ORTHO DEVELOPMENT®

BKS TriMax®

SURGICAL TECHNIQUE

The following technique is a general guide for instrumentation of the BKS TriMax. It is assumed that the surgeon is already familiar with the fundamentals of total knee replacement. Each patient represents an individual case that may require modification of the technique according to the surgeon's judgment and experience.

Please see the Balanced Knee® System Instructions for Use (IFU) for intended uses, indications, device description, contraindications, precautions, warnings and potential risks.

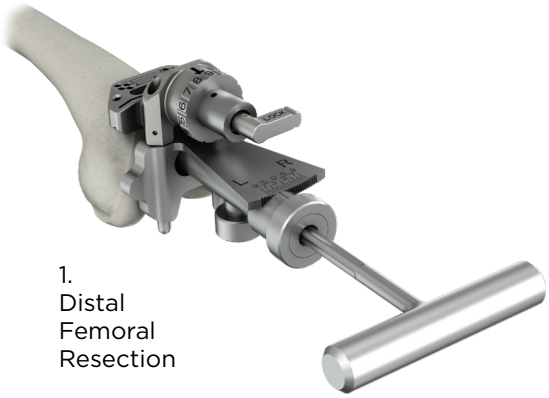
U.S. Federal Law restricts this device to sale by or on the order of a physician.

BKS TRIMAX
DESIGNING SURGEONS:

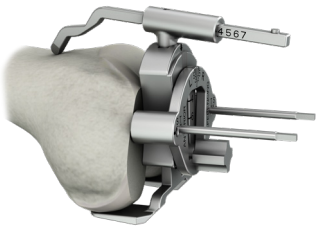
FRIEDRICH BOETTNER, M.D. P.C.
HOSPITAL FOR SPECIAL SURGERY
NEW YORK, NEW YORK

NATHAN G. MOMBERGER, M.D.
THE ORTHOPEDIC SPECIALTY CLINIC (TOSH)
SALT LAKE CITY, UTAH

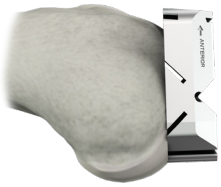
Surgical Technique Overview



1.
Distal
Femoral
Resection



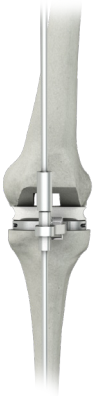
2.
Femoral
Sizing



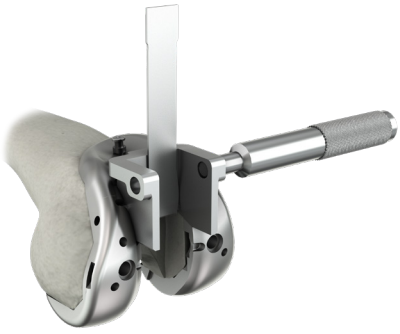
3.
Femoral
Cuts

4.
Proximal
Tibial Resection

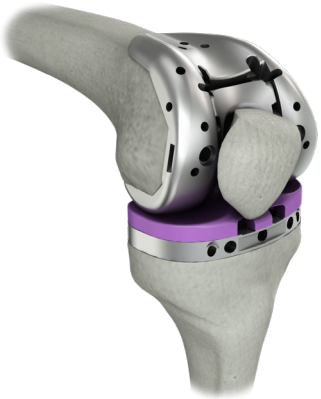
5.
Patella
Preparation



6.
Soft Tissue Balancing
and Equalizing
Flexion/Extension Gaps



7.
Finishing
Cuts



8.
Trial
Reduction

9.
Tibial Keel
Preparation

10.
Final
Implantation

BKS TriMax System Overview

The BKS TriMax® follows Ortho Development's philosophy of Evolutionary Innovation by making refinements to the best, clinically proven technologies. BKS TriMax builds upon Ortho Development's clinical heritage of the Balanced Knee System. The BKS TriMax provides a comprehensive system of implants and surgical instruments that help deliver surgical efficiency and patient satisfaction.

BKS TriMax was designed with the following objectives in mind:

- Reproducible clinical outcomes based upon proven clinical results
- Simple and intuitive instrumentation
- Bone conserving open box design
- E-Vitalize® Vitamin E HXLPE to maximize wear performance
- Accommodate up to 150° of flexion

1. Preoperative Planning

Templates with a 10% magnification are provided for use with preoperative x-rays (Figure 1). Digital Templates are also available through several digital templating software providers. Please consult your Ortho Development sales representative for information on digital templating.

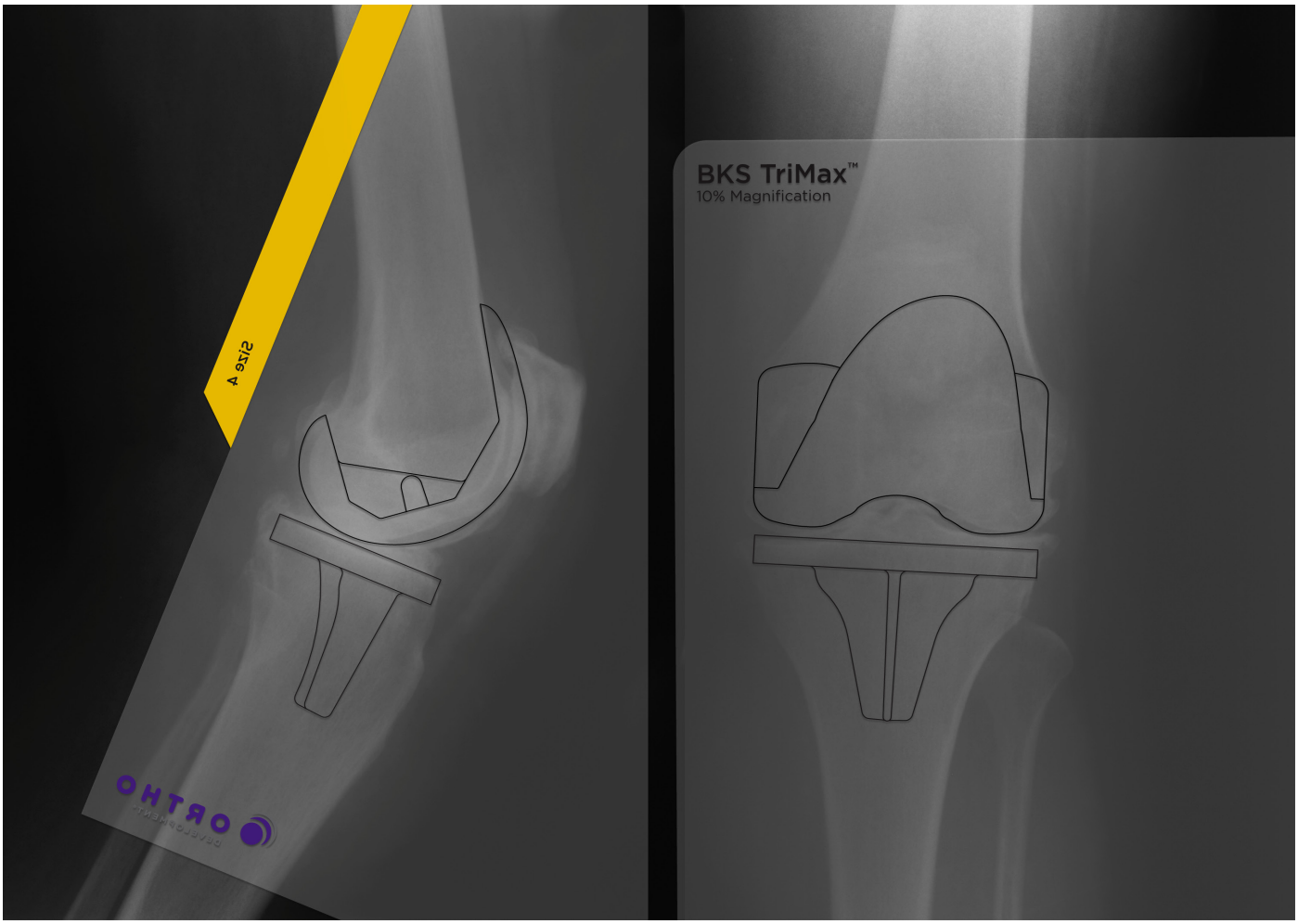


Figure 1: Template overlaid on radiograph

Figure 2:
Entering the
Medullary Canal

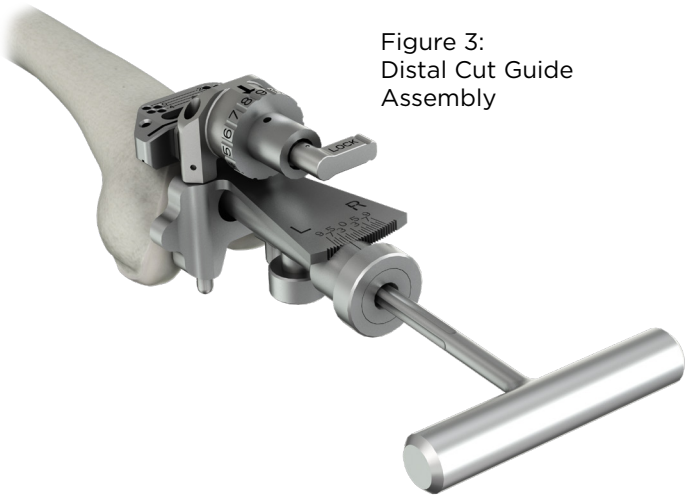


Figure 3:
Distal Cut Guide
Assembly

2. Exposure

A number of different surgical exposures to the knee exist. This technique will illustrate a standard anterior medial parapatellar approach. As cases warrant, alternative approaches such as the midvastus, subvastus, or lateral parapatellar approaches may be selected based on the patient's preoperative deformity and assessment of soft tissues.

3. Entering the Medullary Canal

Use the 8mm I/M Stepped Drill to access the medullary canal. The entry point is generally located superior and just medial to the roof of the intercondylar notch (Figure 2). Make certain that the Stepped Drill is aligned axially to the femoral canal.

4. I/M Alignment

Assemble the Distal Resection Guide to the Distal Resection Guide Scaffolding and tighten the locking lever. Attach the Distal Resection Guide Scaffolding to the I/M Alignment Guide and slowly insert it into the medullary canal (Figure 3). Continue to advance the T-Handle far enough into the femoral canal to ensure the most accurate placement for replication of the anatomic axis. Verification of proper T-Handle placement can be confirmed by placing the T-Handle to the level of the isthmus. Maintaining alignment of the I/M Alignment Guide parallel to the anatomical axis in the sagittal plane during insertion will help to avoid placing the Femoral Component in flexion. Set and lock the I/M Alignment Guide at the appropriate valgus angle, as determined preoperatively. The valgus angle is the angle between the mechanical and the anatomical axis of the femur (Figure 4). An increased valgus angle may be selected in cases of femoral varus deformity or increased hip offset. The BKS TriMax accommodates a wide range of valgus correction. As a general rule, a valgus angle of 5° is appropriate. This angle may be adjusted depending on individual anatomy and can be set from 0° to 9°, in 1° increments (Figure 5).

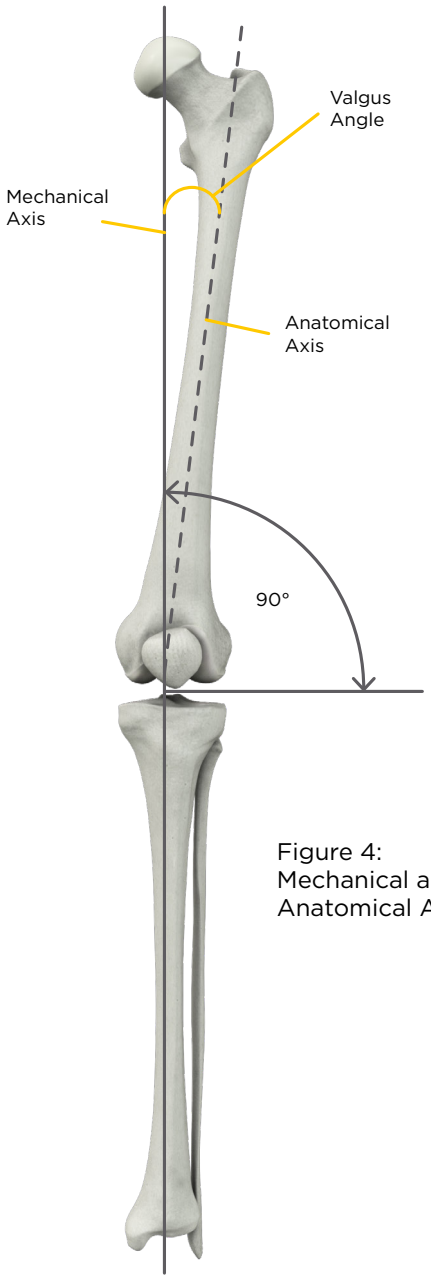


Figure 4:
Mechanical and
Anatomical Axes

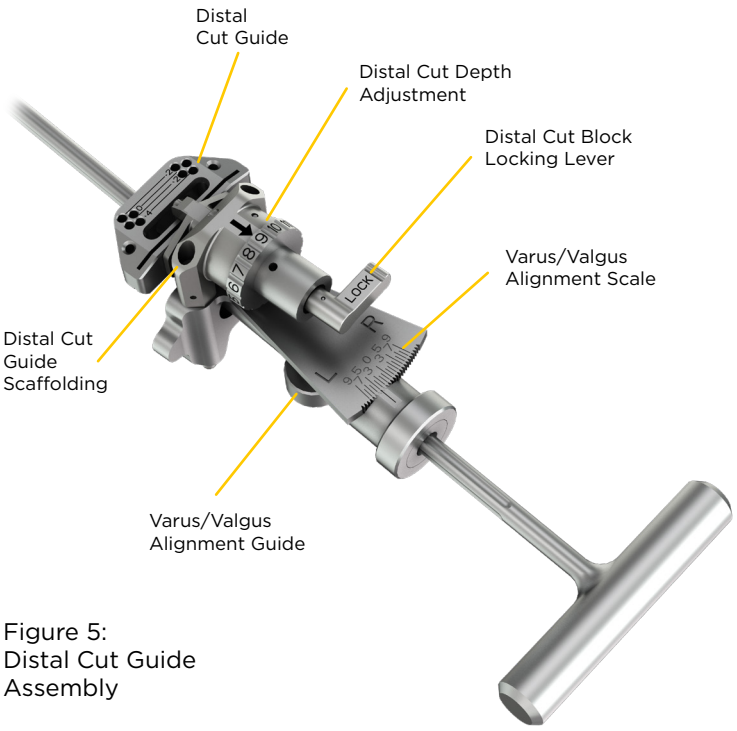


Figure 5:
Distal Cut Guide
Assembly

Figure 6:
Distal Cut Guide
Assembly on the
Anterior Cortex

Figure 7:
Distal Resection
Guide in place

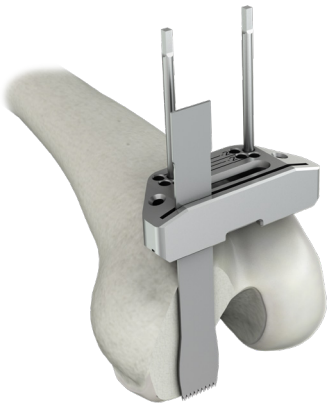


Figure 8:
Distal Femoral
Resection

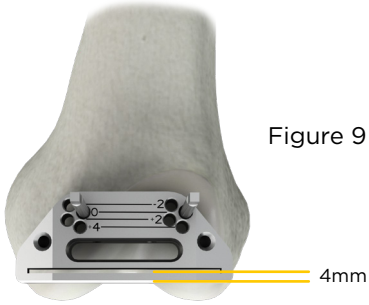


Figure 9

5. Distal Femoral Resection

Adjust the amount of distal femoral resection by rotating the adjustment knob on the Distal Resection Guide Scaffolding (Figure 5). The distal thickness of the femoral component is 9mm, therefore, it is recommended that the distal resection be 9mm.

Once the appropriate resection level is set, fix the Distal Resection Guide to the anterior cortex using two Fixation Pins through the zero holes (Figure 6). The additional 2mm incremental holes on the Distal Resection Guide are used if more or less distal femoral resection is needed. These holes may also be used to place the Distal Resection Guide back onto the anterior cortex if the femur needs to be recut. If additional fixation is necessary, place a Fixation Pin through the oblique hole on the Cutting Block.

Remove the T-Handle, I/M Alignment Guide, and the Distal Resection Guide Scaffolding, leaving only the pinned Distal Resection Guide in place (Figure 7). Use an oscillating saw and a 1.27mm thick blade to resect the distal femur (Figure 8). Check the cut surface for accuracy.

Note: If a non-captured cut is desired, the top of the resection guide may be used. The difference between the captured and non-captured is 4mm (Figure 9). If cutting off the non-captured surface, adjust the guide +4mm (for a 9mm cut set the guide to 13mm).

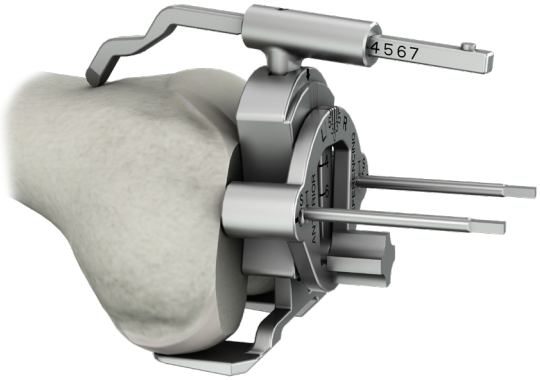


Figure 10:
Anterior Referencing
Sizing Guide

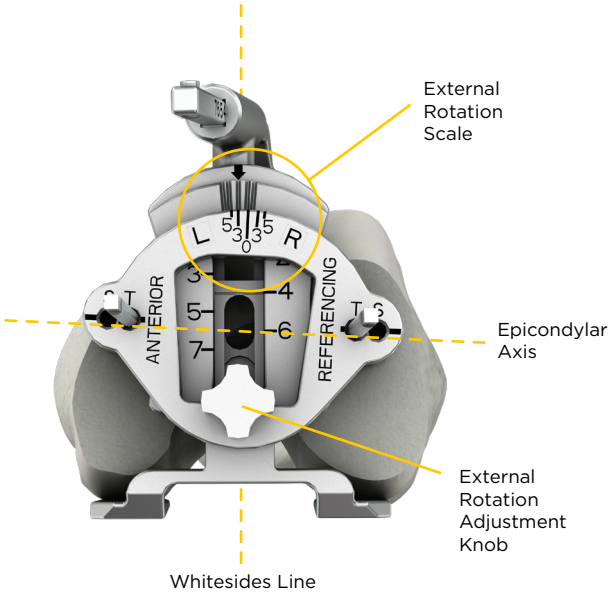


Figure 11:
Anterior Referencing
Sizing Guide

6. Anterior Referencing Femoral Sizing and External Rotation

Place the Anterior Referencing Sizing Guide against the resected surface of the distal femur with the paddles contacting at least one of the posterior condyles. To avoid notching, position the Stylus on the anterior cortex of the femur. Push the Stylus down until it contacts the anterior cortex. Check to ensure that the Stylus is not seated on a high or low point on the anterior cortex. Ensure the Anterior Referencing Sizing Guide is still flush against the distal resected surface (Figure 10). Make note of the size indicated on the Anterior Referencing Sizing Guide. If the measurement is between sizes, begin with the larger component since the component can be downsized later.

The Anterior Referencing Sizing Guide allows the Femoral Component to be placed in 0°, 3°, or 5° of external rotation relative to the normal posterior femoral condyles (Figure 11). Alternatively, external rotation may be set manually by aligning the vertical boom of the Stylus and/or the slot in the middle of the Sizer in line with the epicondylar axis (Figure 11).

With the guide flush on the bone, place two Fixation Pins through the inside holes of the Anterior Referencing Sizing Guide. Make certain the Stylus is still in contact with the anterior cortex. Rotate the Stylus away from the anterior cortex and remove the Anterior Referencing Sizing Guide, leaving the Fixation Pins in place.

Note: The holes in the Anterior Referencing Sizing Guide are marked with T (inside hole), and S (outside hole). T = TriMax, S = Standard BKS (Figure 11).

Figure 12:
Anterior Referencing
Cutting Block

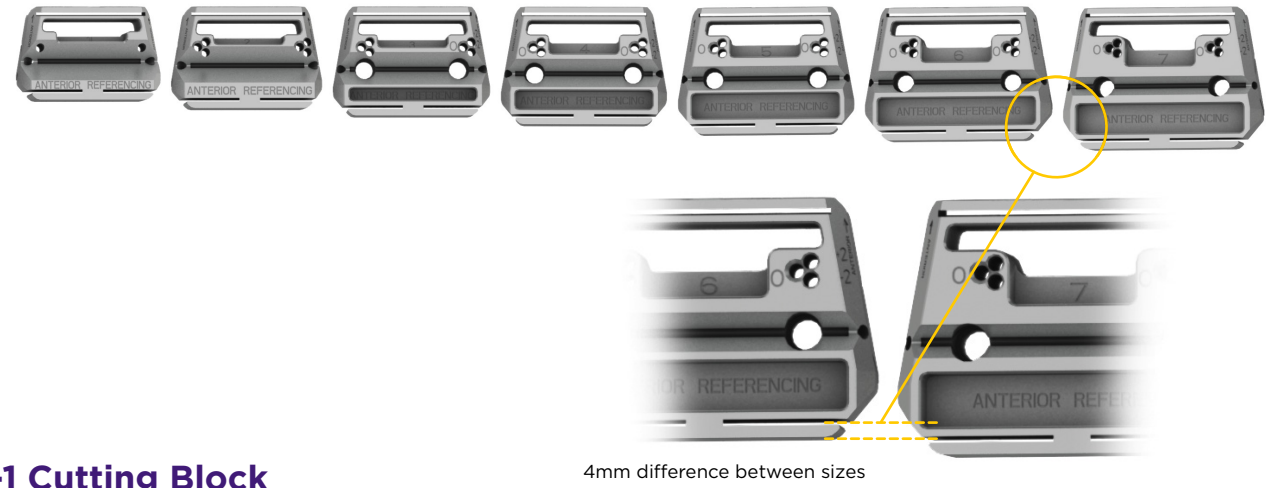


Figure 13:
Anterior Referencing
Cutting Block Size
Range

7. 4-in-1 Cutting Block

Anterior Referencing

Select the 4-in-1 Anterior Referencing Cutting Block as previously determined by the Anterior Referencing Sizing Guide. Slide the Block over the Fixation Pins through the holes marked “0” (Figure 12). The Cut Feeler Gage may be used to measure the intended resection level. The Anterior Referencing Cutting Block may be raised or lowered by ±2mm if more, or less anterior femoral resection is desired. Prior to bone resection, Fixation Pins are placed through the oblique fixation holes before removing the Pins to allow for chamfer cuts. The distance from the pinholes to the anterior cutting surface is the same throughout all sizes.

The distance from the pinholes to the posterior cutting surface increases by 4mm from one size to the next (Figure 13). This allows for intraoperative options for flexion gap assessment and component sizing.

The following order of bone cuts is recommended: 1. Anterior Cortex 2. Posterior Condyles 3. Posterior Chamfer 4. Anterior Chamfer. Use an oscillating saw with a 1.27mm blade to make the resections (Figure 14). The TriMax Femoral Component has a posterior condyle thickness of 11mm.

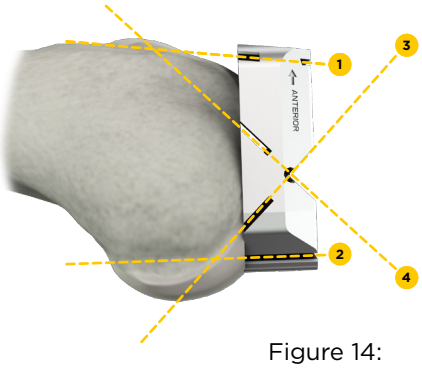


Figure 14:
Femoral Cuts

8. Proximal Tibial Resection

Assemble the Tibial Resection Guide by placing the Ankle Clamp into the Proximal Tibial Guide. Attach the 0° Tibial Cut Guide to the guide assembly. With the knee in flexion, position the Tibial Alignment Guide assembly by securing the Ankle Clamp around the distal tibia, just superior to the malleoli. Align the proximal end of the Tibial Alignment Guide over the medial third of the tibial tubercle. Position and secure the proximal end of the Tibial Alignment Guide with a Fixation Pin through the pin slot. Assemble the Stylus onto the Tibial Cut Guide and lower the guide until the Stylus contacts the tibial plateau (Figure 15). Adjustments can be made using the Tibial Stylus and/or the gold adjustment knob, center the adjustment pin at the etch mark to maximize adjustability (Figure 16).

It is recommended to resect 10mm from the unaffected side of the proximal tibia or 2mm from the deficient side of the proximal tibia. See Appendix A (page 15) for additional Varus/Valgus technique. The resection amount is a conservative estimation and may require re-cutting once flexion and extension gaps are evaluated. A 5° Tibial Cut Guide is also available. When the 5° Cut Guide is used, the Tibial Alignment Guide should be positioned parallel to the axis of the tibia in order to create a cut surface with 5° of posterior slope. When considering the appropriate posterior slope, note that the Tibial Tray and Tibial Insert do not have slope built in. Avoid excessive slope since this can impact A/P stability and extension in a PS knee. The Tibial Alignment Guide facilitates a proximal tibia resection that is perpendicular to the longitudinal axis of the tibia and replicates the native posterior slope.

Adjustments to the posterior slope are made by sliding the Ankle Clamp anterior or posterior, until the cutting slot of the Tibial Cut Guide is parallel to the native slope of the tibia. The Ankle Clamp can also be translated in the coronal plane to make the resection perpendicular to the shaft of the tibia, and/or to correct varus/valgus deformities. When aligning the guide in the coronal plane, it is important to align it to the longitudinal axis of the tibia, not the leg.

Secure the Tibial Cut Guide with the Fixation Pins in the "0" holes to accommodate additional resections of +2mm or +4mm if needed. Remove the Stylus, and resect the proximal tibia using an oscillating saw with a 1.27mm blade (Figure 17).

Note: Care should be taken to protect the medial, lateral, and posterior structures. It is recommend to use a posterior femoral retractor to sublux the tibia forward.

Figure 15:
Tibial Cut Guide
Assembly

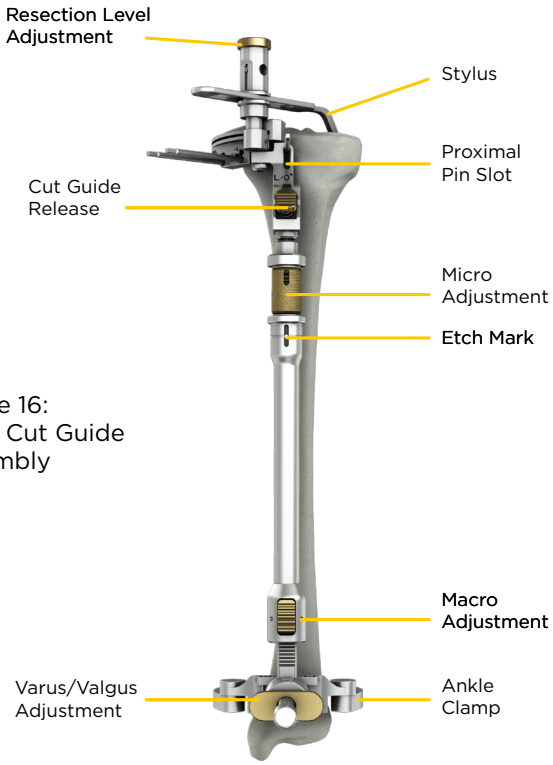


Figure 16:
Tibial Cut Guide
Assembly

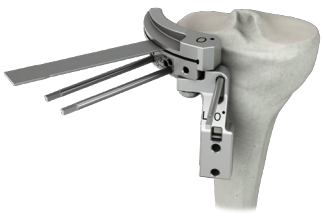


Figure 17:
Tibial Cut
Guide

Figure 18:
Patella Calipers

9. Patella Preparation

Use the Patella Caliper to measure the thickness of the Patella (Figure 18). Use the Patella Sizing Template to select the Implant size that provides maximum coverage with no overhang. The amount of patella resection is determined by subtracting the thickness of the native patella from the thickness of the selected Implant (Figure 19). This number will be the final thickness of the native patella and is set on the Patella Resection Guide. It is recommended to leave 13-15mm of the patient's native patella. If the patella is very worn, consider resecting less bone. Clamp the patella in the Patella Resection Guide, ensuring that the paddle sits flush on the anterior surface of the patella (Figure 20). Tighten the guide completely and resect the patella using an oscillating saw (Figure 21). The Patella Caliper is used after the resection to verify the remaining patellar thickness and symmetry of the cut.

Use the Patella Sizing Template to verify the Implant size. Orient the template towards the medial side of the patella so that one hole is placed on the lateral patellar facet and the other two holes are placed on the medial patellar facet. Insert the Clamp through the slot on the Sizing Template to secure the Template to the resected patella surface. Drill the peg holes using the Patella Peg Drill (Figure 22). Be certain that the Patella Peg Drill bottoms out on the Patella Sizing Template.

Figure 19: Patella size chart

SIZE (Diameter)	**HEIGHT** (Thickness)
29mm	7.5mm
32mm	8.0mm
35mm	9.0mm
38mm	10.0mm
41mm	11.0mm

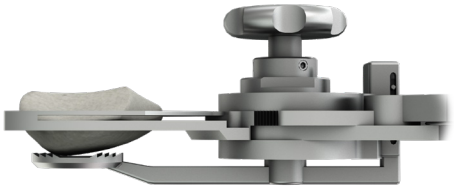


Figure 20:
Patellar Resection

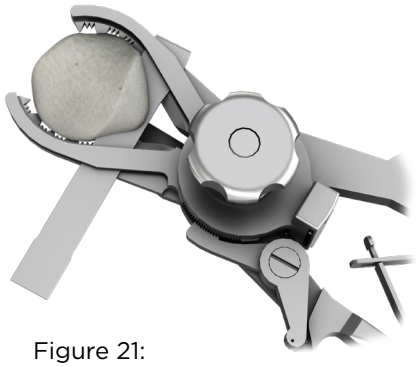


Figure 21:
Patellar Resection

Figure 22:
Drilling Peg Holes

10. Soft Tissue Balancing and Equalization of Flexion/ Extension Gaps

Remove all osteophytes along the tibial rim and femur. Address balancing of the soft tissues in conjunction with further bone resections. See Appendix B (page 15) for further discussion of soft tissue balancing.

Spacer Blocks are provided to assess the symmetry of the flexion and extension gaps. The flexion gap for the BKS TriMax is 2mm larger than the extension gap. Select flexion or extension on the Spacer Block Handle prior to evaluating the gap (Figure 25). Insert the assembly into the joint space at both 90º of flexion, and at full extension. The Alignment Rods are inserted through the Spacer Block Handle to verify appropriate alignment. With the knee flexed, the distal Alignment Rod may be used to assess the varus/valgus angle of the tibial cut (Figure 23). With the knee extended, the two Alignment Rods can be connected to assess the overall alignment of the knee relative to the mechanical axis (Figure 24). The goal is for the Alignment Rods to run from the center of the femoral head, through the center of the knee joint, to the center of the ankle joint i.e. normal mechanical axis.

Check the flexion and extension gaps with the Spacer Block/Handle assembly. The Spacer Block Handle adjusts to provide for the proper thickness in flexion and extension. The Spacer Block Handle assembly equals the Tibial Insert plus the Tibial Tray plus the thickness of the Femoral Component (Figure 25).

The size marked on the Spacer Blocks corresponds to the thickness of the Tibial Insert. Spacer Blocks are available up to 13mm. Tibial Inserts are available in the following sizes 7-14mm, 16mm (18mm and 20mm, UC and PS only).

Tighter in Extension than Flexion

If the knee is tight in extension but balanced in flexion, consider bone and soft tissue adjustments. Removing additional distal femur will increase the extension gap.

The Distal Cut Block can be placed back onto the femur using the existing pin holes and additional resection can be made in 2mm increments. Soft tissue releases may be made to increase the extension gap by releasing the posterior capsule from the femur.

Figure 23: Flexion Assessment

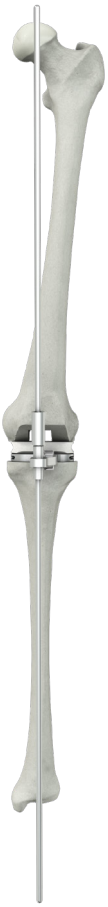


Figure 24: Extension Assessment

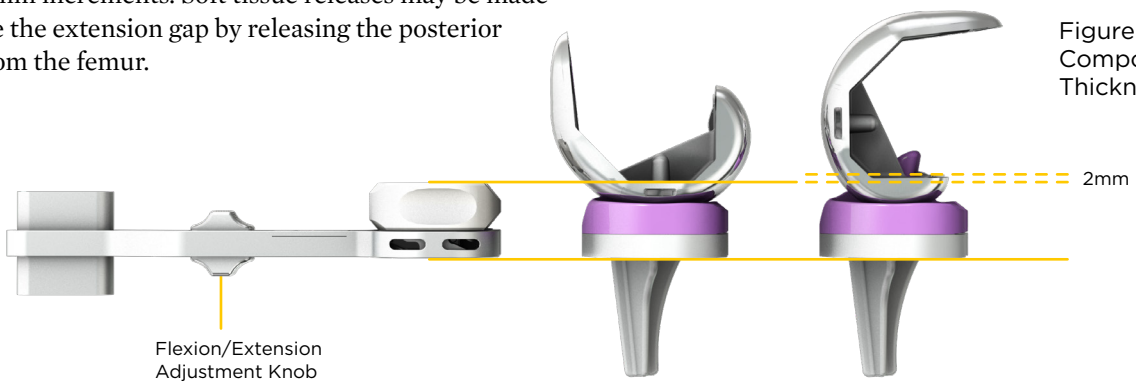


Figure 25: Component Thickness

10. Soft Tissue Balancing and Equalization of Flexion/ Extension Gaps, cont.

Tighter in Flexion than Extension

If the knee is tight in flexion but balanced in extension consider downsizing the Femoral Component. The Anterior Referencing 4-in-1 Cutting Block can be used to remove an additional 4mm from the posterior condyle, increasing the flexion gap by 4mm. By selecting the ±2mm holes the amount of posterior resection can be adjusted. If the pin holes cannot be identified, place pins in the laser marked holes on the Femoral Trial (Figure 26). These pins will allow the 4-in-1 Anterior Referencing Cutting Block to be put into the correct location for recutting. This option is only available using the anterior referencing system. If the PCL is present, a release will lengthen the ligament and open the flexion gap.

Note: For the posterior referencing system (Appendix C, page 16) use the -2mm holes and the next smaller cutting block to open the flexion gap by 2mm. Take care to avoid anterior notching.

Tight in both Flexion and Extension

If the smallest Spacer Block is tight in flexion and extension, additional bone may be resected from the proximal tibia, which will increase the flexion and extension gaps equally. Leave the Fixation Pins in place to facilitate re-cutting of the proximal tibia if necessary.

Figure 26:
Femoral Trial

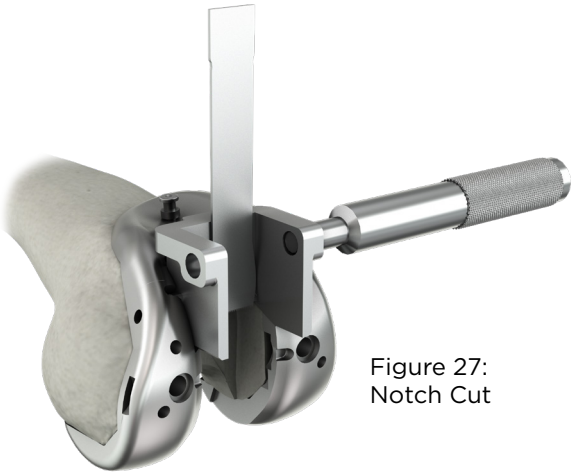


Figure 27:
Notch Cut

11. Femoral Component Positioning (M/L), Femoral Finishing Cuts

For PS Femoral Components Only

After obtaining soft tissue balance and equal flexion and extension gaps, secure the Femoral Trial into place with Fixation Pins. Box Cut Trials are available in three sizes: 2, 3, and 4-7. Assemble the Box Cutting Trial that corresponds to the Femoral Trial and cut the notch using a reciprocating saw (Figure 27). The Bone File may be used to ensure that the surfaces are planar.

For CR Femoral Components Only

Assemble the Trochlear Groove Insert (Figure 28). Use the Femoral Impactor/Extractor to seat the Trial, taking precaution to ensure the Trial does not move into flexion.

Figure 28:
Trochlear
Groove Insert

TIBIAL TRAY SIZE	FEMORAL COMPONENT SIZE					
	2	3	4N/4	5N/5	6	7
2	2	2				
3	3	3	3			
4		4	4	4		
5			5	5	5	
6				6	6	6
7					7	7

Figure 29:
Size Compatability Chart

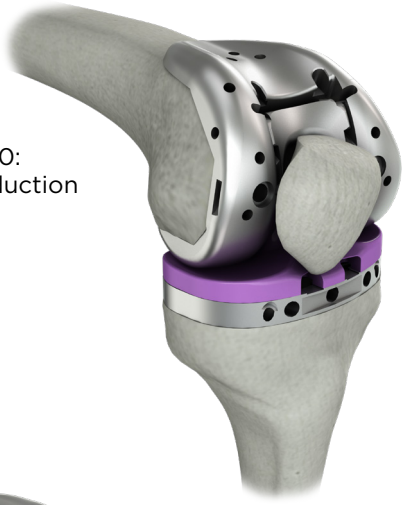


Figure 30:
Trial Reduction

12. Trial Reduction

With the Femoral Trial in place, and the knee in flexion, insert the Tibial Tray Trial and the Tibial Insert. The Femoral Component and Tibial Tray sizes can mismatch by one size, up or down (Figure 29). Perform a full range of motion check, noting medial and lateral stability, and overall A/P and M/L alignment of the Trials (Figure 30). Check final soft tissue balancing at this point and adjust accordingly. Attach the Tibial Trial Alignment Handle to the Tibial Tray Trial while in full extension. Use the handle to rotate the Tibial Insert Trial into congruency with the Femoral Trial. Use an electrocautery or other marking device to indicate on the tibia the congruent rotational position of the Tibial Tray Trial. In general, the midline of the anterior aspect of the Tibial Tray should be in line with the medial third of the tibial tubercle, and the Tibial Alignment Rod should align with the tibial spine. The two Alignment Rods may be inserted through the Tibial Trial Alignment Handle to re-check overall alignment.

Figure 31:
Femoral Lug Drill

13. Femoral Lug Drilling

Prepare for the lugs on the Femoral Component by using the Femoral Lug Drill through the distal holes on the Femoral Trial (Figure 31).

The Femoral Lug Drill will stop at the appropriate depth. Remove the Femoral Trial using the Slap Hammer Extractor (Figure 32).

Figure 32:
Slap Hammer Extractor

14. Tibial Keel Preparation

Remove the Tibial Insert Trial from the Tibial Tray Trial. Realign the Tibial Tray Trial with the rotational mark made during trial reduction. Secure the Tibial Tray Trial to the tibia with Fixation Pins (Figure 33). Please note the appropriate holes on the Tibial Tray Trial that should be used for the Headed Pins (Figure 33a).

Select the appropriate Tibial Punch size that corresponds to Tibial Tray Trial and attach it to the Punch Tower. Position the Posterior Pins into the corresponding holes of the Tibial Tray Trial, then tilt the Punch Tower anteriorly until the Tibial Punch Tower rests on the anterior rim of the Tibial Tray Trial (Figure 34). The Tibial Punch Tower will rest simultaneously on the 6 locations shown (Figure 34a). Use a mallet to drive the Tibial Punch into the proximal tibia until the etch line on the impaction shaft aligns with the top of the Punch Tower handle. The strike plate will not sit flush with the handle (Figure 35). If desired, the Punch can be released and trial reduction may be performed again with the fixed trial.

To remove the Punch from the Tibial Tray Trial, engage the Punch Tower back onto the Tibial Tray Trial and firmly press down on the strike plate. Once locked onto the Punch Tower the handle can be used as a slap hammer to extract the Punch.

Figure 33:
Tibial Tray Trial

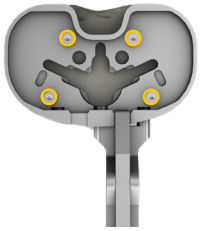


Figure 33a:
Pin Holes

Figure 34:
Tibial Punch
Tower

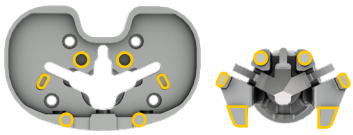


Figure 34a:
Tibial Punch
Engagement Points

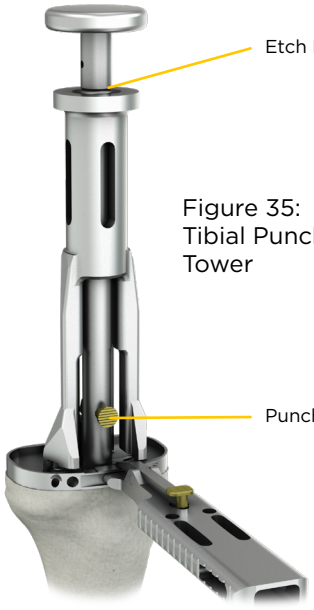


Figure 35:
Tibial Punch
Tower

15. Implanting the Components, Cement Preparation

Thoroughly clean the entire site with pulsatile lavage. The entry hole to the femoral medullary canal may be filled with a cancellous bone plug from either the resected notch from a PS femur or the resected chamfer cuts from a CR femur.

Tibial Tray

Cement the tibia first. Using firm pressure, apply cement to the proximal tibia and tibial keel recess. Ensure cement interdigitation into the bony interstices. Select the appropriate Tibial Tray that corresponds to the last Tibial Tray Trial used. Allow the keel of the Tibial Tray to follow the track created by the Punch. Use the Tibial Tray Impactor to fully seat the Tibial Tray, using caution to not malrotate the Implant (Figure 36).

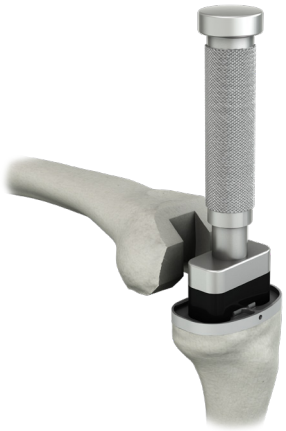


Figure 36: Tibial Tray Impactor

Femoral Component

Place bone cement onto the Femoral Component and the femur using preferred cementing technique. The Femoral Component may be started by hand or by using the Femoral/Impactor Extractor.

Begin by positioning the Femoral Component lugs into the lug holes, then use a mallet to impact the Femoral Impactor/Extractor to seat the Femoral Implant (Figure 37). Remove the Femoral Impactor/Extractor and use the Femoral Impactor to fully seat the implant further if necessary (Figure 38). Place a Tibial Insert Trial onto the Tibial Tray and bring the knee into full extension. Remove any extruded cement. Additional cement may be removed by placing the knee into flexion. Then place the knee back into full extension while allowing the cement to harden. This provides excellent pressurization of the cement interface.

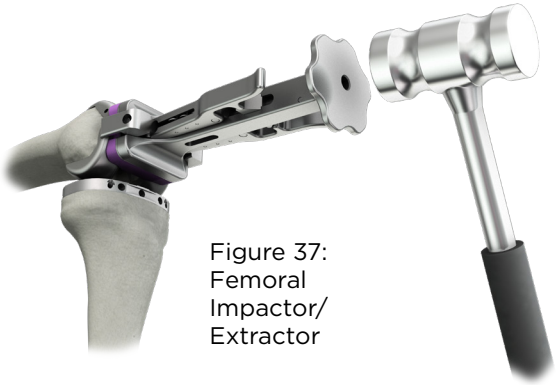


Figure 37: Femoral Impactor/ Extractor

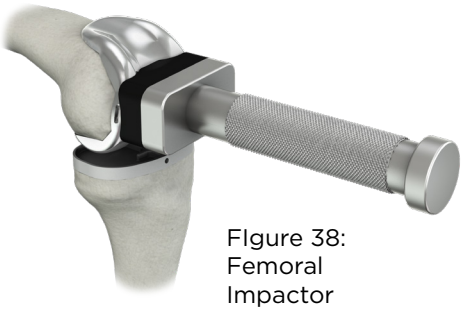


FIgure 38: Femoral Impactor

Patella

Apply cement to the Patella Implant and the surface of the patella. Insert the Implant. Use the Patella Cementing Clamp to fully seat the implant (Figure 39). Remove excess cement.

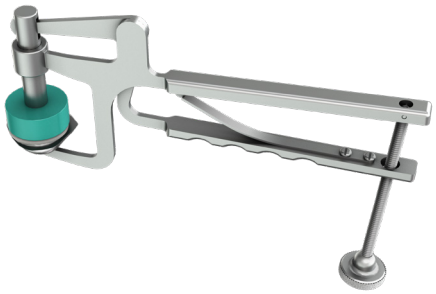


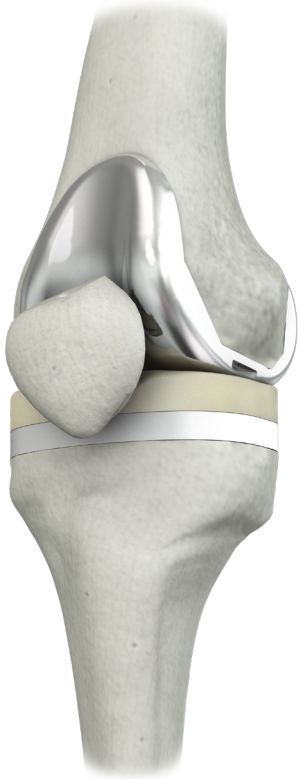
Figure 39: Patella Cementing Clamp

Tibial insert

Once the cement has cured, reassess range of motion and joint stability. Remove the Tibial Insert Trial and any excess cement from the posterior aspect of the joint. Inspect the Tibial Tray for debris, being careful not to scratch the tray. Place the Tibial Insert onto the Tibial Tray. Engage the posterior locking mechanism first. Attach the Tibial Insert Clamp by placing the peg on the Clamp into the Tibial Tray. Squeeze the Clamp together locking the Tibial Insert into place (Figure 40). The insert should seat easily with an audible "snap." Inspect the insert to make sure it is fully seated.

Figure 40: Tibial Insert

Figure 41:
Final Implant



16. Closing the Wound

After taking the knee through full range of motion, and the desired result is achieved (Figure 41), the wound should be closed in a standard fashion.

Friedrich Boettner, M.D.'s Technique

The technique described by Friedrich Boettner, M.D. tries to standardize the treatment of valgus knees. Since it is often difficult to assess the extent of a "pie-crusting" release this technique favors a similar release for almost all valgus knees. This release starts by utilizing the electrocautery to release the IT band starting next to the patella tendon towards the posterior border of the IT band. During the release the knee is positioned in extension and a lamina spreader is utilized to open the lateral gap. Once the IT band release is complete the posterolateral corner is released in a second step. This release is carried towards the lateral border of the popliteus muscle. Usually a "pop" is felt once the tight structures are completly released and the extension gap opens up lateral. The popliteus muscle itself is not released. Dr. Boettner considers the popliteus a dynamic stabilizer which only needs to be released if it is significantly scarred and tightness is encountered in flexion. In his experience this is very rarely necessary.

Appendix A

Varus Knee

In a varus knee, the Tibial Stylus can be placed at 4mm for mild to moderate varus without significant bone loss. In cases of >10° of mechanical varus, a significant lateral opening on the A/P radiograph, or in patients with medial bone loss, the resection level needs to be reduced to <4mm. Alternatively, the resection can be based on the lateral tibia (8-10mm).

Valgus Knee

In a valgus knee, the Tibial Resection Guide is set to resect approximately 5-6mm of the medial tibial plateau. In knees with significant medial opening, the resection level can be reduced. Make sure that the lateral tibia is resected.

Appendix B

Tissue Balancing for Varus and Valgus Knees

Varus

Initial release begins at the time of incision with further and complete balancing at the time of flexion and extension gap verification. Posterior stabilizing knee implants, with removal of the ACL and the PCL, tend to help with the soft tissue balance, and in minor deformities may be sufficient to balance the knee. The medial release involves, first, removal of tibial and femoral osteophytes, then a soft tissue peeling directed from the tibial joint line distally and across the tibial surface anterior to posterior. The semimembranosus can be released from the posterior aspect of the tibia. Further release can be obtained by either directing the blunt soft tissue dissection distally from the medial tibia or by using a pie crusting of the MCL with an 11 blade or 16 gauge needle. In severe cases, the complete medial sleeve of tissue, including the distal superficial MCL insertion, can be released from the tibia. When released as a sleeve, it will heal in the correct, balanced position. In the most severe cases, a sleeve of tissue at the medial epicondyle can be released from the femur.

Rather than releasing the entire MCL off of the tibia in marked varus cases, the pie-crusting technique can be very useful. If the knee is still tight medially after removal of osteophytes and release of the coronary attachment site of the MCL, pie-crust the MCL until it gradually elongates to match the tension of the lateral tissues.

Valgus

The technique described by Leo Whiteside has been found to be useful when dealing with a valgus deformity (Clinical Orthopaedics and Related Research No. 367, October 1999, pp. 130-140). This approach addresses the four main ligamentous structures (LCL, popliteal tendon, iliotibial band, and posterolateral capsule) on the lateral side of the knee. Selected release is based on whether the valgus deformity is present in flexion, extension, or both flexion and extension. The LCL and popliteal tendon function in both flexion and extension. Therefore, knees that are tight only in flexion, or in both flexion and extension on the lateral side undergo resection of these two structures first. The posterolateral capsule and iliotibial band are taut only in extension. Therefore, knees that are tight only in extension, either initially, or after balancing has been performed in flexion, undergo resection of these two structures as necessary. Ligamentous advancement procedures have not been found to be necessary, even in severe deformities.

Figure 42:
Posterior
Referencing
Sizing Guide

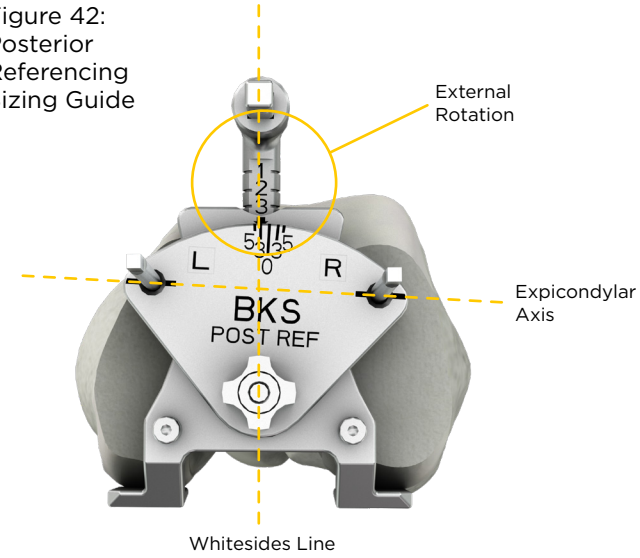
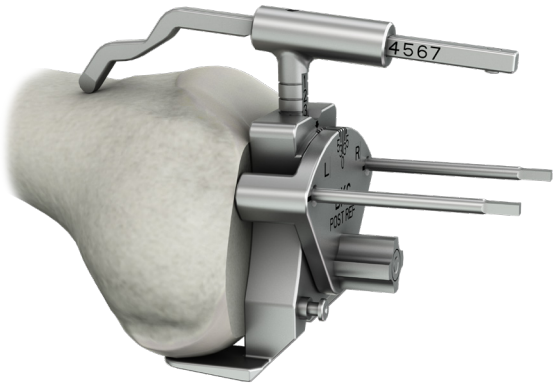


Figure 43:
Posterior
Referencing
Sizing Guide



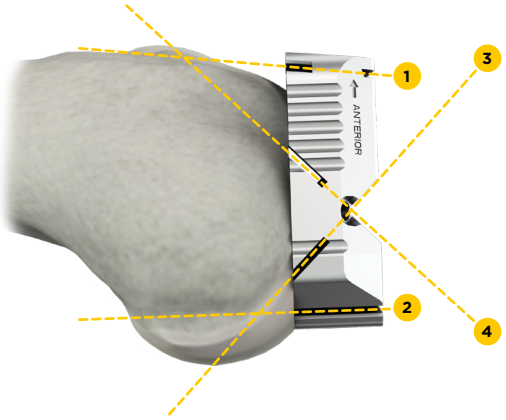
Appendix C

Posterior Referencing

The Posterior Referencing Sizing Guide is designed to place the Femoral Component in 0°, 3°, or 5° of external rotation (Figure 42). Place the Posterior Referencing Sizing Guide against the resected surface of the distal femur with the feet contacting the posterior condyles (Figure 43). With the guide flush on the bone, impact the attached Headed Pins to secure the block in place. Two Fixation Pins are then placed through the holes of the Posterior Referencing Sizing Guide. To avoid notching the anterior cortex, position the Stylus on the anterior cortex of the femur. Push the Stylus down until it contacts the anterior cortex. Check to ensure that the Stylus is not seated on a high or an unusually low point on the anterior cortex (Figure 43). Make note of the size indicated on the Posterior Referencing Sizing Guide. Once the appropriate size has been selected rotate the Stylus away from the anterior cortex and remove the Guide, leaving the Fixation Pins in place.

Figure 44:
Posterior Referencing
Cutting Block

Figure 45:
Femoral Cuts



4-In-1 Cutting Block Posterior Referencing

Select the appropriately sized 4-in-1 Posterior Referencing Cutting Block as previously determined by the Posterior Referencing Sizing Guide. Slide the Posterior Referencing Cutting Block over the Quick Pins through the holes marked "0" (Figure 44). The Cut Feeler Gage can be used to measure the intended resection level. The Posterior Referencing Cutting Block may be raised or lowered by 2mm if more, or less anterior femoral resection is desired. Prior to bone resection, Fixation Pins are placed through the oblique fixation holes before removing the Quick Pins to allow for chamfer cuts. The distance from the pinholes on the Posterior Referencing Cutting Block to the posterior cutting surface is the same throughout all sizes. The distance from the pinholes to the anterior cutting surface increases by 4mm from one size to the next.

Note: Downsizing the Cutting Block will result in an additional 4mm anterior resection. For the posterior referencing system it is recommended to use the -2mm holes and the next smaller cutting block to open the flexion gap by 2mm. This allows intraoperative options for flexion gap assessment and component sizing. Please take care to avoid anterior notching.

The following order of bone cuts is recommended: 1. Anterior Cortex 2. Posterior Condyles 3. Posterior Chamfer 4. Anterior Chamfer. Use an oscillating saw with a 1.27mm blade to make the resections (Figure 45). The TriMax femoral component has a posterior condyle thickness of 11mm.

BKS TriMax Implants

PS - POSTERIOR STABILIZED FEMORAL NONPOROUS

ITEM #	DESCRIPTION
165-1201	PS TriMax Femoral Nonporous LT Size 2
165-1301	PS TriMax Femoral Nonporous LT Size 3
165-1401	PS TriMax Femoral Nonporous LT Size 4
165-1501	PS TriMax Femoral Nonporous LT Size 5
165-1601	PS TriMax Femoral Nonporous LT Size 6
165-1701	PS TriMax Femoral Nonporous LT Size 7
165-1202	PS TriMax Femoral Nonporous RT Size 2
165-1302	PS TriMax Femoral Nonporous RT Size 3
165-1402	PS TriMax Femoral Nonporous RT Size 4
165-1502	PS TriMax Femoral Nonporous RT Size 5
165-1602	PS TriMax Femoral Nonporous RT Size 6
165-1702	PS TriMax Femoral Nonporous RT Size 7

CR - CRUCIATE RETAINING FEMORAL NONPOROUS

ITEM #	DESCRIPTION
165-3201	CR TriMax Femoral Nonporous LT Size 2
165-3301	CR TriMax Femoral Nonporous LT Size 3
165-3401	CR TriMax Femoral Nonporous LT Size 4
165-3501	CR TriMax Femoral Nonporous LT Size 5
165-3601	CR TriMax Femoral Nonporous LT Size 6
165-3701	CR TriMax Femoral Nonporous LT Size 7
165-3202	CR TriMax Femoral Nonporous RT Size 2
165-3302	CR TriMax Femoral Nonporous RT Size 3
165-3402	CR TriMax Femoral Nonporous RT Size 4
165-3502	CR TriMax Femoral Nonporous RT Size 5
165-3602	CR TriMax Femoral Nonporous RT Size 6
165-3702	CR TriMax Femoral Nonporous RT Size 7

PS - POSTERIOR STABILIZED FEMORAL NONPOROUS - NARROW

ITEM #	DESCRIPTION
165-1405	PS Narrow TriMax Femoral Nonporous LT Size 4
165-1505	PS Narrow TriMax Femoral Nonporous LT Size 5
165-1406	PS Narrow TriMax Femoral Nonporous RT Size 4
165-1506	PS Narrow TriMax Femoral Nonporous RT Size 5

CR - CRUCIATE RETAINING FEMORAL NONPOROUS - NARROW

ITEM #	DESCRIPTION
165-3405	CR Narrow TriMax Femoral Nonporous LT Size 4
165-3505	CR Narrow TriMax Femoral Nonporous LT Size 5
165-3406	CR Narrow TriMax Femoral Nonporous RT Size 4
165-3506	CR Narrow TriMax Femoral Nonporous RT Size 5

PATELLA

ITEM #	DESCRIPTION
164-5029	E-Vitalize Patella 29mm
164-5032	E-Vitalize Patella 32mm
164-5035	E-Vitalize Patella 35mm
164-5038	E-Vitalize Patella 38mm
164-5041	E-Vitalize Patella 41mm

PS - POSTERIOR STABILIZED TIBIAL INSERT

ITEM #	DESCRIPTION
166-5207	E-Vitalize PS Tibial Insert Size 2 7mm
166-5208	E-Vitalize PS Tibial Insert Size 2 8mm
166-5209	E-Vitalize PS Tibial Insert Size 2 9mm
166-5210	E-Vitalize PS Tibial Insert Size 2 10mm
166-5211	E-Vitalize PS Tibial Insert Size 2 11mm
166-5212	E-Vitalize PS Tibial Insert Size 2 12mm
166-5213	E-Vitalize PS Tibial Insert Size 2 13mm
166-5214	E-Vitalize PS Tibial Insert Size 2 14mm
166-5216	E-Vitalize PS Tibial Insert Size 2 16mm
166-5218	E-Vitalize PS Tibial Insert Size 2 18mm
166-5220	E-Vitalize PS Tibial Insert Size 2 20mm
166-5307	E-Vitalize PS Tibial Insert Size 3 7mm
166-5308	E-Vitalize PS Tibial Insert Size 3 8mm
166-5309	E-Vitalize PS Tibial Insert Size 3 9mm
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166-5314	E-Vitalize PS Tibial Insert Size 3 14mm
166-5316	E-Vitalize PS Tibial Insert Size 3 16mm
166-5318	E-Vitalize PS Tibial Insert Size 3 18mm
166-5320	E-Vitalize PS Tibial Insert Size 3 20mm
166-5407	E-Vitalize PS Tibial Insert Size 4 7mm
166-5408	E-Vitalize PS Tibial Insert Size 4 8mm
166-5409	E-Vitalize PS Tibial Insert Size 4 9mm
166-5410	E-Vitalize PS Tibial Insert Size 4 10mm
166-5411	E-Vitalize PS Tibial Insert Size 4 11mm
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166-5420	E-Vitalize PS Tibial Insert Size 4 20mm
166-5507	E-Vitalize PS Tibial Insert Size 5 7mm
166-5508	E-Vitalize PS Tibial Insert Size 5 8mm
166-5509	E-Vitalize PS Tibial Insert Size 5 9mm

ITEM #	DESCRIPTION
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166-5512	E-Vitalize PS Tibial Insert Size 5 12mm
166-5513	E-Vitalize PS Tibial Insert Size 5 13mm
166-5514	E-Vitalize PS Tibial Insert Size 5 14mm
166-5516	E-Vitalize PS Tibial Insert Size 5 16mm
166-5518	E-Vitalize PS Tibial Insert Size 5 18mm
166-5520	E-Vitalize PS Tibial Insert Size 5 20mm
166-5607	E-Vitalize PS Tibial Insert Size 6 7mm
166-5608	E-Vitalize PS Tibial Insert Size 6 8mm
166-5609	E-Vitalize PS Tibial Insert Size 6 9mm
166-5610	E-Vitalize PS Tibial Insert Size 6 10mm
166-5611	E-Vitalize PS Tibial Insert Size 6 11mm
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166-5613	E-Vitalize PS Tibial Insert Size 6 13mm
166-5614	E-Vitalize PS Tibial Insert Size 6 14mm
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166-5620	E-Vitalize PS Tibial Insert Size 6 20mm
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166-5709	E-Vitalize PS Tibial Insert Size 7 9mm
166-5710	E-Vitalize PS Tibial Insert Size 7 10mm
166-5711	E-Vitalize PS Tibial Insert Size 7 11mm
166-5712	E-Vitalize PS Tibial Insert Size 7 12mm
166-5713	E-Vitalize PS Tibial Insert Size 7 13mm
166-5714	E-Vitalize PS Tibial Insert Size 7 14mm
166-5716	E-Vitalize PS Tibial Insert Size 7 16mm
166-5718	E-Vitalize PS Tibial Insert Size 7 18mm
166-5720	E-Vitalize PS Tibial Insert Size 7 20mm

CR - CRUCIATE RETAINING TIBIAL INSERT

ITEM #	DESCRIPTION
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166-6208	E-Vitalize CR Tibial Insert Size 2 8mm
166-6209	E-Vitalize CR Tibial Insert Size 2 9mm
166-6210	E-Vitalize CR Tibial Insert Size 2 10mm
166-6211	E-Vitalize CR Tibial Insert Size 2 11mm
166-6212	E-Vitalize CR Tibial Insert Size 2 12mm
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166-6308	E-Vitalize CR Tibial Insert Size 3 8mm
166-6309	E-Vitalize CR Tibial Insert Size 3 9mm
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166-6314	E-Vitalize CR Tibial Insert Size 3 14mm
166-6316	E-Vitalize CR Tibial Insert Size 3 16mm
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166-6408	E-Vitalize CR Tibial Insert Size 4 8mm
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166-6708	E-Vitalize CR Tibial Insert Size 7 8mm
166-6709	E-Vitalize CR Tibial Insert Size 7 9mm
166-6710	E-Vitalize CR Tibial Insert Size 7 10mm
166-6711	E-Vitalize CR Tibial Insert Size 7 11mm
166-6712	E-Vitalize CR Tibial Insert Size 7 12mm
166-6713	E-Vitalize CR Tibial Insert Size 7 13mm
166-6714	E-Vitalize CR Tibial Insert Size 7 14mm
166-6716	E-Vitalize CR Tibial Insert Size 7 16mm

BKS TIBIAL TRAY NONPOROUS

ITEM #	DESCRIPTION
162-1200A	Tibial Tray Nonporous Size 2
162-1300A	Tibial Tray Nonporous Size 3
162-1400A	Tibial Tray Nonporous Size 4
162-1500A	Tibial Tray Nonporous Size 5
162-1600A	Tibial Tray Nonporous Size 6
162-1700A	Tibial Tray Nonporous Size 7

UC - ULTRA CONGRUENT TIBIAL INSERT

ITEM #	DESCRIPTION
166-7207	E-Vitalize UC Tibial Insert Size 2 7mm
166-7208	E-Vitalize UC Tibial Insert Size 2 8mm
166-7209	E-Vitalize UC Tibial Insert Size 2 9mm
166-7210	E-Vitalize UC Tibial Insert Size 2 10mm
166-7211	E-Vitalize UC Tibial Insert Size 2 11mm
166-7212	E-Vitalize UC Tibial Insert Size 2 12mm
166-7213	E-Vitalize UC Tibial Insert Size 2 13mm
166-7214	E-Vitalize UC Tibial Insert Size 2 14mm
166-7216	E-Vitalize UC Tibial Insert Size 2 16mm
166-7218	E-Vitalize UC Tibial Insert Size 2 18mm
166-7220	E-Vitalize UC Tibial Insert Size 2 20mm
166-7307	E-Vitalize UC Tibial Insert Size 3 7mm
166-7308	E-Vitalize UC Tibial Insert Size 3 8mm
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166-7414	E-Vitalize UC Tibial Insert Size 4 14mm
166-7416	E-Vitalize UC Tibial Insert Size 4 16mm
166-7418	E-Vitalize UC Tibial Insert Size 4 18mm
166-7420	E-Vitalize UC Tibial Insert Size 4 20mm
166-7507	E-Vitalize UC Tibial Insert Size 5 7mm
166-7508	E-Vitalize UC Tibial Insert Size 5 8mm
166-7509	E-Vitalize UC Tibial Insert Size 5 9mm

ITEM #	DESCRIPTION
166-7510	E-Vitalize UC Tibial Insert Size 5 10mm
166-7511	E-Vitalize UC Tibial Insert Size 5 11mm
166-7512	E-Vitalize UC Tibial Insert Size 5 12mm
166-7513	E-Vitalize UC Tibial Insert Size 5 13mm
166-7514	E-Vitalize UC Tibial Insert Size 5 14mm
166-7516	E-Vitalize UC Tibial Insert Size 5 16mm
166-7518	E-Vitalize UC Tibial Insert Size 5 18mm
166-7520	E-Vitalize UC Tibial Insert Size 5 20mm
166-7607	E-Vitalize UC Tibial Insert Size 6 7mm
166-7608	E-Vitalize UC Tibial Insert Size 6 8mm
166-7609	E-Vitalize UC Tibial Insert Size 6 9mm
166-7610	E-Vitalize UC Tibial Insert Size 6 10mm
166-7611	E-Vitalize UC Tibial Insert Size 6 11mm
166-7612	E-Vitalize UC Tibial Insert Size 6 12mm
166-7613	E-Vitalize UC Tibial Insert Size 6 13mm
166-7614	E-Vitalize UC Tibial Insert Size 6 14mm
166-7616	E-Vitalize UC Tibial Insert Size 6 16mm
166-7618	E-Vitalize UC Tibial Insert Size 6 18mm
166-7620	E-Vitalize UC Tibial Insert Size 6 20mm
166-7707	E-Vitalize UC Tibial Insert Size 7 7mm
166-7708	E-Vitalize UC Tibial Insert Size 7 8mm
166-7709	E-Vitalize UC Tibial Insert Size 7 9mm
166-7710	E-Vitalize UC Tibial Insert Size 7 10mm
166-7711	E-Vitalize UC Tibial Insert Size 7 11mm
166-7712	E-Vitalize UC Tibial Insert Size 7 12mm
166-7713	E-Vitalize UC Tibial Insert Size 7 13mm
166-7714	E-Vitalize UC Tibial Insert Size 7 14mm
166-7716	E-Vitalize UC Tibial Insert Size 7 16mm
166-7718	E-Vitalize UC Tibial Insert Size 7 18mm
166-7720	E-Vitalize UC Tibial Insert Size 7 20mm

Ortho Development® Corporation designs, manufactures, and distributes orthopedic implants and related surgical instrumentation—with a specialty focus on hip and knee joint replacement, trauma fracture repair and spinal fixation. ODEV was founded in 1994 and is located at the base of the Wasatch Mountains in the Salt Lake City suburb of Draper, Utah. The company has established distribution throughout the United States and Japan, along with other select international markets.

ORTHO DEVELOPMENT®

Ortho Development Corporation
odev.com

12187 So. Business Park Drive
Draper, Utah 84020
801-553-9991/fax 801-553-9993

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