djosurgical™

3DKnee™

Surgical Technique

DJO GLOBAL

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Contributing Surgeon

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This brochure is presented to demonstrate the surgical technique utilized by the surgeon listed above. DJO Surgical, as the manufacturer of this device, does not practice medicine and cannot recommend this or any other surgical technique for use on a specific patient. The choice of the appropriate surgical technique is the responsibility of the surgeon performing the operation.

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Design Rationale

The 3DKnee is design driven by in-vivo and in-vitro data on a wide variety of existing total knee systems.

The 3DKnee was designed as a primary tri-compartmental knee replacement system. The main objective of the femoral component is to resurface the distal femur with minimum bone removal.
The femoral component has an 8-10mm distal and posterior thickness in order to conserve the amount of bone removed from the femur and to maintain the joint line position through full ROM. The femur is made of CoCr.

The 3DKnee femoral component comes in 9 sizes in both lefts and rights to provide versatility in matching the patient's anatomy. Each femoral component size selected will determine the insert size. This will provide an exact match between articulating surfaces.

The dimensions of the femoral components are illustrated below:

Femoral Component

Size (left/right)	A-P Dims (mm)	Box Dims (mm)	M-L Dims (mm)	Distal Condyle Dims (mm)	Posterior Condyle Dims (mm)
2	52	37	58	8	8
3	54	39	61	9	8
4	56.5	41	63.5	9	8
5	59	43	66	10	9
6	62	45	68.5	10	9
7	64	47	71	10	9
8	67	49	73.5	10	9
10	72	53	79	10	10
12	76	57	84	10	10

Tibial Component

The 3DKnee tibial components are color coded in coordination with the appropriate femoral matched insert. The 3DKnee tibial components will modularly connect to the femoral matched tibial insert. If the optimal size tibia component is smaller than the femur, the respective size Foundation/3D down stemmed baseplate can be used with the femoral matched size 3DKnee insert, as indicated in the chart below. For example, if a size 8 left 3DKnee femoral component is selected with a size 8 left 3DKnee tibia insert, then either a size 8 left 3DKnee tibia component, a size 6 left Foundation tibia component, or a size FK6/3DKnee down 8 left tibia component can be used. The size 8 3DKnee tibia insert will modularly connect to either size baseplate (see also color-coded sizing chart in the front of the technique).The 3DKnee inserts are available in 9mm, 11mm, 13mm, 15mm and 19mm thicknesses.

The tibial baseplate has an asymmetric tibial profile.
A posterior notch allows for retention of the posterior cruciate Ligament if desired.

The tibial design comes in six sizes, left and right.
Combining the Foundation Tibia with the 3DKnee Tibia options offers 24 components to the system.

The dimensions of the tibial baseplates are illustrated below:

Tibial Component

Size (left/right)	Lateral A-P Dims (mm)	Medial A-P Dims (mm)	M-L Dims (mm)
3D Down 2 (special order)	34	39	60
3D 2/3D Down 4	38	41	63
3D 4/3D Down 6	42	45	69
3D 6/3D Down 8	44	48	74
3D 8/3D Down 10	47	51	79
3D 10/3D Down 12	50	54	84
3D 12	53	58	89

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Modular 3DKnee Tibial Inserts

The 3DKnee Tibial Insert comes in 9 sizes and is offered in pure ultra-high molecular weight polyethylene (UHMWPE) as well as vitamin E blended UHMWPE. Each insert size is offered in 5 standard thicknesses, resulting in tibial assemblies of 9mm, 11mm, 13mm, 15mm and 19mm. The minimum poly thickness for the 9mm insert is 6mm (the label for the insert thickness refers to the overall thickness of the insert/baseplate assembly).

The tibial baseplate and insert assemble via a locking mechanism that utilizes posterior feet and an anterior snap on the inside pocket of the baseplate. In addition, the inserts are secured with a self-locking attachment screw.

Trials are available for the tibial inserts and are color coded for reference intraoperatively. The sizing chart is located with the surgical technique.

Patellar Components

The Patellar Components for the 3DKnee system are domed shaped to match the geometry of the 3DKnee Femoral Component. Three pegs and grooves are present on the inferior surface of the patella. The shape of the patella is a symmetrical dome and the symmetrical geometry requires no rotational alignment.

The domed patellae are available in 5 resurfacing and recessing diameters (26mm, 29mm, 32mm, 35mm, 38mm). Trials are available for the dome patellae and are color coded for easy reference intraoperatively. The color codes are illustrated below:

Style	Trial Color	Style	Trial Color
Size 26 - 8mm Thick	Yellow	Size 26 - 10mm Thick	Lt. Purple
Size 29 - 8mm Thick	Rust	Size 29 - 10mm Thick	Lt. Purple
Size 32 - 8mm Thick	Green	Size 32 - 10mm Thick	Lt. Purple
Size 35 - 9mm Thick	Blue	Size 35 - 10mm Thick	Lt. Purple
Size 38 - 9mm Thick	Black	Size 38 - 10mm Thick	Lt. Purple

Indications

Joint replacement is indicated for patients suffering from disability due to:
- degenerative, post-traumatic or rheumatoid arthritis;
- avascular necrosis of the femoral condyle;
- post-traumatic loss of joint configuration, particularly when there is patellofemoral erosion, dysfunction or prior patellectomy;
- moderate valgus, varus or flexion deformities;
- treatment of fractures that are unmanageable using other techniques.

This device may also be indicated in the salvage of previously failed surgical attempts.
All devices are intended for cemented applications except for the 3DKnee Porous Coated Femur which is intended for cementless applications.

Contraindications

Total joint replacement is contraindicated where there is:
- infection (or a history of infection), acute or chronic, local or systemic;
- insufficient bone quality which may affect the stability of the implant;
- muscular, neurological or vascular deficiencies, which compromise the affected extremity;
- obesity;
- alcoholism or other addictions;
- materials sensitivity;
- loss of ligamentous structures;
- high levels of physical activity (e.g. competitive sports, heavy physical labor).

Intended Use

DJO Surgical knee devices are intended for treatment of patients who are candidates for knee arthroplasty per the indications for use. While total knee replacements are not intended to withstand activity levels and loads of normal healthy bone, they are a means of restoring mobility and reducing pain for many patients.

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Preoperative Planning

Standing 14x17 x-rays are usually adequate for templating. With significant bony deformity, use a longstanding radiograph to evaluate the angle between the mechanical axis of the leg and the anatomic axis of the femur. The normal mechanical axis is formed by a straight line which begins at the center of the femoral head, passes through the center of the knee joint and ends at the center of the ankle. The mechanical axis will not be normal in the face of femoral, tibial, or joint space deformities. With this in mind, take care to reconstruct the normal mechanical axis on the radiograph. The angle measured between this normal mechanical axis and the axis of the femur will determine which of the IM Femoral Bushings should be used with the Distal Femoral Resection Guide (5°, 7°, or 9°) to obtain a distal femoral cut which will be perpendicular to the mechanical axis of the joint (Figure 1). The goal of this preoperative planning exercise is to demonstrate the correct mechanical axis of the leg, promote minimal bone stock removal, and optimize collateral ligament balance in reconstruction.

Templates for the 3DKnee System are available to aid in preoperative implant sizing.

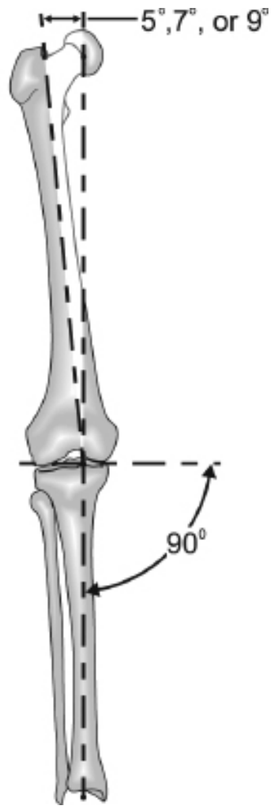

Figure 1

Minimally Invasive Surgical Exposure

Sufficient surgical exposure is critical in total knee arthroplasty. Minimally invasive exposure can be optimized based on patient size and muscle mass. Adequate exposure allows bony landmarks, component alignment and soft tissue evaluation to be assessed more thoroughly and therefore, will contribute to more successful results.

Make a longitudinal anterior skin incision. The incision will vary 3-6 inches in length depending on soft tissue and bony deformity (Figure 2). Careful attention should be paid to old incisions about the knee and, generally, the lateral most usable scar should be targeted (for vascular reasons). Occasionally, pre-incision and skin expanders may be needed to prevent skin loss. Enter the knee joint through a medial parapatellar joint capsule incision (Figure 3) or by splitting the vastus medialis (intravastus approach Figure 4). Both incisions continue inferiorly along the medial side of the tibial tubercle to allow sufficient patella mobilization and adequate knee exposure.

Complete menisectomy is essential for obtaining optimum exposure of the posterior tibia and also aids in clearing the joint space for adequate trialing of the implants. Likewise, removing osteophytes from the intercondylar notch aids in identifying accurate placement of the femoral intramedullary drill hole. Removing all periarticular osteophytes on both the femoral and tibial sides should reduce the possibility of soft tissue impingement and provide the best conditions for accurate implant sizing.

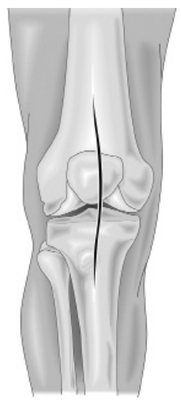

Figure 2
Skin Incision

Figure 3
Medial Parapellar

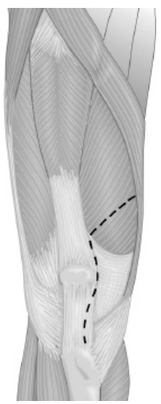

Figure 4
Intravastus

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Open the Femoral Canal

Using the 8mm (5/16 inch) IM Femoral Drill, locate and drill a pilot hole into the intramedullary femoral canal (Figure 5). The inferior edge of this hole should be positioned just anterior to the intercondylar notch (Figure 6). Make the hole larger by toggling the bit inside the canal. This reduces fat emboli risk and allows the guide rod to seek the proper position in the canal. Irrigate and suction the canal to further decrease the risk of fat embolization.

Slowly insert the T-Handle IM Rod into the pilot hole created by the IM Femoral Drill until it passes through the isthmus of the femoral canal.

Establish Femoral Alignment

Select the appropriate Femoral IM Bushing (5°, 7°, or 9°) based on the preoperative measurement of valgus for the distal cut and lock the bushing into the Distal Femoral Resection Guide. The bushing should indicate the proper setting for a left or right knee with appropriate "L" and "R" markings on the bushing facing anteriorly. When correctly assembled, the rod will have a valgus indication to the distal surface of the resection guide.

Assemble the T-Handle IM Rod into the bushing selected and insert the assembly slowly into the femoral canal (Figure 7). The feet on the Distal Femoral Resection Guide should be flush with the back side of the guide by turning each knob on the front surface of the guide counterclockwise until the knob stops. Once the guide is placed in contact with the femur, one of the feet can be extended to contact the femur and provide increased stability of the instrument. Take care not to extend the feet so far that the instrument is lifted off the distal end of the femur. This will result in an inaccurate distal resection.

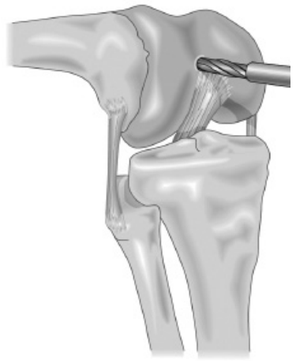


Figure 5

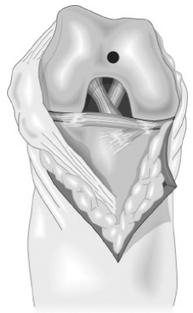


Figure 6

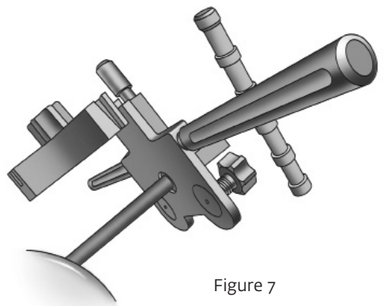


Figure 7

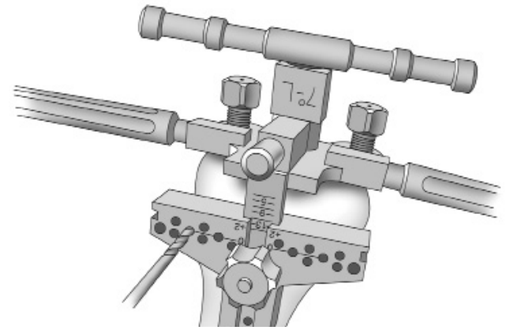
Secure the Distal Femoral Cutting Block at the 11mm resection line on the indicator bar (Figure 8). More distal resection may be considered for knees with flexion contractures and less may be considered for very small knees.

Holes for the External Alignment Tower are present on the Distal Femoral Cutting Block so that an External Alignment Rod may be used to assess alignment prior to making the distal femoral cut. Proper alignment should result in the rod passing over the center of the femoral head.

Distal Femoral Resection

Fix the position of the cutting block by drilling two holes through the holes marked "0" and placing pins through the holes into the femur. Holes placed in 2mm increments above and below the holes marked "0" allow for readjustment of the cutting block to remove more or less bone as determined necessary. Loosen the securing knob, remove the Distal Femoral Resection Guide, and attach the Saw Capture to the cutting block. A general guideline for the distal femoral resection is to remove the same amount of bone that will be replaced with metal. Use a sawguide (Anterior Cut Reference Guide) to check the thickness before cutting (Figure 9).

Using a saw blade that is 1mm thick (.040 inches) and an oscillating saw, cut the distal femur (Figure 10).



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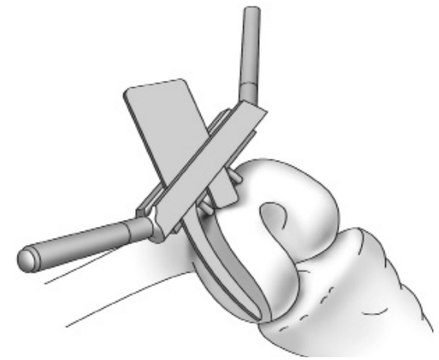

Figure 9

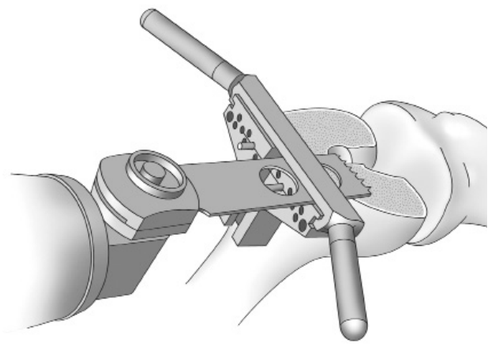

Figure 10

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Tibial Alignment (Extramedullary Option)

Adjust the overall length of the Extramedullary Tibial Resection Guide to the appropriate tibial length. Remove any remnant of the ACL. Using a PCL retractor, sublux the tibia forward for a complete view of the tibial plateau. Lightly anchor the proximal end of the resection guide onto the central tibial plateau at the tibial spines by tapping in the long pin (Figure 11). Strap the ankle spring around the ankle to provide stability of the instrument distally. To establish alignment:

- Position the center of the Tibial Cut Block just medial to the tibial tubercle and the perpendicular center through the medial 1/3 of the ankle.
- With the foot in neutral position, align the rod with the second toe. This is accomplished by the M/L adjustment at the ankle (Figure 12).
- Place the tibial cutting block parallel to the posterior aspect of the tibial plateau (Figure 13).

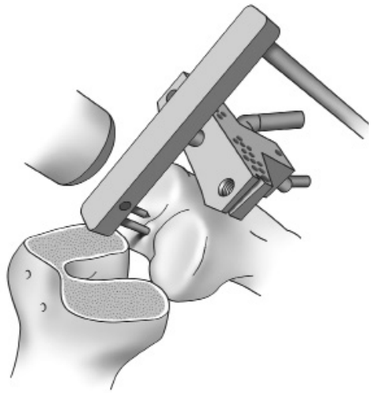

Figure 11

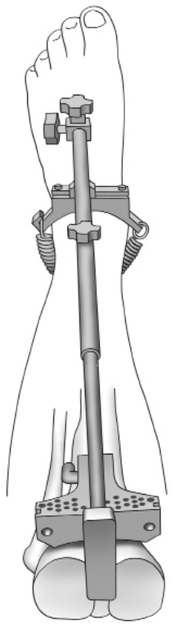

Figure 12

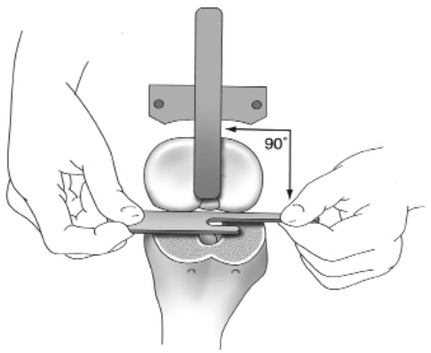

Figure 13

Tibial Slope Alignment and Securing the Cutting Block

Adjust the slope of the cutting block by sliding the Extramedullary Tube along the length of the Ankle Bar until the sawguide (Anterior Cut Reference Guide) runs parallel with the surface of the tibial plateau (Figure 14).

Once rotational alignment and slope have been established, tap the proximal end of the resection guide and fully seat the pins in the tibial plateau (Figure 15).

Place the Tibial Stylus on the cutting block and adjust the block until the tip of the stylus marked "9mm", denoting a 9mm resection, touches the lowest point of the least involved compartment of the tibial plateau (Figure 16).

An alternative method is to adjust the block until the tip of the stylus marked "1mm" touches the lowest point of the most involved compartment of the tibial plateau.

Caution: This alternative method should be used in cases of severe bone loss, where augmentation blocks would be appropriate. Likewise, in cases where the defect is minimal, using the 1mm stylus tip may not indicate the removal of sufficient bone stock to accommodate the tibial component. The surgeon should use their discretion to determine which technique is appropriate for the patient.

Secure the position of the cutting block by drilling two holes through the holes marked "0" and placing pins through the holes into the tibia. Holes placed in 2mm increments above and below the holes marked "0" allow for readjustment of the cutting block to remove more or less bone as determined necessary (Figure 17).

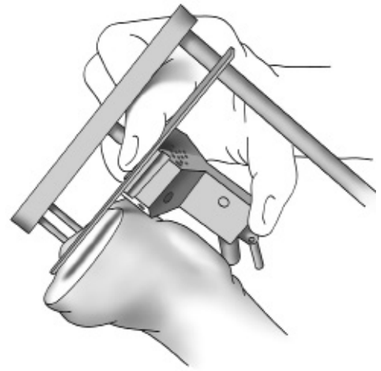

Figure 14

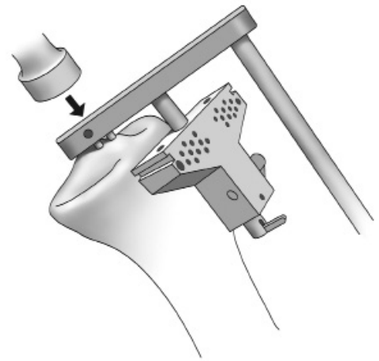

Figure 15

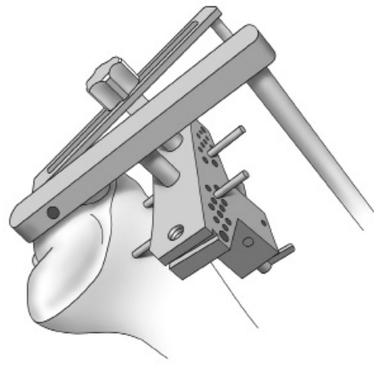

Figure 17

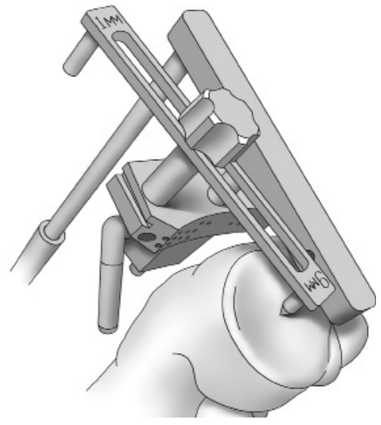

Figure 16

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Total Leg Alignment Confirmation

Now extend the knee and align the tibial resection guide with the distal femoral cut. This will give you an estimate of the total leg alignment for the positioned tibia cut and can be checked with the long alignment rods over the hip and ankle for verification of the correct mechanical axis (Figure 18). The proximal surface of the tibia cut block should be parallel to the distal femoral cut (Figure 19).

Verifying alignment at these specific check points can make a significant difference in the final outcome. Consider the fact that the femoral and tibia alignment guides can each independently allow for 1-2° of error. A combined error in the same direction could add an extra 4° of varus or valgus malalignment. Taking a few minutes to correct positioning prior to cutting can save time later.

To correct malalignment, use the same pins that were used to anchor the Tibial Cut Block and secure the 2° Varus / Valgus Cut Block in place. This cutting block will provide a cutting surface that will correct the malalignment by 2° (Figure 20). The 2° Varus / Valgus Cut Block can also be fitted with the Alignment Tower and External Alignment Rod to verify the correction.

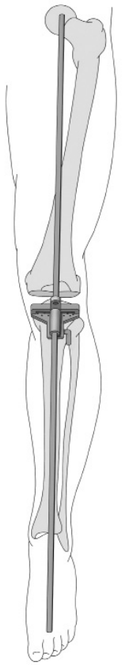

Figure 18

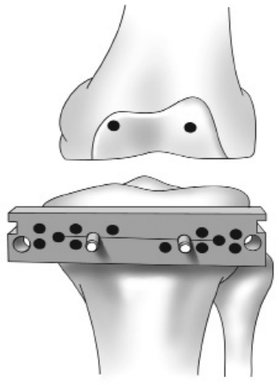

Figure 20

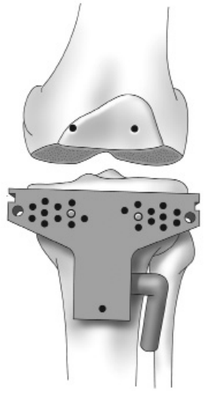

Figure 19

Tibial Alignment (Intramedullary Option)

Using the IM Femoral Drill, locate and drill a pilot hole into the intramedullary tibial canal. The inferior edge of this hole should be positioned 3-5mm anterior to the pinnacle of the proximal tibial spine (Figure 21). Insert the T- Handle into the pilot hole created by the IM drill. Slowly introduce the rod beyond the depth of the pilot hole to open the intramedullary canal.

Assemble the T-Handle Rod and the IM Tibia Resection Guide so the slope indicators on the guide face away from the patient when the guide is in position and insert the apparatus into the tibial canal (Figure 22).

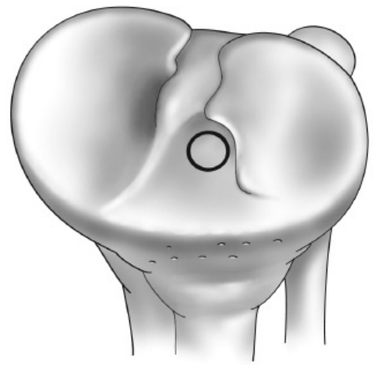

Figure 21

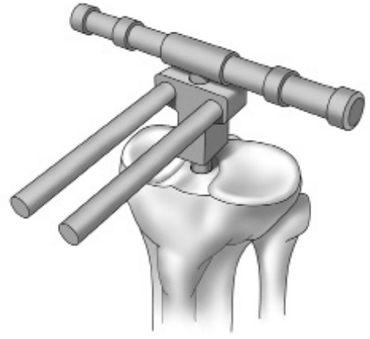

Figure 22

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Tibial Alignment

Assemble the Tibia Cut Block to the IM Resection Guide with the stylus connected to the selected side for determining resection thickness. The alignment drop rod can also be assembled prior to passing to the surgeon for assembly. Assemble the complete IM Resection Guide to achieve 6° of posterior slope (Figure 23). Establish rotational alignment by positioning the center of the T-shaped Tibial Cut Block just medial to the tibial tubercle and the perpendicular center through the medial 1/3 of the ankle.

Place the Tibial Stylus on the cutting block and adjust the block until the tip of the stylus marked "9mm", denoting a 9mm resection, touches the lowest point of the least involved compartment of the tibial plateau.

An alternative method is to adjust the block until the tip of the stylus marked "1mm" touches the lowest point of the most involved compartment of the tibial plateau.

Caution: This method should be used in cases of severe bone loss, where augmentation blocks would be appropriate. Likewise, in cases where the defect is minimal, using the 1mm stylus tip may not indicate the removal of sufficient bone stock to accommodate the tibial component.

Secure the position of the cutting block by drilling two holes through the holes marked "0" and placing pins through the holes into the tibia. Holes placed in 2mm increments above and below the holes marked "0" allow for readjustment of the cutting block to remove more or less bone as determined necessary. Unlock the cutting block from the resection guide. Remove the guide from the tibia, leaving the tibial cutting block against the anterior tibia. Holes for the External Alignment Tower are present in the Tibial Cut Block so that alignment may be assessed prior to making the tibial cut. When using the alignment tower, proper alignment is indicated by the alignment rod pointing at the second toe and medial 1/3 of the ankle with the knee extended as well as aligning with the center of the hip joint to assure correct mechanical axis (Figure 24).

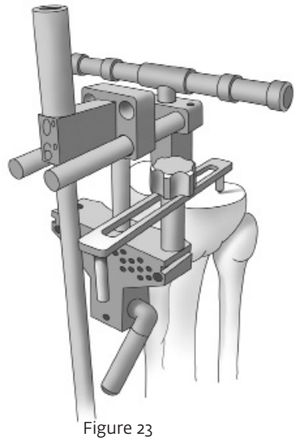


Figure 23

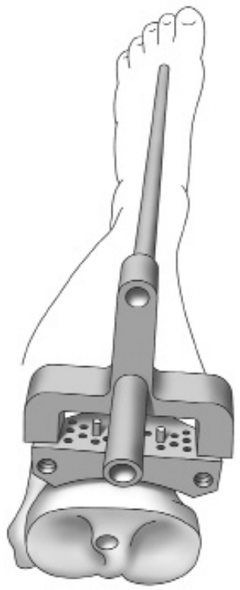


Figure 24

Femoral Alignment
Posterior Reference

Seat the Femoral Sizer on the distal femur using the sizer feet to reference the posterior condyles. Position the stylus tip on the lateral aspect of the anterior cortex of the femur and read the measurement indicator to determine the appropriate size femoral component (Figure 25). For measurements falling less than half way between sizes, select the smaller size; for measurements falling more than half way between sizes select the larger size. Markings are available on the medial and lateral arms of the sizer to indicate the M-L width of each size femoral component and to aid in the proper medial-lateral positioning of the femoral component. Whiteside's line, at the depth of the patellar sulcus, can also be used for M/L positioning and should be perpendicular to the femoral fixation holes.

Allow the anterior portion of the guide to float with the stylus tip until it is positioned on the lateral aspect of the anterior cortex of the femur. Keeping the femoral fixation holes perpendicular to Whiteside's line and parallel to the transepicondylar line is important. If rotating is unclear, bring the knee to 90° of flexion and pick the alignment which most closely parallels the tibial cut plane (Figure 26).

The correct "3° L" or "3° R" markings should always be facing the surgeon when the bushing is in place (Figure 27). An upside down 3° bushing will result in the holes being incorrect. Hold the Femoral Peg Bushing in place with a femoral peg lug and drill the other hole using the 6.4mm (1/4 inch) drill marked "Femoral Peg".

Verify fixation holes are perpendicular to Whiteside's line and parallel to the transepicondylar axis (Figure 28).

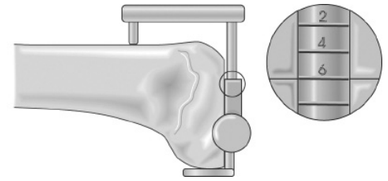


Figure 25

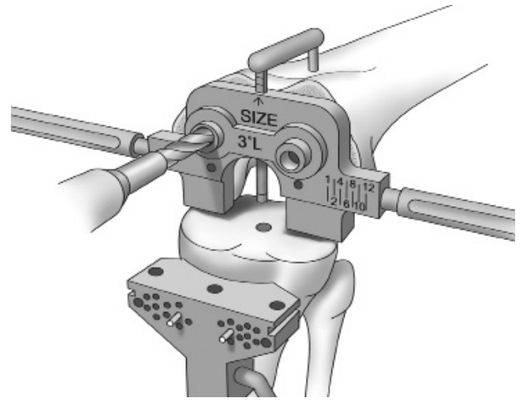
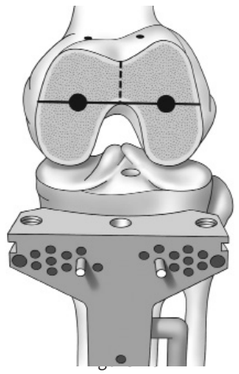


Figure 26



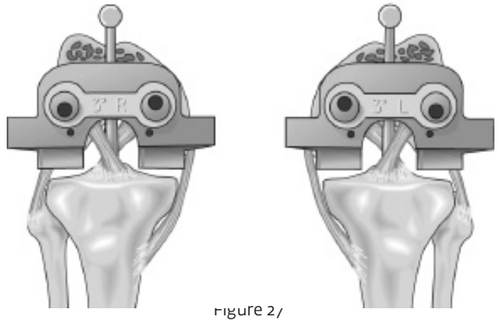


Figure 27

Surgical Technique
3DKnee™

Femoral Preparation: 4-in-1 Speed Blocks

Place the appropriate size 4-in-1 Speed Block on the distal femur. Check the appropriate size by placing the saw guide (Anterior Cut Reference Guide) in the anterior slot to check for notching (Figure 29). If the anterior cutting plane appears excessively notched but the next size up jig is too large, then the femoral fixation hole can be moved up 2mm by using a special auxiliary sizer. Quick lock handles can be attached to the block for stabilization. As an alternative, the block may be pinned in place using short bone pins.

Make the anterior cut, posterior cut, and anterior and posterior chamfer cuts using a 1mm thick saw blade (Figure 30).

Place the appropriate size Trochlear Groove Guide in place on the distal femur (the size of the guide should match that of the 4-in-1 Speed Block used). Ream the trochlear groove area with the drill marked "Trochlear" (Figure 31). To facilitate reaming, balance the drill through the guide and initiate reaming prior to engaging the bone.

Impact the femoral trial on the prepared distal femur. Now fully extend the knee and apply the tower and alignment rod to the Tibial Cutting Block. Make sure that the cutting block is aligned perpendicluar to the distal femoral component and that the alignment rod passes through the hip center and ankle center. This is the final varus/valgus alignment check before proceeding with the tibial cut. If this total leg alignment to the mechanical axis needs adjusting, then apply the 2° tibial correction block. Also, test the ligament stability through range of motion, correcting for bone loss by keeping the cutting block parallel to the femoral articular surface.

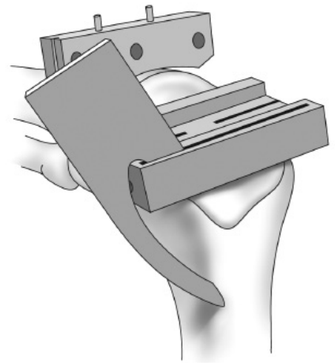


Figure 29

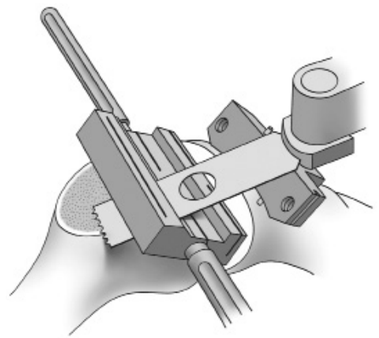


Figure 30

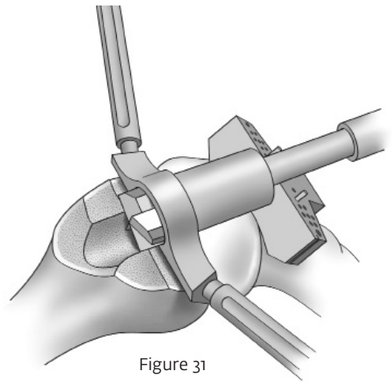


Figure 31

Tibia Cut

With the PCL retractor in place, use a reciprocating saw to cut a groove medial, lateral and 4mm anterior to the PCL (Figure 32). This prevents undermining or cracking the bone block. Place a ½" osteotome in the anterior groove to protect the PCL if following a cruciate retaining technique. Alternatively, the 3DKnee can also be used with a compromised or absent PCL. Place the saw capture guide on the tibial cutting block. Using a 1mm sawblade with the oscillating saw, complete the tibial resection (Figure 33). Using a laminar spreader with the knee at 90° will aid in removing posterior osteophytes and any meniscal remnants or loose bodies.

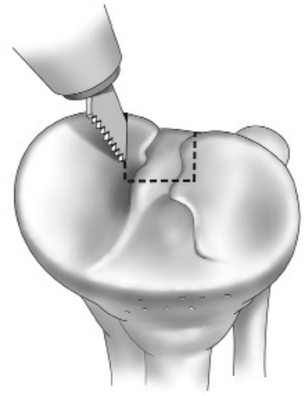


Figure 32

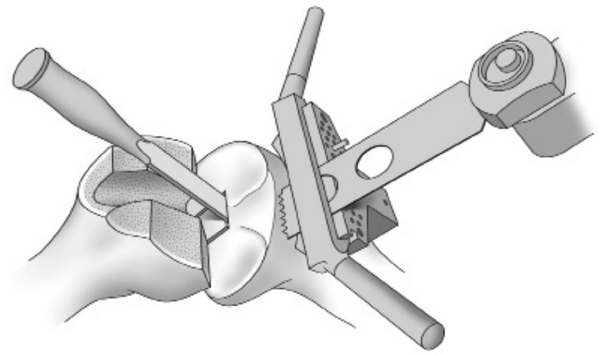


Figure 33

Surgical Technique
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Tibial Sizing

Completely remove all tibial osteophytes prior to tibial sizing to avoid false coverage of osteophyte formation. Size the proximal tibia by matching a Tibial Trial to the profile of the resected tibial plateau and align so the handle closely follows the fixation pins of the tibial cutting block (Figure 34). The External Alignment Rod is used with the Tibial Trial Handle to confirm tibial perpendicular alignment (Figure 35). Using a 3.2mm drill bit, drill two holes perpendicular to the Tibial Sizing Template through the two countersunk holes on the template. Each hole should be drilled approximately 2cm deep. Insert a Headed Tibial Bone Pin through each of the holes to secure the tibial template in place (Figure 36).

Alternatively, determine correct rotational alignment for the tibial trial by performing a trial reduction with the femoral trial component. Mark the position of the tibial plate in full extension and then pin it in this position.

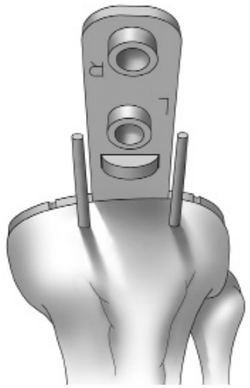

Figure 34

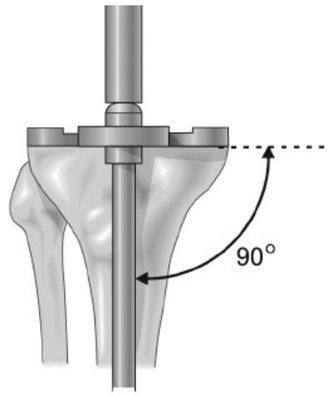

Figure 35

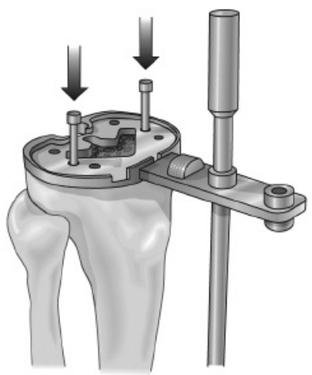
Figure 36

Tibial Keel Preparation

Assemble the Broach Guide Handle to the appropriate size Tibial Broach Guide and place the guide into the central detail on the tibial template. An optional Tibial Stem Reamer can be used to ream the tibial canal prior to broaching (Figure 37). Center the appropriate size Tibial Broach in the hole and broach the tibial canal until the broach is fully seated (Figure 38). Broaching without reaming leaves a nice bone plug by impacting the cancellous tibia bone. This bone plug is good for blocking any cement from the tibial canal and allowing good cement pressurization.

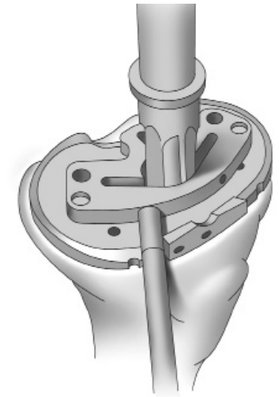
Figure 37

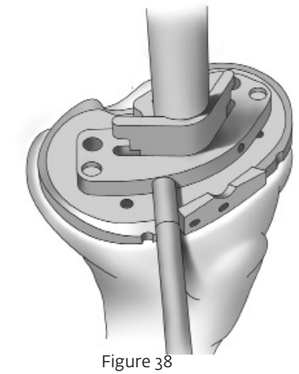
Figure 38

Patella Preparation: Resurfaced Patellar Peg

Measure the overall patellar thickness using calipers. Mark the center of the patellar crest with electrocautery and, using the 1/8" drill bit, drill a hole to mark the center, deep to the cut plane (Figure 39). Place the Patella Osteotomy Guide on the patella and set the stylus to indicate an amount of bone equal to the thickness of the patellar component to be used (Figure 40). It is recommended that at least 13mm of bone be remaining following the osteotomy. Using a 1mm thick saw blade, resect the patella.

Patellar Peg Preparation

Position the Patellar Sizer on the resected patella to align with previously drilled 1/8" centering hole. Press the sharp pin on the Patellar/Sizer/Drill Guide into the resected patella and drill for the patella pegs using the Patella Peg Stop Drill (Figure 41).

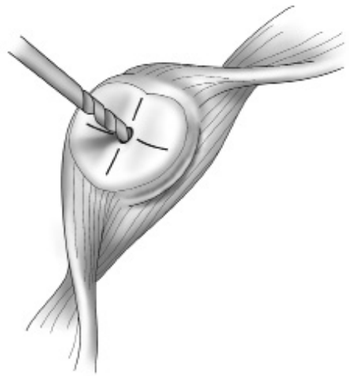

Figure 39

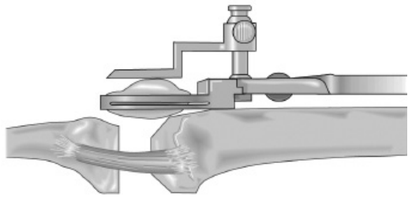

Figure 40

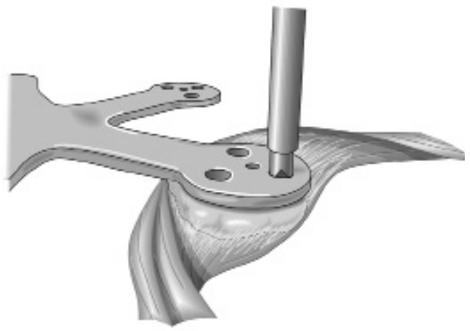

Figure 41

Recessed Patella Preparation

Measure the overall patellar thickness using calipers. Place the Patella Osteotomy Guide on the patella and set the stylus to indicate an amount of bone equal to 2mm less than the thickness of the patellar component to be used (i.e.; if a 9mm Patella is to be used, resect 7mm of bone). Using an oscillating saw and a 1mm thick saw blade, resect the patella. It is recommended that at least 15mm of bone be remaining following this osteotomy.

Patellar Sizing for Recessing

Size the patella using the Patellar Sizer. The center of the appropriate size patella should be positioned medial so that the highest point of the normal patella is replaced by the highest point of the patellar dome. To ensure sufficient rim following countersinking, size the patella such that 2mm of bone will remain beyond the periphery of the patellar diameter (Figure 42).

Recessing

Based on the size of patella chosen, assemble the appropriate Patellar Bushing into the Patellar Clamp and position the clamp over the resected surface of the patella. Care should be taken to position the center of the bushing medially so that the highest point of the patellar component will be correctly postioned. Using the corresponding Patella Reamer, countersink the patella by 2mm by reaming the patella until the top surface of the reamer meets the first engraved line on the inside of the patellar bushing (Figure 43). To facilitate reaming, initiate power to the reamer fully before engaging bone. Apply gentle, uniform pressure to the patellar surface while reaming. This should prevent over reaming and provide a concentric inset cavity for the patellar component.

Patellar Peg Preparation

After reaming, and without removing the Patellar Clamp, place the appropriate Patellar Drill Guide into the Patellar Bushing. Tap the drill guide into place to anchor the sharp pin into the patellar bone. Using the appropriate Patella Peg Stop Drill, drill the three peg holes (Figure 44).

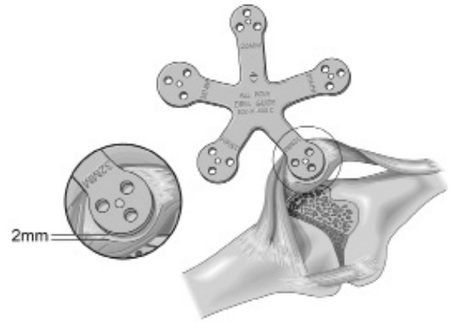

Figure 42

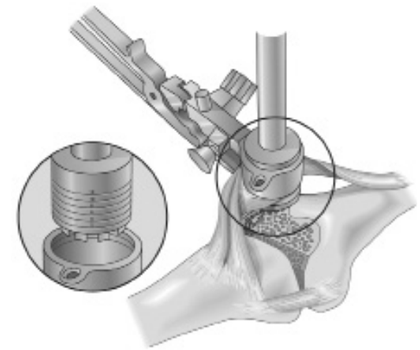

Figure 43

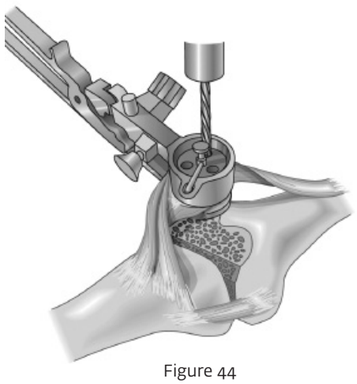

Figure 44

Surgical Technique
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Trial Reduction

Evaluation of implant fit can be accomplished by placing an appropriate size Femoral Trial, Patellar Trial, Tibial Sizing Template, and Tibial Insert Trial into the prepared joint space. This should be done with the tibial trial first to allow ease of femoral trial placement. Sometimes a retractor used to elevate the posterior femur off the tibia makes it easier. The Axial Alignment Rods can then be used to assess the alignment of the joint (Figure 45).

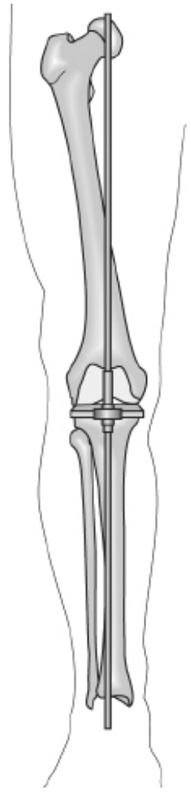

Figure 45

Tibial Component

Place a layer of bone cement on the proximal tibia pressing the cement into the broached keel area. Using the Tibial Impactor and a mallet, impact the tibial component into the tibia until it is fully seated on the tibia (Figure 46). Remove any excess bone cement paying particular attention to area where the tibial insert will be installed. Bone cement remaining near the locking mechanism of the tibial component will prohibit the insert from properly seating in the tibial tray.

Tibial Insert

Place the insert into the tibial baseplate making sure that the posterior feet on the insert catch under the posterior lips on the baseplate. Using the Insert Impactor at a 45° angle, impact the insert into the tray. One impact should be adequate to secure the anterior locking mechanism on the implant (see Figure 47). Tighten the tibial insert attachment screw (captured in the tibial insert) into the tibial baseplate. The recommended applied torque to properly attach the locking screw is 45"lbs. A torquelimiting driver is provided as a minimal value torque (Figure 48). Torque applied is 45"lbs at nominal when the handle gives way and an audible click is heard.

Figure 48

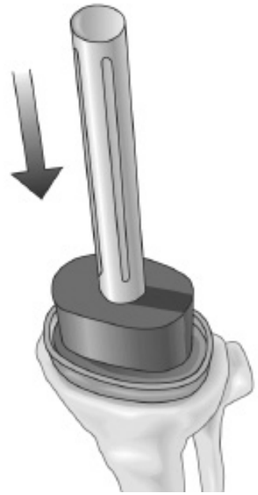

Figure 46

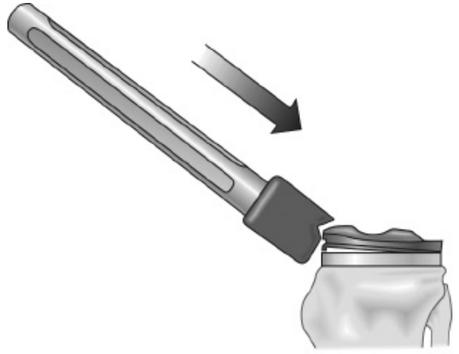

Figure 47

Surgical Technique
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Component Implantation
Femoral Component

Place a thin layer of cement on the internal surfaces of the posterior condyles and posterior chamfer of the femoral component. Then place a layer of cement on the distal femur anterior chamfer and anterior flange area. Using the Femoral Impactor and a mallet, impact the femoral component onto the femur until it is fully seated on the end of the femur (Figure 49). Remove any excess bone cement paying particular attention to the polished articulating surface of the implant and intercondylar area. Now irrigate the joint thoroughly to remove any cement particles.

Patellar Component

Place a layer of bone cement on the underside of the patellar component and on the prepared patella surface. Using the appropriate size Patella Inserter in the Patella Clamp, secure the patellar component in position and tighten the clamp (Figure 50). You may leave the clamp in the secured position until the cement is hard but this is not always necessary. While the cement cures remove any excess cement from around the component.

Wound Closure

After cement polymerization has occurred, the knee should be taken through a range of motion to ensure proper function before closure of the knee. The tourniquet need not be released before closure as long as the lateral geniculate artery has been cauterized. This has been shown to lessen total blood loss. One may choose to employ a closed wound suction device for the immediate recovery period. A standard closure should now be completed. The deep closure proximal and distal to the patella should be closed with an absorbable #1 suture in a running fashion. The capsule around the patella should be closed with interrupted figure of eight non-absorbable #1 sutures. The subcutaneous layer can be closed with 2-0 absorbable sutures either running or interrupted. The skin can be closed with a 3-0 subcutaneous absorbable followed with optional reinforcing skin staples. Verify the final range of motion to ensure complete flexion capabilities and the integrity of the sutures.

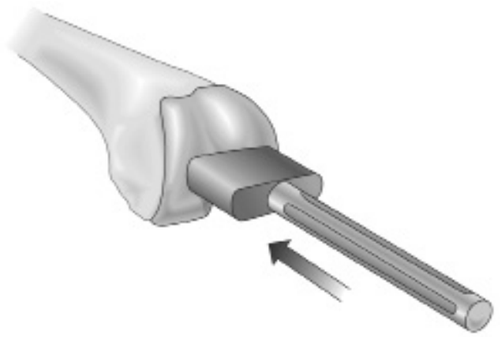

Figure 49

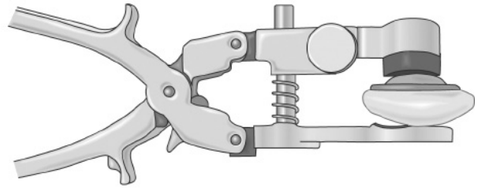

Figure 50

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