Lospa®

Modular Knee System

Surgical Technique

The Revision Knee System with a comprehensive array of implants for cases that require varying levels of constraints.

CORENTEC
IMPLANT SPECIALIST

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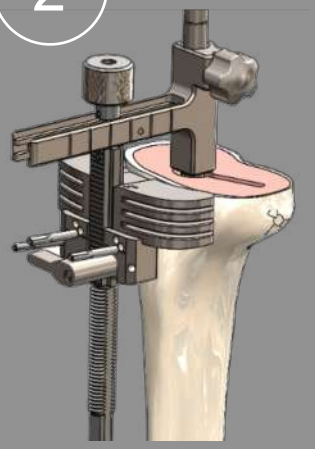

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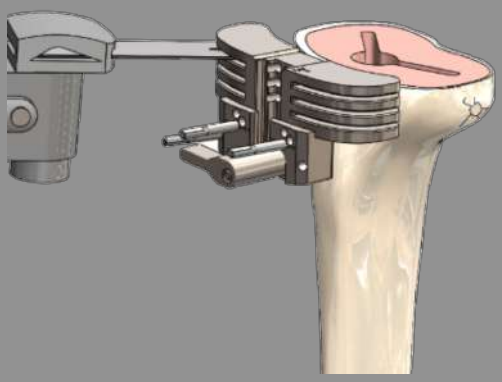

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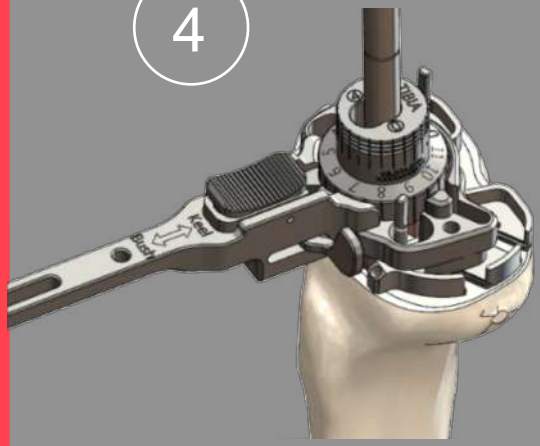

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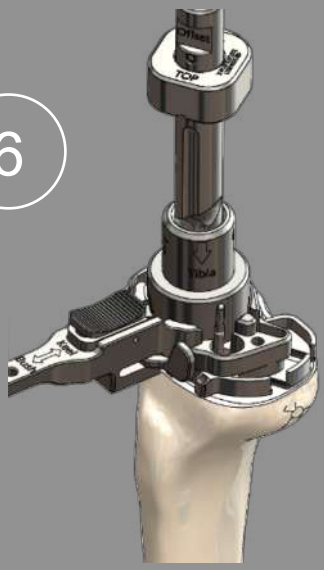

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▪ **Modular** Femur **Surgical Steps Summary**

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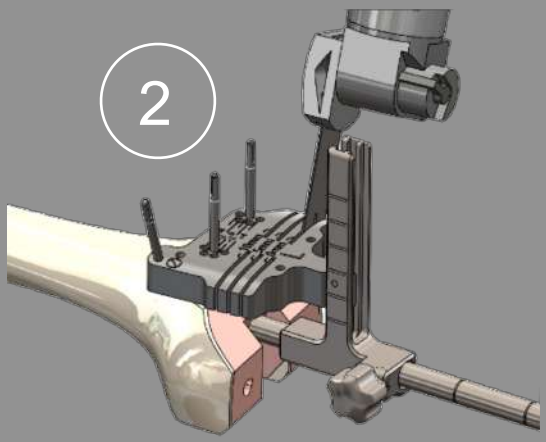

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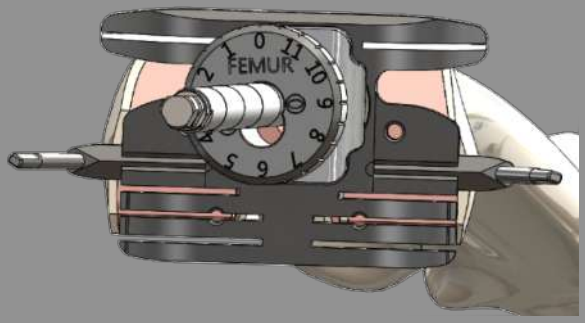

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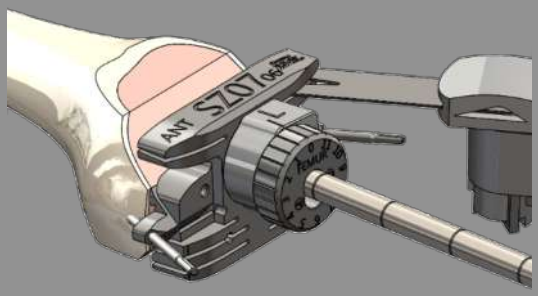

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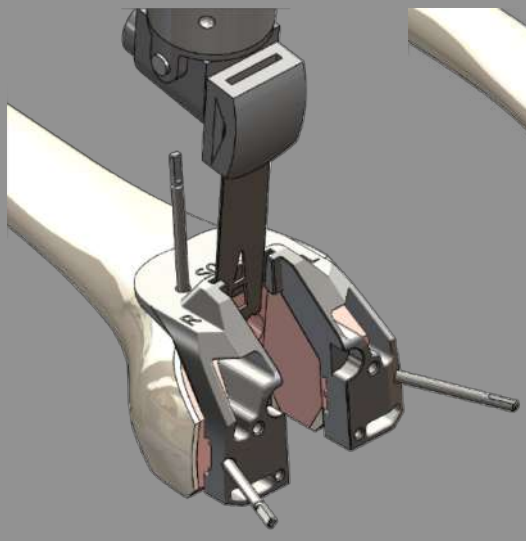

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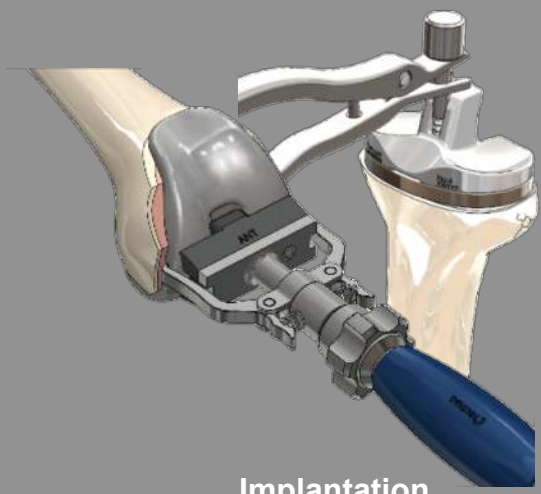


Implantation

1. Surgical Preparation

Introduction

There are many causes leading to total knee arthroplasty failure such as wear, aseptic loosening, infection, osteolysis, ligament instability and patellofemoral complication. Revision procedure should be carefully planned including previous surgery incision site, the condition of the soft tissue, extraction of the primary prosthesis and conservation of bone stock.

A successful revision arthroplasty will restore anatomical alignment with firm fixation of the revision implants while preserving joint line. Revision implants offer additional options including augmentation and stems to stabilize the implants. Lospa Modular Revision prosthesis offers additional constraint level in varus-valgus, axial rotation and hyper-extention motions while to stabilizing the knee joint and increasing conformity.

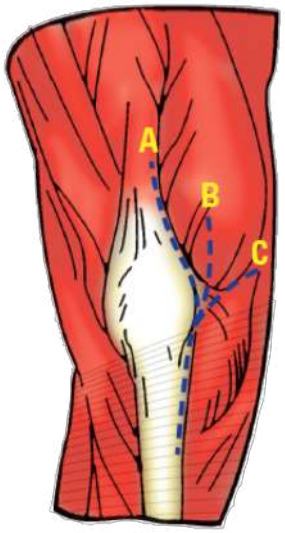
Pre-operative Planning

The angle between the anatomic axis (center of the knee-intramedullary canal) and the mechanical axis (Center of the femoral head-center of the knee) defines the valgus angle.

Approaches

Lospa Modular Knee Instruments are designed for use of three basic procedures:

Medial Parapatellar, Mid-vastus, and Sub-vastus surgical technique. The medial parapatellar('A') approach can begin at the top medial corner of the patella and continuing down along the patellar tendon, ending at the patellar tendon insertion. The mid-vastus('B') approach can create extensive exposure without violating the quadriceps tendon with only a small split in the vastus medialis obliques muscle.



The sub-vastus('C') approach preserves the quadriceps muscle and tendon, but requires careful assessment of patellar mobility as well as size and bulk of the quadriceps muscle mass.

2. Exposure

Component Removal

After adequate exposure of all components has been achieved, attention is turned to component removal. Usually, this requires instruments to disrupt cement/bone and cement/prosthesis. In most cases a thin osteotomes may be used and additional instruments such as an Oscillating Saw, a Gigli Saw or a high speed Burr depending on the surgeon's decision. Most surgeons prefer to remove the femoral component first in order to improve visualization of the posterior tibial component. Take extra care to preserve bone when possible. The cement can be removed after the metal/ polyethylene components are removed with minimal loss of healthy bone.

Two important anatomic conditions should be considered during this procedure. Knowing Joint line and its distance in extension and flexion gaps are important. Joint line could be referenced to below landmarks.

- 12 to 16 mm distal to the Femoral PCL attachment
- 3cm distal to the medial epicondyle and 2.5cm distal to the lateral epicondyle
- Just distal to the inferior pole of the patella
- Reference to meniscal scar when possible

3. Tibial Preparation

3. Tibial Preparation

Tibial Canal Preparation

Start into intramedullary canal using the Starter Awl.
The Intramedullary Twist Drill should be used to drill a hole in the distal femur coaxial with the femoral endosteal canal.

Assemble the '9mm Reamer' to either the T-handle driver. Ream the tibial intramedullary canal and enlarge the entry point using larger diameter reamer.

Progressively ream in 1mm incremental until cortical bone is reached. Ream to the desired depth of stem or to a length of fixation preferred for tibial alignment.

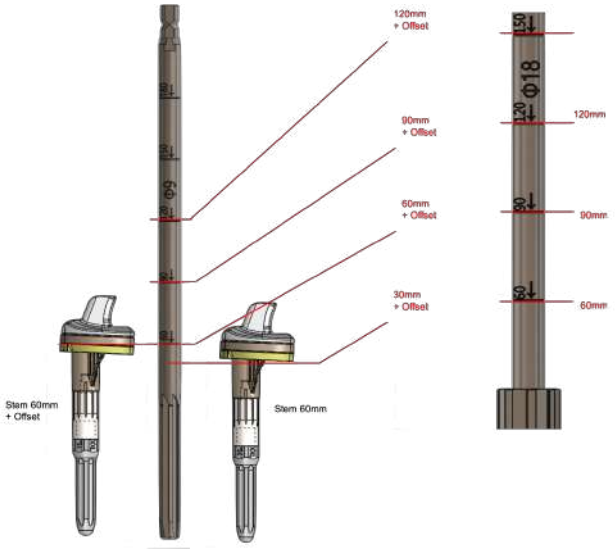
Grooves along the shaft of the reamer indicates stem length. When a offset adopter is used 30mm should be added to length of stem.

If the groove is 60mm, it means 60mm Stem Extension could be used.
Offset adaptor measures 30mm and its length should be considered when reaming.

Leave the final reamer in the tibial intramedullary canal.

Stem Extension Info.

Diameter(mm)	9	10	11	12	13	14	15	16	18
Length(mm)	30			60		90		120	



3. Tibial Preparation *-continued*

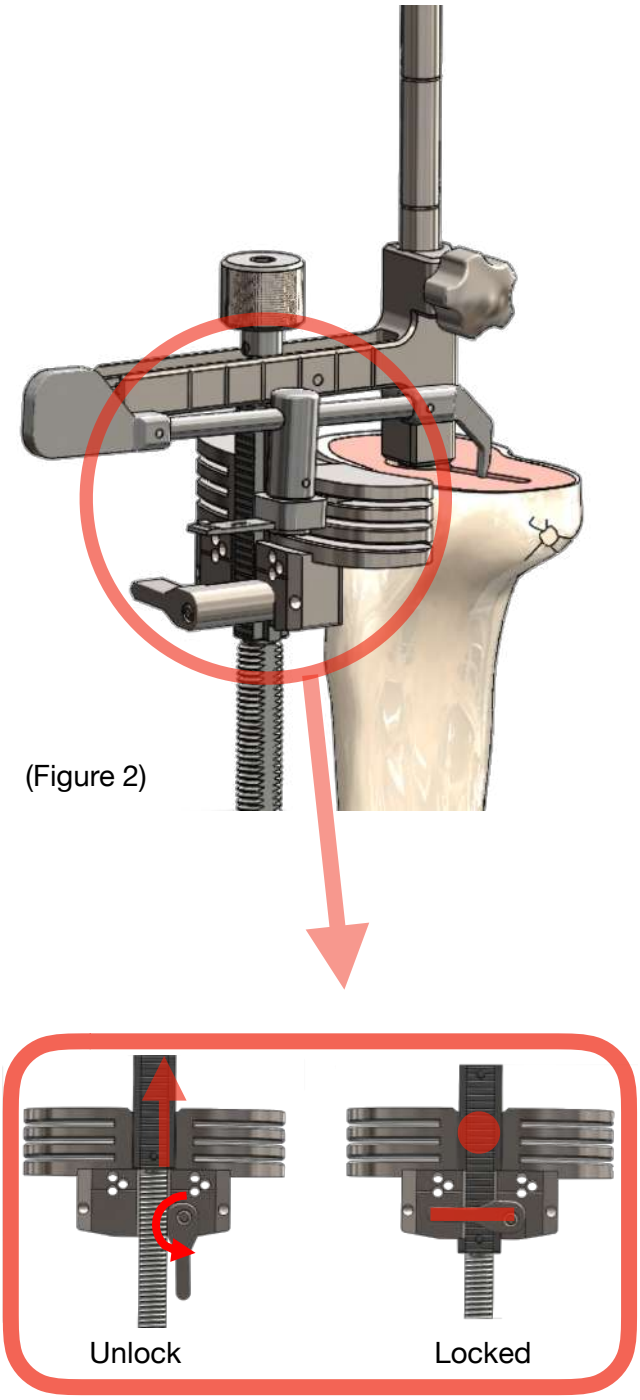
Proximal Tibial Clean-up Resection

Slide the Tibial IM Guide through the shaft of the Reamer. Assemble the Tibial Resection Guide to the Tibial Telescopic Assy. (Figure 1)

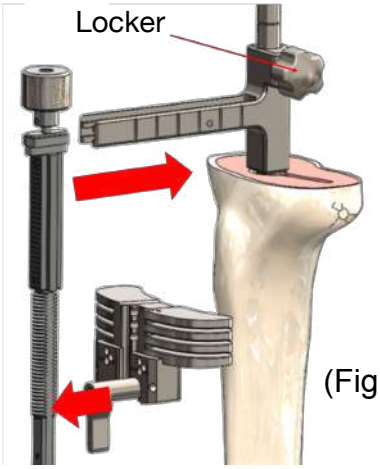
Attach the assembly to the Tibial IM Guide and place the assembly firmly on the proximal tibia using the locking lever. Check and decide the resection level using the Tibial Stylus which has two options: freehand trimming and 2mm cutting. At this point, the 3°posterior slope alignment needs to be achieved. Slide the distal aspect of the Tibial IM guide along the ankle attachment until the longitudinal axis of the Tibial IM guide is parallel to the mechanical axis of the tibia as viewed from the lateral side. The 3°posterior slope is built into the proximal aspect of the guide.

The Tibial Resection Guide with 3°slope is attached to the Tibial IM Guide and the Tibial Resection Guide is placed over the tibial reamer that was left in the intramedullary canal.

The Stylus is attached to the Tibia Resection Guide and lowered with the adjustment cylinder until the tip of the Stylus reaches the deepest point of the most effected part of the tibia plateau. (Figure 2)



(Figure 2)



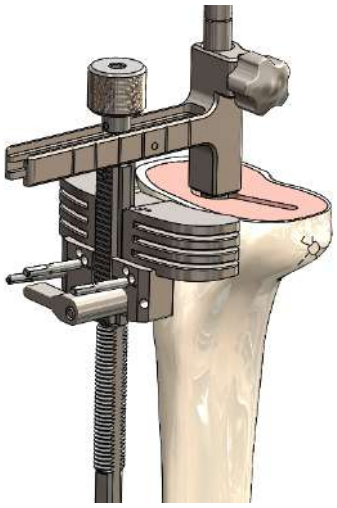
(Figure 1)

3. Tibial Preparation *-continued*

Proximal Tibial Clean-up Resection

The Tibial Resection Guide is attached to the bone using two 3.2 mm pins in the marked pin holes. These two pins are generally placed at the same hole position in the guide to allow adjusting of the Tibial Resection Guide at 2 mm increments if needed.

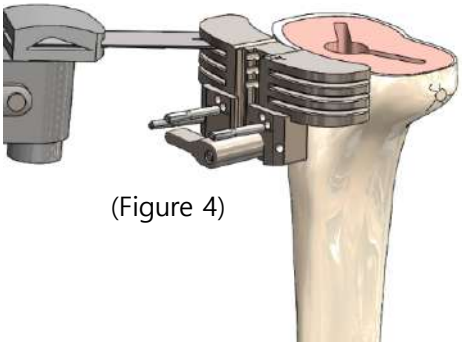
The stylus is now removed. If in a later stage the level of resection is too high, the Tibial Resection Guide can be repositioned over the pins accurately in a lower position. (Figure 3)



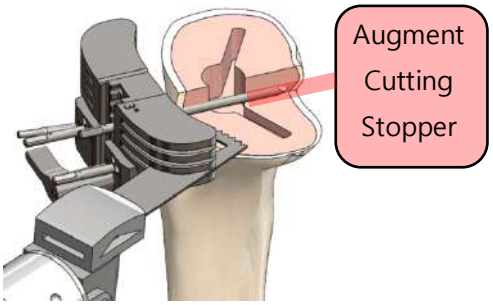
(Figure 3)

The Tibial IM Guide is removed using the slide hammer. The saw capture is placed on The Tibial Resection Guide. The proximal tibia is resected using a saw blade. The angel wing may be placed through the cutting slot on the Tibial Resection Guide to check the resection depth.

Care should be taken not to hit the intramedullary reamer. The soft tissues should be protected from the saw blade. (Figure 4)



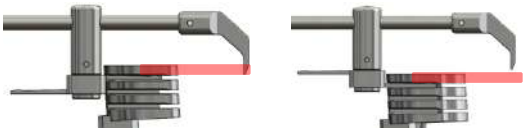
(Figure 4)



▪ **Tip of using the Stylus**

KB.STA.0002 for Trimming available
both Slot Trimming and Freehand Trimming

KB.STA.0002 for 2-10mm Cutting

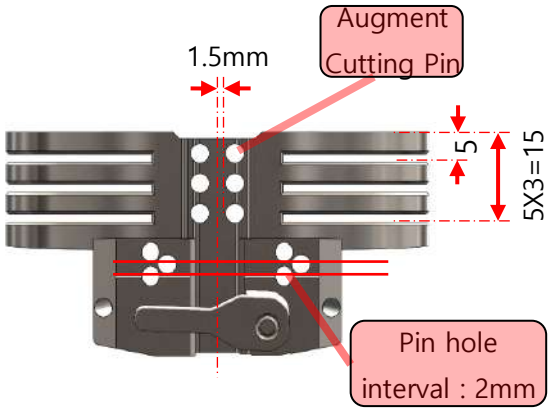


Slot trimming Freehand trimming

For freehand trimming, insert the tip written ‘Free’ into the first slot of the Tibial Resection Guide. On the other hand, for 2mm cutting, insert the tip written ‘Slot’ in the same way.

3. Tibial Preparation *-continued*

▪Tip of using the Tibial Resection Guide

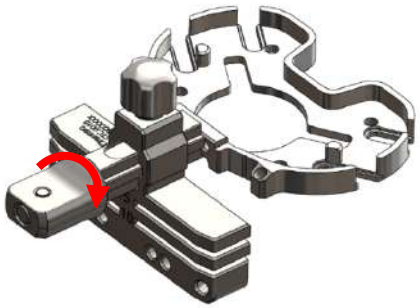


Cutting guide
3° Slope
Augment Cutting 5mm, 10mm, 15mm
Pin Hole : -2mm, +2mm, +4mm

There is 2mm distance between the Pin Holes for resection adjustment. Please note Augment Cutting Pin Holes to stop a saw blade when making a vertical cut. 5mm, 10mm and 15mm Tibial augments could be used. For tibial augment preparation, attach the augment cutting guide assembly to the Tibial Resection Guide and slide the assembly through the baseplate handle. Detach the Baseplate handle and the baseplate trial. Check the resection level.
Detach the Baseplate handle and the baseplate trial. Check the resection level. The Tibial Resection Guide has 3 cutting slots and the interval is 5mm. (1st slot – 5mm cutting, 2nd slot –10mm cutting, 3rd slot –15mm cutting)

Tibial Augment

Select the appropriate Augment Cutting guide and orient to the correct M-L direction. Insert the locking quick-connect handle through the augment resection guide by depressing the ball tip of the handle and inserting the handle through the guide into the anterior quick-connect pocket of the tibial tray trials.
Lock the Augment Cutting Guide by tightening the knob on the quick-connect handle.
Then tighten the thumbscrew the Augment Cutting Guide. Using headless pins, pin the Augment Cutting Guide to the anterior tibia in the most distal holes.
Insert an additional pin at the level of the Augment Cutting Guide(5, 10 or 15mm).
Resect for tibial augments. Loosen the quick-connect knob to release the handle and attached the Au gment Cutting Guide from the tibial tray trials. Remove the tibial tray trials assembly from the canal. For hemi-stepped augment, make a sagittal clean-up cut by using the pin located at the resection level as a guide.



Tibial Component Sizing

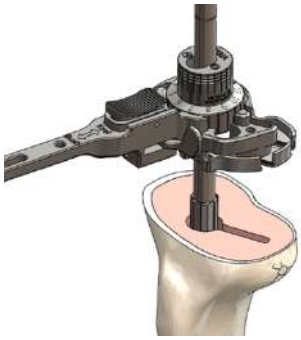
Detach the resection guide and place the assembly over the resected tibial surface and determine the size of the tibial component. Attach the Baseplate Holder to the appropriate size Tibial Baseplate Trial.

3. Tibial Preparation *-continued*

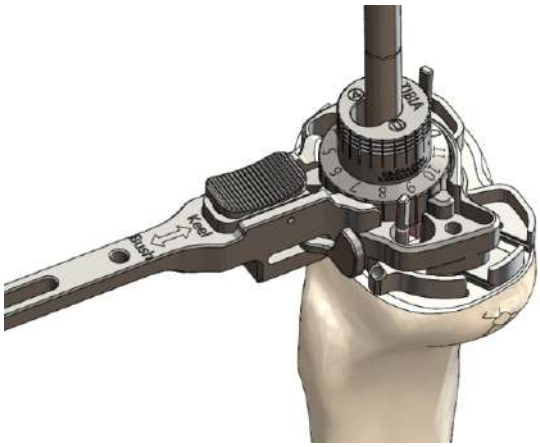
With the Tibial Baseplate Trial firmly pinned in its final place. Place the Boss Drill Guide into the Baseplate Holder, insert the Boss Drill Stem through the assembly to make the cavity for the tibial stem. The Lospa tibial stem diameter is 15mm. If a bigger sized drill was used at the tibal canal preparation step, doing Boss Drill could be skipped. Make the keel preparation using the correct sized Tibial Keel Punch for the selected tibial component size.
*S: #3, M: #4~9, L: #11~16

Offset Determination

Attach the Offset Bush Guide to the assembly. Place the assembly in the appropriate position with regards to rotation at the medial one-third of the tibial tubercle and centered over the proximal tibial bone stock.



Insert the Reamer into the assembly. Ream using the Reamer until flush with the stop. Assess the stability and the length of the stem as the proximal tibia is hand reamed. Start with the smallest Reamer and gradually work up to larger sizes using the stability of the reamer and the depth of the reamer to determine the appropriate stem size for the revision tibial component.



▪Offset Determination Tip

Assemble the corresponding length and diameter Trial Stem to the Tibial Position Dial using the quick connection. The Trial Stem may be undersized to aid in insertion and removal with the reamed canal.
Set the position dial to the 0mm offset by

3. Tibial Preparation *-continued*

loosening the wing nut and sliding to the 0 Mark. Retighten wing nut. Place the Tibial Baseplate Trial construct onto the proximal tibia. Insert the position dial and stem assembly set at 0mm, through the tibial template central hole and into the prepared tibial canal.

Offset adjustments could be made in 2, 4, 6mm. Select the Offset Bush Guide, there are two types 0-4mm and 2-6mm. Rotate the position dial the Baseplate Trial until optimal proximal tibial coverage is achieved. Decide on offset level where the Tibial Baseplate Trial and Proximal Tibial position are aligned.

Note the number marking on the Offset Bush Guide and the direction the Baseplate Holder coincide.
The position dial letter/number combination mark lining up with the Baseplate Trial anterior witness line mark is noted.

Tibial Keel Punch

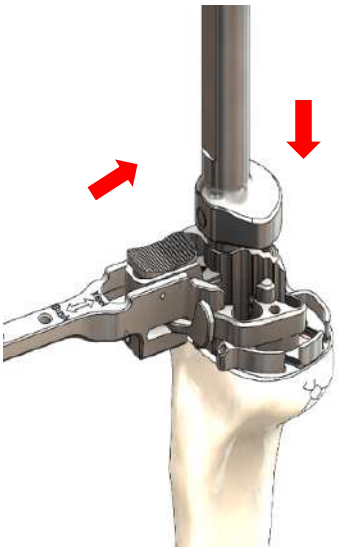
Remove the reamer and the Offset Bush Guide. (Figure 1)

(Figure 1)

Insert the Stem Extension Drill Guide into the Tibial Baseplate Trial. (Figure 2)

(Figure 2)

Slide the assembled Keel Punch through the Stem Extension Drill Guide.
Impact until the punch is fully seated. (Figure 3)



(Figure 3)

After finishing the keel punching, remove the keel punch, Offset Bush Guide, and the Tibial Baseplate Trial.

Tibial Trial Preparation

Assemble the appropriate size Tibial Trial Offset Adaptor/Baseplate with the Stem size as determined by the above hand reaming of the proximal tibia.

3. Tibial Preparation *-continued*

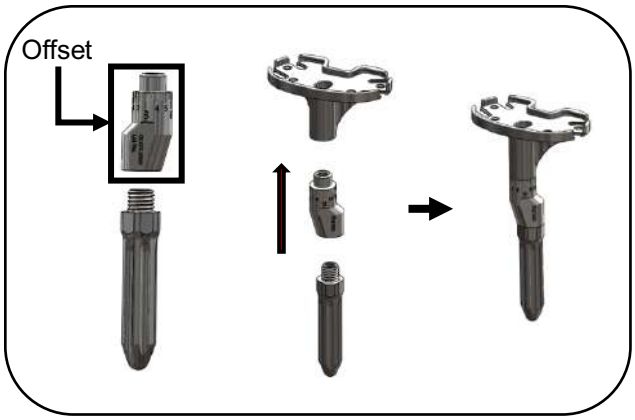
Assemble augments, if needed, onto the Tibial Trial Offset Adaptor/Baseplate.

If augments are not used, then attach Trial Pegs onto the Tibial Trial Offset Adaptor/Baseplate.

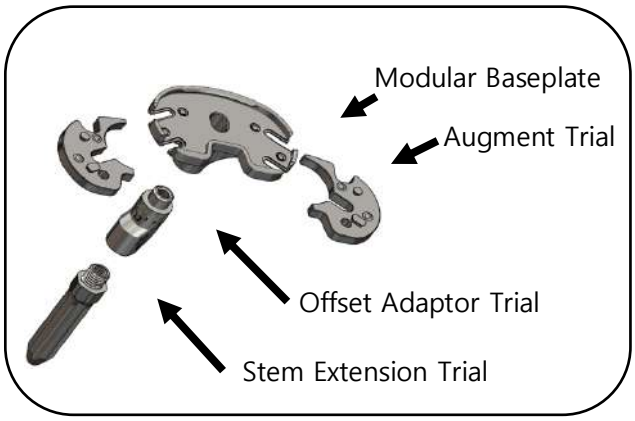
The Tibial Trial Stem should be fully threaded onto the Tibial Trial Offset Adaptor/Baseplate so that the stem is well secured to the Tibial Trial Offset Adaptor/Baseplate.

Controlling the rotation and position of the Tibial Trials, place this down the proximal tibial marrow space. The actual broaching of the proximal tibia occurs with placement of this Tibial Trials as should be apparent from the cutting surfaces underneath the Tibial Baseplate. The rotation should be carefully adjusted.

The Tibial Trial Offset Adaptor/Baseplate and stem should insert into the proximal tibia with modest impaction being needed.



Stem + Offset



Stem + Offset + Augment

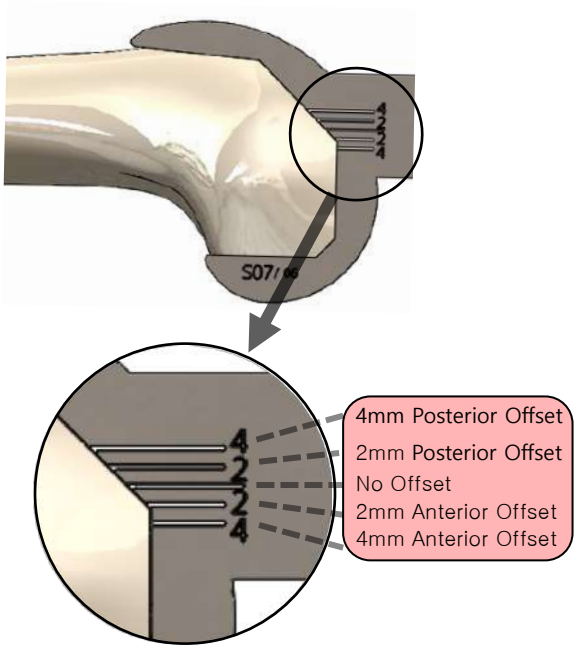
Stem Only

4. Femoral Preparation

4. Femoral Preparation

Femoral Sizing

Insert the Stem Provisional Assembly or Reamer into the femoral canal. Use the the Femoral Template to measure femoral size. Center the various sizes of the Femoral Template on the shaft until the appropriate size is found. Line on the sagittal profile of the Femoral Template indicate the boss position of the femoral component. The shorter engraved lines above and below represent the boss position of the femoral component with 2mm and 4mm anterior and posterior offsets, respectively. Along the handle of each femoral template are two additional tick marks, which represent the M/L width of the corresponding size femoral component.

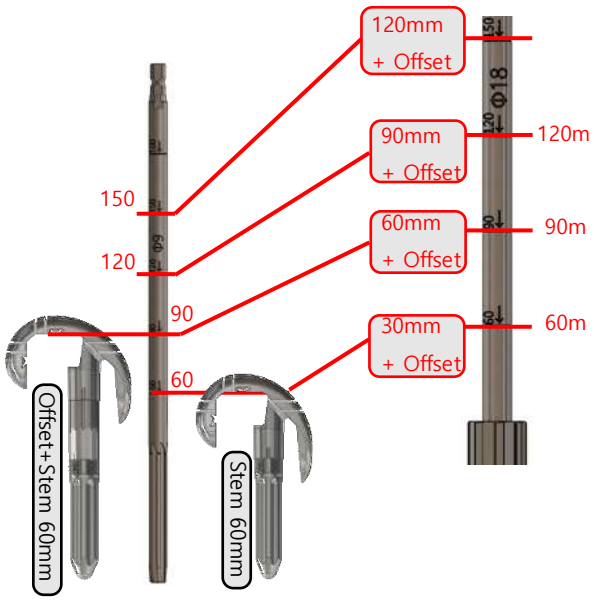


Femoral Canal Preparation

The femoral alignment guide is an intramedullary instrument and needs to be centered in the medullary canal. Determine the general marrow space. The center of the marrow space in the distal femur is located just medial, 4 or 5 mm, and towards the top of the normal intercondylar notch.

This will not be well defined in revision surgery and it may be necessary to use a rolling motion to develop an appropriate canal position as the drill bit progresses up the marrow space. Suction and irrigation can be used to prevent compression of the marrow.

Ream to the desired depth of stem or to a length of fixation preferred for Femoral alignment. Grooves along the shank of the reamer indicate the depth of the reamer in the canal. Progressively ream, increasing diameter in 1mm increments until cortical chatter is achieved and leave the final reamer in the Femoral intramedullary canal.



4. Femoral Preparation *-Continued*

Distal Cutting

The Distal Cutting Guide and alignment guides are designed to achieve the appropriate cuts with removal of a minimal amount of healthy bone stock.

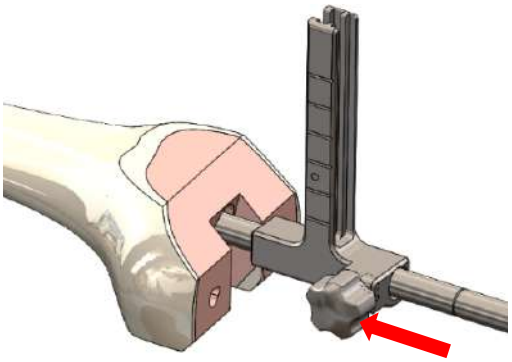
It is recommended that minimal cuts first be attempted, then the Distal Cutting Guide can be backed down to remove additional bone if needed to achieve stable bony fixation of the new components.

Fluid irrigation should be used during bone cuts as the blades can cause thermal damage to normal bone structures. The bone thickness of the patella should be maintained and protected while working on the femur and the tibia.

In some instances, it may be appropriate to leave the old patella component in place to provide some protection during retraction of the patella; therefore, the suggested sequence is addressing the femoral cuts followed by the tibial cuts and the patella last.

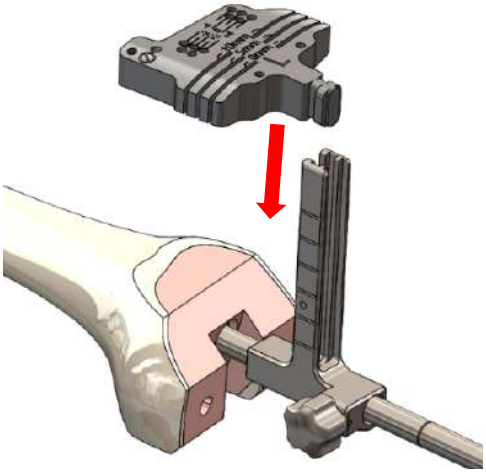
Place the smallest distal femoral reamer on the T-handle. This can be used to hand ream the distal femur which will provide important information. The feel of the reamer will give an indication of the appropriate diameter and the appropriate length needed for the femoral stem.

Increase the size of the reamer until a reasonable firmness is achieved. This determines the appropriate size and length of the stem. Note that it is best to do this using the hand reaming technique with modest firmness as often the bone adjacent to failed knee replacements is osteoporotic and soft.
Remove the T-handle and leave the Femoral Reamer in place, slide the IM Guide over the selected reamer in the femoral canal. (Figure 1)



(Figure 1)

Adjust the Distal Cutting Guide to the appropriate lower extremity. Verify that the Distal Cutting Guide reads “Left” for left leg or “Right” for right leg on the side facing away from the femur. (Figure 2)



(Figure 2)

4. Femoral Preparation *-Continued*

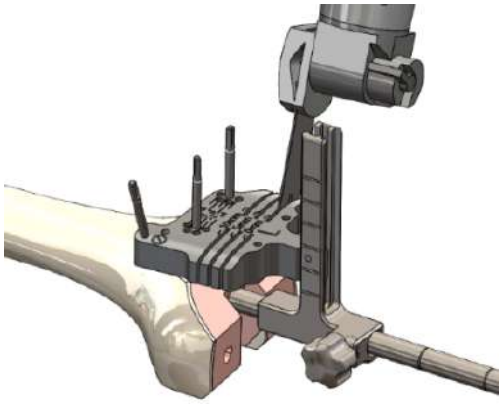
Possible references include the posterior condylar cuts from the previous surgery if they are an accurate representation of rotation. The epicondyles can also be used to determine distal rotation. It should be noted that if rotation of the femur is used to determine appropriate component rotation, this should be checked on the normal extremity as well as the operated extremity prior to draping.

Fix the Disal Cutting Guide to the femur by drilling through the Distal Cutting Guide and then placing Pins. Now secure the Disal Cutting Guide to the femur with at least three pins. Resect the distal femur. 5mm, 10mm and 15mm distal augment resections can be made at this point with the Disal Cutting Guide. Do not remove the Reamer while cutting distal femur. Distal Augment could be used at Distal Cutting phase.

Check the amount of bone that would be removed with the current placement of the augment by using the Angel Wing. Move the Distal Cutting Guide distal or proximal using the multiple holes in the Distal Cutting Guide to result in the appropriate cut to minimize bone loss but to produce an appropriate surface for placement of the revision femoral component. The principle is to restore the anatomic joint line. The most distal cutting surface of the Cutting Guide is at the level of the femoral component.

The –5mm cutting slot is the level that will accommodate the 5mm distal augment medially or laterally on the femoral component. Using an oscillating saw carefully remove the distal femoral bone using the appropriate surface of the Distal Cutting Guide.

Make sure that the assistant surgeon protects the soft tissue structures such as the collateral ligaments. Check the cut with a flat block and, if this is satisfactory, proceed to the chamfer cuts. If additional bone needs to be removed, then the Distal Cutting Guide has multiple positions to allow 2 mm increments of additional bone cut.



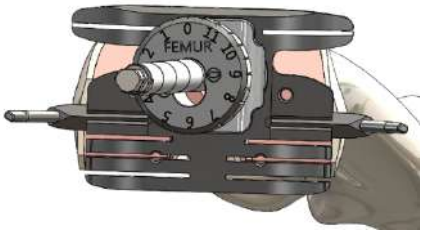
Distal Cutting Guide

4. Femoral Preparation *-Continued*

Offsetting

To prepare for the offset stem, assemble the Femoral Offset Bush Guide to the appropriate size AP Cutting Guide, paying careful attention to clock in such that it reads either “Left” or “Right” depending on which is appropriate. Anterior, posterior and chamfer cutting is done with one guide.

(If no offset is required,
this step is superfluous)

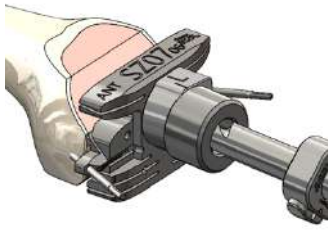


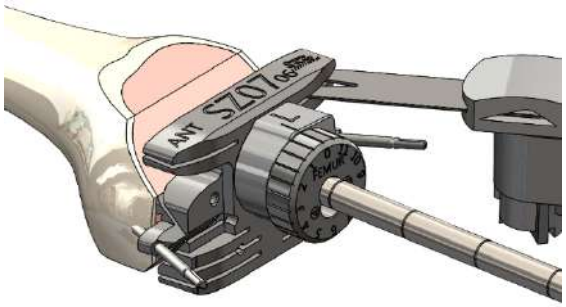
AP Femoral Resection

Slide the AP Cutting Guide and the Femoral Offset Bush Guide to Femoral IM rod. The Femoral IM rod could be placed in neutral or at desired angle. Turn the Femoral Offset Bushing Guide until the best possible AP and ML dimensions are achieved.

In order to enable the base of the stem to be reamed, the cutting must be fitted back onto the straight pins(so that it will be placed in exactly the same position again).
The AP cutting block must be secured in place with the lateral pins with heads in order to improve its stability. Then introduce the Boss Reaming Guide insert into the round opening in the middle of the AP cutting block. Remove the bone substance with the conical reamer.

Place the Stopper on the Offset reamer and proceed with drilling. Drill through IM hold to desired depth for intramedullary stem placement. The exact depth to be drilled is defined by the limit stop of the conical reamer. Stem lengths are available in 30, 60, 90, 120, 150mm lengths with 9, 10, 11, 12, 13, 14, 15, 16, 18, 20mm diameters. Stem housing angle is 6 degrees for real implant. Complete the four femoral resections using an oscillation saw blade.





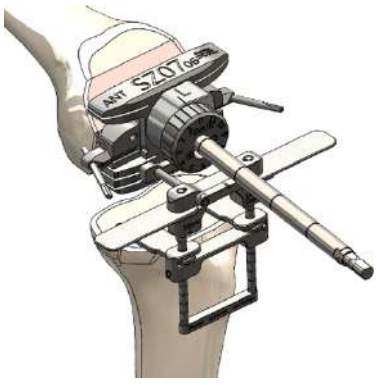
4. Femoral Preparation *-Continued*

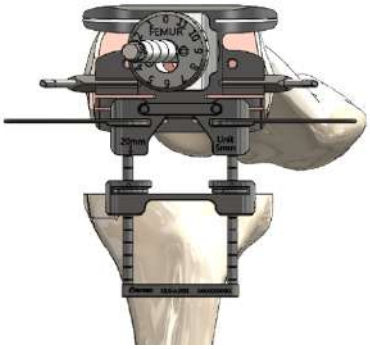
Flexion Gap & Rotation Check

Put the knee into Flexion (90 degrees). Place the ER Guide on the AP cutting guide to access External rotation and check Gap level. Place the lower wing to the Proximal Tibia and upper wing as shown in the figure could be used to confirm Epicondyle axis. Upper extended wing could be used to confirm femoral rotation. If not in used, could be folded. Flexion Gap could be confirmed. Starting at 20mm with 5mm increments by each mark. Besides AP Cutting Guide, the zig could be assembled with Box Cutting Guide, Femoral Trial and check for Gap, Rotation.

Inappropriate femoral component rotation may create a flexion imbalance and/or compromise patellofemoral kinematics. Therefore, it is important to pay particular attention to femoral rotation. A number of methods using anatomic landmarks may be used. These landmarks should be combined with appropriate ligament releases to achieve a rectangular flexion gap. With some of these methods, surgeon judgement must be used as anatomic landmarks are not always reliable because of femoral defects or inconsistencies. When applying judgement, it is particularly important to avoid inappropriate internal rotation.

Anterior cortex should be just trimmed off and minimize bone loss. The AP Cutting Guide is based on the intramedullary space of the distal femur. This ensures the best anterior-posterior placement of the femur. The femur size can be estimated from the x-rays and the component removed. The selected size of the AP Cutting Guide is fixed to the Trial Stem. The size of the stem (length and diameter) was determined above with the hand canal reamers. Place this in position on the distal femur. Adjust the rotation as suggested above, making sure not to internally rotate the AP Cutting Guide.





Information

1. If a knee is too tight in both flexion and extension, reducing the height of the tibial articular surface may be sufficient to balance the construct.

2. If the knee is tight in flexion but acceptable in extension, two options exist. An augment may be used with the distal femur. This will drop the joint line lower, and allow the use of a thinner tibial component. Another option is to use a smaller femoral component.

3. If the joint is loose in extension and tight in flexion, augmentation of the distal femur should provide a good arthroplasty with a thinner polyethylene component if the joint line is at its proper location. Another option is to use a smaller femoral component possibly with a thicker polyethylene component.

4. If the joint is acceptable in flexion but tight in extension, several options exist. One is to release the posterior capsule from the femur. Another alternative is to resect more distal femoral bone. This moves the femoral component proximally on the femur at the expense of elevating the joint line.

5. Obviously, if both components are acceptable, no further modification is necessary.

6. If the joint is acceptable in flexion and loose in extension, the probable solution is augmentation of the distal femur while using the same polyethylene component. This will drop the joint line and tighten the extension gap. Another option is to downsize the femoral component and use a thicker polyethylene component. This will probably raise the joint line.

7. If the joint is loose in flexion and acceptable in extension, a larger femoral component, may suffice. A second option is a thicker tibial articular surface with a more proximal femoral position.

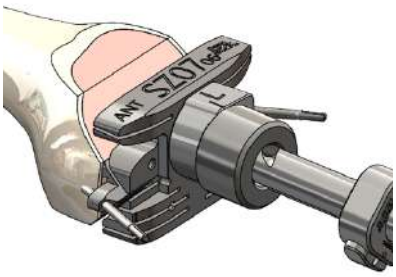
8. If the joint is loose in flexion and acceptable in extension, increasing the femoral size may equalize the gaps. Alternatively, moving the femoral component proximally and applying a thicker tibial articular surface will equalize the gaps. As a less desirable solution, one may choose to accept this situation if it is only of a mild degree, particularly in a highly constrained component.

9. If the joint is symmetrically loose in both flexion and extension, a thicker tibial articular surface will usually solve both problems. In situations where two options exist to help solve the soft tissue mismatch, the position of the patella or the joint line help the surgeon decide which option to select.

4. Femoral Preparation *-Continued*

Box Cutting

Reinsert one or two of the headless holding pins if they were previously removed. These pins will serve to provide rotational alignment for the PS box cutting guide. (Figure 1)



(Figure 1)

Impact the size specific PS box cutting guide on the prepared distal femur after removing the AP cutting guide.

The PS box cutting box is fixed with no fewer tan two and up to three pins. Resect along the interior of the PS box cutting guide with an oscillating saw. Continue both cuts from the anterior portion through to the posterior. (Figure 2)

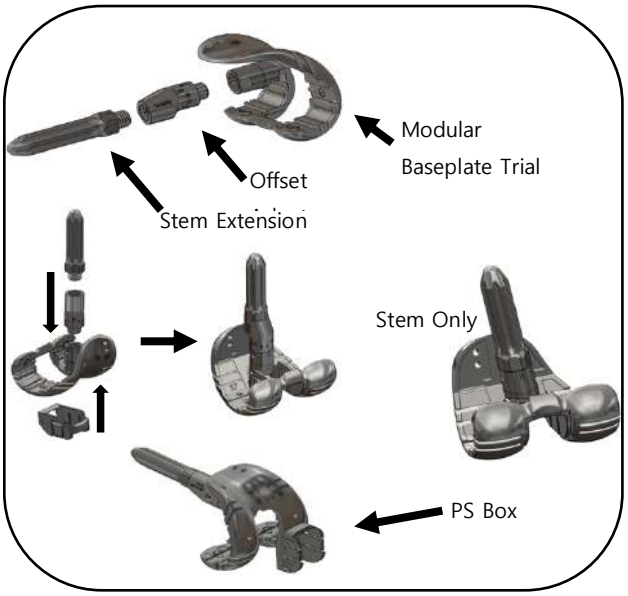
(Figure 2)

A groove is machined into the bridge between the posterior condyles, once the top of the box resection has been completed this groove is fully visible.

Femoral Trial Preparation

Remove the A/P Block and fix the trial stem to the appropriate size Femoral Trial. Secure augments to the distal femur if needed. If no augments are planned, affix pegs to the femoral trial. Gently impact this onto the distal femur. Remove the trial femur and use the indentations from the pegs to drill the peg holes with the Step Drill. Also, remove a small portion of the anterior mid bone where there is a “notch” in the femoral component.

Impact the trial component onto the distal femur. Check for appropriateness of cuts and the fit of the trial component. Make adjustments as needed. Check for residual osteophytes such that the component will fit flush to the bone and the collateral ligaments will not be obstructed.

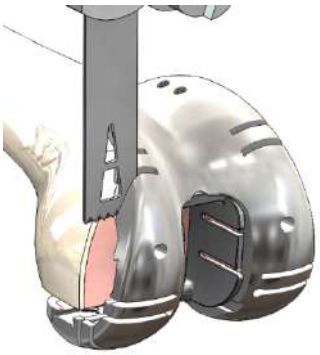


4. Femoral Preparation *-Continued*

Augment Cutting

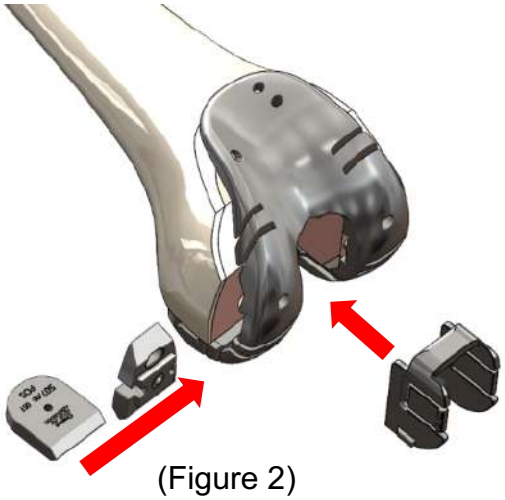
Once the femoral trial component is on place, check if it is necessary to perform the resections to host the distal and posterior auments.

If it is needed, resect for the augments with the saw blade. (Figure 1)



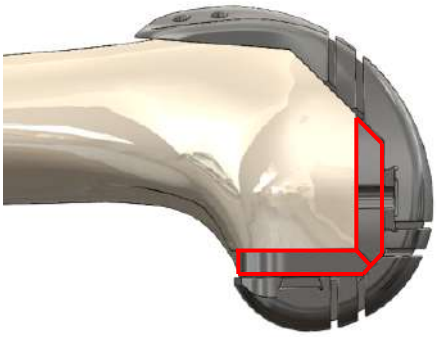
(Figure 1)

If augment cutting is not satisfactory, use saw capture slots on the Femoral trial to revisit cutting levels. Assemble the femoral trial and place it though pins to confirm bone surfaces are flush with the femoral trial. (Figure 2)



(Figure 2)

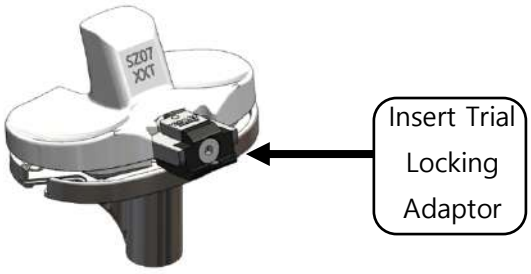
Assemble all Posterior and Distal Femoral Augment Trials prepared for to the Femoral Trial.

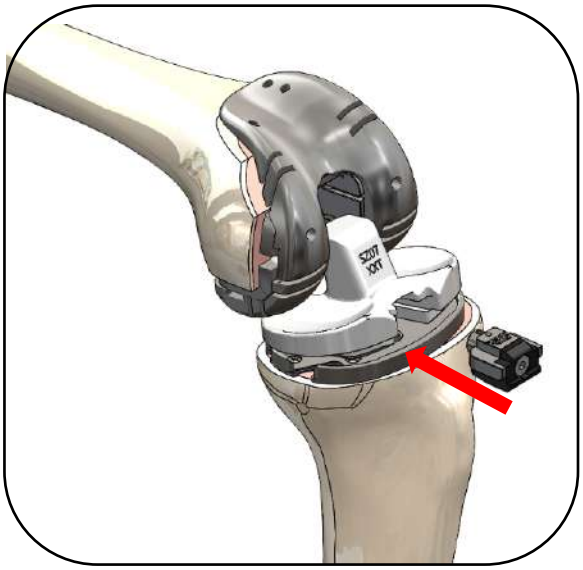


5. Trialing

5. Trialing

Remove the Tibia Baseplate Keel Trial and use the indentations of the pegs to guide the use of the Step Drill to make the peg holes in the proximal tibia. Reposition th the Tibia Baseplate Keel Trial and impact it into the proximal tibia. If it is not going down smoothly, recheck for appropriateness of the size of the stem and the appropriate direction of the stem relative to the proximal tibia. After this has been lightly impacted into the appropriate position, check the contact surface underneath the tibial tray. This should be very squarely down in all aspects and should be contained within the margins of the tibial bone in the same fashion as the tibial sizer had been as noted above, make adjustments as needed.





Insert the Insert Trial on the tibial tray and fix them using the Insert Trial Locking Adaptor and then place the previously assembled Femoral Trial and stem on the distal femur.

5. Trialing *-Continued*

Final Trial

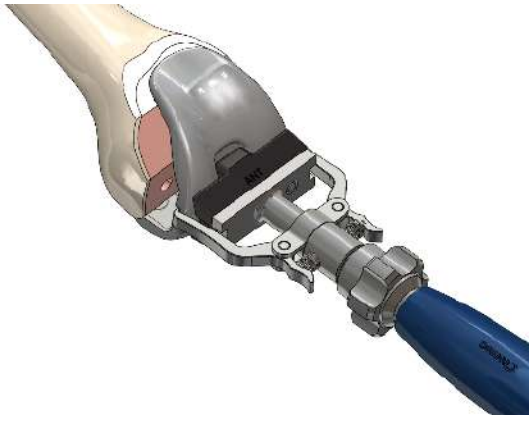
Check the range of motion. The Tibial Trials should be rotationally symmetric with the femoral trial in full extension with the extensor mechanism reduced. Should the selected joint line by the positioning of the Trials differ widely from the joint line anatomical markers, the surgeon has the ability to change the distal/proximal position of the Femoral Component but will have to mirror these changes with appropriate selection of the Tibial Insert and changes to the femoral sizing.
The knee should extend fully but not hyperextend. There should be 1 to 3 mm of laxity in the bent 20° to 30° and in deep flexion there still should be 1 to 3 mm of laxity in both the medial and the lateral collateral ligaments.
Appropriate ligamentous adjustment needs to be achieved using anatomic principles. The variables include changing the thickness of the Tibial Insert, changing the level of the femoral cut, changing the size of the tibial component and changing the level of the tibial component. Other methods include soft tissue balancing techniques which should be part of the orthopedist's surgical skills.

5. Trialing *-Continued*

Trial Removal

Slide the Tibia Insert Remover Bolt on the Tibial Insert Trial and extract the Tibia Insert Trial using Tibia Insert Remover. Extract the Tibial Baseplate Trial using the Baseplate Trial Remover.

To remove the Femoral Trial Assembly, put the Femoral Holder to the Central of the Femoral Box Trial and extract from the femur.

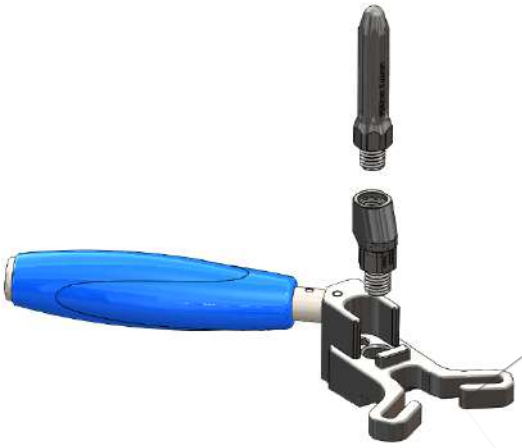


6. Implantation

6. Implantation

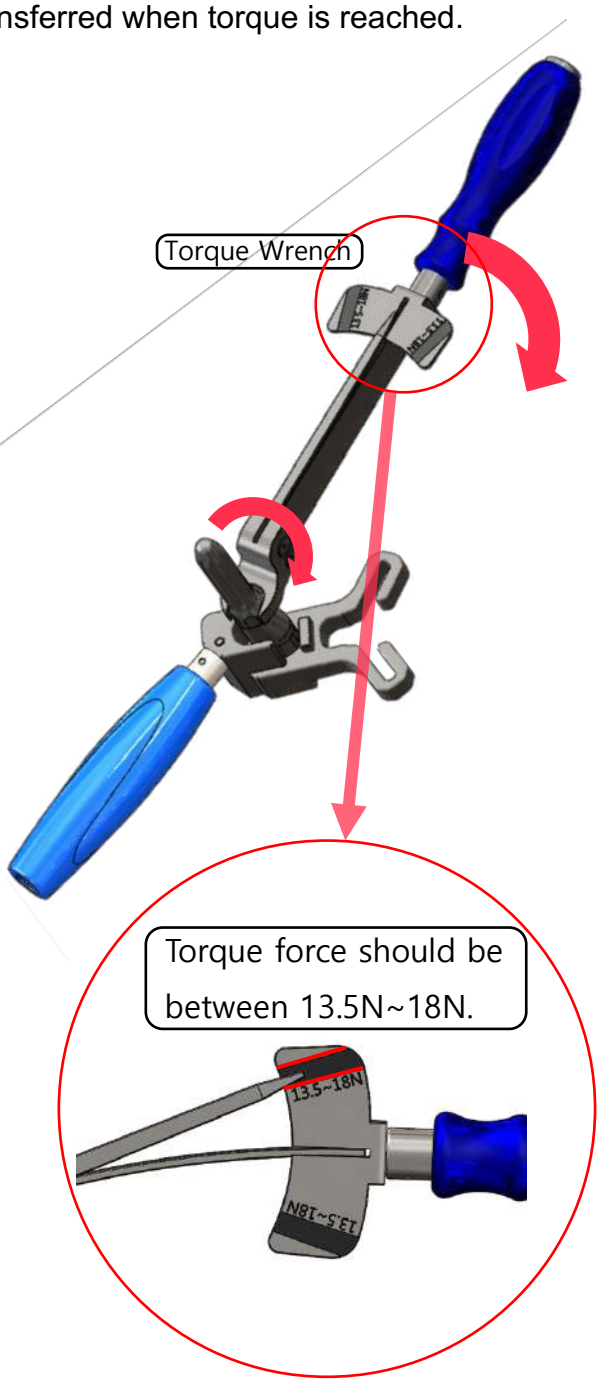
Tibial Implant Assembly

Assemble the Offset Adaptor and Stem extension first and attach to Tibial Baseplate as shown. Attach the Offset Dial Instrument. If diameter of stem is large use the shorter side for attachment.

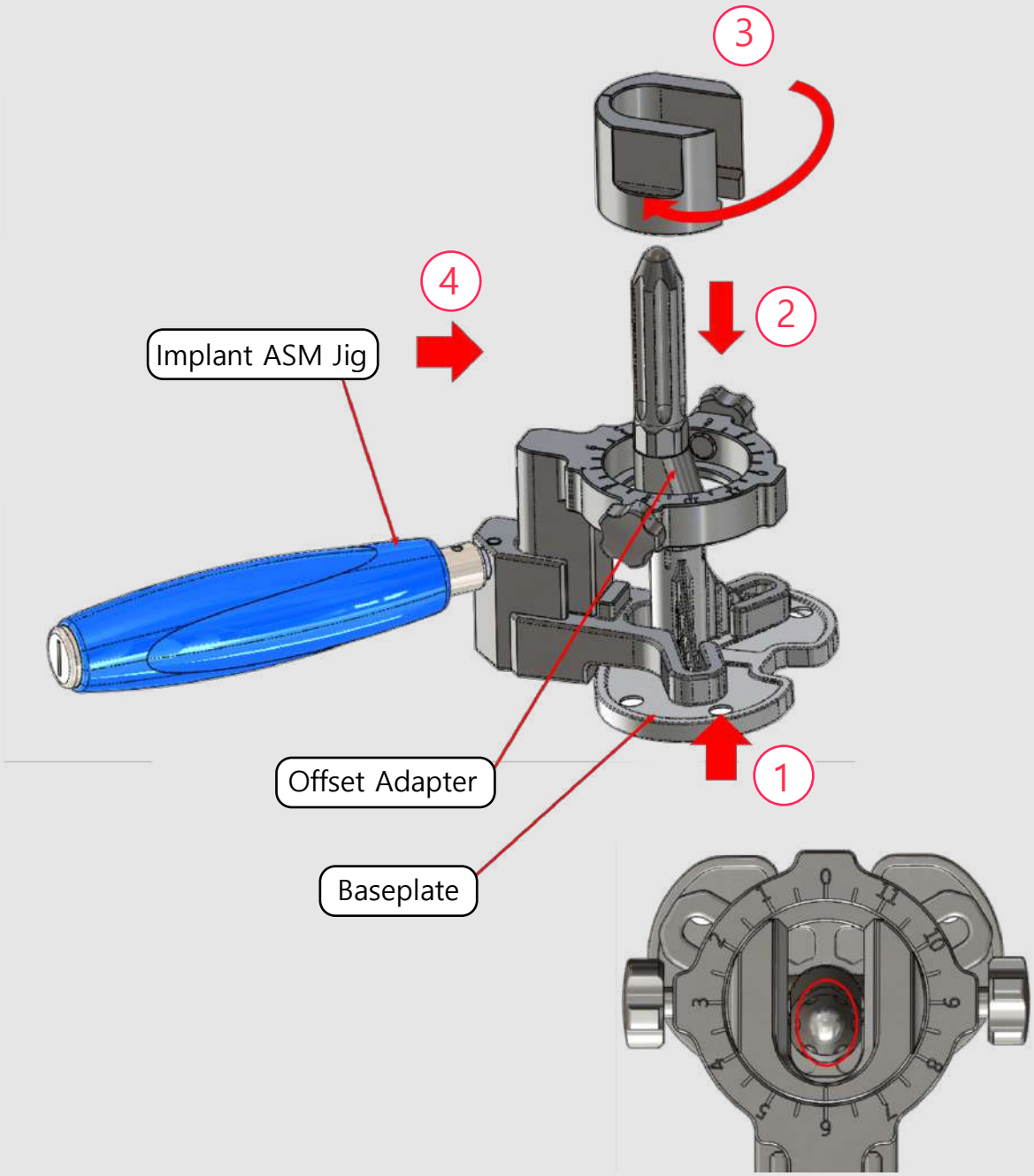


Rotate to get desired Offset and use bolt for firm fixation. Confirm position with Laser marking at anterior portion of Tibial Plate. Offset Adaptor should be facing closed direction of offset dial instrument.

To assembly the tibia half augment, use Torque Driver. 7N Torque Limit handle will make sound while no further force is transferred when torque is reached.



6. Implantation *-Continued*



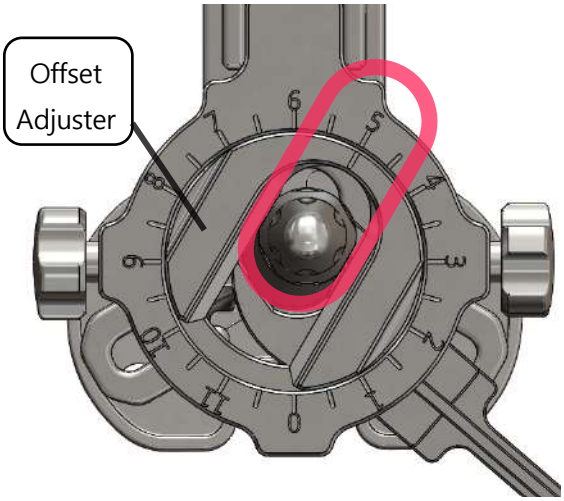
6. Implantation *-Continued*

Tibial Offset Direction Setting

Step 1.
Rotate the Offset Bush to position appropriately and read the number indicated by the arrow in the Baseplate Holder.

Step 2.
Be sure to check the Posterior direction of the Keel Trial and adjust the number when assembling the Tibia, Femur Trial and Offset Adaptor Trial.

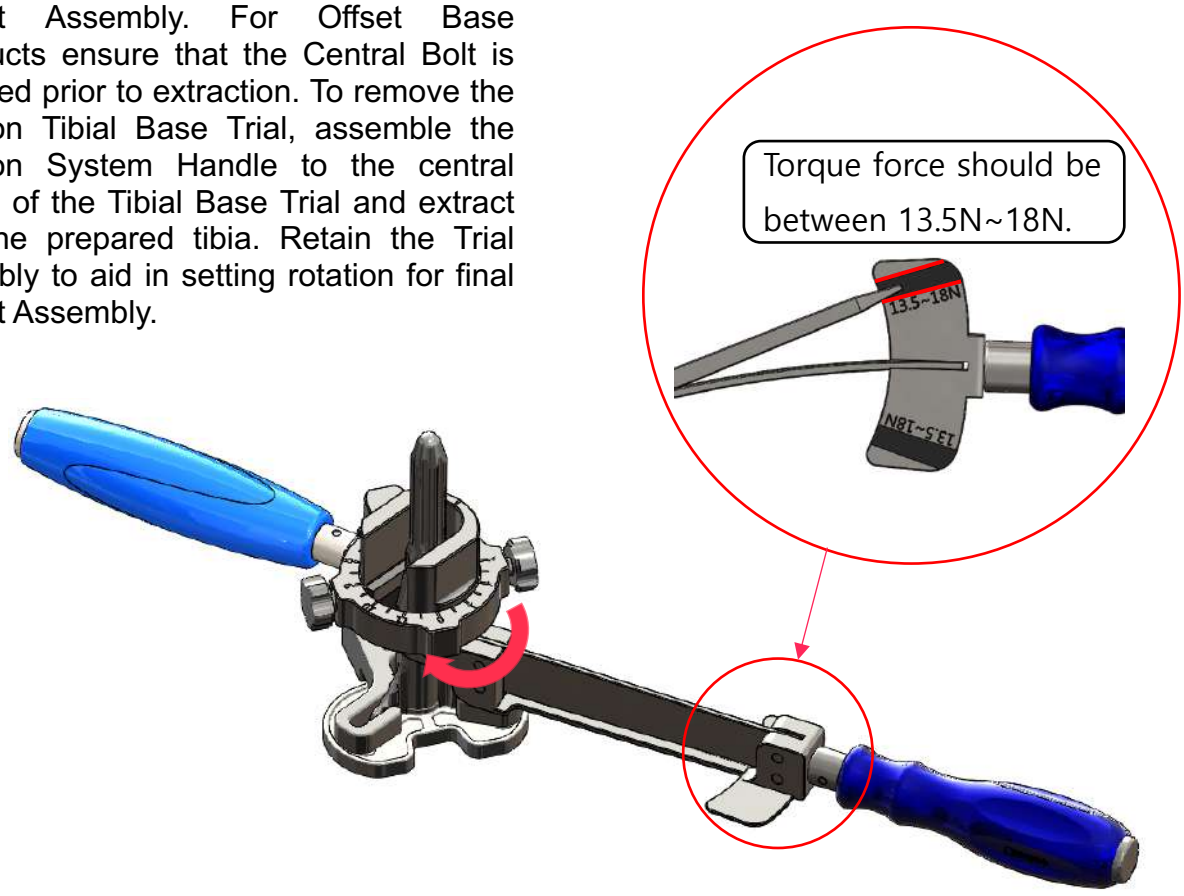
Step 3.
Assemble the assembly jig adjuster so that the offset faces the blocked direction.



6. Implantation *-Continued*

Femoral Implant Assembly

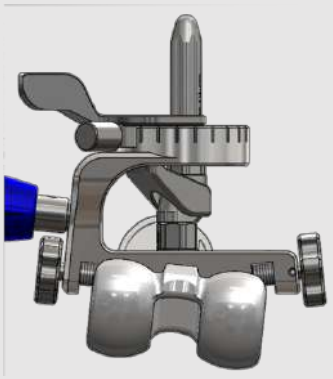
When using an Offset Adaptor ensure that the Central Bolt is tightened prior to extraction. To remove the Femoral Trial Assembly, assemble the Femoral Extractor to the Central Bolt feature of the Femoral Box Trial and extract from the prepared femur. If necessary, the Slap Hammer may be assembled to the Femoral Extractor to aid in Trial removal. Retain the Trial Assembly to aid in setting rotation for final Implant Assembly. For Offset Base constructs ensure that the Central Bolt is tightened prior to extraction. To remove the Revision Tibial Base Trial, assemble the Revision System Handle to the central feature of the Tibial Base Trial and extract from the prepared tibia. Retain the Trial Assembly to aid in setting rotation for final Implant Assembly.



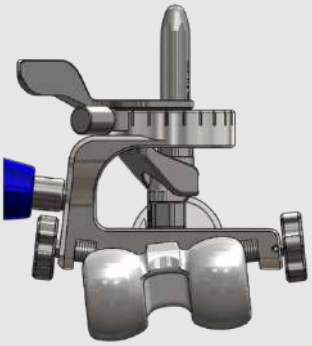
6. Implantation *-Continued*

Femoral Implant Assembly

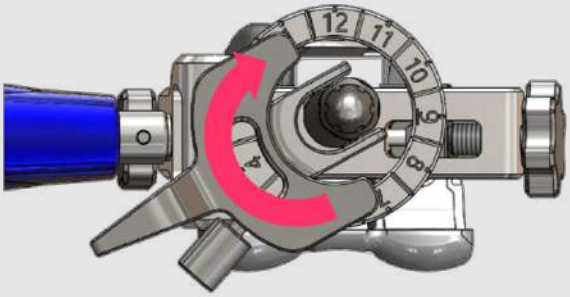
Assemble the Offset Adaptor and Stem extension first and attach to Femoral Component as shown. Rotate the Knob to fixate Implant position. Attach the Offset Dial from above. If diameter of Stem is large tilt the construct for attachment. Rotate to get desired Offset and use bolt for firm fixation. Confirm position With laser marking through reading window.

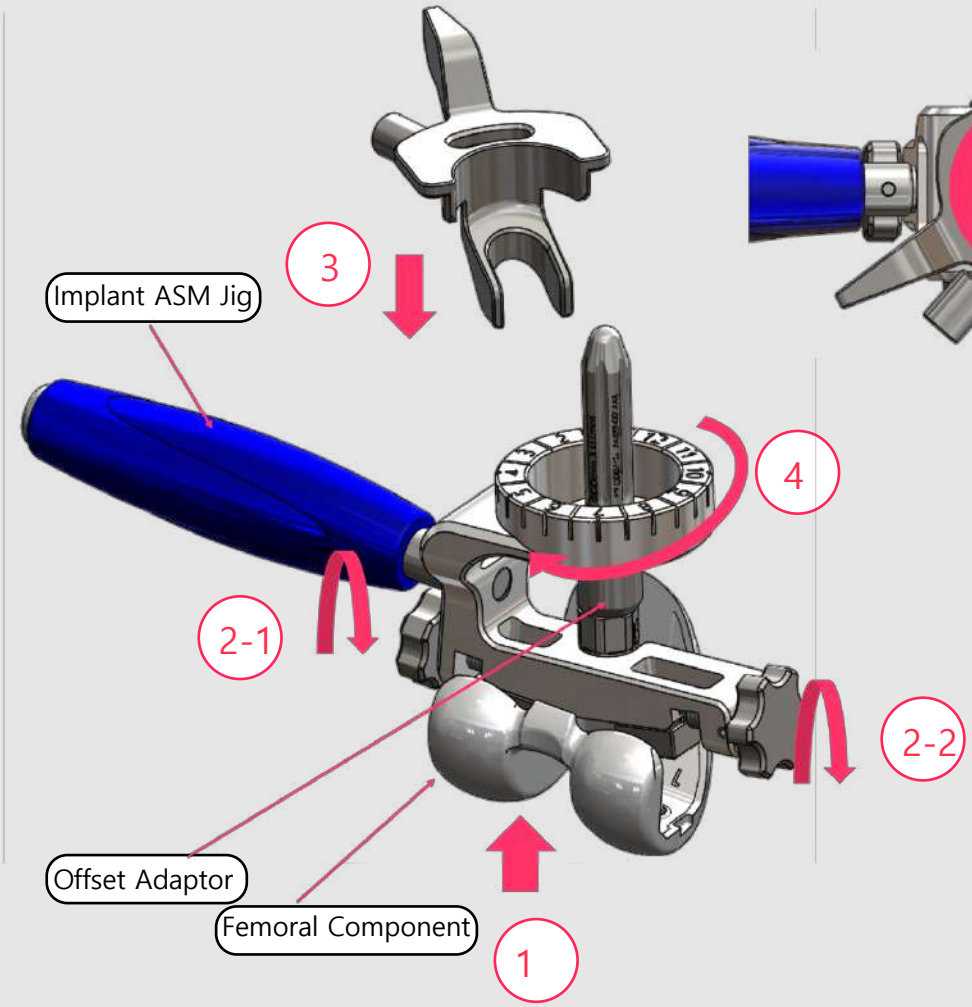


Left



Right

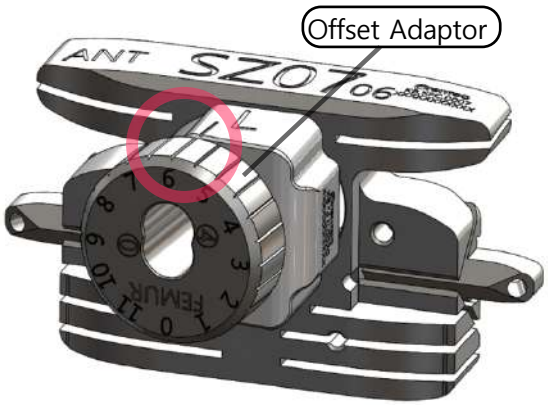




6. Implantation *-Continued*

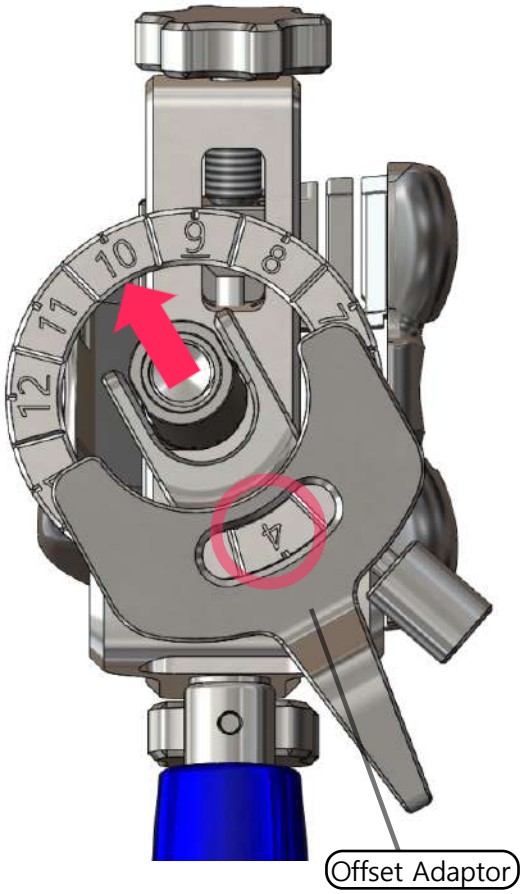
Femoral Offset Direction Setting

Step 1.
Rotate the Offset Bush to position appropriately and read the number indicated by the arrow.



Step 2.
The numbers shall be numbered and assembled according to the Posterior direction of the Femur Trial.(Both Femur R & L are based on the posterion direction)

Step 3.
Assemble the assembly jig adjuster so that the offset faces the blocked direction.



6. Implantation *-Continued*

Posterior Augment

Distal Augment

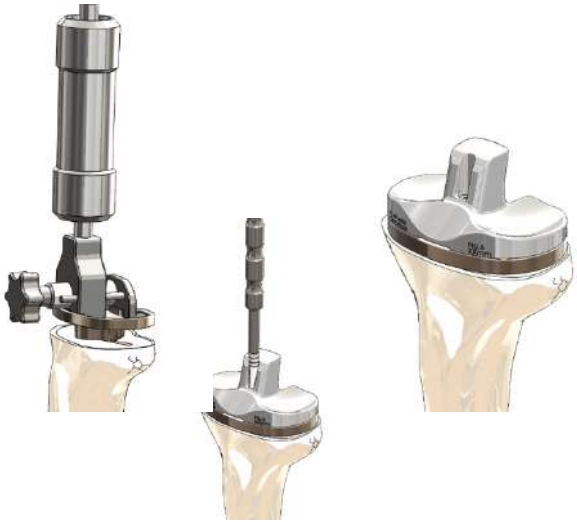
Implantation

If needed, further prepare resected bone surfaces using an osteotome, oscillating saw, or bone file. The femur and tibial components (with or without augmentations) need to be cemented. The cementing technique is the responsibility of the surgeon. After the implants have been chosen, one last check is recommended to ensure that all components match.

Use the Femur Holder to insert the femur stem assembly. After cementing, insert the tibial implant onto the tibia. Impact it with a hammer. Remove excess cement carefully. After cementing, insert the Femur with the aid of the Femur Holder and impact it with the Femoral Impactor.

The femoral condyles of the Femur must be protected to prevent any scratching. Remove excess cement carefully. It is strongly recommended to give extra care to remove cement along the proximal portion of the femoral component and the femoral box. The surface of the tibial plateau must be cleaned.

Instead of inserting the final PE-Inlay, it might be advisable to insert a suitable PE Trial Inlay during the hardening of the bone cement. After hardening, the PE Trial Inlay must be removed. Afterwards, the correct PE-Inlay must be inserted. Insert the locking rod and impact it with the Impactor.



6. Implantation *-Continued*

Tibial Insert Removal

7. **Patella Preparation**

Sizing

Once the sizing of the femur and tibia is appropriate then attention should be turned to the patella. If the patella component has not been removed, and it is deemed necessary, then take great care to remove the patella component without sacrificing bone. Disruption of the cement polyethylene surface prior to removing the cement from the bone will often result in less bone loss. Measure the thickness of the patella. Patellar thickness is measured using the patellar caliper. An estimate of the patellar diameter can be obtained by using the patellar sizing guide. Patellar diameters of 26, 28, 30, 32, 34, 36 are available. (Figure 1)

Figure 1

Figure 2

Figure 3

Cutting

Patellar Resection Guide provides accurate, repeatable measurement of patellar resection. As the patellar is clamped in the jaws of the resection guide, the amount of resection is read. (Remaining patellar thickness after cutting)The Patellar clamp saw capture slots accommodate an 1.27mm saw blade. (Figure 2-3)

Peg Holes Drill

The holes for the 3pegs on the patellar are prepared using the patellar clamp with Peg Drill Guide loaded. *(Figure 4-5)* The patellar surface and the back of the patellar component should be coated with cement. The patellar clamp is then used to compress the patellar component firmly onto the patellar. Excess cement should be removed.

Figure 4

Figure 5

8. Closure & Postoperative Care

The experienced surgeon will be familiar with closure of the wound and this includes, but is not limited to, reconstruction of anatomy, hemostasis, accurate re-approximation of the subcutaneous tissue to relieve tension from the skin closure and then accurate closure of the skin followed by light compression of the wound.
Of note is that the quality of bone and fixation to the bone will guide the experienced orthopedic surgeon in postoperative care. The common approach is to start early ambulation and range of motion. The weight bearing status is determined by the surgeon using experienced judgment regarding bone quality and fixation.

9. Size Combination Chart

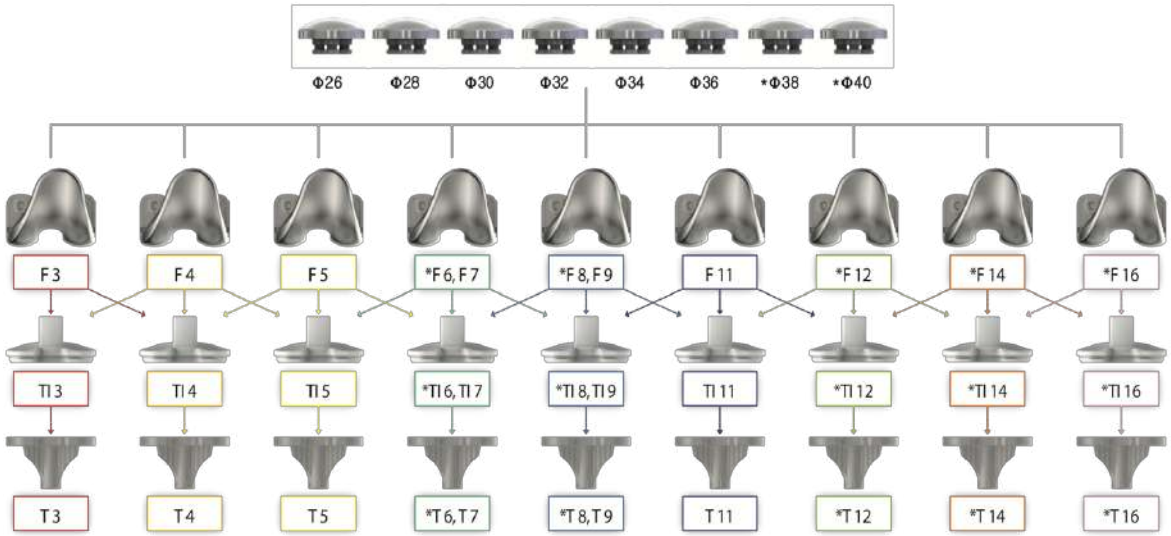
Bearing Couple

* : Special order

Tibial inserts	Femoral components										
	F3 51AP/59ML	F4 54AP/62ML	F5 57AP/65ML	*F6 60AP/65ML	F7 60AP/68ML	*F8 63AP/68ML	F9 63AP/71ML	F11 66AP/74ML	*F12 69AP/74ML	*F14 72AP/77ML	*F16 75AP/80ML
TI3 40AP/61ML	●										
TI4 42AP/64ML		●									
TI5 44AP/67ML			●								
*T6 45AP/70ML				●	●						
TI7 46AP/72ML				●	●						
*TI8 48AP/72ML						●	●				
TI9 48AP/74ML						●	●				
TI11 50AP/76ML								●			
*TI12 52AP/81ML									●		
*TI14 56AP/84ML										●	
*TI16 58AP/86ML											●

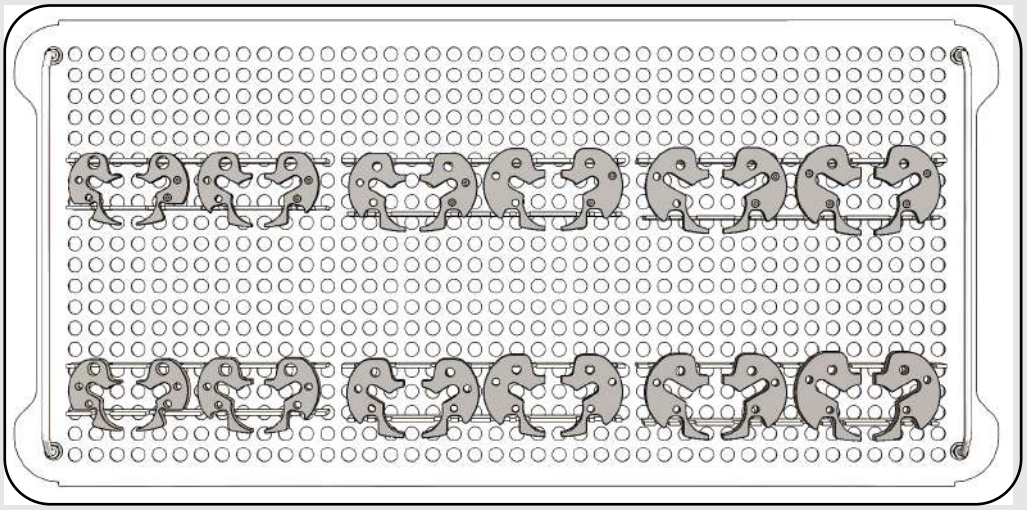
Size Combination Chart

* : Special order



10. Instrument Ordering Information

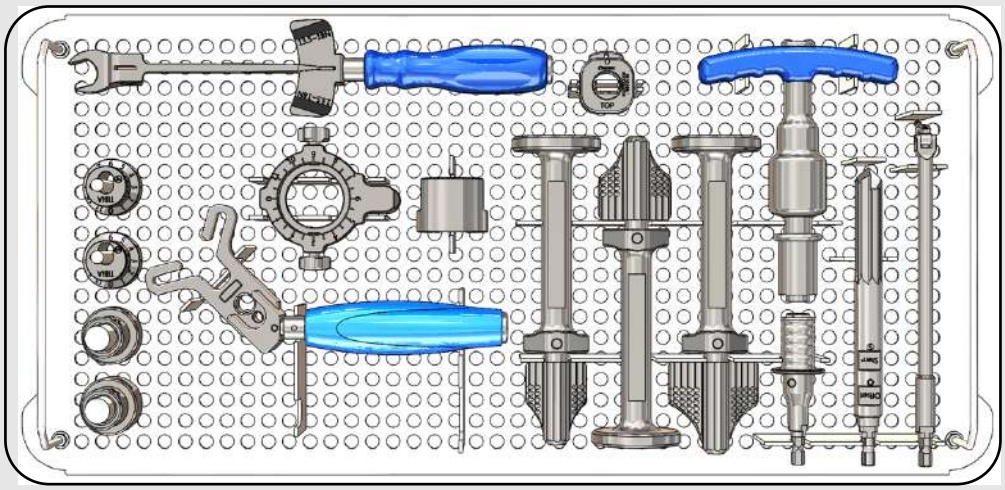
KC.TBT.0004 Tibia Augment Tray



No	Part. No	Description
1	KD.STT.L305	Tibial Augment LL/RM SZ3_5mm
2	KD.STT.L310	Tibial Augment LL/RM SZ3_10mm
3	KD.STT.L405	Tibial Augment LL/RM SZ4_5mm
4	KD.STT.L410	Tibial Augment LL/RM SZ4_10mm
5	KD.STT.L505	Tibial Augment LL/RM SZ5_5mm
6	KD.STT.L510	Tibial Augment LL/RM SZ5_10mm
7	KD.STT.L705	Tibial Augment LL/RM SZ7_5mm
8	KD.STT.L710	Tibial Augment LL/RM SZ7_10mm
9	KD.STT.L905	Tibial Augment LL/RM SZ9_5mm
10	KD.STT.L910	Tibial Augment LL/RM SZ9_10mm
11	KD.STT.LB05	Tibial Augment LL/RM SZ11_5mm
12	KD.STT.LB10	Tibial Augment LL/RM SZ11_10mm
13	KD.STT.M305	Tibial Augment LM/RL SZ3_5mm
14	KD.STT.M310	Tibial Augment LM/RL SZ3_10mm
15	KD.STT.M405	Tibial Augment LM/RL SZ4_5mm
16	KD.STT.M410	Tibial Augment LM/RL SZ4_10mm
17	KD.STT.M505	Tibial Augment LM/RL SZ5_5mm
18	KD.STT.M510	Tibial Augment LM/RL SZ5_10mm
19	KD.STT.M705	Tibial Augment LM/RL SZ7_5mm
20	KD.STT.M710	Tibial Augment LM/RL SZ7_10mm
21	KD.STT.M905	Tibial Augment LM/RL SZ9_5mm
22	KD.STT.M910	Tibial Augment LM/RL SZ9_10mm
23	KD.STT.MB05	Tibial Augment LM/RL SZ11_5mm
24	KD.STT.MB10	Tibial Augment LM/RL SZ11_10mm

10. Instrument Ordering Information *-Continued*

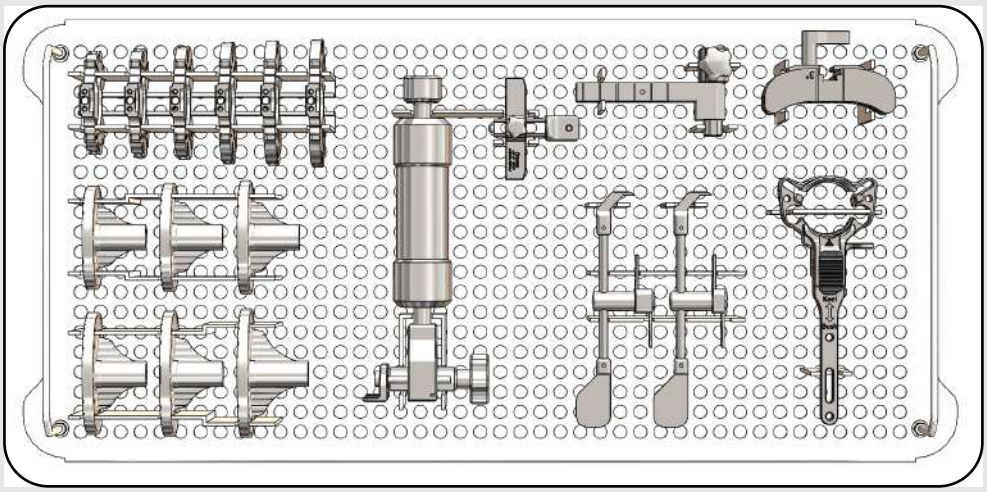
KC.TBS.0001 Tibia Inner Tray 1



No	Part. No	Description
1	HA.01E.0001	Universal Screw Driver (Hip_Instrument)
2	KB.SG0.0020	Modular Shared Drill
3	KB.SG0.0021	Modular Shared Drill Stopper
4	KB.SG0.0019	Torque limit handle (7N)
5	KB.SG0.0023	Torque limit handle 7N
5	KB.STC.0011	Tibial Keel Punch (S)
6	KB.STC.0012	Tibial Keel Punch (M)
7	KB.STC.0013	Tibial Keel Punch (L)
8	KB.ST0.0002	Tibial Implant Jig
10	KB.SG0.0005	Torque Wrench
11	KB.SGA.0104	Offset Bush guide 0mm, 4mm
12	KB.SGA.0126	Offset Bush guide 2mm, 6mm
13	KB.STC.0008	Boss Drill guide SZ3-9
14	KB.STC.0009	Boss Drill guide SZ11-16

10. Instrument Ordering Information *-Continued*

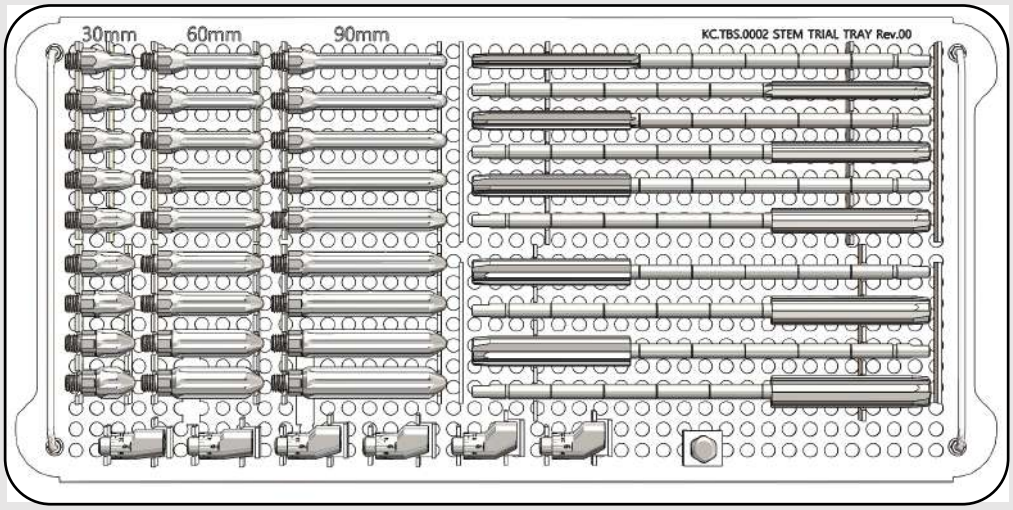
KC.TBT.0003 Tibia Inner Tray 2



No	Part. No	Description
1	KB.STA.0002	Stylus
2	KB.STA.0005	Stylus 2, 10mm
3	KB.STC.0001	Tibial resection guide
4	KB.STA.0007	Baseplate holder (신형)
5	KB.STT.0023	Baseplate Keel Trial SZ3
6	KB.STT.0024	Baseplate Keel Trial SZ4
7	KB.STT.0025	Baseplate Keel Trial SZ5
8	KB.STT.0027	Baseplate Keel Trial SZ7
9	KB.STT.0029	Baseplate Keel Trial SZ9
10	KB.STT.0031	Baseplate Keel Trial SZ11
11	KB.STT.0103	Baseplate Trial SZ3
12	KB.STT.0104	Baseplate Trial SZ4
13	KB.STT.0105	Baseplate Trial SZ5
14	KB.STT.0107	Baseplate Trial SZ7
15	KB.STT.0109	Baseplate Trial SZ9
16	KB.STT.0111	Baseplate Trial SZ11
17	KB.STA.0001	Tibial IM Guide
18	KB.STC.0010	AUGMENT CUTTING GUIDE
19	KB.STA.0006	BASEPLATE TRIAL REMOVER

10. Instrument Ordering Information *-Continued*

KC.TBS.0002 Stem Trial Tray

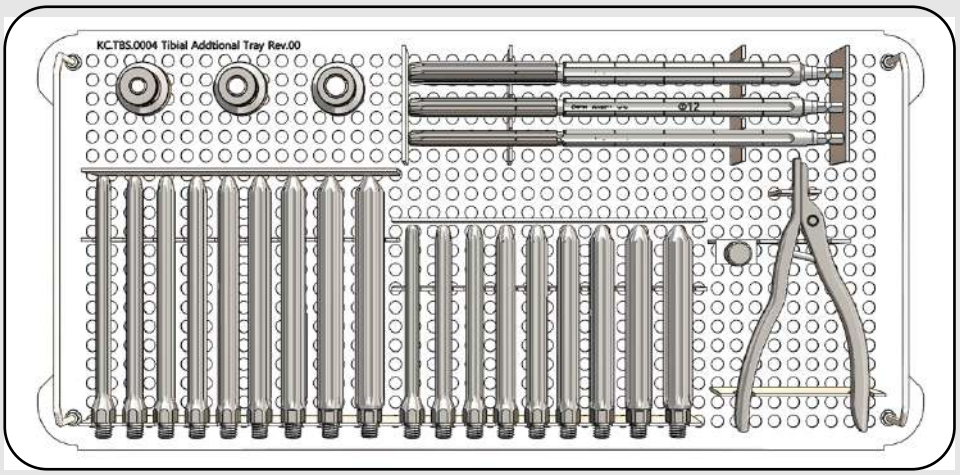


No	Part. No	Description
1	KB.SG0.0009	Offset Reamer Φ9
2	KB.SG0.0010	Offset Reamer Φ10
3	KB.SG0.0011	Offset Reamer Φ11
4	KB.SG0.0012	Offset Reamer Φ12
5	KB.SG0.0013	Offset Reamer Φ13
6	KB.SG0.0014	Offset Reamer Φ14
7	KB.SG0.0015	Offset Reamer Φ15
8	KB.SG0.0016	Offset Reamer Φ16
9	KB.SG0.0017	Offset Reamer Φ17
10	KB.SG0.0018	Offset Reamer Φ18
11	KB.SGT.0903	Stem Extension Trial Φ9 30mm
12	KB.SGT.0906	Stem Extension Trial Φ9 60mm
13	KB.SGT.0909	Stem Extension Trial Φ9 90mm
14	KB.SGT.1003	Stem Extension Trial Φ10 30mm
15	KB.SGT.1006	Stem Extension Trial Φ10 60mm
16	KB.SGT.1009	Stem Extension Trial Φ10 90mm
17	KB.SGT.1103	Stem Extension Trial Φ11 30mm
18	KB.SGT.1106	Stem Extension Trial Φ11 60mm
19	KB.SGT.1109	Stem Extension Trial Φ11 90mm
20	KB.SGT.1203	Stem Extension Trial Φ12 30mm
21	KB.SGT.1206	Stem Extension Trial Φ12 60mm
22	KB.SGT.1209	Stem Extension Trial Φ12 90mm
23	KB.SGT.1303	Stem Extension Trial Φ13 30mm
24	KB.SGT.1306	Stem Extension Trial Φ13 60mm

10. Instrument Ordering Information *-Continued*

No	Part. No	Description
25	KB.SGT.1309	Stem Extension Trial Φ13 90mm
26	KB.SGT.1403	Stem Extension Trial Φ14 30mm
27	KB.SGT.1406	Stem Extension Trial Φ14 60mm
28	KB.SGT.1409	Stem Extension Trial Φ14 90mm
29	KB.SGT.1603	Stem Extension Trial Φ16 30mm
30	KB.SGT.1606	Stem Extension Trial Φ16 60mm
31	KB.SGT.1609	Stem Extension Trial Φ16 90mm
32	KB.SGT.1803	Stem Extension Trial Φ18 30mm
33	KB.SGT.1806	Stem Extension Trial Φ18 60mm
34	KB.SGT.1809	Stem Extension Trial Φ18 90mm
35	KB.SGT.0002	Offset Adaptor Trial 2mm
36	KB.SGT.0004	Offset Adaptor Trial 4mm
37	KB.SGT.0006	Offset Adaptor Trial 6mm
38	KB.SGT.0009	Stem Plug trial

KC.TBS.0004 Tibial Additional Tray



No	Part. No	Description
1	KB.SG0.0510	Φ10 Stem Extension Drill Guide
2	KB.SG0.0512	Φ12 Stem Extension Drill Guide
3	KB.SG0.0514	Φ14 Stem Extension Drill Guide
4	KB.SG0.0110	Reamer Φ10
5	KB.SG0.0112	Reamer Φ12

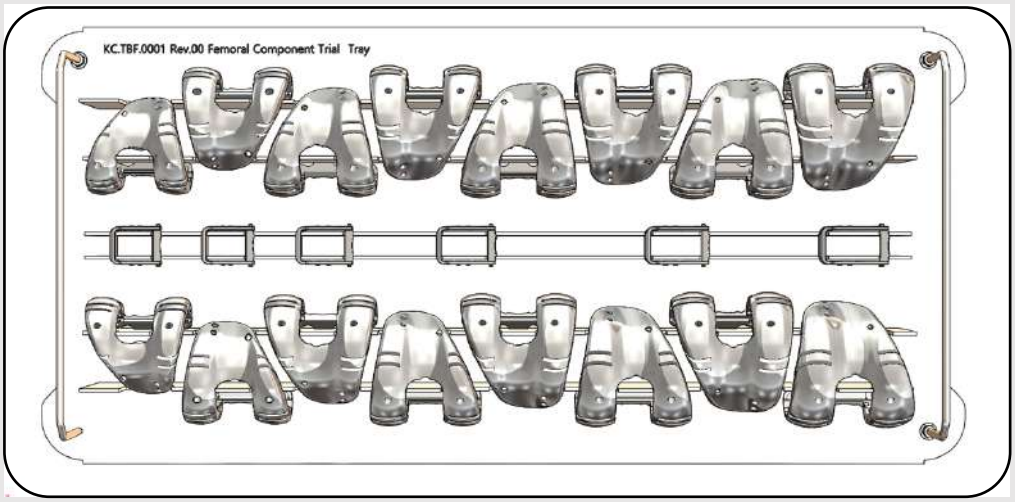
10. Instrument Ordering Information *-Continued*

No	Part. No	Description
6	KB.SG0.0114	Reamer Φ14
7	KB.SGT.0912	Stem Extension Trial Φ9 120mm
8	KB.SGT.0915	Stem Extension Trial Φ9 150mm
9	KB.SGT.1012	Stem Extension Trial Φ10 120mm
10	KB.SGT.1015	Stem Extension Trial Φ10 150mm
11	KB.SGT.1112	Stem Extension Trial Φ11 120mm
12	KB.SGT.1115	Stem Extension Trial Φ11 150mm
13	KB.SGT.1212	Stem Extension Trial Φ12 120mm
14	KB.SGT.1215	Stem Extension Trial Φ12 150mm
15	KB.SGT.1312	Stem Extension Trial Φ13 120mm
16	KB.SGT.1315	Stem Extension Trial Φ13 150mm
17	KB.SGT.1412	Stem Extension Trial Φ14 120mm
18	KB.SGT.1415	Stem Extension Trial Φ14 150mm
19	KB.SGT.1612	Stem Extension Trial Φ16 120mm
20	KB.SGT.1615	Stem Extension Trial Φ16 150mm
21	KB.SGT.1812	Stem Extension Trial Φ18 120mm
22	KB.SGT.1815	Stem Extension Trial Φ18 150mm
23	KB.ST0.0003	Tibia insert remover
24	KB.ST0.0004	Tibia insert remover Bolt

Instruments included in the Tibia Tray		
No	Part. No	Description
1	KA.SG0.0039	Hexa driver
2	01.61.171-0400	Tibial EM Subassy
3	KB.SG0.0002	3.5HEX_AUG Wrench

10. Instrument Ordering Information *-Continued*

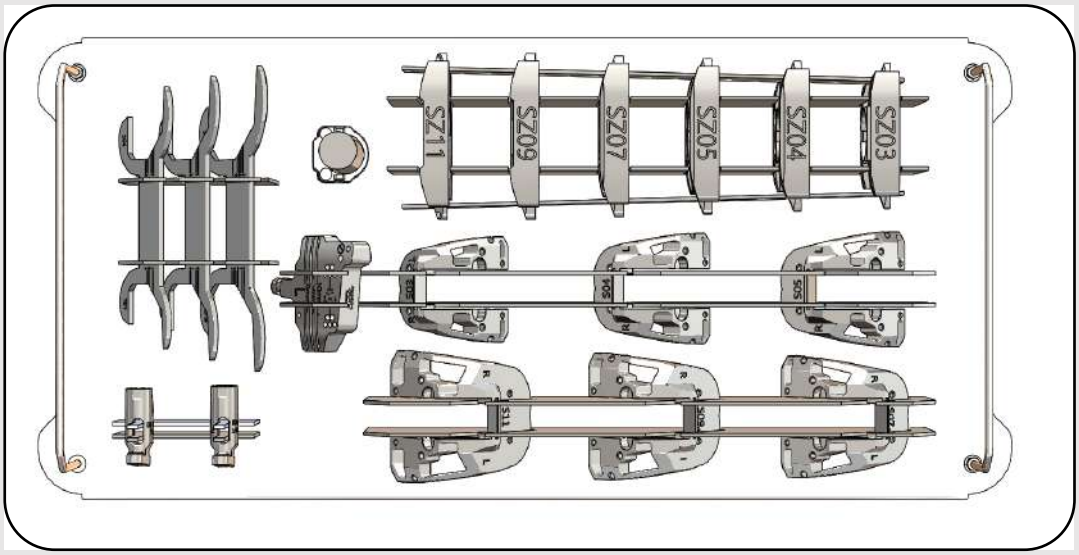
KC.TBF.0001 Femoral Component Trial Tray



No	Part. No	Description
1	KB.SFT.0003	Femoral Component Trial L #03
2	KB.SFT.0004	Femoral Component Trial L #04
3	KB.SFT.0005	Femoral Component Trial L #05
4	KB.SFT.0006	Femoral Component Trial L #06
5	KB.SFT.0007	Femoral Component Trial L #07
6	KB.SFT.0008	Femoral Component Trial L #08
7	KB.SFT.0009	Femoral Component Trial L #09
8	KB.SFT.0011	Femoral Component Trial L #11
9	KB.SFT.0103	Femoral Component Trial R #03
10	KB.SFT.0104	Femoral Component Trial R #04
11	KB.SFT.0105	Femoral Component Trial R #05
12	KB.SFT.0106	Femoral Component Trial R #06
13	KB.SFT.0107	Femoral Component Trial R #07
14	KB.SFT.0108	Femoral Component Trial R #08
15	KB.SFT.0109	Femoral Component Trial R #09
16	KB.SFT.0111	Femoral Component Trial R #11
17	KB.SFT.0203	Femoral Component Trial-PS Box #03
18	KB.SFT.0204	Femoral Component Trial-PS Box #04
19	KB.SFT.0205	Femoral Component Trial-PS Box #05
20	KB.SFT.0207	Femoral Component Trial-PS Box #06/07
21	KB.SFT.0209	Femoral Component Trial-PS Box #08/09
22	KB.SFT.0211	Femoral Component Trial-PS Box #11

10. Instrument Ordering Information *-Continued*

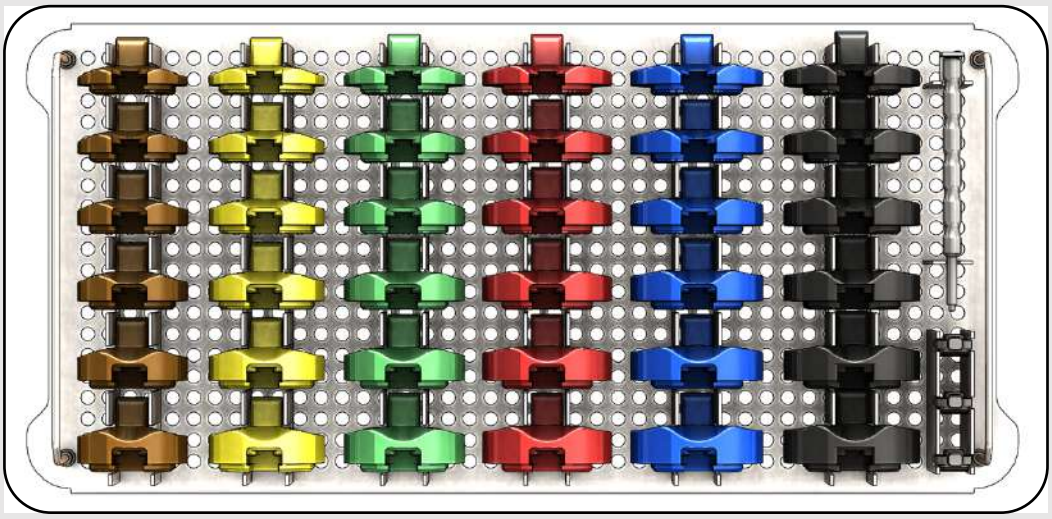
KC.TBC.0001 Cutting Guide Tray



No	Part. No	Description
1	KB.SFC.0003	AP Cutting Guide #03
2	KB.SFC.0004	AP Cutting Guide #04
3	KB.SFC.0005	AP Cutting Guide #05
4	KB.SFC.0007	AP Cutting Guide #07
5	KB.SFC.0009	AP Cutting Guide #09
6	KB.SFC.0011	AP Cutting Guide #11
7	KB.SFC.0103	PS Box Cutting Guide #03
8	KB.SFC.0104	PS Box Cutting Guide #04
9	KB.SFC.0105	PS Box Cutting Guide #05
10	KB.SFC.0107	PS Box Cutting Guide #07
11	KB.SFC.0109	PS Box Cutting Guide #09
12	KB.SFC.0111	PS Box Cutting Guide #11
13	KB.SFC.0001	Distal Cutting Guide
14	KB.SFC.0020	Guide Adaptor
15	KB.SFC.0201	PS Box cutting guide-Stem #03
16	KB.SFC.0202	PS Box cutting guide-Stem #04~13
17	KB.SFM.0002	Femoral Template #03, #04
18	KB.SFM.0003	Femoral Template #05, #06/07
19	KB.SFM.0004	Femoral Template #8, 9, #11

10. Instrument Ordering Information *-Continued*

KC.TBT.0001 Tibial Insert Trial Tray

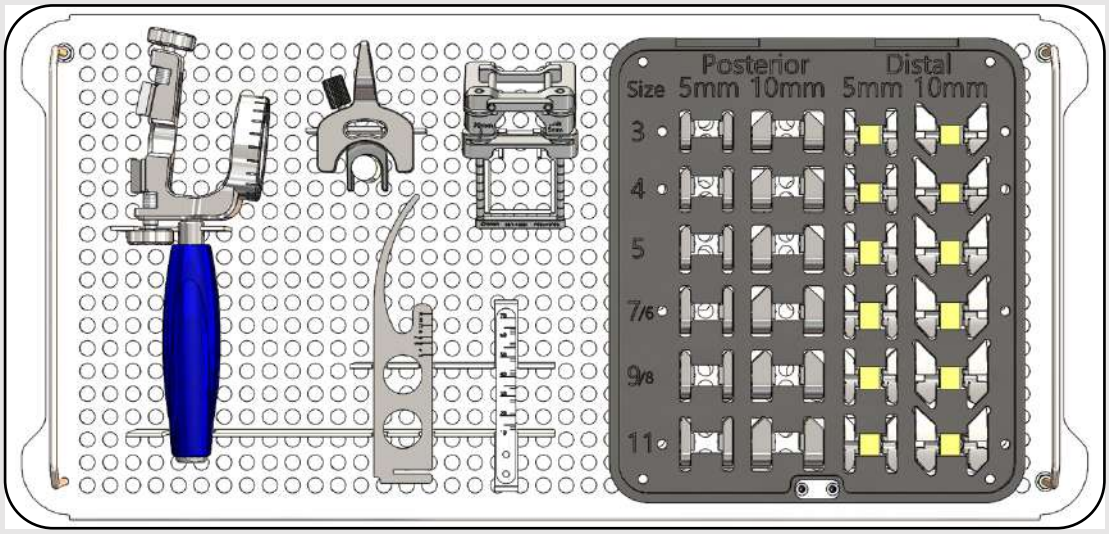


No	Part. No	Description
1	KB.STT.0310	Insert Trial 03 10mm
2	KB.STT.0312	Insert Trial 03 12mm
3	KB.STT.0314	Insert Trial 03 14mm
4	KB.STT.0316	Insert Trial 03 16mm
5	KB.STT.0318	Insert Trial 03 18mm
6	KB.STT.0320	Insert Trial 03 20mm
7	KB.STT.0410	Insert Trial 04 10mm
8	KB.STT.0412	Insert Trial 04 12mm
9	KB.STT.0414	Insert Trial 04 14mm
10	KB.STT.0416	Insert Trial 04 16mm
11	KB.STT.0418	Insert Trial 04 18mm
12	KB.STT.0420	Insert Trial 04 20mm
13	KB.STT.0510	Insert Trial 05 10mm
14	KB.STT.0512	Insert Trial 05 12mm
15	KB.STT.0514	Insert Trial 05 14mm
16	KB.STT.0516	Insert Trial 05 16mm
17	KB.STT.0518	Insert Trial 05 18mm
18	KB.STT.0520	Insert Trial 05 20mm
19	KB.STT.0710	Insert Trial 07 10mm
20	KB.STT.0712	Insert Trial 07 12mm
21	KB.STT.0714	Insert Trial 07 14mm
22	KB.STT.0716	Insert Trial 07 16mm
23	KB.STT.0718	Insert Trial 07 18mm
24	KB.STT.0720	Insert Trial 07 20mm
25	KB.STT.0910	Insert Trial 09 10mm

10. Instrument Ordering Information *-Continued*

No	Part. No	Description
26	KB.STT.0912	Insert Trial 09 12mm
27	KB.STT.0914	Insert Trial 09 14mm
28	KB.STT.0916	Insert Trial 09 16mm
29	KB.STT.0918	Insert Trial 09 18mm
30	KB.STT.0920	Insert Trial 09 20mm
31	KB.STT.1110	Insert Trial 11 10mm
32	KB.STT.1112	Insert Trial 11 12mm
33	KB.STT.1114	Insert Trial 11 14mm
34	KB.STT.1116	Insert Trial 11 16mm
35	KB.STT.1118	Insert Trial 11 18mm
36	KB.STT.1120	Insert Trial 11 20mm
37	KB.STT.0001	Insert Trial Locking Adaptor
38	KB.ST0.0001	Locking rod Impactor

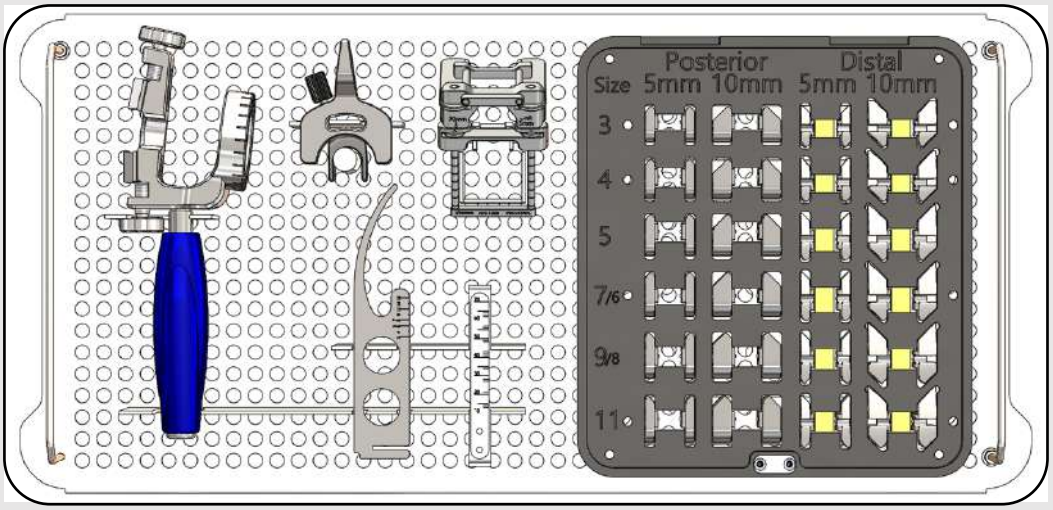
KC.TBS.0003 Shared & etc Tray



No	Part. No	Description
1	KB.SF0.0001	Femur Implant ASM JIG
2	KB.SFM.0001	Joint Line Guide
3	KB.SG0.0022	ANGEL WING ML_SIZE CHECKER
4	KB.SFA.0001	ER Guide
5	KC.TBS.0003-A1	Augment Trial Case

10. Instrument Ordering Information *-Continued*

KC.TBS.0003-A1 Augment Trial Case



No	Part. No	Description
1	KD.SFT.0305	Femoral Distal Augment Trial #03 05mm
2	KD.SFT.0405	Femoral Distal Augment Trial #04 05mm
3	KD.SFT.0505	Femoral Distal Augment Trial #05 05mm
4	KD.SFT.0705	Femoral Distal Augment Trial #06/07 05mm
5	KD.SFT.0905	Femoral Distal Augment Trial #08/09 05mm
6	KD.SFT.1105	Femoral Distal Augment Trial #11 05mm
7	KD.SFT.0310	Femoral Distal Augment Trial #03 10mm
8	KD.SFT.0410	Femoral Distal Augment Trial #04 10mm
9	KD.SFT.0510	Femoral Distal Augment Trial #05 10mm
10	KD.SFT.0710	Femoral Distal Augment Trial #06/07 10mm
11	KD.SFT.0910	Femoral Distal Augment Trial #08/09 10mm
12	KD.SFT.1110	Femoral Distal Augment Trial #11 10mm
13	KD.SFT.2305	Femoral Posterior Augment Trial #03 05mm
14	KD.SFT.2405	Femoral Posterior Augment Trial #04 05mm
15	KD.SFT.2505	Femoral Posterior Augment Trial #05 05mm
16	KD.SFT.2705	Femoral Posterior Augment Trial #06/07 05mm
17	KD.SFT.2905	Femoral Posterior Augment Trial #08/09 05mm
18	KD.SFT.3105	Femoral Posterior Augment Trial #11 05mm
19	KD.SFT.2310	Femoral Posterior Augment Trial #03 10mm
20	KD.SFT.2410	Femoral Posterior Augment Trial #04 10mm
21	KD.SFT.2510	Femoral Posterior Augment Trial #05 10mm
22	KD.SFT.2710	Femoral Posterior Augment Trial #06/07 10mm
23	KD.SFT.2910	Femoral Posterior Augment Trial #08/09 10mm
24	KD.SFT.3110	Femoral Posterior Augment Trial #11 10mm