BEZNOSKA
We bring back joy to movement

Total Knee Joint Replacement
Type CMS

Primary Implants – Knee

ARTHROPLASTY

Preface

The BEZNOSKA/CMS implant for knee joint replacement was designed primarily on the basis of personal and clinical results and experience with various types of oncological knee joint replacement. The technique facilitates simple and perfect fixation of the implant with the aid of intramedullary stems and may be combined with partial replacement of the femur and tibia.

Optimization of the shape of knee joint surfaces ensures maximal mobility, while preserving a good functional stability and minimal risk of polyethylene (PE) wear.The assortment of available sizes and tibial components in symmetrical option and femoral components, always in L and R option, each, covers the entire range of sizes and in combination with PE liners of various thickness, stems of different diameters and lengths provides solutions for most situation as may occur in implantations using suspension types of knee joint replacement with inner rotation.

Precise centering if the implant and its perfect fitting is ensured by means of sophisticated instrumentation set is designed so that taking simple and precisely defined, consecutive steps leads towards solving common problems.

Most of the basic elements contained in the instrumentation set are very similar to those of the instrumentation set for standard knee joint replacement, type SVL, except that the principle of centering is distinctly different: in this procedure, all resections are done using resection blocks along the intramedullary bar. Also, meticulous instrument handling is a must and relatively strict adherence to certain operation procedures is required.

This publication is supposed to be used as an instruction manual for application of the implant and instrumentarium.

For the sake of conciseness, the focus of the handbook is limited to issues pertaining to implantation of the given type of endoprosthesis, on the premise that the surgeon and other personnel are perfectly familiar with the general rules to be followed in the process of knee joint replacement. The aim of this publication is to help physicians and suture nurses with orientation in the individual elements of the instrumentation set and its use, in order to attain optimal results and, last but not the least, to prevent occurrence of unnecessary damage or depreciation of the instrumentation set, or destruction of the implant itself. This publication of manual of Surgical technigue is used only for information. It´s possible to try surgical technigue in workshop in company BEZNOSKA s.r.o.

Attention:

The size of the components used must be identical, i.e., different sizes must not be mixed.

Use options

Anatomic suspension implant with inner rotation. Thanks to the implant's higher inner stability, it can be conveniently used for customized versions, especially in cases involving major bone loss.

The implant is particularly suitable for:

- Patients with deformation changes and severe instability of the knee joint
- Patients with bone tumors in the knee area or major bone defects due to other causes (requiring implant customization)

The implant comprises of the following component:
(for details, see pp. 38–45):

- Femoral component, type CMS
- Tibial component, type CMS
- Articulation insert, type CMS
- Suspension element
- Rotation pin
- Femoral stem, type SVR
- Tibial stem, type SVR

Fig. 1: Total knee joint replacement - type CMS

Surgical technique

The surgical procedure starts with basic tibial resection.
The individual steps during the operation consecutive phases are always the same, even in cases deviating from the recommended sequence of procedures.

Subsequent partial steps:

- preparation of the bone marrow section of the tibia
- resection of the proximal end of the tibia and preparation thereof for the tibial component
- cutting the bone marrow section of the femur
- distal resection of the femur
- setup of outer rotation of the femoral component
- femoral resection (ventral, dorsal, diagonal) and fossa intercondylaris resection
- assembly of trial components and trial joint fitting
- assembly of trial components and trial joint fitting

Approach

The instrumentation set facilitates comfortable implantation of the joint implant using any of the standard surgical approaches used for knee joint replacement, i.e., it does not require any changes in the habitual procedures adopted by the given surgical facility. The procedure is not affected by the tourniquet used for bleeding stoppage.

Preparation of the tibia

1. Opening the bone marrow canal of the tibia

After loosening the soft tissue around the tibia and shifting the tibia forward with the aid of the lifting device, open the bone marrow canal. Drill a hole in the bone marrow canal (T) using a pointed bit, Ø 8 mm (159), cassette "Common Instruments I" along the axis of the tibia. Determine the position of the canal using ventrodistal x-ray or the hole after a revised tibial component. Drill to a depth of 5 cm, maximum, and finish the preparation process by careful pressing the drill, in still mode, all the way into the canal.

During this procedure, the drill will position itself in the direction of the canal, eliminating the risk of perforating the corticalis with its point and diminishing problems during subsequent grinding of the canal.

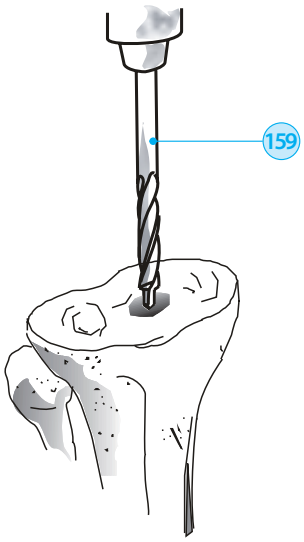


Fig. 2: Opening the bone marrow canal of the tibia

2. Grinding the bone marrow canal of the tibia to final diameter

After finishing preparation of the bone marrow canal with the drill, use the grinding bit (160)-(166) to achieve the desired dimension of the canal for the shank of the endoprosthesis. Grinding is done gradually from the small diameter to a depth corresponding to the stem length. For easier control, a trial collar or sleeve may be used (155) that we pull over the end of the grinder and secure in the desired position. Grinding of the bone marrow canal is completed when the last grinding bit used takes off the desired quantity and length of the corticalis necessary for fixation of the stem.

In the instrumentation set there are grinding bits of Ø 10 to Ø 22 (mm) that can be used also for the femur. As the mode of the hole depth measuring in the tibia and femur differs, the grinder has two different scales. It is therefore essential always to keep this in mind when checking the distance (for simplicity sake, there is a line for each stem length on the grinder that indicates where the sleeve is supposed to be).

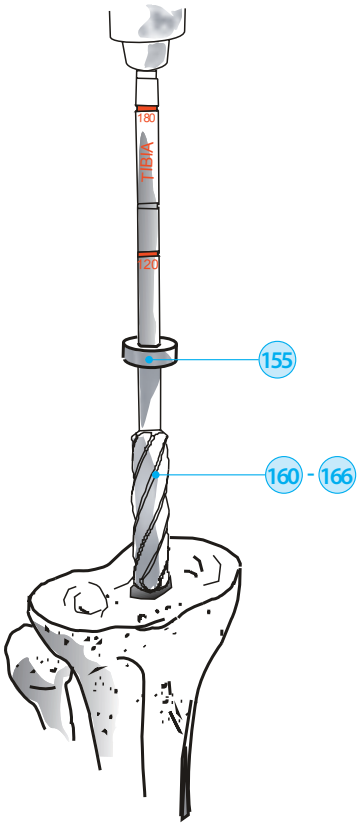


Fig. 3: Grinding the bone marrow canal of the tibia

3. Inserting centering rod

Remember the diameter of the last grinder used for grinding the tibia. Now insert the assembled guiding rod that is used for anchoring and positioning of the intramedullary aiming device. The complete set consists of a bushing 174-179 of the guiding rod 170 and a head "T" 153. The size of the bushing must match the size (diameter) of the last grinder used. To facilitate assembly of the set (especially bushing) it is suitable to use a trial bushing for the canal 169, (see Fig. 4). Once the whole set of guiding rod is inserted, take out the trial bushing and take off the insertion head "T", leaving only the guiding rod in the bone marrow canal. The set is now ready for using the intramedullary rod.

The bushing slipped on the centering rod is used for centering, but also for benchmarking and support. Therefore it is necessary to guide all the way into the canal to ensure good fitting of the set in the bone marrow canal. For this purpose, it is essential that the length of the guiding rod matches the length of the anchoring stem (120 and 180 mm). In some cases the bushing slides in easily, but in most cases it is necessary to press it into the canal with the aid of a bushing 169. If a hammer has to be used, never use it for hitting the plastic handle of the head ("T").

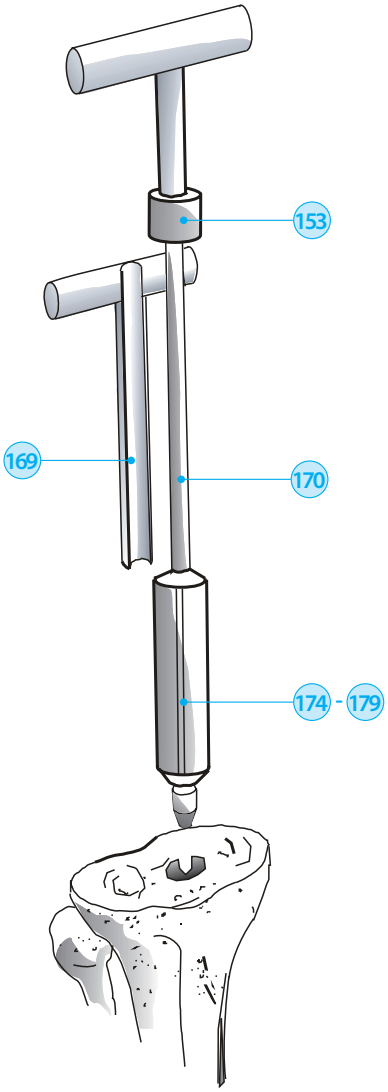


Fig. 4: Centering rod set

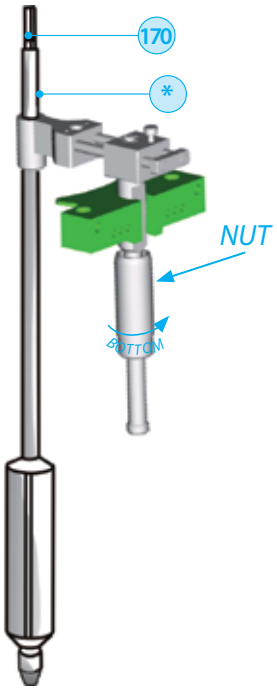


Fig. 5: Set for tibial resection

4. Setting up the intramedullary aiming device

The aiming device consists of an aiming rod 90 with a nut 91 and a resection block 89 (see Fig. 6).
Firstly screw the nut on the aiming rod, then add the resection block. Thereupon slide the aiming rod over the thinner diameter of the below the scale. During the assembly, set the nut as per description (the BOTTOM end is marked). Set the height of the resection block by turning the nut.

Slide completed set onto the guiding rod over the hole in the aiming device bushing (*)

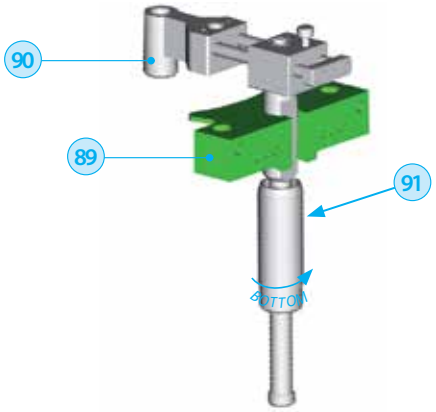


Fig. 6: Intramedullary aiming device

5. Preparation of tibial resection

The next step involves complementation of the aiming device on the upper resection facet of the resection block with a gauge (0,-3) 117. Set the point of the gauge (we recommend) on the tibia in the lowest position (see Fig. 7).

Rotate the assembly slowly to set it in the right position, so that the axis of the resection block (depending on type of axial deformity) runs through the middle of tuberositas tibiae or slightly off the middle between it and the middle edge of tuberculum laterale of intercondylic eminence.

Use the centering rod 185 from the Common Instruments Cassette III. to check accuracy of the position Cifi). Its axis should be pointing towards the first intermetatarsal area of the leg, where by the shin and the subtalar must be in the basic position in the joint (see Fig. 8).

With the rotation set, we determine the level of the resection facet of the tibia during presumed resection of the femur to 14 mm, it is necessary to set the resection block for the lowest PE liner "12" by 14 mm lower than the lowest point on the tibia (see Fig. 7, tab. 1). Secure the resection block with 2 nails 174-179 inserted into previously drilled holes (bit 3.2 from Common Instruments Cassette 189 (see Fig. 9). In the resection block there are two sets of holes for the fixation pins. Only one pin may be chosen from each set (equally marked), preferably always the middle one, marked "N"(see Fig. 9).

For smaller tibiae, both of them may be shifted centrally in the direction of the arrows.

Take out assembled intramedullary aiming device, including the guiding rod with bushing, as follows: first, release the resection block with the aid of the threaded nut. Thereupon, the whole assembly can be taken out from the groove of the resection block.

Resection of the tibial facet follows.

PE liner	Resection
12	14 mm
15	17 mm
20	22 mm

Tab. 1: Recommended tibial resection

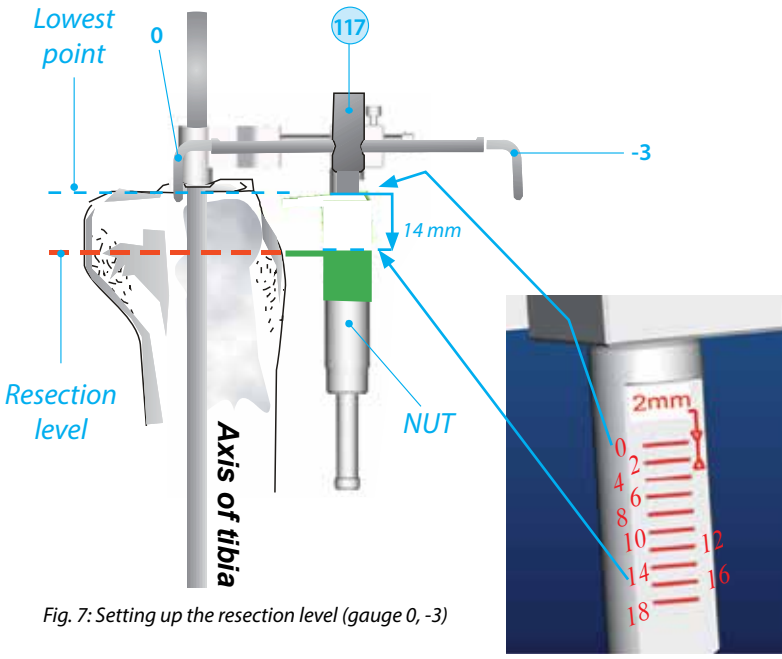


Fig. 7: Setting up the resection level (gauge 0, -3)

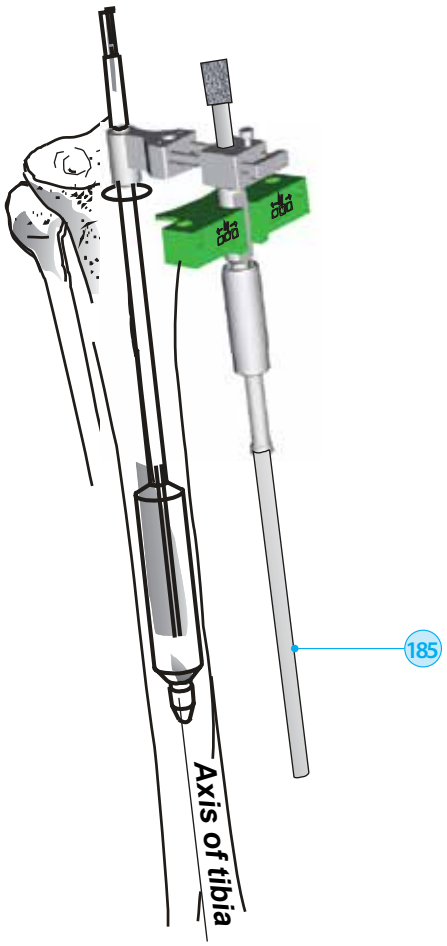


Fig. 8: Assembled intramedullary aiming device and guiding rod with centering rod

6. Tibial resection

Release the resection block, add the guiding rod for the saw blade, and cut the tibial facet to the extent necessary. Thereupon take off the guiding rod and the resection block, and extract the pins using the extractor (Fig. 34 , page 16).

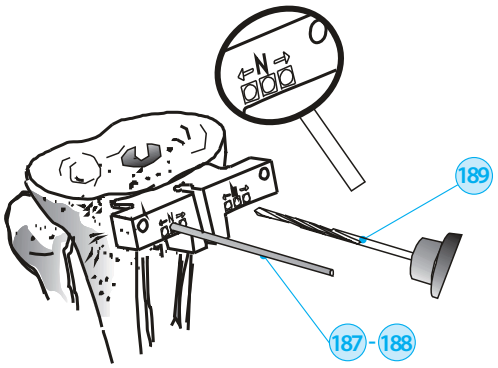


Fig. 9: Securing of set - up tibial aming device

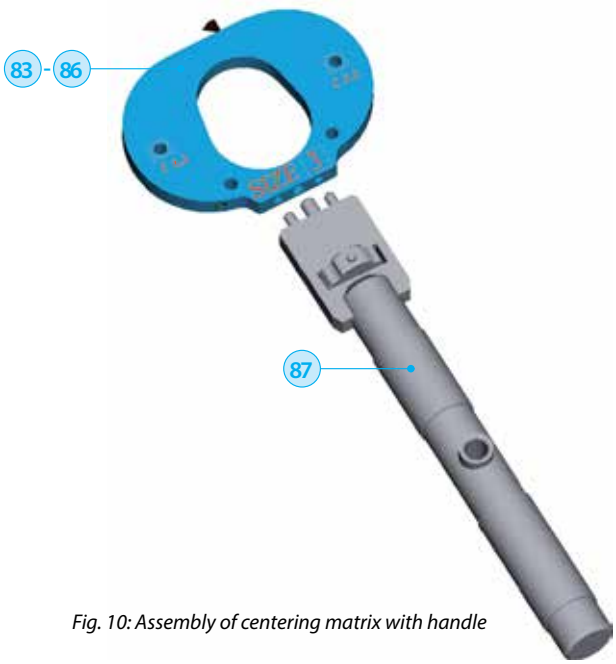


Fig. 10: Assembly of centering matrix with handle

7. Setting up rotation of tibial component

First, assemble the tibial centering matrix 174-179 of the selected size (2–5) using the matrix handle 87 (see Fig. 10)

Re-insert assembled guiding rod into the bone marrow canal, where it will be used as a centering and anchoring element for the centering matrix.

Put the matrix on the guiding rod along with the handle and centering bushing 77 and then over the resection facet, so that the oval part fits into the hole in the matrix.

Insert the centering rod from Common Instruments Cassette III 185 through the hole in the handle * and slowly rotate the centering assembly so that the rod aims towards the middle of the shin (see Fig. 11). Correct position may be marked with the electro - cutter on the front of the tibia to the side of the handle.

Now fasten the matrix in its position with two fixation pins 76 and inserted into previously drilled holes (see Fig. 12). The holes for drilling are marked Q. Use drill bit 3.2 mm from Common Instruments Cassette III. 189.

After securing the matrix, remove the handle with the centering rod, including the guiding rod and bushing. Depending on the size of the tibial centering matrix chosen (e.g. 3), select the same size of resection matrix for the femur (e.g. 3).

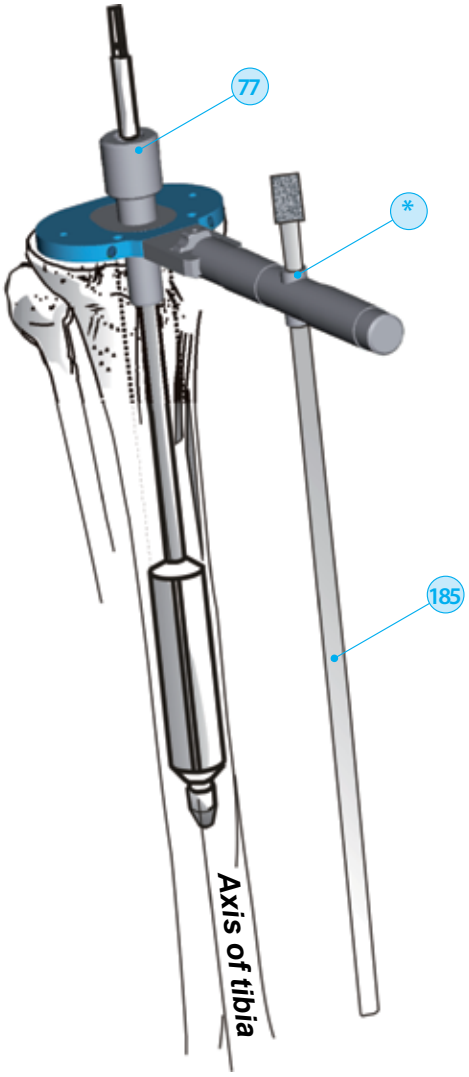


Fig. 11: Assembly of centering matrix guiding rod with centering rod

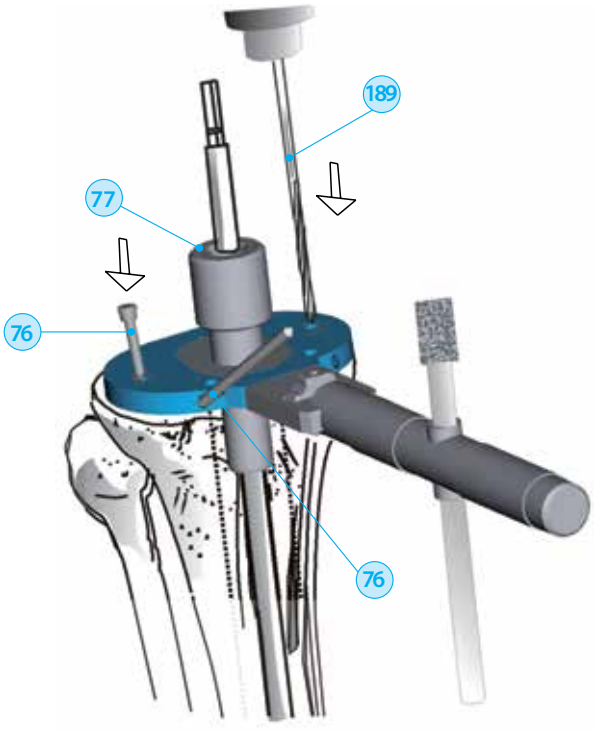


Fig. 12: Matrix securing with fixation pins

8. Preparation of canal for tibial component

Put bushing (80) on the tibial centering matrix, so that the pins on the bottom side of the plate fit into unmarked holes in the matrix. Simultaneously, it is necessary to position the matrix as well as the headed fixation pins (both indentations on the side of the plate are designated for the head of the pin), see Fig. 13.

Using a cone-shaped grinder bit (79), prepare the canal for the stem of the tibial component (keep drilling until the grinder ring (*) touches the bushing) see Fig. 14. The final shape of the prepared canal is shown in Fig. 15.

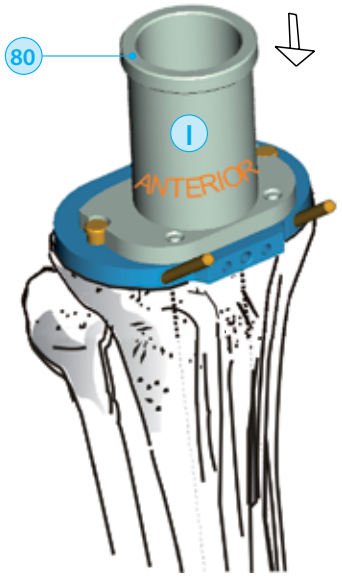


Fig. 13: Positioning drill bushing of cone-shaped grinder bit

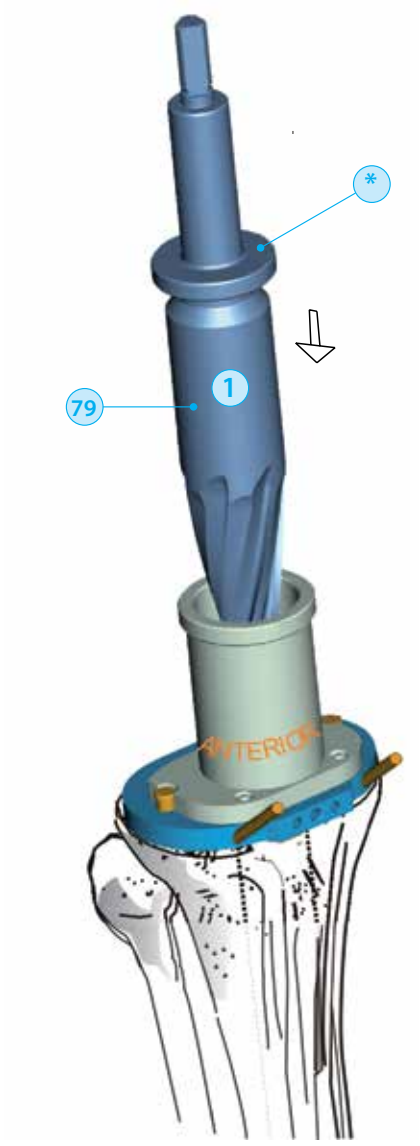


Fig. 14: Preparation of the canal for the stem

Fig. 15: Prepared canal of the tibia with cone-shaped grinder bit

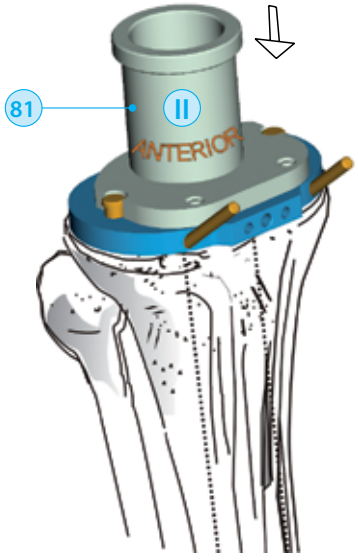


Fig. 16: Substitution of the cone-shaped grinder bushing with a drill bushing of Ø 23

Now take off the cone-shaped grinder drilling bushing and replace it with a bushing for drill with a diameter of Ø 23 mm 81 (see Fig. 16). Thereupon use the cylindrical drill 0–23 78 to prepare the canal for the tibial facet jut (see Fig. 17, 18) Finish the shape of the canal with a chisel 168, by making the sides of the drilled holes (19, 20) perfectly even.

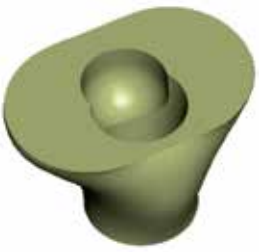


Fig. 18: Tibial canal drilled to a diameter of Ø 23

Fig. 17: Preparation of the canal for the tibial facet jut

Fig. 19: Final shape of the canal in the proximal part of the tibia

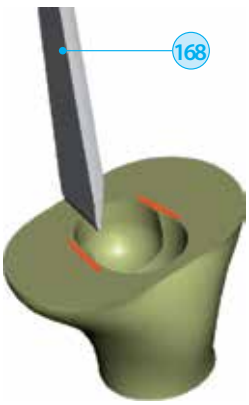


Fig. 20: Make the sides of the drilled holes even with the aid of chisel

Preparation of the femur

9. Opening the bone marrow canal of the femur

The drill for perforating the bone marrow canal (pointed bit) 159 to a diameter of 8 mm from the Common Instruments Cassette I. is driven along the femoral axis just above the upper end of the intercondylic incision, towards the middle or, better yet, more centrally by 5 mm (see Fig. 21). After drilling a hole to a depth of 4–5 cm, press the drill, in still mode, all the way into the canal.

This way, the drill will find its position in the canal, diminishing the risk of the corticalis perforation with its point.

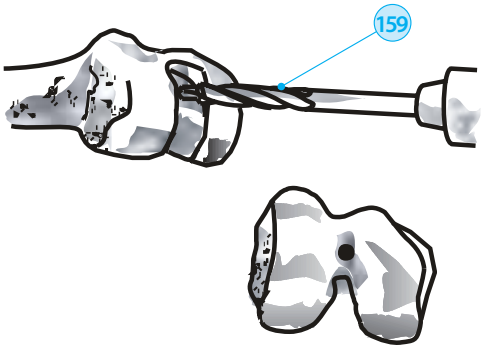


Fig. 21: Opening the bone marrow canal of the femur

10. Grinding the bone marrow canal of the femur to final diameter

After preparing the canal with the drill, we use the grinder 160–166 to achieve the desired dimension for fitting the stem of the endoprosthesis. This is done gradually from the smallest diameter and always to the desired depth. For easier control, a trial collar or sleeve may be used 155 that we pull over the end of the grinder and secure in the desired position. Grinding of the bone marrow canal is completed when the last grinding bit used takes off the desired quantity and length of the corticalis necessary for fixation of the stem.

Remember the diameter of the last grinder used for grinding the femur. Now insert the assembled guiding rod that is used for anchoring and positioning of the matrices for all subsequent femoral resections. The complete set consists of a bushing 174–179, of the guiding rod 172 and a head "T" 153. The size of the bushing must match the size (diameter) of the last grinder used. To facilitate assembly of the set (especially bushing) it is suitable to use a stop bushing for the canal 171. See the assembly in Fig. 23.

Once the whole set of guiding rod is inserted, take out the stop bushing and take off the insertion head "T", leaving only the guiding rod in the bone marrow canal. The assembly is now ready for the femoral centering rod.

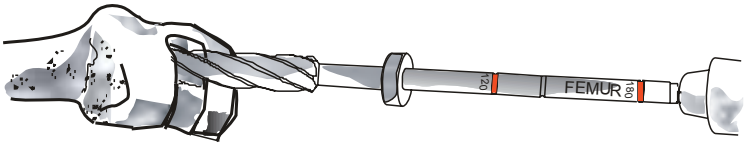


Fig. 22: Grinding the bone marrow canal of the femur

Here again, one has to remember that the grinders are used both for the tibia and femur, so that the depth must be checked on the right scale (a trial sleeve may be used, like for grinding the tibia - stoppage point).

The mode of insertion and selection of elements are identical with those used for tibial centering (III).

When grinding the bone marrow canal, it is essential to keep in mind that the end of the femoral component where the femoral stem is placed has a diameter of 15 mm and is 20 mm long. This means that the canal must be widened to 15 mm at a length of approx. 65mm from the original edge of the condyles, or 25mm from the cut in the area of fossa intercondylaris completed with a chisel (Fig. 48 - rectangular hole for chisel).

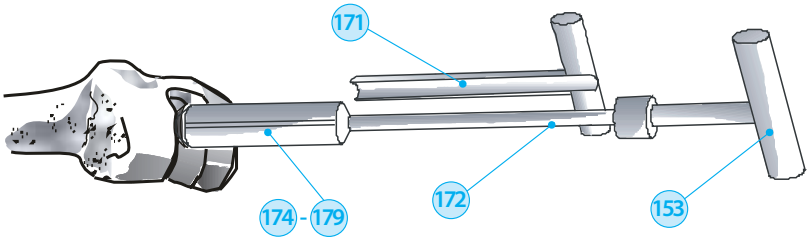


Fig. 23: Centering rod assembly with bushing

11. Femoral centering

Put the femoral centering device 121 on the assembled guiding rod provided with a previously selected angular connecting bushing 119-120 from the Cassette instruments for FEMUR II. (Fig.24). The bushing is designed so as to have a valgosity angle of up to 7°.

The surgeon must make sure that the relevant side of the bushing (R or L) is always directed upwards and be legible from his perspective (Fig.25).

The connecting bushing with valgosity of 7° comes always in two options (R or L). When setting up femoral centering, use the bushing so that the upper side is marked correctly, i.e., RIGHT or LEFT.
Example:
the connecting bushing for the right exremity (leg) must be marked "7° " and the upper side must be read "RIGHT"

Slowly turn the assembly on the guiding rod to set up its rotation correctly and then secure it with at least one nail 187-188. In this phase, it is a good idea to check whether the centering device is set up correctly. The check is done with the aid of an extender 122 placed between the holes of the upper side of the centering device, provided with a centering rod 185 (Common Instruments Cassette III) (see Fig. 26). The point of the centering rod should be aiming towards the middle of the head of the hip joint.

In this stage a problem may appear when centering rod is pointed out of the middle of hip joint head.
1/ heck correctness of the connecting bushing selection - LEFT, RIGHT,
2/ with the centering extender in place, slightly adjust rotation of the matrix around the longitudinal axis of the femur (guiding rod)

After checking and correcting with the aid of the centering rod, as applicable, put the centering rod and the extender back, as they would be in your way during subsequent steps.

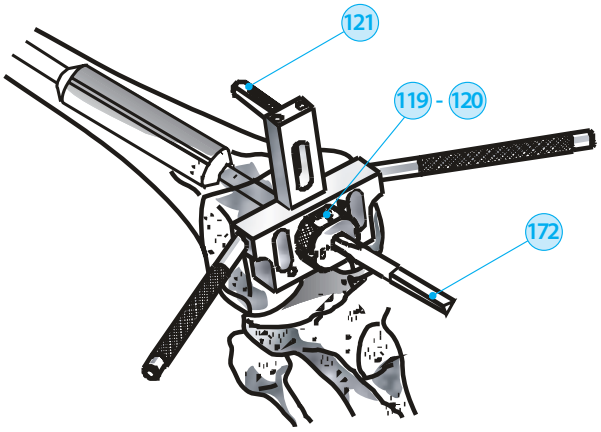


Fig. 24: Femoral centering

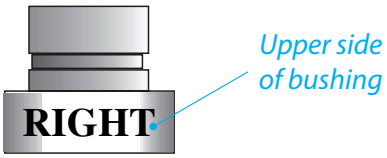


Fig. 25: Connecting bushing

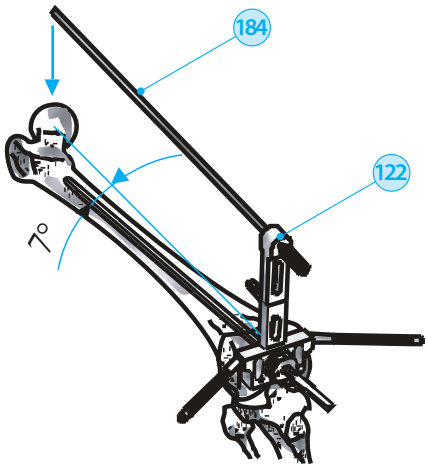


Fig. 26: Centering device check

12. Setting the level of resection of the femur distal end

On the upper cylindrical gauge, properly inserted and fastened with at least one pin of the femoral centering device, we place the matrix for distal resection 127 (see Fig.27). Slide the scale (range 4 to 20 mm) to set the optimal resection from the perspective of the former position of the joint crevice (while keeping in mind that minimum distance of the resection area from the former position of the joint crevice, based on the design of the femoral component, is 12 to 14 mm) - see Fig. 28. Now we can drill holes, using bit 3.2 mm 189 from the Common Instruments Cassette (the holes are marked "0") and insert two fixation pins 188 (see Fig.28) (use a “ttopper” – impactor 154 for driving the pin in Comm. Instr. Cass. I.). Remove the aiming device and the connecting bushing the matrix is now held by the pins only. Take out the guiding rod with the bushing only if you are unable to do the resection! Press the matrix all the way to the front corticalis of the femur (see Fig.30).

It is better to predrill the holes for the pins. Using the hammer is possible, but it may cause slipping of the nail's point or its deformation, thus also shifting the resection level or change in the axial position of the matrix.

Provided that the resection level done with the aid of matrix with pins trough holes marked "0" does not match it may be enlarged (2 mm or 4 mm). The position of the resection level is amended by taking the matrix off (leaving the pins in the bone) and re-inserting it into the holes +2 or -2, -4 from the former position on the centering device (see Fig. 31).

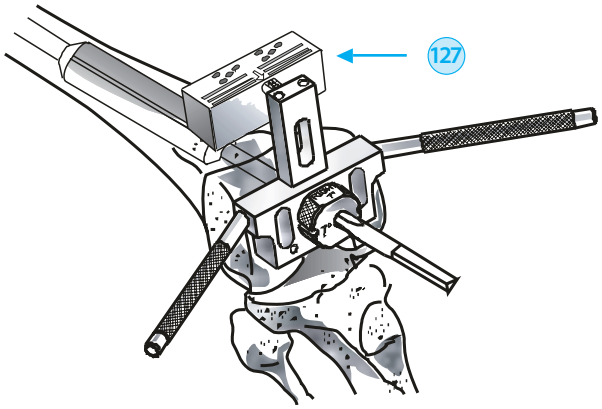


Fig. 27: Positioning the matrix for distal resection

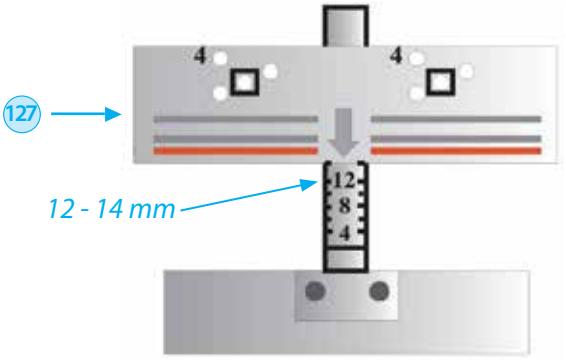


Fig. 28: Set up matrix for distal resection

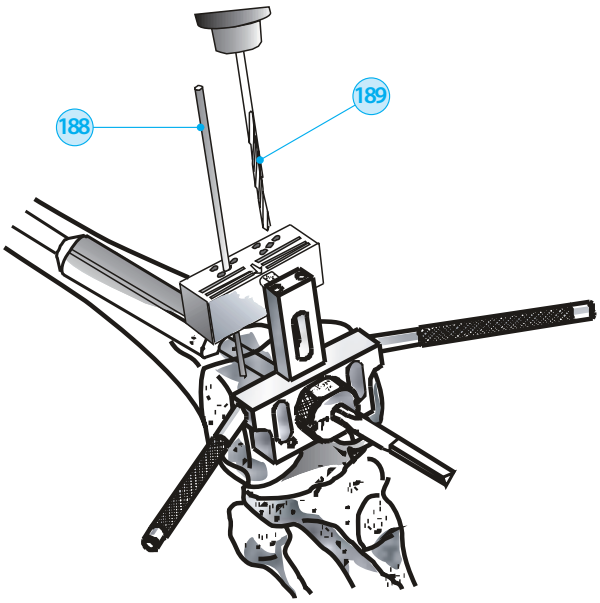


Fig. 29: Insertion of fixation pins

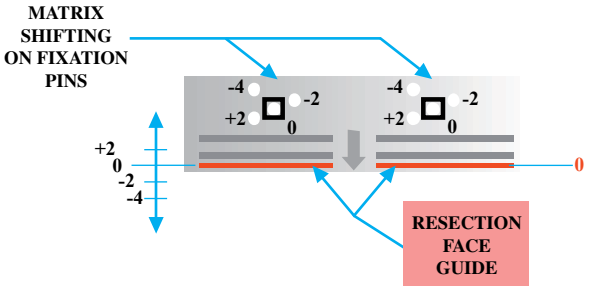


Fig. 31: Matrix positioning for distal resection

13. Distal Femoral Resection

The resection is done making a precise cut with a saw blade (151) across the crevice in the resection matrix marked "0" (see Fig. 32). While cutting, keep pressing the saw blade on the matrix to attain maximal contact between the saw blade and the crevice area of the matrix. Straightness of the cut is important for all subsequent resections, too (check it with a ruler 198 Common Instruments Cassette III). During the distal resection, we always try to remove as little necrotic bone as possible to eliminate proximization of the joint crevice and to preserve as much live bone as possible.

Potential defects are solving with augmentations.

The dimensioning of augmentation is subject to many factors (e.g., defect severity, bone tissue quality, the given facility's common practice, etc.) and is therefore a matter of the surgeon's discretion. However, when weighing the factors, the surgeon ought to keep in mind the fact that "perfect" fixation of the components is crucially decisive for the outcome of the operation.

The resection for the augmentation is by cutting with a saw blade through the relevant cleavage, whereby it is advisable to keep checking the chosen size of the resection for correctness with the aid of a special gauge (seave – common instruments III). Control checks are done over the slot of the corresponding augmentation chosen. Subsequent resection must be carried out parallel by means of a "zero" distal resection, while making sure to avoid damaging the condyle that was left in place with the saw blade!

Note:
For easy and fast pin removals , even from a very hard bone, (during whole surgery),
use "extractor of fixation pins" (190) (Cassette III) (see Fig. 34).

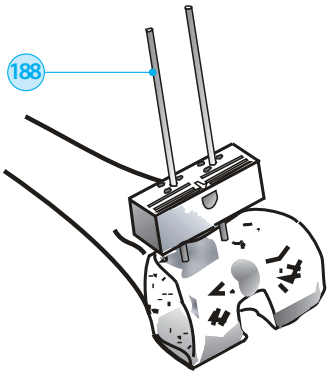


Fig. 30: Stoppage of matrix

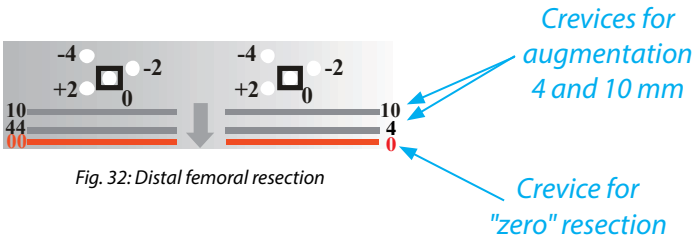


Fig. 32: Distal femoral resection

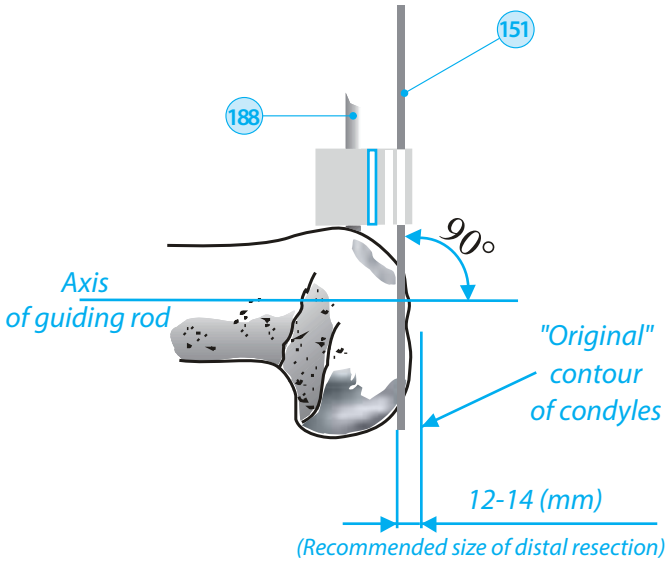


Fig. 33: Distal femoral resection

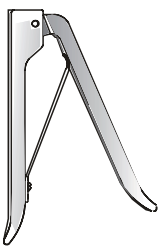


Fig. 34: Extractor of fixation pins

14. Ventral and Dorsal Resection of the Femur

Depending on the size of the centering matrix selected for the tibia, select a corresponding size for the femur for ventrodorsal resection 123-126 Place the matrix on prepared distal facet and connect the angular bushing to it at 7° 119-120, which we have already used when assembling the centering device, Fig. 25 (making sure that the position of the bushing is correct - 0 RIGHT 0 LEFT - Fig. 25). Check whether the guiding rod in the bone marrow canal is stable and place the assembly onto it (see Fig. 35, 36). Once the distal facet has been cut and the appropriate augmentation considered, it is time to complement the matrix with spacing rings no. 134-135 to ensure perfect leaning on the resected facets (see Fig. 37).

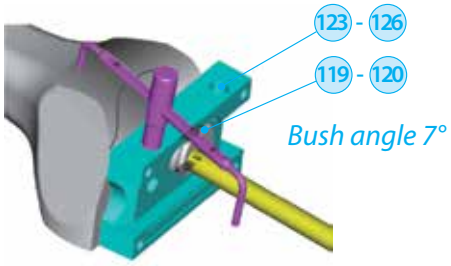


Fig. 35: Placing matrix for ventral dorsal resection

When positioning the resection matrix, make sure that the headings on the block are not reversed and that the heading "ANTERIOR " is on the side of ventral corticalis.
Reversing the block would not only cause undesirable shifting of the resection level in ventrodorsal direction, but also severe problems with matrix positioning (the front of the component is tilted by 5° ventrally).

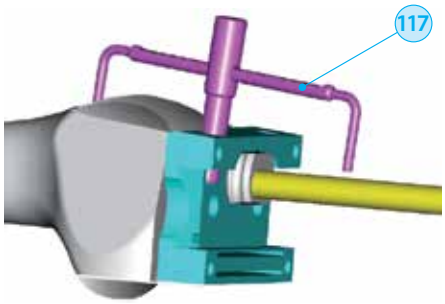


Fig. 36: Assessment of the size and AP position of the matrix for ventral dorsal resection

resection matrix for ventro dorsal resection correctly, it is necessary to complement the assembly with a gauge 0,+3 117 or, for dorsal facets, use tin control scale (ruler) from Cassette III. We proceed by applying the ruler and/or turning the gauge (point marked "0") to assess the position of the ventral area of the femur to the corresponding area of the matrix, whereupon we use the "little scythe tin matrix" to assess the position of the dorsal areas. If both areas "match",we set up the rotation position of the matrix (see note rotation adjustment and Fig. 38 page 18), secure the position with two fixation pins and correct the straightness with a precise cut along the matrix, ventrally and dorsally. We recommend using the guiding bar). With dorsal condyles, augmentation may be done by asymmetrical resection over the chosen slot in the matrix.

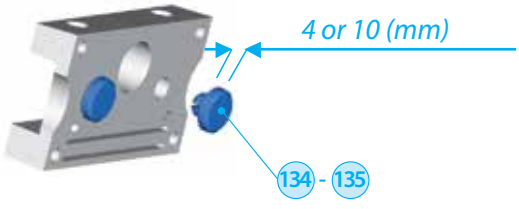


Fig. 37: Use distang rings

Rotation adjustment:

Rotation position adjustment of the femoral component is essential for setting up the resection surface. Correct position of the resection matrix is achieved when the dorsal area is parallel with the resection facet of the tibia and the space created between both facets/ surfaces is symmetrical. Both conditions can be checked by means of spacer blocks 181-183 (Cassette II). Any asymmetry must be corrected with the aid of soft tissue tension.

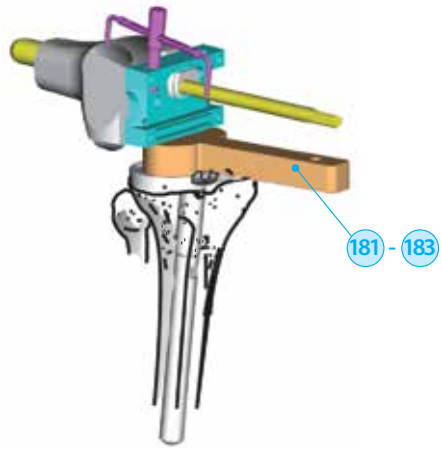


Fig. 38: Rotation adjustment

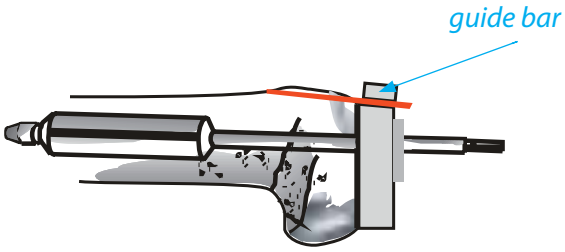


Fig. 39: Ventral resection

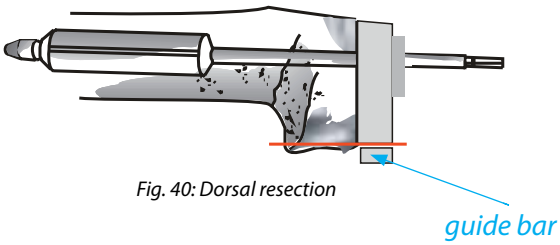


Fig. 40: Dorsal resection

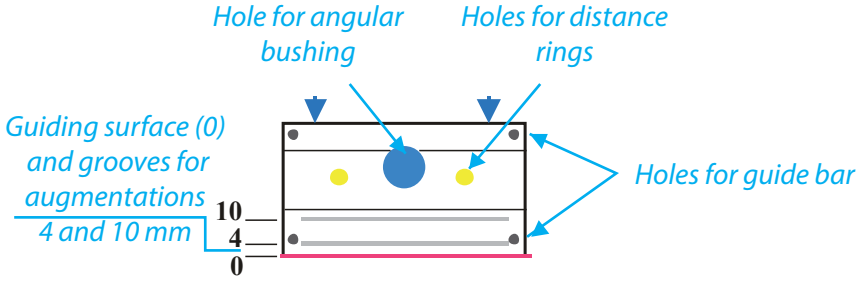


Fig. 41: Front view of the matrix for ventro dorsal resection (sketch)

15. Diagonal femoral and fossa intercondylaris resections

After having finished ventral and dorsal resections and having removed the rectangular matrix for ventral - dorsal resection, we prepare the triangular matrix for diagonal resection and fossa inter condylaris resection 130-133 (the matrix must have the same size). Connect the selected matrix with the aid of the angular bushing at 7° 119-120 Fig. 35 which we used before in a set with the matrix for ventral dorsal resection. Make sure that the position of the bushing is correct - 0 RIGHT / 0 LEFT - see Fig. 36a).

Check whether the guiding rod 172 in the bone marrow canal is stable and place the assembly on it (see Fig.42).

Once the distal facet has been cut and the appropriate augmentation considered, it is time to complement the matrix with spacing rings no. 134-135 to ensure perfect leaning on the resected facets (see Fig. 43). Press the matrix down carefully on the prepared facets, tap on it lightly, if necessary, and secure it with fixation pins 188.

Now resect the ventrodistal and dorsodistal diagonal facets of the femur (see Fig. 44 - ventrodistal and 45 - dorsodistal). If necessary, we may complete the matrix with a guiding bar 186 for the saw blade when making the dorsodistal cut. The cut is made with a saw blade 151 from Cassette I.

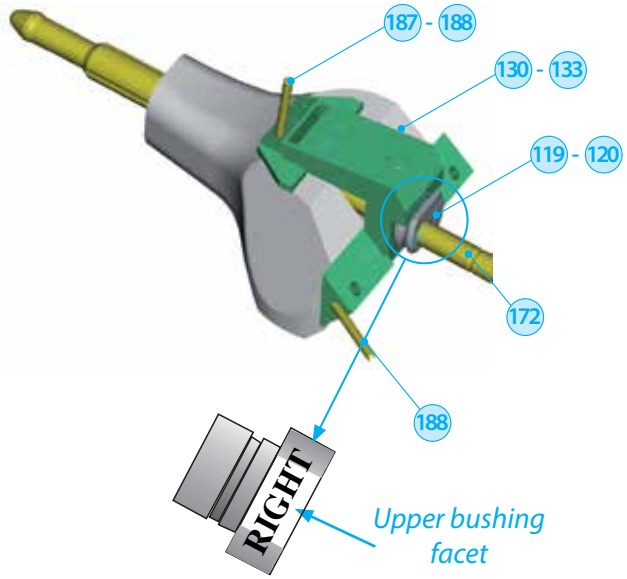


Fig. 42: Positioning matrix for diagonal resection

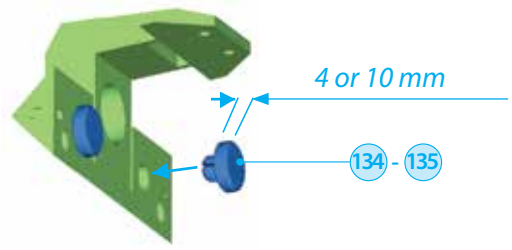


Fig. 43: Use of distance rings

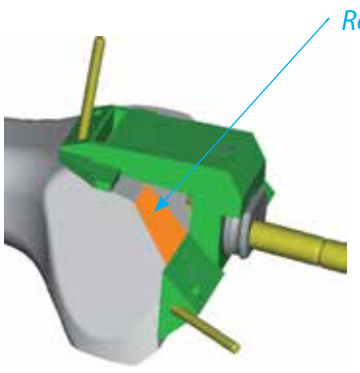


Fig. 44: Ventrodistal resection

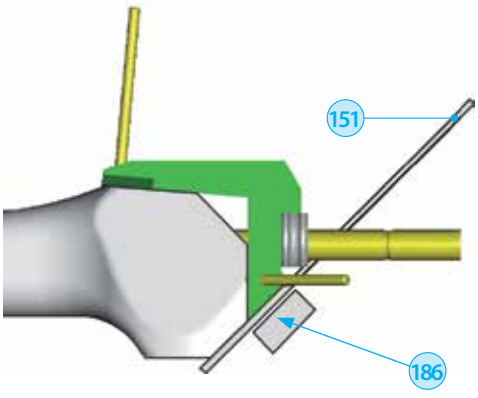


Fig. 45: Dorsodistal resection

Now we are ready to make a resection in the area of fossa intercondylaris, the guiding rod remains in the canal. When making the cut, it is essential to proceed with utmost caution to avoid undesirable undercutting of the condyles that should be preserved. Partitioning of the intercondylical part of the bone is done in two steps. First, cut the bone carefully with the saw blade 151 along the precisely defined edge of the matrix 18 and make a chip in it gently with the chisel 168 see Fig. 46, 47, 48.
Next, take off the whole matrix set, including the guiding rod, and then finish carefully the resection in the area of fossa intercondylaris manually with the saw blade complete the partitioning with the chisel, if/as necessary. The final appearance of the resection is shown in Fig.50.

Cutting must be started very carefully and the saw blade must adhere evenly to the resection facet of the matrix. The position of the saw blade before starting to cut and the direction of the cut are shown in the figures (pointed arrows). As preparation for intercondylic resection, cut the side as shown in Fig. 38a and 38b. The cut runs across the whole ventrodorsal dimension of the femur the width is limited by the distal support facet of the triangular part of the matrix and the proximal edge of the groove in the ventral support "wing" of the matrix. When making the cut, keep the saw blade in its position very firmly to avoid undercutting the condyles (see Fig.39).

Fig. 48 shows the next step of preparing the intercondylic area - cut with the saw blade (the cut may be positioned perpendicularly to the ventrally sloped facet of the triangular part of the matrix but it is necessary to be carefully so as not to undercut the condyles, to avoid cutting deeper than 15 mm) and to finish the cut with the chisel. The chisel may only be used to a certain depth due to the inserted guiding rod.

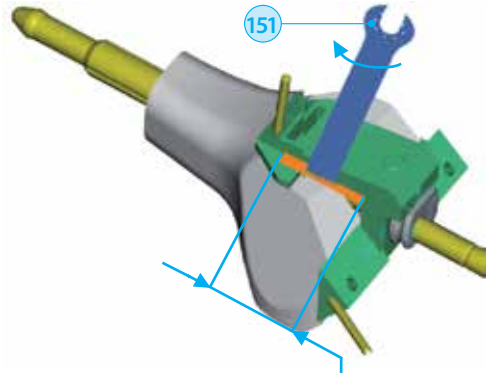


Fig. 46: Cut I

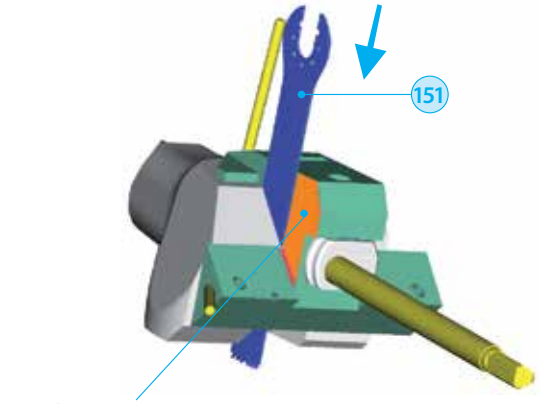


Fig. 47: Cut I

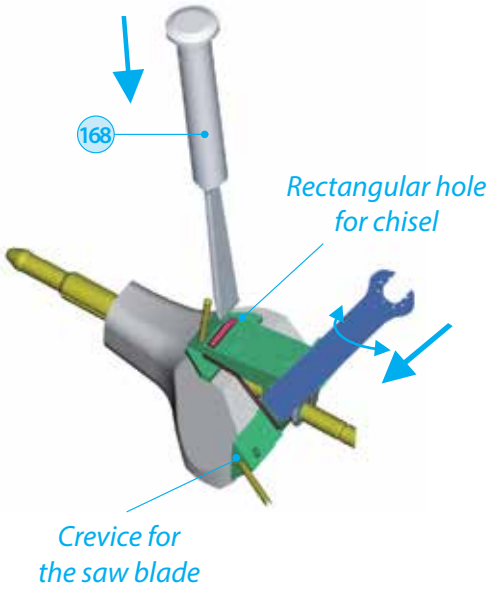


Fig. 48: Cut II and III

16. Trial joint fitting

Once the intercondylar resection is finished, the femur and tibia are ready for trial fitting.

Assemble gradually the tibial and femoral components (same size again) and place them on the prepared facets - as a standard rule, we start with the tibial component. When assembling the component, it is essential to adhere to the following procedure and always to use sizes of components and stems which the resection made or the bone marrow canal was drilled for. Under no circumstances is it admissible to use a stem of a different diameter than the size of the grinding bit used last, as per Par. 2 (Grinding the Bone Marrow Canal of the Tibia).

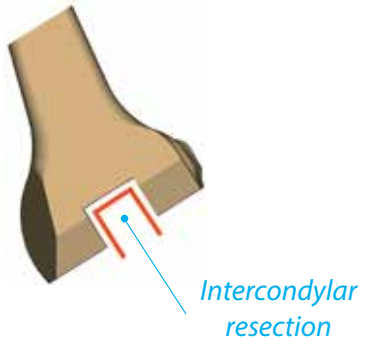


Fig. 49: Finished resection of the femur

Assembling the Tibial Trial Component

Select the right size of tibial component 52-55 according to the size of the previously used centering matrix and complement it with a tibial trial stem 56-73 (the length and diameter must correspond to the depth of drilling/grinding and the diameter of the grinding bit used last, see Par. 2). The tibial component is selected so as to match the size of the resection facet - the component must not overreach. Fasten the stem to the component by screwing it all the way into the bottom hole of the tibial component - see Fig.51.

Fig. 50: Finished shape of the distal resection

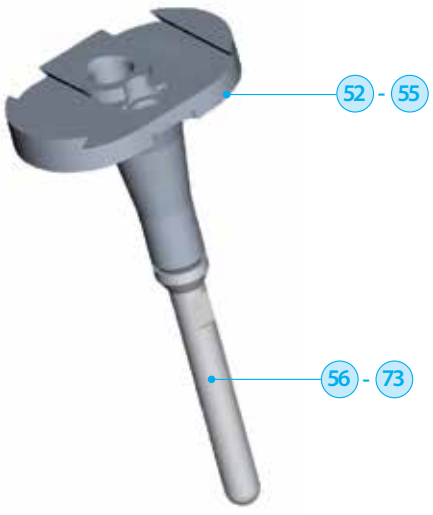


Fig. 51: Trial assembly of tibial component

Assembly of Femoral Trial Component

Take individual parts of the component from the Trial Components Cassette: the femoral component 105-112, the end of the suspension element, starting with size 1 (for insert height 12 and 15) 114, and the trial stem 93-104 according to previous resections, diameters, and the depth of the prepared bone marrow canal of the femur.

During the assembly, first screw in the end piece on the suspension element of the femoral component, using a screwdriver. Thereupon screw the trial stem 93-104 into the cylindrical hole on the bottom facet of the femoral component and tighten it with the aid of a key (Common Instruments Cassette III), see Fig. 52.

Having prepared the facets for augmentation by resecting the femur, we complement the assembly with the suitable block from the net of femoral trial augmentations no. 1-48 (see Fig. 53).

Put the augmentations in the designated place in the femoral component and then insert the collet carefully into the designated hole. During the assembly process, as well as when releasing the augmentations, it is essential to avoid using excessive force to prevent damaging the collet and subsequent loss of its functionality. Particularly undesirable would be any form of shifting it sideways, e.g., by prying. The best way of releasing the augmentations is to slide a chisel in the slot between the augmentation and the femoral component (net with common instruments) and release it carefully. All femoral augmentations are laid out logically in groups in a single net sorted out by the size of corresponding femoral component. Individual augmentations within each group are organized according to the concrete place in the component. Each element is therefore marked with the size (2÷5), component version (L / R), and the side where it is to be fit in the component (L / R). The last distinguishing feature is the thickness (4 or 10 mm).

Fig. 52: Trial assembly of the femoral component

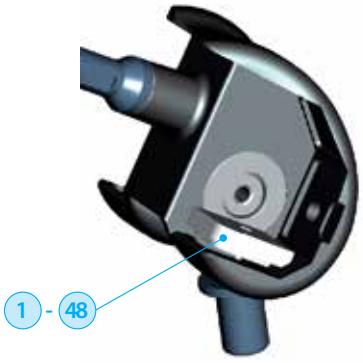


Fig. 53: Femoral augmentation

After assembling the trial component, gradually place it on the prepared resection facet. First insert the tibial component - making sure not to use too much force - except that the plastic hammer (50) may be used for fitting the tibial component firmly on the resected proximal area from the cassette of trial and auxiliary instruments CMS.

Next we position the femoral component assembly -here, too we proceed very carefully, in order to be able to detect any deviations between the prepared distal end of the femur and the inner facets of the trial component, or in the sizes of the canal and the trial stem. To facilitate orientation during the assembly, use the guiding rod for inserting the femoral component (118) from the Femoral Instruments Cassette.

For perfectly firm fitting of the component on the resected facet, it is recommended to use the "stopper" for femoral components (154) from the Common Instruments Cassette I.

One the contact of both components and the bone is adequate, place the femoral component into trial position by inserting the end of the suspension element into the hole in the tibial component. Thereupon complement the assembly with the trial liner of suitable thickness by sliding it over the dove-tail of the tibial component to a locking point (the nose of the liner must overreach the sleeve of the suspension element, see Fig. 55).

Perform trial joint fitting. Select the trial insert so that maximal mobility as well as adequate stability are ensured. Check the symmetry of the resection area in flexed and extended positions, and the overall mobility and stability of the joint. It necessary, use a thicker liner.

Finally, check the axial position of the extremity.

If we use liner height 19, the tail piece of the suspension element must be replaced with size 2.

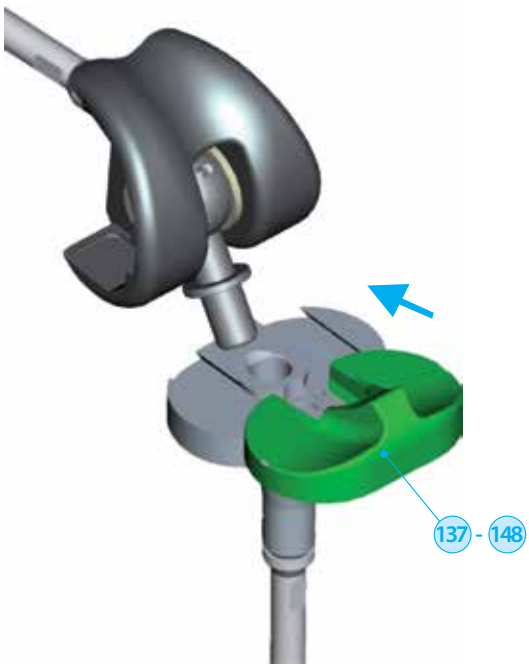


Fig. 54: Complete trial assembly

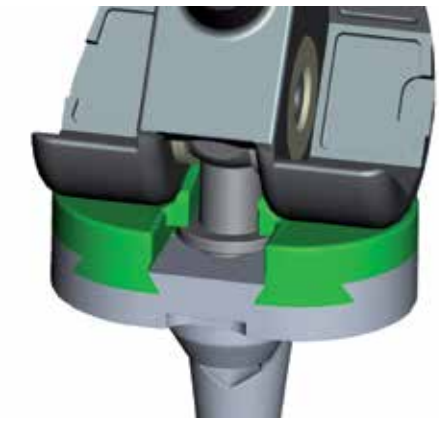


Fig. 55: Detail of locked fitting

After testing the mobility and stability of the joint, we may start removing the trial components. Slide out the trial insert this will release the locked trial components. Start by pushing the femoral component away from the tibial component this will push out the tail piece of the suspension element.
Using a screwdriver, unscrew the tail piece of the suspension element of the femoral component.
Using the guiding rod of the femoral component (118) and the sliding hammer from the Common Instruments Cassette to pull off the femoral component.

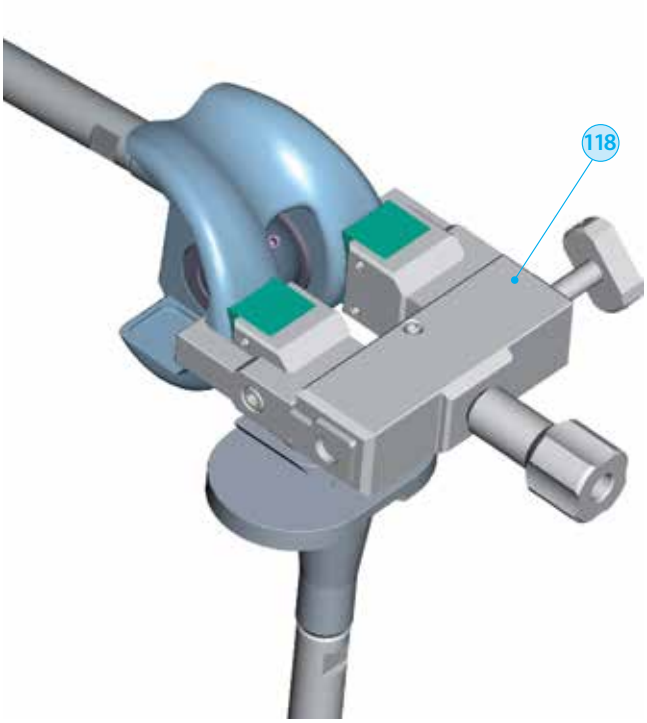


Fig. 56: Pulling off the trial femoral component

Fig.58 indicates the procedure and orientation of the connecting elements when inserting the extractor into the tibial component. The extractor end is provided with a perpendicular jut (**) that has to fit into the longitudinal groove in the tibial component. Turn by 90° to connect the instrument to the tibial component. Now the assembly is ready for extraction (*). Simultaneous use of the sliding hammer is necessary not only because the assembly is usually wedged into the bone marrow canal, but also because it must be extracted in the axial direction of the stem.

Use the extractor for easier extraction (51) of the trial tibial component. The mode of using the extractor is shown in Fig. 57 it is a good idea to use the sliding hammer for extracting the assembly.

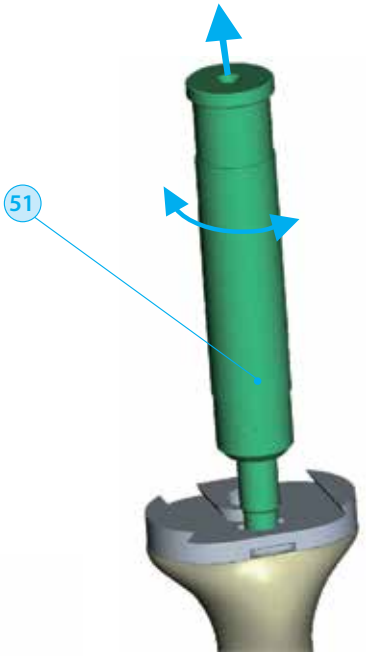


Fig. 57: Extractor

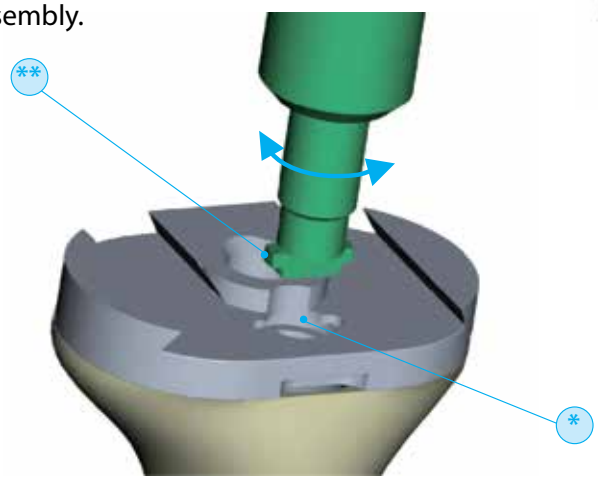


Fig. 58: Inserting the extractor

17. Implantation of knee joint replacement

Now we may assembly the implant individual components and then the partial sets. First assemble the tibial part consisting of a component (I) and extending stem (II). The PE connecting threaded liner is part of the sterile pack with the tibial component (III) see Fig. 59. Start the process by complementing the tibial component with an extending stem (the length and diameter must be the same as those of the trial stem) which we screw into the bottom hole of the cylindrical part. Tighten the threading of the stem with the aid of a key (192-195) from Common Instruments Cassette (III).

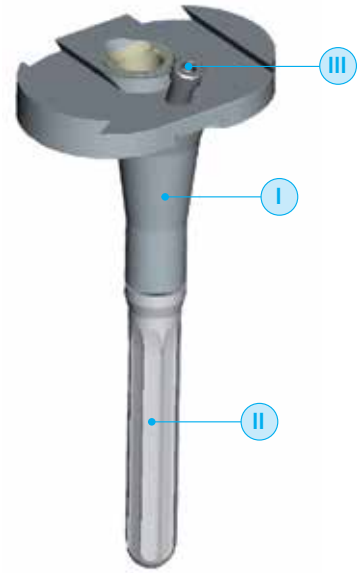


Fig. 59: Tibial component assembly

Next assemble the femoral part. It consists of a femoral component (I) (same size as the tibial component), suspension element (IV), stoppage screw (V), rotation pin (III), and extension stem (II) (the length and diameter must be the same as those of the trial stem). Away from the operation area, assemble the femoral component with the suspension element (IV) of the corresponding size (depending on the size of the trial liner used fro trial fitting - PE liner 1/12 suspension element 1/12), see Fig. 60. Than we complete the assemble by connecting femoral augmentaions a) (distal) and b) (dorsal).See possible assemble in Fig. 64.

Fig. 60: Femoral component assembly

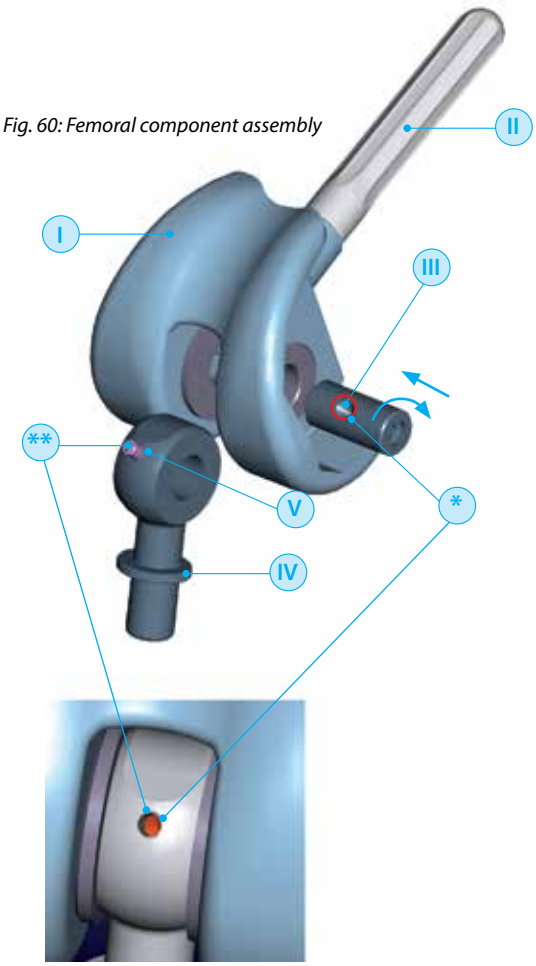


Fig. 61: Detail of pin position for fixation

Procedure:

Using the screwdriver (180), unscrew the stoppage screw to open the hole (to be used for positioning the rotation pin). With the stoppage screw still on the screwdriver insert the screw into the threaded eyelet of the auxiliary pliers (82). Depending on the size of the femoral component, select a rotation pin of a corresponding size and insert it into pin driver (173). Now insert the suspension element between the condyles and secure it by inserting the rotation pin, using the pin driver, through the femoral component, Fig. 60. Secure locking of the components by means of the stoppage screw that we fitted into the auxiliary pliers Fig. 61.

With the aid of the rotation pin driver, turn the pin clockwise until indentation in the pin appears (*) in the hole of the suspension element (**). With the aid of the auxiliary pliers (82), put the stoppage screw into the threaded hole and screw it in with the screwdriver (the screw must be even with the surface of the suspension element eyelet) Fig. 62. Finally, unscrew the pin driver from the pin and put a PE peg into the threaded hole (***). During inserting augmentations of femoral component it´s necessary to keep the rule, when it is used distal augmentation thin 10(mm) (10/4 and 10/10) and any dorsal augmentation together, dorsal augmentation is inserted always as first one.

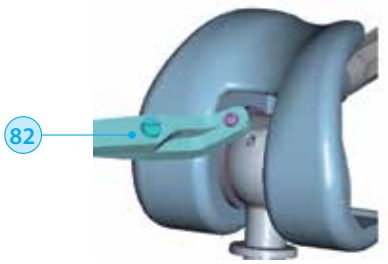


Fig. 62: Securing the stoppage screw using auxiliary pliers

Note:
During inserting augmentations of the femoral compoment it could be difficult to put in a tenon of the augmentation into the hole in femoral component. The reason could be deficient unbuttoned securing screw.

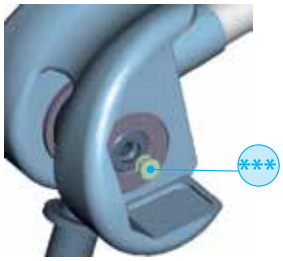


Fig. 63: Plugging hole in the pin

The components are fixed to all external resection facets with bone cement; stems are inserted without cement. Bone cement must not be, under any circumstances, applied in the bone marrow canal, due to danger of bone cracking when the stem is inserted and driven into the canal.During the implantation procedure, the tibial component is assembled first, implant the femoral component next.
For insertion of the tibial component, an inserting device may be used (88).

Bone cement must be applied in an even and well-spread layer - this can only be achieved if we apply adequate quantity of bone cement to the anchoring facets and then tap firmly on the components using tools from the instrumentation set (femoral

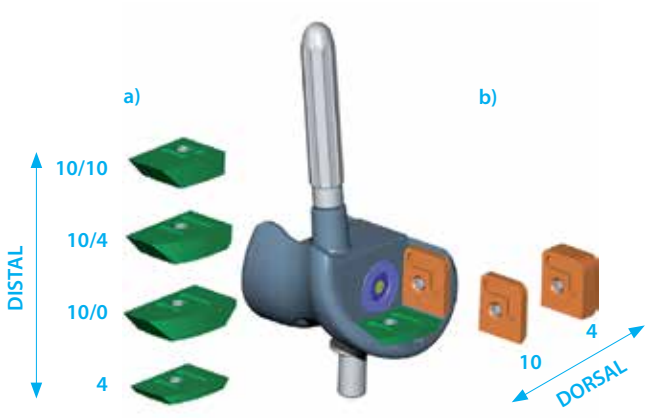


Fig. 64: Femoral component assembly

component stopper/hammer and tibial component stopper/hammer this tool must not be used for hammering in the trial liner). For insertion of the femoral component, it is necessary to use the relevant instrument from the Femoral Instrument Cassette (femoral component stopper /hammer). Fitting of both components is done with the aid of the femoral component's suspension element inserted into the hole in the tibial component (like in trial fitting), see Fig. 54 .

Thereupon both components are locked by inserting a trial insert of the right size and height (the height of the liner, e.g., 3/12, matches suspension element 3/12). Slide the liner onto the dovetail of the tibial component, making sure that they lock properly. The nose of the liner must overlap over the suspension element sleeve (see Fig. 65–67).

Extend the joint. This squeezes out excess cement and establishes micro congruence between the components. When the cement hardens, flex the joint again, remove excess (extruded) cement, and check mobility and stability of the joint for the last time.
Now the right size of PE liner may be unpacked, whereby we make sure not to lose the connecting screw that is packed together with the tibial component. Take out the insert and place it on a perfectly cleaned upper facet of the tibial component in accordance with the above-described surgical technique.
Secure the insert by screwing it in and tightening it with the connecting screw.
Finally, insert the plug scren, using the inserting device (149) , Fig. 66).

Completion of surgery
The surgery will be completed vis standard reconstruction of an extension device, set-up a sucking drainage, closure a surgical wound flake by flake and application a proteeting bandage on.

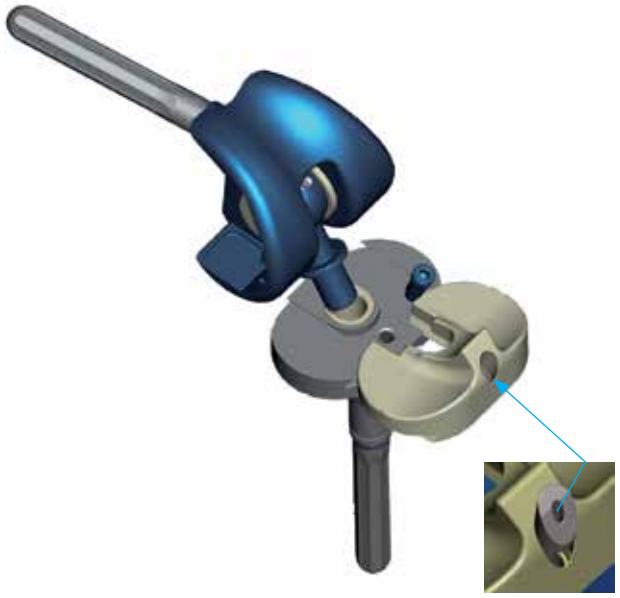


Fig. 65: Implant assembly

Fig. 66: Detail of plug insertion

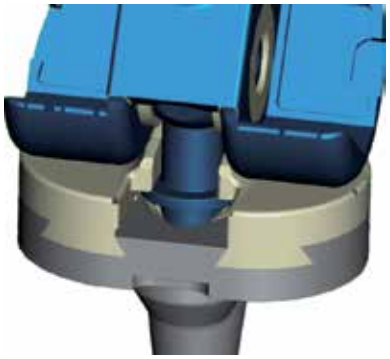
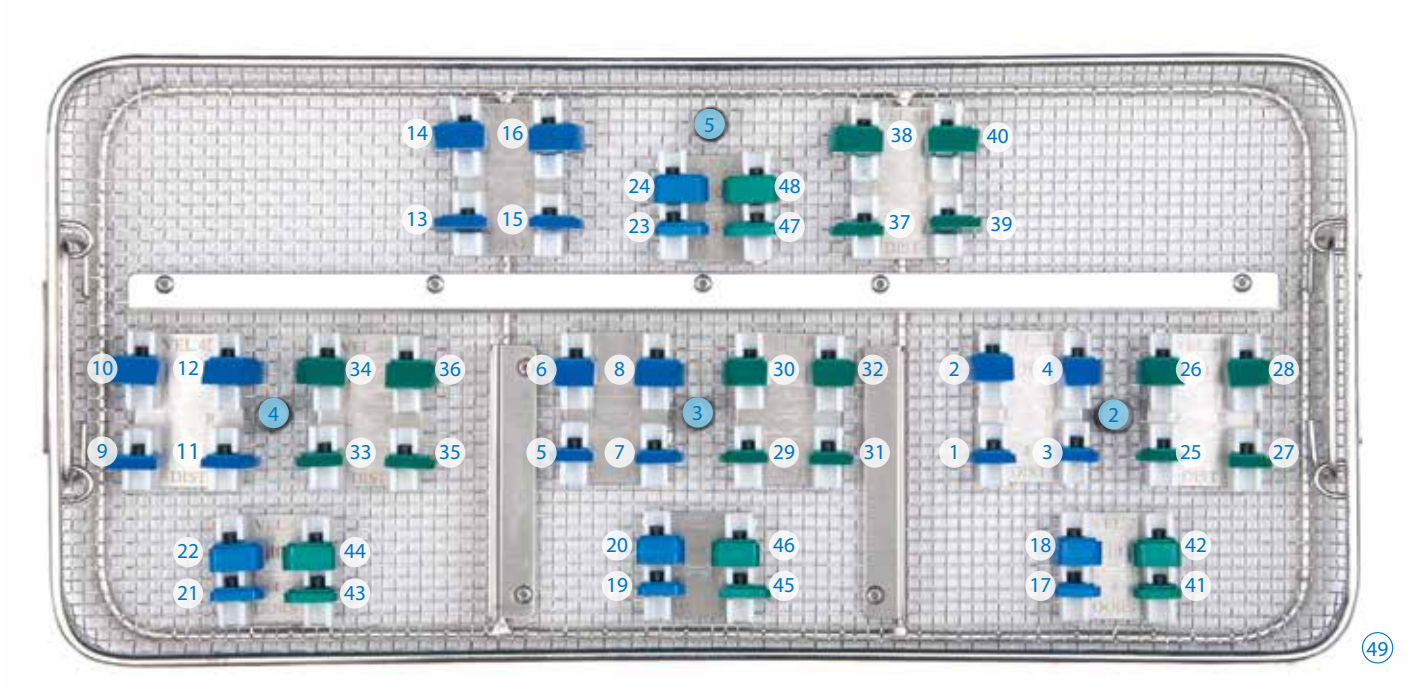


Fig. 67: Detail of locking

Set of instruments

The sets of instruments are determined for application of total knee joint - type CMS (301080). The set is clearly aranged in 9 cassettes. All sets are suitable for handling during surgery, transportation, sterilization and storage as well.

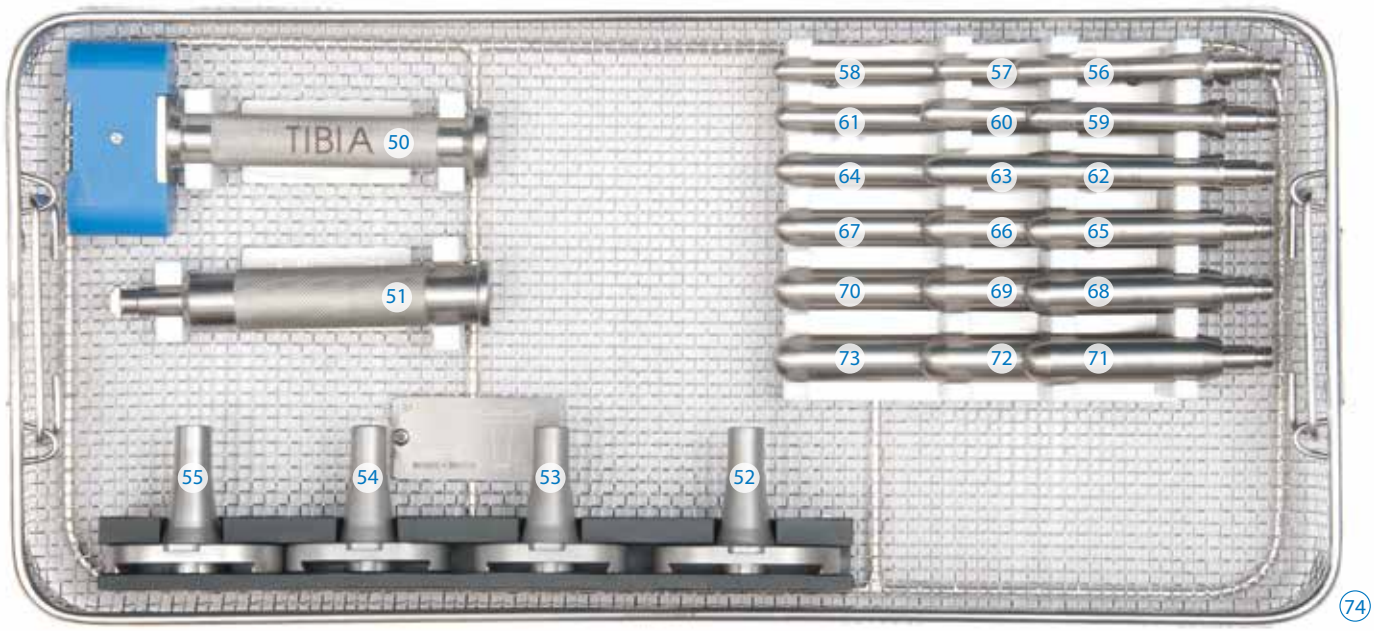


Set of instruments for application of revision knee joint - CMS

INSTRUMENTS FOR APPLICATION OF KNEE JOINT - CMS - FEMORAL AUGMENTATION

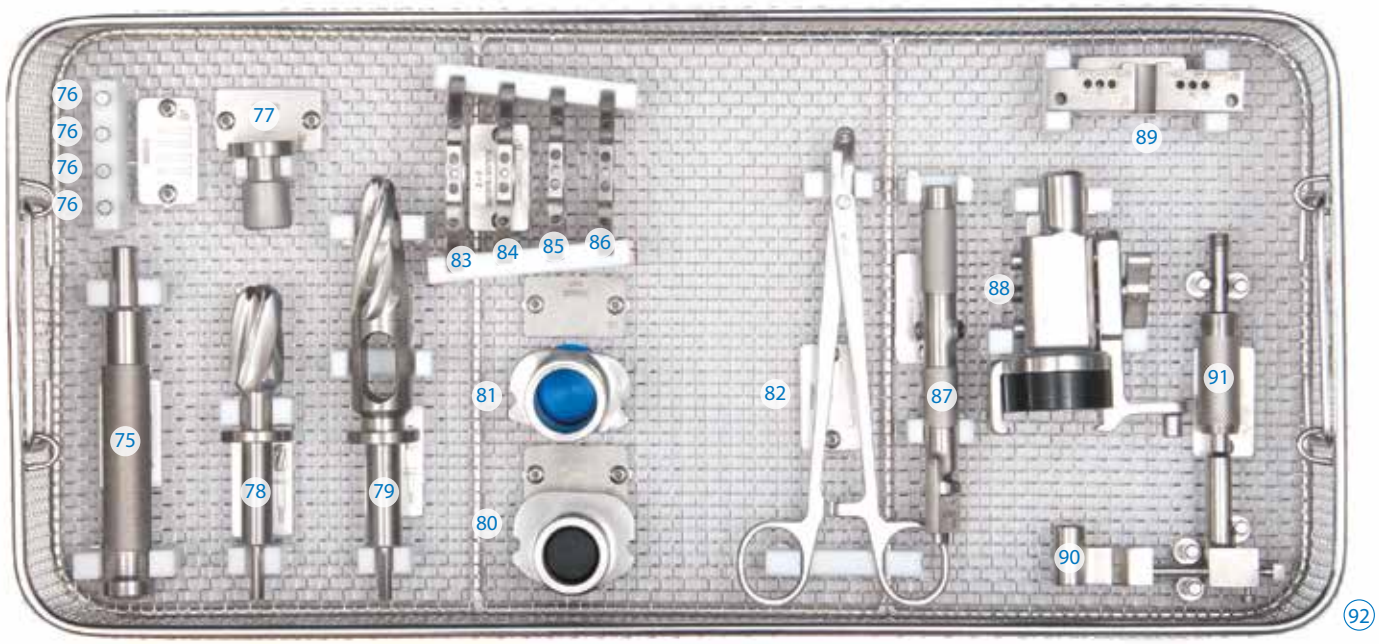
	Denomination	Qty	Order Number
1	SVR - Trial distal femoral aug., 2L/L-5	1	308610
2	SVR - Trial distal femoral aug., 2L/L-10/4	1	308611
3	SVR - Trial distal femoral aug., 2L/R-5	1	308615
4	SVR - Trial distal femoral aug., 2L/R-10/4	1	308616
5	SVR - Trial distal femoral aug., 3L/L-5	1	308620
6	SVR - Trial distal femoral aug., 3L/L-10/4	1	308621
7	SVR - Trial distal femoral aug., 3L/R-5	1	308625
8	SVR - Trial distal femoral aug., 3L/R-10/4	1	308626
9	SVR - Trial distal femoral aug., 4L/L-5	1	308630
10	SVR - Trial distal femoral aug., 4L/L-10/4	1	308631
11	SVR - Trial distal femoral aug., 4L/R-5	1	308635
12	SVR - Trial distal femoral aug., 4L/R-10/4	1	308636
13	SVR - Trial distal femoral aug., 5L/L-5	1	308640
14	SVR - Trial distal femoral aug., 5L/L-10/4	1	308641
15	SVR - Trial distal femoral aug., 5L/R-5	1	308645
16	SVR - Trial distal femoral aug., 5L/R-10/4	1	308646
17	SVR - Trial dorsal femoral aug., 2L-4	1	308660
18	SVR - Trial dorsal femoral aug., 2L-10	1	308662
19	SVR - Trial dorsal femoral aug., 3L-4	1	308665
20	SVR - Trial dorsal femoral aug., 3L-10	1	308667
21	SVR - Trial dorsal femoral aug., 4L-4	1	308670
22	SVR - Trial dorsal femoral aug., 4L-10	1	308672
23	SVR - Trial dorsal femoral aug., 5L-4	1	308675
24	SVR - Trial dorsal femoral aug., 5L-10	1	308677
25	SVR - Trial distal femoral aug., 2R/L-5	1	308710
26	SVR - Trial distal femoral aug., 2R/L-10/4	1	308711
27	SVR - Trial distal femoral aug., 2R/R-5	1	308715
28	SVR - Trial distal femoral aug., 2R/R-10/4	1	308716
29	SVR - Trial distal femoral aug., 3R/L-5	1	308720
30	SVR - Trial distal femoral aug., 3R/L-10/4	1	308721
31	SVR - Trial distal femoral aug., 3R/R-5	1	308725
32	SVR - Trial distal femoral aug., 3R/R-10/4	1	308726
33	SVR - Trial distal femoral aug., 4R/L-5	1	308730
34	SVR - Trial distal femoral aug., 4R/L-10/4	1	308731
35	SVR - Trial distal femoral aug., 4R/R-5	1	308735
36	SVR - Trial distal femoral aug., 4R/R-10/4	1	308736
37	SVR - Trial distal femoral aug., 5R/L-5	1	308740
38	SVR - Trial distal femoral aug., 5R/L-10/4	1	308741
39	SVR - Trial distal femoral aug., 5R/R-5	1	308745
40	SVR - Trial distal femoral aug., 5R/R-10/4	1	308746
41	SVR - Trial dorsal femoral aug., 2R-4	1	308760
42	SVR - Trial dorsal femoral aug., 2R-10	1	308762
43	SVR - Trial dorsal femoral aug., 3R-4	1	308765
44	SVR - Trial dorsal femoral aug., 3R-10	1	308767
45	SVR - Trial dorsal femoral aug., 4R-4	1	308770
46	SVR - Trial dorsal femoral aug., 4R-10	1	308772
47	SVR - Trial dorsal femoral aug., 5R-4	1	308775
48	SVR - Trial dorsal femoral aug., 5R-10	1	308777
49	Tray - instr. for appl. of KJ - CMS - femoral aug.	1	300982

Content of cassettes is only informative and could be changed up to implemented innovative changes.



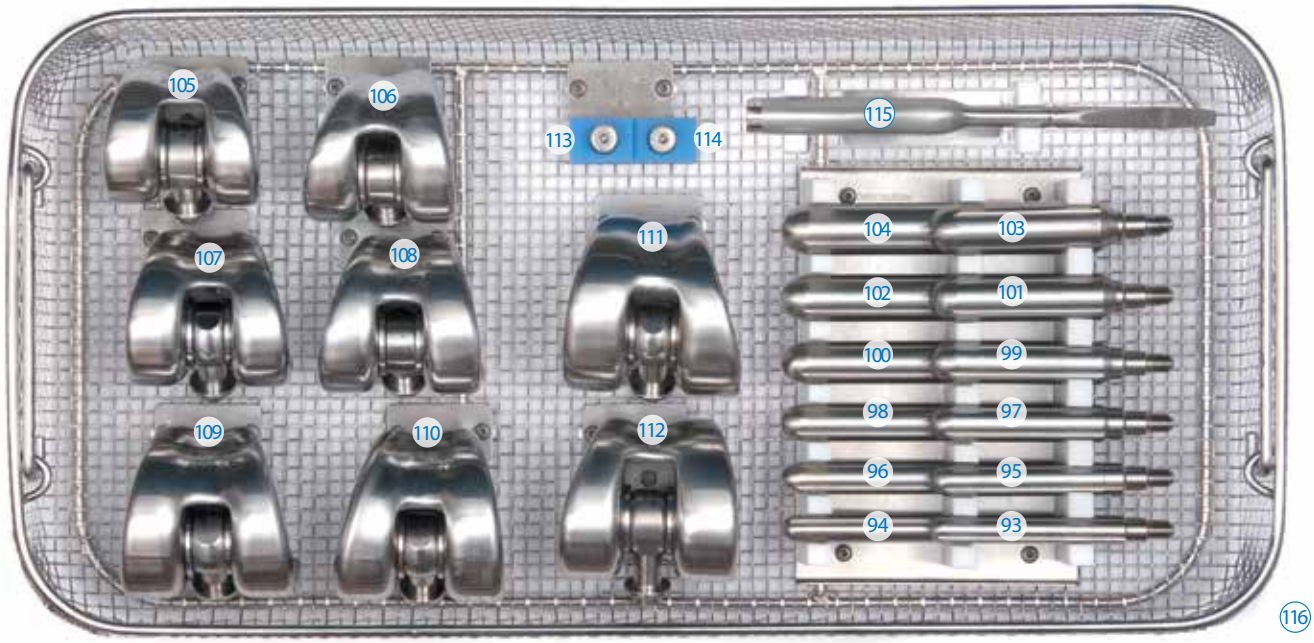
Set of instruments for application of revision knee joint - CMS **INSTRUMENTS FOR APPLICATION OF KNEE JOINT - CMS - TIBIA (I)**			
	Denomination	**Qty**	**Order number**
50	CMS - Tibial component impactor	1	307990
51	CMS - Extractor of trial tibial component	1	307949
52	CMS - Trial tibial component, 2	1	307925
53	CMS - Trial tibial component, 3	1	307926
54	CMS - Trial tibial component, 4	1	307927
55	CMS - Trial tibial component, 5	1	307928
56	SVR - Trial tibial stem, 10-80	1	308310
57	SVR - Trial tibial stem, 10-120	1	308311
58	SVR - Trial tibial stem, 10-180	1	308312
59	SVR - Trial tibial stem, 12-80	1	308315
60	SVR - Trial tibial stem, 12-120	1	308316
61	SVR - Trial tibial stem, 12-180	1	308317
62	SVR - Trial tibial stem, 14-80	1	308320
63	SVR - Trial tibial stem, 14-120	1	308321
64	SVR - Trial tibial stem, 14-180	1	308322
65	SVR - Trial tibial stem, 16-80	1	308325
66	SVR - Trial tibial stem, 16-120	1	308326
67	SVR - Trial tibial stem, 16-180	1	308327
68	SVR - Trial tibial stem, 18-80	1	308330
69	SVR - Trial tibial stem, 18-120	1	308331
70	SVR - Trial tibial stem, 18-180	1	308332
71	SVR - Trial tibial stem, 20-80	1	308335
72	SVR - Trial tibial stem, 20-120	1	308336
73	SVR - Trial tibial stem, 20-180	1	308337
74	Tray - instr. for appl. of revision KJ - CMS - tibia (I)	1	301082

Content of cassettes is only informative and could be changed up to implemented innovative changes.



Set of instruments for application of revision knee joint - CMS **INSTRUMENTS FOR APPLICATION OF KNEE JOINT - CMS - TIBIA (II)**			
	Denomination	**Qty**	**Order number**
75	Extractor of fixation pins, with head	1	309322
76	SVL - Fixation pins with head, L20	4	309312
77	CMS - Case for centering template	1	307983
78	CMS - Cylindrical cutter, D23	1	307986
79	CMS - Cone cutter	1	307985
80	CMS - Drilling sleeve I	1	307981
81	CMS - Drilling sleeve II	1	307982
82	CMS - Pliers for loading of set screw	1	307967
83	CMS - Centrering template, 5	1	307978
84	CMS - Centrering template, 4	1	307977
85	CMS - Centrering template, 3	1	307976
86	CMS - Centrering template, 2	1	307975
87	SVR - Trial tibial component handle	1	308278
88	CMS - Tibial component loader	1	307988
89	SVR - Resection block, 0°, for intramedullary aiming device	1	309106
90	SVR - Tibial intramedullary aiming device	1	308272
91	SVR - Nut for intramedullary aiming device	1	309104
92	Tray - instr. for appl. of revision KJ - CMS - tibia (II)	1	301083

Content of cassettes is only informative and could be changed up to implemented innovative changes.

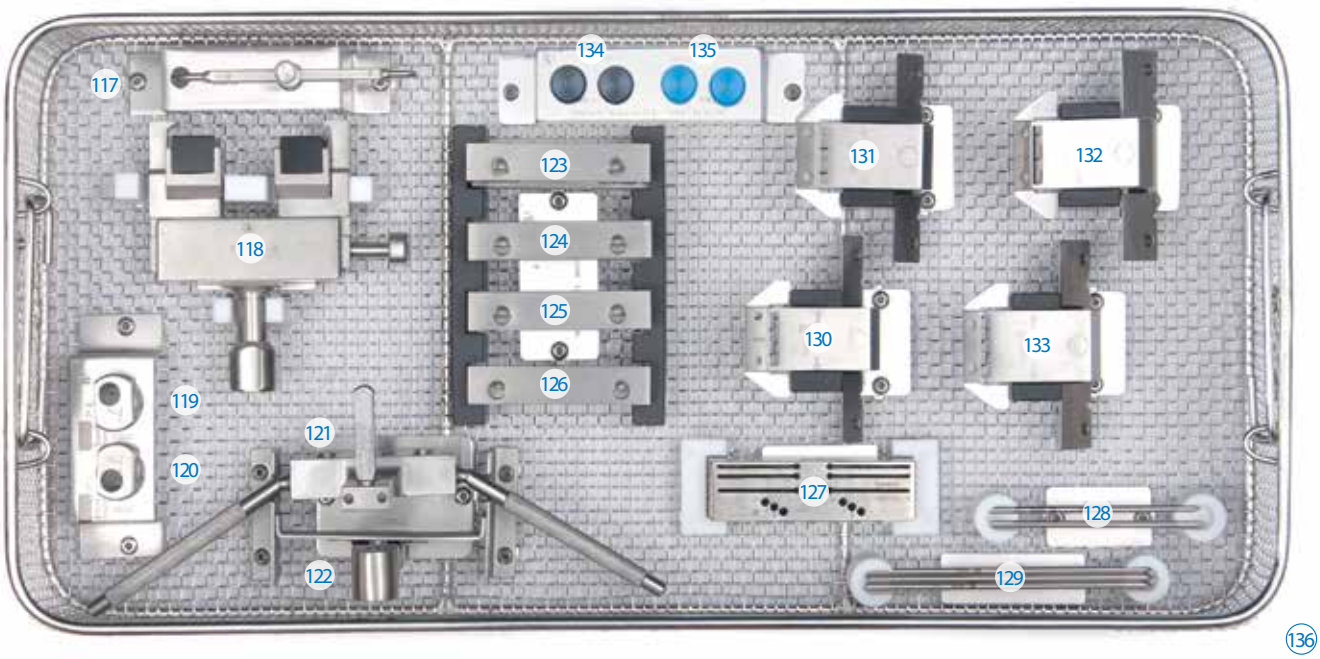


Set of instruments for application of revision knee joint - CMS

INSTRUMENTS FOR APPLICATION OF KNEE JOINT - CMS - FEMUR (I)

	Denomination	Qty	Order Number
93	SVR - Trial femoral stem, 12-120	1	308230
94	SVR - Trial femoral stem, 12-180	1	308231
95	SVR - Trial femoral stem, 14-120	1	308235
96	SVR - Trial femoral stem, 14-180	1	308236
97	SVR - Trial femoral stem, 16-120	1	308240
98	SVR - Trial femoral stem, 16-180	1	308241
99	SVR - Trial femoral stem, 18-120	1	308245
100	SVR - Trial femoral stem, 18-180	1	308246
101	SVR - Trial femoral stem, 20-120	1	308250
102	SVR - Trial femoral stem, 20-180	1	308251
103	SVR - Trial femoral stem, 22-120	1	308255
104	SVR - Trial femoral stem, 22-180	1	308256
105	CMS - Trial femoral component, 2R	1	307911
106	CMS - Trial femoral component, 2L	1	307901
107	CMS - Trial femoral component, 3R	1	307912
108	CMS - Trial femoral component, 3L	1	307902
109	CMS - Trial femoral component, 4R	1	307913
110	CMS - Trial femoral component, 4L	1	307903
111	CMS - Trial femoral component, 5R	1	307914
112	CMS - Trial femoral component, 5L	1	307904
113	CMS - End of trial hinge II	1	307920
114	CMS - End of trial hinge I	1	307922
115	SVR - Trial insert extractor	1	308430
116	Tray - instr. for appl. of revision KJ - CMS - femur (I)	1	301084

Content of cassettes is only informative and could be changed up to implemented innovative changes.

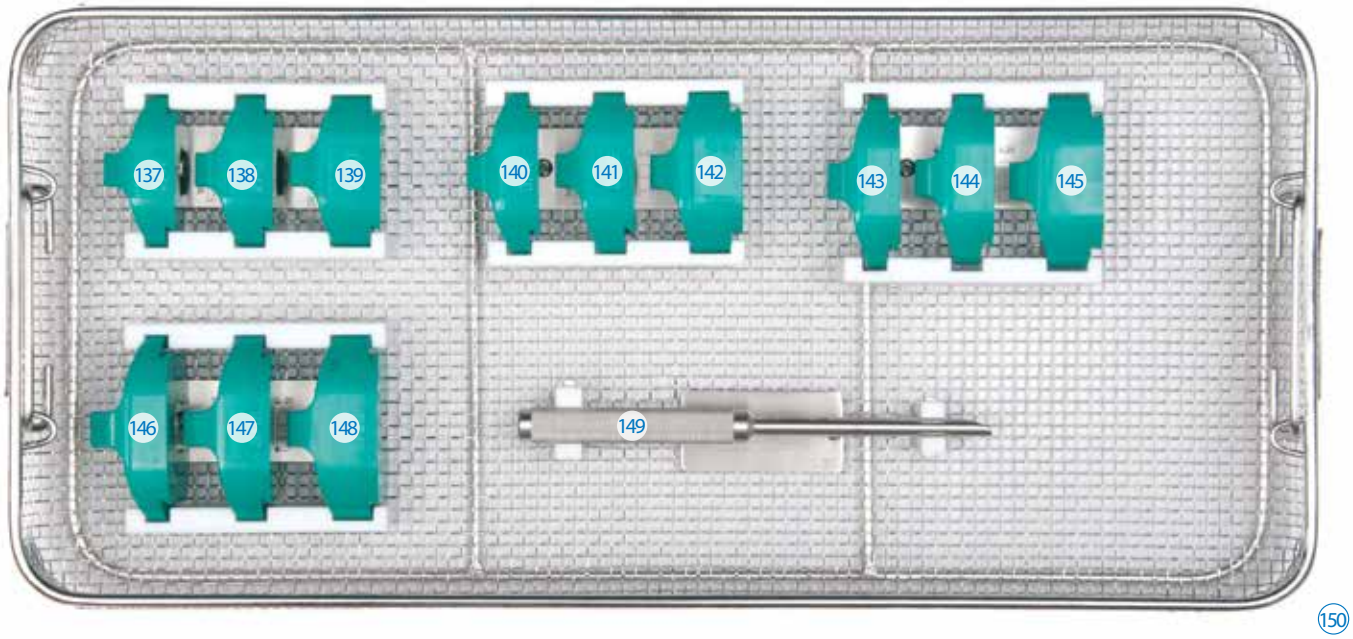


Set of instruments for application of revision knee joint - CMS

INSTRUMENTS FOR APPLICATION OF KNEE JOINT - CMS - FEMUR (II)

	Denomination	Qty	Order Number
117	SVR - Resection gauge, 0, -3	1	308190
118	SVR - Femoral component loader	1	308270
119	CMS - Angular connecting sleeve, 7°/L	1	307950
120	CMS - Angular connecting sleeve, 7°/R	1	307951
121	SVR - Femoral centering instrment	1	308160
122	Adapter for femoral centering device	1	309030
123	SVR - Template for ventral and dorsal resection, 2	1	308172
124	SVR - Template for ventral and dorsal resection, 3	1	308173
125	SVR - Template for ventral and dorsal resection, 4	1	308174
126	SVR - Template for ventral and dorsal resection, 5	1	308175
127	SVR - Template for distal femoral resection	1	308170
128	Fixation nail, L90	2	309305
129	SVL - Fixation pin, L125, spear end	6	309310
130	CMS - Template for transversal resection, 2	1	307960
131	CMS - Template for transversal resection, 3	1	307961
132	CMS - Template for transversal resection, 4	1	307962
133	CMS - Template for transversal resection, 5	1	307963
134	SVR - Distance ring, 4	2	308192
135	SVR - Distance ring, 10	2	308194
136	Tray - instr. for appl. of revision KJ - CMS - femur (II)	1	301085

Content of cassettes is only informative and could be changed up to implemented innovative changes.

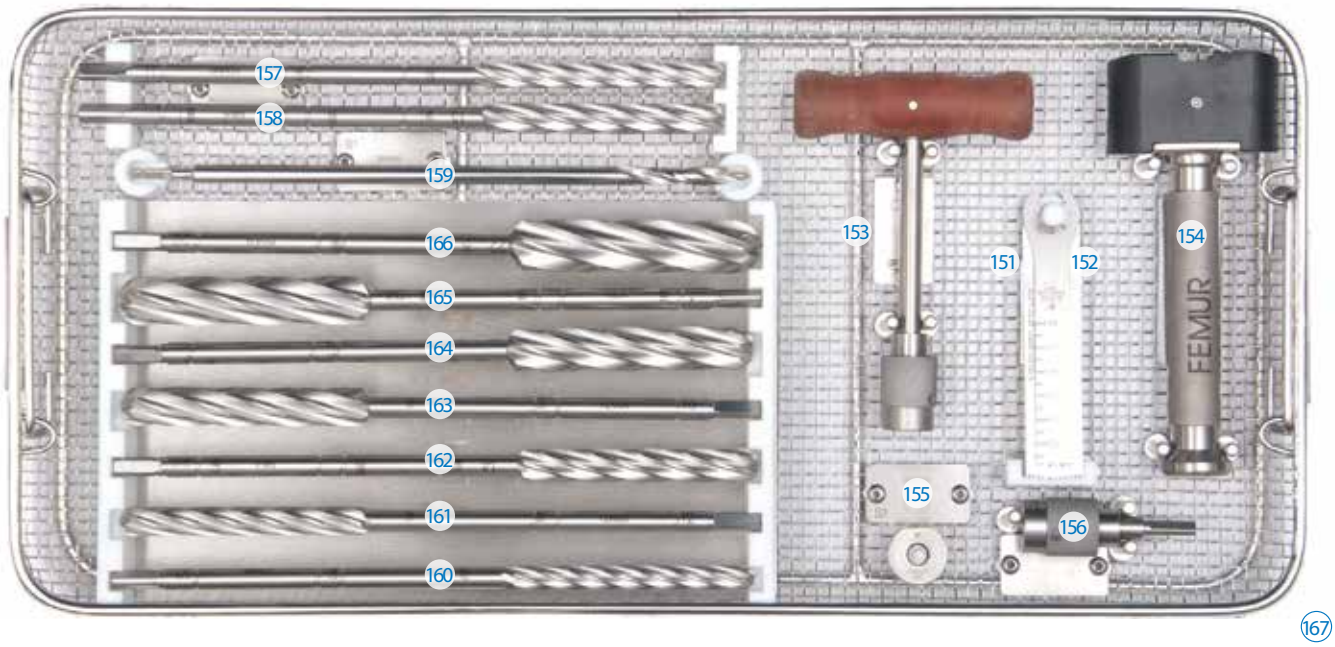


Set of instruments for application of revision knee joint - CMS

INSTRUMENTS FOR APPLICATION OF KNEE JOINT - CMS - TRIAL INSERTS

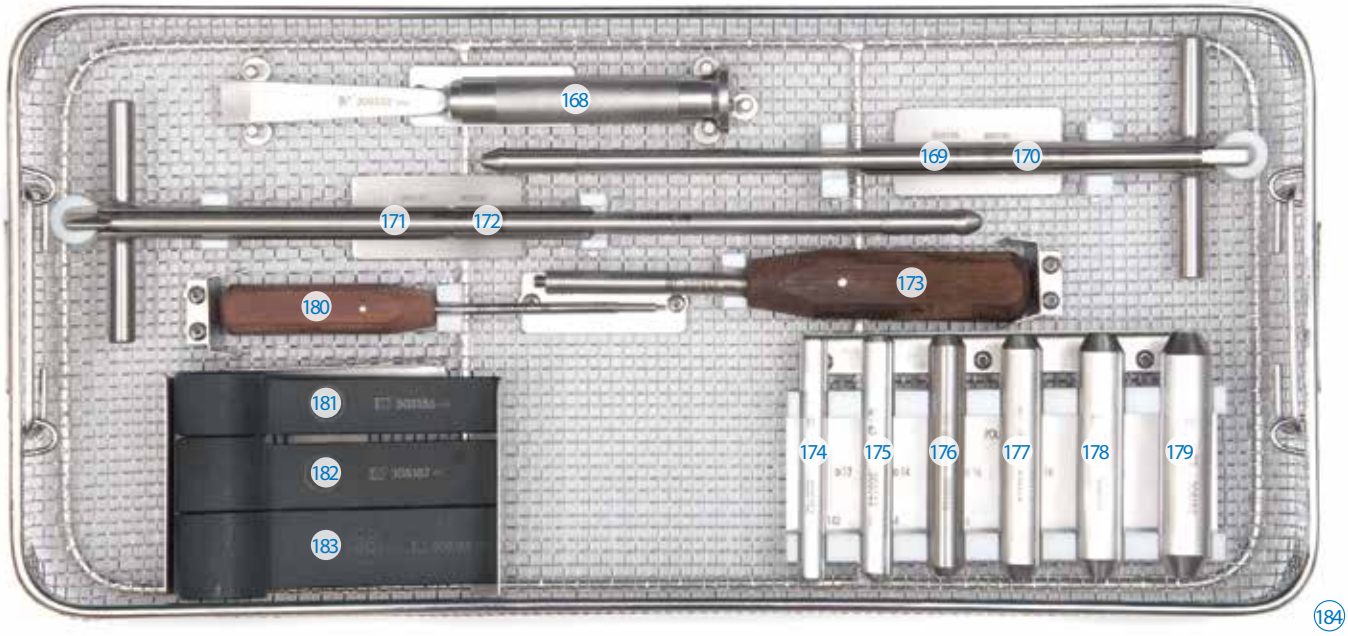
	Denomination	Qty	Order Number
137	CMS - Trial insert, 2-12	1	307930
138	CMS - Trial insert, 2-15	1	307931
139	CMS - Trial insert, 2-20	1	307933
140	CMS - Trial insert, 3-12	1	307935
141	CMS - Trial insert, 3-15	1	307936
142	CMS - Trial insert, 3-20	1	307938
143	CMS - Trial insert, 4-12	1	307940
144	CMS - Trial insert, 4-15	1	307941
145	CMS - Trial insert, 4-20	1	307943
146	CMS - Trial insert, 5-12	1	307945
147	CMS - Trial insert, 5-15	1	307946
148	CMS - Trial insert, 5-20	1	307948
149	CMS - Plug loader	1	307992
150	Tray - instr. for appl. of revision KJ - CMS - trial inserts	1	301086

Content of cassettes is only informative and could be changed up to implemented innovative changes.



Set of instruments for application of revision knee joint - CMS **INSTRUMENTS FOR APPLICATION OF KNEE JOINT - CMS - COMMON (I)**			
	Denomination	**Qty**	**Order Number**
151	Saw blade, 0.9/15, L115 - SYNTHES	1	401110
152	Saw blade, 0.9/24, L115 - SYNTHES	1	401100
153	"T" head - triangular (Synthes)	1	304002
154	Femoral component impactor	1	309090
155	SVR - Displaced sleeve for cutter	1	308120
156	Coupler - triangular conn. (Synthes)/triangular	1	401205
157	CMS - Cylindrical cutter, D11 - triangular conn. (Synthes)	1	308001
158	CMS - Cylindrical cutter, D13 - triangular conn. (Synthes)	1	308003
159	Drill bit for medullary canal perforation, D8.0	1	309000
160	SVR - Cylindrical cutter, D10 - triangular conn. (Synthes)	1	308100
161	SVR - Cylindrical cutter, D12 - triangular conn. (Synthes)	1	308102
162	SVR - Cylindrical cutter, D14 - triangular conn. (Synthes)	1	308104
163	SVR - Cylindrical cutter, D16 - triangular conn. (Synthes)	1	308106
164	SVR - Cylindrical cutter, D18 - triangular conn. (Synthes)	1	308108
165	SVR - Cylindrical cutter, D20 - triangular conn. (Synthes)	1	308110
166	SVR - Cylindrical cutter, D22 - triangular conn. (Synthes)	1	308112
167	Tray - instr. for appl. of revision KJ - CMS - common (I)	1	301087

Content of cassettes is only informative and could be changed up to implemented innovative changes.

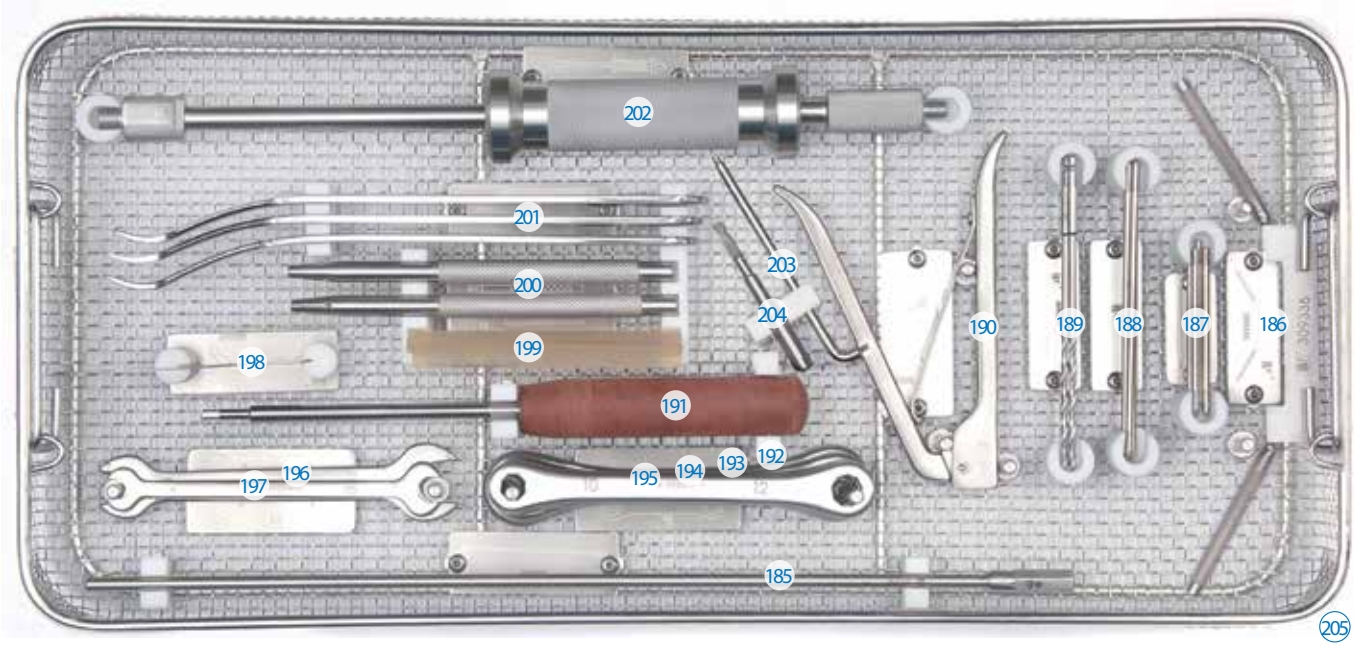


Set of instruments for application of revision knee joint - CMS

INSTRUMENTS FOR APPLICATION OF KNEE JOINT - CMS - COMMON (II)

	Denomination	Qty	Order Number
168	Chisel, 18 mm	1	309352
169	SVR - Pressure sleeve I	1	308135
170	SVR - Guiding rod I	1	308130
171	SVR - Pressure sleeve II	1	308137
172	SVR - Guiding rod II	1	308132
173	CMS - Loader of rotating peg	1	307965
174	SVR - Sleeve, D12	1	308142
175	SVR - Sleeve, D14	1	308144
176	SVR - Sleeve, D16	1	308146
177	SVR - Sleeve, D18	1	308148
178	SVR - Sleeve, D20	1	308150
179	SVR - Sleeve, D22	1	308152
180	CMS - Hexagonal screwdriver, D2.0	1	307970
181	SVR - Spacer, 26	1	308186
182	SVR - Spacer, 30	1	308187
183	SVR - Spacer, 35	1	308188
184	Tray - instr. for appl. of revision KJ - CMS - common (II)	1	301088

Content of cassettes is only informative and could be changed up to implemented innovative changes.



Set of instruments for application of revision knee joint - CMS **INSTRUMENTS FOR APPLICATION OF KNEE JOINT - CMS - COMMON (III)**			
	Denomination	**Qty**	**Order Number**
185	SVL - Centering rod	1	309340
186	SVL - Guiding bar	4	309335
187	SVL - Fixation pin, L90	4	309306
188	SVL - Fixation pin, L125, drill end	2	309311
189	Drill bit, D3.2	1	309300
190	Extractor of fixation pins	1	309320
191	Hexagonal screwdriver, D3.5, L250	1	102450
192	SVR - Closed end wrench for cementless stem, 10-12	1	308410
193	SVR - Closed end wrench for cementless stem, 12-14	1	308412
194	SVR - Closed end wrench for cementless stem, 16-18	1	308414
195	SVR - Closed end wrench for cementless stem, 20-22	1	308416
196	SVR - Open end wrench for trial stem, 8-10	1	308420
197	SVR - Open end wrench for trial stem, 13-17	1	308422
198	SVR - Checking gauge	1	308440
199	SVL - Ruler	2	309350
200	Fixation pin impactor	3	309315
201	Narrow retractor	1	202200
202	SVR - Sliding hammer - extractor	2	308435
203	Hexagonal "L" wrench, D2.5	1	707022
204	Pin handle II	1	309314
205	Tray - instr. for appl. of revision KJ - CMS - common (III)	1	301089

Content of cassettes is only informative and could be changed up to implemented innovative changes.

In general

Total replacement consists of modular elements. Functional implants must comprise:

1. A femoral component with an extending stem and a suspension element connected to a component and secured by a fixation screw.
2. A tibial component with an extending shank and a PE liner of the right size, secured by a connecting screw.

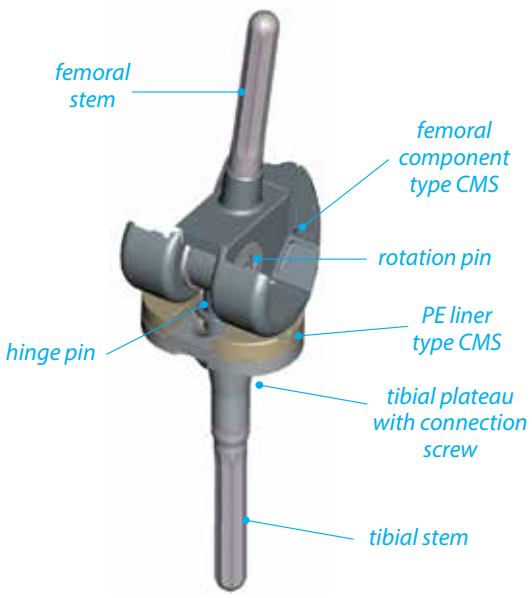
Different sizes of femoral and tibial components may not be interchangeably combined.
Every PE liner of particular thickness matches a particular size of suspension element.
Individual product kits may also contain a partial tibial replacement (possibly with a fastener for patellar ligament) and femur with distance rings.

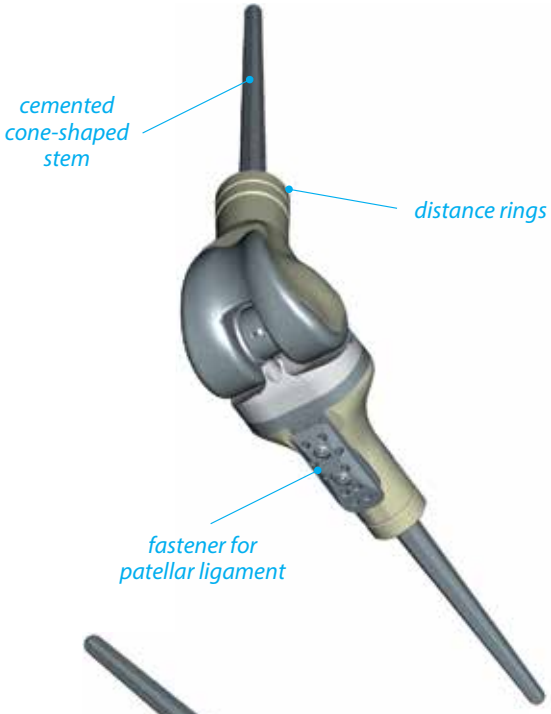
The implant kit contains the following elements:

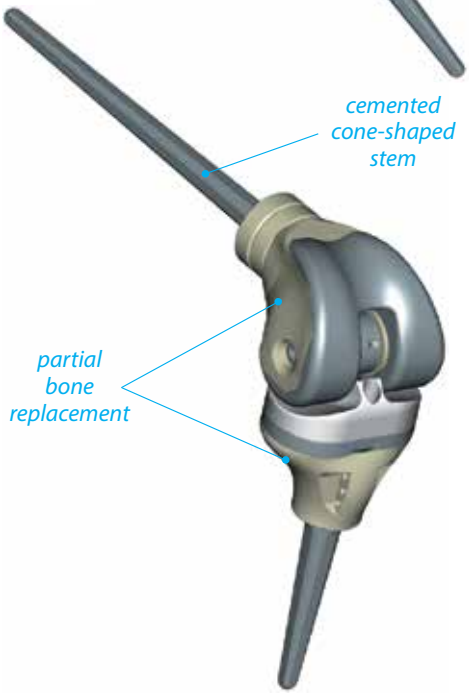
- *Femoral component (with extending stem)*
- *Tibial component (with extending stem)*
- *PE liner, type CMS*

Individually, the implant kit may contain additional partial bone replacement:

- *femoral and tibial with distance rings*
- *partial tibial replacement may be complemented with a fastener for patellar ligament*

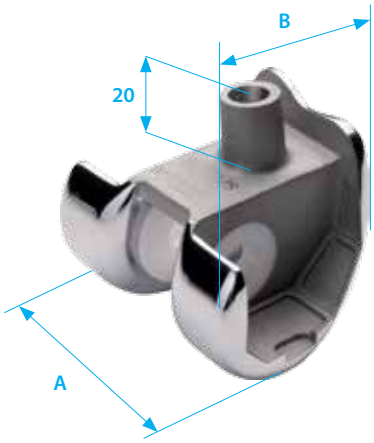






System CMS – femoral component

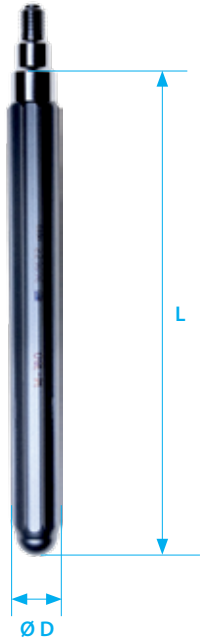
Material: Co-Cr-Mo casting alloy (ISO 5832-4)



Size	left (L) / right (R)	Dimension [mm] A perpendicular	Dimension [mm] B ventrodorsal	Order Number
2	L	64	56	341550
	R			341560
3	L	68	60	341551
	R			341561
4	L	72	64	341552
	R			341562
5	L	75	68	341553
	R			341563

System SVR - Femoral stem, cementless

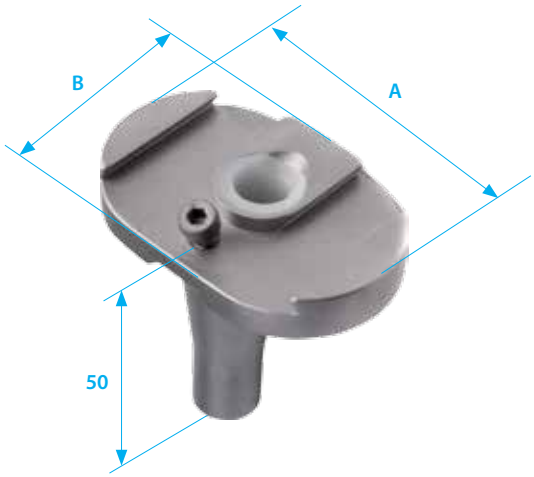
Material: Wrought titanium Ti6Al4V alloy (ISO 5832-3)



Dimension D [mm]	Dimension L [mm]	Denomination	Order Number
12	80	S.V.R. - femoral stem, cementless 12L120	360610
	140	S.V.R. - femoral stem, cementles 12L180	360612
14	80	S.V.R. - femoral stem, cementles 14L120	360620
	140	S.V.R. - femoral stem, cementles 14L180	360622
16	80	S.V.R. - femoral stem, cementles 16L120	360630
	140	S.V.R. - femoral stem, cementles 16L180	360632
18	80	S.V.R. - femoral stem, cementles 18L120	360640
	140	S.V.R. - femoral stem, cementles 18L180	360642
20	80	S.V.R. - femoral stem, cementles 20L120	360650
	140	S.V.R. - femoral stem, cementles 20L180	360652
22	80	S.V.R. - femoral stem, cementles 22L120	360660
	140	S.V.R. - femoral stem, cementles 22L180	360662

System CMS – tibial component

Material: Stainless steel (ISO 5832-1)



Size	Dimension [mm] A perpendicular	Dimension [mm] B ventrodorsal	Order Number
2	64	42	341610
3	68	45	341611
4	72	48	341612
5	78	51	341613

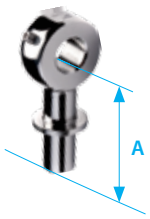
System SVR - tibial stem, cementless

Material: Wrought titanium Ti6Al4V alloy (ISO 5832-3)

Dimension D [mm]	Dimension L [mm]	Order Number
10	80	360900
	120	360902
	180	360904
12	80	360910
	120	360912
	180	360914
14	80	360920
	120	360922
	180	360924
16	80	360930
	120	360932
	180	360934
18	80	360940
	120	360942
	180	360944
20	80	360950
	120	360952
	180	360954

System CMS – hinge item

Material: Wrought high nitrogen stainless steel (ISO 5832-9)



Size	Pin thick [mm]	Denomination (size/thick)	Dimension A [mm]	Order Number
2	12	2/12	45	341565
	15	2/15	48	341566
	20	2/20	53	341568
3	12	3/12	45	341570
	15	3/15	48	341571
	20	3/20	53	341573
4	12	4/12	45	341575
	15	4/15	48	341576
	20	4/20	53	341578
5	12	5/12	45	341580
	15	5/15	48	341581
	20	5/20	53	341583

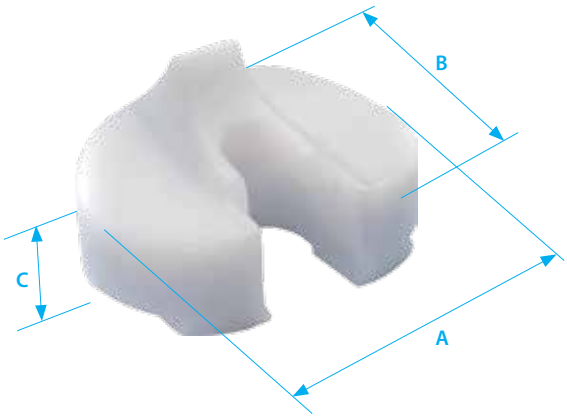
System CMS – rotating item

Material: Stainless steel (ISO 5832-1)

Size	Dimension A [mm]	Order Number
2	25	341600
3	26	341601
4	27	341602
5	28	341603

System CMS - PE liner (UHMWPE)

Material: UHMWPE (ISO 5834-2)



Size	Thickness C [mm]	Dimension [mm] A perpendicular	Dimension [mm] B ventrodorsal	Order Number
2	12	64	42	341620
	15			341621
	20			341623
3	12	68	45	341625
	15			341626
	20			341628
4	12	72	48	341630
	15			341631
	20			341633
5	12	78	51	341635
	15			341636
	20			341638

System SVR - dorsal femoral augmentation

Material: Wrought titanium Ti6Al4V alloy (ISO 5832-3)

Size	left (L) / right (R)	Thickness [mm]	Order Number
2	L	4	360120
		10	360122
	R	4	360420
		10	360422
3	L	4	360130
		10	360132
	R	4	360430
		10	360432
4	L	4	360140
		10	360142
	R	4	360440
		10	360442
5	L	4	360150
		10	360152
	R	4	360450
		10	360452

System SVR – distal femoral augmentation for left femoral component

Material: Wrought titanium Ti6Al4V alloy (ISO 5832-3)

Size	left (L) / right (R)	Thickness of distal augmentation [mm]	Thickness of dorsal augmentation [mm]	Indication	Order Number
2	L	4	4/10	4	360020
		10	-	10/0	360022
			4	10/4	360023
			10	10/10	360024
	R	4	4/10	4	360025
		10	-	10/0	360027
			4	10/4	360028
			10	10/10	360029
3	L	4	4/10	4	360030
		10	-	10/0	360032
			4	10/4	360033
			10	10/10	360034
	R	4	4/10	4	360035
		10	-	10/0	360037
			4	10/4	360038
			10	10/10	360039
4	L	4	4/10	4	360040
		10	-	10/0	360042
			4	10/4	360043
			10	10/10	360044
	R	4	4/10	4	360045
		10	-	10/0	360047
			4	10/4	360048
			10	10/10	360049
5	L	4	4/10	4	360050
		10	-	10/0	360052
			4	10/4	360053
			10	10/10	360054
	R	4	4/10	4	360055
		10	-	10/0	360057
			4	10/4	360058
			10	10/10	360059

System SVR – distal femoral autmentation for right femoral component

Material: Wrought titanium Ti6Al4V alloy (ISO 5832-3)

Size	left (L) / right (R)	Thickness of distal augmentation [mm]	Thickness of dorsal augmentation [mm]	Indication	Order Number
2	L	4	4/10	4	360320
		10	-	10/0	360322
			4	10/4	360323
			10	10/10	360324
	R	4	4/10	4	360325
		10	-	10/0	360327
			4	10/4	360328
			10	10/10	360329
3	L	4	4/10	4	360330
		10	-	10/0	360332
			4	10/4	360333
			10	10/10	360334
	R	4	4/10	4	360335
		10	-	10/0	360337
			4	10/4	360338
			10	10/10	360339
4	L	4	4/10	4	360340
		10	-	10/0	360342
			4	10/4	360343
			10	10/10	360344
	R	4	4/10	4	360345
		10	-	10/0	360347
			4	10/4	360348
			10	10/10	360349
5	L	4	4/10	4	360350
		10	-	10/0	360352
			4	10/4	360353
			10	10/10	360354
	R	4	4/10	4	360355
		10	-	10/0	360357
			4	10/4	360358
			10	10/10	360359

Standing warnings to mind and precautions to take

Before surgery

Pacient

- consents to the surgery while being aware of the risk and extent of the operation
- must be mentally capable of comprehending the principle of the surgery, the type of the implant proposed, and the importance of certain post-surgery regimen
- must meet the BMI requirement, i.e., body mass index of weight (max. BMI = 30)
- must acknowledge the limitation of physical activities arising from the type of implant and surgery, see under Post-surgery Warnings and Precautions

The surgical facility

- Z- procures complete sets of implants and tools necessary for the implantation
- checks packets for sterility (undamaged sealing and expiration date)
- ensures maximal sterility during surgery
- makes sure that no damaged, non-sterile, or used implant is used
- carefully considers indications of severe osteoporosis, history of infections, significant overweight, patients exposed to severe physical stress, and patients with a drug or alcohol addiction
- carefully considers individual options of TKJR/CMS and consults every case with the manufacturer. (Individual TKJR/CMS options are designated for patients with severe defects or bone tumors. Such surgeries require removal of major portions of bone structure in the area of distal femur or proximal tibia, or both simultaneously. Removed must also be the lateral and crucial ligaments, so that virtually all the forces and stress that the knee joint is exposed to is transmitted onto the implant!)

During surgery

- during implantation it is necessary to use the manufacturer's instrumentation set and to follow the manufacturer's instructions and recommendations
- when handling the product, it is essential to protect articulated polished areas, facets for induction of the liner and suspension element, and all threaded areas, as damaged articulated areas impact unfavorably on the implant life - span
- no damaged tools may be used for inserting
- definitive components (PE liners, femoral/tibial components) must not be used, on principle, for trial fitting
- only trial components and trial liners may be used for trial fitting
- after cementing in the components, remove all excess bone cement, as loosen particles of bone cement might penetrate into the space between the friction facets and cause an abnormal implant wear
- for definitive fitting, all parts of TKJR/CMSS must be perfectly clean and dry (articulation facets, the upper platform, and the hole in tibial platform for the suspension element)
- the connecting screw must be properly tightened (2 to 2.5 Nm)

After surgery

The patient

- must be aware of his mobility limitations in knee joint flexibility due to the implant design
- must be repeatedly advised that the implant may only be exposed to limited stress/load and that the stress/load may only be imposed gradually and individually – in accordance with the physician's recommendations
- in any case, post-surgery patients should avoid long walks, jogging, jumping, squatting, kneeling, sports involving physical contact, horseback riding, skiing, hard physical work, and carrying heavy loads – on the contrary, swimming is highly recommended
- generally, all activities involving a greater risk of a sudden, accidental fall should be avoided
- in cases involving a severe infection, a surgery, or invasive medical examination, it is advised to take antibiotics preventively
- in any case, all post-surgery patients should see their orthopaedic specialist for regular annual checkups, even if no problems occur
- if problems occur, see a physician (sudden pain, reddening or secretion/inflammation of the surgical scar, mobility inhibition, fever) or consult the problem with a physician by phone

The surgical facility

- must inform the patient that the load bearing capacity of the implant is always lower than that of the replaced joint, and repeatedly refer to the above Warnings to Mind and Precautions to Take
- must see post-surgery patients for follow-up checkups of TKJR/CMS
- post-surgery patients may undergo MRI

BEZNOSKA
We bring back joy to movement

Contact

Export:

tel.: +420 312 811 221

CE 1014

BEZNOSKA, s.r.o.
Dělnická 2727, 272 01 Kladno, Czech Republic
www.beznoska.com, export@beznoska.cz

tel.: +420 312 660 670
GSM: +420 602 666 503
fax: +420 312 660 216
+420 312 662 464