems. For the winglet preparation, the corresponding trial tibia stem is connected to the winglet chisel for the final preparation.

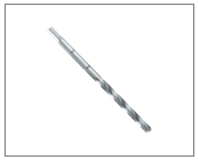
Ø 12 mm drill sleeves for T0 – T3+ in set no. NQ1005 (tibia prep.)
for T4 – T5 in set no. NQ1026 (stem prep.)
Ø 14 mm drill sleeves for T0 – T3+ in set no. NQ1026 (stem prep.)
for T4 – T5 in set no. NQ1005 (tibia prep.)
Ø 16 mm drill sleeves for T0 – T5 in set no. NQ1026 (stem prep.)

NOTE

The cemented implant stems have diameters 10, 12 and 14 mm. The drills are 2 mm wider (12, 14, 16 mm) in order to prepare a 1 mm surrounding cement mantle.

Winglet chisel/trial keel
NQ1090R-NQ1095R

Osteodenser holder
NQ1097R



Drill for cemented stem
NS376R-NS377R,
NS380R

Trial stem cemented
NS384T-NS389T

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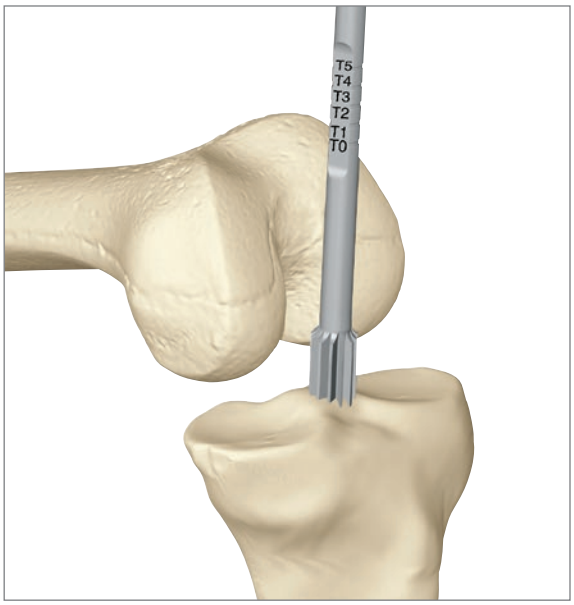
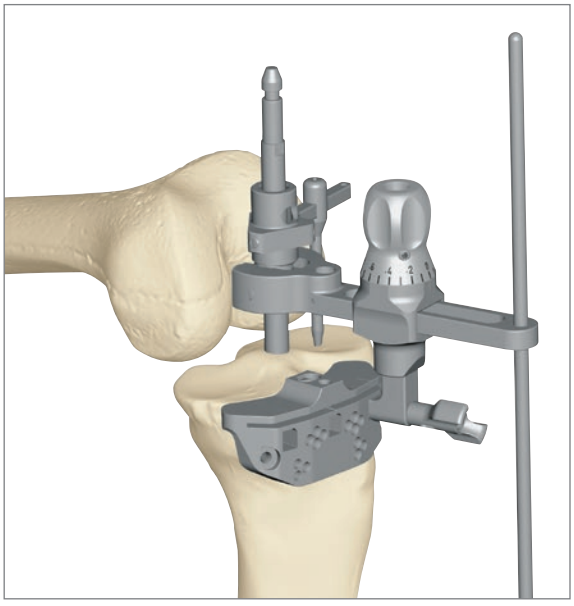
8 | TIBIA PREPARATION



Option 2: priority to the extension stem fixation
Please note that this option is indicated for cementless stems. In this case, the medullary canal of the tibia is opened according to the preoperative planning (entry point) with the Ø 9 mm drill. The thinnest reamer (for short or long stem) is coupled with the T-handle and inserted into the tibia medullary canal until the laser marking of the estimated tibia resection height according to the planned tibia size (T0-T5) is reached. If necessary, a bigger diameter is used until a good stability in the bone is achieved. The final depth of the reamer is chosen after tibia resection by inserting the reamer into the tibia until the correct laser marking is reached. Once the T-handle is removed, the intramedullary alignment system is mounted on the reamer with the 0° angle sleeve (angled sleeve for slope is not recommended here!) and the cutting guide. The stylus is set on the deepest point of the tibia plateau to define the 0-level cut.



The height of the cut is then adjusted by turning the tuning wheel. The alignment of the cutting block can be checked with the IM alignment rod. The cutting block is fixed with two headless pins in position "0"; the +/-2 mm pinholes are available on the resection blocks to further adjust the resection level if needed. In order to avoid movements during the resection, additional pins are set in convergent holes if necessary. The IM tibia alignment system is removed in one step with the T-handle after unlocking the cutting block from the alignment system.
The surgeon must take into account the alignment of the tibia as directed by the cementless stem since it may not coincide with the mechanical axis of the tibia.

NOTE
For the cementless stems the reamer diameter corresponds to the final implant stem diameter.

INSTRUMENTS


Reamer for cementless stem NQ1151R-NQ1156R


IM alignment rod NS331R


Tibia alignment system NS332R


Tibia IM stylus for orientation sleeves NS847R

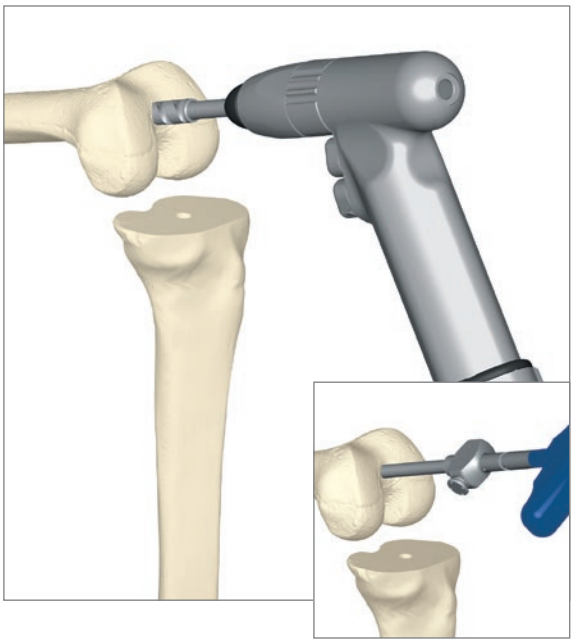

Tibial/distal cutting guide NS334R


Tibia orientation sleeve 0° NS843R

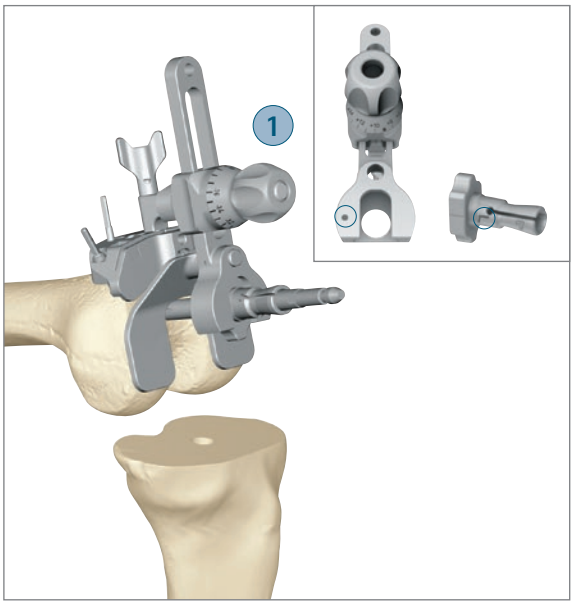

Alignment rod long NP471R

9.1 Femur intramedullary alignment

- The medullary canal of the femur is opened according to the preoperative planning (entry point) with the drill Ø 9 mm. The rod is inserted into the intramedullary canal using the T-handle. Once the rod is inserted, the T-handle can be removed.
- In order to compensate the anatomical valgus angulation of the femoral bone in relation to the mechanical axis, the appropriate angle sleeve 5°, 6° or 7° according to the preoperative planning is set into the intramedullary alignment system. The distal femur contact plate and the cutting block are connected to this system. The assembly is placed on the IM rod in contact with at least one distal condyle.



- A laser marking on the alignment system shows in which direction the sleeve has to be assembled. For a right leg, the "R" on the sleeve is connected with the laser marking on the alignment system. For a left leg, the "L" on the sleeve is connected with the laser marking.
- The planned height of the distal resection is adjusted by turning the wheel (1) until the desired thickness matches the anterior laser marking. The standard resection is 9 mm and corresponds to the distal thickness of the implant.



NOTE

To measure the correct resection height, the distal femur contact plate has to be proper assembled with the alignment system NS332R.


Drill Ø 9 mm NS330R


Acculan drill

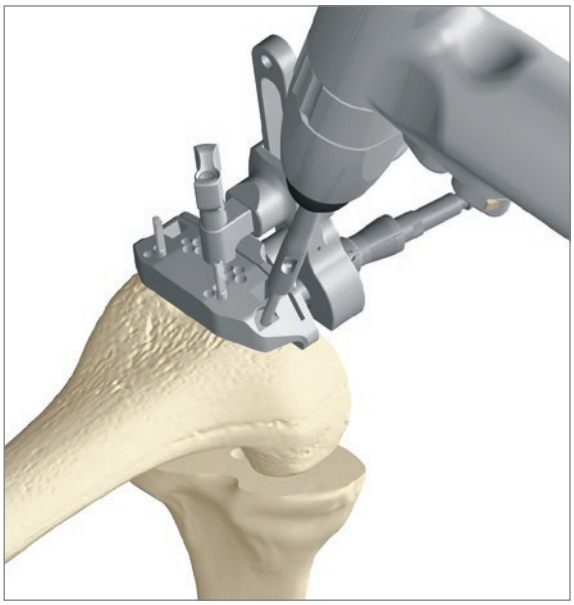

T-handle NE198R


Tibia alignment system NS332R


Distal femur contact plate NS834R

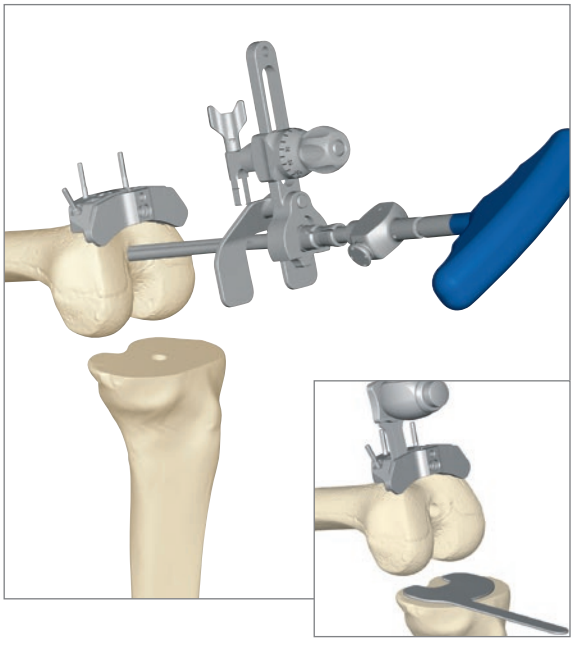

Femur orientation sleeve NS335R-NS337R


Tibial/distal cutting guide NS334R



9.2 Distal resection

- The cutting block is fixed with two headless pins in position "0". To avoid movement during resection, additional pins are set in convergent holes.



- The intramedullary alignment system is completely removed in one step with the T-handle by unlocking the connection to the cutting guide.
- The distal femoral resection is performed by sawing through the slot with a 1.27 mm thick oscillating saw blade. Make sure that the resection is fully completed and that no remaining bone structures are prominent to the resection plane.
- Pins and cutting block are removed.

NOTE

Please always pay a great care to the lateral structures by protecting them if necessary by the use of Hohmann retractors.

INSTRUMENTS

IM alignment rod NS331R

Tibia alignment system NS332R

Distal femur contact plate NS834R

Femur orienting sleeve NS335R-NS337R

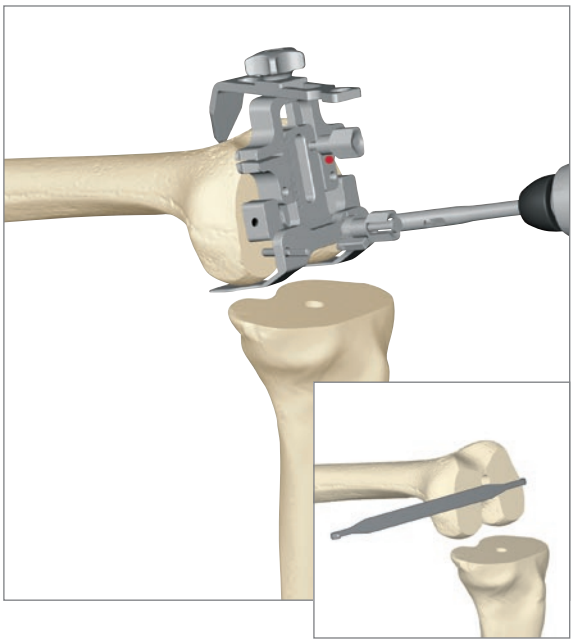
Tibial/distal cutting guide NS334R

Headless pins 63 mm NP583R

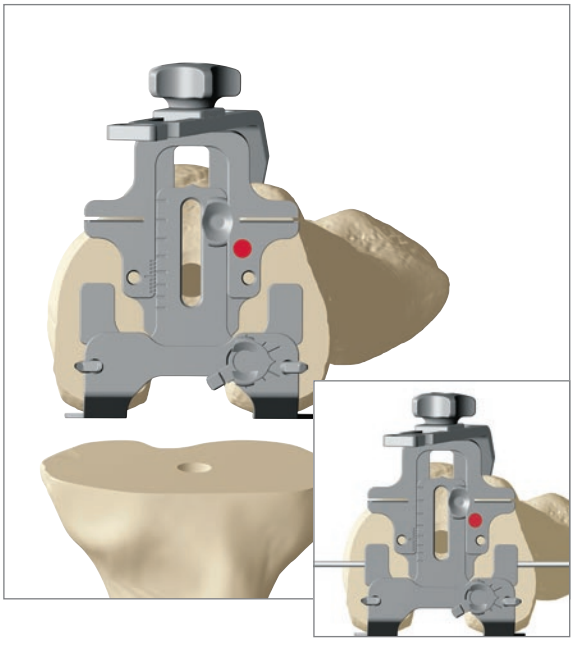
Acculan drill

9.3 Femur A/P sizing and rotation – anterior referencing

- The medio-lateral (ML) size of the resected femur should be checked with the ML femoral sizing gauge. One side specifies standard sizes, the other side narrow sizes. (For size information, see table on pages 71 and 74).
- The femur alignment block is placed flush onto the resected distal surface of the femur. The posterior foot plate must be in contact with the posterior condyles. The femoral alignment block is fixed with two headless pins against the distal femur through the posterior holes.



- It is possible to adjust the external rotation by moving the posterior lever arm in the right direction (clockwise for right knees, anti-clockwise for left knees). The rotational position is confirmed by assessing the trans-epicondylar axis perpendicularity or by checking the Whiteside's line through the slot at the middle of the instrument. Size and rotation are fixed by tightening the screw at the bottom lever arm.



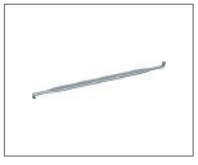
NOTE

With two pins in the sidewise holes of the femur alignment block it is possible to do the rotational alignment with reference to the epicondyles (see small picture beside).

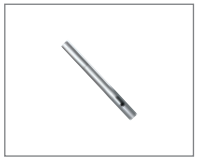
T-handle NE198R

Tibia protection plate NQ377R

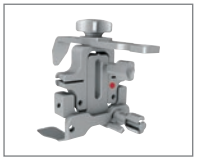
Acculan saw



ML femoral size gauge NS339R



Pin driver NP613R



Femur alignment block NS340R

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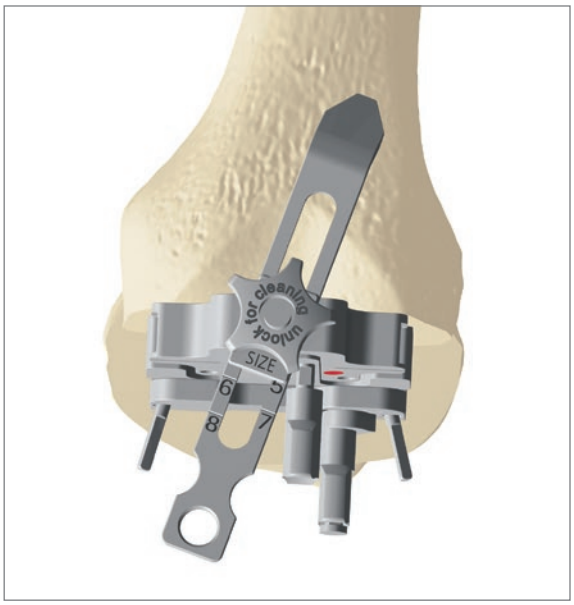
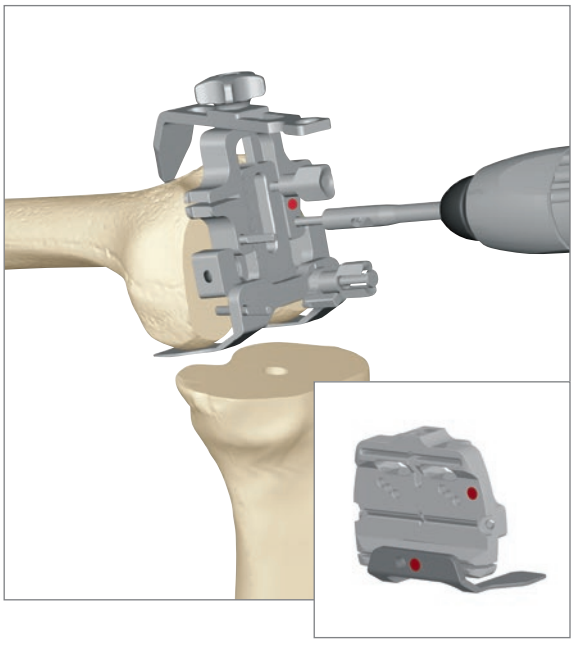
9 | FEMUR PREPARATION



- The femur sizing is achieved by reading frontally the marked size on the scale when the stylus tip is placed at the intended exit point of the saw blade on the anterior lateral cortex in order to avoid any notching. A scale on the surface of the stylus indicates the femur size depth and the position can then be fixed by tightening the screw.

IMPORTANT

Before performing the anterior referencing, ensure that the screw that fixes the stylus is not too loose. Otherwise there is a risk to create a notching on the anterior femur.



- Two long headless pins are fixed through the 2 frontal holes in order to reference the position of the 4-in-1 cutting guide. It is recommended to check the level of the anterior resection by using the check plate in the alignment block slots. The size to choose is to be read on the scale (see § 6 Assembly instructions and instrument handling).
- The posterior pins and the block are removed, leaving the headless pins in place.

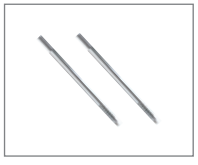
Option: posterior referencing

To perform a posterior referencing, femur plates in 0° and 3° external rotation are optionally available.

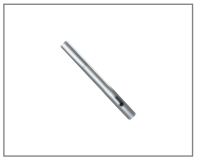
The correct femur plate is fixed on the 4-in-1 cutting guide. Then the cutting guide is placed on the distal resection of the femur. It is very important that the femur plates are in direct contact with the dorsal condyles. The cutting guide is fixed with two headless pins in the "0" holes. The femur plates are removed from the cutting guide.

INSTRUMENTS

Femur alignment block NS340R



Headless pins 63 mm NP583R

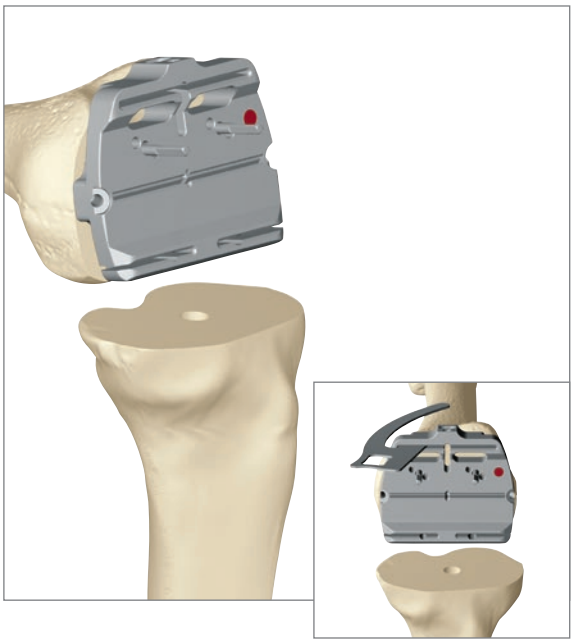


Pin driver NP613R

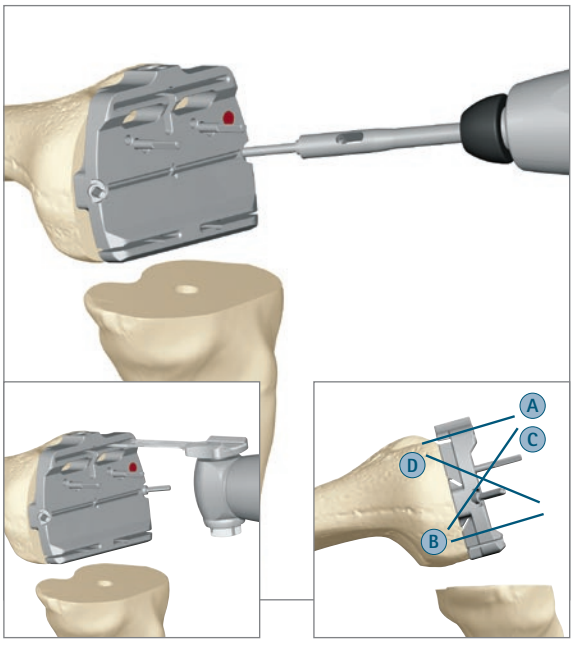
Acculan drill

9.4 Femur anterior, posterior and chamfer resections

- The 4-in-1 cutting guide that matches the femur size is placed over the two headless pins into the marked "0 mm" pinhole and pressed onto the distal resection. It is advised to check the level of the anterior resection by using the check plate in the alignment block slots before placing the converging pins for fixation.
- Before fixing the guide with convergent headless pins, it is possible to adjust the A/P position by using the holes marked +/-2 mm in order to remain as close as possible to the anterior cortex without notching it.



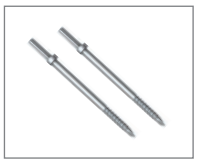
- The resections are performed as follow: anterior cut (A), posterior cut (B), removal of sizing pins, posterior chamfer (C), anterior chamfer (D). Thereby, the maximum distal contact surface and cutting block fixation is preserved up to the last resection, ensuring stability.
- Convergent pins and cutting guide are removed, and the resections are carefully checked in order to detect any remaining bone stock.
- For downsizing the femur, a smaller 4-in-1 cutting guide is placed directly onto the same anterior headless pins using the same holes as previously (-2/0/+2 mm). Since the reference is anterior, you will achieve the same anterior cut but recut the posterior condyles, the posterior chamfer as well as the anterior chamfer. This will open your posterior gaps correspondingly.



4-in-1 femur cutting guide NQ1041R-NQ1048R

Cutting depth check blade NS850R

Acculan saw



Headed pins 50 mm NP586R

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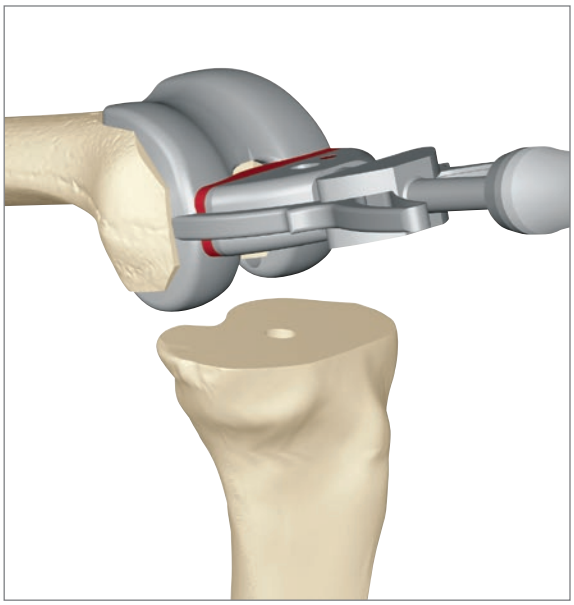
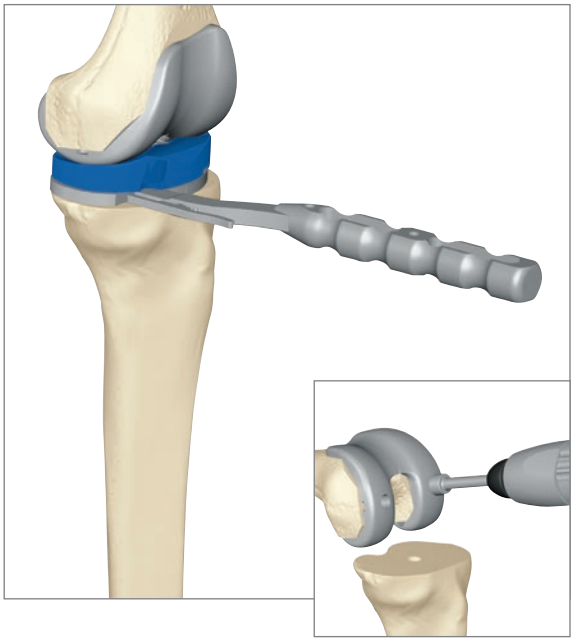
9 | FEMUR PREPARATION



- The quality of the resections and the fit of the prosthesis can be assessed by placing the femur trial implant onto the bone preparation. Using the corresponding holder with the fitting insert (small for sizes F1-F5, large for sizes F6-F8), make sure to apply a force toward anterior in order to avoid a flexed position.



- When the frontal headless pins have been removed, it is possible to downsize the femur as follows: place the femur alignment block on the distal resected bone. With the help of the cutting depth check plate the anterior reference can be found. When the alignment block is in a proper position, the pins are drilled through the anterior holes. Now a smaller cutting guide can be placed over the pins.
- The peg holes for the femoral implant are drilled with the Ø 6 mm drill with stop. They determine the final position of the femoral implant. Therefore it is strongly recommended that these holes are only drilled after the joint function test has been carried out.

INSTRUMENTS

Trial femur insertion instrument NS600R

Trial femur NQ451R-NQ458R, NQ461R-NQ468R, NQ1052R-NQ1057R, NQ1062R-NQ1067R

Tibia trial/preparation plateau NQ1079R-NQ1089R

Tibia trial/preparation plateau holder NQ378R

Trial gliding surface

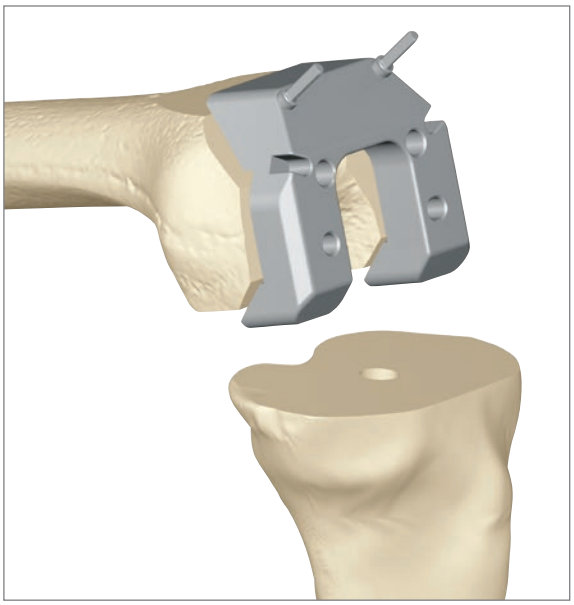
Insert for NS600R, NQ1031R-NQ1032R

Drill with stop Ø 6 mm NQ449R

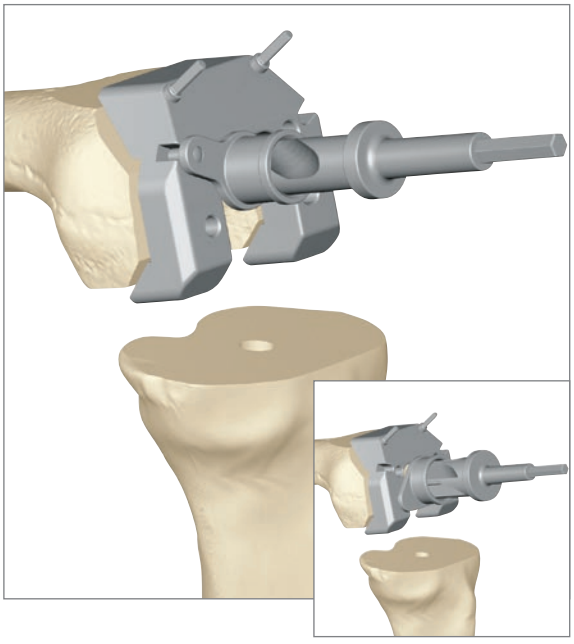
PS trial peg NQ499RM

9.5 PS box preparation

- In order to perform the femoral preparation for the PS version, the trial femoral implant and the trial gilding surface must be removed. The trial tibia plateau can remain on the bone.
- The appropriately sized PS preparation guide is selected (size of the femoral component) and inserted with its two pegs in the peg holes for the femoral component. It should then be pressed firmly onto the bone. The guide is fixed to the bone with two headed pins.



- The drilling guide for the Ø 14 mm drill is put into the hole of the PS preparation guide. It is moved in both lateral and medial direction in order to drill the two box corners. Then the cutting guide for the Ø 22.5 mm cutter is attached and the bone is milled with the cutter up to its stop.



PS femur box preparation guide NQ571R-NQ578R

Headed pins 50 mm NP586R

Pin driver NP613R

Acculan drill

Milling guide Ø 14 mm NQ589R

Milling guide Ø 22.5 mm NQ591R

Reamer with stop Ø 14 mm NQ590R

Reamer with stop Ø 22.5 mm NQ592R

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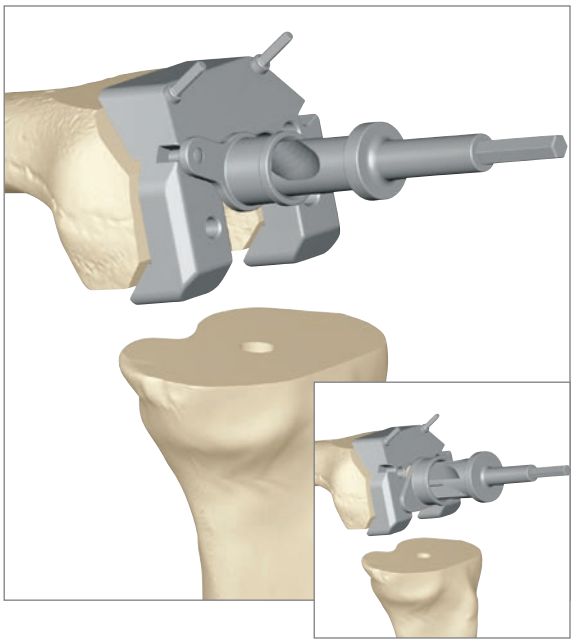


SIZE COMPATIBILITY TIBIA WITH FEMUR PS / PE PS – FEMUR CR / PE UC – FEMUR CR / PE UCR

Sizes	F1	F2/F2N	F3/F3N	F4/F4N	F5/F5N	F6/F6N	F7/F7N	F8
T0/T0+								
T1/T1+								
T2/T2+								
T3/T3+								
T4/T4+								
T5								

Recommended combination
Possible combination
Combination to avoid

NOTE

For possible size combinations of cruciate sacrificing femur and tibia please refer to the table above. For cruciate retaining versions (Femur CR / PE DD – Femur CR / PE RP) there is no limitation.

INSTRUMENTS

PS femur box preparation guide NQ571R-NQ578R

Headed pins 50 mm NP586R

Pin driver NP613R

Acculan drill

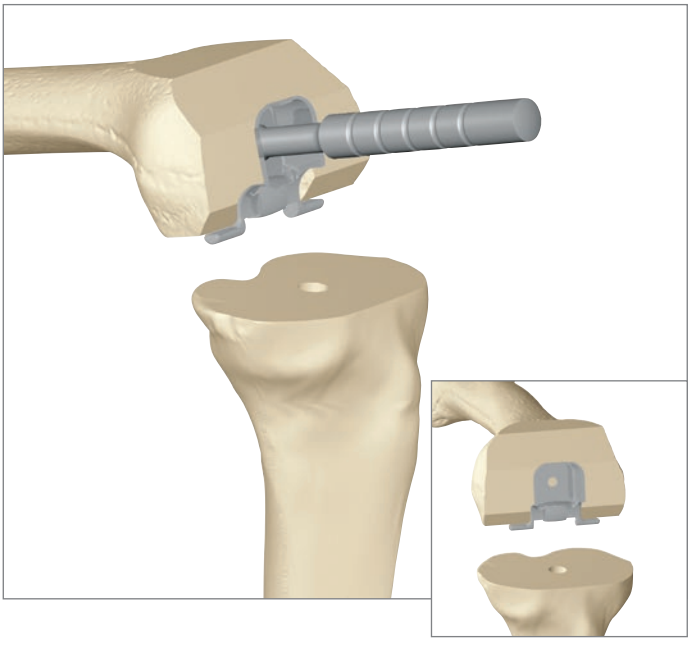
Milling guide Ø 14 mm NQ589R

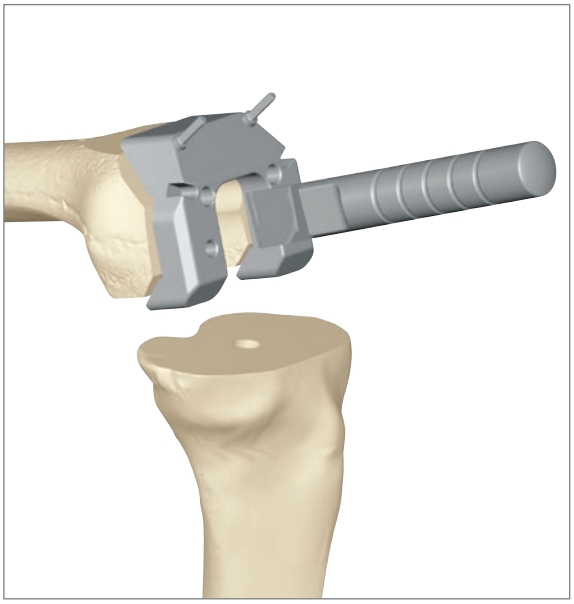
Milling guide Ø 22.5 mm NQ591R

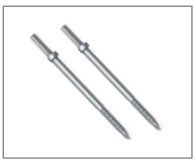
Reamer with stop Ø 14 mm NQ590R

Reamer with stop Ø 22.5 mm NQ592R

- Both lateral and medial walls are prepared with the chisel cutting edge always positioned on the outside.
- To check the intercondylar preparation, the appropriately sized PS trial femoral box template is selected and placed into position with the holder. Correct positioning is confirmed through the equal height of the trial template and the distal resection as well as contact between the two pegs and the posterior chamfer resection.



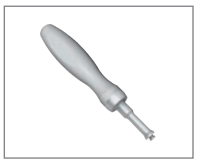




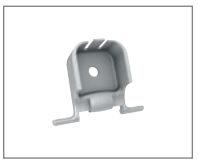
Headed pins 50 mm
NP586R

PS femur box preparation guide
NQ571R-NQ578R

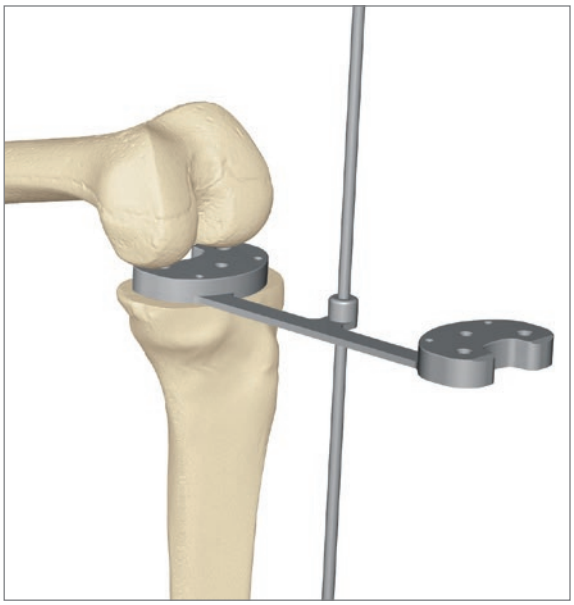
Blade chisel NQ593R



Femur box holder/ extractor NS428R



Trial femur box
NQ581T-NQ588T

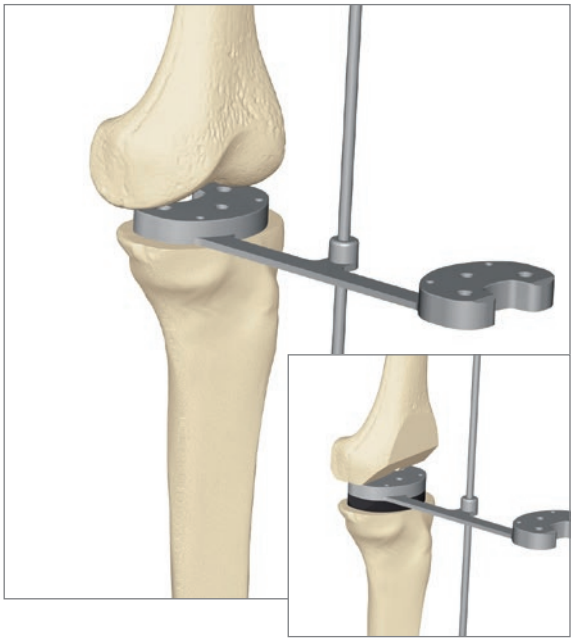


10.1 Tibia first – measurement with spacers

- After performing the tibia resection, check the plane of the resection by inserting the thinnest spacer block (10 mm) in the joint. If the resection needs correction then apply the cutting block accordingly and recut the proximal tibia accordingly. The soft tissue gaps can be assessed by applying a varus/valgus stress in extension and in flexion. If the joint is too lax, insert the next spacer and repeat the operation until a spacer thickness allows the knee to reach a stable point in flexion and extension.

NOTE

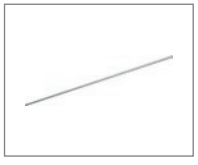
The posterior cruciate ligament (PCL) must be released and removed, if necessary, prior to assessing gaps in flexion and extension since it will increase the flexion gaps once removed.



- The measurements can also be done after the distal resection is performed by adding the distal cut spacer for the extension measurement.

INSTRUMENTS

Tibia cut spacer
NS852R-NS854R

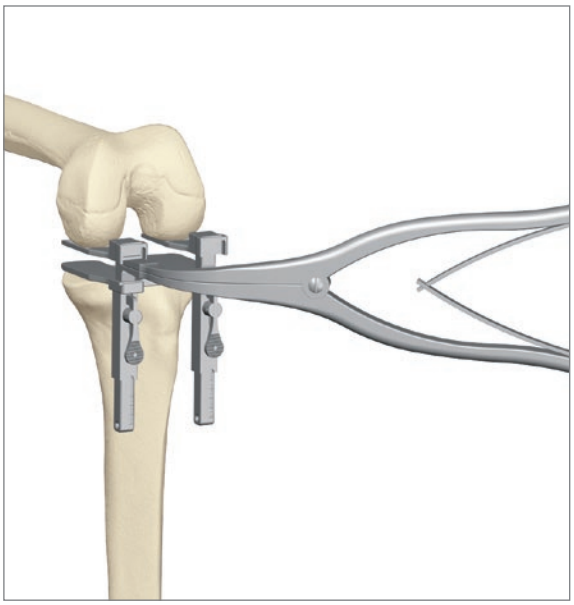


Alignment rod long
NP471R

Added femur cut spacer
NS498

10.2 Optional tibia first – measurement with distractor

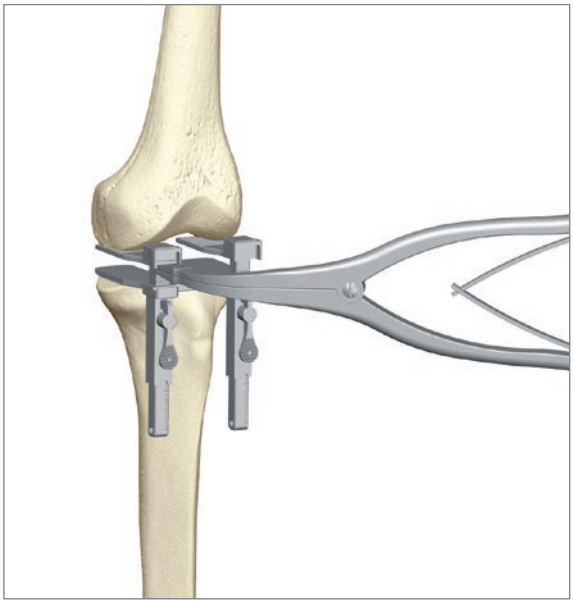
- After performing the tibia resection, check the plane of the resection so that it corresponds with the mechanical axis of the tibia. Insert the distractor into the joint and use the clamp to distract sequentially the medial and lateral gaps in extension.
- If the medial and lateral gaps are asymmetrical, it is necessary to perform an appropriate release on the contracted side and then repeat the gaps measurements.



NOTE

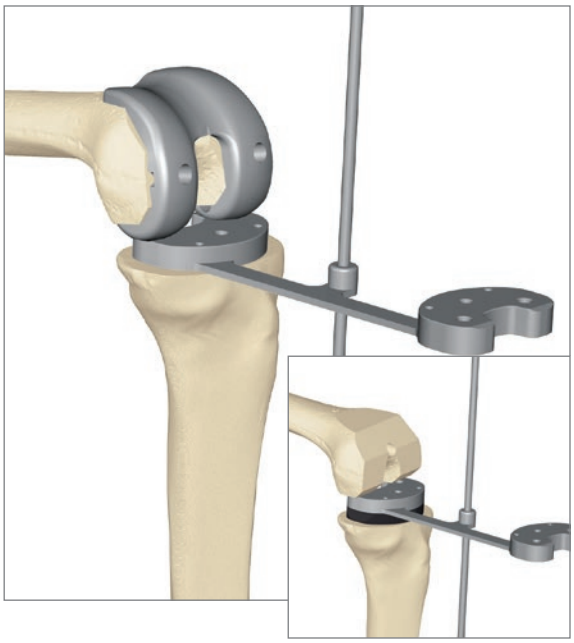
The distractor set is not part of the standard instrumentation, but can be ordered optionally (see §18 Optional instruments, page 68).

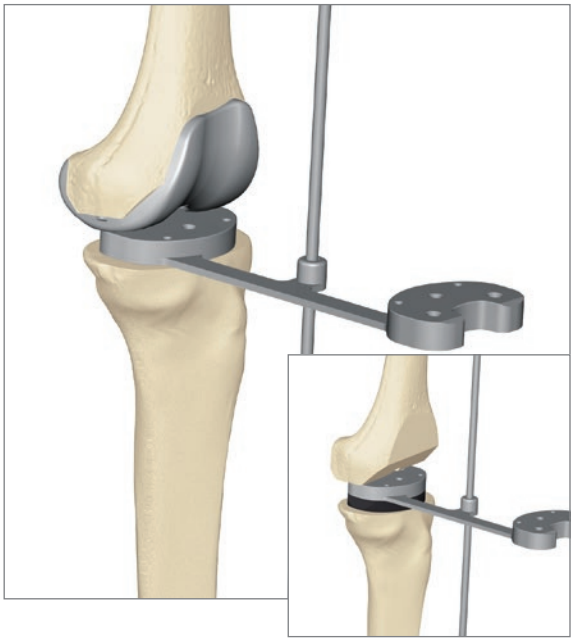
- When the joint is balanced in extension, note the thickness of the gaps, and move to the flexion gap measurement and repeat the same operation. In flexion, the possible future rotation of the femoral component should be taken into account.
- When the flexion gaps (FG) differ from the extension gaps (EG), calculate the needed thickness of the distal resection in order to equalize flexion and extension:
  distal resection height = 9 mm – EG + FG.
  (Note: The PCL must be released and removed if necessary prior to this step since its removal will increase the flexion gaps.)



Distraction clamp
NP609R

Femur-tibia distractor
NP604R





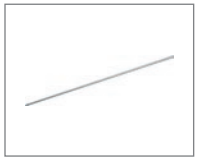
10.3 Femur first – measurement with spacers

- After completion of the femoral and tibial resections, the trial femur implant is placed on the femur. The height of the resection and flexion / extension gaps can be checked by inserting the spacers.
- If the medial and lateral gaps are asymmetrical, it is necessary to perform the appropriate release on the contracted side and then repeat the gaps measurements with the spacers until stability is reached.
- If the flexion and extension gaps are incongruent then please refer to the chapter 10.4 strategies and define the right corrective action.
- The thickness of the last spacer that allows good balance and stability of the knee corresponds to the needed polyethylene thickness that should be used.
- At each step, the leg axis can be checked by inserting the alignment rod through the spacer handle; the rod should point respectively at the femoral head center and the ankle joint center.
- The measurements can also be done after the distal resection is performed by adding the distal cut spacer for the extension measurement.

INSTRUMENTS

Tibia cut spacer
NS852R-NS854R

Added femur cut spacer
NS498



Alignment rod long
NP471R

Trial femur
NQ451R-NQ458R

10.4 Strategies

When the flexion and extension gaps are incongruent, an individualized strategy has to be defined in order to correct it.

The table presents some possible options to follow in order to correct a situation where the flexion and extension gaps are not both equally optimal but either tight or wide.

This does not pretend to be an exhaustive and systematic solution matrix. The surgeon has to make his own choices depending on the clinical evaluation, the surgical situation, patient specific issues and his own experience.

		Flexion Gap		
		optimal	tight	wide
Extension Gap	optimal		▪ increase tibia slope ▪ downsize the femur	▪ posterior capsule release and thicker insert ▪ increase distal cut and thicker insert ▪ increase femur size
	tight	▪ posterior capsule release ▪ increase distal cut	▪ thinner insert ▪ increase tibia cut	▪ increase distal cut, release posterior capsule and thicker insert ▪ upsize femur and increase distal cut ▪ upsize femur and release posterior capsule
	wide	▪ decrease distal cut ▪ downsize femur and thicker insert	▪ downsize femur and thicker insert ▪ downsize femur and decrease distal cut ▪ decrease distal cut	▪ thicker insert

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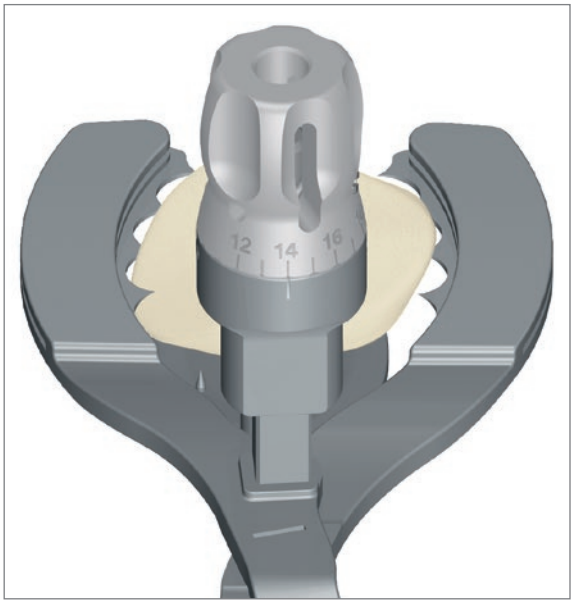
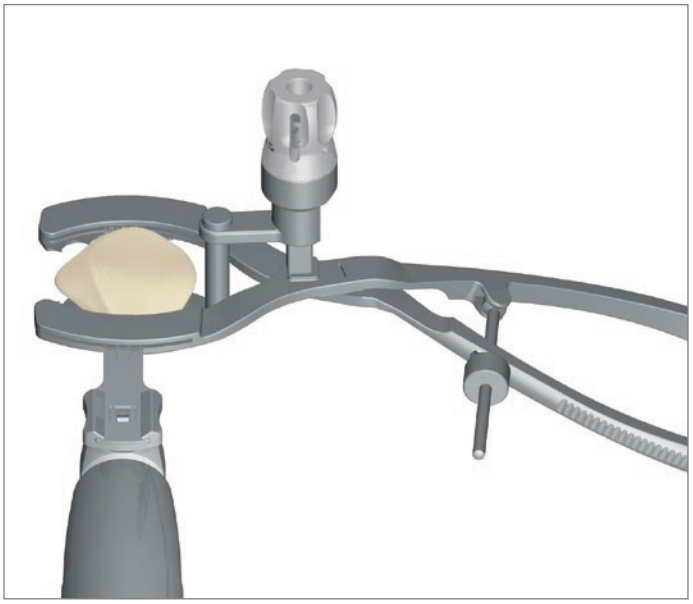
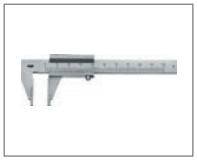
11 | PATELLA PREPARATION

- The thickness of the patella is measured using the caliper. This thickness should not be exceeded after implantation of the patella implant. The level of bone resection is calculated. A minimum thickness of the remaining patella bone should not be less than 12 mm.
- The resection level is adjusted by turning the resection depth wheel to the planned level of remaining patellar bone thickness. Then the patella is fixed into the patella resection clamp.
- The resection is performed through the cutting slot with a 1.27 mm thick saw blade.





INSTRUMENTS

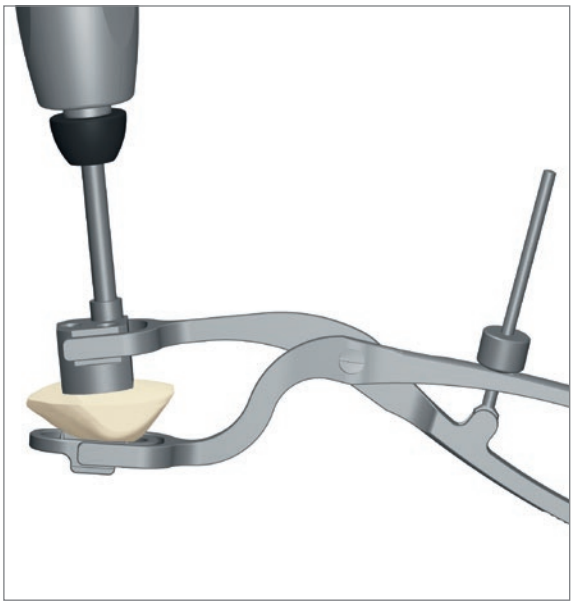


Caliper AA847R

Patella resection clamp NS840R

Acculan saw

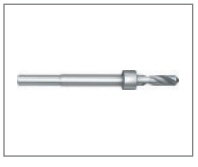
- The patella resection clamp is removed. The patella drill / impaction clamp is set onto the osteotomized patellar surface choosing a medialized position to recreate the resected apex of the articular surface; the trial patella can be placed on top of the drill guide in order to check its position to the medial rim and appropriate positioning in the superior and inferior direction.



- The peg holes for the implant are drilled through the holes with the Ø 6 mm drill until the stop is reached. The size of the patella is established with the corresponding trial patellar implant.

Patella drill / impaction clamp NS841R

Acculan drill



Drill with stop Ø 6 mm NQ449R

Trial patella NQ281-NQ285

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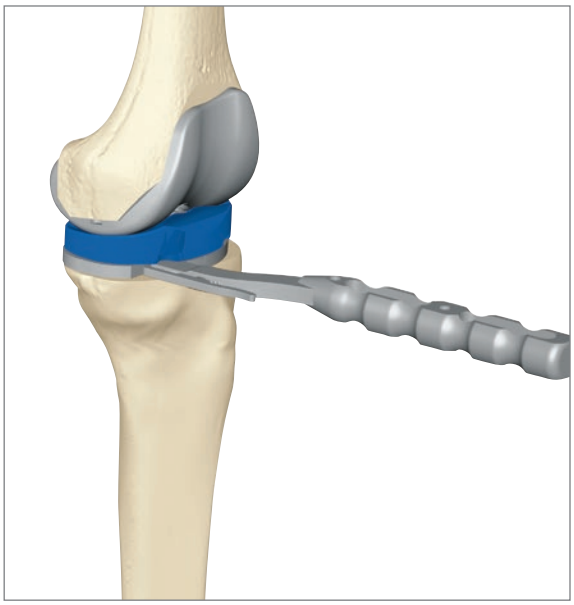
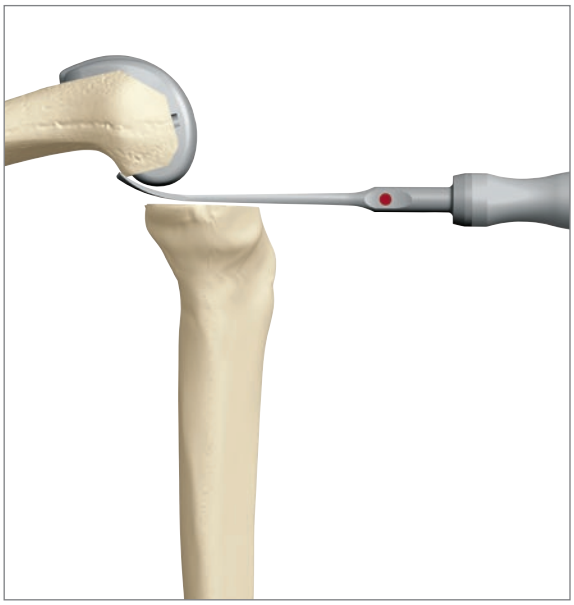
12 | TRIAL REDUCTION



- The trial femoral and tibial implants are placed onto the prepared bony surfaces.
- The polyethylene trial corresponding to the gap measurements with the spacer or the distractor is placed between both trial implants.
- The RP gliding surfaces are available in thicknesses from 10 to 16 mm.
- For DD, UC, UCR and PS version the range is from 10 to 20 mm.
- RP and UCR provide a full height range of trial gliding surfaces.
- For DD, UC and PS, a 6 mm trial spacer is supplied. E.g. the 18 mm size is achieved by using the 6 mm trial spacer + 12 mm trial gliding surface.
- For the PS version the appropriate trial femoral prosthesis is connected to the PS femoral box and placed on the bone. The PS trial peg is fixed on the tibia trial implants using the holder for the PS trial femoral box template. The knee kinematics are checked with the help of the trial prostheses.

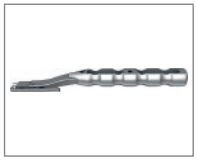


- The following sequence is recommended for trial prosthesis removal:
  - PS peg
  - Trial gliding surface
  - Trial femoral prosthesis
  - Trial tibia wing stem with / without extension stem
  - Trial tibia plateau

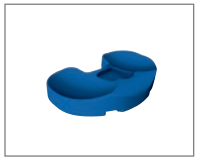
- For the rotating versions RP and UCR there are special metal and plastic inserts provided.
- The metal inserts are used to do a realistic trial reduction with rotation possibility. The metal insert is placed on the trial tibia plateau. Then the RP or UCR trial gliding surface is placed on the metal insert. The trial reduction can be performed (with trial implants) (see picture 1 on page 49).

INSTRUMENTS

Tibia trial / preparation plateau NQ1079R-NQ1089R



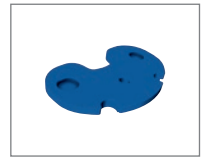
Tibia trial / preparation plateau holder NQ378R



Trial gliding surface

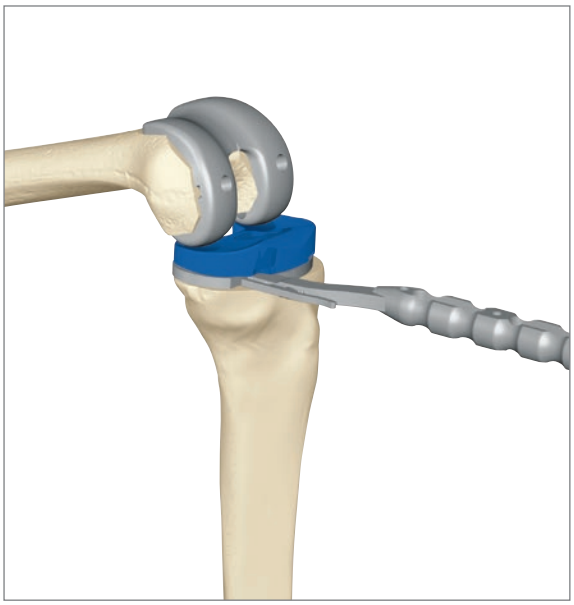
PS trial peg NQ499RM

Trial femur NQ451R-NQ458R, NQ461R-NQ468R, NQ1052R-NQ1057R, NQ1062R-NQ1067R



Trial spacer 6 mm NQ544

- The plastic inserts are used when the final femur and tibia are already implanted. The plastic insert is placed on the final tibia implant. Then the RP or UCR trial gliding surface is placed on the plastic insert. The trial reduction can be performed (with final femur and tibia implant) (see picture 2).
- The stability of the joint is assessed by applying varus/valgus stresses in extension and flexion. If the joint appears to be lax (opening of gaps under stress), then a thicker trial gliding surface is tested.
- The range of motion is assessed. Intra-operative limited extension and flexion and marked hyperextension must be avoided.

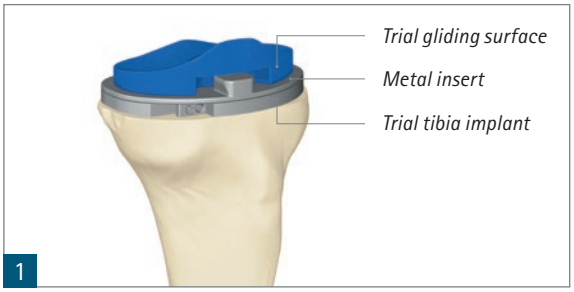


NOTE

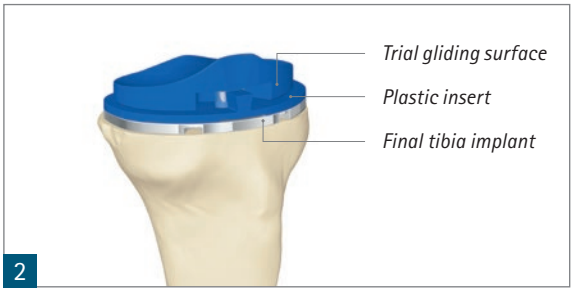
Bone rests in the dorsal region of the femur have to be removed with a curved osteotome to avoid implant-bone conflicts in flexion.

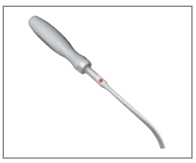
Trial reduction RP/UCR

Picture 1: Trial reduction with trial implants (metal insert)



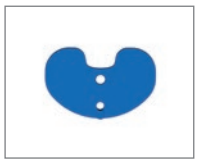
Picture 2: Trial reduction with final implants (plastic insert)





Osteotome NS366R

Metal insert for
RP NQ1391R-NQ1395R
UCR NQ1290R-NQ1295R



Plastic insert for
RP NQ1381-NQ1385
UCR NS200-NS205

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13 | ASSEMBLY OF EXTENSION STEMS

- For the assembly of the extension stem on the final implant the stem has to be tightened with a torque of 20 Nm. It is recommended to tighten the extension stem on the table and ensure that the components are hold by an assistant during the tightening.

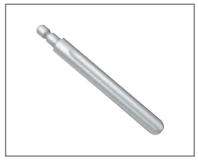
INSTRUMENTS / IMPLANTS

Tibia holder for stem torque fixation NS390R

Torque wrench NE184RM

Stem adapter for NE184RM for extension stems Ø 12, 14 mm NE185R

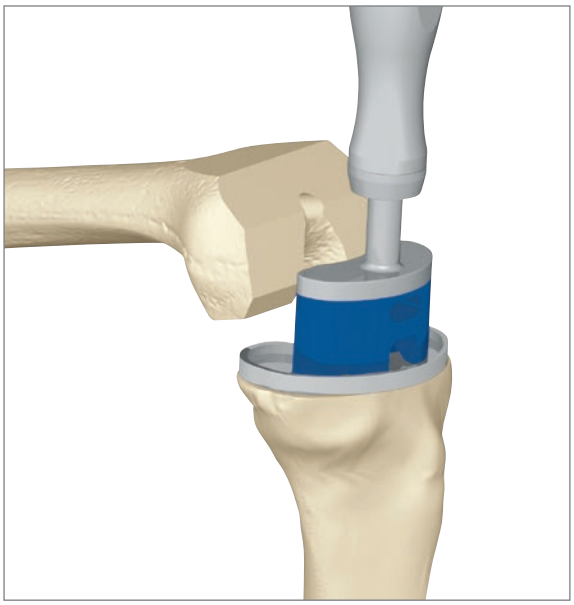
Stem adapter for NE184RM for extension stems Ø 10 mm NS835R



Tibia extension stem NX060K-NX068K, NX082K-NX087K

- The following implant sequence is recommended:
  - Tibia implant with / without extension stem
  - Femur implant
  - Gliding surface
  - Patella implant

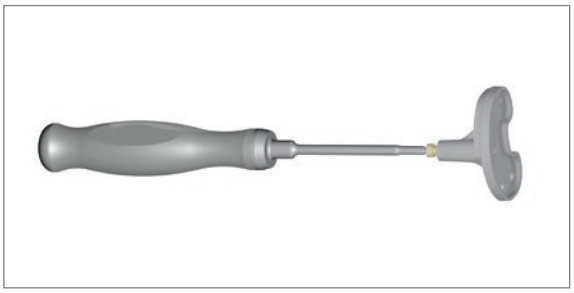
- The final tibia implant is brought precisely into the predefined position. The final positioning is achieved with the help of the tibia impactor.



- The obturator screw is fixed hand-tight with the stem tightening key NS378R. The peek plug can be fixed on the tibia by hand or with help of the screw driver NS423R.

NOTE

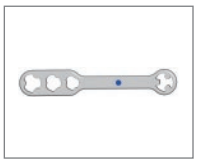
The obturator screw diameter 12 mm fits to the tibial plateau size T0-T3+. The obturator screw diameter 14 mm fits to the tibial plateau size T4-T5.



Tibia plateau impactor NS425

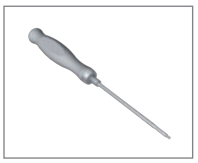
Tibia implant

Obturator screw NN261K, NN264K, NN261Z, NN264Z



Stem tightening key NS378R

Peek plug NN260P



Screw driver SW 3.5 NS423R

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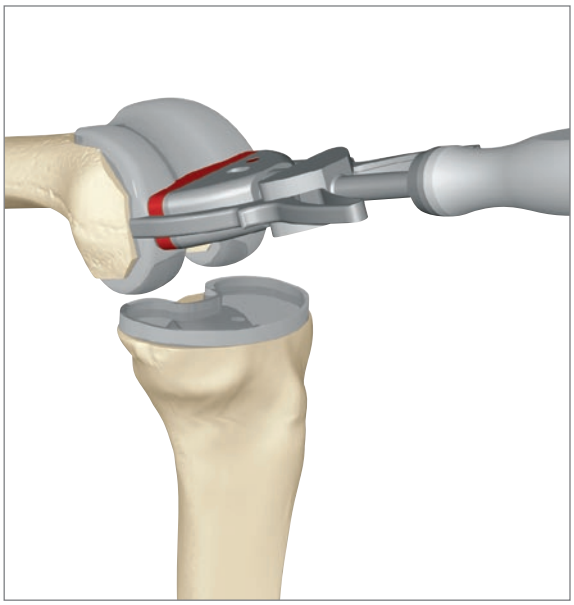
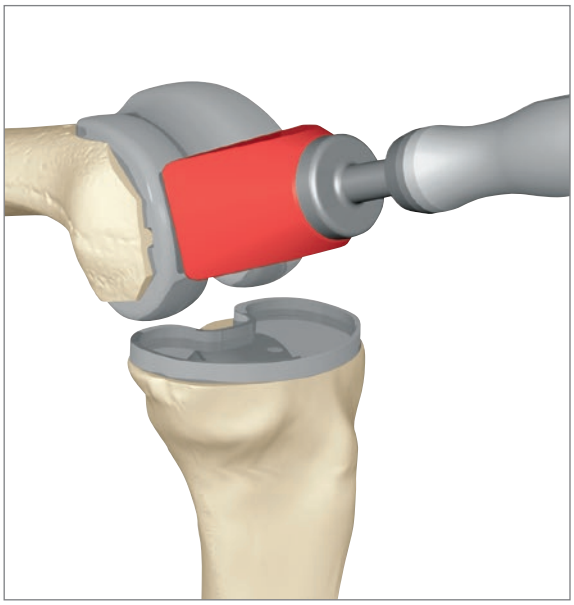
14 | COMPONENT IMPLANTATION



- Using the femur holder and its insert of the corresponding size group (small for sizes F1-F5, large for sizes F6-F8), the final femur implant is brought into alignment and implanted. Care must be taken to assure the holder is properly seated and attached to the femoral implant so that it does not dislodge during cementing. A special attention has to be placed to the sagittal orientation: forcing the holder to the anterior direction helps to avoid an implantation in a flexion position.
- The femur holder is opened by turning its handle anti-clockwise.



- The femoral impactor is used to knock the implant into place.

INSTRUMENTS

Implant holding/insertion instrument NS600R

Femur insert to NS600R, NQ1031/NQ1032

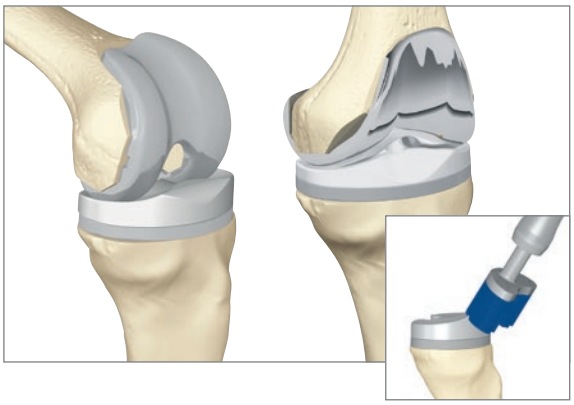
Femur impactor NS424

Femur implant

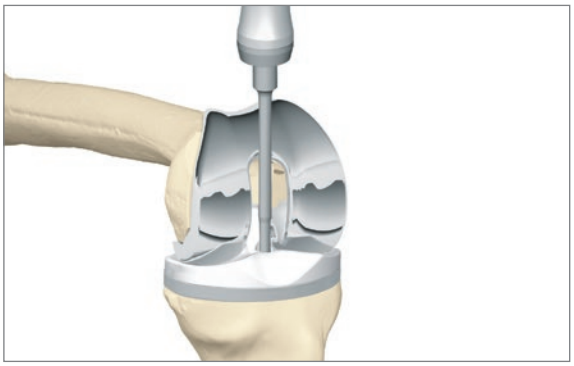
Tibia implant

- If using a fixed platform, the gliding surface is placed into position by inserting first its posterior part in the tibia plateau and impacting the anterior part with the help of the tibia impactor.

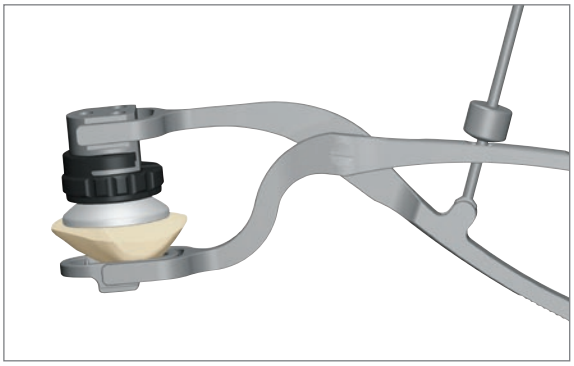
NOTE
It may be prudent to use a trial insert for the cement curing. Afterwards recheck joint motion and stability before deciding on the final type and thickness of the polyethylene insert.



- In case of using a PS gliding surface, it is mandatory to fix it with the PS fixation screw. The screw has to be tightened firmly with the PS screw driver after the cement hardening process to avoid any micro movements. For a correct fixation, the screw has to be screwed-in completely into the gliding surface until the stop is reached.



NOTE
The CoCr version of the PS screw is packed with the PS gliding surface. In case of a TKA with AS components, please order the corresponding AS fixation screw separately and substitute the CoCr fixation screw:
NN497Z for a PS gliding surface of 10 or 12 mm
NN498Z for a PS gliding surface of 14 or 16 mm
NN499Z for a PS gliding surface of 18 or 20 mm



- The patella is implanted using the patella drill / impaction clamp and the concave plastic cap, which allows good transmission of forces during the cement hardening process and at the same time protects the patella implant against damage.

Gliding surface

Patella drill / impaction clamp NS841R

Inlay for NS841R, NS842

Patella implant NX041–NX045

Tibia plateau impactor NS425

PS screw driver NQ1070R

- Regardless of what fixation method is utilized it is critical that correct techniques are employed in order to avoid complications and early failure. Also, even with accurate cuts it is important to ensure that components are fully seated, as it is easy for this to be obscured when cementing is taking place. Varus/valgus alignment can be significantly affected by unequal medial-lateral cement mantles and poorly seated components and there can be a tendency to place femoral components in relatively flexed positions if specific care is not taken.

- It should also be noted that when definitive components are cemented in, they may prove more stable and seat better than the trials, which are often a little loose. It is therefore worthwhile to recheck the balancing and stability at this point so that further adjustments can be made if necessary. It has been possible to relate poor cementing techniques to early and continuous component migration, which in turn is of positive prognostic significance when predicting aseptic loosening so proper attention to the cementation steps must be taken.[4]

- Preparation of the bony surfaces and cancellous bone should be performed with pulsatile type lavage with the knee under a pressure tourniquet. This step allows for well-fitting cement penetration and interlocking to the bony prepared surfaces and also removes bone debris that can serve as third body particles that increase polyethylene wear after surgery.[5,6] The surfaces should be properly dried prior to cementation and appropriate exposure of all bony surfaces achieved.[7,8] All of the surfaces should be pressurized for optimal cement penetration. Emphasizing the importance of effective cementation of the posterior femoral condylar surfaces is also recommended since it can have a major effect on the longevity of the fixation of the femoral implant.[9] A further point worth noting is that if holding the knee out in full extension while cement is hardening is used to compress components down and possibly improve cement intrusion.

- Care should be taken to completely remove all excess cement that protrudes from the implant bone interface. Any remnants of overhanging cement can impinge on surrounding soft tissue or can provide a source of debris that can serve as a generator of third body wear and may contribute to the demise of the fixation earlier than expected.[10] Further recommendations for cementation technique are published in the scientific information brochures "Aesculap Implant Fixation in TKA", order number O61802 and BonOs® R and BonOs® R Genta, order number O65002.

BonOs® R | BonOs® R Genta

EASYMIX®

- After cement polymerization and removal of all cement excess, thoroughly irrigate the joint. If a tourniquet is used, hemostasis is achieved after its deflation.

- Close soft tissue in the normal layered fashion.

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For the IQ Columbus® instrument sets it is possible to order it on a modular basis. Please order by single set numbers, e. g.

Basic instruments with narrow femur and DD gliding surfaces
Order: NQ1001, NQ1002, NQ1003, NQ1024, NQ1005, NQ1006

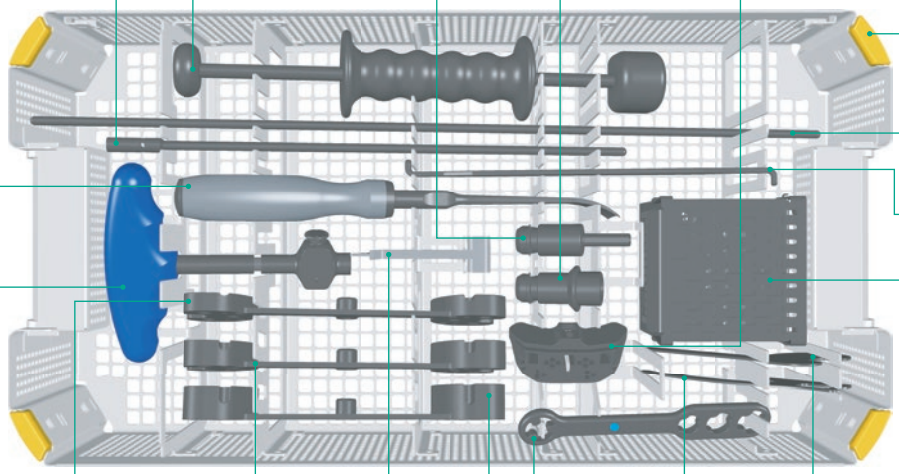
Instrument trays	page 57
Optional instruments	page 68
Sawblades	page 70

Item No.	Description	Container recommended	Lid	Height of tray incl. lid
NQ1001	IQ Columbus® set general instruments	JK444	JK489	119 mm
NQ1002	IQ Columbus® set manual instruments	JK442	JK489	89 mm
NQ1003	IQ Columbus® set femur preparation	JK442	JK489	89 mm
NQ1004	IQ Columbus® set trial femur components standard	JK444	JK489	119 mm
NQ1024	IQ Columbus® set trial femur components narrow	JK444	JK489	119 mm
NQ1010	IQ Columbus® set preparation instruments PS	JK442	JK489	89 mm
NQ1005	IQ Columbus® set tibia preparation	JK442	JK489	89 mm
NQ1006	IQ Columbus® set trial gliding surfaces DD	JK442	JK489	89 mm
NQ1007	IQ Columbus® set trial gliding surfaces RP	JK442	JK489	89 mm
NQ1008	IQ Columbus® set trial gliding surfaces UC	JK442	JK489	89 mm
NQ1009	IQ Columbus® set instruments for tibia hemi spacer	JK441	JK489	69 mm
NQ1025	IQ Columbus® set preparation instruments UCR	JK442	JK489	89 mm
NQ1027	IQ Columbus® set preparation instruments UCR T0/T0+	JK341	JK389	69 mm
NQ1026	IQ Columbus® set stem preparation	JK444	JK489	119 mm
NS709	IQ set patella preparation	JK444	JK489	119 mm
NP138	IQ set navigation instruments	JK444	JK489	119 mm

X-RAY TEMPLATES

Item No.	Description
NQ192	Columbus® X-ray templates set 1.1:1
NQ193	Columbus® X-ray templates set 1.15:1

NQ1001 | IQ Columbus® SET GENERAL INSTRUMENTS



NP684R
Slap hammer

GB414R
Hexagonal chuck (Targon®) with triang. shank

GB413R
Acculan LI hexagonal chuck (Targon®)

NS334R
IQ tibia/distal femur cutting guide

NE331R
Alignment rod with sleeve 300 mm
NE332R
Alignment rod with sleeve 400 mm (optional)

NS366R
IQ osteotome fine curved 20/205 mm

NE198R
Revision navigated T-handle

NQ1011R
Tray general instruments

NP471R
Alignment rod long, 470 mm

NS339R
ML femoral size gauge

NP580R consisting of:
Threaded pins headless
4 x NP582R 3.2 x 38 mm
6 x NP583R 3.2 x 63 mm
4 x NP585R 3.2 x 30 mm
4 x NP586R 3.2 x 50 mm
1 x NP613R Threaded pin driver attachment

NS852R
IQ spacer for tibia cut 10+12 mm

NS853R
IQ spacer for tibia cut 14+16 mm

NE456R
Alignment rod control plate (optional)

NS850R
IQ cutting check plate

NQ377R
Tibia protection plate asym.

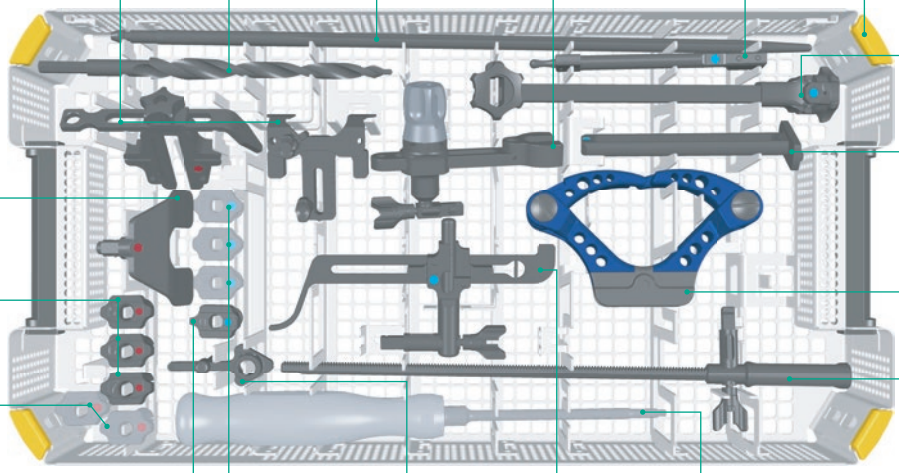
TF161
Graphic template F/ NQ1011R (NQ1001)

JA455R
Lid for tray

NS854R
IQ spacer for tibia cut 18+20 mm

NS378R
Stem tightening key

NQ1002 | IQ Columbus® SET MANUAL INSTRUMENTS



NS340R
Manual femoral alignment block

NS330R
IQ stepped drill for intramedullary alignment rod

NS331R
IQ intramedullary alignment rod, 400 mm, Ø 8.0 mm

NS332R
IQ intramedullary alignment system

NS343R
IQ tibia alignment system proximal fixation

NQ1012R
Tray manual instruments

NS342R
IQ tibia alignment system handle

NS344R
IQ tibia alignment system support for bimalleolar clamp

NS345R
IQ tibia alignment system bimalleolar clamp

NS341R
IQ holding rod for tibial/ distal cutting guide

NS834R
IQ distal femur contact plate large

NS335R–NS337R
IQ femur orientation sleeve AP 5°, 6°, 7°

NS578R–NS579R
IQ femur orientation sleeve 8°, 9° (optional)

NS843R
IQ IM tibia orientation sleeve 0°

NS846R–NS844R
IQ IM tibia orientation sleeve 3°, 5°, 7° (optional)

NS847R
IQ tibia stylus for orientation sleeves

NS347R
IQ tibia stylus

NE425R
Tibia stylus (optional)

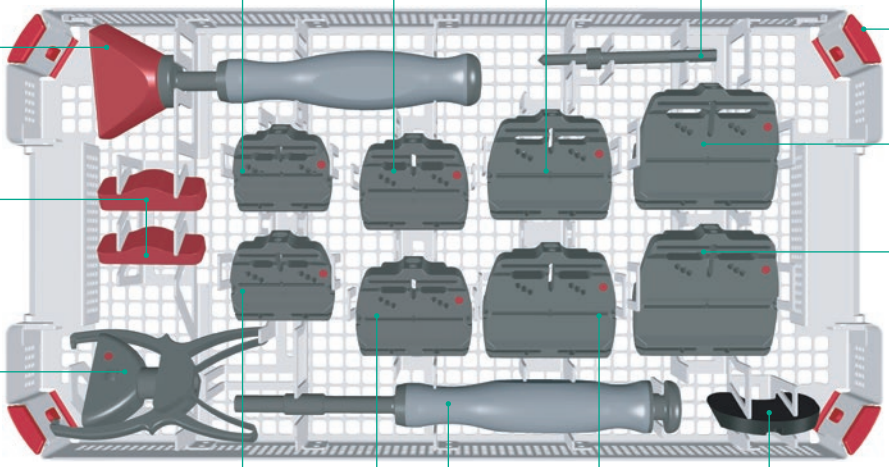
NS423R
Screw driver SW 3.5 (optional)

TF162
Graphic template F/ NQ1012R (NQ1002)

JA455R
Lid for tray

AESCULAP® Columbus®

NQ1003 | IQ Columbus® SET FEMUR PREPARATION



NQ1041R
IQ Columbus® 4-in-1 femur cutting guide F1

NQ1043R
IQ Columbus® 4-in-1 femur cutting guide F3

NQ1045R
IQ Columbus® 4-in-1 femur cutting guide F5

NQ449R
Columbus® drill with stop Ø 6.0 mm

NS424
IQ femoral component impactor

NQ1031–NQ1032
IQ Columbus® insert femur for NS600R small / large

NS600R
IQ implant holding / insertion instrument

NQ1013R
Tray femur preparation

NQ1047R
IQ Columbus® 4-in-1 femur cutting guide F7

NQ1048R
IQ Columbus® 4-in-1 femur cutting guide F8

TF163
Graphic template

JA455R
Lid for tray

NQ1042R
IQ Columbus® 4-in-1 femur cutting guide F2

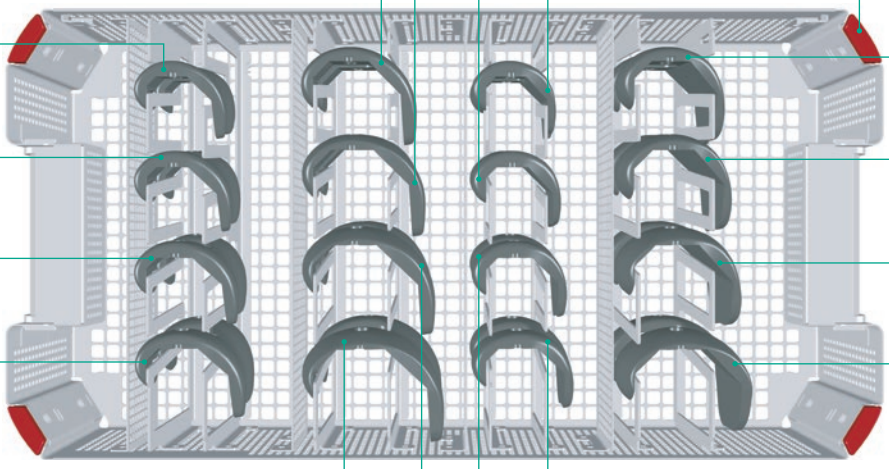
NQ1044R
IQ Columbus® 4-in-1 femur cutting guide F4

NS600R
IQ implant holding / insertion instrument

NQ1046R
IQ Columbus® 4-in-1 femur cutting guide F6

NS498
Spacer for added femur cuts

NQ1004 | IQ Columbus® SET TRIAL FEMUR COMPONENTS STANDARD



NQ456R
Columbus® trial femur component F6L

NQ462R
Columbus® trial femur component F2R

NQ455R
Columbus® trial femur component F5L

NQ461R
Columbus® trial femur component F1R

NQ1014R
Tray trial femur components standard

NQ451R
Columbus® trial femur component F1L

NQ452R
Columbus® trial femur component F2L

NQ453R
Columbus® trial femur component F3L

NQ454R
Columbus® trial femur component F4L

NQ465R
Columbus® trial femur component F5R

NQ466R
Columbus® trial femur component F6R

NQ467R
Columbus® trial femur component F7R

NQ468R
Columbus® trial femur component F8R

TF164
Graphic template

JA455R
Lid for tray

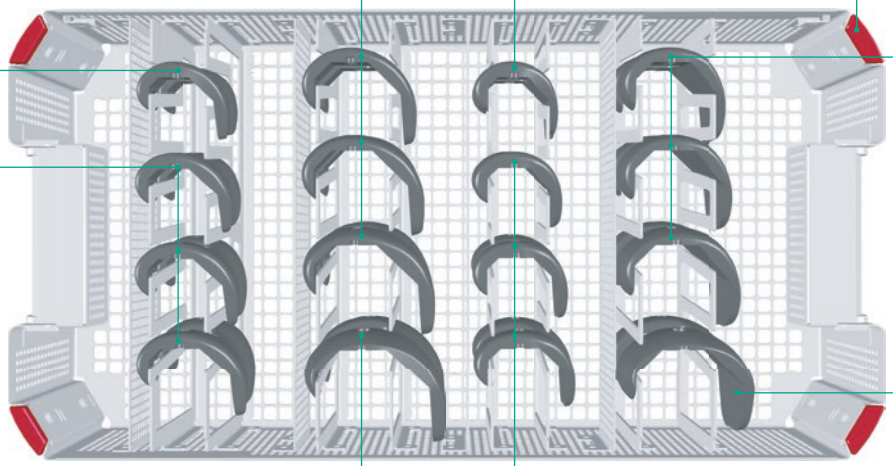
NQ458R
Columbus® trial femur component F8L

NQ464R
Columbus® trial femur component F4R

NQ457R
Columbus® trial femur component F7L

NQ463R
Columbus® trial femur component F3R

NQ1024 | IQ Columbus® SET TRIAL FEMUR COMPONENTS NARROW



NQ1055R–NQ1057R
IQ Columbus® narrow trial femur component L F5N-F7N

NQ461R
IQ Columbus® trial femur component F1R

NQ1034R
Tray trial femur components narrow

NQ1065R–NQ1067R
IQ Columbus® narrow trial femur component R F5N-F7N

NQ451R
IQ Columbus® trial femur component F1L

NQ1052R–NQ1054R
IQ Columbus® narrow trial femur component L F2N-F4N

NQ468R
IQ Columbus® trial femur component F8R

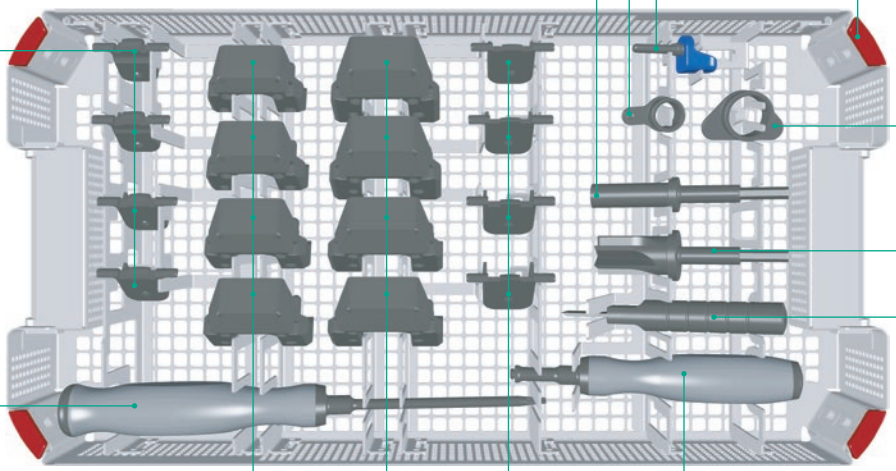
NQ458R
IQ Columbus® trial femur component F8L

NQ1062R–NQ1064R
IQ Columbus® narrow trial femur component R F2N-F4N

TF174
Graphic template

JA455R
Lid for tray

NQ1010 | IQ Columbus® SET PREPARATION INSTRUMENTS PS



NQ589R
Target device Ø 14 mm for femoral box preparation

NQ590R
Reamer with stop Ø 14 mm

NQ499RM
PS tibial trial peg

NQ1020R
Tray preparation instruments PS

NQ581T–NQ584T
Trial femur box F1-F4

NQ591R
Target device Ø 22.5 mm for femoral box preparation

NQ592R
Reamer with stop Ø 22.5 mm

NQ593R
Blade chisel

NQ1070R
PS screw driver

NQ571R–NQ574R
PS femoral box preparation guide F1-F4

NQ575R–NQ578R
PS femoral box preparation guide F5-F8

NQ585T–NQ588T
Trial femur box F5-F8

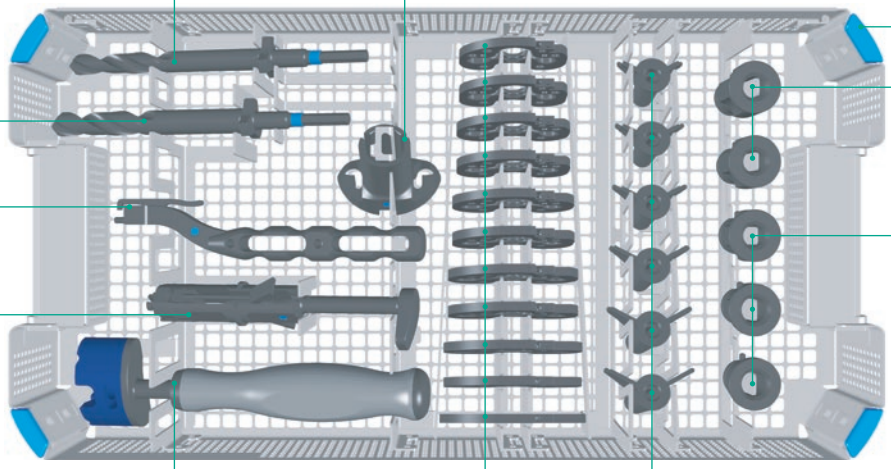
NS428R
Femur gauge holder/ extractor

TF170
Graphic template

JA455R
Lid for tray

AESCULAP® Columbus®

NQ1005 | IQ Columbus® SET TIBIA PREPARATION



NQ1116R
Drill with stop
Ø 12 mm

NQ1096R
IQ Columbus®
guide for winglet
rasp / trial keel

NQ1126R
Drill with stop Ø 14 mm

NQ378R
Columbus® tibial trial /
preparation plateau holder

NQ1097R
IQ Columbus® winglet
impactor / extractor

NQ1015R
Tray tibia preparation

NQ1125R–NQ1124R
IQ Columbus® tibia
drill sleeve Ø 14 mm
T5-T4 / T4+

NQ1113R–NQ1111R
IQ Columbus® tibia
drill sleeve Ø 12 mm
T3 / T3+-T0-T1+

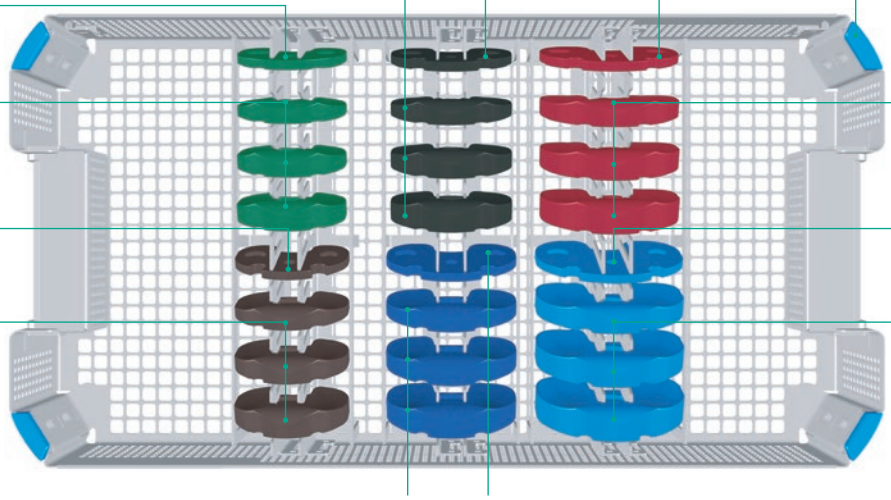
NS425
IQ tibial plateau
impactor

NQ1079R–
NQ1089R
IQ Columbus® tibia
trial / preparation
plateau T0-T5

NQ1090R–
NQ1095R
IQ Columbus®
winglet rasp / trial
keel T0 / 0+-T5

TF165
Graphic template
JA455R
Lid for tray

NQ1006 | IQ Columbus® SET TRIAL GLIDING SURFACES CR DD



NQ525–NQ527
Columbus® CR / PS trial
gliding surfaces T2 / 2+
10 mm, 12 mm, 14 mm

NQ524
Columbus® CR / PS
trial spacer 6 mm
T2 / 2+

NQ544
Columbus® CR / PS
trial spacer 6 mm
T4 / 4+

NQ504
Columbus® CR / PS trial
spacer 6 mm T0 / 0+

NQ505–NQ507
Columbus® CR / PS trial
gliding surfaces T0 / 0+
10 mm, 12 mm, 14 mm

NQ514
Columbus® CR / PS trial
spacer 6 mm T1 / 1+

NQ515–NQ517
Columbus® CR / PS trial
gliding surfaces T1 / 1+
10 mm, 12 mm, 14 mm

NQ1016R
Tray trial gliding surfaces
CR DD

NQ545–NQ547
Columbus® CR / PS trial
gliding surfaces T4 / 4+
10 mm, 12 mm, 14 mm

NQ554
Columbus® CR / PS trial
spacer 6 mm T5

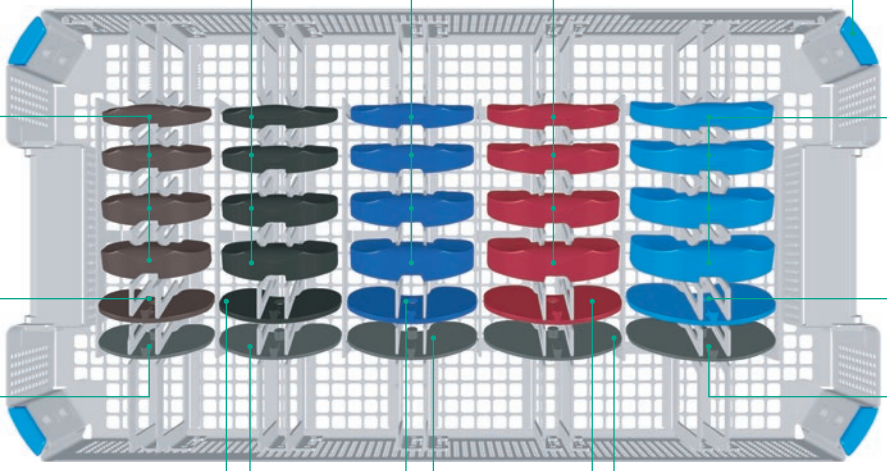
NQ555–NQ557
Columbus® CR / PS trial
gliding surfaces T5
10 mm, 12 mm, 14 mm

NQ535–NQ537
Columbus® CR / PS trial
gliding surfaces T3 / 3+
10 mm, 12 mm, 14 mm

NQ534
Columbus® CR / PS trial
spacer 6 mm T3 / 3+

TF166
Graphic template
JA455R
Lid for tray

NQ1007 | IQ Columbus® SET TRIAL GLIDING SURFACES RP



NQ1320–NQ1323
Columbus® trial gliding surface T2/T2+ 10 mm, 12 mm, 14 mm, 16 mm

NQ1330–NQ1333
Columbus® trial gliding surface T3/T3+ 10 mm, 12 mm, 14 mm, 16 mm

NQ1340–NQ1343
Columbus® trial gliding surface T4/T4+ 10 mm, 12 mm, 14 mm, 16 mm

NQ1017R
Tray trial gliding surfaces RP

NQ1310–NQ1313
Columbus® trial gliding surface T1/T1+ 10 mm, 12 mm, 14 mm, 16 mm

NQ1350–NQ1353
Columbus® trial gliding surface T5 10 mm, 12 mm, 14 mm, 16 mm

NQ1381
Columbus® RP insert tibia/surf. gl. T1/T1+

NQ1385
Columbus® RP insert tibia/surf. gl. T5

NQ1391R
Insert tibia gliding surface RP T1/T1+

NQ1395R
Insert tibia gliding surface RP T5

NQ1392R
Insert tibia gliding surface RP T2/T2+

NQ1393R
Insert tibia gliding surface RP T3/T3+

NQ1394R
Insert tibia gliding surface RP T4/T4+

TF167
Graphic template

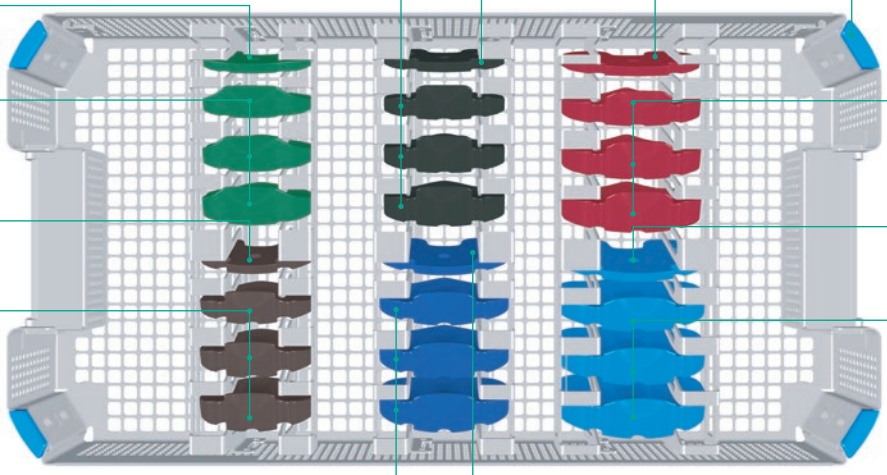
JA455R
Lid for tray

NQ1382
Columbus® RP insert tibia/surf. gl. T2/T2+

NQ1383
Columbus® RP insert tibia/surf. gl. T3/T3+

NQ1384
Columbus® RP insert tibia/surf. gl. T4/T4+

NQ1008 | IQ Columbus® SET TRIAL GLIDING SURFACES UC



NQ325–NQ327
Columbus® UC trial gliding surfaces T2/2+ 10 mm, 12 mm, 14 mm

NQ524
Columbus® CR/PS trial spacer 6 mm T2/2+

NQ544
Columbus® CR/PS trial spacer 6 mm T4/4+

NQ1018R
Tray trial gliding surfaces UC

NQ504
Columbus® CR/PS trial spacer 6 mm T0/0+

NQ305–NQ307
Columbus® UC trial gliding surfaces T0/0+ 10 mm, 12 mm, 14 mm

NQ345–NQ347
Columbus® UC trial gliding surfaces T4/4+ 10 mm, 12 mm, 14 mm

NQ514
Columbus® CR/PS trial spacer 6 mm T1/1+

NQ554
Columbus® CR/PS trial spacer 6 mm T5

NQ315–NQ317
Columbus® UC trial gliding surfaces T1/1+ 10 mm, 12 mm, 14 mm

NQ355–NQ357
Columbus® UC trial gliding surfaces T5 10 mm, 12 mm, 14 mm

NQ335–NQ337
Columbus® UC trial gliding surfaces T3/3+ 10 mm, 12 mm, 14 mm

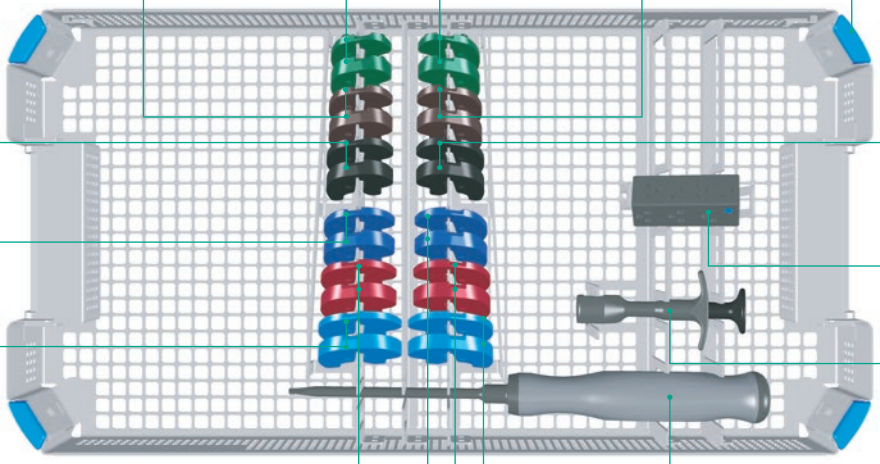
NQ534
Columbus® CR/PS trial spacer 6 mm T3/3+

TF168
Graphic template

JA455R
Lid for tray

AESCULAP® Columbus®

NQ1009 | IQ Columbus® SET INSTRUMENTS FOR TIBIA HEMI SPACER



NQ1163–NQ1164
Columbus® trial hemi spacer T1/1+ RM/LL 4 mm, 8 mm

NQ1160–NQ1161
Columbus® trial hemi spacer T0/0+ RM/LL 4 mm, 8 mm

NQ1180–NQ1181
Columbus® trial hemi spacer T0/0+ RL/LM 4 mm, 8 mm

NQ1183–NQ1184
Columbus® trial hemi spacer T1/1+ RL/LM 4 mm, 8 mm

NQ1019R
Tray instruments for tibia hemi spacer

NQ1166–NQ1167
Columbus® trial hemi spacer T2/2+ RM/LL 4 mm, 8 mm

NQ1169–NQ1170
Columbus® trial hemi spacer T3/3+ RM/LL 4 mm, 8 mm

NQ1175–NQ1176
Columbus® trial hemi spacer T5 RM/LL 4 mm, 8 mm

NQ1186–NQ1187
Columbus® trial hemi spacer T2/2+ RL/LM 4 mm, 8 mm

NQ1078R
IQ Columbus® tibia pin drill guide 18.5 mm

NP744R
Tibia plug remover

NQ1172–NQ1173
Columbus® trial hemi spacer T4/4+ RM/LL 4 mm, 8 mm

NQ1195–NQ1196
Columbus® trial hemi spacer T5 RL/LM 4 mm, 8 mm

NQ1070R
PS screw driver

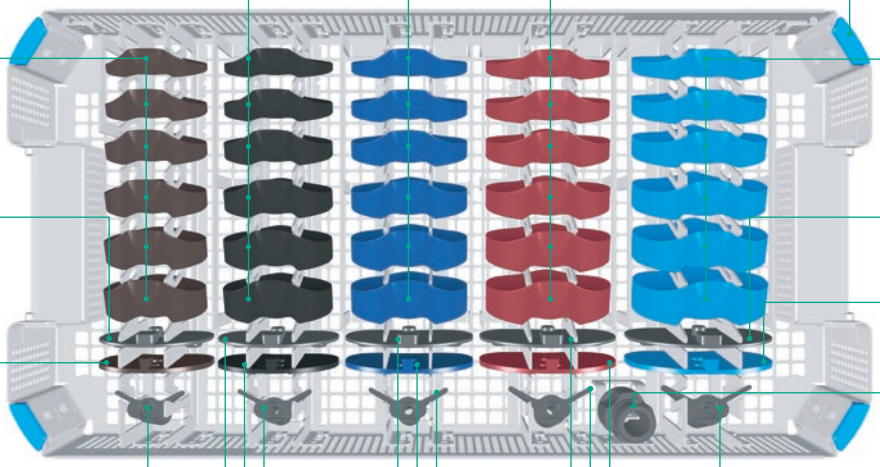
TF169
Graphic template

JA455R
Lid for tray

NQ1192–NQ1193
Columbus® trial hemi spacer T4/4+ RL/LM 4 mm, 8 mm

NQ1189–NQ1190
Columbus® trial hemi spacer T3/3+ RL/LM 4 mm, 8 mm

NQ1025 | IQ Columbus® SET PREPARATION INSTRUMENTS UCR



NQ1220–NQ1225
Columbus® UCR trial gliding surface T2
10 mm, 12 mm, 14 mm, 16 mm, 18 mm, 20 mm

NQ1230–NQ1235
Columbus® UCR trial gliding surface T3
10 mm, 12 mm, 14 mm, 16 mm, 18 mm, 20 mm

NQ1240–NQ1245
Columbus® UCR trial gliding surface T4
10 mm, 12 mm, 14 mm, 16 mm, 18 mm, 20 mm

NQ1035R
Tray preparation instruments UCR

NQ1210–NQ1215
Columbus® UCR trial gliding surface T1 10 mm, 12 mm, 14 mm, 16 mm, 18 mm, 20 mm

NQ1291R
Columbus® UCR insert trial gliding surface T1/T1+

NS201
Columbus® UCR insert tibia/gliding surface T1/1+

NQ1250–NQ1255
Columbus® UCR trial gliding surface T5 10 mm, 12 mm, 14 mm, 16 mm, 18 mm, 20 mm

NQ1295R
Columbus® UCR insert trial gliding surface T5

NS205
Columbus® UCR insert tibia/gliding surface T5/5+

NQ1121R
IQ Columbus® tibia drill sleeve Ø 14 mm T0-1+

NQ1091R
IQ Columbus® winglet rasp/trial keel T1/T1+

NQ1272R
Columbus® UCR tibial broach T2/T2+

NQ1273R
Columbus® UCR tibial broach T3/T3+

NS204
Columbus® UCR insert tibia/gliding surface T4/T4+

NQ1275R
Columbus® UCR tibial broach T5

TF175
Graphic template

JA455R
Lid for tray

NS202
Columbus® UCR insert tibia/gliding surface T2/T2+

NS203
Columbus® UCR insert tibia/gliding surface T3/T3+

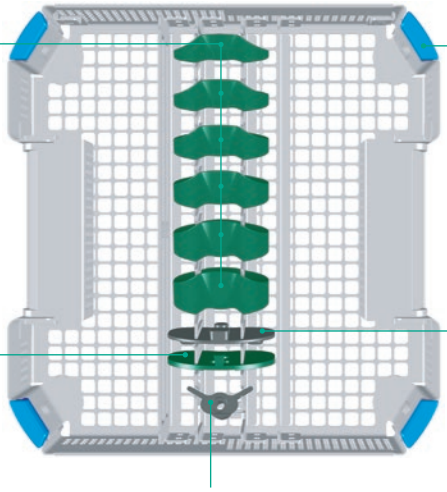
NQ1274R
Columbus® UCR tibial broach T4/T4+

NQ1292R
Columbus® UCR insert trial gliding surface T2/T2+

NQ1293R
Columbus® UCR insert trial gliding surface T3/T3+

NQ1294R
Columbus® UCR insert trial gliding surface T4/T4+

NQ1027 | IQ Columbus® SET PREPARATION INSTRUMENTS UCR T0/T0+



NQ1200–NQ1205
Columbus® UCR trial gliding surface T0 10 mm, 12 mm, 14 mm, 16 mm, 18 mm, 20 mm

NQ1037R
Tray preparation instruments UCR T0/T0+

NS200
Columbus® UCR insert tibia/gliding surface T0/T0+

NQ1290R
Columbus® UCR insert trial gliding surface T0/T0+

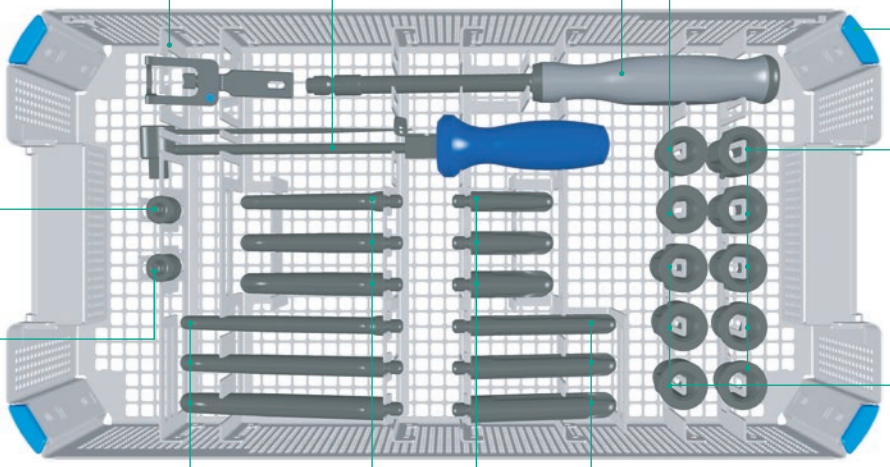
NQ1090R
IQ Columbus® winglet rasp/trial keel T0/T0+

TF210
Graphic template

JA415R
Lid for tray

AESCULAP® Columbus®

NQ1026 | IQ Columbus® SET STEM PREPARATION



NS390R
IQ counter torque for stem fixation

NE184RM
Torque wrench 20/27 nm

NS390R
IQ counter torque for stem fixation

NQ1114R–NQ1115R
IQ Columbus® tibia drill sleeve Ø 12 mm T4/4+–T5

NQ1036R
Tray stem preparation

NQ1131R–NQ1135R
IQ Columbus® tibia drill sleeve Ø 16 mm T0–1+, T2/2+, T3/3+, T4/4+, T5

NS835R
IQ adapter SW 5.0 for extention stems for NE184RM

NE185R
e.motion® adapter for extention stems for NE184R

NQ1121R–NQ1123R
IQ Columbus® tibia drill sleeve Ø 14 mm T0–1+, T2/2+, T3/3+

TF176
Graphic template

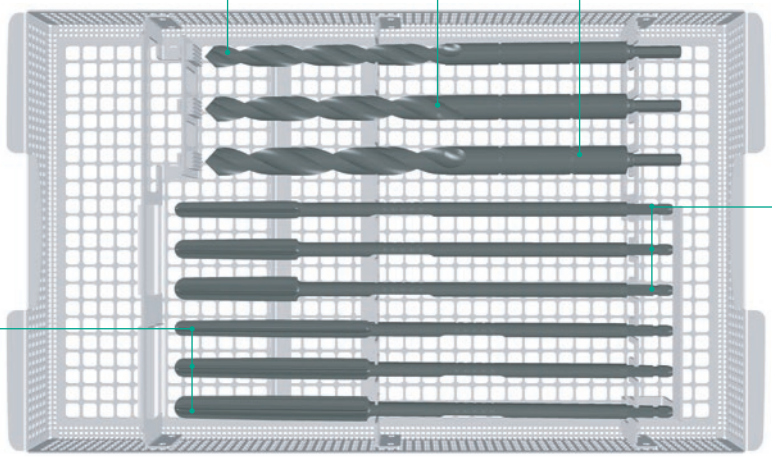
JA455R
Lid for tray

NS397T–NS399T
IQ trial stem long cementless Ø 10 mm, 12 mm, 14 mm

NS394T–NS396T
IQ trial stem short cementless Ø 10 mm, 12 mm, 14 mm

NS384T–NS386T
IQ trial stem short cemented Ø 12 mm, 14 mm, 16 mm

NS387T–NS389T
IQ trial stem long cemented Ø 12 mm, 14 mm, 16 mm



NS376R
VEGA System® PS drill for extension stem Ø 12 mm

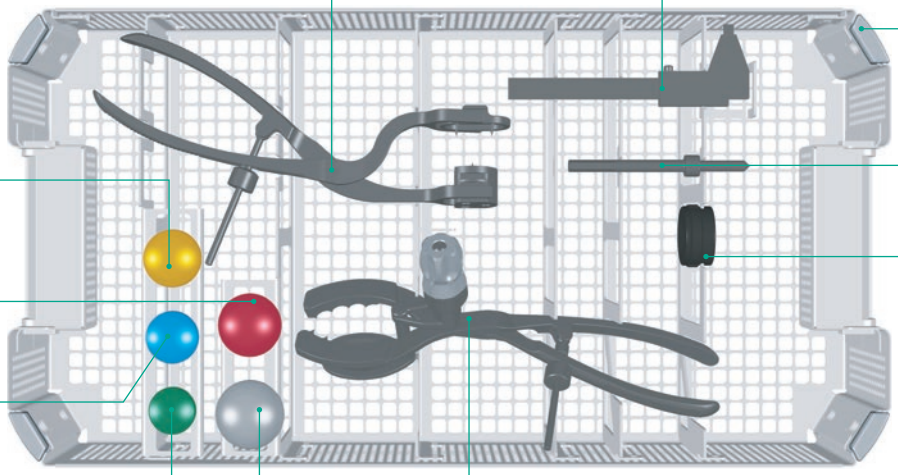
NS377R
VEGA System® PS drill for extension stem Ø 14 mm

NS380R
VEGA System® PS drill for extension stem Ø 16 mm

NQ1151R–NQ1153R
Reamer for trial stem cementless short Ø 10 mm, 12 mm, 14 mm

NQ1154R–NQ1156R
Reamer for trial stem cementless long Ø 10 mm, 12 mm, 14 mm

NS709 | PATELLA PREPARATION



NS841R
Patella drilling and impacting clamp

AA847R
Caliper

NS719R
Tray patella preparation

NQ449R
Drill with stop
Ø 6 x 28 mm

NS842
Insert for NS841R

NQ283
Trial patella 3 pegs P3
Ø 32 x 9 mm

NQ284
Trial patella 3 pegs P4
Ø 35 x 10 mm

NQ282
Trial patella 3 pegs P2
Ø 29 x 8 mm

NQ281
Trial patella 3 pegs P1
Ø 26 x 7 mm

NQ285
Trial patella 3 pegs P5
Ø 38 x 11 mm

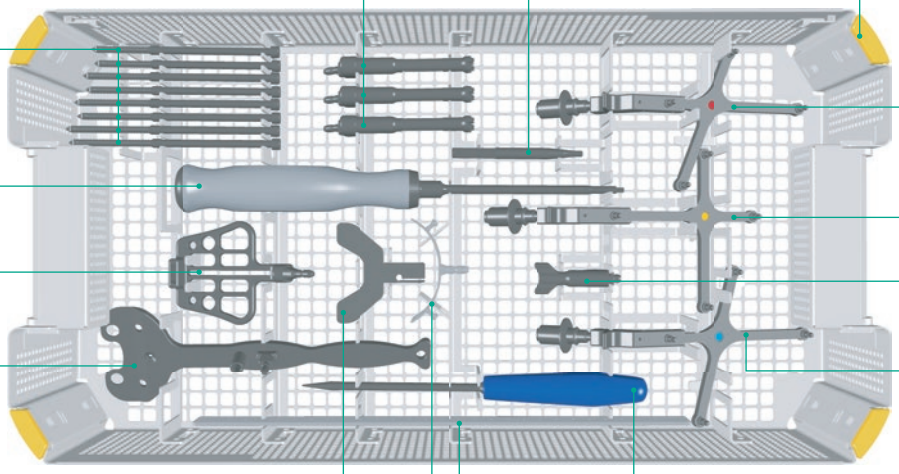
NS840R
Patella resection clamp

TF069
Graphic template

JA455R
Lid for tray

AESCULAP® Columbus®

NP138 | OrthoPilot® TKA NAVIGATION INSTRUMENTS



NP619R
Transmitter mounting sleeve

NE358R
Screw driver bit torx SW 3.5

NP620R–NP623R
Bicortical screw 30 mm, 35 mm, 40 mm, 45 mm

NS423R
Screw driver SW 3.5

NS320R
Navigated femur alignment block

NP617RM
Tibia cut check plate

NP139R
Tray IQ navigation instruments

FS635
Passive transmitter red

FS633
Passive transmitter yellow

FS626R
Rigid body adapter modular

FS634
Passive transmitter blue

NQ958R
Y-footplate for alignment block

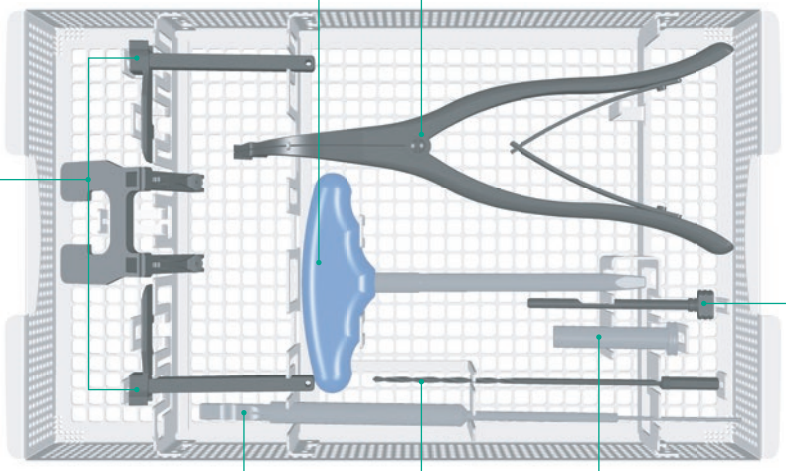
NM743
Elastic foot strap (optional)

FS604
Straight pointer

NM769R
Transmitter foot plate (optional)

TF149
Graphic template

JA455R
Lid for tray



NQ940R
Soft tissue protector handle for transmitter screw (optional)

NP609R
Distraction clamp for NE750R

NE750R
Femur-tibia distractor

NP616R
Bicortical screw drill guide

NP281R
Screw length measuring device (optional)

NP615R
Bicortical screw drill Ø 3.2 mm

NQ941R
Soft tissue protector for transmitter screw (optional)

NOTES

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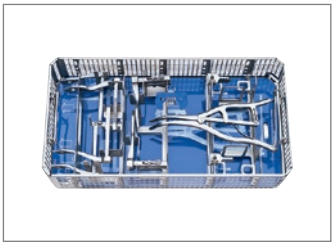
GENERAL

NP609R distractor clamp

NP604R femur-tibia distractor



NM640 force controlled spreader set

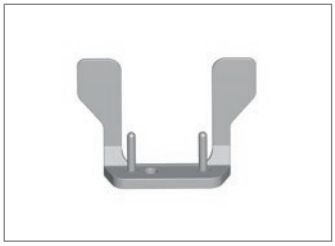
NE150R leg positioner for TKA
NE153R fixation frame

Pin set (NP742R, NP743R, NP748R, NP749R, NP750R)

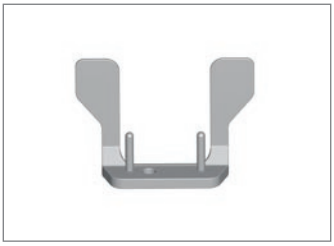
NE332R alignment rod with sleeve 400 mm (storage in set NQ1001)

NE456R alignment control plate (storage in set NQ1001)

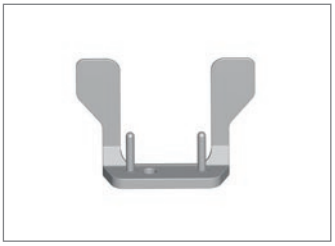
FEMUR



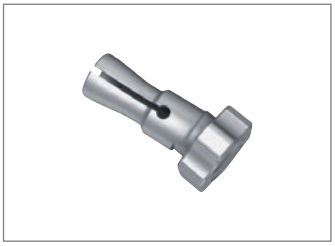
NQ1072R posterior femur plate neutral



NQ1073R posterior femur plate 3° left



NQ1074R posterior femur plate 3° right



NS578R IQ femur IM orientation sleeve 8° (storage in set NQ1002)

NS579R IQ femur IM orientation sleeve 9° (storage in set NQ1002)

NS333R IQ distal femur contact plate

TIBIA

NS844R IQ tibia IM orientation sleeve 3° (storage in set NQ1002)

NS845R IQ tibia IM orientation sleeve 5° (storage in set NQ1002)

NS846R IQ tibia IM orientation sleeve 7° (storage in set NQ1002)

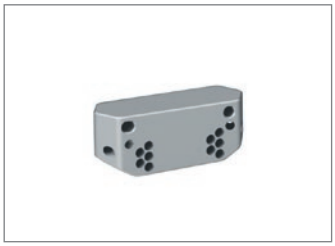
NS374R tibial plateau holder/impactor

NS406R medialised cutting guide left

NS407R medialised cutting guide right

NS863R FGT tibia EM alignment system (storage in set NQ1002)*

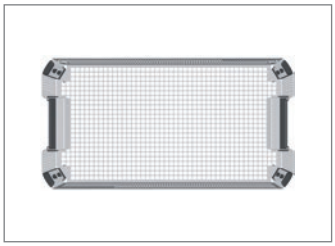
NE425R tibia stylus (storage in set NQ1002)



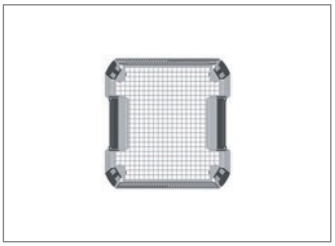
NS861R FGT tibial correction cutting guide 2° var/val

NS879R IQ FGT counter guide for NS861R

STORAGE OPTIONAL INSTRUMENTS



NQ1429R tray optional instruments large, lid JA455R



NE1029R tray optional instruments small, lid JA415R

NOTE
For the optional trays the following containers and lids are recommended:
NQ1429R: Container JK442, Lid JK489
NE1029R: Container JK342, Lid JK389

** For assembly instructions please refer to IQ e.motion® FGT surgical technique brochure O47302*

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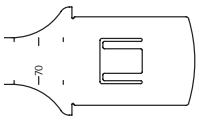
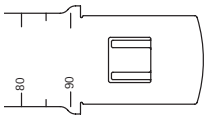
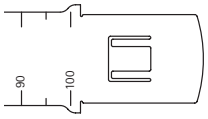
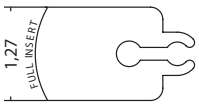
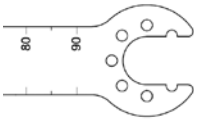
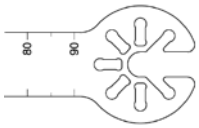
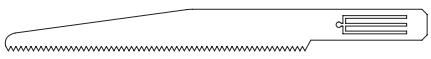
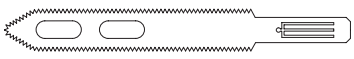
System	Item No.	Width	Thickness	Sawblades 1 sterile ②
Aesculap Acculan Length 75 mm	GE231SU	9 mm	1.27 mm	
Aesculap Acculan Length 90 mm	GE233SU	13.5 mm	1.27 mm	
	GE236SU	13 mm	1.27 mm	
	GE241SU	19 mm	1.27 mm	
	GE246SU	23 mm	1.27 mm	
Aesculap Acculan Length 100 mm	GE249SU	19 mm	1.27 mm	
Stryker System 2000, System 6-8 Length 90 mm	GE330SU	13 mm	1.27 mm	
	GE331SU	19 mm	1.27 mm	
	GE332SU	25 mm	1.27 mm	
DePuy Synthes **Trauma Recon System** **Battery Power Line II** Length 90 mm	GE323SU	13 mm	1.27 mm	
Zimmer Biomet Universal Length 90 mm	GE326SU	25 mm	1.27 mm	
Conmed Mpower 2 Length 90 mm	GE327SU	13 mm	1.27 mm	
	GE329SU	25 mm	1.27 mm	

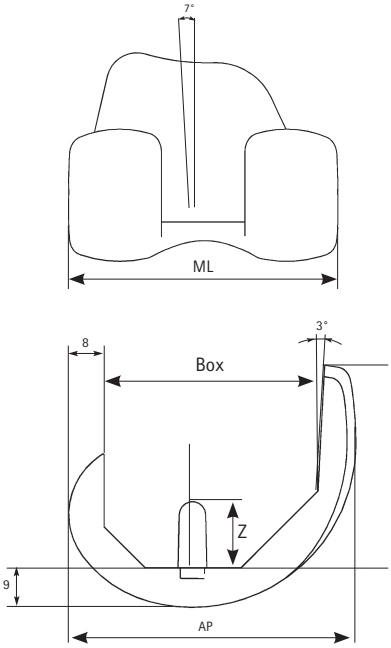
You will find the sawblades with Aesculap coupling in our Burrs & Blades catalog O17599.

System	Sawblades for reciprocating saws 75/10/1.0/1.2 mm	Sawblade for reciprocating saws 75/12/1.0/1.2 mm
Acculan	 GC769R	 GC771R

FEMORAL COMPONENT

Dimensions in mm

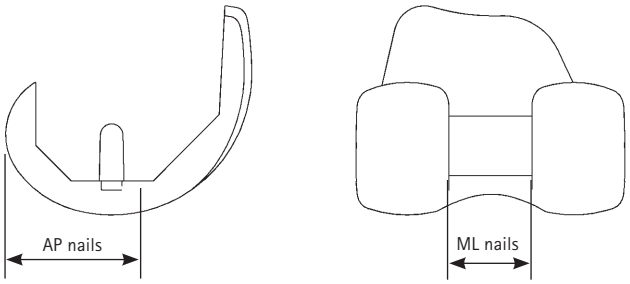
Size	ML	AP	Box	Peg Z
F1	56	50	34	12
F2N	56	53	37	13.5
F2	59	53	37	13.5
F3N	59	56.5	40	15
F3	62.5	56.5	40	15
F4N	62.5	60.5	43.5	15
F4	66.5	60.5	43.5	15
F5N	66.5	65	47.5	15
F5	71	65	47.5	15
F6N	71	70	52	15
F6	76	70	52	15
F7N	76	75.5	57	15
F7	82	75.5	57	15
F8	82	80.5	62	15



FEMORAL IMPLANTS FOR COMBINED USE WITH INTRAMEDULLARY NAILS

Dimensions in mm

	AP nails CR	AP nails PS	ML nails
F1	22.5	31	18
F2 / F2N	24	32.5	19
F3 / F3N	26	34	20.5
F4 / F4N	28	36	21
F5 / F5N	30	38	22
F6 / F6N	32.5	40.5	23
F7 / F7N	35	42.5	25
F8	39	47	25



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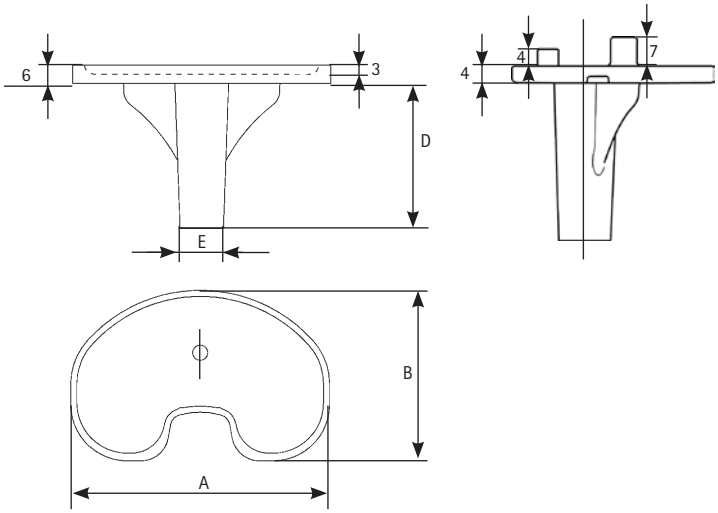
20 | DIMENSIONS

TIBIAL COMPONENT

Dimensions in mm

	T0/T0+	T1/T1+	T2/T2+	T3/T3+	T4/T4+	T5
A	62	65	70	75	80	85
B	41/44	43/46	45/49	48/52	51/55	56
D	28	28	33	38	43	48
D_{UCR}	28	28	28	28	28	28
E	12.3	12.3	12.3	12.3	14.3	14.3

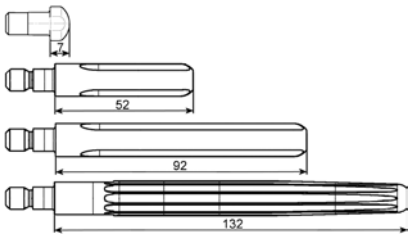


21 | OVERVIEW OF EXTENSION STEM LENGTHS

EXTENSION STEM LENGTHS

Dimensions in mm

	T0/T0+	T1/T1+	T2/T2+	T3/T3+	T4/T4+	T5
D	28	28	33	38	43	48
D + Stem 52 mm	80	80	85	90	95	100
D + Stem 92 mm	120	120	125	130	135	140
D + Stem 132 mm	160	160	165	170	175	180



The overall length of the tibia plateau with the respective extension stem is given by the tibia keel length (dimension D) and the obturator 7 mm or the stem length 52, 92 or 132 mm.

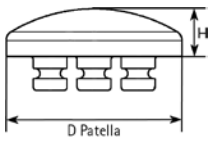
Obturator screws are available in diameters 12 and 14 mm.
All extension stems are available in diameters 10, 12 and 14 mm.

22 | OVERVIEW OF PATELLA SIZES

PATELLA COMPONENT

Dimensions in mm

	Patella P1	Patella P2	Patella P3	Patella P4	Patella P5
D Patella x H	Ø 26 x 7	Ø 29 x 8	Ø 32 x 9	Ø 35 x 10	Ø 38 x 11



TIBIA CEMENTED


CR / PS


CRA / PSA


RP


UCR

Types:	T0	T0+	T1	T1+	T2	T2+	T3	T3+	T4	T4+	T5
CR / PS CoCr	NN070K	NN058K	NN071K	NN072K	NN073K	NN074K	NN075K	NN076K	NN077K	NN078K	NN079K
CR / PS AS	NN070Z	NN058Z	NN071Z	NN072Z	NN073Z	NN074Z	NN075Z	NN076Z	NN077Z	NN078Z	NN079Z
CRA / PSA CoCr	NN470K	NN469K	NN471K	NN472K	NN473K	NN474K	NN475K	NN476K	NN477K	NN478K	NN479K
CRA / PSA AS	–	–	NN471Z	NN472Z	NN473Z	NN474Z	NN475Z	NN476Z	NN477Z	NN478Z	NN479Z
RP CoCr	–	–	NN271K	NN272K	NN273K	NN274K	NN275K	NN276K	NN277K	NN278K	NN279K
RP AS	–	–	NN271Z	NN272Z	NN273Z	NN274Z	NN275Z	NN276Z	NN277Z	NN278Z	NN279Z
UCR CoCr	NN670K	NN668K	NN671K	NN672K	NN673K	NN674K	NN675K	NN676K	NN677K	NN678K	NN679K

TIBIA CEMENTLESS


CR / PS

Types:	T0	T0+	T1	T1+	T2	T2+	T3	T3+	T4	T4+	T5
CR / PS CoCr	–	–	NN081K	NN082K	NN083K	NN084K	NN085K	NN086K	NN087K	NN088K	NN089K

TIBIA STEMS CEMENTED

Types:	Ø 10 mm		Ø 12 mm		Ø 14 mm	
	52 mm	92 mm	52 mm	92 mm	52 mm	92 mm
T0-T5 CoCr	NX060K	NX061K	NX062K	NX064K	NX063K	NX065K
T0-T5 AS	NX060Z	NX061Z	NX062Z	NX064Z	NX063Z	NX065Z

TIBIA STEMS CEMENTLESS

Types:	Ø 10 mm		Ø 12 mm		Ø 14 mm	
	92 mm	132 mm	92 mm	132 mm	92 mm	132 mm
T0-T5 CoCr	NX082K	NX083K	NX084K	NX086K	NX085K	NX087K
T0-T5 AS	NX082Z	NX083Z	NX084Z	NX086Z	NX085Z	NX087Z

OBTURATOR

Types:	Ø 12 mm	Ø 14 mm
T0-T3+ CoCr	NN261K	
T0-T3+ AS	NN261Z	
T4-T5 CoCr		NN264K
T4-T5 AS		NN264Z

PEEK PLUG

Types:	Ø 14 mm
T0-T5	NN260P

AS FIXATION SCREW FOR PS GLIDING SURFACES

Types:	
10 / 12	NN497Z
14 / 16	NN498Z
18 / 20	NN499Z

(CoCr version packed with gliding surface)

CRA / PSA TIBIA HEMI SPACERS WITH SCREWS

Types:	4 mm					
	T0	T1	T2	T3	T4	T5
RM / LL CoCr	NN560K	NN563K	NN566K	NN569K	NN572K	NN575K
RM / LL AS	–	NN563Z	NN566Z	NN569Z	NN572Z	NN575Z
RL / LM CoCr	NN580K	NN583K	NN586K	NN589K	NN592K	NN595K
RL / LM AS	–	NN583Z	NN586Z	NN589Z	NN592Z	NN595Z

Types:	8 mm					
	T0	T1	T2	T3	T4	T5
RM / LL CoCr	NN561K	NN564K	NN567K	NN570K	NN573K	NN576K
RM / LL AS	–	NN564Z	NN567Z	NN570Z	NN573Z	NN576Z
RL / LM CoCr	NN581K	NN584K	NN587K	NN590K	NN593K	NN596K
RL / LM AS	–	NN584Z	NN587Z	NN590Z	NN593Z	NN596Z

GLIDING SURFACES


DD


UC


UCR

RP


PS

T0/T0+							T1/T1+					
Types:	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm
DD	NN200	NN201	NN202	NN203	NN204	NN205	NN210	NN211	NN212	NN213	NN214	NN215
UC fix.	NN400	NN401	NN402	NN403	NN404	NN405	NN410	NN411	NN412	NN413	NN414	NN415
UCR	NN600	NN601	NN602	NN603	NN604	NN605	NN610	NN611	NN612	NN613	NN614	NN615
RP	–	–	–	–	–	–	NN310	NN311	NN312	NN313	–	–
PS	NN500	NN501	NN502	NN503	NN504	NN505	NN510	NN511	NN512	NN513	NN514	NN515

T2/T2+							T3/T3+					
Types:	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm
DD	NN220	NN221	NN222	NN223	NN224	NN225	NN230	NN231	NN232	NN233	NN234	NN235
UC fix.	NN420	NN421	NN422	NN423	NN424	NN425	NN430	NN431	NN432	NN433	NN434	NN435
UCR	NN620	NN621	NN622	NN623	NN624	NN625	NN630	NN631	NN632	NN633	NN634	NN635
RP	NN320	NN321	NN322	NN323	–	–	NN330	NN331	NN332	NN333	–	–
PS	NN520	NN521	NN522	NN523	NN524	NN525	NN530	NN531	NN532	NN533	NN534	NN535

T4/T4+							T5					
Types:	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm
DD	NN240	NN241	NN242	NN243	NN244	NN245	NN250	NN251	NN252	NN253	NN254	NN255
UC fix.	NN440	NN441	NN442	NN443	NN444	NN445	NN450	NN451	NN452	NN453	NN454	NN455
UCR	NN640	NN641	NN642	NN643	NN644	NN645	NN650	NN651	NN652	NN653	NN654	NN655
RP	NN340	NN341	NN342	NN343	–	–	NN350	NN351	NN352	NN353	–	–
PS	NN540	NN541	NN542	NN543	NN544	NN545	NN550	NN551	NN552	NN553	NN554	NN555

FEMUR CR CEMENTED

Types:	F1	F2N	F2	F3N	F3	F4N	F4	F5N	F5	F6N
Left CoCr	NN001K	NN800K	NN002K	NN801K	NN003K	NN899K	NN004K	NN900K	NN005K	NN901K
Left AS	NN001Z	NN800Z	NN002Z	NN801Z	NN003Z	NN899Z	NN004Z	NN900Z	NN005Z	NN901Z
Right CoCr	NN011K	NN810K	NN012K	NN811K	NN013K	NN909K	NN014K	NN910K	NN015K	NN911K
Right AS	NN011Z	NN810Z	NN012Z	NN811Z	NN013Z	NN909Z	NN014Z	NN910Z	NN015Z	NN911Z

Types:	F6	F7N	F7	F8
Left CoCr	NN006K	NN009K	NN007K	NN008K
Left AS	NN006Z	NN009Z	NN007Z	NN008Z
Right CoCr	NN016K	NN019K	NN017K	NN018K
Right AS	NN016Z	NN019Z	NN017Z	NN018Z

FEMUR PS CEMENTED

Types:	F1	F2N	F2	F3N	F3	F4N	F4	F5N	F5	F6N
Left CoCr	NN161K	NN840K	NN162K	NN841K	NN163K	NN939K	NN164K	NN940K	NN165K	NN941K
Left AS	NN161Z	–	NN162Z	–	NN163Z	–	NN164Z	–	NN165Z	–
Right CoCr	NN171K	NN850K	NN172K	NN851K	NN173K	NN949K	NN174K	NN950K	NN175K	NN951K
Right AS	NN171Z	–	NN172Z	–	NN173Z	–	NN174Z	–	NN175Z	–

Types:	F6	F7	F8
Left CoCr	NN166K	NN167K	NN168K
Left AS	NN166Z	NN167Z	–
Right CoCr	NN176K	NN177K	NN178K
Right AS	NN176Z	NN177Z	–

FEMUR CR CEMENTLESS

Types:	F1	F2N	F2	F3N	F3	F4N	F4	F5N	F5	F6N
CoCr left	NN021K	NN820K	NN022K	NN821K	NN023K	NN919K	NN024K	NN920K	NN025K	NN921K
CoCr right	NN031K	NN830K	NN032K	NN831K	NN033K	NN929K	NN034K	NN930K	NN035K	NN931K

Types:	F6	F7N	F7	F8
CoCr left	NN026K	NN029K	NN027K	NN028K
CoCr right	NN036K	NN039K	NN037K	NN038K

PATELLA 3-PEG

Types:	F1–F8
P1	NX041
P2	NX042
P3	NX043
P4	NX044
P5	NX045

SIZE COMPATIBILITY TIBIA WITH FEMUR PS / PE PS – FEMUR CR / PE UC – FEMUR CR / PE UCR

Sizes	F1	F2 / F2N	F3 / F3N	F4 / F4N	F5 / F5N	F6 / F6N	F7 / F7N	F8
T0 / T0+								
T1 / T1+								
T2 / T2+								
T3 / T3+								
T4 / T4+								
T5								

Recommended combination

Possible combination

Combination to avoid

STANDARD AND NARROW (N) SIZES OF THE Columbus® FEMUR COMPONENTS

Measure-ments	ML F1	ML F2	ML F3	ML F4	ML F5	ML F6	ML F7
AP F1	F1						
AP F2	F2N	F2					
AP F3		F3N	F3				
AP F4			F4N	F4			
AP F5				F5N	F5		
AP F6					F6N	F6	
AP F7						F7N	F7
AP F8							F8

NOTES

24 | LITERATURE

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Aesculap AG | Am Aesculap-Platz | 78532 Tuttlingen | Germany
Phone +49 7461 95-0 | Fax +49 7461 95-2600 | www.bbraun.com

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