BEZNOSKA
We bring back joy to movement

Total Knee Joint Replacement
Type SVL (supplement SVS)

Primary Implants – Knee

ARTHROPLASTY

Preface

The knee implant, type BEZNOSKA/SVL, was designed according to the latest know-how and experience with this type of knee implant. The design provides for a simple and perfect fixation of the implant at minimal bone resection.

Shape optimization of the joint facets ensures maximal scope of mobility at good functional stability and minimization of polyethylene (UHMWPE) wear.

The assortment of available sizes, always in left and right options each, makes it possible to cover the entire range of sizes ever needed. In combination with polyethylene liners of different thicknesses, the assortment allows the surgeon to find a solution for practically any situation as may occur during primary implantation of the knee endoprosthesis.

Accurate positioning and perfect fitting of the implant is greatly facilitated by a comprehensive instrumentation set. The underlying concept is based on the principle of simple, clearly defined, consecutive steps and suggested solutions for common problems. The instruments are equally suitable for usage during minimally invasive surgeries.

This publication aims to serve as a handbook of instructions for a specific implant and instrumentation set. To be brief and instructive, it is limited to be focusing on the described implant, on the premise that the surgeon and his assistants are fully acquainted with general rules of knee replacement.

The aim of the publication is to help surgeons and theatre nurses to get an overview of the instruments and their proper utilization, in order to optimize the results of their work and, last but not the least, to preclude undesirable damage and depreciation of the instruments or – worse yet – the implant itself. Under no circumstances should this handbook be viewed as a study book of surgical technique.

Author: prof. Antonín Sosna, MD

Head of Department of Orthopaedics, 1st Faculty of Medicine, Charles University and University Hospital Motol

Characteristics of Implant

- The implant is designated for surgeries where the posterior cruciate ligament (LCP) is to be preserved.
- The anatomical shape of the femoral and tibial component, i.e. both left (L) and right (R) options.
- Variability allowing for combining femoral and tibial component of different sizes.
- Sophisticated design provides for solving femorotibial and femoropatellar defects.
- Subsequent revision system options (SVR).
- Navigation system options.

Possibility to Avail the Navigation System

The total knee endoprosthesis - type SVL, can be successfully performed using a computer navigation CAOS (computer assisted orthopaedic surgery). Comparing the conventional methods of knee implantation the computer assisted technics brings certain advantages, foremost, resulting from the increased accuracy of such a surgery.

Pros & Cons of CAOS

- Better balance of ligaments.
- More accurate patello-femoral tracking.
- Set-up of equable and commensurate flexion space.
- More accurate reconstruction of mechanical axis.
- Ever-lasting check and recommendation of next steps in surgical

technique during surgery.

- Analysis of movement range in order to retain the maximal joint function.
- Accurate location of implant.
- Prolongation of implant lifespan.
- Risk reduction of dangerous complications (dislocation, impingement, change of limb length).

Surgical Technique – Patient's Position

Introduction

The following description is a set of standard surgical techniques beginning with distal femoral resection. However, the modularity of the instruments makes it possible to start the procedure with a resection of the tibia, without a problem, if it convenes the surgeon. The subsequent steps in the individual stages of the surgery remain unchanged.

Surgical Approach

The instruments are designed so as to allow for implantation of the knee implant comfortably by means of any of the surgical methods normally used for knee replacements and do not require any changes in the establishment surgical practice.

However, we like to recommend the medial parapatelae approach, as it provides best for making optimal use of all the benefits that the instruments bring, including lesser invasiveness. The approach is not affected if a tourniquet is used for bleeding stoppage.

After penetrating into the knee, loosen the soft tissue in a standard manner. Flexing the knee is advised, but not necessary, as well as leveling of edge osteophytes. This will facilitate a more accurate determination of the size, side positioning, and tone of collateral structures. If necessary, we may do the first balancing of the soft tissue on the concavity of axial deformity.

A. Femoral Resection (Part 1)

1. Opening the Marrow Canal of the Femur

After flexing the knee to 90°, use the perforator 66 and a drill with point 22 (Ø 8mm) to create access to the marrow canal. Position the drill along the axis of the femur, immediately above the top of the intercondylar incision, either in the middle or, preferably, up to 5mm off (see Fig. 1 & 2). Drill to a depth of 4 to 5cm. Thereupon finish this preparatory step by pressing the stopped drill, using not-too-great a force, all the way into the canal (as far as it goes). This way, the drill sets itself in, in the direction of the canal, minimizing the risk of perforating the corticalis with the tip of the drill.

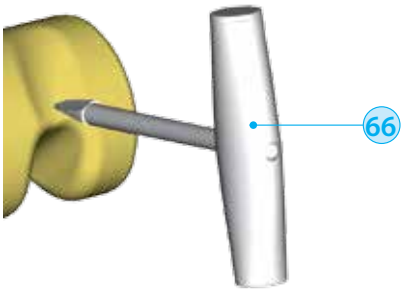


Fig. 1 – opening the marrow canal

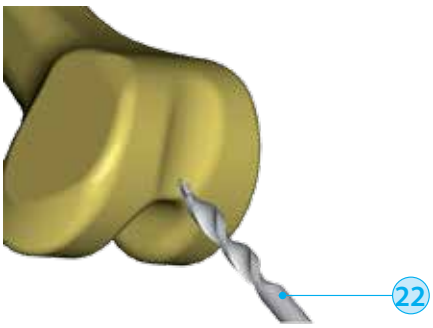


Fig. 2 – opening the marrow canal (drill)

- references on instruments correspond to their layout(s) in the trays (see pp. 26-31)

2. Preparation of Distal Femoral Resection

Into the marrow canal, prepared as described above, insert (not forcefully) the nail 14, after fitting it onto the femoral centering device 16. We may now complement the set with the resection block for distal femoral resection 20 (see Fig. 3).

Proper use of the set requires as follows

a) setting up the angle between axis of the nail inserted into the marrow canal and the mechanical axis, estimated or measured during pre-surgery planning (see Art. I)

b) setting up the size of distal resection – position of the distal resection block (see Art. II)

Fulfillment of both requirements, (I) and (II), will ensure that the distal resection of the femur, using the blade saw, across the groove of the resection block will be perpendicular to the mechanical axis of the femur and at the desired distance from the joint's crevice.

I) Adjusting the angle between mechanical and femoral axes

The centering matrix facilitates a smooth adjustment of the angle (valgosity) within a range of 0 to 9° for right and left leg. Adjustment of the position is done by turning the stop screw *, while simultaneously keeping control over the runner position ** on the centering device scale (see Fig. 4).

For checking the angle, we recommend using the extender of the centering device 17, along with the direction rod 95 (see Fig. 5). The axis of the rod should level with the head of the femur, i.e. the tip of the rod should be pointing to the head of the hip joint.

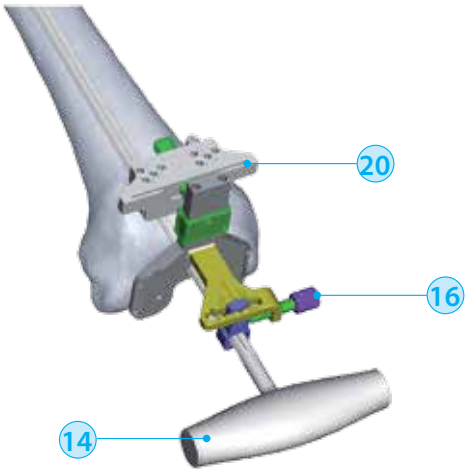


Fig. 3 – femoral centering devicel set

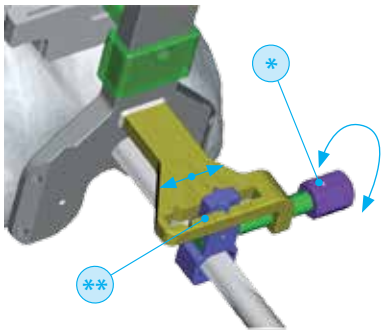


Fig. 4 – adjustment of the femoral centering device runner

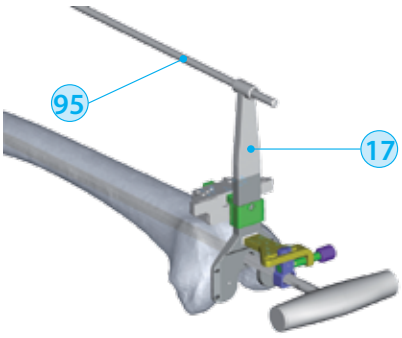
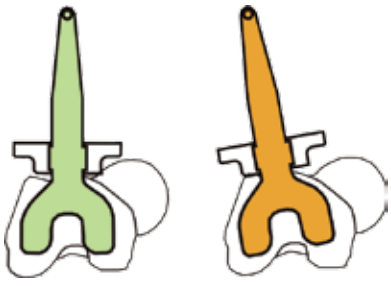


Fig. 5 – checking correct angular position of the femoral centering device runner



CORRECT ***WRONG***

Fig. 6 – checking correct position of the axis

Note 1:
Correct position of the axis in this set is checked with the aid of the centering matrix, the extender of the centering device,, and the direction rod, while turning simultaneously the set on the screw inserted into the marrow canal – too large deviation (in rotary position) of the set from the perpendicular line on the transepicondylar axis might lead to unnecessary distal resection errors.

After setting the centering matrix into a correct rotary position, secure its position by pressing the tips of the points on its posterior facet into the femur condyles. Often it is a good idea to fasten the matrix with the fastening pins, size 3.2 (mm), inserted into the slanted lateral holes. If we want to use smooth fastening pins, size 3.2 (mm), it is recommended to pre-drill the holes for them first!
When setting the valgosity angle, make sure to have the correct side (R/L).
At this point, we may have a problem with positioning the centering rod off the middle of the hip joint head.

Note 2:
When setting the valgosity angle, make sure to have the correct side (R/L). At this point, we may have a problem with positioning the centering rod off the middle of the hip joint head.
Solution:
1. *check insertion of the nail in the marrow canal of the femur, and make adjustments if/as necessary*
2. *check whether you have the correct side (L/R) and correct angle deviation, and make adjustments if/as necessary*
3. *with the centering device extender, slightly adjust the rotary position of the matrix to the axis of the nail in the marrow canal*

Having checked the angle of centering matrix extender and th

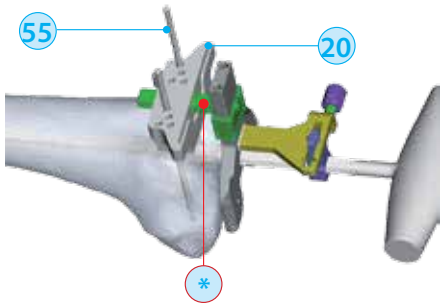


Fig. 7 – final set-up of distal resection block

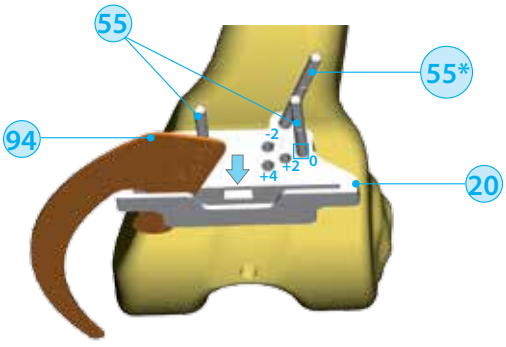


Fig. 8 – checking the size of the resection and The mode of securing the resection block

II) Setting the resection level of the distal end of the femur

On the gauge which is connected to a sliding sleeve and correctly positioned, and secured by at least one of the centering device pins, we put on the distal femoral resection block (20) – see Fig. 3). Slide it along the scale (*) ranging from 4 to 20 mm, set up the optimal resection size This level should respect the thickness of the distal femoral condyle – usually, it is 10 to 12 mm (see Fig. 7). At this point, we recommend making a visual check of the size of the intended resection using a metal measuring gauge (94). Place the gauge over the groove in the resection block for the saw blade and move it gradually on the outer side towards both condyles.Next, press the block, together with the measuring gauge from above towards the ventral side of the condyles and secure it with the aid of a pair of fixation pins (55) . Now remove the whole set (centering device and nail in the marrow canal), leaving only the resection block, secured with pins (see Fig. 8)

Note 3:
The fixation pins are always inserted through a couple of holes marked "0", which enables us to correct the resection, if necessary, by shifting the block into a new position by means of simple repositioning of the pins into the next pair of holes (+2, +4, +6) – resection sizes differ by 2 mm.

Note 4:
For securing the resection block, we may use the pins themselves (56) (fasten the holder of selfdrilling pins or use pins (61) without a threading (55). If using smooth pins, pre-drill holes of 3.2 mm. In this case, always insert the pins with the aid of a stamper (63). The principles contained in this note apply to all instruments throughout the whole surgery. Insertion of smooth pins without pre-drilling is possible, occasionally, but it always has to be carefully considered. Driving pins in with a hammer without pre-drilling may result in slipping of the pin tip off position or deformation of the pin, with the consequence of losing the right resection level or change in the axial position of the matrix.

Note 5:
The block for distal femoral resection can be additionally secured, after pressing it into the condyle, with the aid of a diagonally inserted fixation pin (55) through a hole on the proximal side of the matrix (see Fig. 8).*

Note 6:
Pressing of the resection block into the ventral part of the condyles has to be done very carefully, as it facilitates safe and accurate insertion of the fixation pins. If one of the condyles (usually on the outer side) sticks out distinctly, it may be carefully cut off with the saw blade.

3. Distal Femoral Resection

The resection is done by an accurate cut with the saw blade in the crevice along the resection block distal facet (Fig. 9 & 10). The evenness and size of the resection can be verified with the aid of a metal measuring gauge (94) or ruler (54) (applies to all subsequent resections), applied over the resected facet of the condyles.

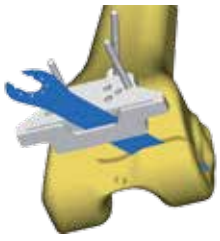


Fig. 9 – distal femoral resection (saw blade position)

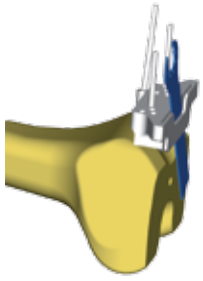


Fig. 10 – distal femoral resection (finishing)

Note 7:
For easy and quick removal of the pins, from very hard bone (during the whole surgery), the instrumentation set contains fixation pin extractors (93). Pins with a head may also be removed with the multi-purpose, sliding hammer (91).

B. Tibial Resection

4. Preparation of Tibial Resection

For adjustment of the tibial plateau resection, the extramedullary (4a) and intramedullary (4b) targeting device (pointer) can be used. The tibial pointer is designed like modular building blocks that allow the surgeon liberal transition between both options any time during the surgery.

Resection blocks with dorsal angle of 0° and 5° are always applied to the outer proximal part (pointer). The pointer shoulder is also used in both cases. The only difference is that the sleeve on the ankle end is used in extramedullary targeting and the nail in the marrow canal with the centering rod is used in intramedullary one.

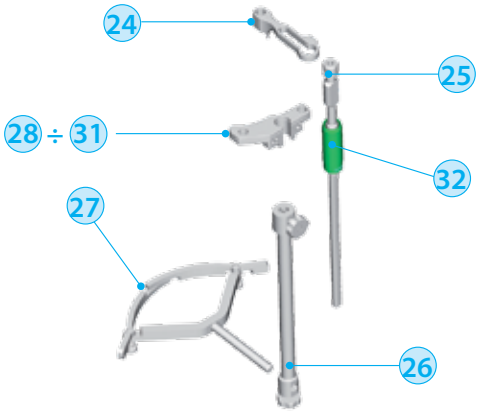


Fig. 11 – tibial pointer (assembly)

4a – Using the Set for Extramedullary Targeting

First of all, assemble the tibial pointer (pointer arm + rod with matrix + telescope + distal ankle sleeve and complement it with a resection block in the correct side option (L/R) and dorsal angle (in this phase, we preferably use a block with a dorsal angle of 0° - the resection angle can be enlarged simply by replacing the block with dorsal angle of 5°) (see Fig. 11).

Slide the resection block on the pointer up to the place above the scale, where its diameter is thinner, and secure it with the sliding matrix (see Fig. 12). Adjust the pointer length by sliding the telescopic elements (see Fig. 13).

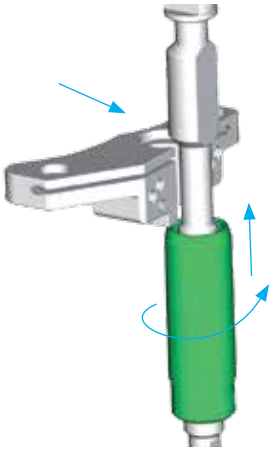


Fig. 12 – resection block (assembly)

After loosening the tibia from the soft tissue adequately and pulling it out frontwards with the aid of the crowbar, apply the previously assembled tibial targeting device (pointer), so that the tip of the pointer arm remains approximately in the middle of the intercondylar eminence, a little closer to the front edge of the tibial plateau (it is recommended to knock the tip lightly into this position), and subsequently, fasten the ankle so that the long axis of the instrument runs along the line that connects

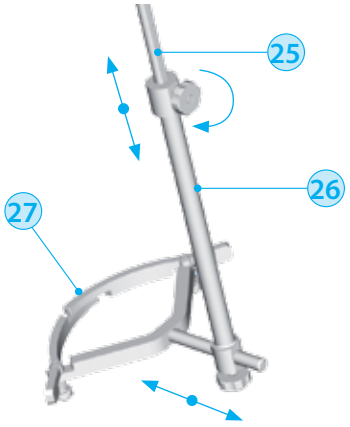


Fig. 13 – adjusting the length of tibial pointer

to the middle of the tibial plateau – i.e., the middle of the ankle. Simultaneously, we adjust the angle of the dorsal resection as necessary (upper facet of the resection block must be sloped at 3 to 5°).
Secure the resection block desired dorsal angle at 5° or, if using "0°, set the resection block by sliding the telescope distal sleeve (in arrow direction) along the guiding bar of the ankle sleeve (see Fig. 14).

Fix the position with the aid of stoppage screws.
Thereupon set a correct rotary position, so that the vertical axis of the pointer proximal part runs (depending on the type of axial deformity) in the middle of tuberositas tibiae (or slightly off the middle) and medial edge of tuberculum laterale of the intercondylic eminence.
The telescope with the bar should be positioned in the direction of the second intermetatarsal area of the leg which however must be in the basic position in the area of the ankle and the subtalar joints.
At this point, complement the pointer with a size resection gauge (+2,+4) 48. For cases requiring atypical position of the resection level, such as cases of severe deformity, we may use a gauge of (0,-3) 49 with the resection level juxtaposed to the deepest point of the tibial facet of the joint – defect has to be filled up either with a bone cement or with a bone graft thereafter, depending on the situation.
By sliding the resection block along the guiding bar, which is done with the aid of the matrix, we adjust the tip of the gauge (we recommend +2) to the deepest point of the articulated facet of the tibia. The resection will be made, according to the set-up resection block, approx. 2 mm below the level of the deepest point of the defect. After adjusting the resection level, secure the resection block by inserting a pair of fixation pins 55 or 56 into the holes marked "0" (see Fig.15) and one diagonally inserted fixation pin 55* into the lowest hole in the matrix.

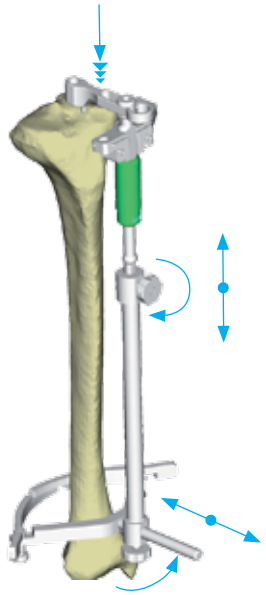


Fig. 14 – securing the tibial pointer (targeting device)

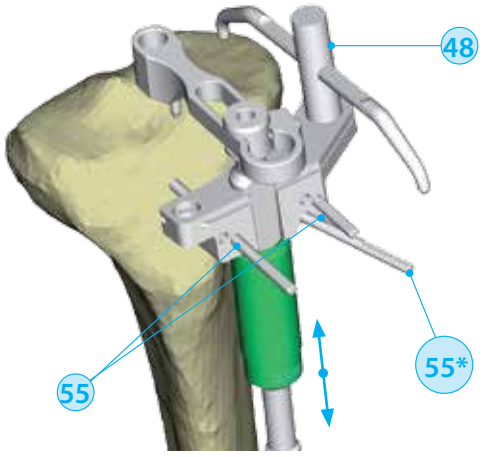


Fig. 15 – adjusting the resection level and securing the resection block

Note 8:

After securing the tibial pointer in its position, prior to making the resection, check:

1. *whether the tibial pointer longitudinal axis point to the middle of the ankle, i.e. whether the resection facet is perpendicular to the tibia mechanical axis (this does not apply I cases involving a very severe deformity of tibial diaphysis, where the situation has to be handled individually – ad hoc).*
2. *adjusting desired dorsal angle of the resection facet… 3÷5° (side view)*
3. *correct rotary position*
4. *resection level on the lateral condyle should not be more than 10mm. For checking the approximate accuracy, we may use the metal gauge from the set of general instruments – slide it into the resection block crevice. During the individual steps, done as described in the preceding paragraph, two basic problems might occur:*

1. *incorrect axis*
2. *unsuitable resection level or incorrect dorsal angle*

Possible solution:

ad 1. In this case, it is absolutely necessary to extract both fixation pins and repeat the entire procedure of tibial pointer adjustment (trying to correct the position, with the position fixed, by sliding the ankle sleeve would only cause deformation of the fixation pin or their loosening in the bone.

ad 2. unsuitable level or incorrect (dorsal) angle can be rectified, to some extent, either by sliding the resection block (put the block on the inserted fixation pins over the holes marked +2 – this will increase the resection level by +2mm) or use a resection block with a dorsal angle of 5° (put the block on the inserted fixation pins over the holes marked as with block 0° - this will enlarge the dorsal resection angle, while simultaneously preserving the ventral edge of the cut on the same level).

4b – Using Intramedullary Targeting Device

If we decide to cut the tibia with the aid of the intramedullary pointer, it is necessary to follow the steps described in the in the following part of these instructions.

Opening the marrow canal of the tibia

After loosening the tibia from the soft tissue adequately and pulling it out frontwards with the aid of the crowbar, open the marrow canal. Using a drill with a tip of diameter of 8 mm (49), designated for marrow canal perforation (same as for femur), insert it along the axis of the tibia. The marrow canal position is identified with the aid of a ventrodorsal and lateral X-ray (see Fig. 16).

Drill to a depth of 2 to 4 cm and finish the preparation by pressing the drill – without using too much force – into the canal all the length.

Now assemble the tibial targeting device - pointer (pointer arm (24) + take the bar (25) with the matrix (32) and complement it with the resection block making sure to have the correct side (L/R) and set the dorsal angle (in this stage always at 5°) and also the control centering rod (33) (see Fig. 17).

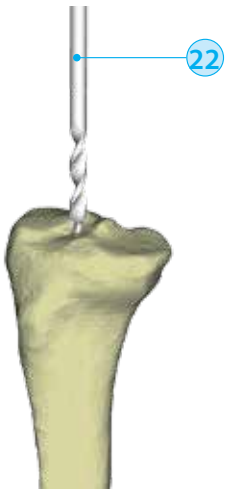


Fig. 16 – drilling the marrow canal of the tibia using an 8 mm drill

While preparing the intramedullary pointer set, proceed exactly as with the extramedullary pointer. Adjustment of the resection block height is done by turning the matrix. Complement the set by driving the nail for the marrow canal through the front hole of the pointer arm.

Assembling and inserting the intramedullary pointer

After loosening the tibia from the soft tissue adequately and pulling it out frontwards with the aid of the crowbar, insert the assembled set with the aid of the nail into the open marrow cavity/canal (see Fig.17) – do not use force!!

Next, turning the set around the nail, adjust a correct rotary position, so that the vertical axis of the pointer runs (depending on axial deformity) through the middle of tuberositas tibiae (or slightly off the middle) and the medial edge of tuberculum laterale of the intercondylar eminence.

The centering rod, inserted into the hole in the rod longitudinal axis, should be pointing towards the first metatarsal area of the leg which however has to be in basic position in the area of the ankle and the subtalar joints. When satisfied with the position, secure the rotary stability of the set by knocking on the tip on the bottom side of the pointer arm into the intercondylar eminence.

Next, complement the resection block in the pointer set with a measuring gauge on the upper facet (+2,+4) 48 (atypical position of the resection level, in cases of very severe deformity, we may use a gauge of (0,-3) 49 with the resection level juxtaposed to the deepest point of the tibial facet of the joint.

Adjust the tip of the gauge (we recommend +2) to the deepest point of the articulated facet of the tibia (see Fig.18). Subsequent steps are identical to the procedures described for the use of the extramedullary pointer (see 4a).

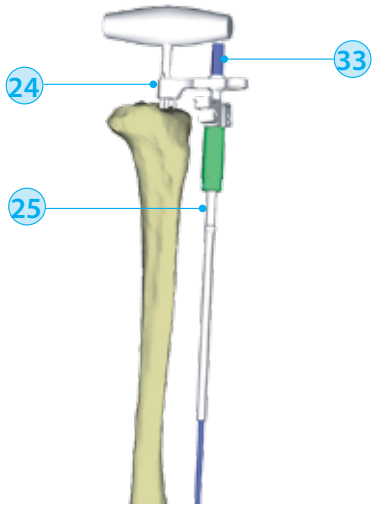


Fig. 17 – intramedullary targeting device - assembly and insertion

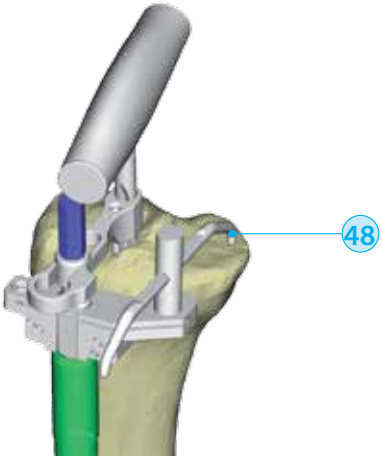


Fig. 18 – set-up of the resection level

5. Tibial Resection

For checking the correctness of the tibial pointer position and securing the resection block in its position, we take off the pointer set, leaving only the resection block. Press the block onto the front facet of the tibia and finish its fixation by inserting the pin, Ø 3.2 mm, diagonally into the bottom hole. Simultaneously, we may double-check the resection level with the metal gauge 94 (see Fig. 19).

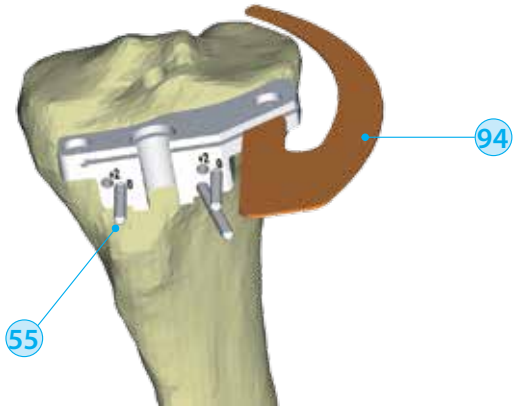


Fig. 19 – checking the resection level

Resection of the tibial plateau is done with the aid of a saw blade, with a cut over the resection block'crevice (see Fig. 20). Complement the resection (separation of the resected bone) with the aid of a wide, fine chisel and bone pliers. Take the resection block off and now we can remove the fixation pin with the extractor.

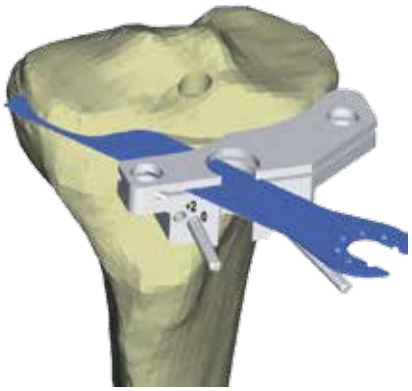


Fig. 20 – carrying out the tibial resection

6. Assessment of the Extension Space Using Firm Spacer

Bring the joint to full extension and pull the facets of the femur and tibia as far apart as possible. Estimate the size of the extended space and, according to the estimation, select a suitable spacer. The minimum thickness of the spacer should be 18 mm 69 (see Note). Slide the spacer between the resected facets and make a judgment as to how tightly the facets fit to the body of the instrument (see Fig. 21).

If the spacer of 18 mm does not fit into the resection space, make an additional resection.

It is a good idea to use the correction block, by means of which we enlarge the resection by 2 mm in a single step procedure. The mode of using the block and securing it with the aid of diagonally inserted fixation pins 55 is clearly.

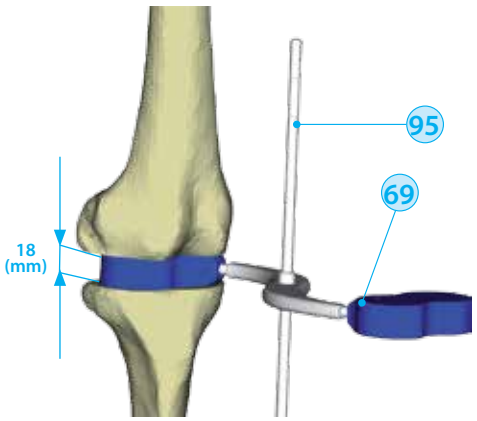


Fig. 21 – measuring and assessing the size of extended space

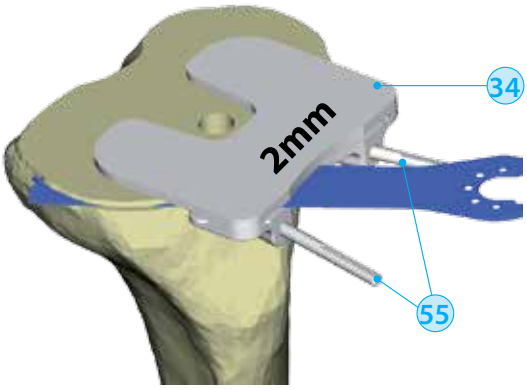


Fig. 22 – use of the correction block

Note 9:
If the resected facets are parallel, but the lateral ligaments are not completely stretched after inserting the spacer, use a thicker spacer. Repeat the procedure until both resected facets are in tight contact with the spacer – for problem-free implantation and functionality of the implant, the extension space has to be at least 18 mm. This value corresponds to the total thickness of the femoral component, tibial component, and the thinnest PE liner, combined. In this step, it is advisable to move the tibia toward the femur, by rocking it gently (on ventral level), to verify, whether the tension in both lateral ligaments is "identical". While doing this, make sure that the leg is still extended.
If the extension space is imbalanced, i.e., if you detect imbalance in the tension of the lateral ligaments, it is necessary to rectify it by loosening the soft tissue in the space gradually. During this correction, it is also necessary to keep checking the position of the leg with the aid of the assembled centering rod 95, 96, which should be pointing towards the middle of the head of the femur to the middle of the ankle (see Fig. 21).
Once the space is even, proceed as described in the introductory part of this note.

C. Femoral Resection – Finalization

7. Assessment of Flexion Space Using Distance Spacers

The purpose of this step is to ensure correct balancing of the extension space and get information on the position of the dorsal condyles of the femur versus the tibia when flexed, i.e., the distance between each of the two condyles from the resected facets of tibia. For this purpose, we use a set of distance rings 72 ÷ 84 and a their holder 60. First of all, take the spacer holder and place the selected spacers 72 ÷ 84 into the relevant holes from above. We can "guess" the thickness of the rings by measuring the extension space – usually, the flexion space is at this point (i.e. before resection of dorsal condyles) smaller by approx. 8 mm to 10 mm. Next, flex the joint to 90° and pull the femur as far from the resected facets of the tibia as possible. While doing this, try to keep the femoral condyles in "anatomical" position against the tibia, i.e. under no circumstances should we use the crowbar for pushing the tibia out – it might spoil the results of the following step.
Slide the holder carefully into the space thus created, so that the whole length of its bottom side leans onto the resected facet of the tibia and, simultaneously, the spacers come into contact with both dorsal condyles of the femur (see Fig. 23).
If unable to assess the thickness of the spacers correctly, select another size. Correct selection of spacers is verified by checking the stability of the joint during careful abduction and adduction of the shin bone. During this procedure, we make sure to keep the knee flexed at 90°.
The result of measuring allows us to determine the difference between each of the dorsal condyles of the femur and the resected facet of the tibia. Make sure to remember the vale measured and the side of the more prominent condyle – it is important for correct positioning of the tracking matrix.

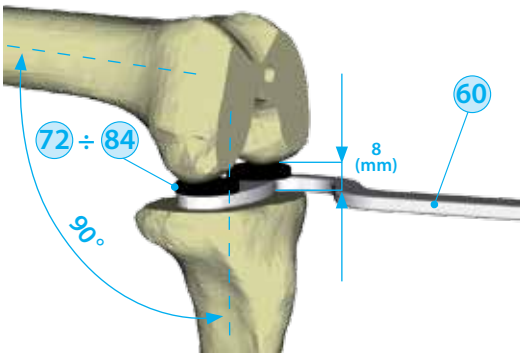


Fig. 23 – gauging and appraisal of the flexion space

Note 10:

1. At this point, we should no longer intervene in the joint functionality by further loosening of the lateral ligaments. Also, it is presumed that all osteophytes, remnants of the joint casing, etc. had been removed during preparation of the extension space.
2. The actual size of the spacers should not be too far off from our "estimation"! At this point, when the tight contact between both rings is established, i.e. the femoral condyles are fitting tightly and determining the flexion space accurately, the following situations may occur:

a) both rings are equally thick
b) thickness of the rings is not identical and the difference is less than 4 mm
c) thickness of the rings is not identical and the difference is greater than 4 mm.

Each of the above scenarios requires a different course of procedure (see 8).

Important note:

We have to realize that the knee is, when flexed to 90°, under physiological conditions, looser on the side by approx. 1 to 2 mm, whereas a knee implant is a merely a mechanical replica of the joint shape and facet, but it does not possess the biomechanics of a healthy knee.

Therefore, we endeavor to ensure that the tension in the ligaments after implantation be practically symmetrical.

C. Femoral Resection – Finalization

8. Adjustment of Matrix Positioning

Adjusting the positioning matrix (21) is very important for positioning the femoral component in ventrodorsal direction.

The basic position of the support guide (the relevant line on the guide is in the oval cut-out of the matrix,

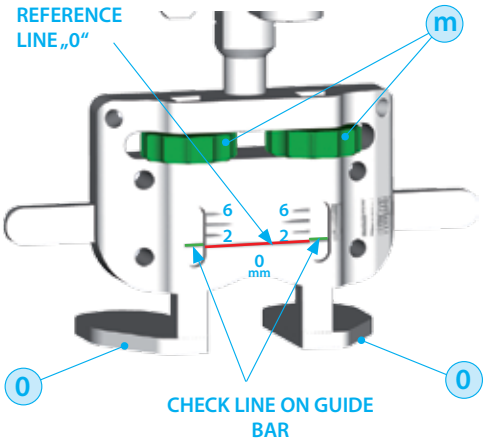


Fig. 24 – basic position of the positioning matrix guide bars

in the same position as "0" on the corpus of the matrix - see Fig. 24), ensures that subsequent dorsal resection of 8 mm is correct and thereby also that the dorsal condyle of the femoral component will copy the facet of the condyle before resection.

Adjustment of matrix positioning
(as per paragraphs a, b, c, plus the following notes):

ad a) If both rings are equally thick, we leave both of the sliding supports (0) in the basic position (the line on both support guides is at "0"") (see Fig. 24).

ad b) If the thicknesses of the spacers differ, leave the support guide corresponding to the thinner ring in basic position and push the second support guide in, by turning the matrix (m) by the difference of the spacer thicknesses. This will ensure that the resected facet we make will be parallel to the proximal resection of the tibia.

Example:

On the side of the lateral condyle, we have used a 10 mm spacer and on the side of the medial condyle an 8 mm one. The support corresponding to the medial condyle will be in the basic position "0" and the support on the side of the lateral condyle will be pushed in by 2mm (Fig. 25, left).

ad c) If the difference in the spacer thickness is greater than 4 mm, it is necessary to assess, whether the diminished resection of the dorsal part of the lateral condyle will secure the femoral component adequately. Possible solutions are described in Par. 10 – Positioning Matrix – Supplement.

9. Adjusting the Matrix Positioning and Selecting the Size of Femoral Component

Next, place the prepared positioning matrix (21) onto the distal resected facet of the femur (the lateral

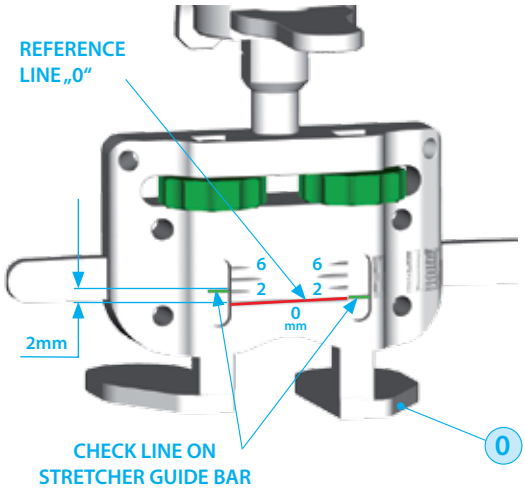


Fig. 25 – adjusting the support of the positioning matrix (R side)

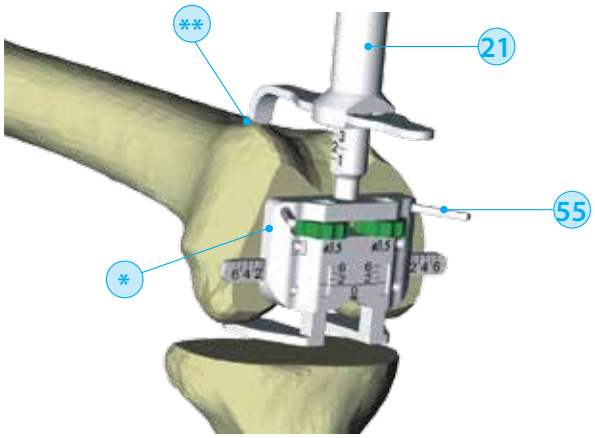


Fig. 26 – placing the positioning matrix

position should be approximately symmetrical to M-L resection dimension). Simultaneously, press the support facets onto the dorsal condyles. After checking the position (see Note 1), secure the matrix with a pair of fixation pins, Ø 3.2 mm 55, inserted through the angular lateral holes * (top or bottom) of the matrix (see Fig. 26).

Thereupon, we can determine the size of femoral component (see Fig. 27). Measure by moving the gauge runner a along the threaded bar of the gauge, while simultaneously pulling the gauge arm b to ensure contact of the gauge tip ** with ventral corticalis of the femur. We can determine the size definitively after deducting the number on the lateral facet of the gauge cylindrical body c. While measuring, the gauge arm must be pushed out, so that the value of the number indicating the extension of the arm b is identical to the subsequently defined size of the gauge components. This is because the gauge tip corresponds to the most distant point on the patellar facet of the femoral component. For correct decision about the size of the femoral component, we recommend to adhere to principles specified in Note 12.

Lastly, we use the drill, bit Ø 3.5 mm 18 to make a couple of holes for the pins of the resection block (see Fig. 28). Provided that the preceding steps have been carried out meticulously, we can be sure that the correct size of femoral component was selected, set up the A-P positions (relation between extension and flexion space) correctly and, also, that the components will be in a correct position for rotation around the mechanical axis (balanced flexion space).

Fig. 29 shows the view of the distal resected facet prepared for fitting of the combined resection block.

Note 11:
Before anchoring the positioning matrix in its position, check carefully whether it fits perfectly

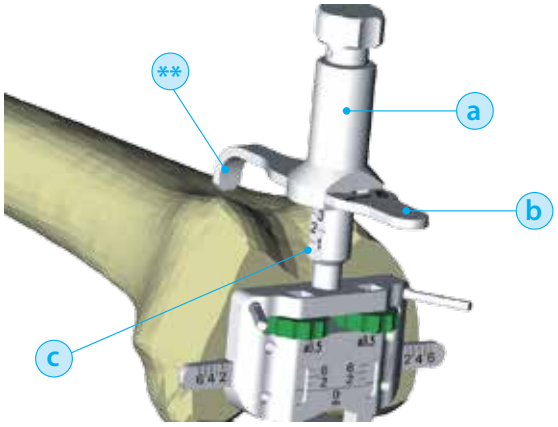


Fig. 27 – determining the size of femoral component

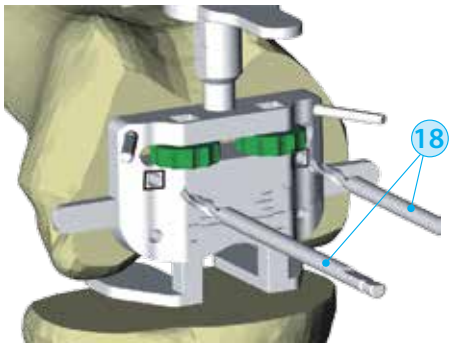


Fig. 28 – drilling of apertures for the resection block pins

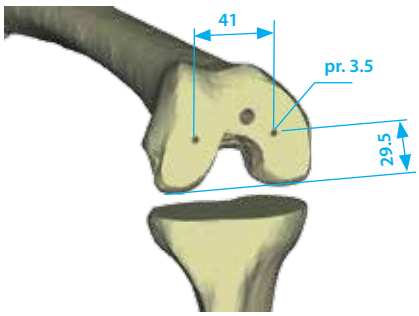


Fig. 29 – distally resected surface of femur

onto the resected facet, whether it is the correct side, and whether the contact of the support on the dorsal condyles is perfect. Pressing the supports into position carefully and sliding the holder with spacers of diminished thickness of about 2 to 2 mm can be more helpful than measuring the flexion gap.

Note 12:
When selecting the size of femoral component, we have to follow the principles that ensure the implant's proper functionality, namely:
- the size of the femoral component must be the same as the size of the tibial component, or one size bigger, maximum. Therefore, we recommend assessing the size of the tibial component before selecting the femoral component.
- checking the ventral resection with the aid of the gauge tip of the positioning matrix, is imperative to prevent the possibility of cutting the ventral corticalis
- if the value appearing on the scale is between sizes, always choose the larger component In certain cases, it is possible to arrive at similar results by sliding the femoral component in ventral direction – see 10 – Positioning Matrix – Supplement (Other Options)

10. Positioning Matrix – Supplement (Other Options)

This part is focused on certain details and functions of the positioning matrix, other than those covered in Basic Instructions.

The regular course of procedure described above under Basic Information is merely one of optional ways of making use of the functionality of the positioning matrix. Continuous pushing out of the both supports not only provides for a better adjustment to the knee anatomy, it also is an opportunity for corrections. Namely, when measuring the flexion space, we may find that one of the condyles if far too prominent of the opposite condyle. The difference might be so great (>4mm) as to make it infeasible to anchor the implant properly with an anatomy-based resection, as the condyle would not fit. In most cases where a severe varus deformity is involved, the prominence of the rear facets of the medial femoral condyle is particularly great. This can be solved by means of shifting/sliding the femoral component ventrally (see Example 1).

Problems may however emerge with the A-P (ventrodorsal) positioning of components, e.g., when the measured dimension of the femur is between the dimensions of the individual components delivered (the sizes differ by 4 mm) and it is necessary to decide which size to choose, whereby respecting the best-suitable size of the tibial component is advised. Choosing a smaller size instead might result in undercutting the ventral corticalis, whereas the larger size sticks out distinctly (possible danger of imperfect anchoring of the femoral component, overlap of the facet over the ventral contour – patellar impingement – i.e. limited scope of mobility), facilitates adjustment of the positioning matrix correctly by sliding the femoral component ventrally or dorsally. The sliding movement is achieved by changing the position of both of the supports by the same distance and in the same direction – see Example 1.

Example 1 – see picture:

Let's say that the difference identified by measuring the flexion space s, e.g., 2 mm. We would thereupon set the first support at "0" on the side of the prominent (medial) condyle (resection will be 8 mm) and the second support we would slide in by 2 mm – resection of this condyle would be 6mm. However, if we wanted to shift simultaneously the femoral component ventrally , e.g., by 2 mm, we would have to push both supports out by two

additional millimeters (2 mm) to "-2" on the medial side (the distance of the movement into minus would have to be estimated – it is not marked on the corpus of the matrix) or "0" on the lateral side. Resection of the condyles would change from 8 mm to 10 mm, in the first case, and from 6 mm to 8 mm, in the second case. It is thereby necessary to keep in mind that simultaneously with sliding the femoral component we also increase the flexion space (the knee will be "looser" when flexed than when extended) (see Fig. 30).

Caution:
Changing the position (turning) of the femoral component in the sense of outer rotation and (inner) rotation, as opposed to the knees anatomical disposition, has to be done utmost carefully and always with consideration to functionality consequences. Namely, if we change the size of the resection on one of the condyles only, the "implant" on that side will be looser, too – moreover, changing the resection on only one of the condyles by 1mm will change the rotary position of the femoral component by approx. 1°.

11. Resection of Femur – Combined Resection Matrix

After taking the positioning matrix off, take the resection matrix for combined femoral resection of therelevant size 7 ÷ 12 (preceding step) and insert the pins of the matrix into the prepared holes, Ø 3.5 mm (see Fig. 31 and Note 1).

Tap the matrix carefully into position, so that it fits perfectly onto the distal resection facet. Check, whether the correct size of the matrix has been selected – metal gauge 94 (see Fig. 32) and secure it with self-drilling fixation pins, Ø 3,2 mm 55, as necessary (see Fig. 33).

Next, we make ventral, dorsal, and diagonal

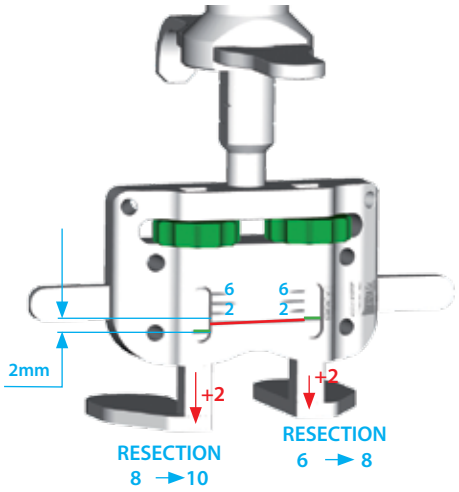


Fig. 30 – ventral off-set of component by 2 mm

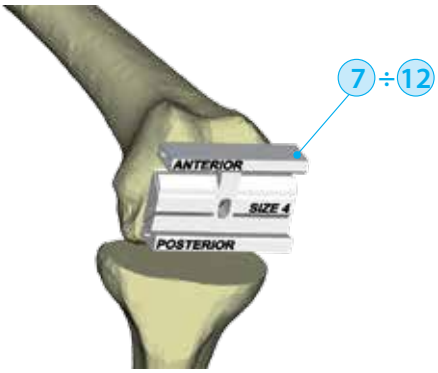


Fig. 31 – applying combined resection matrix

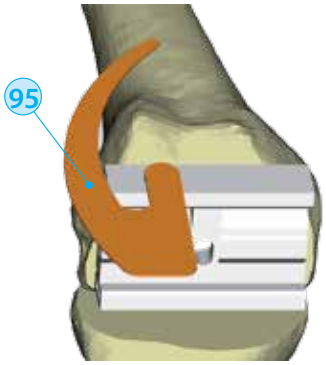


Fig. 32 – checking the resection accuracy

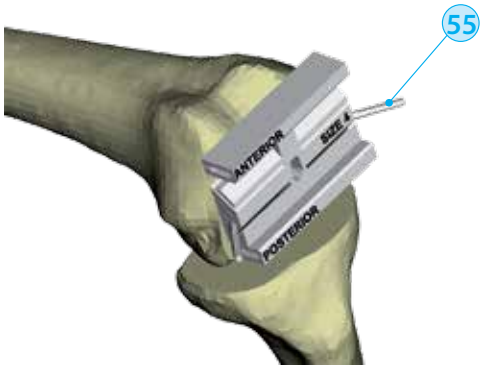


Fig. 33 – securing the matrix with pins

resections of the femur (see Fig. 34 – ventral resection, Fig.. 34 - dorsal resection, Fig. 36 – diagonal resection). For accurate guiding of the saw blade when making the ventral and dorsal cuts, it is advisable to use the guiding ruler 15.

Of course, the resection may also be made with a saw simply hand-guided over the facet of the matrix. In this case, however, constant visual control is imperative – therefore, we recommend never to make the dorsal resection with a hand-guided saw! After finishing the resection and taking the matrix off, we check the accuracy and the level with the aid of a see-through ruler 54 (see Fig. 37).

Note 3:

1. The resection matrix should never be secured withthe fixation nails only, as it nearly always causes the matrix to shift off position on the resected facet, thus leading to errors in the resection process.
2. When applying the resection matrix, it is necessary to make sure that the writing on the block is not reversed - "ANTERIOR" must be on the ventral corticalis (see Fig. 31). Reversed application of the block would not only cause undesirable shift in the resection level in ventrodorsal direction, but also hard-to-solve problems during application of the components (angle of the component facet by 5° ventrally).
3. Before making the resection, we recommend to verify whether the selected size of the femoral component is correct (esp. the position of the ventral resection) using a metal matrix.

After completing the resection, pulling out the matrix pins from the bone might be a problem. If unable to pull the matrix off by hand, use the sliding hammer 91.

Procedure: Insert the oval end of the guiding rod stem into the hole in the middle of the resection matrix and then turn it by 90° round its longitudinal axis.

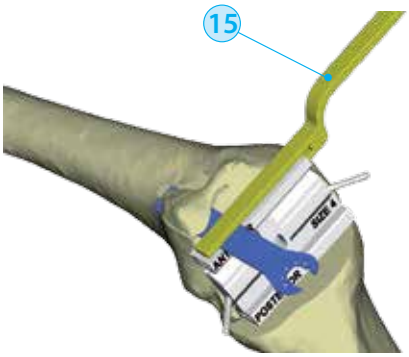


Fig. 34 – ventral resection

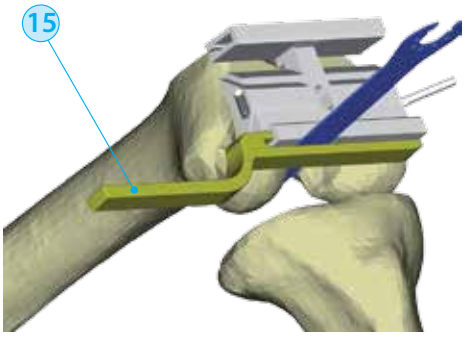


Fig. 35 – dorsal resection

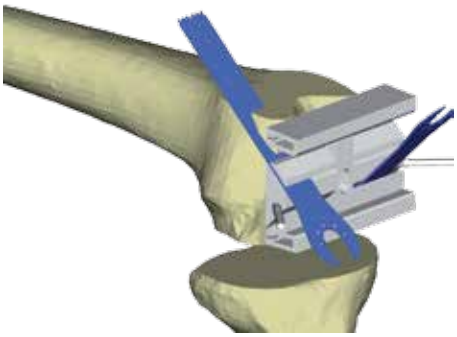


Fig. 36 – diagonal resection

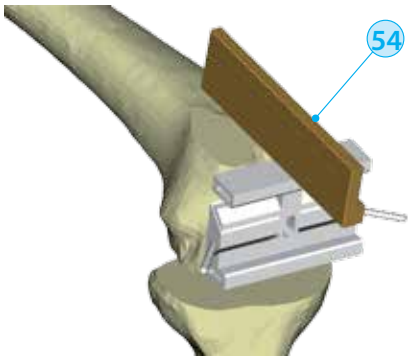


Fig. 37 – check using the transparent ruler

Next, tapping gently in the direction of the femoral axis, take the block off carefully (see Fig. 38).
Any other course of procedure might result in damages to the bone above the block or the guiding holes. Fig. 39 demonstrates the femur prepared for trial fitting – i.e. definitive shape of the ventral, dorsal, and diagonal anchoring facets.
The holes for the implant pins (Ø 6 mm) and the ventrodistal groove for the stabilization pin in the patellar facet of the component, will be done just after several steps that follow.

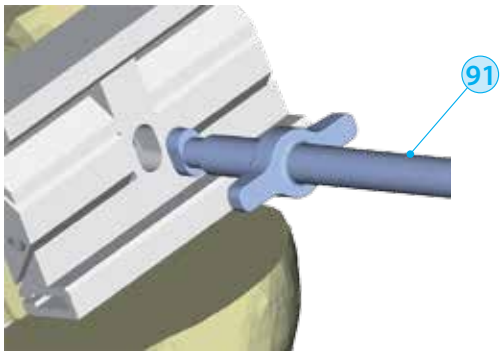


Fig. 38 – tightening of resection block using a sliding hammer

Intercondylic femoral resection - Procedure in case of SVS femoral component (order number 300927 - SVS supplement for SVL)
The last femoral resection is used to perform an enlargement of the intercondylic space for the elements substituting the posterior cruciate ligament.
After removal of the template for the oblique resection, a template is used for the intercondylic resection Fig. 1s from the cassette of templates for the femur. (The templates must be of the same size). With the two guiding pins, it is gently placed onto the guiding holes and then punched (see Fig. 1s). The template must fit perfectly onto the resected surfaces. According to the situation, the template may be supplemented with two fixation screws. During the resection, we start with the cuts performed with the saw leaf according to the internal sides of the template. These cuts should reach the depth corresponding to the height of the femoral stabilizing element (for size 1 and 2 ... 11 (mm), for size 3 ... 13 (mm), for size 4 ....16 (mm), for size 5 ..... 17 (mm), for size 6 ..... 19 (mm)). The resection is completed with a sharp chisel 16 from the set of instruments for the femur (see Fig. 2s)

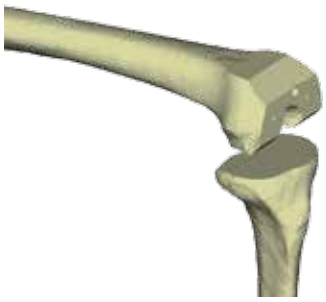


Fig. 39 – creation of resection surface(s) on femur and on tibia

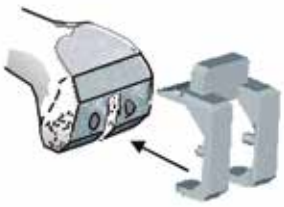


Fig. 1s – placement of the template for the intercondylic resection

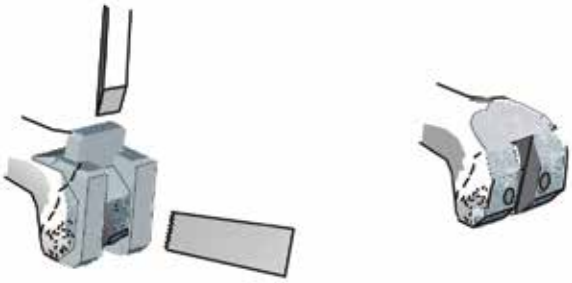


Fig. 2s – intercondylic resection – processing and final shape

During the resection, we proceed very gently. The chisel is used very gently to avoid breaking off a part

of the condyles. The saw leaf is always used along the sides of the template groove, and the chisel is used along the guiding planes of the nose. The chisel must then be on the guiding surface of the template nose along its whole length – this ensures the extent of the resection is big enough for the appropriate element of the implant.
For ensuring the correct resection, there are two cuts on the internal surface of the dorsal ends of the template (see Fig. 3s as marked with *). A correctly performed resection has the lower edge of the ruler attached to the nose of the template and touching the side of the template just at the point of the more distant edge of the groove (*). This edge is marked with an arrow on the broken line.
For problem-free implantation, ensure the extent of resection meets the parameters mentioned above.

Fig. 3s – checking the resection size

After completing the resection, there may be a problem with removing the template. If it is not possible to pull it out freely by hand, use a sliding hammer from the set of universal instruments.

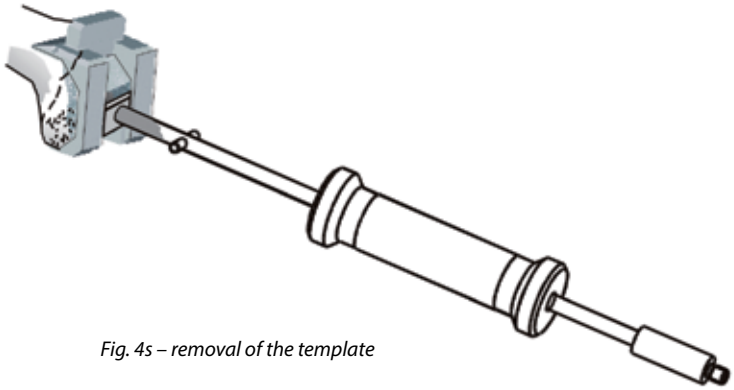


Fig. 4s – removal of the template

Procedure: Insert the flat end of the guiding rod stem from below to the groove of the resection template and shift it maximally upwards in the longitudinal axis. Then, use several gentle punches along the axis of the femur to gently remove the block (see Fig. 4s). Using any other method may lead to damage of the resection surfaces, which causes defects in the subsequent step and can ultimately impair the perfect fixation and centration of the femoral component.

12. Adjusting Rotation of Tibial Component and M-L Position of Femoral Component (Trial Articulation)

For trial fitting of the femoral component, in terms of the size and correct side (R/L), use instruments. Apply them to the prepared facet of the femur and

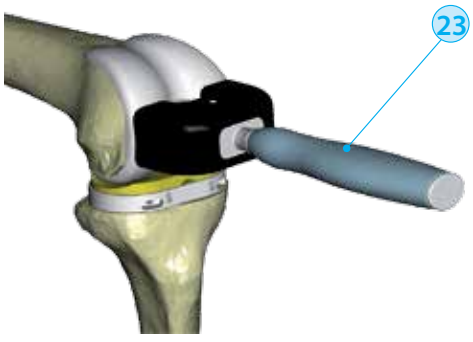


Fig. 40 – tapping the femoral component

adjust its central position. Tap the component into position 23 using the hammer (see Fig. 40).
It is possible to use a reversed course of procedure, i.e. apply the tibial centering matrix with the liner first (see the following paragraph).

Caution:
If found that the preceding resections do not correspond to the anchoring facets of the components (wrong flexed position of the femoral component is particularly inadmissible), check the resections and correct them as necessary.

Next, assemble the tibial centering matrix of the selected size 35 with a handle for the matrix 36 ÷ 47 (see Fig. 41). The orientation of the matrix and the handle has to match (e.g. for the left knee, the writing must be oriented upwards and read "LEFT"). The size of the matrix is selected so that the facet of the tibial resection is covered as much as possible, yet the matrix should not reach beyond the edge of the bone. When choosing the size, we have to keep in mind that the size of the tibial component may be identical as the size of the femoral component, or one size smaller, maximum.
Complement the set with a plastic trial liner of corresponding size and suitable thickness 103 ÷ 132, ev. 139 ÷ 168 (see Fig. 42).

Flex the knee to 90° and gradually into full extension and identify the correct rotary position of the tibial component. While doing this, try to keep maximum contact between the trial liner and the femoral component. Correct rotary position is checked by means of the centering rod 95 inserted through the hole in the handle which has to be pointing towards the middle of the ankle (see Fig. 43). We mark the correct position on the ventral side of the tibia using an electrical cutter – we use the symbols on the centering matrix.

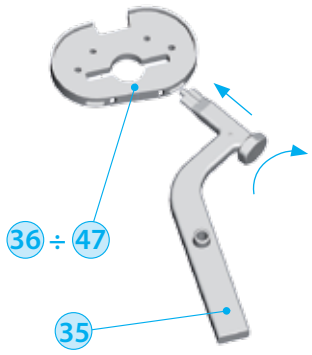


Fig. 41 – centering matrix with handle

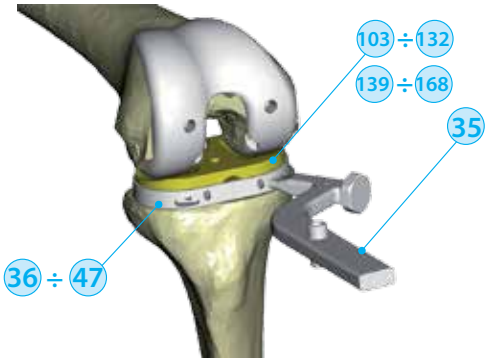


Fig. 42 – set of trial components and handle of centering matrix

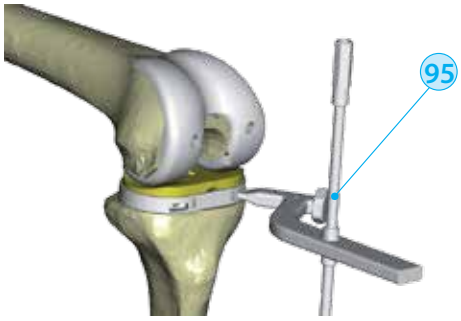


Fig. 43 – trial articulation and check-up of correct position of the tibial centering matrix

Note 14:
If we want to secure the tibial centering matrix so that the trial liner can be put into it, we use a pair of short nails with a head and drive them in from the top. An extractor is used for subsequent extraction of thepins.

Note 15:
If we have a problem with inserting the centering matrix or the liner (especially in atients withvery „tight" knees), we recommend to modify the course of procedure and fit the femoral component in only after inserting the centering matrix and trial liner. If still unable to fit the trial components in, we perform an additional resection of the tibia (see Fig. 22).

After checking the joint mobility, we decide what the definitive M-L position of the femoral component should be.If the position is symmetrical and the functionality of the joint biomechanically correct (esp. movement of the patella), we drill a pair of definitive holes through the femoral component, using a drill with 6 mm bit (19) for the implant fixation pins (see Fig. 44). It is not used in case of SVS.

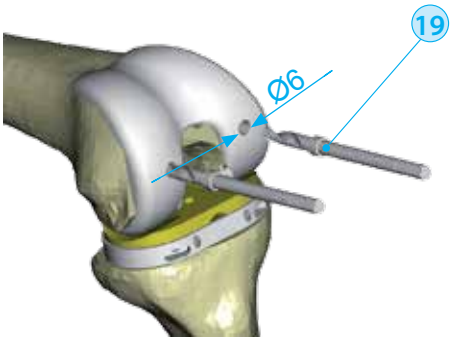


Fig. 44 – drilling of apertures for the anchoring pins of implant

Next, we remove all components, which is not a problem with the tibial elements. We tighten the firmly the set up femoral component with the aid of a sliding hammer (91). Thereupon we insert the end with the facet into the cut-out of the component in the arrow direction (see Fig. 45) and tighten it carefully by tapping gently with the sliding hammer on the axis of the femoral component.

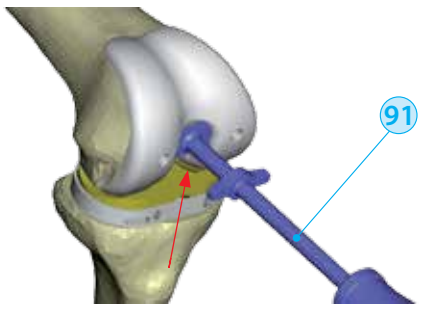


Fig. 45 – tightening of trial femoral component

13. Finishing the Femoral Resection – Preparation of Ventral Groove

The last step of the work on the femoral anchoring facets involves preparation of the bone ventral part for the femoral component anchoring element.
Take the femoral trial matrix of the relevant size

1 ÷ 6 (must correspond to the trial component size) and put it on the prepared femur. Insert the pins of the matrix into the holes in the distal femoral resection. We may tap the matrix carefully with the hammer and secure it on ventral side with one or two pins, Ø 3.2 mm.

Next, take a 35-mm 89 and an 18-mm 90 chisel and chip off the relevant part of the bone (see Fig. 46). It is not used in case of SVS.

We recommend chopping 35-mm wedges with the chisel in the sides of the groove and then gradually separating a small block of bone with the 18-mm chisel. For perfect finishing of the cut-out, we may use the bone rasp. It is important that the contour of the groove is copying the side of the matrix, otherwise there would be a problem to fit the implant perfectly, especially in patients with sclerotic bones.
After completing the resection of the femur, pull the matrix off with the sliding hammer and fill the hole (ø 8) left by the guiding rod with a bone chip.

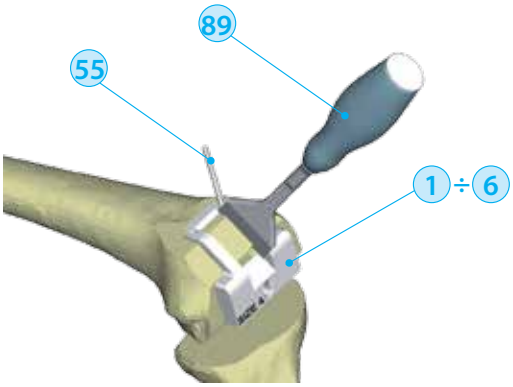


Fig. 46 – preparation of the ventral groove

14. Fitting and Securing the Tibial Centering Matrix for Making a Hole for the Anchoring Part of the Tibial Component

Take the matrix with the handle and apply it to the resection facet, so that its broader side rests on the medial condyle and mark the correct side (on the handle) so that it is legible from the surgeon's viewpoint. The orientation of the matrix is done according to lines made with the electrical cutter.
Simultaneously check the setting with the centering rod 95 inserted through the hole in the middle of the handle. Position the rod so that it is pointing to the middle of the ankle (see Fig. 43). Secure the matrix in the correct position with a pair of fixation pins 55. The holes for drilling are marked „□„.

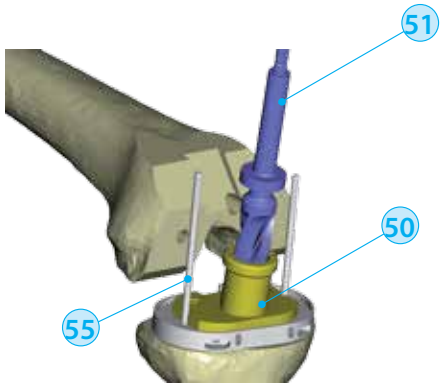


Fig. 47 – drilling a hole for the tibial component anchoring stem

15. Preparing a Hole for the Tibial Component Stem

Apply the drill to the tibial centering matrix 50, so that the pins on the bottom side of the supporting board fit into unmarked holes in the matrix and the support board fits perfectly to the upper facet centering matrix.

Simultaneously, position the casing according to the pair of inserted fixation pins (both lateral cut-outs in the supporting board are designated for sliding over the fixation pin).

Next take the drill, fitted with a bit of 15 mm 51 and drill a canal for the tibial component stem (see Fig. 47).

After drilling the hole, take the drilling casing off and prepare the stamper 52 (see Fig. 48).

The stamper is designated for creating a bed for the tibial component antirotation ribs; apply it from above onto the tibial centering matrix. The stamper position and orientation are determined in the same way as those of the drilling casing.

After pressing the extending part of the stamper all the way in, the preparation of the bone bed for the tibial component is complete (see Fig. 49). The stamper, including the centering matrix, and both fixation pins can thereupon be removed.

Fig. 48 – stamper for preparation of the bed for the tibial component antirotation ribs

Once driven in, the stamper might be hard to extract. The hammer may be used for easier extraction. Pulling out the stamper has to be done along its longitudinal axis, whereby wrenching is not admissible.

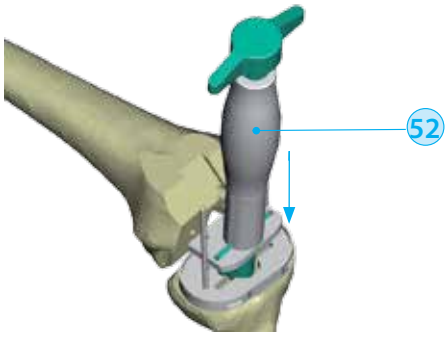


Fig. 49 – preparing the bed for the tibial component antirotation ribs

16. Implantation of the Implant (Knee Replacement)

Fixate the components with bone cement. Firstly, implant the tibial component and inserting the trial liner into it.

Watch out for the connection screw M6 that is designated for fixation of the definitive PE liner –

before implanting the tibial components, this screw has to be unscrewed and put aside in a safe place, while preserving maximum sterility, so it would not be lost (see Fig. 50).

Secondly, implant the femoral component.

The layer of bone cement has to be continuous and even – this can only be accomplished, if we apply the necessary thickness of bone cement onto the implant anchoring facets and the resected bone facets, and then use tools to tap the components into their position (stamper for the femoral component and stamper for the tibial plateau – these must not be used for hammering on the trial liner).

Next extend the joint. This will squeeze out surplus cement and stabilize the joint micro congruence. When the cement hardens, bring the joint back into flexion and remove the squeezed-out cement surplus. Thereupon, make the final check of the joint mobility and stability. Depending on the results, have the definitive PE liner unpacked (check L/R sides, size, thickness). Press the liner onto the perfectly cleaned upper facet of the tibial component and secure it in this position by screwing in and tightening the connection screw (see Fig. 51).

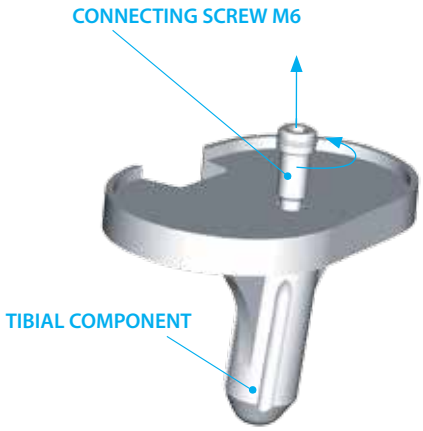


Fig. 50 – preparing the tibial component

17. Finalization of the Surgery

Complete the surgery with standard reconstruction of the extension device, inserting drains, closing the surgery suture, layer by layer, and applying cover bandage.

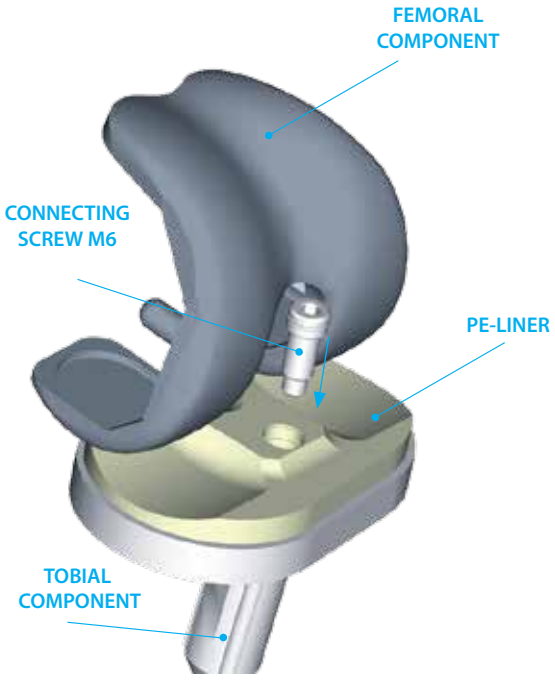


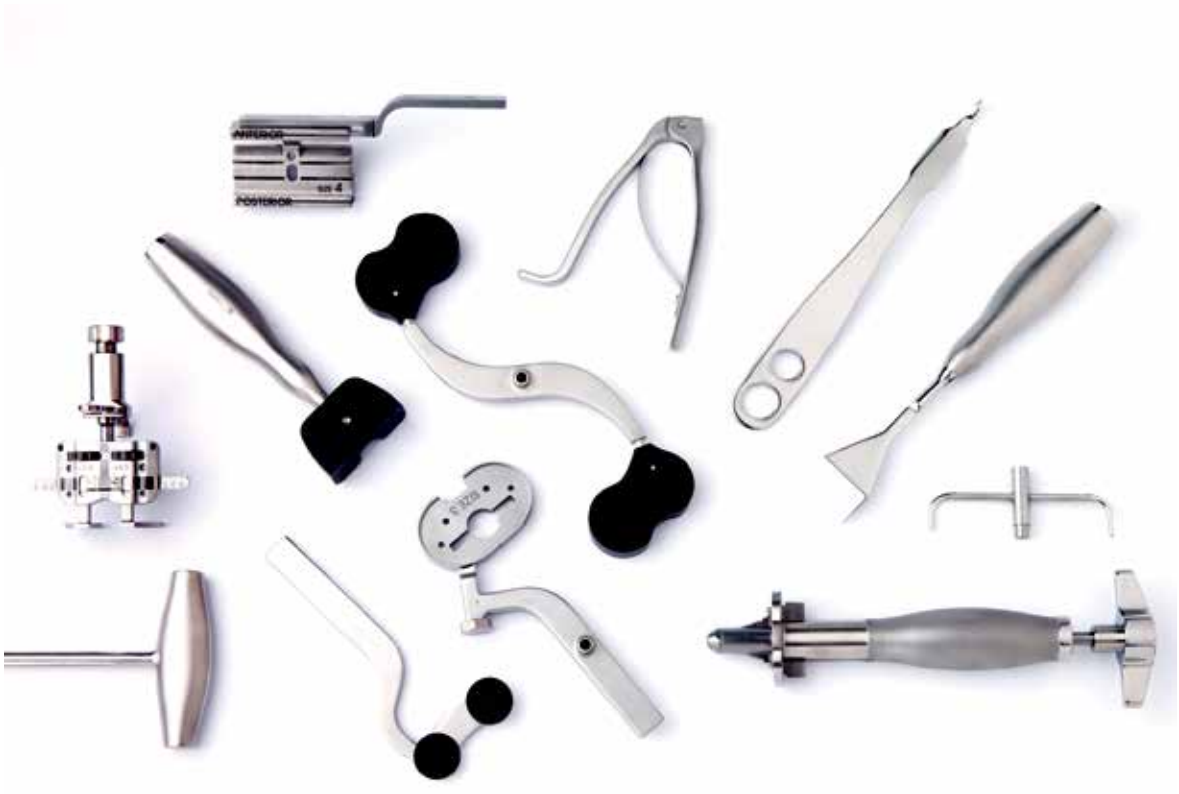
Fig. 51 – total knee replacement (securing the liner with a screw)

Innovated Instrumentation Set

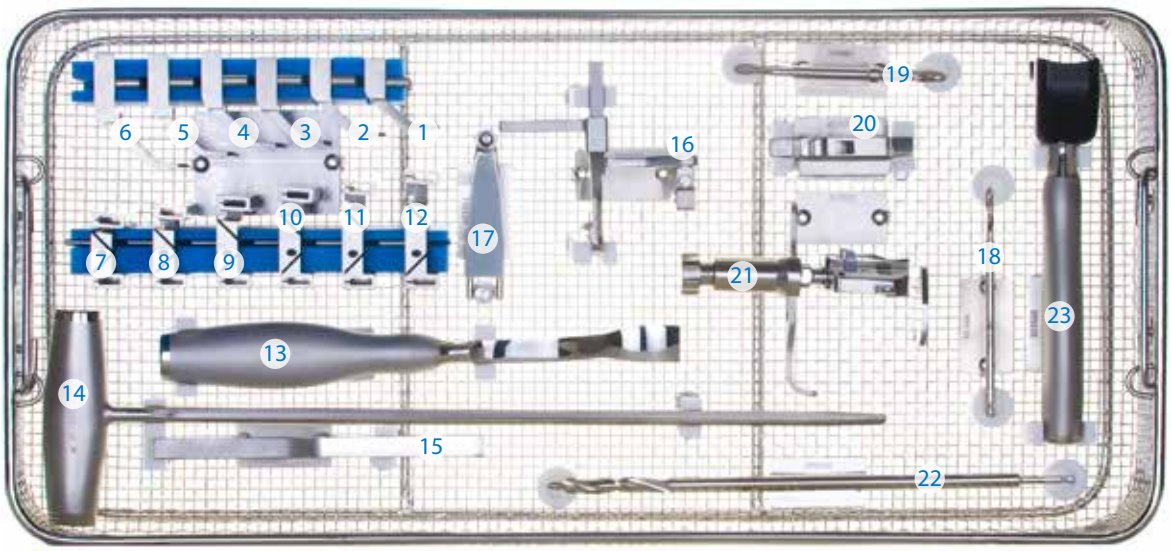
In order to secure the easy, quick, well-arranged and namely reliable implantation of knee endoprosthesis - type SVL, the manufacturer is providing a special instrumentation set. This set of the 2nd generation brings a plenty of new elements that contribute markedly to a hassle-free surgery and involve a better comfort for surgeons and other medical staff who are rubbing their shoulders daily with, too.

Czech
Grand Design
Nomination
2009

The development and design of new instruments has been consulted with the leading Czech orthopaedists and chief draughtwoman Mrs. Anna Kozova. As a result of such a fruitful co-operation there have been those friendly user´s instruments awarded from the esthetic point of view, too.
The Academy of Design of the Czech republic has nominated Messrs. Beznoska in a category „Manufacturer of Year 2009" where the third prize was won in a keen competition.
The instrumentation set has been chosen and published in a book Design Pro - Czech Industrial Design 1990 - 2010 (authors Jan Paula and Jiří Hulák) that includes the most important projects on that field during last twenty years.

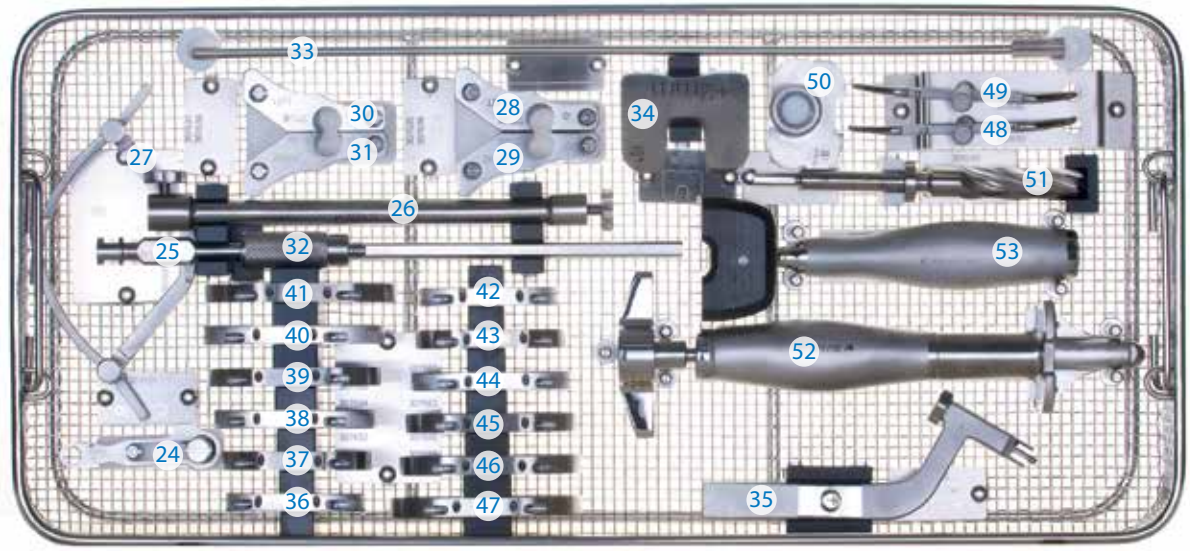


Instrumentation

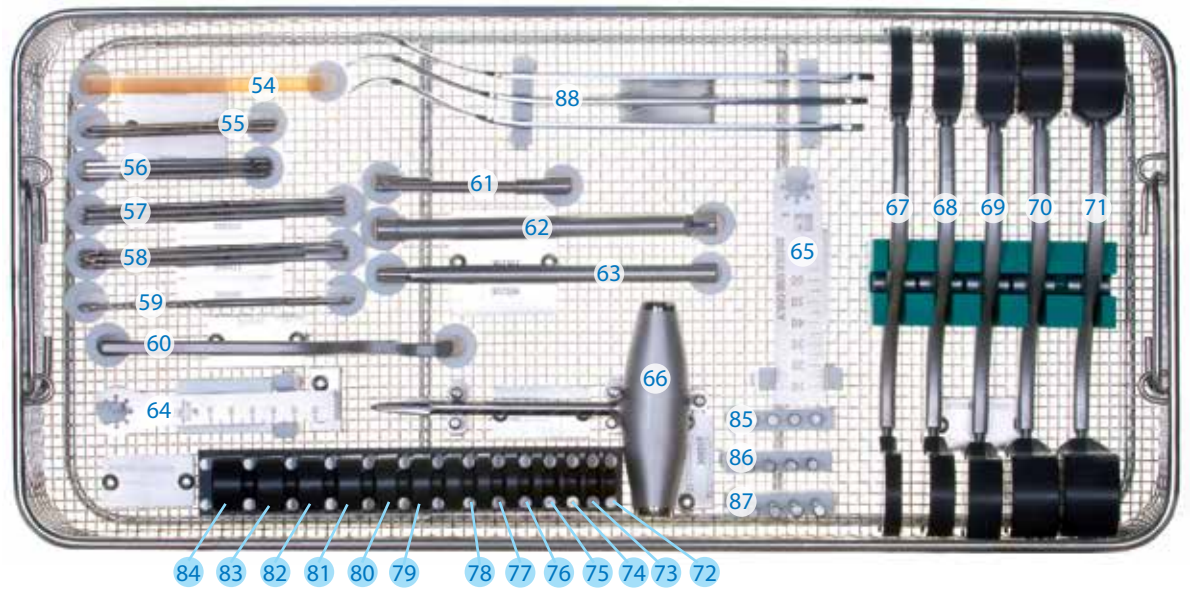


Set of instruments for application of KJ - SVL INSTRUMENTS FOR APPLICATION OF KNEE JOINT - SVL - FEMUR			
	Denomination	**Qty**	**Order Number**
	Tray - instr. for appl. of KJ - SVL - femur		300120
1	SVL - Resection block for ventral groove, 1	1	307621
2	SVL - Resection block for ventral groove, 2	1	307622
3	SVL - Resection block for ventral groove, 3	1	307623
4	SVL - Resection block for ventral groove, 4	1	307624
5	SVL - Resection block for ventral groove, 5	1	307625
6	SVL - Resection block for ventral groove, 6	1	307626
7	SVL - Femoral resection block, 1	1	307611
8	SVL - Femoral resection block, 2	1	307612
9	SVL - Femoral resection block, 3	1	307613
10	SVL - Femoral resection block, 4	1	307614
11	SVL - Femoral resection block, 5	1	307615
12	SVL - Femoral resection block, 6	1	307616
13	SVL - Chisel for osteophytes	1	307688
14	SVL - Intramedullary nail	1	307603
15	SVL - Guide rail	1	307609
16	SVL - Femoral centering device	1	307600
17	SVL - Extender for femoral centering device	1	307601
18	Drill bit D3.5 - flat conn.	2	307606
19	Drill bit, D6.0	1	309085
20	SVL - Resection block for distal femoral resection	1	307602
21	SVL - Positioning template	1	307605
22	Drill bit for medullary canal perforation, D8.0	1	309000
23	SVL - Femoral component impactor	1	307608

Note: *The cassette lay-out is only of an informative character and may be amended depending on future innovation.*



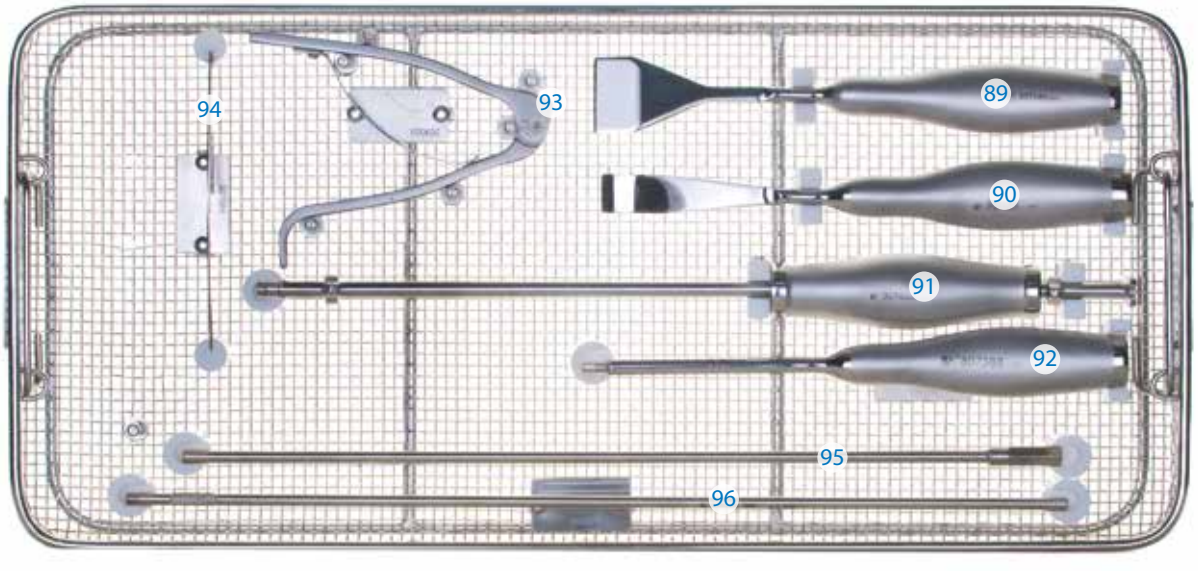
Set of instruments for application of KJ - SVL INSTRUMENTS FOR APPLICATION OF KNEE JOINT - SVL - TIBIA			
	Denomination	**Qty**	**Order Number**
	Tray - instr. for appl. of KJ - SVL - tibia		300121
24	SVL - Tibial targeting device - arm	1	307630
25	SVL - Tibial targeting device - rod	1	307631
26	SVL - Tibial targeting device - telescope	1	307632
27	SVL - Tibial targeting device - distal holder	1	307633
28	SVL - Tibial resection block, 0/L	1	307635
29	SVL - Tibial resection block, 0/R	1	307636
30	SVL - Tibial resection block, 5/L	1	307637
31	SVL - Tibial resection block, 5/R	1	307638
32	SVR - Nut for intramedullary aiming device	1	309104
33	SVL - Centering rod, intramedullary targeting	1	307640
34	SVL - Correctional tibial resecton block, 2 mm	1	307641
35	SVL - Handle for tibial centering template	1	307650
36	SVL - Tibial centering template, 1L	1	307651
37	SVL - Tibial centering template, 2L	1	307652
38	SVL - Tibial centering template, 3L	1	307653
39	SVL - Tibial centering template, 4L	1	307654
40	SVL - Tibial centering template, 5L	1	307655
41	SVL - Tibial centering template, 6L	1	307656
42	SVL - Tibial centering template, 1R	1	307661
43	SVL - Tibial centering template, 2R	1	307662
44	SVL - Tibial centering template, 3R	1	307663
45	SVL - Tibial centering template, 4R	1	307664
46	SVL - Tibial centering template, 5R	1	307665
47	SVL - Tibial centering template, 6R	1	307666
48	SVL - Resection gauge, +2, +4	1	307645
49	SVL - Resection gauge, +0, +3	1	307646
50	SVR - Drilling sleeve for tibial centering template	1	309150
51	SVR - Tibial drill bit, D15	1	309155
52	SVL - Tibial puncher	1	307670
53	SVL - Impactor of tibial component	1	307671



Set of instruments for application of KJ - SVL

INSTRUMENTS FOR APPLICATION OF KNEE JOINT - SVL - COMMON (I)

	Denomination	Qty	Order Number
	Tray - instr. for appl. of KJ - SVL - common (I)		300122
54	SVL - Ruler	5	309350
55	Fixation pin, L90	5	309305
56	SVL - Fixation pin, L90	5	309306
57	SVL - Fixation pin, L125, spear end	5	309310
58	SVL - Fixation pin, L125, drill end	1	309311
59	Drill bit, D3.2	1	309300
60	SVL - Distance rings holder	1	307690
61	Pin handle II	1	309314
62	Impactor of flat headed fixation pin	1	307307
63	Fixation pin impactor	2	307306
64	Saw blade, 0.9/15, L115 - SYNTHES	1	401110
65	Saw blade, 0.9/24, L115 - SYNTHES	1	401100
66	Perforator	1	307340
67	SVL - Spacer, 8/10	1	307691
68	SVL - Spacer, 12/14	1	307692
69	SVL - Spacer, 16/18	1	307693
70	SVL - Spacer, 20/22	1	307694
71	SVL - Spacer, 24/26	1	307695
72	Distance ring, 8	2	309881
73	Distance ring, 9	2	309882
74	Distance ring, 10	2	309883
75	Distance ring, 11	2	309884
76	Distance ring, 12	2	309885
77	Distance ring, 13	2	309886
78	Distance ring, 14	2	309887
79	Distance ring, 15	2	309888
80	Distance ring, 16	2	309889
81	Distance ring, 17	2	309879
82	Distance ring, 18	2	309878
83	Distance ring, 19	2	309877
84	Distance ring, 20	2	309876
85	Pin with head, D3.2, L25	4	309317
86	Pin with head, D3.2, L40	4	309318
87	Pin with head, D3.2, L60	4	309319
88	Narrow retractor	3	202200



Set of instruments for application of KJ - SVL Instruments for application of knee joint - SVL - common (II)			
	Denomination	**Qty**	**Order Number**
	Complete set		300123
89	Chisel, 35 mm	1	307686
90	Chisel, 18 mm	1	307685
91	Universal sliding hammer	1	307682
92	Hexagonal screwdriver, D3.5	1	307388
93	Fixation pin extractor, D3.2	1	307305
94	SVL - Checking gauge	1	307684
95	SVL - Centering rod	1	309340
96	SVL - Extension guiding rod	1	309345

Set of instruments for application of KJ - SVL INSTRUMENTS FOR APPLICATION OF KNEE JOINT - SVL - TRIAL COMPONENTS (L)			
	Denomination	**Qty**	**Order Number**
	Tray - instr. for appl. of KJ - SVL - trial com. (L)		300124
97	SVL - Trial femoral component, 1L	1	307701
98	SVL - Trial femoral component, 2L	1	307702
99	SVL - Trial femoral component, 3L	1	307703
100	SVL - Trial femoral component, 4L	1	307704
101	SVL - Trial femoral component, 5L	1	307705
102	SVL - Trial femoral component, 6L	1	307706
103	SVL - Trial insert, 1L-8	1	309500
104	SVL - Trial insert, 1L-10	1	309502
105	SVL - Trial insert, 1L-12	1	309504
106	SVL - Trial insert, 1L-15	1	309506
107	SVL - Trial insert, 1L-18	1	309508
108	SVL - Trial insert, 2L-8	1	309510
109	SVL - Trial insert, 2L-10	1	309512
110	SVL - Trial insert, 2L-12	1	309514
111	SVL - Trial insert, 2L-15	1	309516
112	SVL - Trial insert, 2L-18	1	309518
113	SVL - Trial insert, 3L-8	1	309520
114	SVL - Trial insert, 3L-10	1	309522
115	SVL - Trial insert, 3L-12	1	309524
116	SVL - Trial insert, 3L-15	1	309526
117	SVL - Trial insert, 3L-18	1	309528
118	SVL - Trial insert, 4L-8	1	309530
119	SVL - Trial insert, 4L-10	1	309532
120	SVL - Trial insert, 4L-12	1	309534
121	SVL - Trial insert, 4L-15	1	309536
122	SVL - Trial insert, 4L-18	1	309538
123	SVL - Trial insert, 5L-8	1	309540
124	SVL - Trial insert, 5L-10	1	309542
125	SVL - Trial insert, 5L-12	1	309544
126	SVL - Trial insert, 5L-15	1	309546
127	SVL - Trial insert, 5L-18	1	309548
128	SVL - Trial insert, 6L-8	1	309550
129	SVL - Trial insert, 6L-10	1	309552
130	SVL - Trial insert, 6L-12	1	309554
131	SVL - Trial insert, 6L-15	1	309556
132	SVL - Trial insert, 6L-18	1	309558

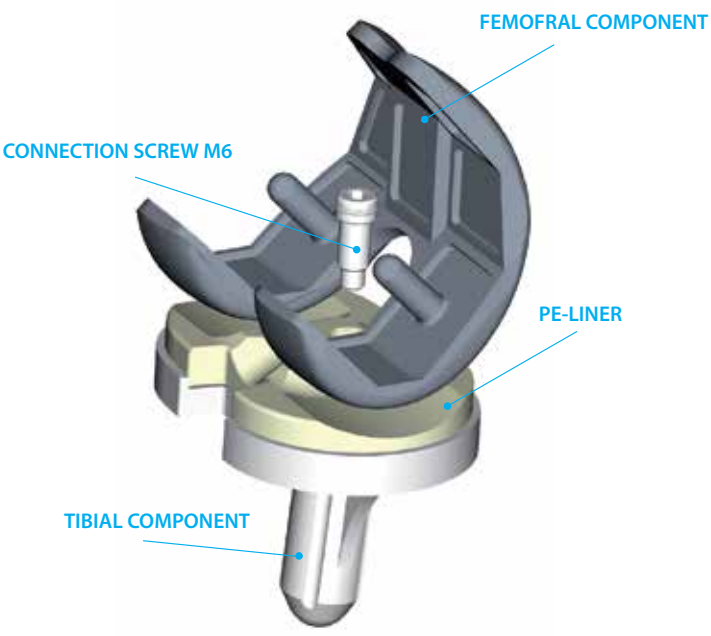
Set of instruments for application of KJ - SVL INSTRUMENTS FOR APPLICATION OF KNEE JOINT - SVL - TRIAL COMPONENTS (R)			
	Denomination	**Qty**	**Order Number**
	Tray - instr. for appl. of KJ - SVL - trial com. (R)		300125
133	SVL - Trial femoral component, 1R	1	307711
134	SVL - Trial femoral component, 2R	1	307712
135	SVL - Trial femoral component, 3R	1	307713
136	SVL - Trial femoral component, 4R	1	307714
137	SVL - Trial femoral component, 5R	1	307715
138	SVL - Trial femoral component, 6R	1	307716
139	SVL - Trial insert, 1R-8	1	309600
140	SVL - Trial insert, 1R-10	1	309602
141	SVL - Trial insert, 1R-12	1	309604
142	SVL - Trial insert, 1R-15	1	309606
143	SVL - Trial insert, 1R-18	1	309608
144	SVL - Trial insert, 2R-8	1	309610
145	SVL - Trial insert, 2R-10	1	309612
146	SVL - Trial insert, 2R-12	1	309614
147	SVL - Trial insert, 2R-15	1	309616
148	SVL - Trial insert, 2R-18	1	309618
149	SVL - Trial insert, 3R-8	1	309620
150	SVL - Trial insert, 3R-10	1	309622
151	SVL - Trial insert, 3R-12	1	309624
152	SVL - Trial insert, 3R-15	1	309626
153	SVL - Trial insert, 3R-18	1	309628
154	SVL - Trial insert, 4R-8	1	309630
155	SVL - Trial insert, 4R-10	1	309632
156	SVL - Trial insert, 4R-12	1	309634
157	SVL - Trial insert, 4R-15	1	309636
158	SVL - Trial insert, 4R-18	1	309638
159	SVL - Trial insert, 5R-8	1	309640
160	SVL - Trial insert, 5R-10	1	309642
161	SVL - Trial insert, 5R-12	1	309644
162	SVL - Trial insert, 5R-15	1	309646
163	SVL - Trial insert, 5R-18	1	309648
164	SVL - Trial insert, 6R-8	1	309650
165	SVL - Trial insert, 6R-10	1	309652
166	SVL - Trial insert, 6R-12	1	309654
167	SVL - Trial insert, 6R-15	1	309656
168	SVL - Trial insert, 6R-18	1	309658

General Section

All elements of the total knee replacement are made in L+ R options (L/R) with certain limitations in terms of combining femoral and tibial components (see table). However, under no circumstances, different sizes (1-6) or side options (L/R) of the tibial component and the PE liner may be combined.

The implant has to contain the following elements (see picture):

- Femoral component
- Tibial component + safety screw
- PE liner



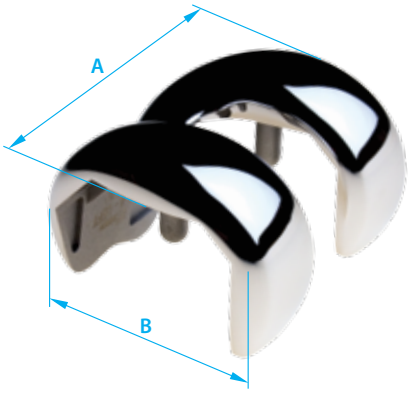
Admissible combinations

		Tibial component and PE liner					
		1	2	3	4	5	6
Femoral component	1	X					
	2		X				
	3		X	X			
	4			X	X		
	5				X	X	
	6					X	X

Note: *The table applies both to L(left) and R(right) options*

Femoral component – type SVL/N

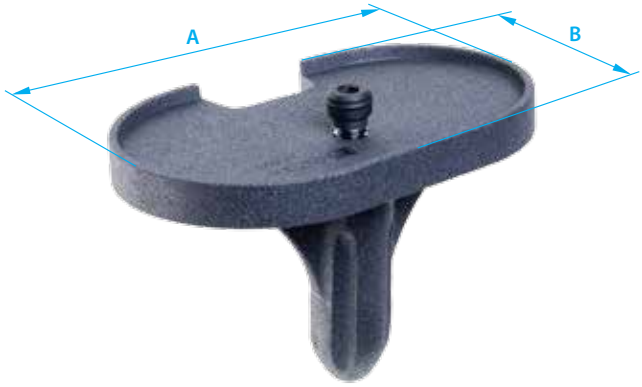
Material: Co-Cr-Mo casting alloy (ISO 5832-4)



Size	left (L) / right (R)	A transverse [mm]	B anteroposterior [mm]	Order number
1	L	57	52	350001
	R			350011
2	L	64	56	350002
	R			350012
3	L	70	60	350003
	R			350013
4	L	72	64	350004
	R			350014
5	L	76	68	350005
	R			350015
6	L	82	74	350006
	R			350016

Tibial component – type SVL

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



Size	left (L) / right (R)	A transverse [mm]	B anteroposterior [mm]	Order number
1	L	65	43	357001
	R			358001
2	L	70	47	357002
	R			358002
3	L	74	50	357003
	R			358003
4	L	80	53	357004
	R			358004
5	L	84	57	357005
	R			358005
6	L	89	60	357006
	R			358006

Tibial component modular - type SVL

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

Size	Left (L) / right (R)	A transverse [mm]	B anteroposterior [mm]	Order number
1	L	65	43	357031
	R			358031
2	L	70	47	357032
	R			358032
3	L	74	50	357033
	R			358033
4	L	80	53	357034
	R			358034
5	L	84	57	357035
	R			358035
6	L	89	60	357036
	R			358036

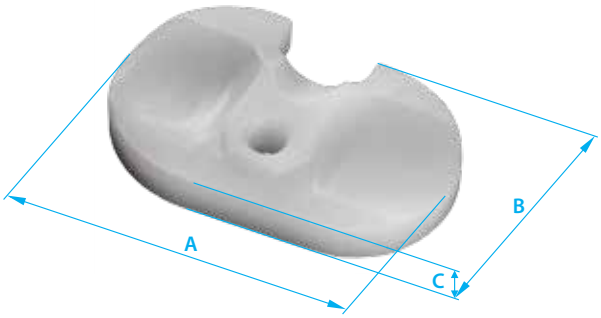
Stem of tibial component - type SVL

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

ØD [mm]	Length mm	Order number
12	25	360971
12	50	360972
15	25	360975
15	50	360976

Insert – type SVL

Material: UHMWPE (ISO 5834-2)



Left insert				
Size	Thickness C [mm]	A [mm]	B [mm]	Order number
1	8	62	40	357041
	10			357042
	12			357043
	15			357044
	18			357045
2	8	67	44	357051
	10			357052
	12			357053
	15			357054
	18			357055
3	8	71	47	357061
	10			357062
	12			357063
	15			357064
	15			357065
4	8	77	50	357071
	10			357072
	12			357073
	15			357074
	18			357075
5	8	81	54	357081
	10			357082
	12			357083
	15			357084
	18			357085
6	8	86	57	357091
	10			357092
	12			357093
	15			357094
	18			357095

Right insert				
Size	Thickness C [mm]	A [mm]	B [mm]	Order number
1	8	62	40	358041
	10			358042
	12			358043
	15			358044
	18			358045
2	8	67	44	358051
	10			358052
	12			358053
	15			358054
	18			358055
3	8	71	47	358061
	10			358062
	12			358063
	15			358064
	18			358065
4	8	77	50	358071
	10			358072
	12			358073
	15			358074
	18			358075
5	8	81	54	358081
	10			358082
	12			358083
	15			358084
	18			358085
6	8	86	57	358091
	10			358092
	12			358093
	15			358094
	18			358095

BEZNOSKA
We bring back joy to movement

Contact

Export:

tel.: +420 312 811 221
+420 312 811 225

export@beznoska.cz

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