Columbus® Revision Knee System

Surgical Technique

Aesculap Orthopaedics

AESCULAP®
Implant Systems

Columbus® Revision Knee System

Surgical Technique

Contents

Columbus® Revision Knee System

Surgical Technique

1. System Overview

Femur Offset
- Moves up to ±4 mm in anterior and posterior direction

2 Levels of Stability
- Medium and high constraint options available

4 Point Snap-In Locking Mechanism
- Mitigates backside wear

Tibia Offset
- Moves up to ± 6 mm offset in medial or lateral direction

Fig.

The patient's desire for a better quality of life has driven exponential demand in the knee replacement market. Revision operations, in turn, will continue to play a significant role in the future.

The Columbus Revision Knee System is based on the long-standing clinical history of the Columbus Primary Knee System, and achieves mobility through a flexion angle up to 130°. Various implant sizes, augment and stem options, as well as 2 levels of constraint provides flexibility to adapt the treatment plan to the patient's individual needs.

2. Indications and Contraindications

Indications:

The Columbus Revision Knee System is indicated for use in reconstruction of the diseased knee joint caused by osteoarthritis, rheumatoid arthritis, post-traumatic arthritis, the need to revise failed arthroplasties or osteotomies where pain, deformity or dysfunction persist, and for patients suffering from correctable valgus or varus deformity and moderate flexion contracture.
The Columbus Revision Knee System is designed for use with bone cement.

Warning:

- Devices are designed for use with bone cement.

Contraindications:

Contraindications include, but are not limited to:

- Joint conditions that can be treated by reconstructive surgery (e.g. osteotomy)
- Acute or chronic infections near the joint, or systemic infections
- Secondary diseases that could influence joint implant functionality
- Systemic diseases and metabolic disorders
- Severe osteoporosis or osteomalacia
- Severely damaged bone structures that could prevent stable implantation of implant components
- Bone tumors in the region of implant fixation
- Bone malformations, axial misalignments or other bone conditions that rule out implantation of a prosthetic joint
- Predictable overload of the joint implant (e.g. due to adiposity)
- Dependency on pharmaceutical drugs, drug abuse, or alcoholism
- Fever, infection or inflammation (systemic or local)
- Pregnancy
- Mental illness
- Severe osteopenia (or any other medical or surgical finding) that would preclude any benefit from the implants
- Combination with implant components from other manufacturers
- Inadequate patient compliance
- Foreign body sensitivity to the implant materials
- All cases not listed under indications

Columbus® Revision Knee System

Surgical Technique

3. Precautions and Warnings

Warnings:

Implants are designed for single patient use only and must never be reused. As with all other orthopedic implants, the components should never be re-implanted under any circumstances.

The mixing of different manufacturer implant components is not recommended due to metallurgical, mechanical and functional reasons. Dissimilar metals in contact with each other can accelerate the corrosion process due to galvanic corrosion effects. Do not use implants or instruments from other systems or manufacturers, and do not mix cobalt-chromium and titanium implant components together in a total knee system.

The implants can become loose or break if subjected to increased loading. Factors such as the patient's weight, activity level and adherence to weight-bearing or load-bearing instructions can affect the implant's longevity. Damage to the weight-bearing bone cement and/or bone structures caused by infection can give rise to loosening of the components and/or fracture of the bone.

These warnings do not include all adverse effects which could occur with surgery, but are important considerations specific to metallic devices. The risks associated with orthopedic surgery, general surgery and the use of general anesthesia should be explained to the patient prior to surgery. See the PRECAUTIONS and POSSIBLE ADVERSE EFFECTS sections for additional warnings.

Aesculap Knee Systems are intended to be used by surgeons specializing in orthopedic surgery who have a thorough knowledge of knee arthroplasty, joint morphology and the biomechanical principles of the knee.

Precautions

Pre-operative assessment of the suitability of the patient's anatomy for accepting implants is made on the basis of x-rays, CT scans and other radiological studies.

Only patients that meet the criteria described in the Indications for Use section should be selected.

Correct selection of the implant is extremely important. The morbidity as well as patient weight height, occupation and/or degree of physical activity should be considered.

Proper implant handling before and during the operation is crucial. Handle the implant components properly. Ensure packaging integrity for implant sterility. Do not use any implant where the packaging has been breached. Do not resterilize an implant. Do not allow the implants surfaces to be damaged.

Adequately Instruct the Patient

The physician should inform the patient about knee implant advantages and disadvantages, post-operative limitations, weight/load bearing stresses which could affect bone healing, implant limitations, and the fact that premature physical activity and full weight/load bearing stresses have been implicated in premature loosening, damage and/or fracture of knee prostheses.

Aesculap Knee Systems have not been evaluated for safety and compatibility in the MR environment. Aesculap Knee Systems have not been tested for heating or migration in the MR environment. IFU# - SOP - AIS - 5000163

See www.aesculapimplantsystems.com for complete instructions for use, cautions, precautions and warnings.

4. Preoperative Planning

If the primary prosthesis failed, it is imperative to identify the causes of failure in order to avoid repeat errors. It is recommended to consult the pre- and post-operative X-ray images.

Other parameters to ensure optimal results include:

- Restoration of the joint line
- Proper axis alignment
- Functionality of the extensor mechanism
- Functional stability
- Evaluation of soft tissue condition
- Preservation of bone

For the purposes of preoperative planning, Columbus® Revision Knee System X-ray templates are available for X-ray image analysis, to help determine the following:

- Angle between anatomic and mechanical femur axis
- Resection heights
- Size of the implants
- Entry points for intramedullary alignment
- Need for and dimensions of augments and stems

Extensive loss of bone can be compensated with the Columbus Revision Knee System:

- Maximum distal femur bone loss:
  - F1 – F3: 19 mm
  - F4 – F7: 24 mm
- Maximum tibial bone loss:
  - T0 – T1: 39 mm
  - T2 – T3: 43 mm
  - T4 – T5: 47 mm

Note: *Columbus Revision medium constraint PE insert distributes rotational forces via the peg in the femur and tibia components, resulting in a potentially higher risk of loosening. Additionally, the high constraint PE insert is subjected to varus/valgus forces. Therefore, Aesculap recommends using the femur and tibia components only with stems. Deviation decisions are at the discretion of the surgeon.*

Note: *With a Columbus Primary PS implant revision, the torque screwdriver (NE358R) needs to be ordered separately to remove the PE insert fixation screw.*

Note: *For implantation of a Columbus Primary CR femur with DD/UC PE insert and Columbus Revision tibia, the respective Columbus Primary trial femurs for the operative side and drill with stop for the femur pegs must be ordered separately.*

Columbus® Revision Knee System

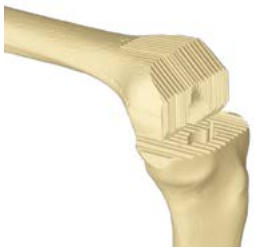
Surgical Technique

5. Workflow Guide

1

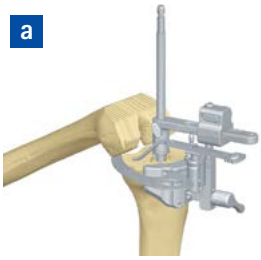
a

b

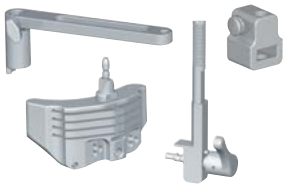


2

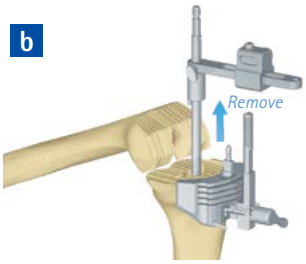
a



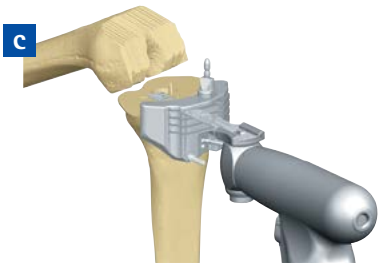
Needed instruments



b

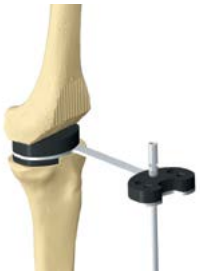


c

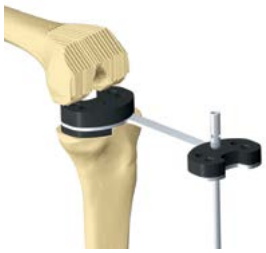


3

a

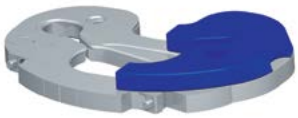


b



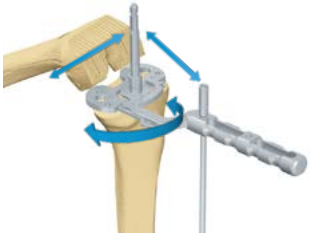
4

a



Augments optional

b



5

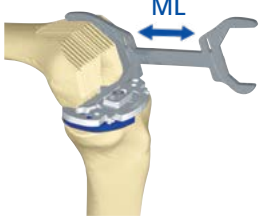
a

c

d

6

a



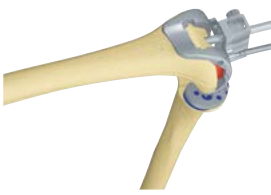
7

a

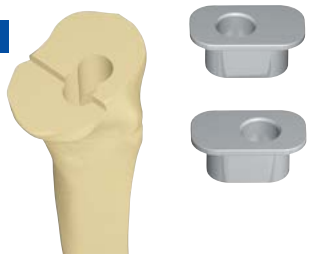
Augments optional

8

a



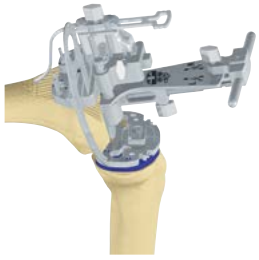
b



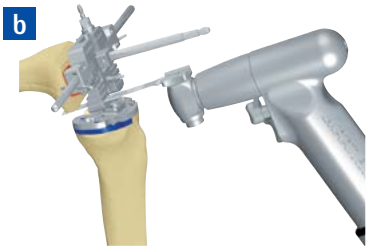
Needed instruments

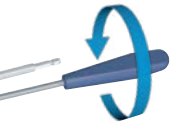
Tip: Hand tighten to allow medial/lateral movement of trial stem

b



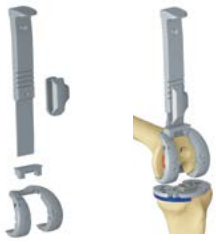
b





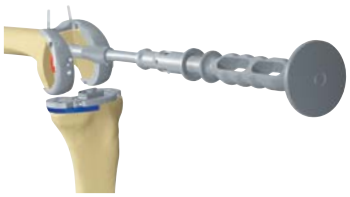
b (optional)

Needed instruments

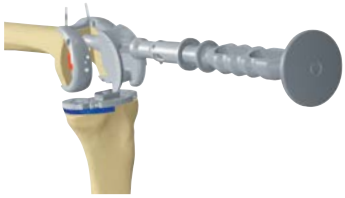


9

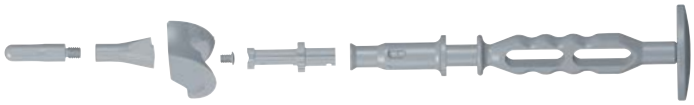
a



b



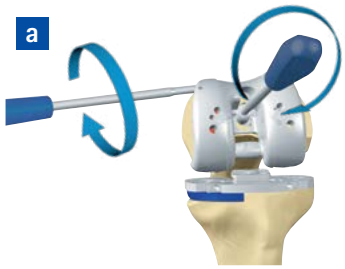
Needed instruments



Tip: Hand tighten to allow anterior/posterior movement of trial stem

10

a



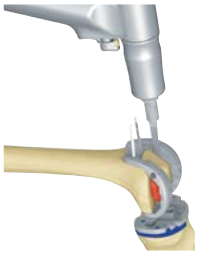
b

11

a

b

c



Columbus® Revision Knee System

Surgical Technique

6. Set Joint Line Reference

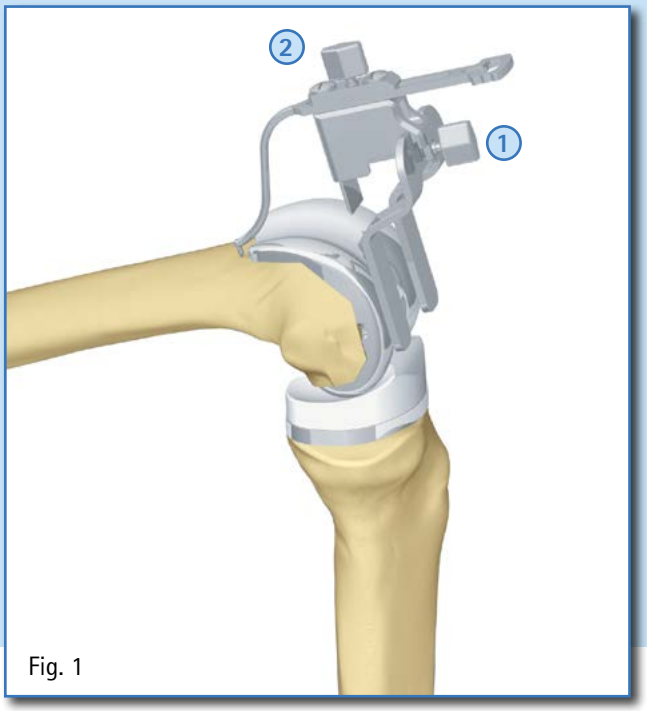


Fig. 1

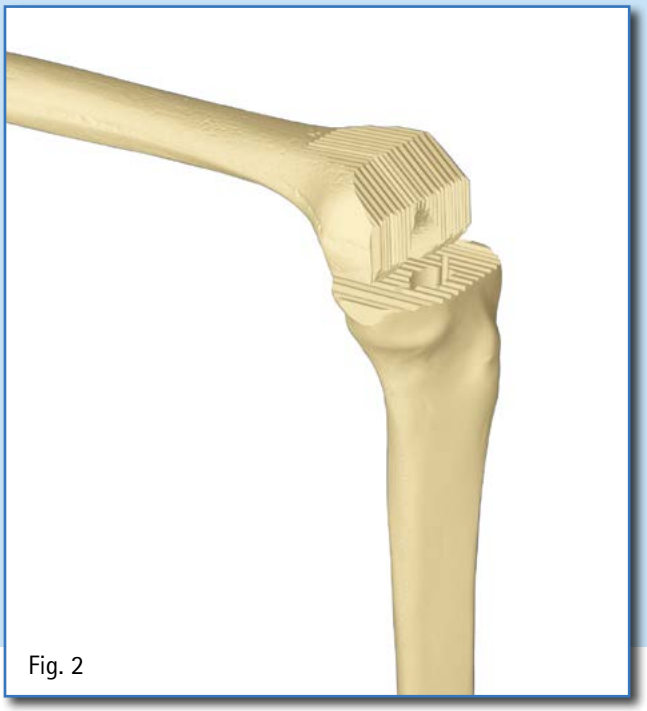


Fig. 2

The joint line positioner (NQ798R) is placed on the distal femur contact plate (NQ799R) and secured with screw (1). On the anterior side of the femur, a reference mark is made, for example, at the level where the primary femoral shield ends proximally. The stylus on the joint line positioned is locked in place using screw (2).

The stylus should remain in this locked position for the remainder of the surgery. It may however, be decoupled from the distal femur contact plate for use later during the procedure.

Remove all primary implants.

Note: *The implant matrix (see pages 44-47) can be used to ensure availability of implants, as specified in preoperative planning.*

This surgical guide describes the **Tibia First** technique. However, if the **Femur First** technique is used, the step **Femur Preparation** on page 20 will be performed first.

7. Tibial Preparation

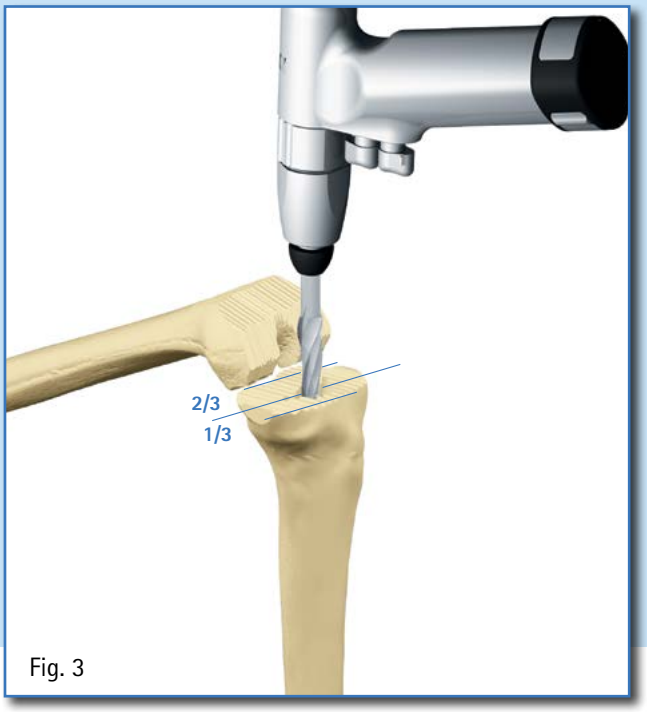


Fig. 3

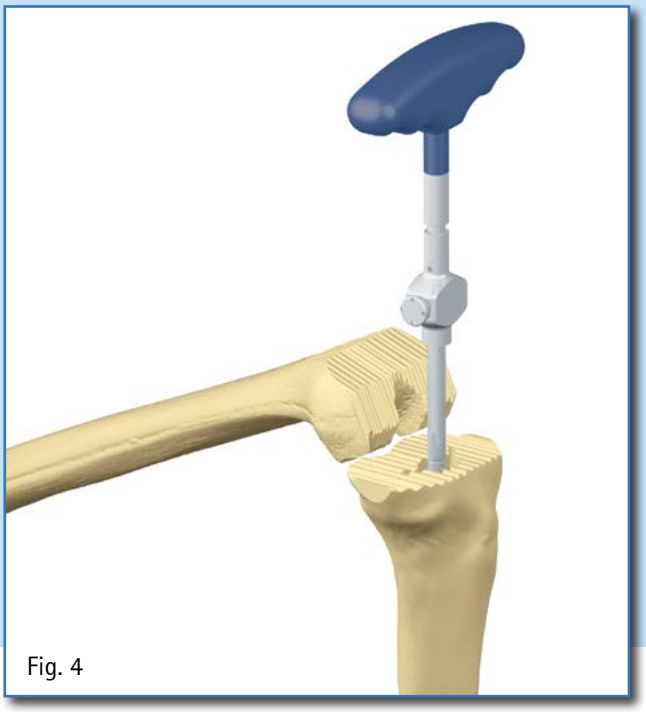


Fig. 4

7.1 Tibial Reaming

Determine the entry point for the drill (NP410R) and reamers, if necessary, with assistance from X-rays, the AP distance from 1/3 to 2/3, or via the trial tibia.

Ream the intramedullary canal as deeply as possible using the reamer until stable anchorage is achieved for precise axle alignment.

Following the tibial resection, repeat reaming to the required depth, with the desired diameter, in order to achieve fixation preference: pressfit or cemented application. The reamers have markings for the different stem lengths. The depth reference is always the back side of the direct implant without augment. The markings on the reamer includes the stem length and height of the tibial keel. Since bone is removed during proximal resection, it may be necessary to increase the depth so that the stem can be inserted.

Warning: *Too aggressive of a pressfit fixation could lead to pain at the tip of the stem. Therefore, reaming by hand to achieve a less aggressive glide fit is recommended.*

Note: *Pressfit tibial stem implants are 1 mm diameter larger than the corresponding reamer. Reamers and implants are conically shaped until 52 mm from the tip. Therefore, the depth of the preparation is crucial.*

For cemented stems, a cement mantle of at least 1 mm is required. It is necessary to ream with a larger diameter for the cement mantle. Alternatively, thinner stems can be used (-2 mm). Reamers with a diameter of 14, 15, 17, 18 and 20 mm are available.

Columbus® Revision Knee System

Surgical Technique

7. Tibial Preparation *(continued)*

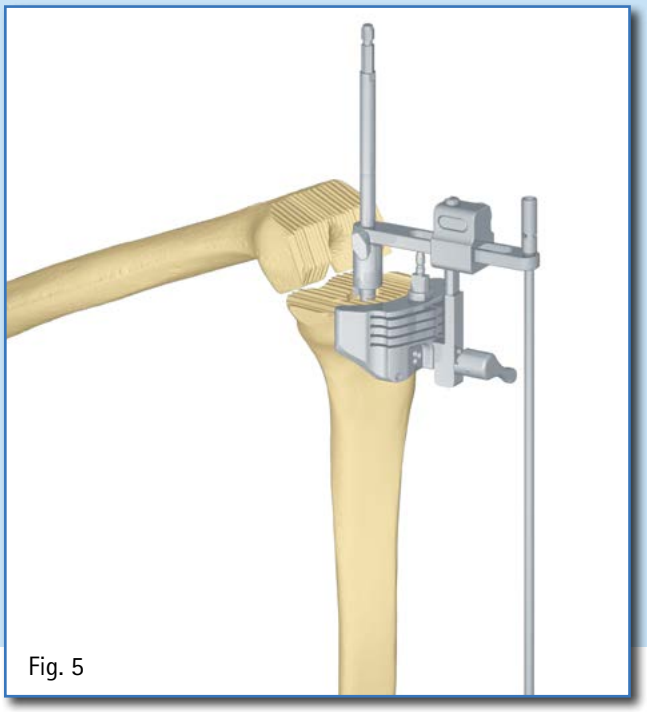


Fig. 5

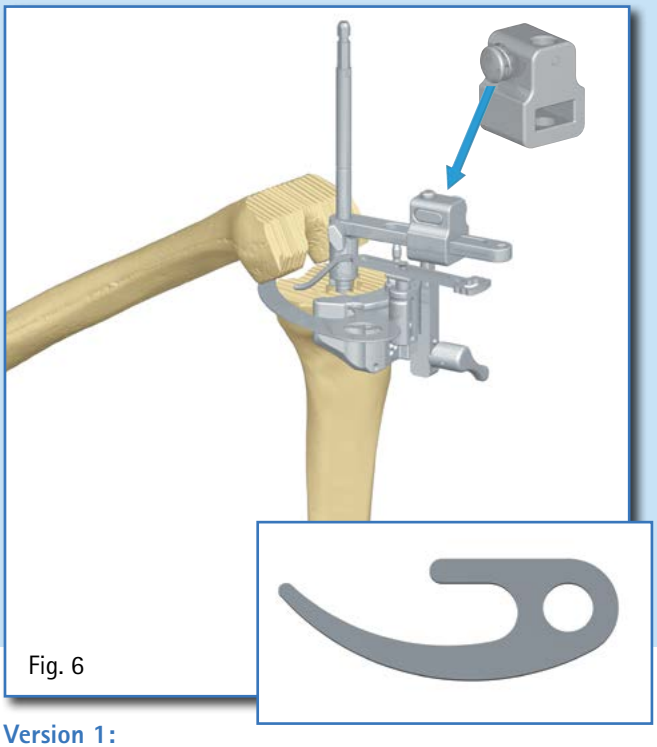


Fig. 6

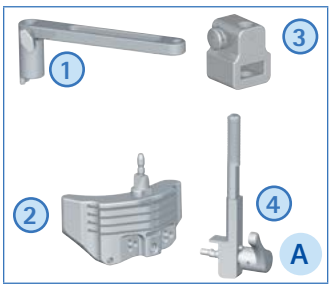
7.2 Intramedullary Alignment

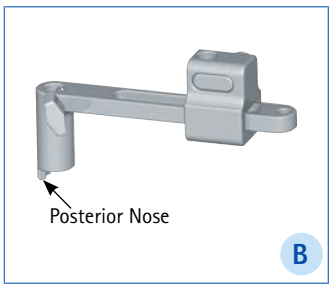
Assemble the alignment system, including tibial cutting guide, completely and fit onto the reamer. Place the posterior nose of the alignment system – lever arm (NQ648R) at the same level as the reamer mark.

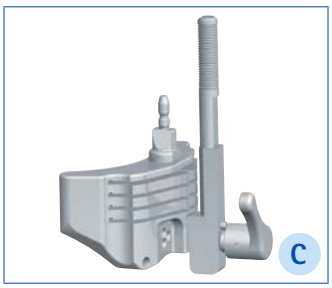
Optional: Review the position of the leg axis by inserting the alignment rod long (NP471R)/alignment rod short with sleeve (NE331R) into the borehole of the alignment system – lever arm.

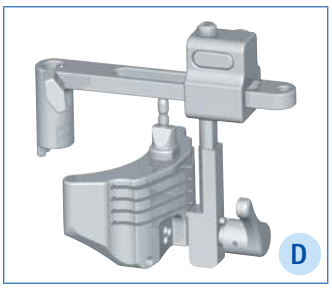
Version 1:
Determine the resection height by means of the posterior nose of the alignment system – lever arm. Ensure this is at the same level as the reamer mark. Press the button on the right side of the of the alignment system – build block (NQ649R), see fig. 6, to select the cut depth. This will allow the build block to change its vertical placement on the alignment system – body (NQ647R).

Version 2:
Determine the resection height by means of the tibial cutting guide stylus (NE425R) through the cutting slot, which has been adjusted to the desired resection height. The position of the cut can be checked using the resection check blade ("angel wing" – NM350R).









A: (1) Alignment System – Lever Arm (NQ648R), (2) Tibial Cutting Guide - Right, Left (NQ651R, NQ650R), (3) Alignment System - Build Block (NQ649R), (4) Alignment System – Body (NQ647R) **B:** Alignment System – Lever Arm and Build Block Assembled **C:** Alignment System – Body and Tibial Cutting Guide Assembled **D:** Alignment System and Tibial Cutting Guide Fully Assembled

7. Tibial Preparation *(continued)*

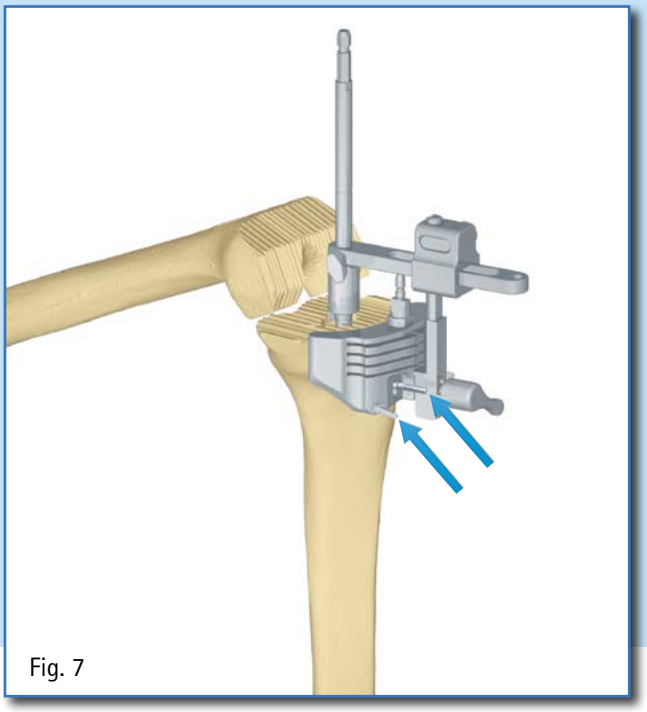


Fig. 7

Fix the tibial cutting guide in the desired position via two parallel headless pins and one convergent headed pin.

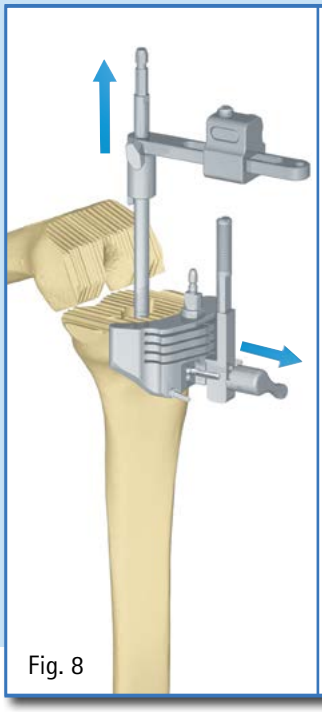


Fig. 8

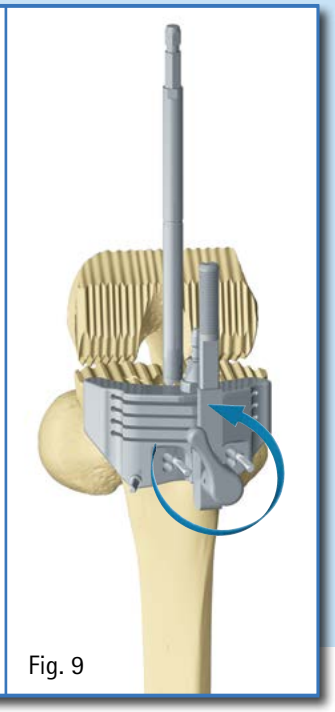


Fig. 9

Remove the alignment system and the reamer. Release the alignment system – build block (NQ649R) by pressing its button on the right side and withdrawing the construct proximally; the alignment system - lever arm (NQ648R) will withdraw at the same time.

Next, remove the alignment system – body (NQ647R) by turning the knob counter-clockwise to an 11 o'clock position. This will unlock the alignment system – body from the tibial cutting guide. Withdraw anteriorly.

The reamer is removed by first reattaching the T-handle (NE198R) and then turning the T-handle clockwise to withdraw proximally.

7. Tibial Preparation *(continued)*

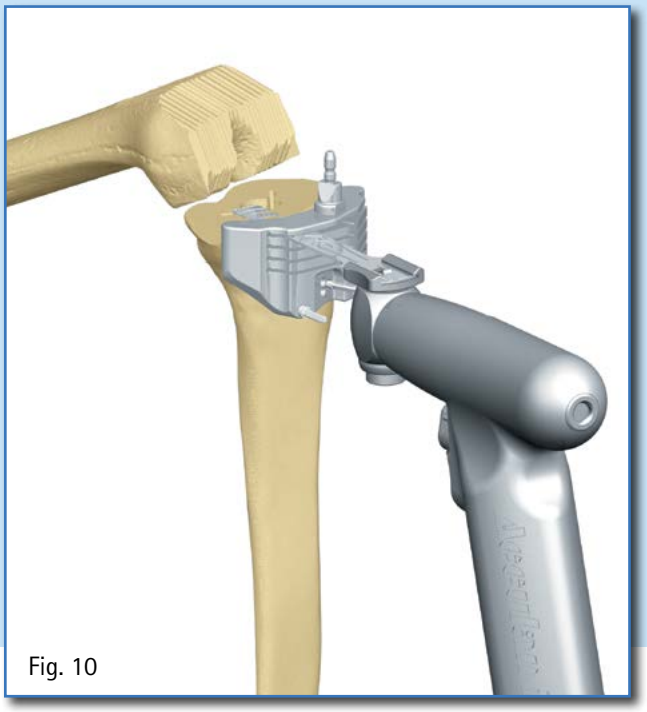


Fig. 10

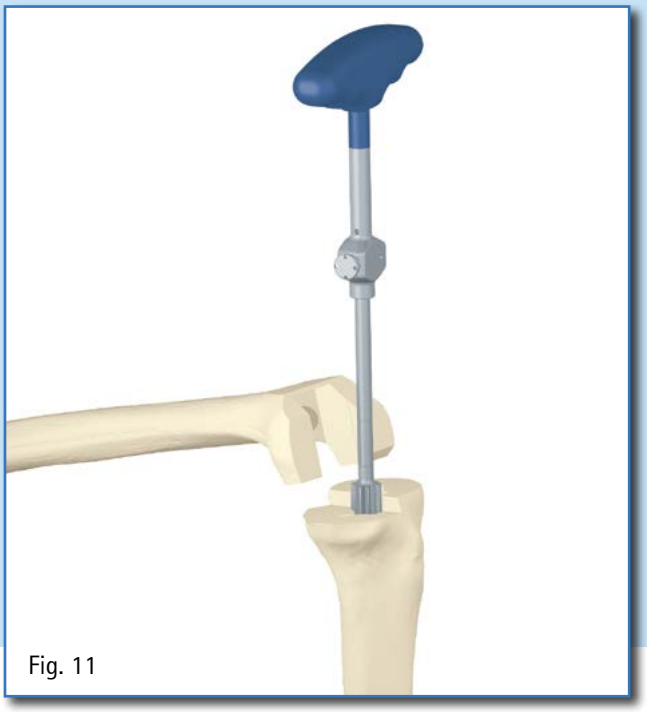


Fig. 11

7.3 Tibial Resection

Perform tibial resection using a 1.27 mm thick cutting blade.

Optional: It is also possible to make cuts for the 5, 10, and 15 mm augments with the tibial cutting guide by using the designated depth slots. The position at which the augment ends sagittally in the tibia center must be taken into account.

Note: *To minimize the risk of tibial fracture, the horizontal incision should be made before the sagittal incision. The sagittal incision should not be deeper than the horizontal resection surface.*

Following the tibial resection, repeat reaming to the required depth, with the desired diameter, in order to achieve fixation preference: pressfit or cemented application. See page 11 for more reaming information.

Note: *If performing Gap Measurements, perform this step after the Gap Measurement step.*

7. Tibial Preparation *(continued)*

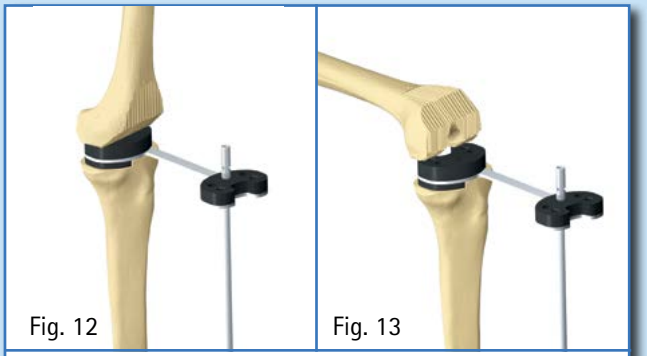


Fig. 12

Fig. 13

Fig. 14

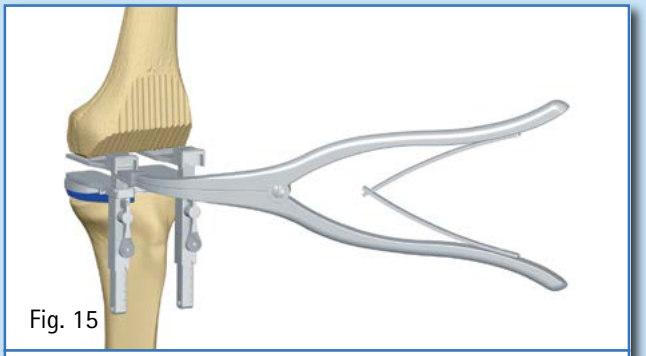


Fig. 15

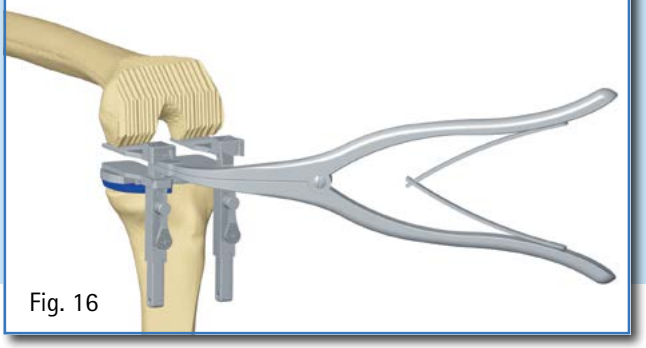


Fig. 16

7.4 Gap Measurements (Optional)

Extension/Flexion Gap Measurement with Spacer Blocks

Extension/flexion gaps can be measured with spacer blocks. For improved stability after augment incision, a unilateral trial plate can be attached to the bottom side of the spacer block. For example, a spacer block with a height of at least 18 mm without the spacer plate for the femoral incision should be used, since this will represent the minimum space required by the implants (PE insert inclusive of tibia = 10 mm, femur distal implant = 9 mm, femur dorsal implant = 8 mm).

After the distal femur resection of 9 mm, the joint stability can be simulated by additional mounting of the spacer plate for the femoral incision. A spacer block of the required PE insert height is then used.

Note: *In the case of asymmetry, a ligament release on the tighter side may be considered. However, if the asymmetry is caused by a bone defect, this is not a viable option.*

Extension/Flexion Gap Measurement with Distractor

Extension/flexion gaps can be measured medially and laterally with a distractor instrument. This measurement is performed on the trial tibia with the trial augments attached to the trial tibia, if required.

The material thickness of the trial tibia is 5 mm.

Note: *In the case of asymmetry, a ligament release on the tighter side may be considered. However, if the asymmetry is caused by a bone defect, this is not a viable option. Afterwards, an additional measurement should be performed. If the results are satisfactory, the values are recorded.*

Distractor and spreader instruments are not included in the standard Columbus Revision Instrument Set.

Columbus® Revision Knee System

Surgical Technique

7. Tibial Preparation *(continued)*

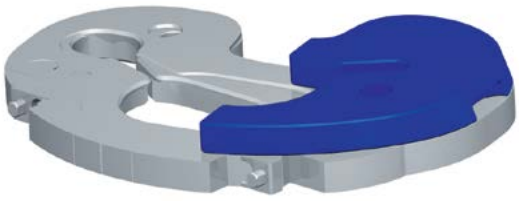


Fig. 17

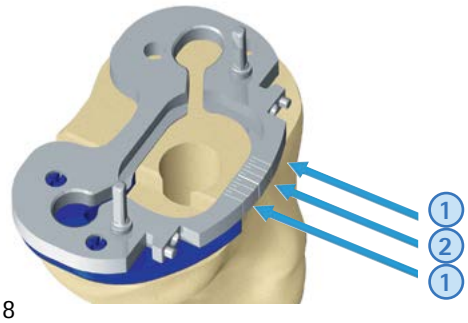


Fig. 18

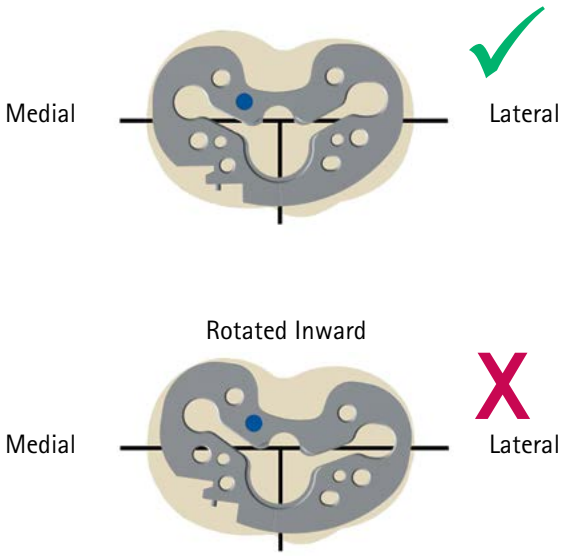


Fig. 19

7.5 Tibial Component Sizing and Position

Select the trial tibia which best covers the bone in ML and AP directions, and attach the corresponding trial augment underneath the trial tibia, if applicable.

Once the ML, AP, and rotational position have been determined, secure the trial tibia in this position using two short headed pins.

The outer markings indicate the positions where the augments will end medially (1), as a reference for the saw incisions. The central marking (2) indicates the center of the trial tibia.

Note: *The transition from the medial to the central third of the anterior tuberosity and the second toe axis of the leg serve as reference points for the rotation. These two reference points often are not congruent with the mechanical axis of the tibia. Take into account the rotation with respect to the tubercle in order to maintain the alignment of the extensor mechanism.*

Version 1:

Assemble the trial tibia and trial femur with the desired PE insert and place onto the bone. Through flexion and extension movements in combination with slight rotations, the tibia will move into its natural position under the trial femur. This position is marked anteriorly with a cauterizer exactly where the trial tibia displays a centered anterior marking. Carefully evaluate this stability of the extensor mechanism before accepting this "floating" alignment of the trial tibia.

Note: *The Columbus Revision Knee System has a symmetric shape. Therefore, it is not possible to achieve 100% tibial bone coverage with desired trial tibia rotational position. However, an overhang should be avoided.*

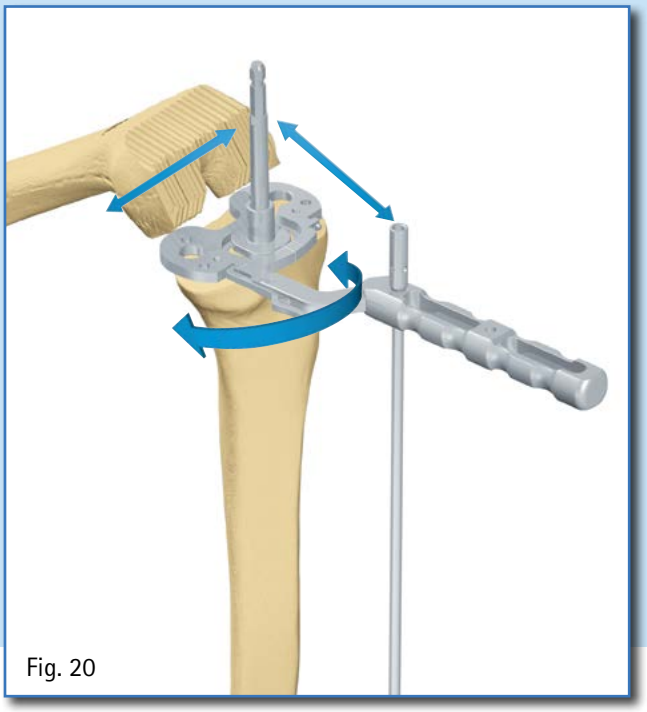


Fig. 20

Fig. 21

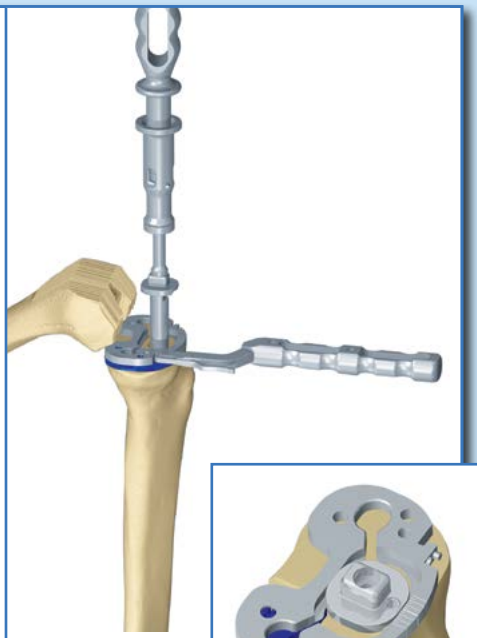


Fig. 22

7.5 Tibial Component Sizing and Position *(continued)*

Version 2:

Insert the desired diameter reamer into the tibial canal until the appropriate depth is reached.

Place the tibial reamer chimney (NQ677R) over the reamer until fully seated within the trial tibia. Secure the chimney to the trial tibial with the anterior eccentric screw using the screwdriver (NQ642R). Determine the optimal ML, AP and rotational position. Secure the trial tibia in this position using two short headed pins.

Remove the trial tibial handle, chimney and reamer.

Version 3:

Connect the tibial trial stem connector adapter (NQ397R) to the tibial trial stem connector (NQ676R). Then connect the tibial trial stem connector to the desired diameter/ length stem and affix the construct to the impactor handle (NQ565RM). Impact this construct into the trial tibia until fully seated. Detach the impactor handle. Secure the tibial trial stem connector to the trial tibial with the anterior eccentric screw using the screwdriver (NQ642R). Determine the optimal ML, AP, and rotational position. Secure the trial tibia in this position using two short headed pins.

Remove the trial tibial handle and tibial trial stem connector.

Optional: For Version 2 and 3, the trial tibia position can be reviewed by inserting the alignment rod long (NP471R)/ alignment rod short with sleeve (NE331R) into the handle for trial tibia (NQ678RM).

Note: *Ensure that the eccentric screw of the tibial reamer chimney and tibial trial stem connector is turned to the closed position to avoid bending it during introduction.*

7. Tibial Preparation *(continued)*

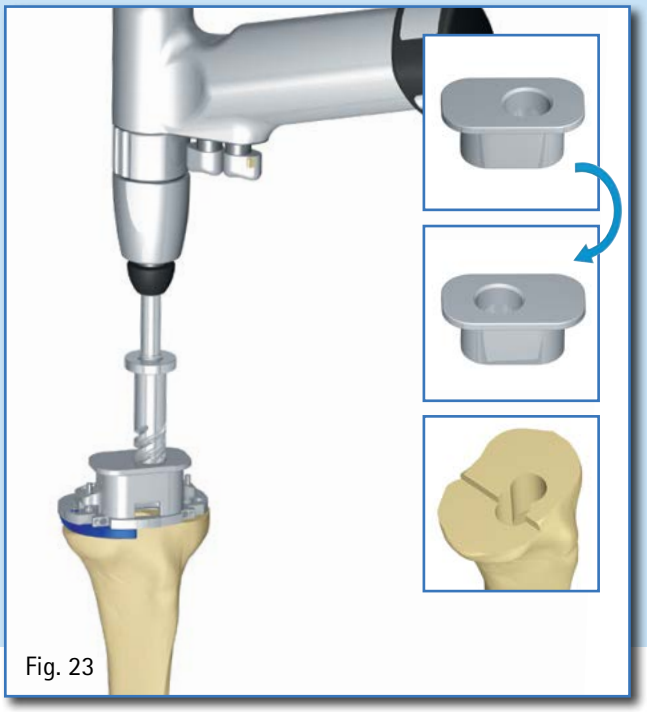


Fig. 23

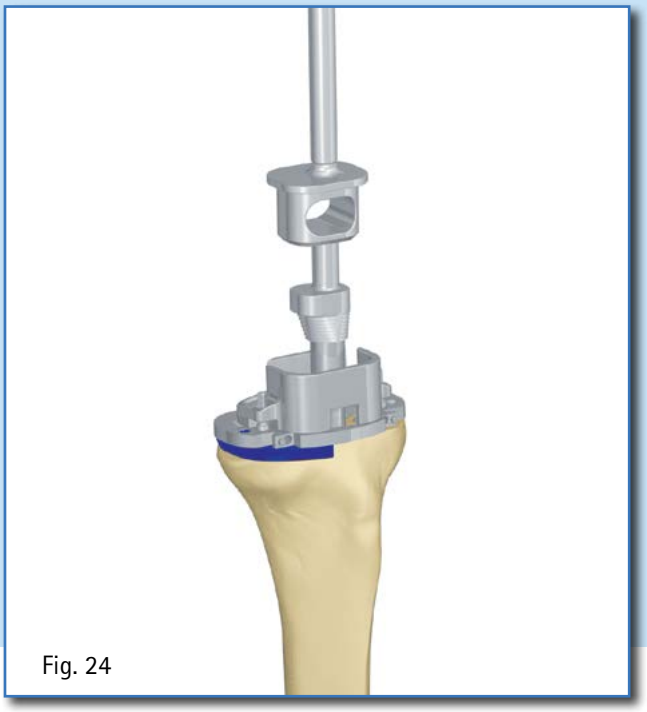


Fig. 24

7.6 Tibial Box Preparation

Place the tibial drill sleeve guide (NQ669R) and the drill sleeve (NQ663R) onto the trial tibia (tibia size 0: tibial drill sleeve guide – NQ668R and drill sleeve (NQ662R).

Drill two overlapping holes – by reinserting the drill sleeve in a 180° rotated position – up to the depth limit using the 16 mm tibial box preparation drill (NQ661R).

The result is a binocular-shaped cavity.

Note: *When preparing the tibia, the required buildup height (thickness of tibia + PE insert + optional augments) for reconstruction of the joint line should be taken into account at an early stage. In particular, the tibia should not end up too far distal; otherwise, there may not be sufficient space in the ML dimension to accommodate the tibial keel in the tibial metaphysis, which could result in fractures due to excessive strain. The joint line should therefore preferably be achieved by using augments on both sides rather than by a higher PE insert. This applies to both to preparation and the final implant.*

Connect the tibial stem collar rasp T1-T5 (NQ667R) (tibia size 0: tibial stem collar rasp – NQ666R) with the desired diameter/length stem. Impact this construct up to the stop position in the trial tibia two times by turning the rasp 180°.

7. Tibial Preparation *(continued)*

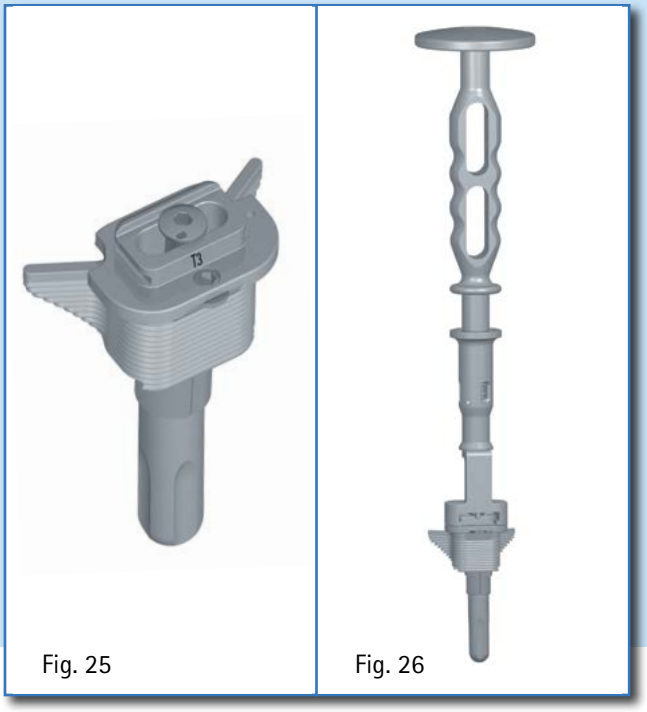


Fig. 25

Fig. 26

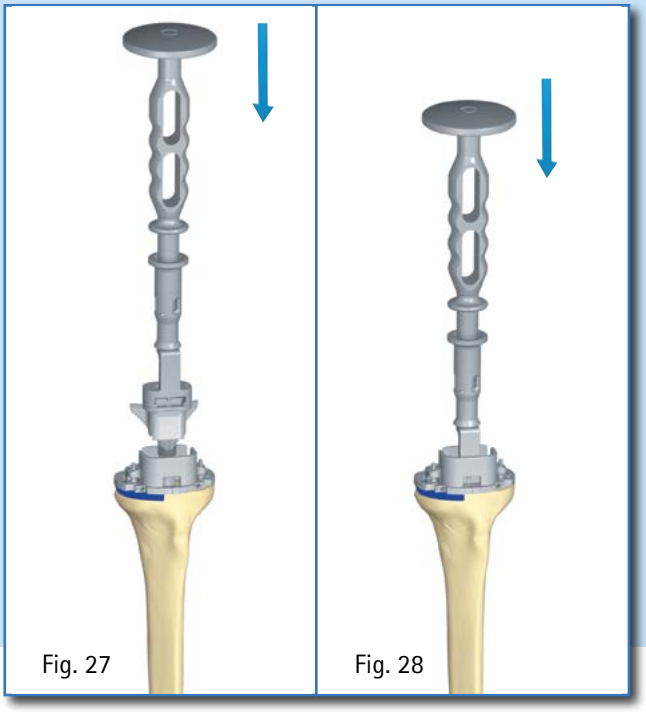


Fig. 27

Fig. 28

7.6 Tibial Box Preparation *(continued)*

Complete the box shape as follows using the rasp:

Assemble the impactor handle (NQ565RM), tibial keel holder (NQ665R) (tibia size 0: tibial keel holder– NQ664R), tibial trial keel in the respective size, tibial stem connector (NQ833R), and tibial trial stem in the desired size. Allow the stem connector to have ML movement in order to self-center within the tibial canal.

Drive this rasp assembly into the trial tibia until fully seated, with or without the guide (T1-T5 - NQ669R, T0 – NQ668R).

The depth of the trial keel seating must be taken into account.

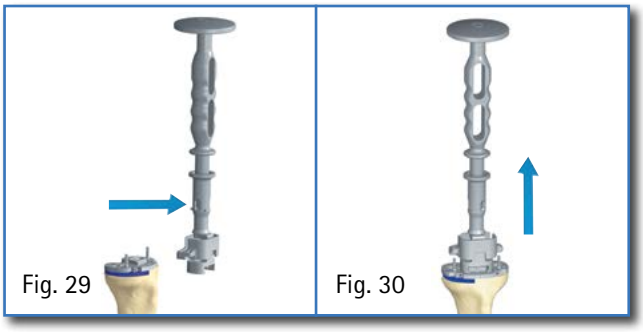
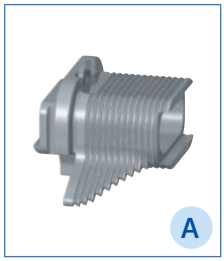
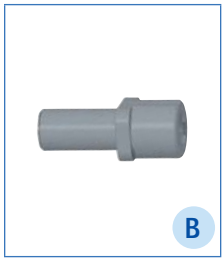
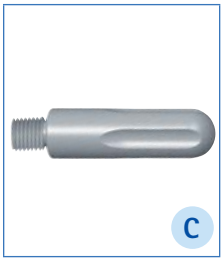


Fig. 29

Fig. 30







A: Tibial trial keel in the respective size; **B:** Tibial stem connector (NQ833R); **C:** Trial Stem in desired size

Remove the tibial keel holder and impactor handle from the anterior direction. Tighten the topside screw in the tibial trial keel to secure the stem's ML placement. Tighten the eccentric screw on the anterior location of the trial keel to fixate the trial keel to the trial tibia.

Preparation of the tibia is now complete. Both pins can now be removed.

Columbus® Revision Knee System

Surgical Technique

8. Femoral Preparation

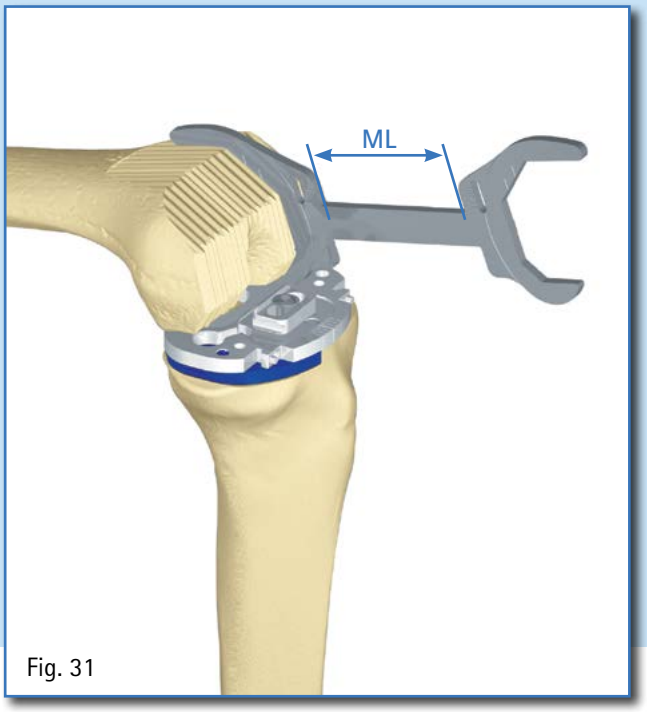


Fig. 31

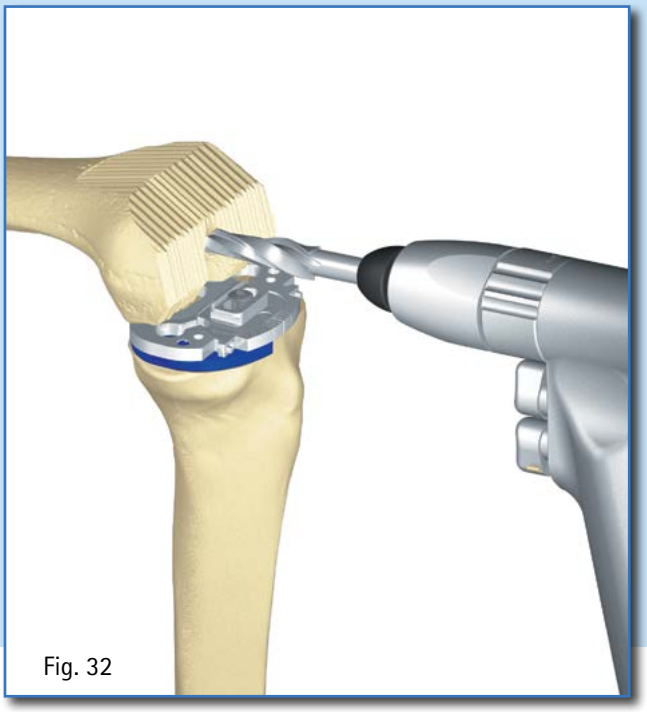


Fig. 32

8.1 Femoral Reaming

Determine the size of the femur using the femoral sizers (F1/F2 – NQ711R, F3/F4 – NQ712R, F5/F6 – NQ713R, F7 – NQ714R). The sizers indicate the respective AP and ML dimensions. Additional markings on the instrument indicate the available distal and posterior femoral augments for each size.

Determine the entry point for the drill (NP410R) and reamers, if necessary with assistance from X-ray images. Drilling is performed in the selected angle, taking into account the femoral curvature and other patient-specific aspects.

8. Femoral Preparation *(continued)*

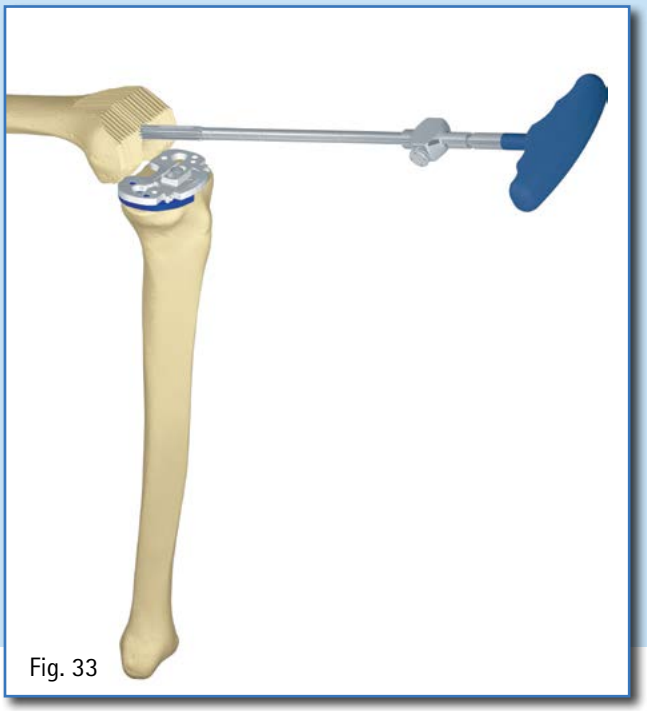


Fig. 33

8.1 Femoral Reaming *(continued)*

Following the femoral resection, repeat reaming to the required depth, with the desired diameter, in order to achieve fixation preference: pressfit or cemented application. The reamers have markings for the different stem lengths. The depth reference is always the back side of the direct implant without augments. The markings on the reamer include the stem length and height of the femoral box. Since bone is removed during the distal resection, it may be necessary to increase the depth so that the stem can be inserted correctly.

Warnings: *Too aggressive pressfit fixation could lead to pain at the tip of the stem. Therefore, reaming by hand to achieve a less aggressive glide fit is recommended.*

Note: *Pressfit femoral stem implants are 1 mm diameter larger than the corresponding reamer. Reamers and implants are conically shaped until 56 mm from the tip. Therefore, the depth of the preparation is crucial.*

For cemented stems, a cement mantle of at least 1 mm is required. It is necessary to ream with a larger diameter for the cement mantle. Alternatively, thinner stems can be used (-2 mm). Reamers with a diameter of 14, 15, 17, 18 and 20 mm are available

Columbus® Revision Knee System

Surgical Technique

8. Femoral Preparation *(continued)*

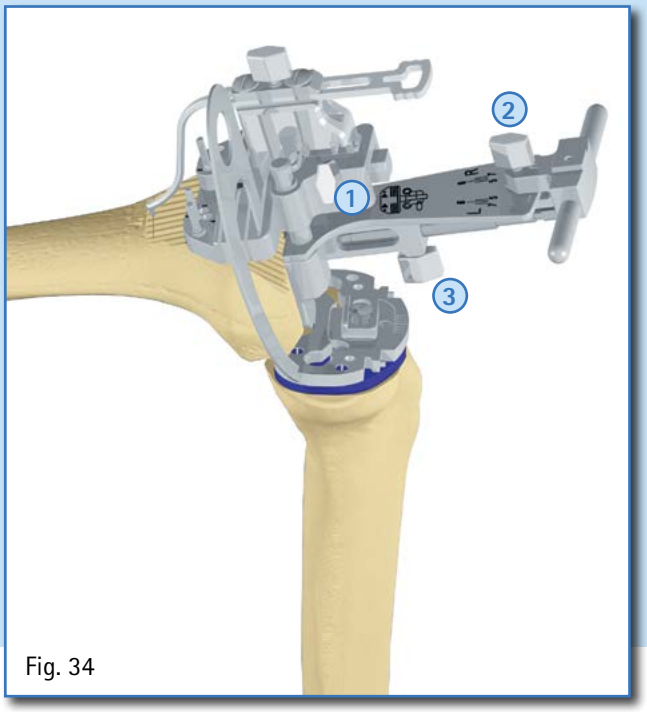


Fig. 34

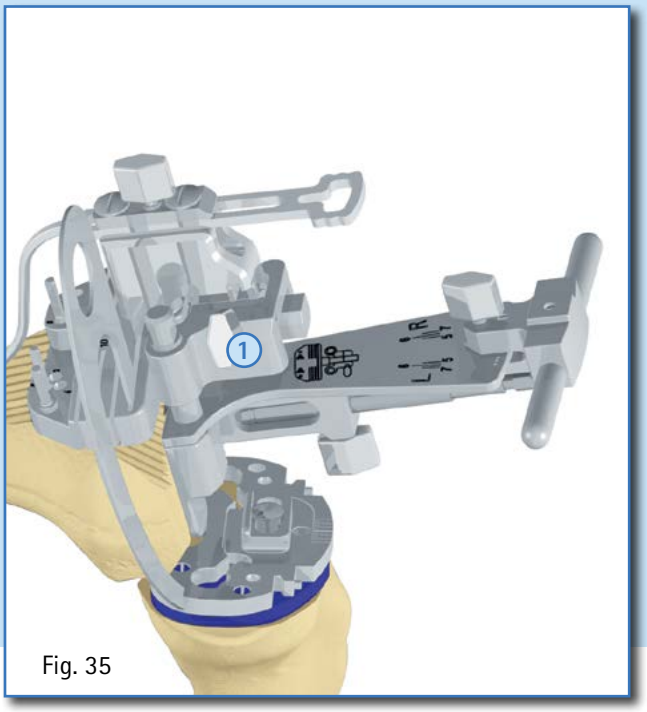


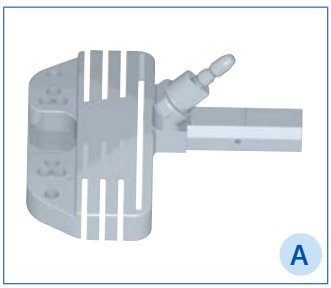
Fig. 35

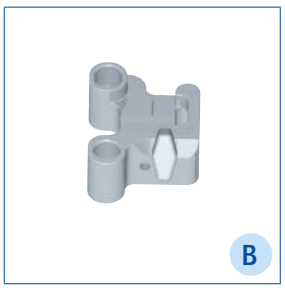
8.2 Distal Femoral Resection

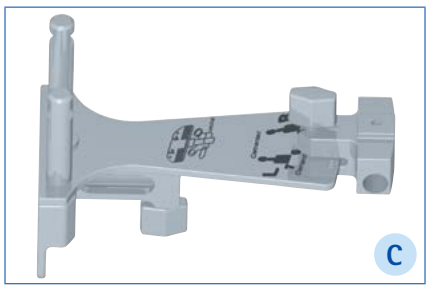
Completely assemble the alignment system, including the femoral cutting guide. The femoral cutting guide can be locked in place – a neutral position or in a more proximal/distal position – by tightening screw (1). The desired angle between anatomic leg axis and mechanical axis (5° or 7° for pressfit and 6° for cemented applications) for the operative leg (left or right) is set and secured by tightening screw (2). Slide alignment system onto the reamer until contact with the bone and secure in place by tightening screw (3).

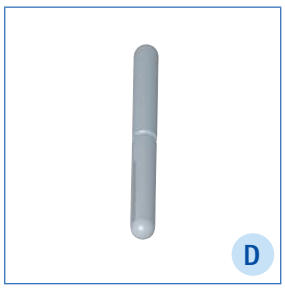
Version 1:
The cuts can be checked using the resection check blade ("angel wing" - NM350R) in the continuous cutting slot.

Version 2:
Attach the joint line positioner (NQ789R) to the distal femoral cutting guide (NQ701R). The cutting guide is adjusted until the stylus tip coincides with the anterior mark previously made using the primary femoral implant. If necessary, this mark is used as a reference for distal or proximal position. The resection position is locked by tightening screw (1).









A: Distal Femoral Cutting Guide (NQ701R); **B:** Alignment System – Body (NQ703R); **C:** Alignment System – Base (NQ702R); **D:** Alignment System – Handle Bar (NQ474R).

8. Femoral Preparation *(continued)*

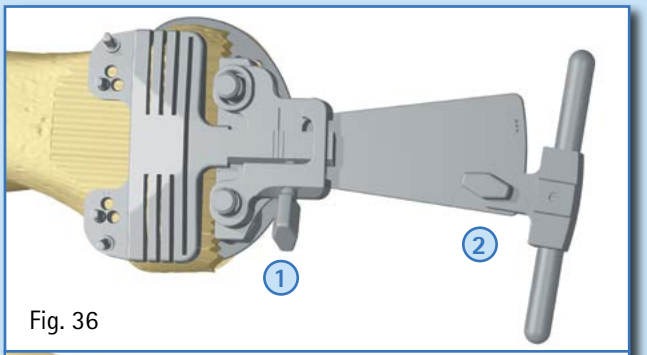


Fig. 36

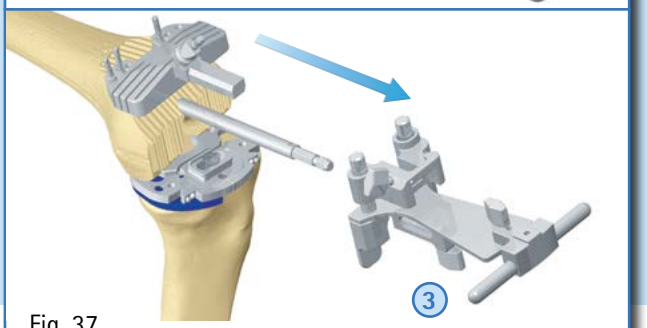


Fig. 37

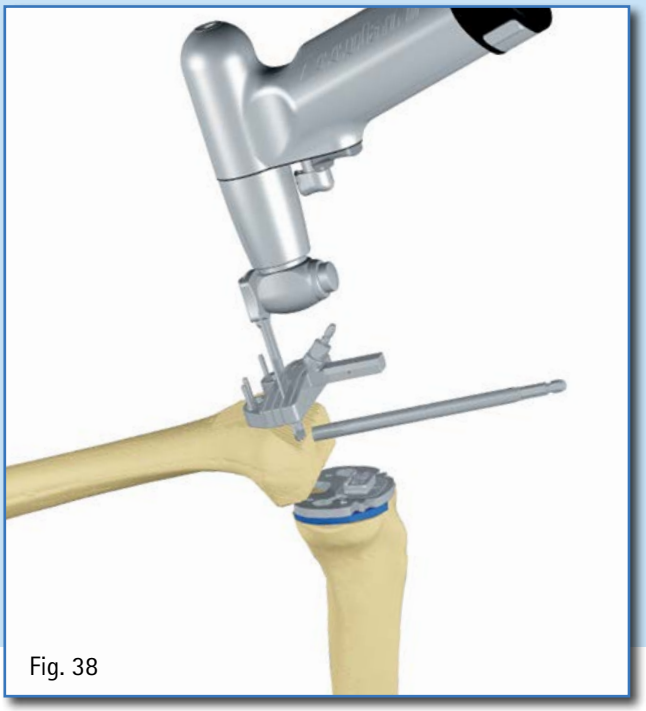


Fig. 38

Fixate the cutting guide to the anterior femur with two parallel headless pins and one/two convergent headed pins. Remove the resection check blade, the joint line positioner, and the alignment system by untightening screw (1) and untightening screw (3).

The reamer can remain in the femoral canal for the distal cuts.

The distal femoral cut is performed in the selected plane of resection. If required, additional bone resection can be made for the distal femoral augments using the appropriate cutting slot.

Fig. 39

Following the femur resection, repeat reaming to the required depth, with the desired diamter, in order to achieve fixation preference: pressfit or cemented application. See page 21 for more reaming information.

8. Femoral Preparation *(continued)*

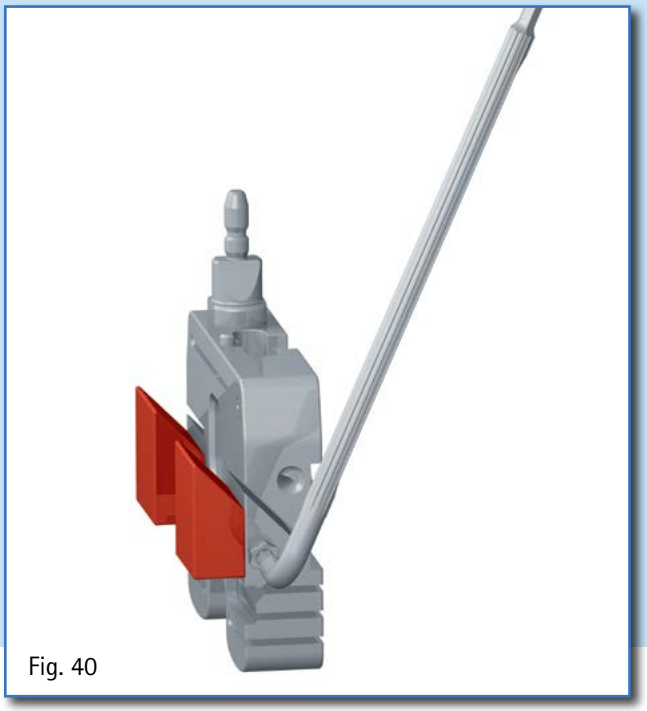


Fig. 40

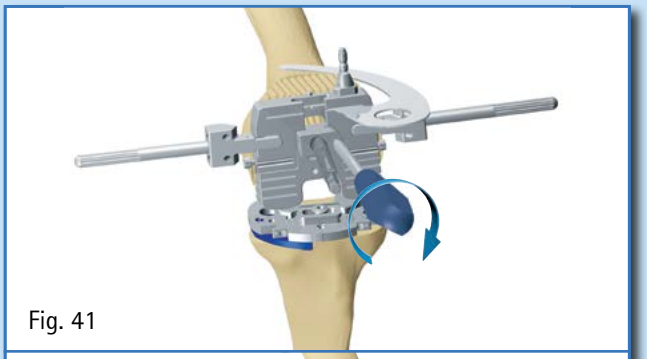


Fig. 41

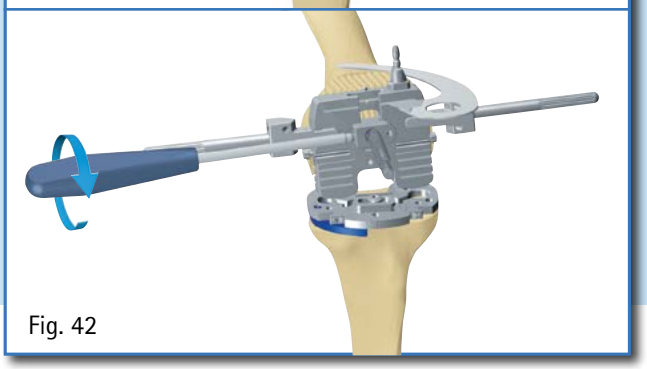


Fig. 42

8.3 AP and Rotational Alignment

If resection was performed for distal femoral augments, analogously dimensional distal trial augments must be attached to the back side of the 4-in-1 cutting guide.

Attach handles (NQ720R) to the 4-in-1 cutting guide. Place the cutting guide with the desired femur AP orientation sleeve (pressfit 5° - NQ705R, pressfit 7° - NQ707R, cemented 6° - NQ706R) over the femoral reamer.

Adjust femoral cutting guide manually to desired rotational position. Use the resection check blade ("angel wing" - NM350R) in the anterior continuous cutting slot as a reference to avoid anterior notching.

Secure the desired anterior/posterior position of the cutting guide by tightening the distal screw on the AP orientation sleeve. Secure the desired rotational position of the cutting guide by tightening the side screw on the AP orientation sleeve.

Note: *The offset value that is obtained through this step serves as an initial, approximate estimate. The definitive offset value will later be obtained via the assembly of the trial femur and trial stem.*

8. Femoral Preparation *(continued)*

Fig. 43

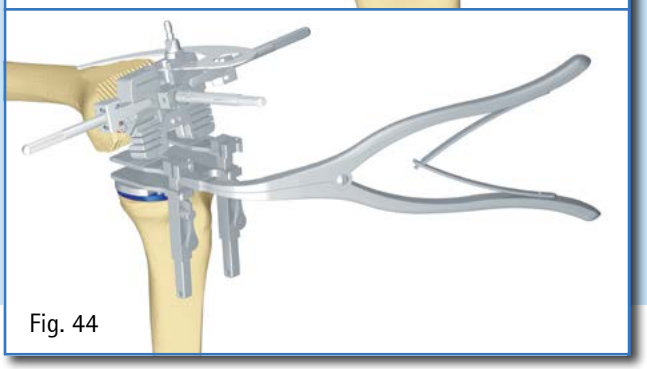


Fig. 44

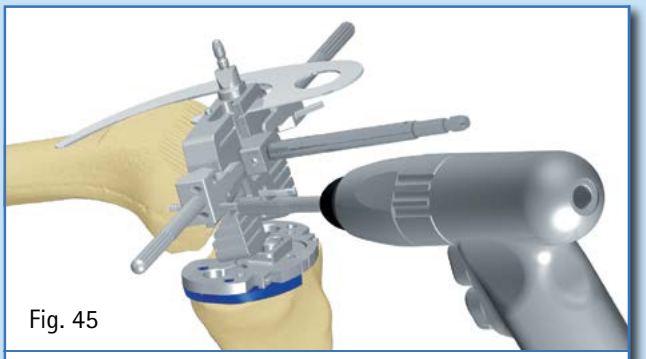


Fig. 45

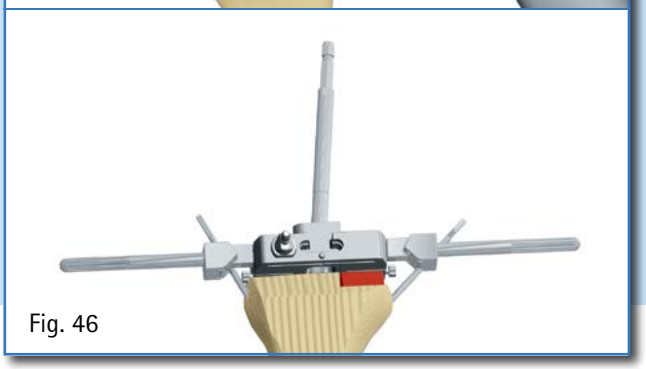


Fig. 46

8.3 AP and Rotational Alignment *(continued)*

The flexion gap can now be measured and compared with the extension gap. With an unbalanced flexion and extension gap, adjustments should be undertaken on the femoral side, such as change of femur size or change of distal augmentation.

Version 1:

Use the trial insert to assist with femoral rotation and gap measurements. The flexion gap must be filled with the trial PE to the point where ligaments are taught.

Note: In cases of insufficient collateral ligaments, this technique can cause an incorrect rotation of the 4-in-1 cutting guide. Therefore, the rotation must also be referenced with the epicondyle.

The size of the polyethylene insert corresponds with the tibia size, as the system is fixed-bearing. This applies to the trial components and final implant.

Version 2:

Use the distractor and spreader instruments.

Note: *Distractor and spreader instruments are not included in the standard Columbus Revision Instrument Set.*

Note: The dorsal geometry of the 4-in-1 cutting guide matches the dimensions of the corresponding femoral implant. This measurement is also performed on the trial tibia with trial augments, if required. The values can be recorded.

Verify that the cutting guide is in direct contact with the distal femur and that the distal augments are securely fastened.

Fixate the cutting guide in the desired rotational position by using two long headless pins through the holes in the handles. Additionally, one long headless pin can be placed through the distal hole in the cutting guide by selecting the operative leg (L – left leg, R – right leg).

Columbus® Revision Knee System

Surgical Technique

8. Femoral Preparation *(continued)*

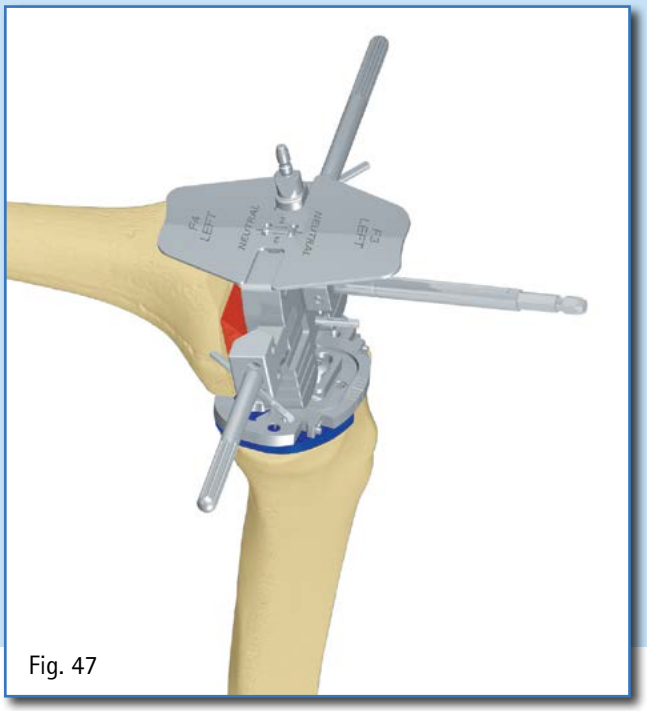


Fig. 47

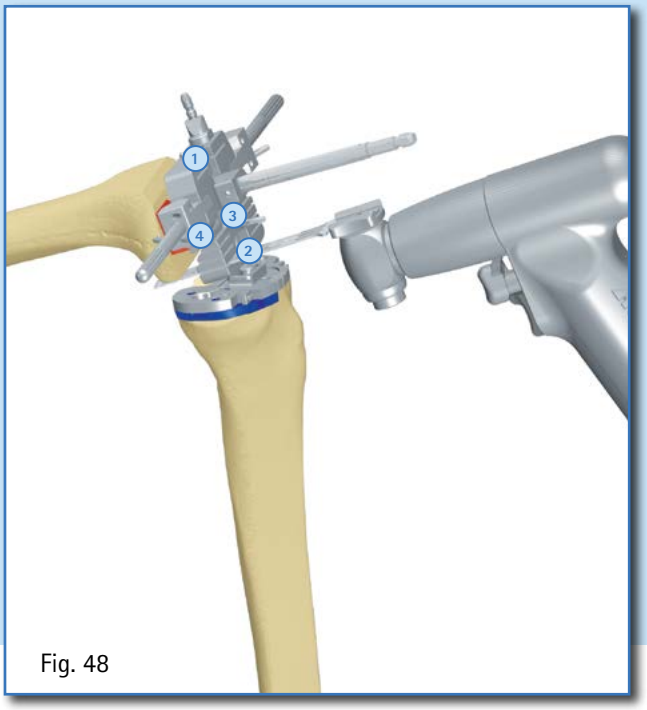


Fig. 48

8.3 AP and Rotational Alignment *(continued)*

Optional:

Review the femur size and ML position by attaching the anterior femur sizer (F1/F2 – NQ715R, F3/F4 – NQ716R, F5/F6 – NQ717R, F7 – NQ718R) to the femoral cutting guide on the central hole.

7.4 Femoral Resection

The four femoral resection cuts are performed in the following sequence:

1. Anterior Cut
2. Posterior Cut (Including Augment Cut If Required)
3. Posterior Chamfer Cut
4. Anterior Chamfer Cut

8. Femoral Preparation *(continued)*

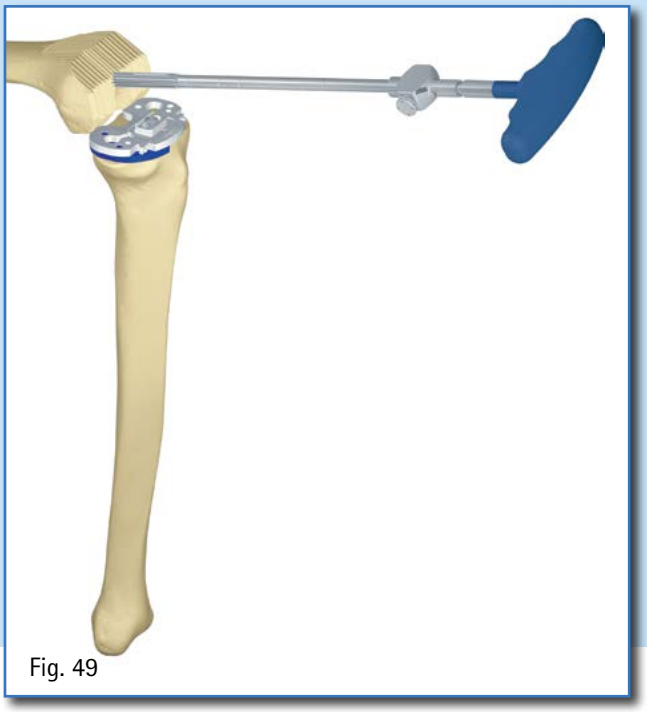


Fig. 49

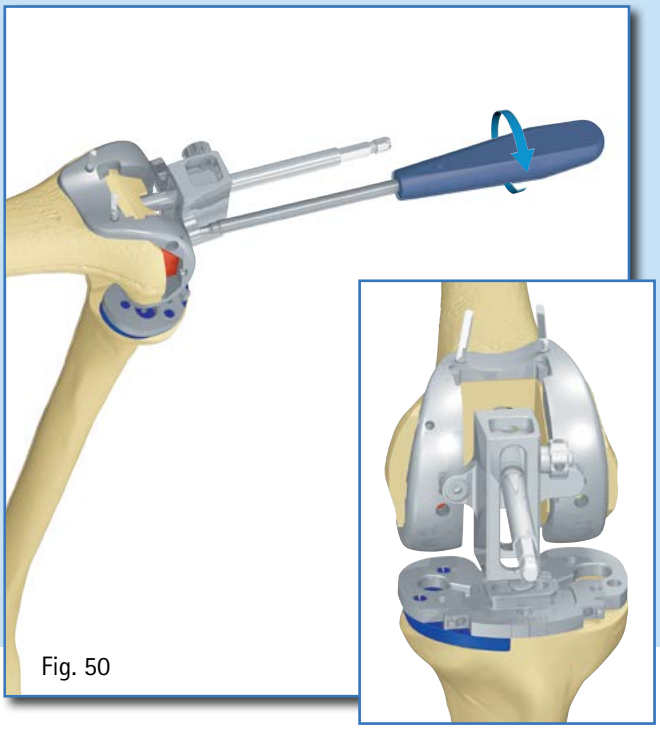


Fig. 50

8.5 Femoral Box Preparation

Reinsert the appropriate diameter reamer into the medullary canal to the desired depth, in order to achieve fixation preference: pressfit or cemented application. The reamer will remain in place for the next step of femur box preparation.

Select the trial femur for the appropriate size and operative leg (left or right). Attach distal or posterior augments that correspond to the femur size, if applicable.

Select the femoral reamer positioner with the desired angle (pressfit 5° - NS002R, pressfit 7° - NS005R, cemented 6° - NQ836R) and attach it to the trial femur with the operative side (L – left, R – right) legible in the anterior view. Secure via the distal screw using the screwdriver (NQ642R).

Slide this assembly of the femoral reamer positioner onto the reamer shaft until the internal femoral geometry of the trial femur makes full contact with the bone. Secure the placement of the reamer via the side dial. If necessary, the screwdriver (NQ642R) can assist with turning the dial.

Secure the trial femur in place with two anterior headed pins. Remove the femoral reamer positioner and the reamer.

Columbus® Revision Knee System

Surgical Technique

8. Femoral Preparation *(continued)*

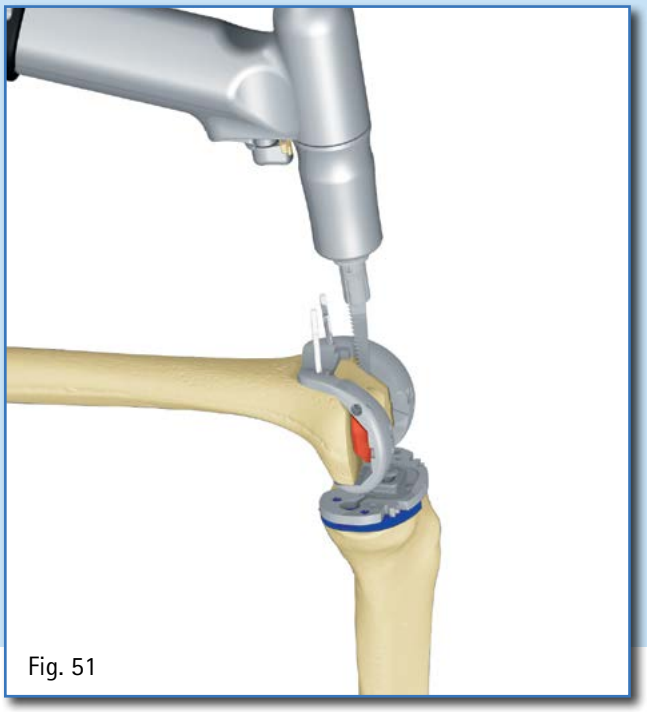


Fig. 51

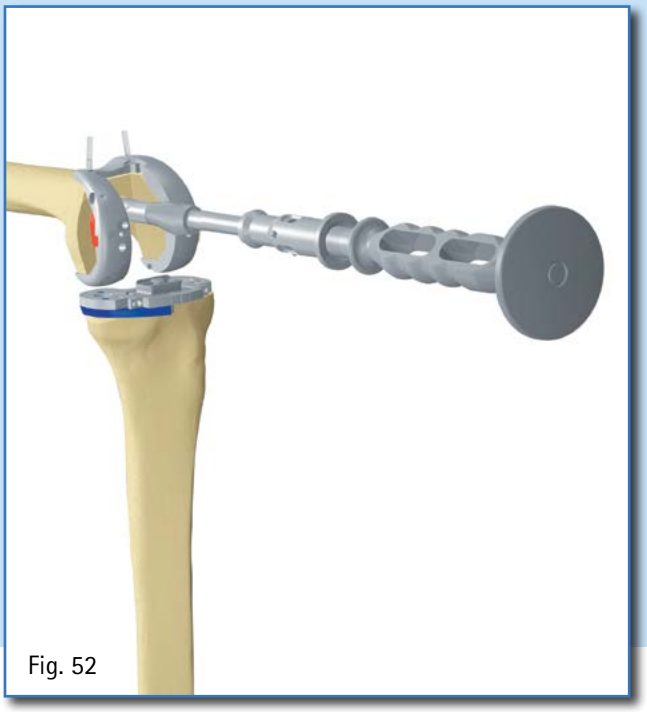
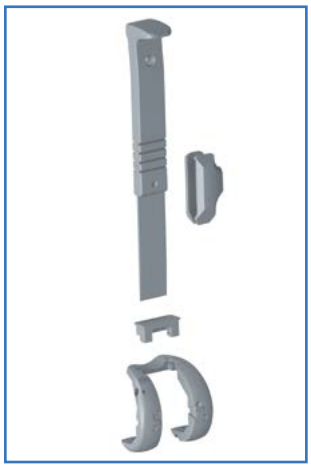


Fig. 52

8.5 Femoral Box Preparation *(continued)*

In order to remove any remaining bone, perform medial and lateral interior femoral box cuts with an oscillating, small saw blade.

If necessary, use a chisel to remove all bone pieces.



Optional:

The proximal box incision can also be performed with a box chisel. Mount the femoral box chisel guide (NQ796R) to the proximal trial femur. Attach the femoral box chisel stop (NQ795R) to the femoral box chisel (NQ794R) so that the desired size is visible but smaller sizes are not. Impact the chisel through the guide to the stop position.

To ensure optimal implant fit of the femoral trial stem the lateral geometry is prepared with the rasp. Connect the rasp (NQ832R) to the handle (NQ565RM) and the trial stem, until assembly is secure. Drive the rasp into the femoral cavity twice up to and including the last wide tooth at the distal end.

8. Femoral Preparation *(continued)*

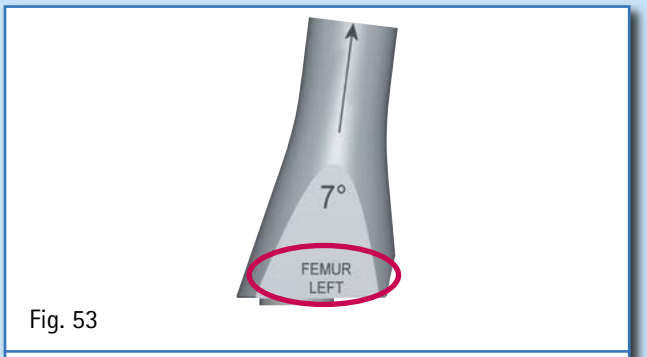


Fig. 53

Fig. 54

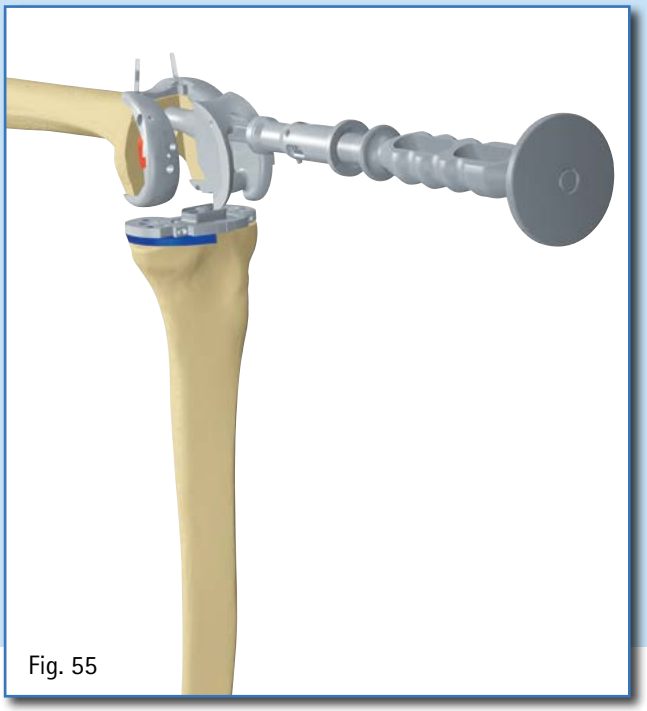


Fig. 55

8.6 Femoral Trial Box Assembly

Thread the selected femoral trial stem into the femoral trial stem adapter having the desired angle and length:

- Femoral pressfit stem trial adapters available in 5° short (NS008R), 5° long (NS011R), 7° short (NS014R), and 7° long (NS017R)
- Femoral cemented stem trial adapters available in 6° short (NQ837R) and 6° long (NQ838R)

Note: *The length code of the adapter and the trial stem have to be the same, i.e a short stem uses the short adapter and the long stem uses the long adapter.*

Then thread the attachment screw (NS001R) into the adapter for one or two turns of the thread. Insert the stem into the proximal guide of the femoral trial box and loosely fixate from the distal side. There should be some play in the AP direction to allow for self-centering.

Connect the impactor handle (NQ565RM) to the femoral trial box holder (NQ770R), ensuring the spring ball is laterally positioned. Connect this construct distally to the femoral trial box.

This trial femoral box assembly is inserted manually into the femur, then impacted until fully seated using a mallet.

8. Femoral Preparation *(continued)*

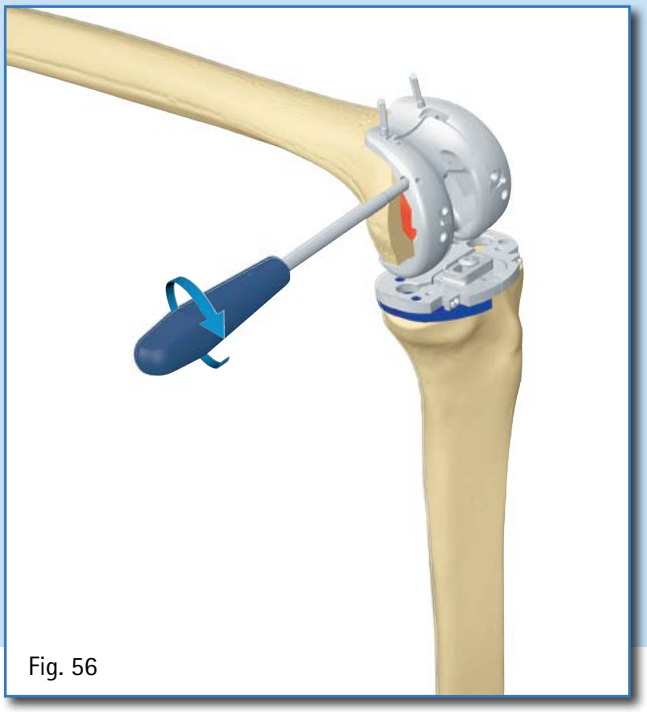


Fig. 56

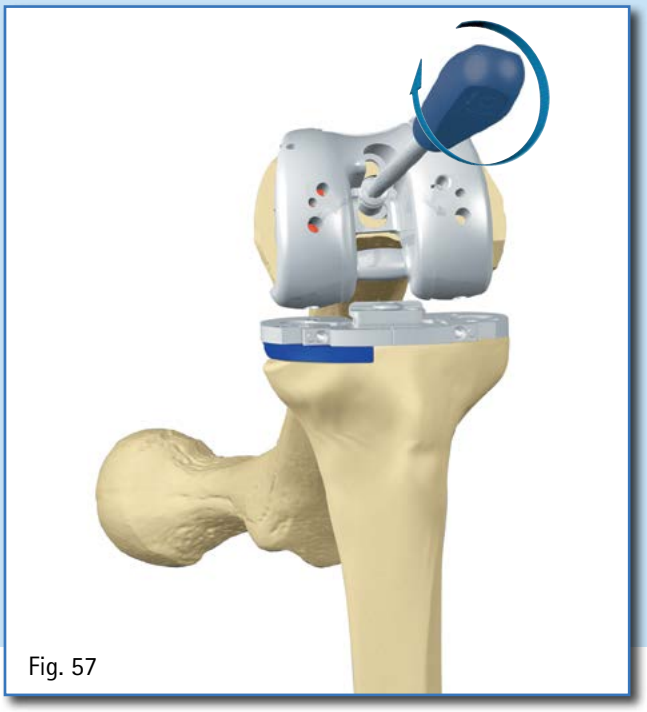


Fig. 57

8.6 Femoral Trial Box Assembly *(continued)*

Use the screwdriver (NQ642R) to secure the trial femoral box to the trial femur.

Use the screwdriver (NQ642R) to secure the intercondylar attachment screw, in order to maintain the self-aligned AP position of the femoral stem.

The two pins in the femoral trial can now be removed.

9. Stability Review

Fig. 58

The trial insert can now be selected and inserted into the trial tibia. Heights 16, 18, and 20 mm can be created by combining the 10, 12, and 14 mm trial insert with the 6 mm supplementary insert.

Trial posts for medium (NP105) and high (NP106) constraints may be used with the trial inserts, by inserting them into the trial insert first posteriorly and then anteriorly.

Joint stability in flexion and extension can now be reviewed and a thicker/thinner insert is selected in accordance with the result. It is recommended to perform this review with the patella.

Note: *The size of the polyethylene insert corresponds with the tibia size, as the system is fixed-bearing. This applies to the trial components and final implant.*

Columbus® Revision Knee System

Surgical Technique

10. Patella Preparation and Implantation

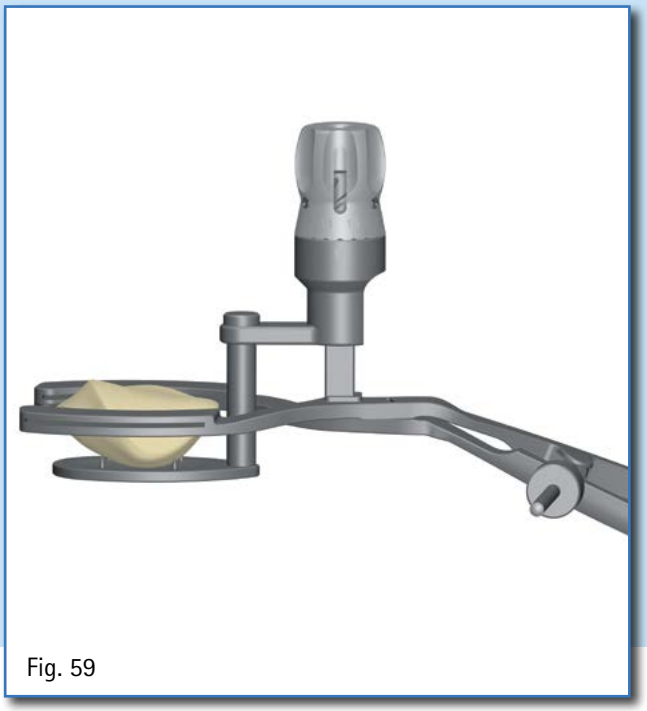


Fig. 59

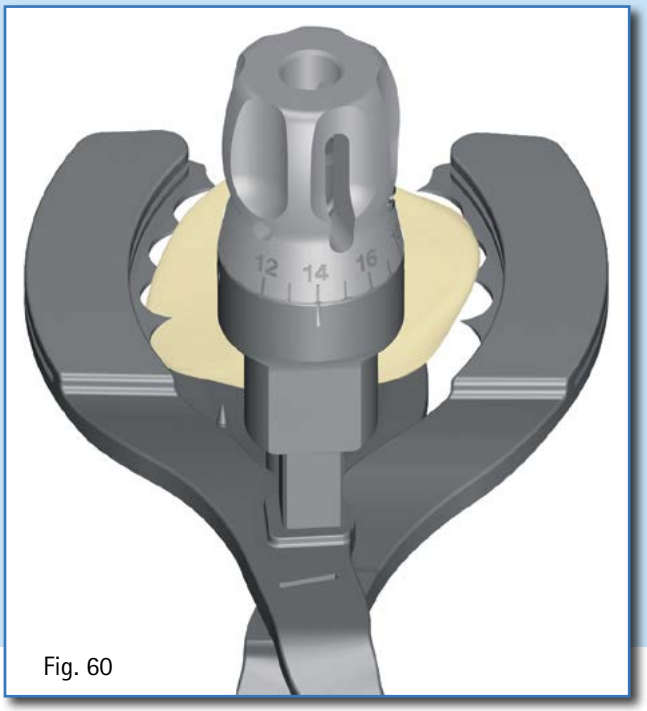


Fig. 60

10.1 Patella Preparation

The thickness of the patella is measured using the caliper (AA847R). This thickness should not be exceeded after implantation of the patella implant. Calculate bone resection.

Note: *The minimum thickness of the remaining patellar bone should be 12 mm.*

Using the patella resection clamp (NS840R), clamp the patella and adjust the level of resection by turning the depth wheel to the planned level of remaining patellar bone thickness.

Perform the resection through the cutting slot with a 1.27 mm thick saw blade.

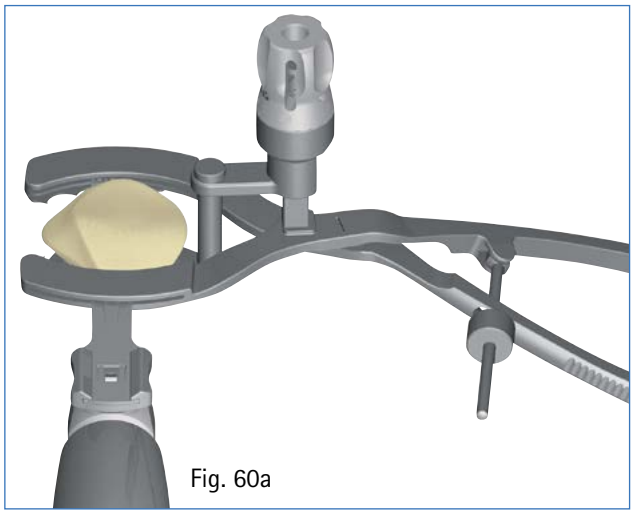
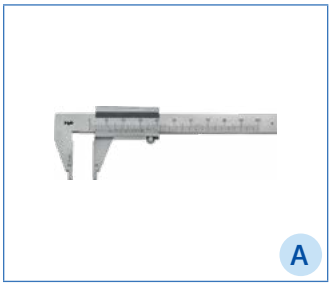


Fig. 60a



A: Caliper (AA847R,) **B:** Patella resection clamp (NS840R), **C:** Acculan® oscillating saw

10. Patella Preparation and Implantation *(continued)*

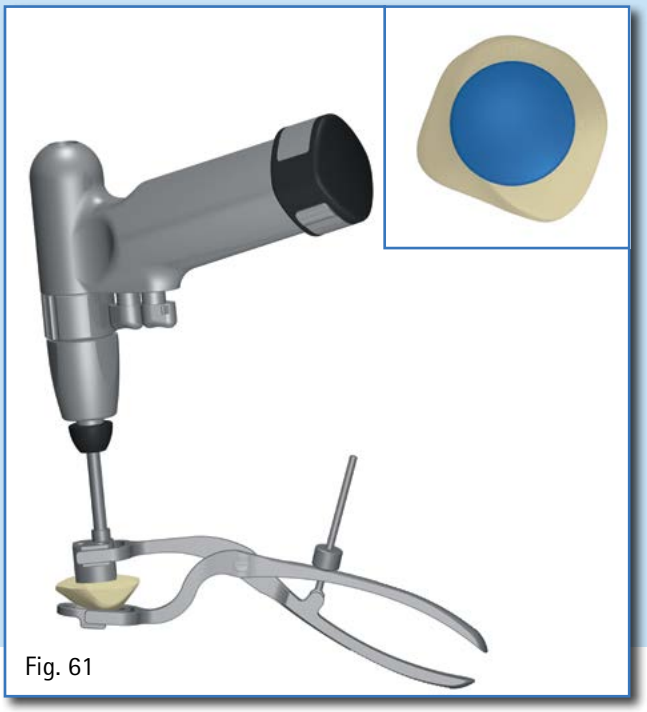


Fig. 61

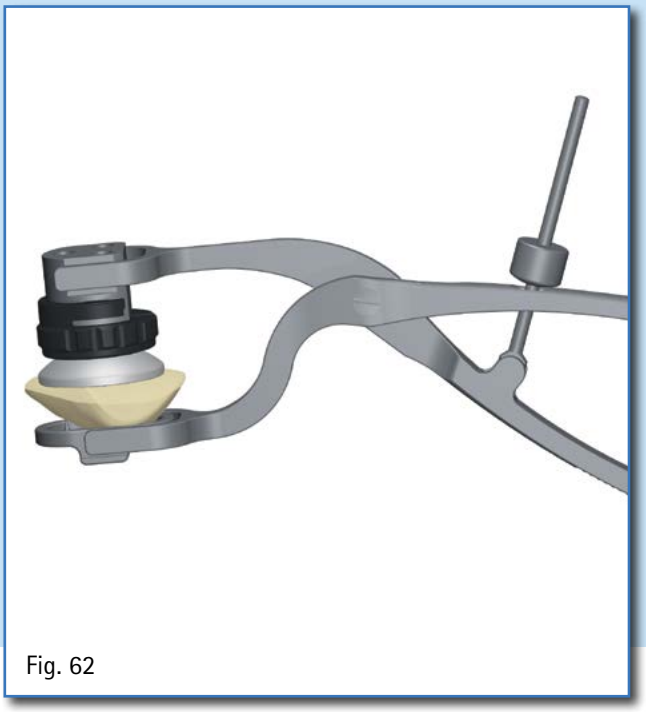


Fig. 62

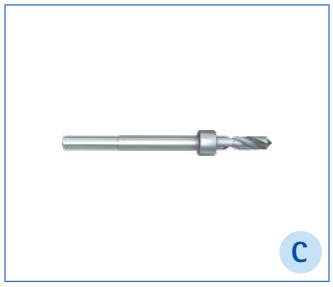
Remove the patella resection clamp. Attach the patella drilling/cementing clamp (NS841R) to the osteomized patellar surface choosing a medialized position to recreate the resected apex of the articular surface. The trial patella can be placed on top of the drill guide to check its position relative to the medial rim as well as in the superior and inferior direction.

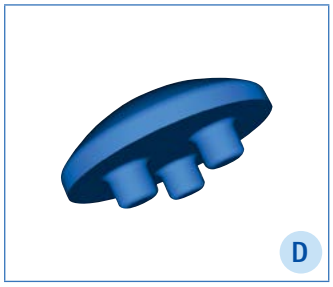
Drill the pegs of the implant through the holes with the 6 mm drill (NQ449R) until the stop is reached. The size of the patella is established with the corresponding trial patellar implant.

10.2 Patella Implantation

Attach the cementing adapter (NS842) to the patella drilling/cementing clamp (NS841R). Place the patella onto the bone with the pegs in the corresponding holes and use the patella drilling/cementing clamp to assist with force transmission during cement hardening.

Note: *All cement residue must be removed carefully in order to avoid third body wear.*





A: Patella drilling/cementing clamp (NS841R), **B:** Acculan® drill, **C:** Drill with stop 6 mm (NQ449R,) **D:** Trial patella (NQ281-NQ285)

Columbus® Revision Knee System

Surgical Technique

11. Assembly and Implantation

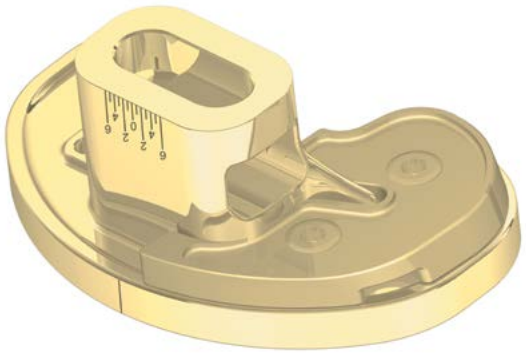


Fig. 63

Fig. 64

11.1 Tibial Assembly

Select the required final implants and prepare based on the result of the trial reduction.

If required, attach the tibial augments to the underside of the tibia using the screws packaged with the augments and screwdriver (NQ642R).

Note: *To apply the required torque, all implants that are tightened with a defined torque (tibial/femoral stem) must be subjected to the torque three times.*

To assist with tightening to the appropriate torque, pressure should be applied to the torque wrench from above. For this reason, it is an advantage to have two persons perform the implant assembly and coupling.

With the tibial implant flipped over, place the tibia implant holder (NQ835R) onto the tibia and fasten by turning the handle. This handle will act as a counter-holder. The defined tibial stem is first threaded into the tibia by hand, based on the medial/lateral offset position noted on the tibial trial implants. Then, attach the stem key for torque wrench (NE185R) onto the torque wrench (NE184RM) and tighten the stem to 20Nm.

Note: *The ML stem position of the tibial trial stem serves as a reference for the assembly of the final tibial stem.*

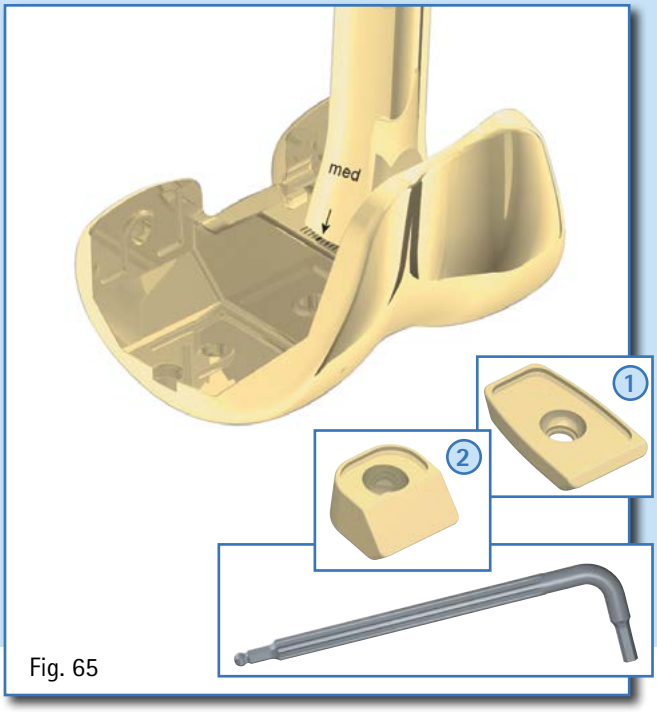


Fig. 65

Fig. 66

11.2 Femoral Assembly

If required, attach the femoral augments to the backside of the femur using the screws packaged with the augments and screwdriver (NQ642R). The cranked wrench (NQ643R) with ball-shaped end may assist with fixation of the posterior augments.

Sequence for Femoral Augment Assembly:

1. Distal Augment (1)
2. Posterior Augment (2)

Insert the separately packaged femoral stem nut into the backside of the femur. Then, with the tension bolt inside the defined femoral stem, thread the tension bolt into the femoral stem nut by hand, based on the anterior/posterior offset position noted on the femoral trial implants. Next, attach femoral stem implant holder (NQ834R) to the femoral stem to act as a counter-holder. Lastly, attach the stem key for torque wrench (NE185R) onto the torque wrench (NE184RM) and tighten the stem to 27Nm.

Note: *The AP stem position of the femoral trial stem serves as a reference for the assembly of the final femoral stem.*

Columbus® Revision Knee System

Surgical Technique

11. Assembly and Implantation *(continued)*

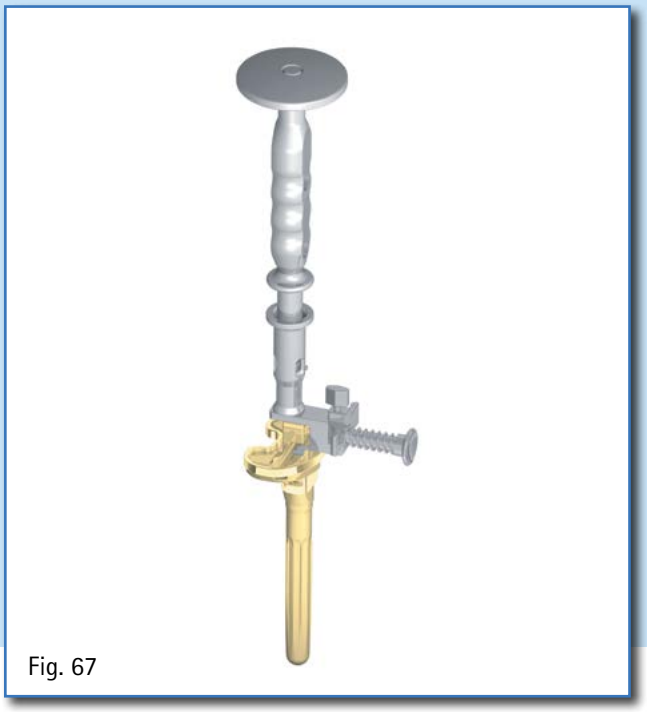


Fig. 67

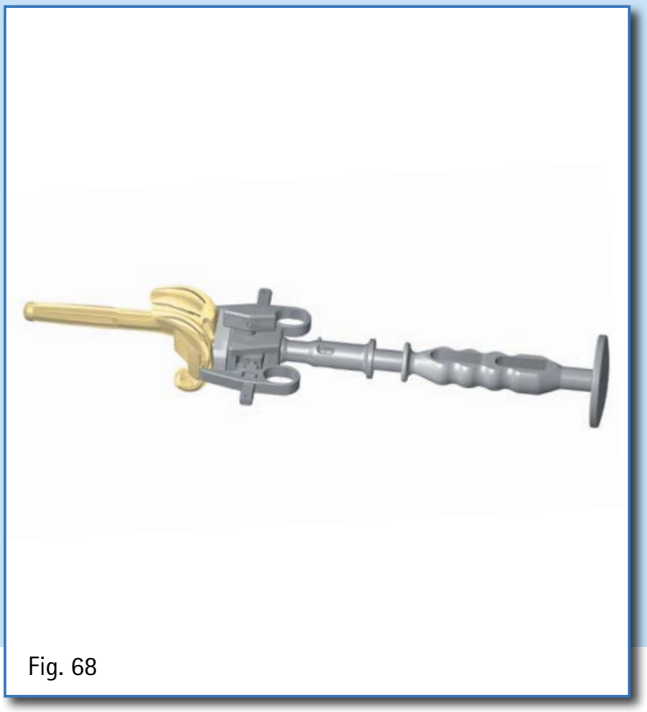


Fig. 68

11.3 Tibial Implantation

Note: *Tibial and femoral implants must be cemented. The stem can be used either with cement or pressfit applications, depending upon the fixation need.*

It must be ensured that the bone preparation, in terms of sizes, diameters, heights and lengths, matches the final implant. Verify this information with the trial components prior to final implant assembly and implantation.

Implantation sequence:

- Tibia
- Femur
- PE Insert
- Patella

Connect the tibial implant holder (NQ560R) to the impactor handle (NQ565RM). Attach the tibia to the implant holder and secure using the tightening knob. Then, hammer this construct perpendicularly into the bone in the correct rotational position.

Optional:

Insert the tibia by hand in the correct rotational position. Place the tibia impactor (NQ645) onto the tibia and then hammer it perpendicular into the bone.

11.4 Femoral Implantation

Connect the femoral implant holder (NQ399R) to the impactor handle (NQ565RM). Attach the femur to the implant holder by placing the binary claws onto the lateral recesses of the implant. Then, hammer this construct into the bone in the correct position.

Optional:

Insert the femur by hand in the correct position. Place the femur impactor (NQ644) onto the femur and then hammer it into the bone.

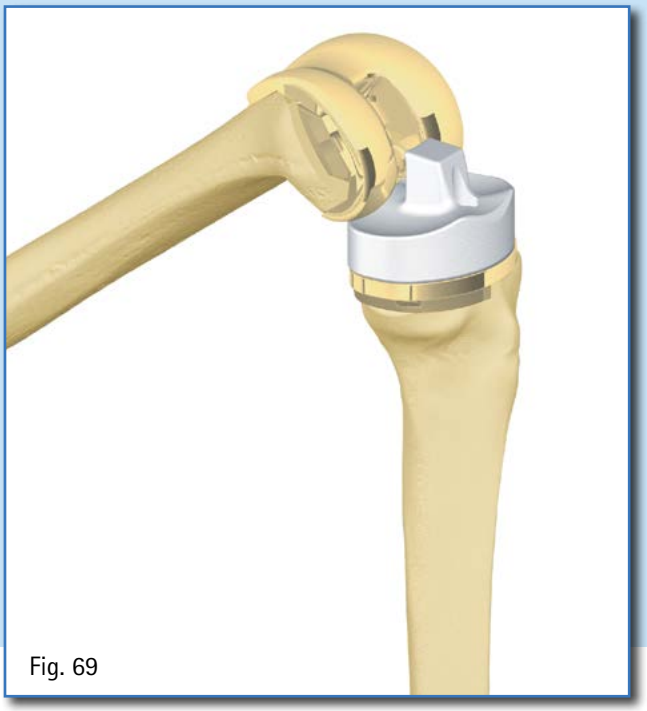


Fig. 69

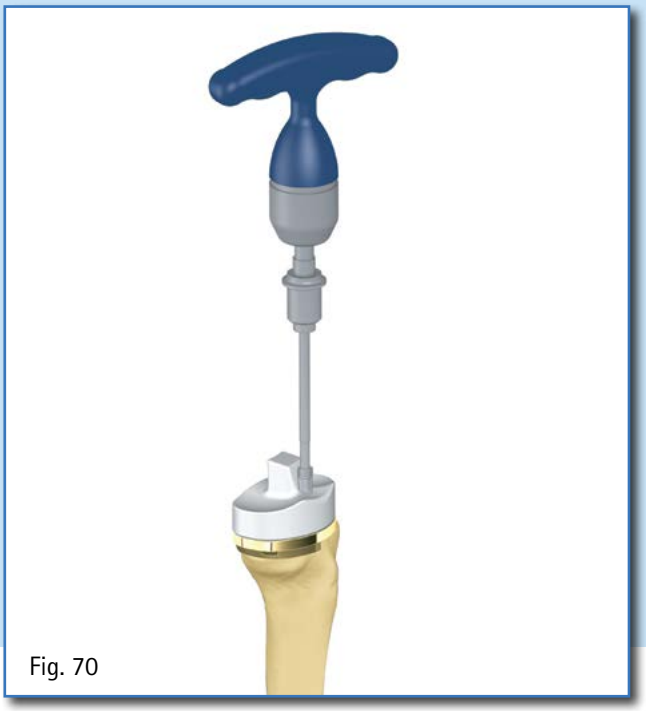


Fig. 70

11.5 PE Insert Implantation

The final PE insert is initially inserted into the tibial implant with the posterior side placed at a downward angle. Then, use the tibial impactor (NQ645) and a mallet to impact the PE insert on the anterior side. Ensure that all 4 locking points (two on the posterior side and two on the anterior side) are fully seated within the tibial implant.

Note: *The size of the polyethylene insert corresponds with the tibia size, as the system is fixed-bearing. This applies to the trial components and final implant.*

All cement residue must be removed carefully in order to avoid third body wear. Ensure all cement residue is removed surrounding the PS box.

It is recommended to place a trial PE insert into the tibial implant directly after the femur has been implanted. Place the leg in extension and wait for the cement to fully cure. Then review joint stability with the trial PE insert after the cement has fully cured.

After hardening of the bone cement, the PE insert fixation screw is implanted. Attach the torque wrench adapter (NP450R) to the torque wrench T-handle (NE160R). Place the PE insert fixation screw into the borehole within the PE insert and use the torque wrench T-handle to seat the fixation screw.

Note: *It is recommended to implant the final PE implant and PE insert fixation screw after the cement has fully cured.*

Columbus® Revision Knee System

Surgical Technique

12. Cementation Technique

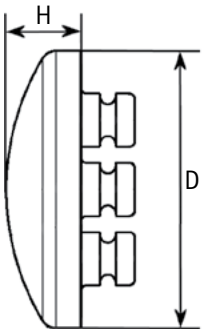
- Regardless of what fixation method is utilized, it is critical that correct techniques are employed to help avoid complications and early failure. Even with accurate resection, it is important to ensure that components are fully seated, as it is easy for this to be obscured when cementing is taking place. Varus-valgus alignment can be significantly affected by unequal medial-lateral cement mantles and poorly seated components. There can be a tendency to place femoral components in relatively flexed positions if specific care is not taken.
- It should also be note 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. This in turn is of positive prognostic significance when predicting aseptic loosening, so proper attention to the cementation steps must be taken.
- 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 optimal 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.
- The surfaces should be properly dried prior to cementation and appropriate exposure of all bony surfaces achieved. 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 significant effect on the longevity of the fixation of the femoral implant. A further point worth noting is that 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.
- 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 preferred layered fashion.

13. Implant Specifications

Femur/Tibia Compatibility Chart

Sizes	F1	F2	F3	F4	F5	F6	F7
T0/T0+							
T1/T1+							
T2/T2+							
T3/T3+							
T4/T4+							
T5							

Ideal combination for optimum performance
Possible, but not recommended
Not compatible



Patella Measurements in (mm)

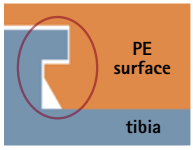
Size	Diameter	Height
P1	26	7
P2	29	8
P3	32	9
P4	35	10

PE Insert Measurements	Medium Constraint	High Constraint
Post Width	17.25 mm	17.75 mm
Rotation	±2.2°	±1.2°
Varus/Valgus	No Stability	±1° / ±0.4°
Hyper Extension	4°	
Flexion	130°	
Jumping Distance Size 4 (at 90°)	15-17 mm	
PE Design	Fixed PS	
Slope Built Into PE	3°	

Note: PE Insert based on tibia size

PE Insert Measurements

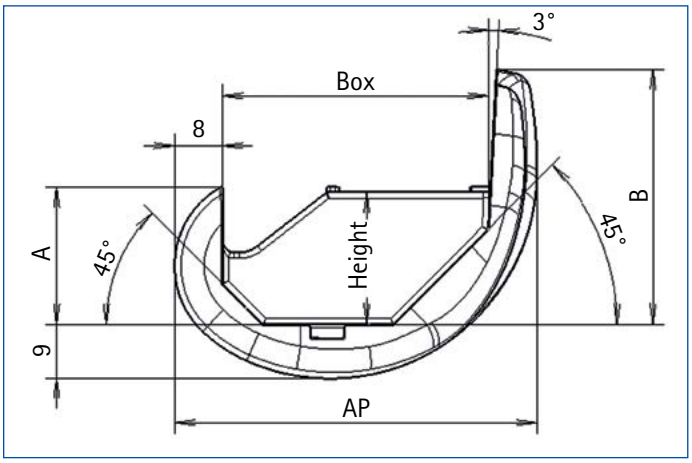
- Sizes T0/T0+ and T1/T1+ with heights 10, 12, 14, 16, 18, 20, 24 mm
- Sizes T2/T2+ and T3/T3+ with heights 10, 12, 14, 16, 18, 20, 24, 28 mm
- Sizes T4/T4+ and T5 with heights 10, 12, 14, 16, 18, 20, 24, 28, 32 mm
- Fixation screw packaged with PE insert
- PE insert secured in the tibia with four point locking mechanism

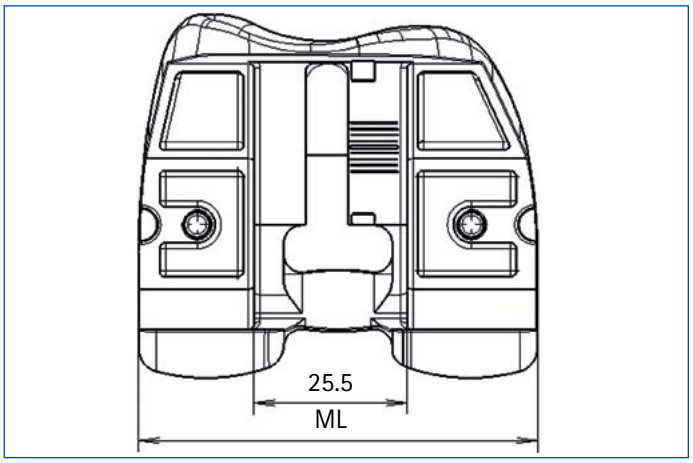


Columbus® Revision Knee System

Surgical Technique

13. Implant Specifications *(continued)*





Femoral Measurements in (mm)

	ML	AP	Box	Box diff. -	Box Diff. +	A	B	Height
F1	56	50	34	0	3	18.5	34	19
F2	59	53	37	3	3	20	36.5	20.5
F3	62.5	56.5	40	3	3.5	21.5	39.5	22
F4	66.5	60.5	43.5	3.5	4	23	42.5	22
F5	71	65	47.5	4	4.5	26	46	22
F6	76	70	52	4.5	5	28	49.5	22
F7	82	75.5	57	5	0	30	53.5	22

Femur Details

- Anatomic design - left/right
- 7 sizes
- J-Curve design
- Cement pockets 1 mm deep
- Hyperextension of 4°
- Flexion angle of 130°
- AP offset of ±4 mm through femoral stems

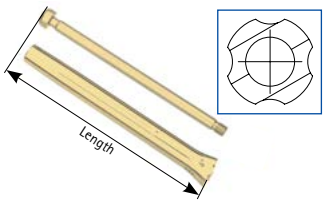
Femoral Augment Details

- Cement pockets 1 mm deep
- Fixated with a screw on the backside of the femur
- Distal augment heights:
  - F1-F3: 5, 10 mm
  - F4-F7: 5, 10, 15 mm
- Posterior augment heights:
  - F1-F3: 5, 10 mm
  - F4-F7: 5, 10, 15 mm

Note: *Max bone loss at distal femur:*

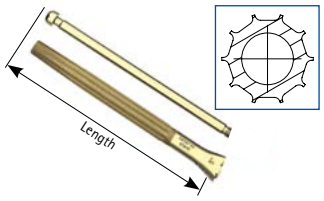
- *F1-F3: 19 mm*
- *F4-F7: 24 mm*

Femoral Stem Details



Cemented

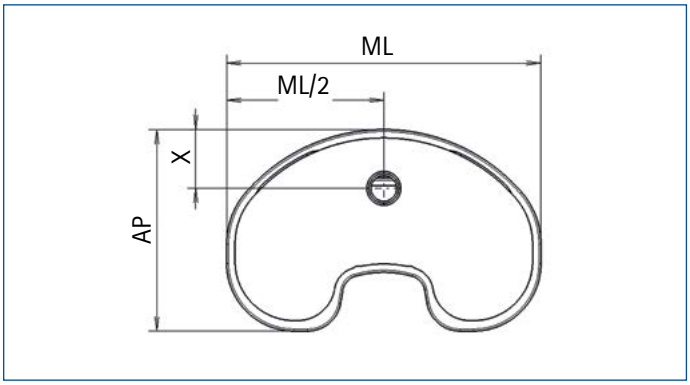
- Cemented: 6° angle
- Length: 77, 157 mm
- Diameter: 12, 15, 18 mm
- Cylindrical and polished
- Four fluted grooves to reduce the risk of embolism

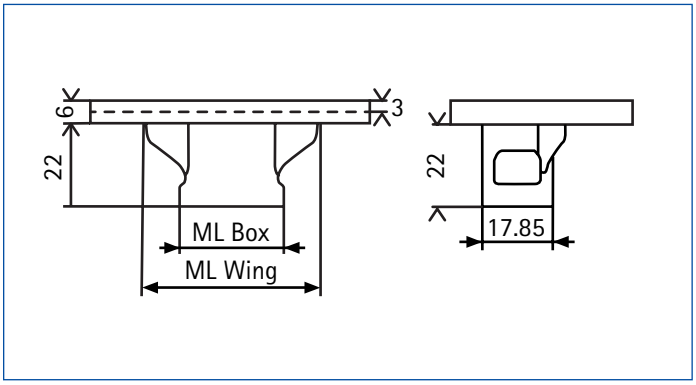


Pressfit

- Pressfit: 5°, 7° angle
- Length: 117, 177 mm
- Diameter: 12 - 20 mm (1 mm increments)
- Slightly tapered
- 10 fluted grooves (Wagner profile)

13. Implant Specifications *(continued)*





Tibia Measurements in (mm)

Size	T0/0+	T1/1+	T2/2+	T3/3+	T4/4+	T5
ML	62	65	70	75	80	85
AP	41/44	43/46	45/49	48/52	51/55	56
X	10.5/11	11.5/12.5	12.5/14	15.5	15.5/17	17

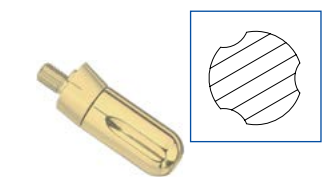
Tibia Measurements in (mm)

Size	T0	T0+	T1	T1+	T2	T2+	T3	T3+	T4	T4+	T5
ML wing	37.3	37.3	39.3	39.3	42.3	42.3	45.3	45.3	48.3	48.3	51.3
ML box	23.85	23.85	27.85	27.85	27.85	27.85	27.85	27.85	27.85	27.85	27.85

Tibia Details

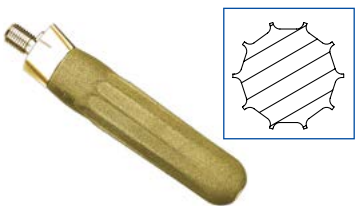
- Symmetric design
- 11 sizes
  - T0 through T4 have plus sizes
  - Plus sizes are wider in the AP than standard
- Cement pockets 1 mm deep
- AP offset ±6 mm through tibial stems
  - Size T0/T0+ ±4 mm

Tibial Stem Details



Cemented

- Cemented: no angle
- Length: 52, 92 mm
- Diameter: 12, 15, 18 mm
- Cylindrical and polished
- Three fluted grooves to reduce the risk of embolism
- Asymmetric "collar" for increased stability



Pressfit

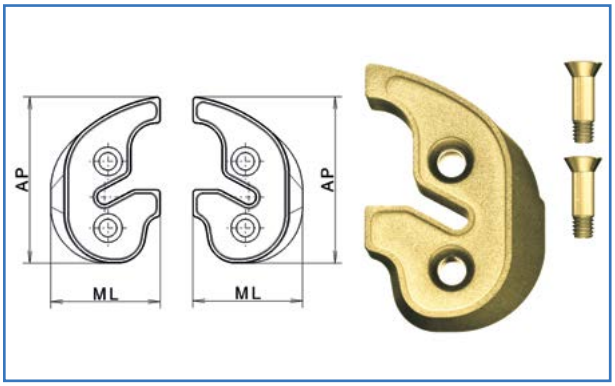
- Pressfit: no angle
- Length: 92, 132 mm
- Diameter: 11 - 20 mm (1 mm increments)
- Slightly tapered
- 10 fluted grooves (Wagner profile)
- Asymmetric "collar" for increased stability

Columbus® Revision Knee System

Surgical Technique

13. Implant Specifications *(continued)*

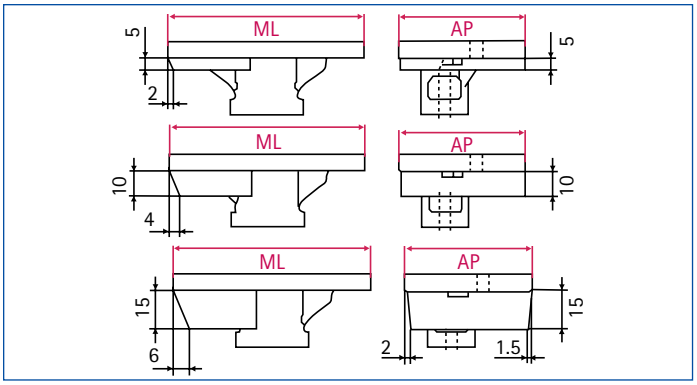
Tibial Augment Details

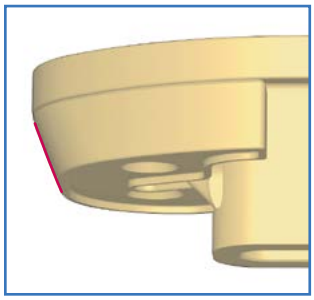


- Cement pockets 1 mm deep
- Fixated with a screw on the underside of the tibia
- Tibia augment heights: 5, 10, 15 mm
- Anatomical medial or lateral design

Tibia Hemi-Augment Measurement in (mm)

Size	T0	T1	T2	T3	T4	T5
AP	40.3	42.3	44.4	47.4	50.5	55.5
ML	24.8	26.3	28.8	31.1	33.8	36.3





The reduction in diameter follows the natural anatomic design.

Tibia Hemi-Augment Measurements in (mm)

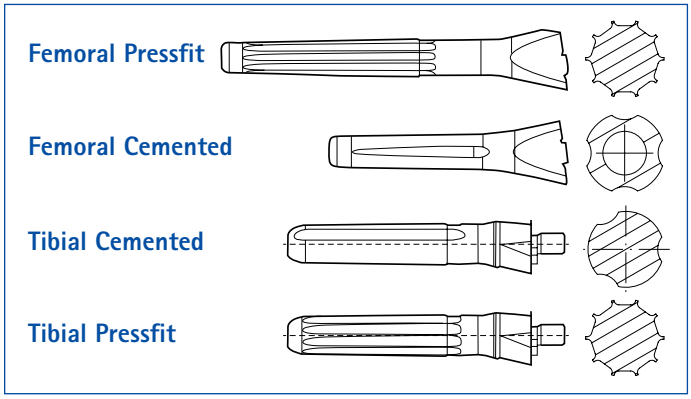
w/ 2 augments	T0/T0+	T1/T1+	T2/T2+	T3/T3+	T4/T4+	T5
Original ML	62	65	70	75	80	85
5 mm ML	58	61	66	71	76	81
10 mm ML	54	57	62	67	72	77
15 mm ML	50	53	58	63	68	73
Original AP	41/44	43/46	45/49	58/52	51/55	56
5 mm AP	40.3	42.3	44.4	47.4	50.5	55.5
10 mm AP	40.3	42.3	44.4	47.4	50.5	55.5
15 mm AP	37.3	39.3	41.4	44.4	47.5	52.5

Note: *Max bone loss at tibia*

- *T0-T1: 39 mm*
- *T2-T3: 43 mm*
- *T4-T5: 47 mm*

13. Implant Specifications *(continued)*

Stem Measurements in (mm)

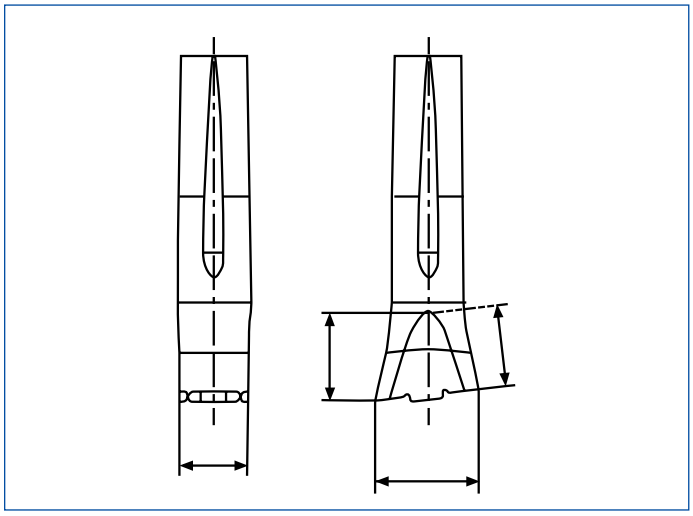


Cemented Stems:

- Polished
- 3° conically shaped up to 3.6 cm from the stem tip

Pressfit Stems:

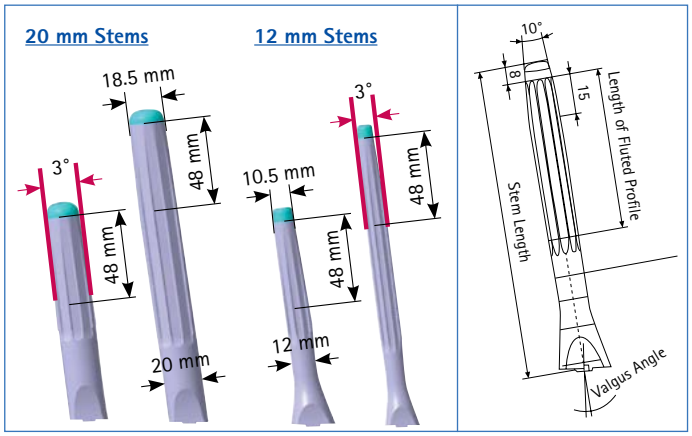
- Corrundum radiated
- 3° conically shaped up to 5.6 cm from the stem tip



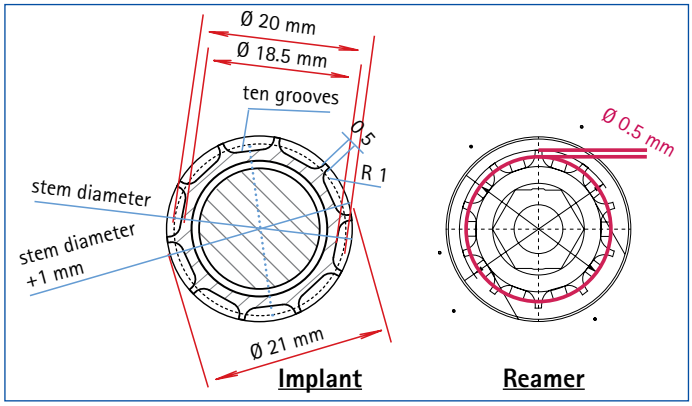
Connection Hub Measurements in (mm) for Femoral Stem

	D. 12 x L. 77	D. 15 x L. 77	D. 18 x L. 77	D. 12 x L. 157	D. 15 x L. 157	D. 18 x L. 157
A	14	14	14	14	14	14
B	20.9	20.9	20.9	20.9	20.9	20.9
C	17.3	17.8	17.1	17.3	17.8	17.1
D	16.1	16.6	15.9	16.1	16.6	15.9

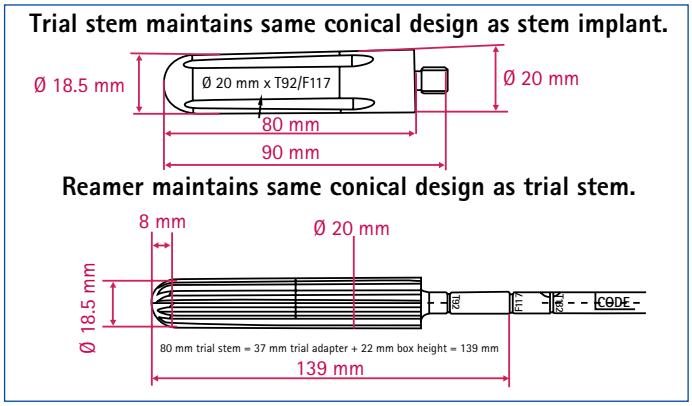
**It is recommended that you check the patient x-ray template of manufactured cone and place it on top with EnduRo template to ensure all implants fit together.*



The pressfit stem offers a 1 mm pressfit.



Size 20 mm is used as an example.



Size 20 mm is used as an example.

Cemented Stem Measurements in (mm)

	D. 12 Stem		D. 15 Stem		D. 18 Stem	
Reamer	12	14	15	17	18	20
Trial Stem	12	14	15	17	18	20
Cement Mantle	Minimal	2	Minimal	2	Minimal	2

Columbus® Revision Knee System

Surgical Technique

14. Columbus Revision Implants

Columbus Rev PS Femur

Size	Qty.	Left	Right
F1	1	NR001Z	NR011Z
F2	1	NR002Z	NR012Z
F3	1	NR003Z	NR013Z
F4	1	NR004Z	NR014Z
F5	1	NR005Z	NR015Z
F6	1	NR006Z	NR016Z
F7	1	NR007Z	NR017Z

Columbus Rev Femoral Augment – Distal

Size	Qty.	5 mm	10 mm	15 mm
F1	2	NR461Z	NR471Z	–
F2	2	NR462Z	NR472Z	–
F3	2	NR463Z	NR473Z	–
F4	2	NR464Z	NR474Z	NR484Z
F5	2	NR465Z	NR475Z	NR485Z
F6	2	NR466Z	NR476Z	NR486Z
F7	2	NR467Z	NR477Z	NR487Z

Columbus Rev Femoral Augment – Posterior

Size	Qty.	5 mm	10 mm	15 mm
F1	2	NR561Z	NR571Z	–
F2	2	NR562Z	NR572Z	–
F3	2	NR563Z	NR573Z	–
F4	2	NR564Z	NR574Z	NR584Z
F5	2	NR565Z	NR575Z	NR585Z
F6	2	NR566Z	NR576Z	NR586Z
F7	2	NR567Z	NR577Z	NR587Z

Columbus Rev Femoral Stem Nut All Sizes

Qty.	Item No.
2	NR400Z

Patellas

Size	Qty.	Item No.
P1	1	NX041
P2	1	NX042
P3	1	NX043
P4	1	NX044

Columbus Rev Femoral Stem Cemented 6°

Size (mm)	Qty.	Item No.
D. 12 x L. 77	1	NR291Z
D. 15 x L. 77	1	NR292Z
D. 18 x L. 77	1	NR293Z
D. 12 x L. 157	1	NR294Z
D. 15 x L. 157	1	NR295Z
D. 18 x L. 157	1	NR296Z

Columbus Rev Femoral Stem Cementless 5°, 7°

5°		
Size (mm)	**Qty.**	**Item No.**
D. 12 x L. 117	1	NR402Z
D. 13 x L. 117	1	NR403Z
D. 14 x L. 117	1	NR404Z
D. 15 x L. 117	1	NR405Z
D. 16 x L. 117	1	NR406Z
D. 17 x L. 117	1	NR407Z
D. 18 x L. 117	1	NR408Z
D. 19 x L. 117	1	NR409Z
D. 20 x L. 117	1	NR410Z
D. 12 x L. 177	1	NR432Z
D. 13 x L. 177	1	NR433Z
D. 14 x L. 177	1	NR434Z
D. 15 x L. 177	1	NR435Z
D. 16 x L. 177	1	NR436Z
D. 17 x L. 177	1	NR437Z
D. 18 x L. 177	1	NR438Z
D. 19 x L. 177	1	NR439Z
D. 20 x L. 177	1	NR440Z
7°		
D. 12 x L. 117	1	NR502Z
D. 13 x L. 117	1	NR503Z
D. 14 x L. 117	1	NR504Z
D. 15 x L. 117	1	NR505Z
D. 16 x L. 117	1	NR506Z
D. 17 x L. 117	1	NR507Z
D. 18 x L. 117	1	NR508Z
D. 19 x L. 117	1	NR509Z
D. 20 x L. 117	1	NR510Z
D. 12 x L. 177	1	NR532Z
D. 13 x L. 177	1	NR533Z
D. 14 x L. 177	1	NR534Z
D. 15 x L. 177	1	NR535Z
D. 16 x L. 177	1	NR536Z
D. 17 x L. 177	1	NR537Z
D. 18 x L. 177	1	NR538Z
D. 19 x L. 177	1	NR539Z
D. 20 x L. 177	1	NR540Z

Columbus® Revision Knee System

Surgical Technique

14. Columbus Revision Implants *(continued)*

Columbus Rev Tibia

Size	Qty.	Standard	Plus
T0	1	NR070Z	NR068Z
T1	1	NR071Z	NR072Z
T2	1	NR073Z	NR074Z
T3	1	NR075Z	NR076Z
T4	1	NR077Z	NR078Z
T5	1	NR079Z	–

Columbus Rev Tibial Hemi-Augment

Size	Qty.	5 mm RL/LM	10 mm RL/LM	15 mm RL/LM	5 mm RM/LL	10 mm RM/LL	15 mm RM/LL
T0/T0+	1	NR240Z	NR241Z	NR242Z	NR040Z	NR041Z	NR042Z
T1/T1+	1	NR244Z	NR245Z	NR246Z	NR044Z	NR045Z	NR046Z
T2/T2+	1	NR248Z	NR249Z	NR250Z	NR048Z	NR049Z	NR050Z
T3/T3+	1	NR252Z	NR253Z	NR254Z	NR052Z	NR053Z	NR054Z
T4/T4+	1	NR256Z	NR257Z	NR258Z	NR056Z	NR057Z	NR058Z
T5	1	NR260Z	NR261Z	NR262Z	NR060Z	NR061Z	NR062Z

Columbus Rev PS MC (Moderately Constrained) PE Insert

Size	Qty.	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm	24 mm	28 mm	32 mm
T0/T0+	1	NR100M	NR101M	NR102M	NR103M	NR104M	NR105M	NR106M	–	–
T1/T1+	1	NR110M	NR111M	NR112M	NR113M	NR114M	NR115M	NR116M	–	–
T2/T2+	1	NR120M	NR121M	NR122M	NR123M	NR124M	NR125M	NR126M	NR127M	–
T3/T3+	1	NR130M	NR131M	NR132M	NR133M	NR134M	NR135M	NR136M	NR137M	–
T4/T4+	1	NR140M	NR141M	NR142M	NR143M	NR144M	NR145M	NR146M	NR147M	NR148M
T5	1	NR150M	NR151M	NR152M	NR153M	NR154M	NR155M	NR156M	NR157M	NR158M

Note: *PE Insert based on tibia size*

Columbus Rev PS HC (Highly Constrained) PE Insert

Size	Qty.	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm	24 mm	28 mm	32 mm
T0/T0+	1	NR600M	NR601M	NR602M	NR603M	NR604M	NR605M	NR606M	–	–
T1/T1+	1	NR610M	NR611M	NR612M	NR613M	NR614M	NR615M	NR616M	–	–
T2/T2+	1	NR620M	NR621M	NR622M	NR623M	NR624M	NR625M	NR626M	NR627M	–
T3/T3+	1	NR630M	NR631M	NR632M	NR633M	NR634M	NR635M	NR636M	NR637M	–
T4/T4+	1	NR640M	NR641M	NR642M	NR643M	NR644M	NR645M	NR646M	NR647M	NR648M
T5	1	NR650M	NR651M	NR652M	NR653M	NR654M	NR655M	NR656M	NR657M	NR658M

Note: *PE Insert based on tibia size*

Columbus Rev Tibial Stem Cemented

Size (mm)	Qty.	Item No.
D. 12 x L. 52	1	NR191Z
D. 15 x L. 52	1	NR192Z
D. 18 x L. 52	1	NR193Z
D. 12 x L. 92	1	NR194Z
D. 15 x L. 92	1	NR195Z
D. 18 x L. 92	1	NR196Z

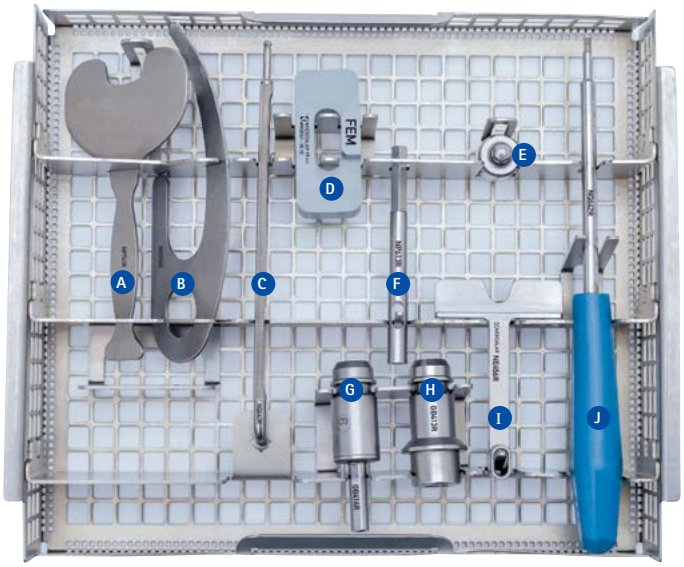
Columbus Rev Tibial Stem Cementless

Size (mm)	Qty.	Item No.
D. 11 x L. 92	1	NR171Z
D. 12 x L. 92	1	NR172Z
D. 13 x L. 92	1	NR173Z
D. 14 x L. 92	1	NR174Z
D. 15 x L. 92	1	NR175Z
D. 16 x L. 92	1	NR176Z
D. 17 x L. 92	1	NR177Z
D. 18 x L. 92	1	NR178Z
D. 19 x L. 92	1	NR179Z
D. 20 x L. 92	1	NR180Z
D. 11 x L. 132	1	NR181Z
D. 12 x L. 132	1	NR182Z
D. 13 x L. 132	1	NR183Z
D. 14 x L. 132	1	NR184Z
D. 15 x L. 132	1	NR185Z
D. 16 x L. 132	1	NR186Z
D. 17 x L. 132	1	NR187Z
D. 18 x L. 132	1	NR188Z
D. 19 x L. 132	1	NR189Z
D. 20 x L. 132	1	NR190Z

Columbus® Revision Knee System

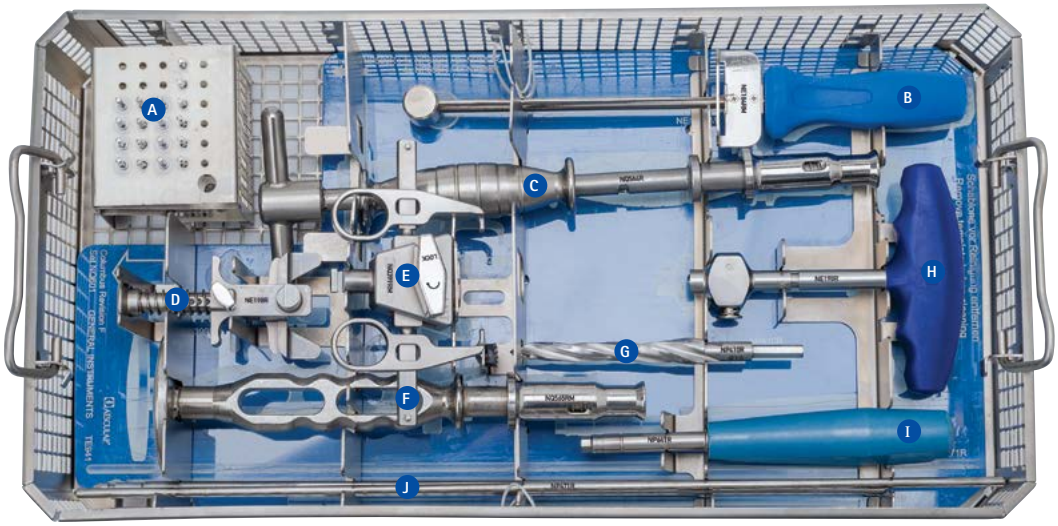
Surgical Technique

15. Columbus Revision Instruments – 13 Trays



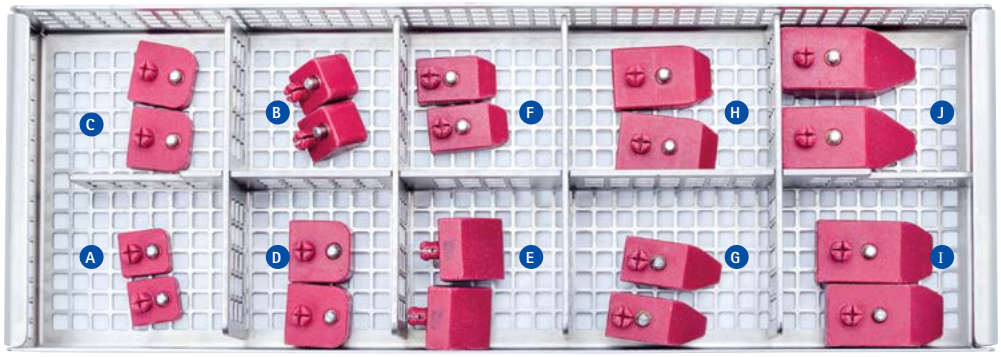
General Instruments (NQ601) – Top Tray

Index	Qty.	Item No.	Description	Index	Qty.	Item No.	Description
A	1	NP741R	Tibial Protection Plate	F	1	NP613R	Pin Driver
B	1	NM350R	Cut Check Blade Th. 1.3 mm	G	1	GB414R	Hexagonal Quick Connect with Triangular Chuck Connector
C	1	NQ643R	Cranked Wrench HEX 3.0 mm	H	1	GB413R	Hexagonal Quick Connect
D	1	NQ561	Insert for Femoral Implant Holder/Insertion Instrument (NQ560R)	I	1	NE456R	Alignment Rod Control Plate
E	1	NE185R	Stem Key for Torque Wrench (NE184RM)	J	1	NQ642R	Screwdriver HEX 3.0 mm



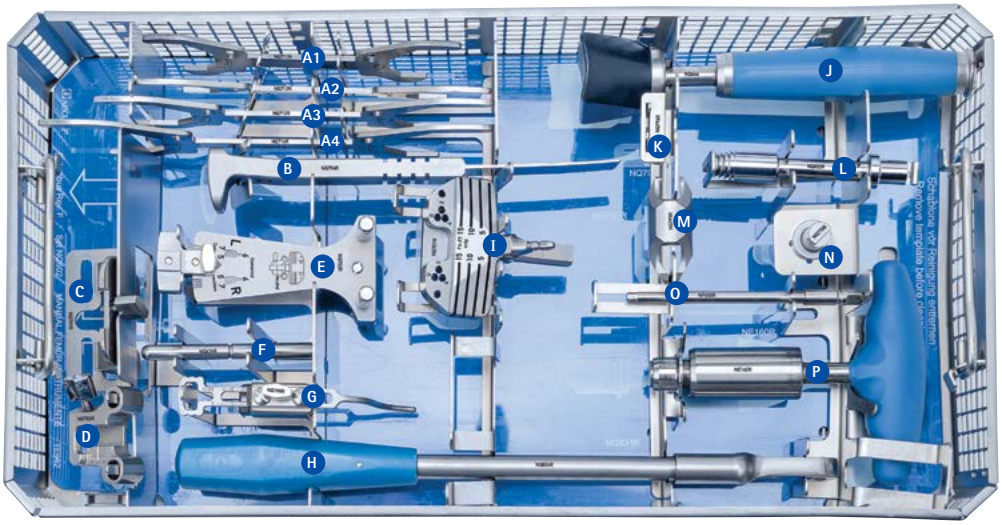
General Instruments (NQ601) – Bottom Tray

Index	Qty.	Item No.	Description	Index	Qty.	Item No.	Description
	1	NP480R	Pin Box	G	1	NP410R	Drill D. 10 mm
	4	NP582R	Threaded Headless Pin D. 3.2 mm x L. 38 mm	H	1	NE198R	T-handle
A	6	NP583R	Threaded Headless Pin D. 3.2 mm x L. 63 mm	I	1	NP614R	Pin Driver Handle
	4	NP585R	Threaded Headed Pin D. 3.2 mm x L. 30 mm		1	NE376R	IM Alignment Rod D. 8 mm x L. 260 mm
	4	NP586R	Threaded Headed Pin D. 3.2 mm x L. 50 mm	J	1	NE331R	Alignment Rod Short with Sleeve
B	1	NE184RM	Torque Wrench 20/27 Nm		1	NP471R	Alignment Rod Long
C	1	NQ564R	Impactor/Extractor		1	NQ621R	General Instruments Tray
D	1	NQ560R	Tibial Implant Holder/Impactor		1	TE941	Graphic Template for NQ621 (NQ601)
E	1	NQ399RM	Femoral Implant Holder/Inserter		1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm
F	1	NQ565RM	Impactor/Extractor Handle				



Manual Femur Instruments Tray (NQ602) – Top Tray

Index	Qty.	Item No.	Description	Index	Qty.	Item No.	Description
A	2	NQ745	Femoral Trial Augment Posterior F1-F3 H. 5 mm	F	2	NQ740	Femoral Trial Augment Distal F1-F3 H. 5 mm
B	2	NQ746	Femoral Trial Augment Posterior F1-F3 H. 10 mm	G	2	NQ741	Femoral Trial Augment Distal F1-F3 H. 10 mm
C	2	NQ747	Femoral Trial Augment Posterior F4-F7 H. 5 mm	H	2	NQ742	Femoral Trial Augment Distal F4-F7 H. 5 mm
D	2	NQ748	Femoral Trial Augment Posterior F4-F7 H. 10 mm	I	2	NQ743	Femoral Trial Augment Distal F4-F7 H. 10 mm
E	2	NQ749	Femoral Trial Augment Posterior F4-F7 H. 15 mm	J	2	NQ744	Femoral Trial Augment Distal F4-F7 H. 15 mm



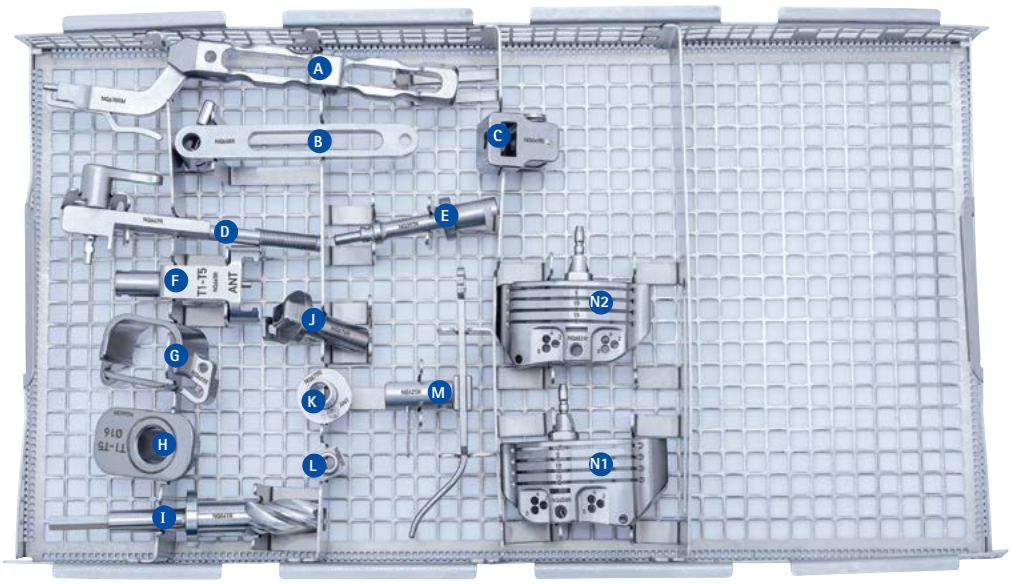
Manual Femur Instruments Tray (NQ602) – Bottom Tray

Index	Qty.	Item No.	Description	Index	Qty.	Item No.	Description
A1-4	1 ea.	NQ711R, NQ712R, NQ713R, NQ714R	Femoral Sizer F1/F2, F3/F4, F5/F6, F7	I	1	NQ701R	Distal Femoral Cutting Guide
				J	1	NQ644	Femur Impactor, Curved
				K	1	NQ796R	Femoral Box Chisel Guide
				L	1	NQ832R	Femoral Stem Starter Rasp
B	1	NQ794R	Femoral Box Chisel	M	1	NQ795R	Femoral Box Chisel Stop
C	1	NQ799R	Distal Femoral Contact Plate	N	1	NQ770R	Femoral Trial Box Holder/Extractor
D	1	NQ703R	Distal Femoral Cutting Guide Body	O	1	NP450R	Torque Wrench Adapter HEX 4.5 mm
E	1	NQ702R	Distal Femoral Cutting Guide Base	P	1	NE160R	Torque Wrench T-handle 10 Nm
F	1	NQ474R	Distal Femoral Cutting Guide Handle Bar		1	NQ622R	Manual Femur Instruments Tray
G	1	NQ798R	Jointline Positioner		1	TE942	Graphic Template for NQ622R (NQ602)
H	1	NQ834R	Femoral Stem Implant Holder		1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm

Columbus® Revision Knee System

Surgical Technique

15. Columbus Revision Instruments *(continued)*



Tibial Preparation Instruments Tray (NQ603) – Top Tray

Index	Qty.	Item No.	Description
A	1	NQ678RM	Handle for Trial Tibia
B	1	NQ648R	Tibial Cutting Guide Lever Arm
C	1	NQ649R	Tibial Cutting Guide Build Block
D	1	NQ647R	Tibial Cutting Guide Body
E	1	NQ397R	Tibial Trial Stem Connector Adapter
F	1	NQ665R	Tibial Broach/Keel Trial Holder
G	1	NQ669R	Guide for Tibial Broach/Keel Trial and Drill Sleeve
H	1	NQ663R	Drill Sleeve for Tibial Keel Preparation T1-T5
I	1	NQ661R	Drill D. 16 mm with Stop for Tibial Keel Preparation
J	1	NQ676R	Tibial Trial Stem Connector for M/L Position Check
K	1	NQ677R	Tibial Reamer Chimney D. 8.0 mm for M/L Position Check
L	1	NQ833R	Tibial Stem Connector
M	1	NE425R	Tibial Cutting Guide Stylus without Notch
N1-2	1 ea.	NQ650R, NQ651R	Tibial Cutting Guide Left, Right

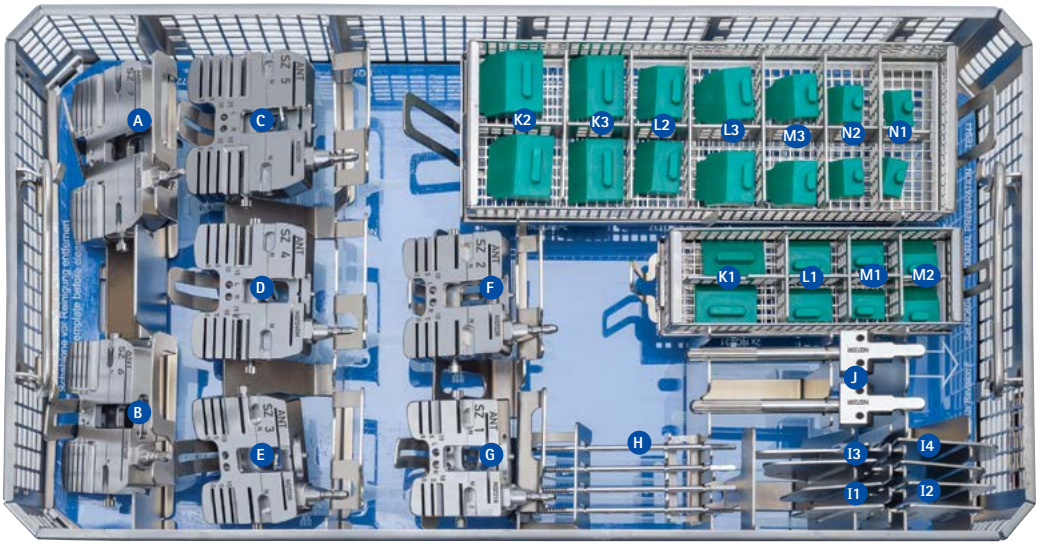
Tibial Preparation Instruments Tray (NQ603) – Bottom Tray

Index	Qty.	Item No.	Description	Index	Qty.	Item No.	Description
A	1	NQ835R	Tibia Implant Holder	K	1	NQ687RM	Trial Tibia T4
B	1	NQ667R	Tibial Stem Collar Rasp T1-T5	L	1	NQ686RM	Trial Tibia T3+
C	1	NQ645	Tibia Impactor	M	1	NQ685RM	Trial Tibia T3
D	1	NQ675R	Tibial Broach/Keel Trial T5	N	1	NQ684RM	Trial Tibia T2+
E	1	NQ674R	Tibial Broach/Keel Trial T4/T4+	O	1	NQ683RM	Trial Tibia T2
F	1	NQ673R	Tibial Broach/Keel Trial T3/T3+	P	1	NQ682RM	Trial Tibia T1+
G	1	NQ672R	Tibial Broach/Keel Trial T2/T2+	Q	1	NQ681RM	Trial Tibia T1
H	1	NQ671R	Tibial Broach/Keel Trial T1/T1+		1	NQ623R	Tibial Preparation Instruments Tray
I	1	NQ689RM	Trial Tibia T5		1	TE943	Graphic Template for NQ623R (NQ603)
J	1	NQ688RM	Trial Tibia T4+		1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm

Columbus® Revision Knee System

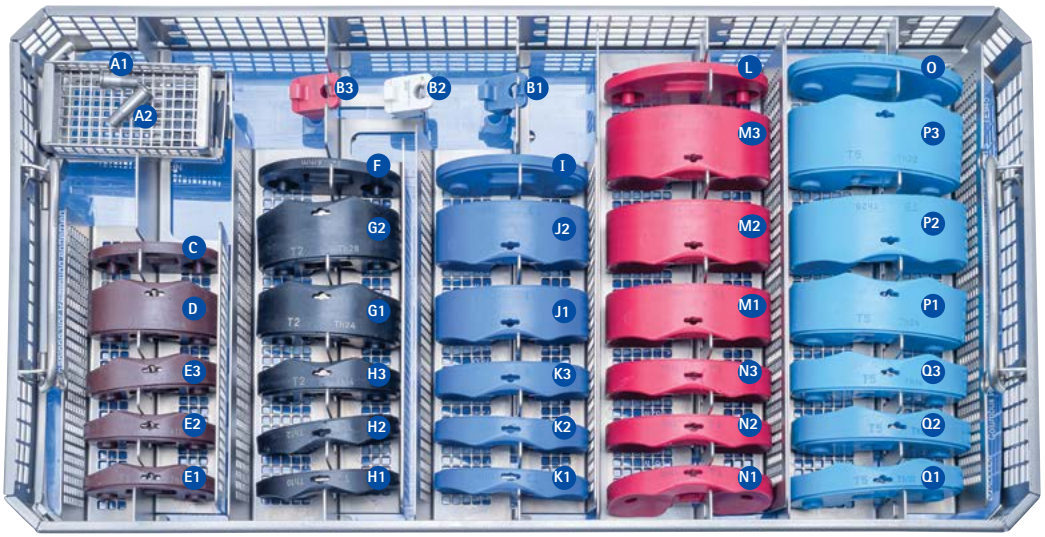
Surgical Technique

15. Columbus Revision Instruments *(continued)*



Femoral Preparation Instruments Tray (NQ604)

Index	Qty.	Item No.	Description
A	1	NQ727R	4-in-1 Cutting Guide F7
B	1	NQ726R	4-in-1 Cutting Guide F6
C	1	NQ725R	4-in-1 Cutting Guide F5
D	1	NQ724RM	4-in-1 Cutting Guide F4
E	1	NQ723R	4-in-1 Cutting Guide F3
F	1	NQ722R	4-in-1 Cutting Guide F2
G	1	NQ721R	4-in-1 Cutting Guide F1
H	4	NP584R	Threaded Headless Pin D. 3.2 mm x L. 88 mm
I1-4	1 ea.	NQ715R, NQ716R, NQ717R, NQ718R	Anterior Femur Sizer F1/F2, F3/F4, F5/F6, F7
J	2	NQ720R	Handles for 4-in-1 Cutting Guide
K1-3	2 ea.	NQ737, NQ738, NQ739	4-in-1 Cutting Guide Distal Augment F7 H. 5, 10, 15 mm
L1-3	2 ea.	NQ734, NQ735, NQ736	4-in-1 Cutting Guide Distal Augment F5/F6 H. 5, 10, 15 mm
M1-3	2 ea.	NQ732, NQ733, NQ729	4-in-1 Cutting Guide Distal Augment F3/F4 H. 5, 10, 15 mm
N1-2	2 ea.	NQ730, NQ731	4-in-1 Cutting Guide Distal Augment F1/F2 H. 5, 10 mm
	1	NQ624R	Manual Femoral Instruments Tray
	1	TE944	Graphic Template for NQ624R (NQ604)
	1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm



PS PE Insert Trial Instruments Tray (NQ605)

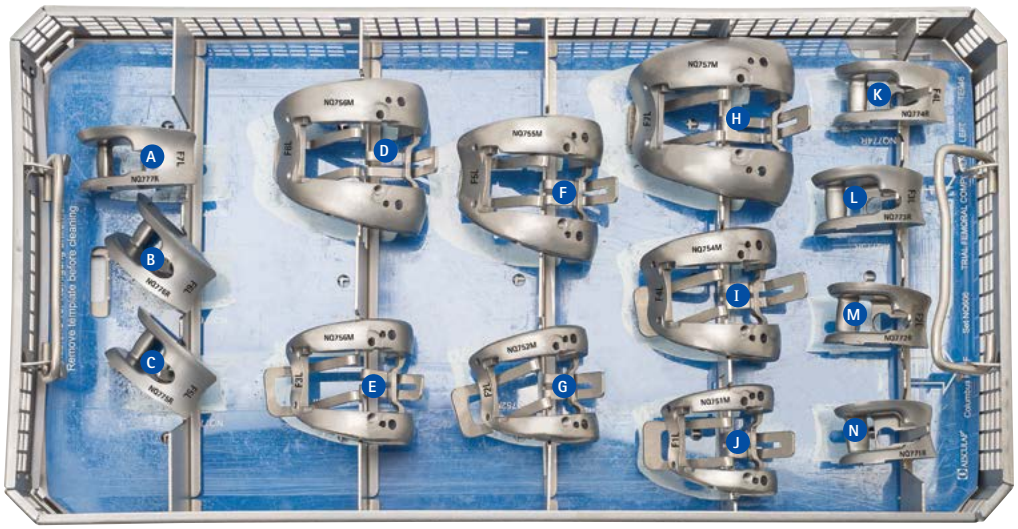
Index	Qty.	Item No.	Description
A1-2	1 ea.	NP038R, NP039R	Insert Post Fixation Screw Short, Long
B1-3	1 ea.	NP104, NP105, NP106	PS PE Insert Post Standard, Medium and High Constraint
C	1	NP059	PS PE Insert Trial T1/T1+ H. 6 mm
D	1	NP056M	PS PE Insert Trial T1/T1+ H. 24 mm
E1-3	1 ea.	NP050M, NP051M, NP052M	PS PE Insert Trial T1/T1+ H. 10, 12, 14 mm
F	1	NP069	PS PE Insert Trial T2/T2+ H. 6 mm
G1-2	1 ea.	NP066M, NP067M	PS PE Insert Trial T2/T2+ H. 24, 26 mm
H1-3	1 ea.	NP060M, NP061M, NP062M	PS PE Insert Trial T2/T2+ H. 10, 12, 14 mm
I	1	NP079	PS PE Insert Trial T3/T3+ H. 6 mm
J1-2	1 ea.	NP076M, NP077M	PS PE Insert Trial T3/T3+ H. 24, 28 mm
	1	NQ833R	Tibial Stem Connector (located in small basket).

Index	Qty.	Item No.	Description
K1-3	1 ea.	NP070M, NP071M, NP072M	PS PE Insert Trial T3/T3+ H. 10, 12, 14 mm
L	1	NP089	PS PE Insert Trial T4/T4+ H. 6 mm
M1-3	1 ea.	NP086M, NP087M, NP088M	PS PE Insert Trial T4/T4+ H. 24, 28, 32 mm
N1-3	1 ea.	NP080M, NP081M, NP082M	PS PE Insert Trial T4/T4+ H. 10, 12, 14 mm
O	1	NP099	PS PE Insert Trial T5 H. 6 mm
P1-3	1 ea.	NP096M, NP097M, NP098M	PS PE Insert Trial T5 H. 24, 28, 32 mm
Q1-3	1 ea.	NP090M, NP091M, NP092M	PS PE Insert Trial T5 H. 10, 12, 14 mm
	1	NQ625R	PS PE Insert Trial Instruments Tray
	1	TE945	Graphic Template for NQ625R (NQ605)
	1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm
	1	NQ833R	Tibial Stem Connector

Columbus® Revision Knee System

Surgical Technique

15. Columbus Revision Instruments *(continued)*



Femoral Trials Left Instruments Tray (NQ606)

Index	Qty.	Item No.	Description
A	1	NQ777R	Femoral Trial Box F7L
B	1	NQ776R	Femoral Trial Box F6L
C	1	NQ775R	Femoral Trial Box F5L
D	1	NQ756M	Femoral Trial F6L
E	1	NQ753M	Femoral Trial F3L
F	1	NQ755M	Femoral Trial F5L
G	1	NQ752M	Femoral Trial F2L
H	1	NQ757M	Femoral Trial F7L
I	1	NQ754M	Femoral Trial F4L
J	1	NQ751M	Femoral Trial F1L
K	1	NQ774R	Femoral Trial Box F4L
L	1	NQ773R	Femoral Trial Box F3L
M	1	NQ772R	Femoral Trial Box F2L
N	1	NQ771R	Femoral Trial Box F1L
	1	NQ626R	Femoral Trials Left Instruments Tray
	1	TE946	Graphic Template for NQ626R (NQ606)
	1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm

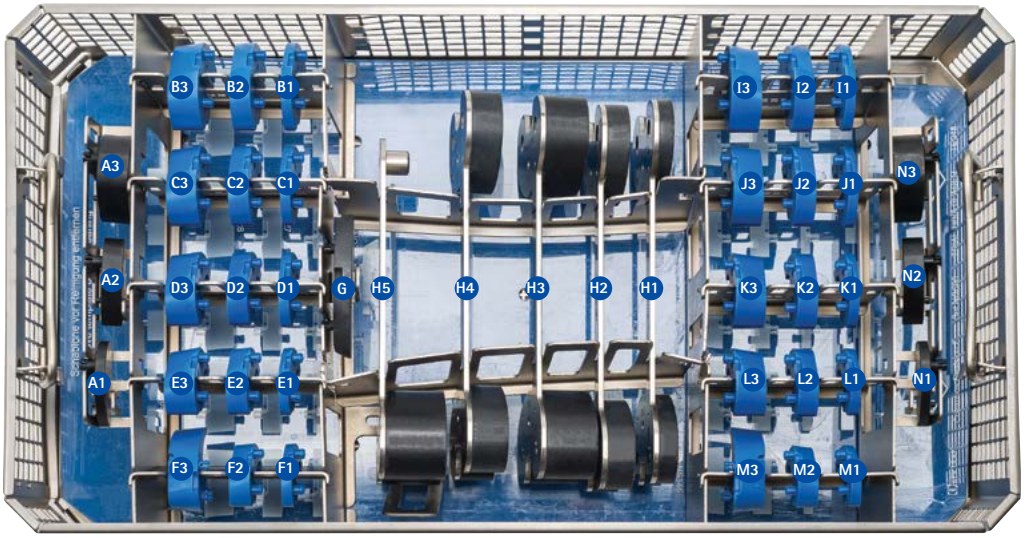
Femoral Trials Right Instruments Tray (NQ607)

Index	Qty.	Item No.	Description
A	1	NQ781R	Femoral Trial Box F1R
B	1	NQ782R	Femoral Trial Box F2R
C	1	NQ783R	Femoral Trial Box F3R
D	1	NQ784R	Femoral Trial Box F4R
E	1	NQ761M	Femoral Trial F1R
F	1	NQ764M	Femoral Trial F4R
G	1	NQ767M	Femoral Trial F7R
H	1	NQ762M	Femoral Trial F2R
I	1	NQ765M	Femoral Trial F5R
J	1	NQ763M	Femoral Trial F3R
K	1	NQ766M	Femoral Trial F6R
L	1	NQ785R	Femoral Trial Box F5R
M	1	NQ786R	Femoral Trial Box F6R
N	1	NQ787R	Femoral Trial Box F7R
	1	NQ627R	Femoral Trials Right Instruments Tray
	1	TE947	Graphic Template for NQ627R (NQ607)
	1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm

Columbus® Revision Knee System

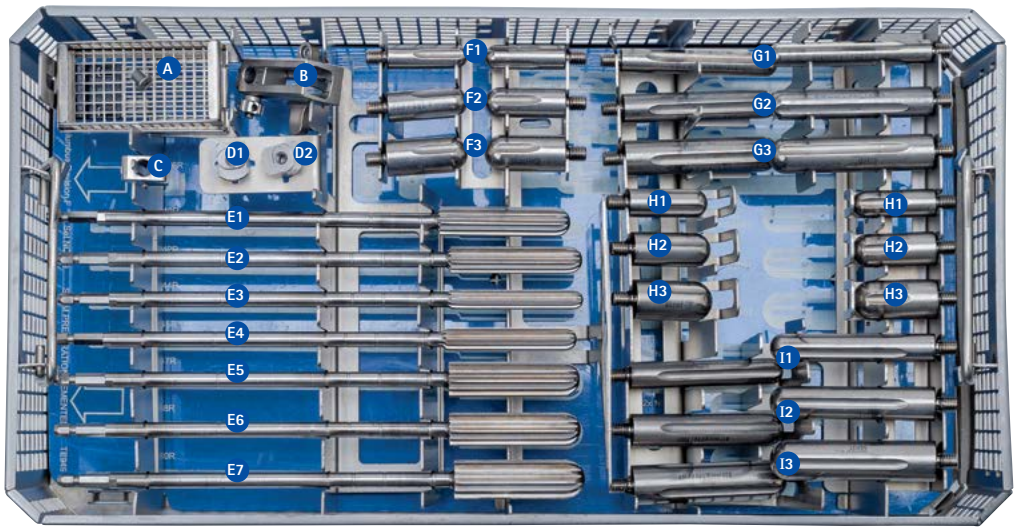
Surgical Technique

15. Columbus Revision Instruments *(continued)*



Tibial Hemi-Augment Trial Instruments Tray (NQ608)

Index	Qty.	Item No.	Description
A1-3	1 ea.	NQ692, NQ694, NQ696	Complement Tibial Hemi-Augment Trial RM/LL H. 5, 10, 15 mm
B1-3	1 ea.	NS130, NS131, NS132	Tibial Hemi-Augment Trial T5 RM/LL H. 5, 10, 15 mm
C1-3	1 ea.	NS126, NS127, NS128	Tibial Hemi-Augment Trial T4/T4+ RM/LL H. 5, 10, 15 mm
D1-3	1 ea.	NS122, NS123, NS124	Tibial Hemi-Augment Trial T3/T3+ RM/LL H. 5, 10, 15 mm
E1-3	1 ea.	NS118, NS119, NS120	Tibial Hemi-Augment Trial T2/T2+ RM/LL H. 5, 10, 15 mm
F1-3	1 ea.	NS114, NS115, NS116	Tibial Hemi-Augment Trial T1/T1+ RM/LL H. 5, 10, 15 mm
G	1	NQ710	Complement Trial Spacer for Femur Cut
H1-5	1 ea.	NQ652R, NQ653R, NQ654R, NQ655R, NQ656R	Spacer for Tibia Cut 10/12, 14/16, 18/20, 24/28, 32 mm
I1-3	1 ea.	NS160, NS161, NS162	Tibial Hemi-Augment Trial T5 RL/LM H. 5, 10, 15 mm
J1-3	1 ea.	NS156, NS157, NS158	Tibial Hemi-Augment Trial T4/T4+ RL/LM H. 5, 10, 15 mm
K1-3	1 ea.	NS152, NS153, NS154	Tibial Hemi-Augment Trial T3/T3+ RL/LM H. 5, 10, 15 mm
L1-3	1 ea.	NS148, NS149, NS150	Tibial Hemi-Augment Trial T2/T2+ RL/LM H. 5, 10, 15 mm
M1-3	1 ea.	NS144, NS145, NS146	Tibial Hemi-Augment Trial T1/T1+ RL/LM H. 5, 10, 15 mm
N1-3	1 ea.	NQ693, NQ695, NQ697	Complement Tibial Hemi-Augment Trial RL/LM H. 5, 10, 15 mm
	1	NQ628R	Tibial Hemi-Augment Trial Instruments Tray
	1	TE948	Graphic Template for NQ628R (NQ608)
	1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm



Cemented Stem Preparation Instruments Tray (NQ609)

Index	Qty.	Item No.	Description
A	3	NS001R	Femoral Trial Stem Screw Attachment HEX 3.0 mm
B	1	NQ836R	Femoral Cemented Reamer Positioner Neutral 6° L/R
C	1	NQ706R	Femoral Cemented Reamer AP Orientation Sleeve Neutral 6° L/R
D1-2	1	NQ837R, NQ838R	Femoral Cemented Trial Stem Adapter 6° Neutral 37, 77 mm
E1-7	1 ea.	NQ840R, NQ842R, NQ844R, NQ845R, NQ847R, NQ848R, NQ850R	Cemented L. 52/77/92/157 mm Stem Reamers D. 10, 12, 14, 15, 17, 18, 20 mm
F1-3	2 ea.	NQ851T, NQ852T, NQ853T	Cemented Short L. 52/77 mm Trial Stems D. 12, 15, 18 mm
G1-3	2 ea.	NQ854T, NQ855T,NQ 856T	Cemented Long L. 92/157 mm Trial Stems D. 12, 15, 18 mm
H1-3	2 ea.	NS208T, NS209T, NS210T	Cemented Short L. 52/77 mm Trial Stems D. 14, 17, 20 mm
I1-3	2 ea.	NS211T, NS212T, NS213T	Cemented Long L. 92/157 mm Trial Stems D. 14, 17, 20 mm
	1	NQ629R	Cemented Stem Preparation Instruments Tray
	1	TE949	Graphic Template for NQ629R (NQ609)
	1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm

Columbus® Revision Knee System

Surgical Technique

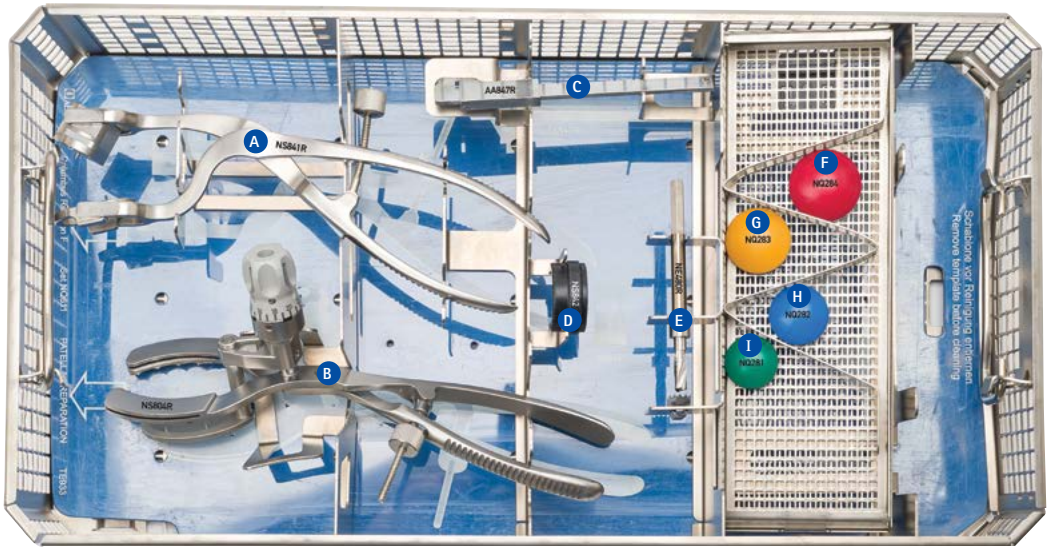
15. Columbus Revision Instruments *(continued)*

Cementless Stem Preparation Instruments Tray (NQ610)

Index	Qty.	Item No.	Description
A1-10	1 ea.	NS021R, NS022R, NS023R, NS024R, NS025R, NS026R, NS027R, NS028R, NS029R, NS030R	Cementless L. 92/117/132/177 mm Stem Reamers D. 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 mm
B	3	NS001R	Femoral Trial Stem Screw Attachment HEX 3.0 mm
C	1	NS002R	Femoral Cementless Reamer Positioner Neutral 5° L/R
D	1	NS005R	Femoral Cementless Reamer Positioner Neutral 7° L/R
E	1	NQ705R	Femoral Cementless Reamer AP Orientation Sleeve Neutral 5° L/R
F	1	NQ707R	Femoral Cementless Reamer AP Orientation Sleeve Neutral 7° L/R
G1-2	1 ea.	NS008R, NS011R	Femoral Cementless Trial Stem Adapter 5° Neutral 37, 57 mm
H1-2	1 ea.	NS014R, NS017R	Femoral Cementless Trial Stem Adapter 7° Neutral 37, 57 mm
	1	NQ630R	Cementless Stem Preparation Instruments Tray
	1	TE938	Graphic Template for NQ630R (NQ610)
	1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm

Cementless Trial Stem Instruments Tray (NQ610)

Index	Qty.	Item No.	Description
A1-5	2 ea.	NS046T, NS047T, NS048T, NS049T, NS050T	Cementless Long L. 132/177 mm Trial Stems D. 16, 17, 18, 19, 20 mm
B1-5	2 ea.	NS041T, NS042T, NS043T, NS044T, NS045T	Cementless Long L. 132/177 mm Trial Stems D. 11, 12, 13, 14, 15 mm
C1-5	2 ea.	NS036T, NS037T, NS038T, NS039T, NS040T	Cementless Short L. 92/117 mm Trial Stems D. 16, 17, 18, 19, 20 mm
D1-5	2 ea.	NS031T, NS032T, NS033T, NS034T, NS035T	Cementless Short L. 92/117 mm Trial Stems D. 11, 12, 13, 14, 15 mm
	1	NQ646R	Cementless Trial Stem Instruments Tray
	1	TE939	Graphic Template for NQ646R (NQ610)
	1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm



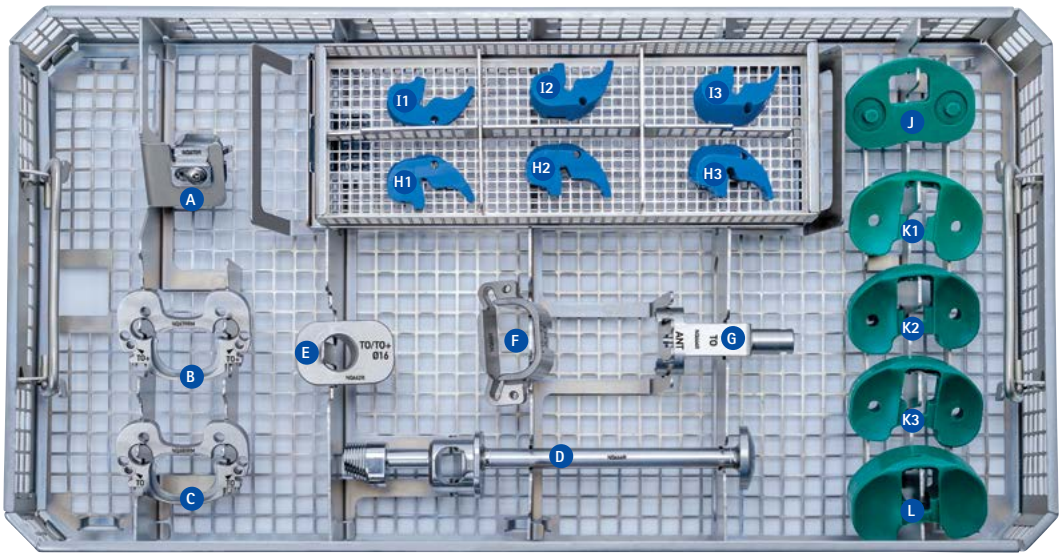
Patella Preparation Instruments Tray (NQ611)

Index	Qty.	Item No.	Description
A	1	NS841R	Patella Drilling and Cementing Clamp
B	1	NS840R	Patella Resection Clamp
C	1	AA847R	Caliper Measures in D. 100 mm
D	1	NS842	Cementing Adapter
E	1	NE480R	Drill with Stop D. 6 mm L. 25 mm
F	1	NQ284	Patella Trial P4 D. 35 mm x H. 10 mm
G	1	NQ283	Patella Trial P3 D. 32 mm x H. 9 mm
H	1	NQ282	Patella Trial P2 D. 29 mm x H. 8 mm
I	1	NQ281	Patella Trial P1 D. 26 mm x H. 7 mm
	1	NQ631R	Patella Preparation Instruments Tray
	1	TE933	Graphic Template for NQ631R (NQ611)
	1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm

Columbus® Revision Knee System

Surgical Technique

15. Columbus Revision Instruments *(continued)*



Tibial T0 and PS PE Insert Instruments Tray (NQ612)

Index	Qty.	Item No.	Description
A	1	NQ670R	Tibial Broach/Keel Trial T0/T0+
B	1	NQ679RM	Trial Tibia T0+
C	1	NQ680RM	Trial Tibia T0
D	1	NQ666R	Tibial Stem Collar Rasp T0
E	1	NQ662R	Drill Sleeve for Tibial Keel Preparation T0
F	1	NQ668R	Guide for Tibial Broach/Keel Trial and Drill Sleeve
G	1	NQ664R	Tibial Broach/Keel Trial Holder
H1-3	1 ea.	NS140, NS141, NS142	Tibial Hemi-Augment Trial T0/T0+ RL/LM H. 5, 10, 15 mm
I1-3	1 ea.	NS110, NS111, NS112	Tibial Hemi-Augment Trial T0/T0+ RM/LL H. 5, 10, 15 mm
J	1	NP049	PS PE Insert Trial T0/T0+ H. 6 mm
K1-3	1 ea.	NP040M, NP041M, NP042M	PS PE Insert Trial T0/T0+ H. 10, 12, 14 mm
L	1	NP046M	PS PE Insert Trial T0/T0+ H. 24 mm
	1	NQ632R	Tibial T0 and PS PE Insert Instruments Tray
	1	TE934	Graphic Template for NQ632R (NQ612)
	1	JH217R	1/1 Perf. Basket Lid 489 x 257 mm

Aesculap Implant Systems, LLC | 3773 Corporate Parkway | Center Valley, PA | 18034
Phone 866-229-3002 | Fax 610-984-9096 | www.aesculapimplantsystems.com

Aesculap Implant Systems, LLC - a B. Braun company

SOP-AIS-5001088 Rev. 01 DOC1022 Rev. D 500 10/19