

SPC Distal Cut First Surgical Technique



Introduction

The GENESIS[®] II Total Knee System has been designed to offer the orthopaedic surgeon solutions to address intraoperative situations. Implant function is directly related to accurate surgical technique. GENESIS II instrumentation has been developed to be an easy-to-use system that will assist the surgeon in obtaining accurate and reproducible knee alignment.

The instrumentation can be used in minimally invasive or standard exposures. While it has been the designers' objective to develop accurate, easy-to-use instrumentation, each surgeon must evaluate the appropriateness of the following technique based on his or her medical training, experience and patient evaluation.

Contributing Clinicians

Robert B. Bourne, MD, FRCSC
Chief of Orthopaedic Surgery
University Hospital
The University of Western Ontario
London, Ontario, Canada

William B. Smith, MD
Assistant Clinical Professor in Orthopaedic Surgery
Medical College of Wisconsin
Columbia Hospital
Milwaukee, Wisconsin

Steven B. Haas, MD, MPH
Professor of Orthopaedic Surgery
Weill Medical College of Cornell University
Associate Chief of the Knee Service
The Hospital for Special Surgery
New York, New York

Mark A. Snyder, MD
Director of the Deaconess Hospital
Total Joint Program
Chairman of the Division of Orthopaedic Surgery
President of the Deaconess Hospital Foundation
Cincinnati, Ohio

Richard S. Laskin, MD
Professor of Orthopaedic Surgery
Weill Medical College of Cornell University
Co-Chief, Knee Service
The Hospital for Special Surgery
New York, New York

Todd V. Swanson, MD
Desert Orthopaedic Center
Las Vegas, Nevada

Jan Victor, MD
Department of Orthopaedics
St. Lucas Hospital
Brugge, Belgium

Michael D. Ries, MD
Professor and Vice Chairman
University of California, San Francisco
Department of Orthopaedic Surgery
San Francisco, CA

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Nota Bene:

The technique description herein is made available to the healthcare professional to illustrate the authors' suggested treatment for the uncomplicated procedure. In the final analysis, the preferred treatment is that which addresses the needs of the patient.

Distal Cut First Short Technique

Femoral Preparation



Use the 9.5mm drill to open up the femoral canal and slide the valgus alignment assembly until at least one side contacts the distal femur



After the assembly is placed in neutral rotation, impact the floating spikes into the distal femur and secure the distal block with pins.



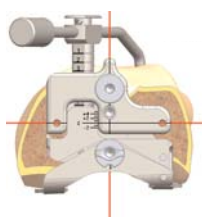
Remove the IM rod, unlock the lever on the valgus alignment guide and remove the valgus alignment assembly using the universal extractor.



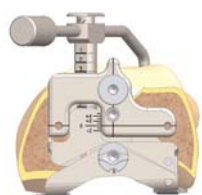
Resect the distal femur.



Position the sizing guide flush against the distal femur, while ensuring that the posterior paddles are contacting the underside of both posterior condyles.



To set rotation: Pin through lateral pivot pinhole, located on the lower lateral corner of the sizing guide. Adjust external rotation of the sizing guide by turning the rotational adjustment knob clockwise (0-6°.)



Fixed posterior referencing: Ensure the sizing guide is set in the "0" position. Drill and insert two pins through the locator holes of the sizing guide. Determine the size of the component by the graduations on the stylus. If the femur is in-between two sizes, choose the larger size.



Adjustable anterior and posterior referencing: Position the sizing guide stylus so that it contacts the lateral ridge of the anterior cortex and determine the size from the graduations on the shaft of the stylus.



If the indicated size is in-between two sizes, turn the upper hex screw clockwise to the next lower size for anterior referencing or turn the upper hex screw counter clockwise to the next larger size for adjustable posterior referencing. To lock in position tighten the locking hex screw. Drill to mark the locator holes for the A-P cutting block



Place the correctly sized A-P cutting block on the distal femur and make anterior, posterior and chamfer cuts.

Tibial Preparation



Extramedullary tibial alignment: Assemble extramedullary tibial guide with the non-spiked (shown) or spiked rod and place on tibia. Align guide over medial third of the tibial tubercle and parallel to the tibia.



Intramedullary tibial alignment: Place the intramedullary alignment assembly on the tibia. The alignment rod should align with the medial third of the tibial tubercle. Impact assembly.



Attach the tibial stylus to the tibial cutting block and lower the cutting block until the stylus touches the low point on the least affected side of the tibia. Once the resection level is determined, insert pins to secure and remove alignment assembly.



Resect the proximal tibia.



Size the tibia.

Posterior-Stabilized



Pin trial through anterior flange. Select the Housing Resection Collet matching the femoral trial size (either 1-2 or 3-8).



Ream through the collet until the depth stop contacts the collet and then move the reamer anterior and posterior until it contacts the depth stop.



Impact the housing box chisel anteriorly and posteriorly through the housing resection collet to square the corners of the PS box resection.



Select the appropriate size Femoral Trial Cam Module, insert the arms of the cam module into the anterior aspect of the femoral trial box and rotate posteriorly.

Final Preparation



Prepare the patella using surgeon's preferred technique.



After trial ROM and alignment checks, select the appropriate trial fin punch and punch through the trial.



Seat the tibial implant with the tibial impactor.



Place the femoral implant on the femur and use the femoral impactor to fully seat the implant



Place the patellar implant onto the patella and clamp onto the bone to pressurize.



Attach the articular inserter/extractor to the tibial tray (for standard inserts). Lift inserter superiorly until the anterior lip of the insert is fully seated.

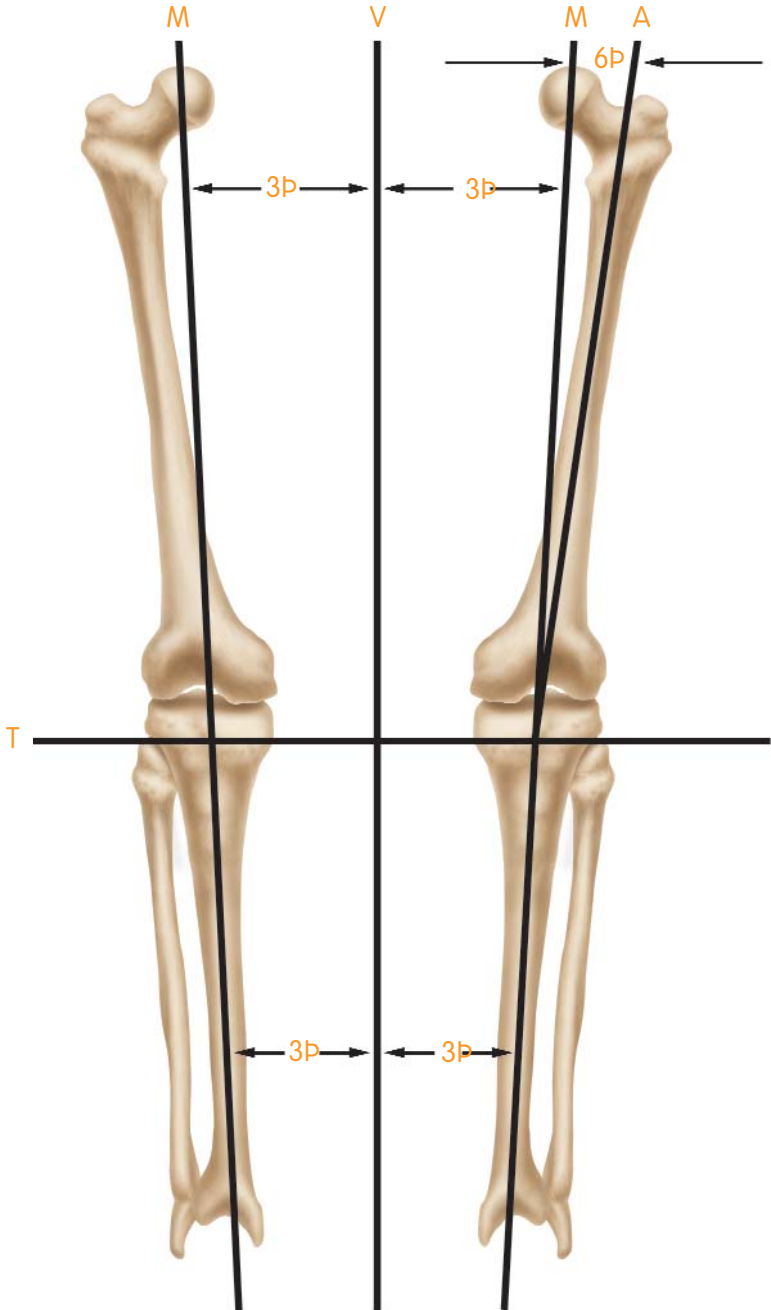
Preop Planning

Determine the angle between the anatomical and the mechanical axes. This measurement will be used intraoperatively to select the appropriate valgus angle so that correct limb alignment is restored. *(Beware of misleading angles in knees with a flexion contracture or rotated lower extremities.)* The T-template provided as part of the GENESIS[®] II templates will help in this determination.

Tip: Many surgeons prefer to simply select a standard angle for the distal femoral cut (i.e., 5°, 6° or 7°) based on the patient and surgical experience.

Recommended Sawblades*	
Cat. No.	Description
7151-2901	Stryker 2000 (Fanned)
7151-2905	Stryker 2000 (Straight)
7151-2911	Hall Powerpro (Fanned)
7151-2904	3M (Fanned)
7151-2908	3M (Straight)
7151-2910	VersiPower (Fanned)
Or any 0.053" or 1.35mm thickness sawblade	

*For MIS-style blocks only.



M = Mechanical Axis
A = Anatomical Axis
T = Transverse Axis
V = Vertical Axis

Femoral Preparation

Intramedullary Femoral Alignment

1. Open the femoral canal with a 9.5mm intramedullary drill (*Figure 1*).

Instrument Assembly:

- a. Attach the selected valgus angle bushing (5°, 6° or 7°) to the valgus alignment guide. Check the bushing position to make sure that “left” is facing anteriorly when operating on a left knee and “right” is facing anteriorly when operating on a right knee.
- b. Attach a modular T-handle to the IM rod and insert through the alignment assembly (*Figure 2*).
- c. Assemble the distal femoral cutting block onto the valgus alignment guide. Positioning the block at the “primary” resection level will ensure the cut will equal the distal thickness of the femoral prosthesis. Lock by pressing the lever in a horizontal position toward the medial side.

Tip: If desired, the distal femoral cutting block may be set to resect an additional +2, +5 or +7mm of bone.

2. Slide the intramedullary rod of the assembly into the femoral canal until the alignment guide contacts the distal femur (*Figure 3*).

Tip: There may be times when only one side of the guide will touch bone.

3. Orient rotation of the assembly neutral to the posterior condyles (*Figure 4*) and impact one or both of the floating spikes into the distal femur.



Figure 1



Figure 2

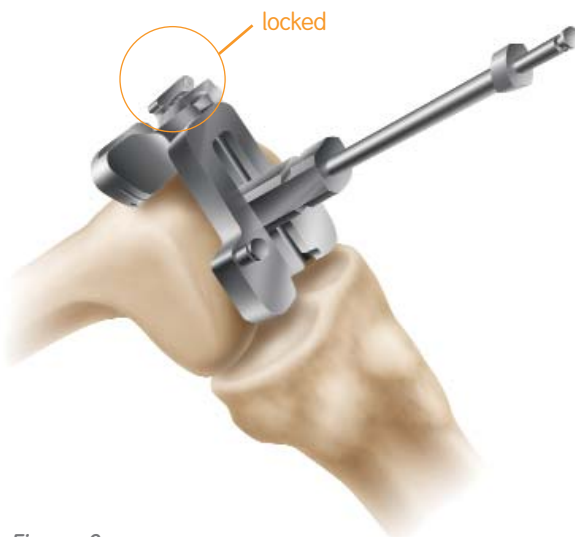


Figure 3



Figure 4

Femoral Preparation

Distal Femoral Resection

1. Using non-headed pins, pin the distal femoral cutting block to the anterior femur using the holes marked "0." Once adequate distal femoral resection is noted, an additional headed or non-headed pin should be placed obliquely to provide additional stability (*Figure 5*).
2. Unlock the lever on the valgus alignment guide, remove the intramedullary rod and the valgus alignment assembly using the universal extractor (*Figure 6*). Only the distal femoral cutting block should remain on the femur.
3. Resect the distal femur (*Figure 7*), then remove the distal femoral cutting block.

Tip: If the distal femoral resection is not adequate, remove the oblique headed pin, and reposition the block through the pin holes marked +2, +4, or +6mm for the desired level of resection and re-insert the oblique pin.

See the sawblade chart on page 6 for sawblades that work with GENESIS® II MIS cutting block tolerances.



Figure 5

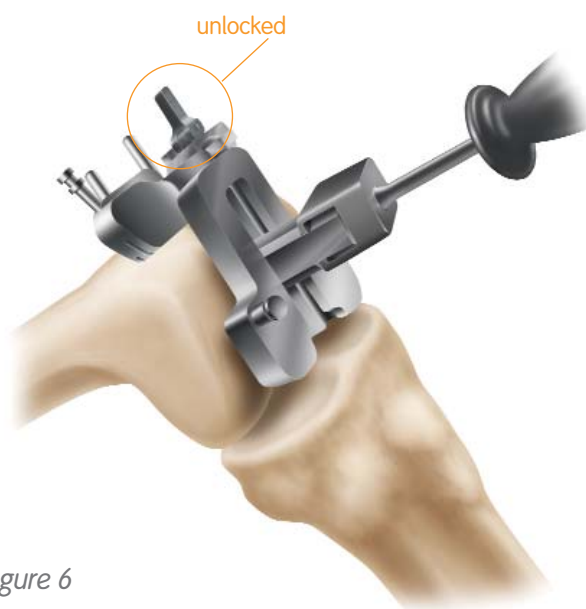


Figure 6



Figure 7

Femoral Preparation

The sizing guide allows for external rotation to be set from zero to six degrees based on surgeon preference and patient anatomy. Rotational alignment may be checked by aligning the A-P axis with the pointer on the sizing guide (*Figure 8a*) or by ensuring that the laser marked lines on the face of the guide are parallel with the epicondylar axis (*Figure 8b*). The rotational adjustment knob on the lower portion of the guide is turned to dial in rotation (*Figure 8c*).

A unique feature of the sizing guide for this system is that it may be used in a traditional fixed posterior referencing manner or can be adjusted anteriorly or posteriorly when the component is in between sizes and the surgeon wishes to fine-tune femoral placement. With posterior referencing, the larger size is usually chosen, which has the advantage of balancing the flexion and extension spaces. Possible disadvantages to posterior referencing may include either notching the anterior cortex or overstuffing the patellofemoral joint. With anterior referencing, the smaller size is usually chosen, which reapproximates the patellofemoral joint and reduces the chance of notching but may leave the knee loose in flexion. (For a full discussion on anterior and posterior referencing, please see Appendix C).

Surgeons wishing to use the guide in a fixed posterior referencing manner should turn to page 11. However, the guide also allows for adjustable anterior or posterior referencing. When in between sizes, the surgeon can choose to adjust sizing up to 4mm anteriorly, thereby taking up to an additional 4mm off the anteriorly of condyles, or up to 2mm posteriorly, taking up to an additional 2mm off of the anterior cortex. To use the sizing guide in this manner, femoral size is read from the graduations on the stylus arm relative to the anterior surface.

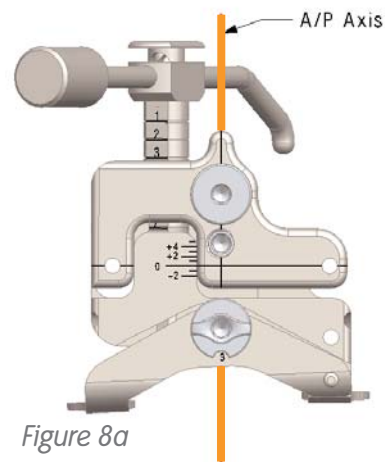


Figure 8a

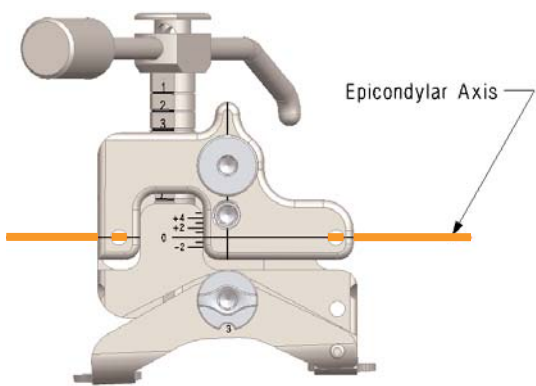


Figure 8b

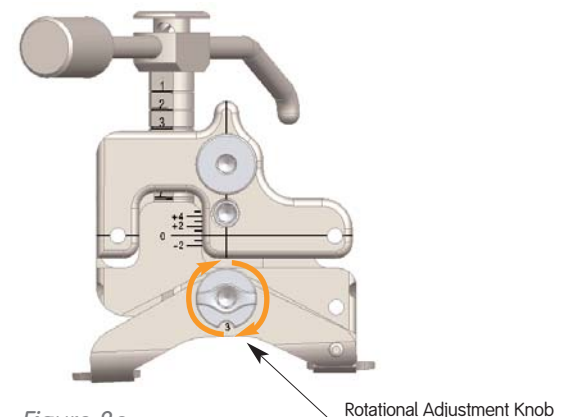


Figure 8c

Femoral Preparation

If the anterior surface of the guide is in between two sizes when it is at the zero position, the upper hex screw can be rotated to shift the anterior face of the sizing guide up to the next smaller size or down to the next larger size on the stylus. As a result, the locator holes for the A-P cutting block are shifted either anteriorly or posteriorly to align with the next implant size (Figure 9)

Tip: The gap between the top of the sizing guide and the stylus graduation line indicates how much bone will be removed from either the anterior cortex or posterior condyles by choosing the next larger size (Figure 10).

Sizing Guide Procedure: Rotation

1. Flex the knee, approximately 90° so the posterior condyles are accessible.
2. Choose appropriate sizing guide, “LEFT” for a left knee and “RIGHT” for a right knee.
3. Position the femoral sizing guide flush against the distal femur, while ensuring the posterior paddles are contacting the underside of both posterior condyles. Once correct position of sizing guide is established, place a pin through lateral pivot pinhole located in the posterior-lateral corner on the face of the sizing guide (Figure 11).
4. Adjust the external rotation of the sizing guide to be aligned anatomically with the Epicondylar and/or A/P axis. This can be achieved by turning the ROTATIONAL ADJUSTMENT KNOB clockwise (0-6°) using a hex screwdriver (Figure 12).
5. Once rotation is set, sizing can be established either by fixed posterior referencing or adjustable referencing.

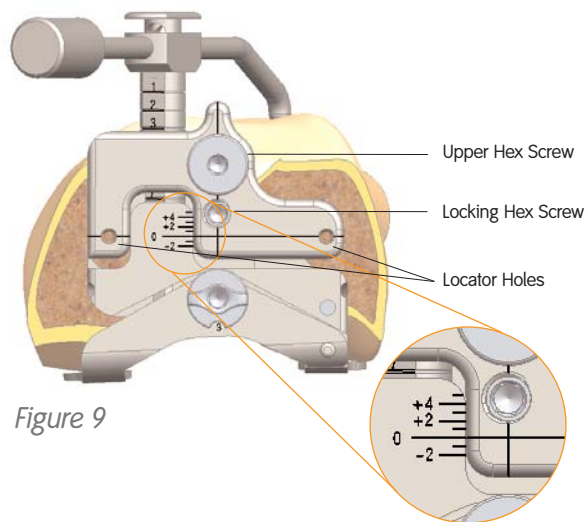


Figure 9

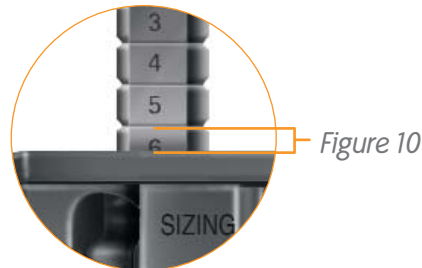


Figure 10

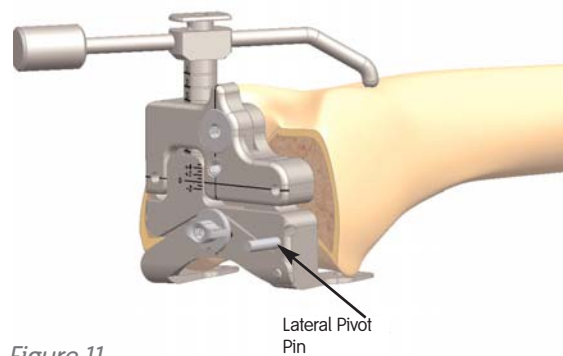


Figure 11

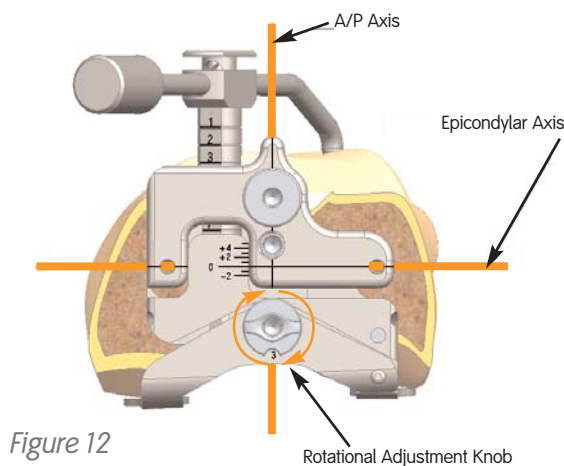


Figure 12

Sizing Guide Procedure: Fixed Posterior Referencing

1. Ensure that the anterior surface of the sizing guide is set in the "0" position.
2. Drill and insert two pins through the locator holes of the sizing guide to secure the guide.
3. Position the sizing guide stylus so that it contacts the lateral ridge of the anterior femoral cortex (highest point on the anterior cortex of the femur).
(Figure 13)
4. Determine the size of the component from the graduations on the shaft of the stylus.
5. If the femur is between sizes, chose the larger size.
6. Remove the pins and the sizing guide

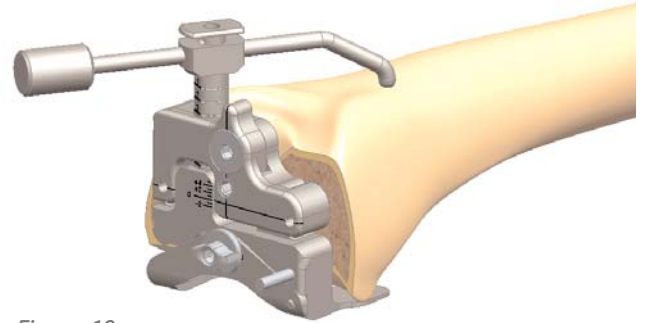


Figure 13

Sizing procedure: Adjustable Anterior or Posterior Referencing

1. Ensure that the anterior surface of the sizing guide is set in the "0" position.
2. Drill and insert two pins through the oblique holes of the sizing guide to secure the guide.
3. Position the sizing guide stylus so that it contacts the lateral ridge of the anterior femoral cortex (highest point on the anterior cortex of the femur).
(Figure 14)
4. Determine the size of the component from the graduations on the shaft of the stylus.
5. If the indicated size is in-between sizes, you can turn the UPPER HEX SCREW (Figure 14) to shift the anterior surface up to an additional 4mm to the next smaller size or down an additional 2mm to the next larger size (Figure 15 a and b). Once the appropriate size is selected, turn the LOCKING HEX SCREW to lock the anterior surface and drill holes into position (Figure 14).
6. Drill the locator holes on the anterior face of the sizing guide to set position for the cutting block.
7. Remove the pins and sizing guide.

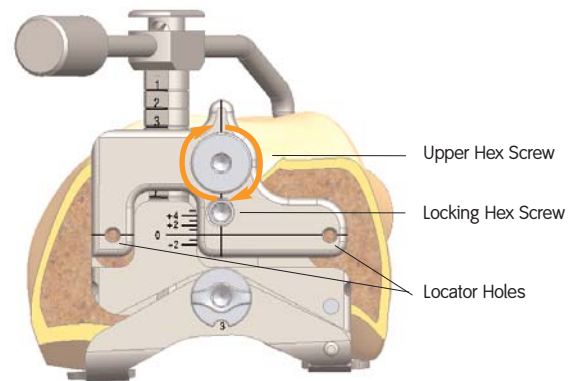


Figure 14

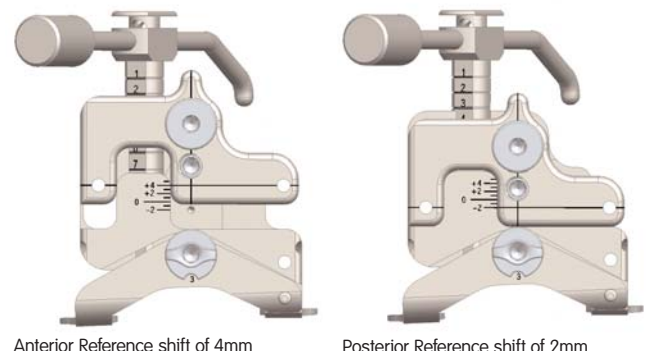


Figure 15a and b

Femoral Preparation

A-P Femoral Resection

1. Position the fixed spikes on the A-P cutting block into the predrilled holes.

Tip: It is not necessary that the block be centered M-L on the distal femur.

2. Ensure that the cutting block is flush with the resected distal femur. Several holes in the A-P block allow fixation of the block. Place one pin centrally through one of the middle holes just medial or lateral to the quick-connect attachment. For additional stability, a headed pin may be placed through the holes on the medial or lateral side of the block (Figure 16).



Figure 16

3. Complete the anterior, posterior and chamfer cuts (Figures 17-20). The block is designed to allow for angling of the sawblade during the cuts.

Tip: To maintain block stability, the anterior chamfer cut should be completed last.

Tip: Some surgeons prefer to make the chamfer cuts after assuring that the flexion and extension spaces are equal. If desired, chamfer cuts may be made through the posterior stabilized femoral housing block or through dedicated chamfer cutting blocks.



Figure 17



Figure 18



Figure 19



Figure 20

Femoral Preparation

Downsizing the Femoral Component

1. Attach the downsizing drill guide to the cut femur, placing the spikes on the back of the plate into the same location holes used for the A-P cutting block (Figure 21).
2. Drill new location holes through the downsizing drill guide (shifted 2mm anterior).
3. Place the smaller A-P cutting block into the new location holes. Redo the posterior, anterior and chamfer cuts.

Tip: It is useful to mark the original pin track holes with methylene blue in order to properly identify the new holes.



Figure 21

Tibial Preparation

The system allows the surgeon to perform either extramedullary or intramedullary tibial alignment. For intramedullary tibial alignment, turn to page 19.

When using the extramedullary tibial alignment, the surgeon may use a non-spiked or spiked fixation rod. For tibial preparation using the extramedullary guide with a non-spiked fixation rod see below. For tibial preparation using the extramedullary guide with a spiked rod, turn to page 17.

Extramedullary Tibial Alignment

Instrument Assembly:

- Insert the ankle clamp into the distal end of the alignment tube and thread the locking pin into the ankle clamp (Figure 22).
- After the ankle clamp is moved into the proper position, lock into place with the gold knob.
- Choose the correct left or right tibial cutting block. Select the spiked or non-spiked fixation rod.



Figure 22

Non-spiked Fixation Rod

Instrument Assembly:

- Place the appropriate left or right tibial cutting block on top of the disc on the non-spiked fixation rod (Figure 23). Tighten the central knob to lock the block into position.
- Introduce the rod into the Extramedullary Assembly and adjust and lock the cam in the assembly.

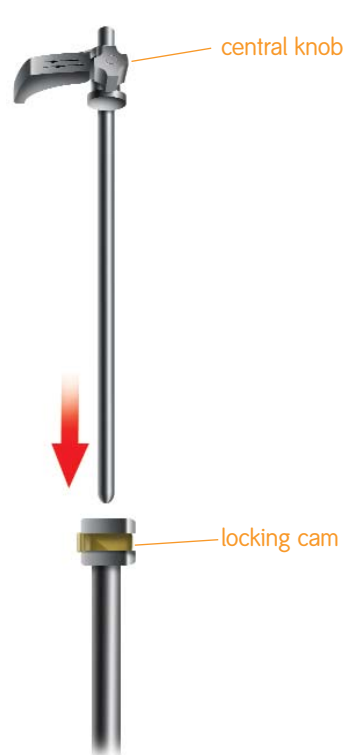


Figure 23



Figure 24

- Place the arms of the extramedullary alignment clamp around the ankle, and adjust the distal M-L slide directly over the middle of the tibiotalar joint, which is also approximated by the second ray of the foot proximal to the malleoli (Figure 24). The cutting block on the proximal end of the assembly should be proximal to the tibial tubercle (Figure 25).



Figure 25

Tibial Preparation

2. Assess rotation of the alignment guide and slope of the cutting plane. The goal is to align the extramedullary alignment assembly rotationally so that it aligns over the medial third of the tibial tubercle and over the second toe (*Figure 26*).
3. Rotational alignment is critical due to the 3° posterior sloped cut. The slope can be adjusted according to the patient's anatomy (*Figure 27*).

Note: 3-5° of slope is built into the articular insert (depending on which insert is chosen) and 3° of slope is built into the tibial cutting block. A neutral or slightly sloped alignment should usually be chosen.

Tip: Neutral or minimally sloped alignment may be achieved by palpating the fibula followed by aligning the alignment guide parallel to the fibula. Tibial bowing and soft tissue bulk may make external tibial referencing unreliable.



Figure 26



Figure 27

Spiked Fixation Rod

Instrument Assembly:

- a. Place the spiked fixation rod through the central anterior hole in the tibial cutting guide; adjust the block and tighten the central knob to lock the block in position.
- b. Introduce the spiked fixation rod into the proximal end of the alignment assembly and adjust and lock the cam on the assembly (Figure 28).

1. Place the arms of the extramedullary alignment clamp around the ankle, and adjust the distal M-L slide directly over the middle of the tibiotalar joint which is also approximated by the second ray of the foot proximal to the malleoli (Figure 29). The cutting block on the proximal end of the assembly should be proximal to the tibial tubercle (Figure 30).
2. Impact the longer spike of the spiked fixation rod into the proximal tibia (Figure 31).

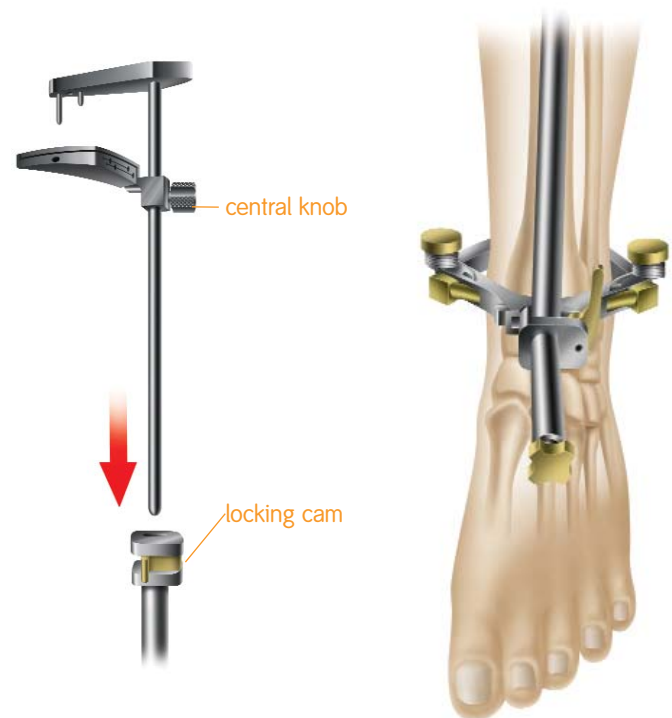


Figure 28

Figure 28



Figure 30

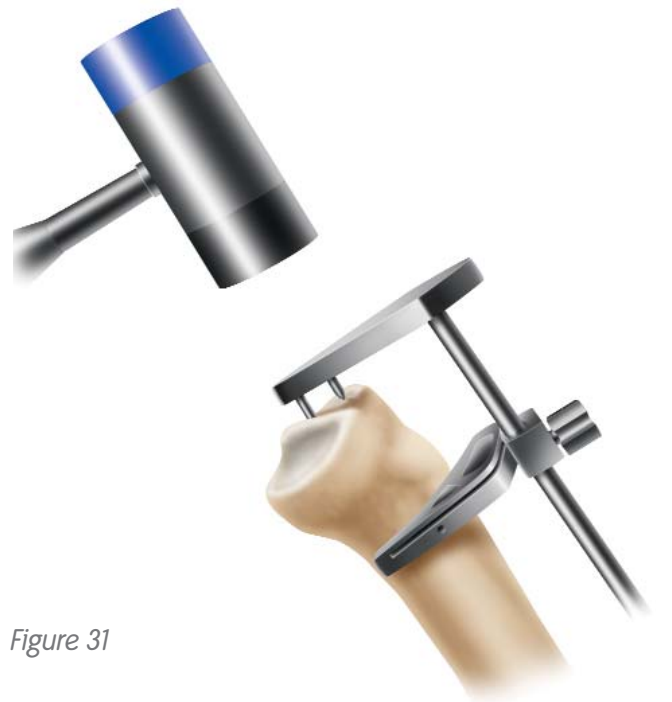


Figure 31

Tibial Preparation

3. Assess rotation of the alignment guide and slope of the cutting plane. The goal is to align the extramedullary alignment assembly rotationally so that it aligns over the medial third of the tibial tubercle and over the second toe (*Figure 32*).
4. Rotational alignment is critical due to the 3° posterior sloped cut. The slope can be adjusted according to the patient's anatomy (*Figure 33*). Impact the second spike to secure the assembly (*Figure 34*).

Note: 3-5° of slope is built into the articular insert (depending on which insert is chosen) and 3° of slope is built into the tibial cutting block. A neutral or slightly sloped alignment should usually be chosen.

Tip: Neutral or minimally sloped alignment may be achieved by palpating the fibula followed by aligning the alignment guide parallel to the fibula. Tibial bowing and soft tissue bulk may make external tibial referencing unreliable.



Figure 32



Figure 33



Figure 34

Intramedullary Tibial Alignment

Instrument Assembly:

- a. Insert the external rod of the Intramedullary Tibial Alignment Guide through the middle hole on the correct left or right tibial cutting block and lock the cam (Figure 35).
- b. Attach the T-handle to the IM rod and pass it through the cannulated alignment sleeve on the alignment assembly (Figure 36).

1. Make a 9.5mm pilot hole into the tibial canal (Figure 37) (generally 2-3mm medial to the midline). A preliminary resection of the tibial spine may facilitate seating of the tibial drill guide onto the proximal tibia.



Figure 36

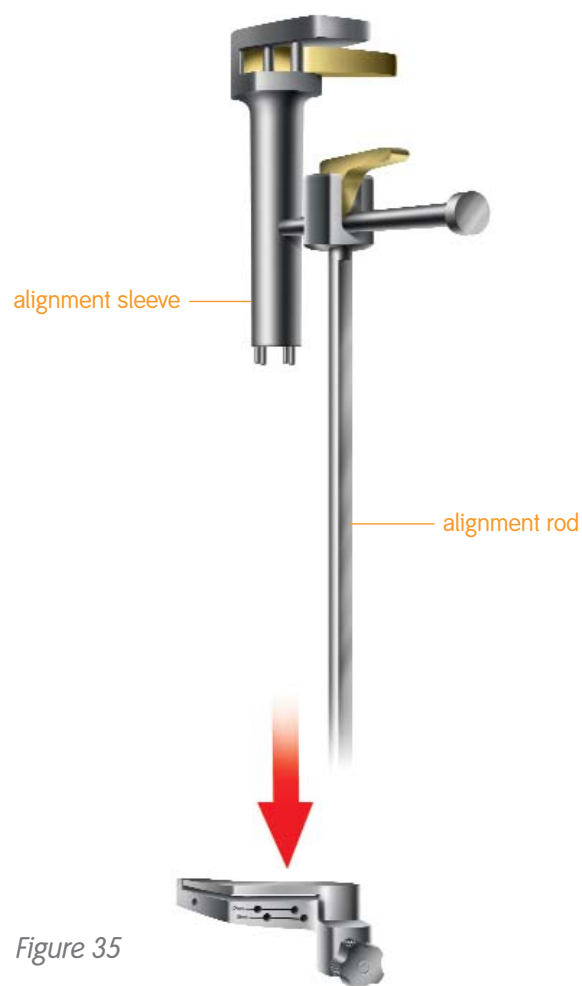


Figure 35



Figure 37

Tibial Preparation

2. Slowly insert the IM rod into the tibial canal.
3. Assess rotation of the intramedullary tibial alignment guide. Rotational alignment is critical due to the 3° posterior sloped cut. The alignment rod of the intramedullary tibial alignment assembly should align with the medial third of the tibial tubercle (*Figure 38*).
4. Impact the proximal end of the cannulated alignment sleeve to drive the distal spikes into the proximal tibia to lock rotational alignment (*Figure 39*).



Figure 38

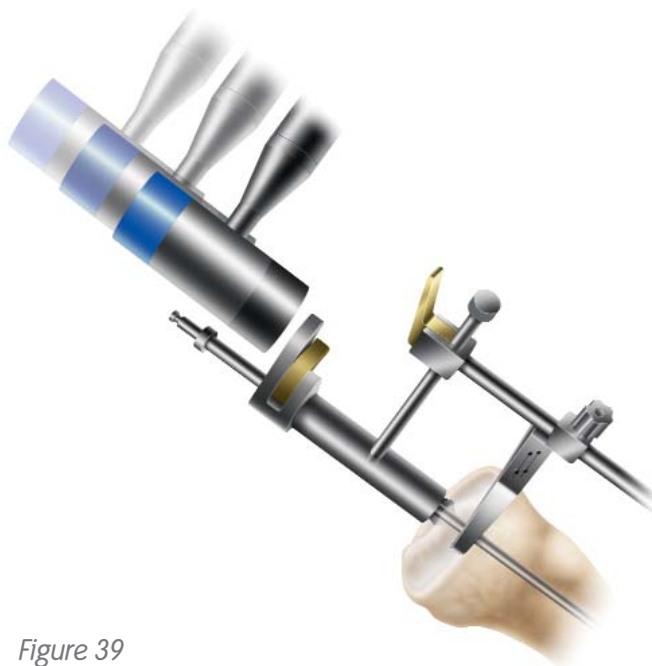


Figure 39

Tibial Resection

1. Attach the tibial stylus to the tibial cutting block by inserting the stylus foot into the cutting slot.
2. Lower the cutting block until the stylus touches the low point on the less affected side of the tibia (Figure 40). The stylus can be adjusted for a 9, 11 or 13mm tibial resection by twisting the knob on top of the stylus.
3. Pin the tibial cutting block to the tibia by inserting pins first through the central holes; then the oblique hole.

Tip: Pinning through the central holes marked 0mm with smooth pins will allow the block to be moved +2mm should additional resection be required (Figure 41).

Tip: A 9mm resection is recommended since 9mm of metal and plastic is the thinnest available component.

Tip: To do an extramedullary alignment check, place the extramedullary alignment rod through the tibial cutting block.



Figure 40



Figure 41

Tibial Preparation

4. To remove the assembly:

- a. For the intramedullary alignment assembly, use the universal extractor leaving the cutting block on the anterior tibia (*Figure 42*) after loosening the thumbscrew.
- b. For the extramedullary assembly with spiked rod, release the cam at the top of the alignment tube and using the slap hammer to remove the spiked fixation rod (*Figure 43*) after loosening the thumbscrew.
- c. The extramedullary assembly with the non-spiked rod may be left in place or removed by loosening the thumbscrew and lowering the non-spiked rod to disengage from the tibial cutting block.



Figure 42



Figure 43

5. Cut the tibia by first directing the blade in the posterior direction and then laterally (Figure 44).
6. Check alignment and balance with spacer block and rod (Figures 45 & 46). Balance ligaments in standard fashion.

Tip: Since the spacer block has one end for asymmetric posterior condyles and one for extension, ensure that the end is used for both extension and flexion for SPC.



Figure 44



Figure 45



Figure 46

Tibial Sizing

Option A – Stemless Tibial Trials

1. Attach a quick-connect handle to a stemless trial one size below the femoral component size and place on the cut tibia to assess coverage (Figure 47). As needed, additional sizes should be templated using the stemless trials.
2. Once the appropriate size is determined, pin the medial size of the selected stemless trial with a short headed pin.
3. Place a trial insert into the stemless tibial trial tray and perform a trial range of motion to allow the baseplate to center on the femoral trial. (As a secondary check, the surgeon may pass the alignment rod through the quick-connect handle to assess alignment) (Figure 48). Pin the lateral side of the trial.

Tip: After putting the knee through a trial ROM, the surgeon should note the proper rotation of the trial tibial component on the proximal tibia and mark the tibia for future reference.

Tip: The center-line marks on the femoral and tibial trial components usually line up.

4. Using the tibial fin/stem punch, rotational alignment may be set now or at the time of trial placement. See page 38.

Tip: In the case of sclerotic bone, first drill for the stem using the 11mm tibial drill. To avoid fracture, predrill the tibial plateau with a 1/8" drill bit.



Figure 47

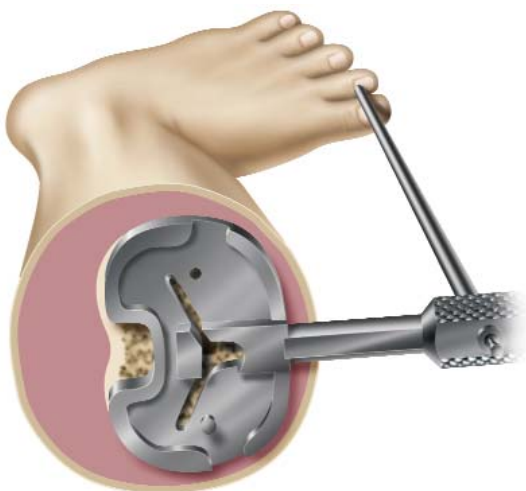


Figure 48

Option B – Stemmed Tibial Trials

1. Place a tibial drill guide one size below the femoral component size on the cut tibia to assess coverage. As needed, additional sizes should be templated (Figure 49).
2. Once the tibial drill guide has been centralized on the proximal tibia, pin the drill guide in place. Retract the gold collar on the drill guide handle and insert the 11mm tibial collet.
3. With the 11mm tibial collet in place, drill with the 11mm tibial drill (Figure 50) and punch with the 11mm tibial punch (Figure 51). If a 9.5mm hole has already been made for use of the intramedullary tibial alignment assembly, you only need to utilize the 11mm tibial punch at this time.
4. Remove the tibial drill guide.
5. Place the stemmed tibial trial into the prepared hole.
6. Using the tibial fin punch, rotational alignment may be set now or at the time of trial placement. See page 38.

Tip: After putting the knee through a trial ROM, the surgeon should note the proper rotation of the trial tibial component on the proximal tibia and mark the tibia for future reference.

Tip: The center-line marks on the femoral and tibial trial components usually line up.



Figure 49



Figure 50

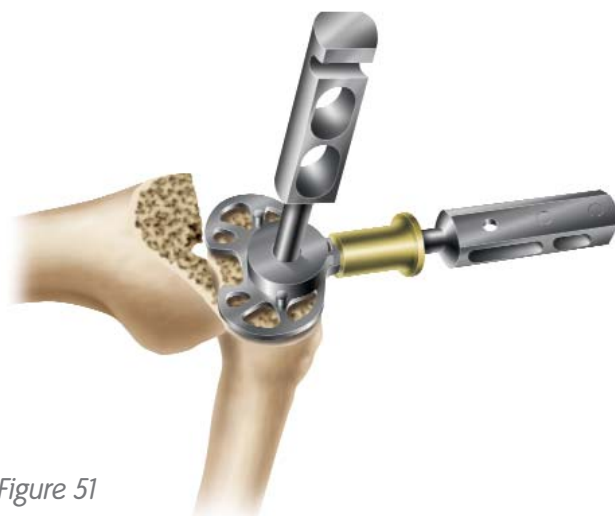


Figure 51

Femoral Sizing and Placement

Femoral Housing Box Resection

1. Pin the femoral trial through the anterior flange (*Figure 52*).
2. Choose the Housing Resection Collet matching the femoral trial size (either 1-2 or 3-8). Attach the collet to the femoral trial by sliding the housing collet (anterior to posterior) into the slots on the distal face of the femoral trial and threading the two posts into the femoral trial. The housing collet should be secured in the anterior position first and then shifted to the posterior position and screwed.
3. Attach the housing reamer dome and the PS reamer sleeve to the patellar reamer shaft. Ream through the housing resection collet in both the anterior and posterior positions until the depth stop contacts the collet (*Figure 53*).
4. Impact the housing box chisel through the housing resection collet to square the corners of the housing. The housing box chisel should be used anteriorly and then posteriorly to ensure that the full length of the box is prepared (*Figure 54*).



Figure 53



Figure 53

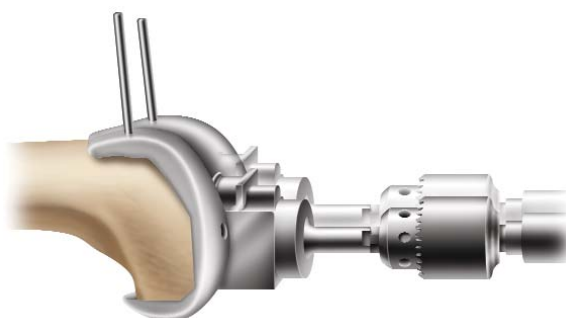


Figure 54

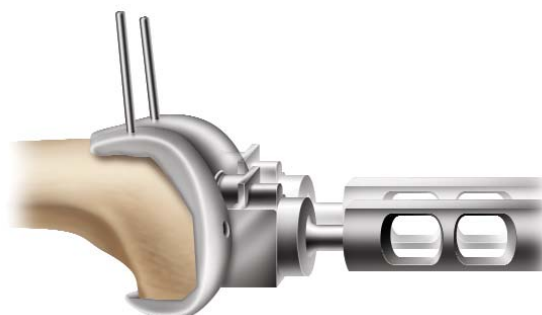


Figure 55

Femoral Trial Cam Module Assembly

1. Select the appropriate sized Femoral Trial Cam Module (matching the femoral trial size selected).
2. Insert the arms of the femoral cam module into the anterior aspect of the femoral trial box and rotate posteriorly until seated (*Figures 56 & 57*).

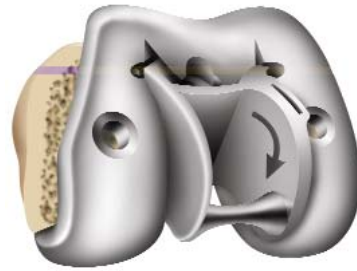


Figure 56

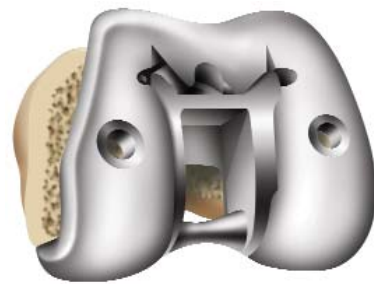


Figure 57

Resurfacing Patellar Preparation

The surgeon can choose from a freehand cutting technique with towel clips or if desired, he or she can choose one of the following instrumented techniques.

Resection Guide Technique

1. Measure the overall thickness of the patella with the patellar calipers (*Figure 58*).
2. Subtract from this number the thickness of the GENESIS® II round resurfacing patellar component, which is 9mm.

Note: The thickness of the GENESIS II oval resurfacing patellar component varies by diameter. See the chart on page 33.

3. The guide is set at the amount of bone that should remain after cutting the patella – i.e. the difference between the original patellar thickness and the implant thickness. The guide is set at this level by turning the knurled knob (*Figure 59*).

For example:

A. Measure the overall thickness of the patella with the patellar calipers. For this example, the patella measures 25mm.

B. Subtract the thickness of the round resurfacing patellar component. In this example, 9mm. (25mm - 9mm = 16mm). The guide should be set at 16mm for this example.



Figure 58



Figure 59

4. Cut the patella through the dedicated saw guides (Figure 60).
5. Drill for the three pegs (Figure 61), insert the resurfacing patellar trial and remeasure. The overall thickness should be equivalent to the original thickness (Figure 62).

Reaming Technique

The reaming technique described for the biconvex patella on page 35 can be used with the resurfacing patellar implant as well. The only differences in technique between it and the biconvex are the use of the RED resurfacing depth gauge, resurfacing reamers and the resurfacing drill guides.



Figure 60



Figure 61



Figure 62

Resurfacing Patellar Preparation

Patellar Large Reamer Resurfacing Instrumentation

The objective of this technique is to resurface the articular surface of the patella with the precision of a reaming technique. The reamed patellar surface can accommodate an oval or round resurfacing patellar component.

1. Trim tissue surrounding the patella using electrocautery (bovie) (Figure 63).
2. Use a rongeur to remove osteophytes and reduce the patella to its true size (Figure 64). The bovie should also be used to release soft tissue attachments to the estimated level of resection.
3. Place the collet over the patella so that it fits snugly around the patellar diameter (Figure 65). The goal is to reduce the patella to its smallest diameter so that the smallest possible collet will fit around the entire patella. Use the patellar reamer collet as a sizing template to select the appropriately sized collet and reamer.

Tip: The collet should be resting on the soft tissue surrounding the patella. If the patella does not enter the collet evenly but instead enters at an angle, the collet may not be completely surrounding the patella, but instead resting on part of the bone. If the collet is only slightly smaller than the patella, you may trim 1-2mm of the medial and lateral edges of the patella to ensure a snug fit. If the collet is far smaller than the patella, choose the next size up and assess fit.

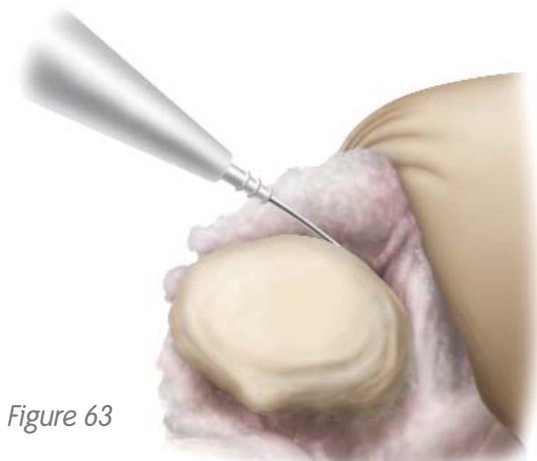


Figure 63



Figure 64



Figure 65

Surgeon Acknowledgement: The technique for the Patellar Large Reamer Resurfacing System was developed in conjunction with Warren Jablonsky, MD, McHenry County Orthopedics, Crystal Lake, IL.

4. Measure patellar thickness with the patellar calipers (Figure 66).

Tip: The patella should measure a minimum of 19mm before reaming to use this resurfacing technique.

Determine the design and diameter of the patellar implant to be used. A round or oval resurfacing design may be chosen. The round resurfacing patella is 9mm thick, and the depth stop for this technique prepares for 9mm resection. The oval patella's thickness varies.

Tip: Minor adjustments may be necessary at the time of resection to accommodate the largest diameter oval patellar implants. Please see chart on page 33.

Instrument Assembly:

- Slide the correct diameter of patellar reamer collet into place on the patellar reamer guide.
- Attach the patellar reamer guide to the patella.
- Secure the patellar reamer guide on the patella by tightening the set screw.
- Attach the matching size patellar reamer dome and large patellar depth stop to the patellar reamer shaft.

5. Rotate the BLACK resurfacing patellar depth gauge around so that the hooked end or "claw" surrounds the patellar reamer shaft (Figure 67). Lower the depth stop by compressing the button until it meets the depth gauge (Figure 68). Remove the depth gauge from the assembly. Ream the patella until the depth stop engages the patellar reamer guide (Figure 69).

Tip: Excessive force on the reamer shaft may alter the depth of resection, causing overreaming.



Figure 66



Figure 67



Figure 68

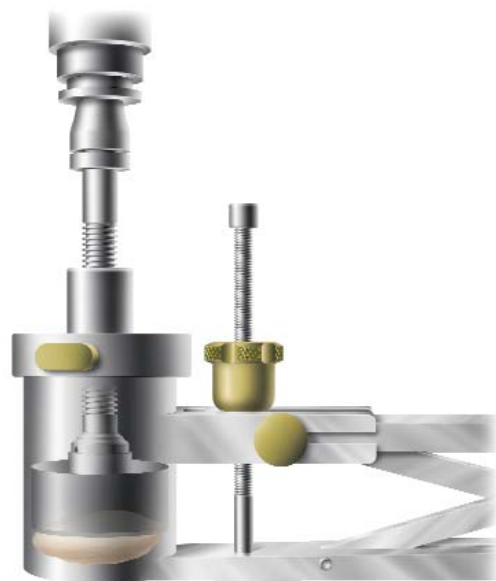


Figure 69

Resurfacing Patellar Preparation

6. After reaming, the patella should have a completely flat articular surface (*Figure 70*). Measure the resected patella to ensure adequate resection (the resected patella should measure its original depth minus 9mm).
7. Drill the appropriate fixation holes for the resurfacing patellar implant using the correctly sized drill guide and resurfacing drill (*Figure 71*).
8. Place the patellar trial into the prepared patella. If desired, use the calipers to remeasure the composite thickness of bone and trial.



Figure 70



Figure 71

Oval Resurfacing Patellar Preparation

The oval patellar implant can be prepared for use with any resurfacing technique; however, there are a few differences in final preparation. The patella has to be implanted in the proper orientation, where the extended lateral flange will be riding on the lateral side of the femoral component.

The oval patellar implant does not have the same thickness for all sizes. This is due to the varying offset needed to obtain the correct design for the different diameters. (See the chart for sizing/ thickness options.)

1. Mark the medial facet axis of the patella superior and inferiorly with a marking pen or use the laser etch line on the sizing guide to mark the vertical ridge of the patella.
2. Measure the depth of the patella at its maximum depth centrally along the medial facet (Figures 72 & 73).

Oval Patellar Sizing Options	
Oval Resurfacing Implant	
Diameter	Thickness
29mm	8.5mm
32mm	9.0mm
35mm	9.0mm
38mm	9.5mm
41mm	10.0mm



Figure 72

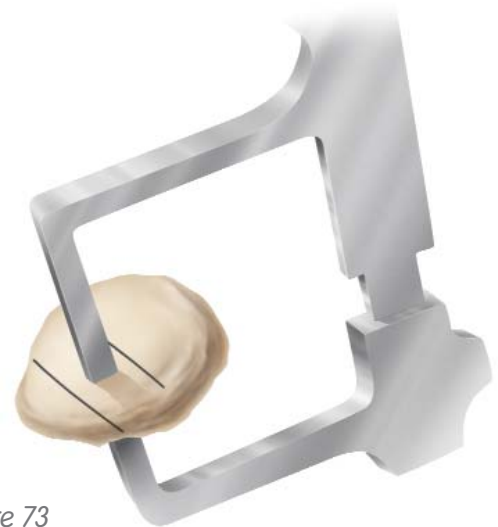


Figure 73

The technique for the Oval Patella was developed in conjunction with William J. Robb III, MD, Illinois Bone and Joint Institute, Glenbrook Hospital, Evanston Northwestern Healthcare.

Oval Resurfacing Patellar Preparation

3. Resect the patella using the preferred method.
4. Measure the diameter of the resected patella with the trial templates (*Figure 74*).
5. Centralize the thickest portion of the prosthetic patella along the line of the previously marked medial facet eminence.
6. Place the appropriate drill guide on the patellar reamer guide and clamp the guide to the patella. Drill to the measured depths (*Figure 75*).
7. Place the trial on the patella and remeasure the patella if desired (*Figures 76 & 77*).



Figure 74

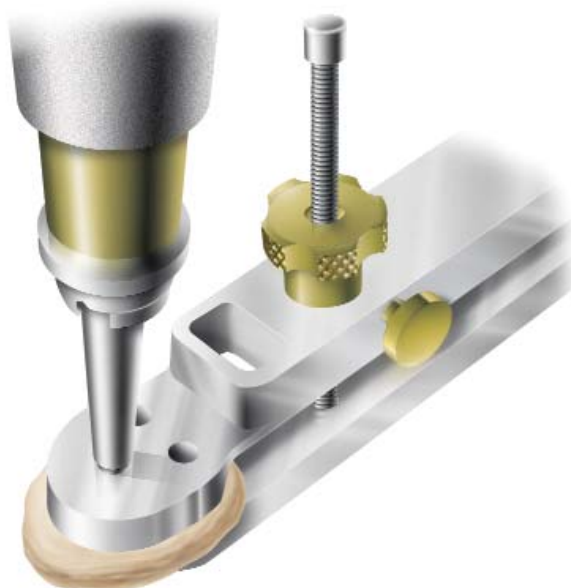


Figure 75



Figure 76



Figure 77

Biconvex Patellar Preparation

Biconvex Patella

Instrument Assembly:

Determine the appropriate diameter patellar implant, and select the correctly-sized patellar reamer collet and slide it into place on the patellar reamer guide (*Figure 78*).

1. Attach the patellar reamer guide to the patella. Tighten the patellar reamer guide on the patella (*Figure 79*).
2. Use the patellar calipers to measure the thickness of the patella (*Figure 80*).



Figure 78



Figure 79

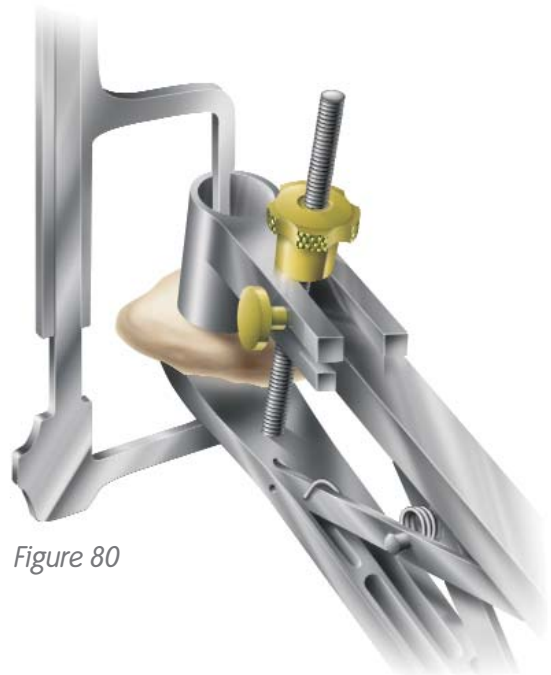


Figure 80

Biconvex Patellar Preparation

Instrument Assembly:

- a. Attach the BLUE patellar depth gauge to the reamer guide (Figure 81).
- b. Attach the matching sized patellar reamer dome and patellar depth stop to the patellar reamer shaft (Figures 82 & 83). Lower the assembly through the patellar reamer guide until the reamer dome contacts the patella.

3. Swing the patellar depth gauge around so that the "claw" surrounds the patellar reamer shaft.
4. Lower the patellar depth stop by pushing the gold button until it contacts the patellar depth gauge. The patellar depth stop will automatically lock in place (Figure 84).
5. Remove the depth gauge.
6. Ream the patella until the depth stop engages the patellar reamer guide.

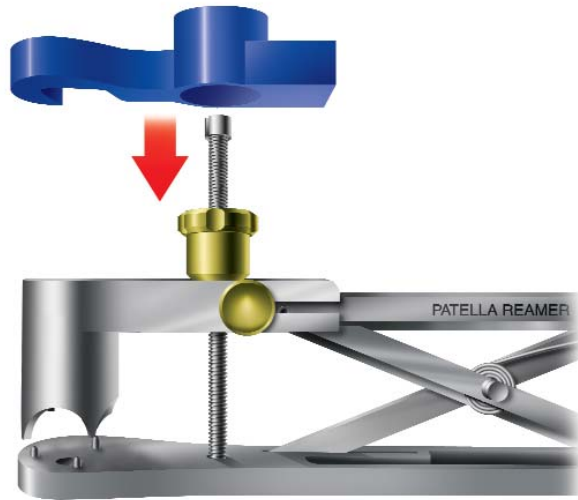


Figure 81



Figure 82



Figure 83

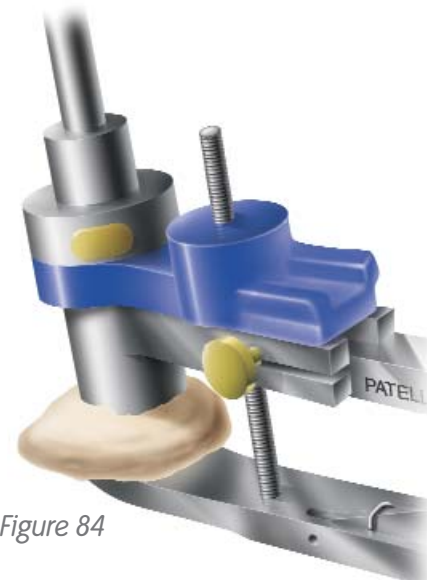


Figure 84

Component Trialing

1. Flex the knee to 90° and insert the femoral trial using the femoral trial impactor (*Figure 85*).
2. Use the appropriate insert trial (begin with a 9mm trial) to determine stability and alignment.
3. Perform a trial range of motion. The alignment marks on the front of the femoral and tibial trials should line up (*Figure 86*). The quick-connect handle may be attached to the tibial trial and used to set the appropriate rotational alignment.

*Option: Extend the knee fully with the handle attached to the tibial trial. Pass the extramedullary rod through the handle to assess full leg alignment (*Figure 88*).*

Tip: The technique of tibial trial, then femoral trial and then trial insert works for all GENESIS® II inserts EXCEPT the dished inserts. For the deep dished, insert the trial bearing BEFORE the femoral trial.

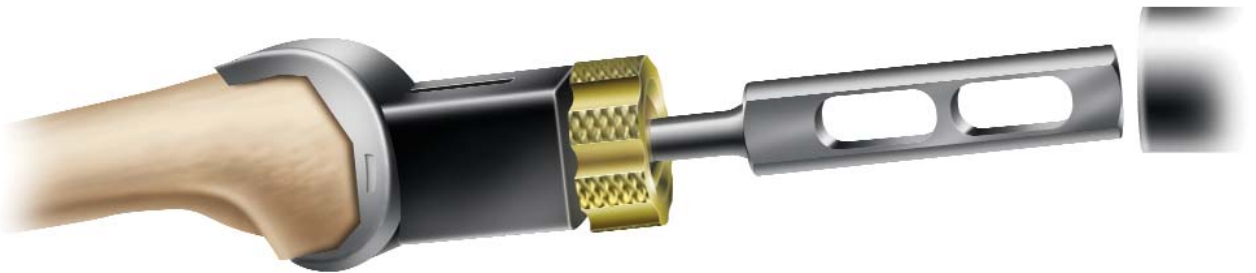


Figure 85



Figure 86

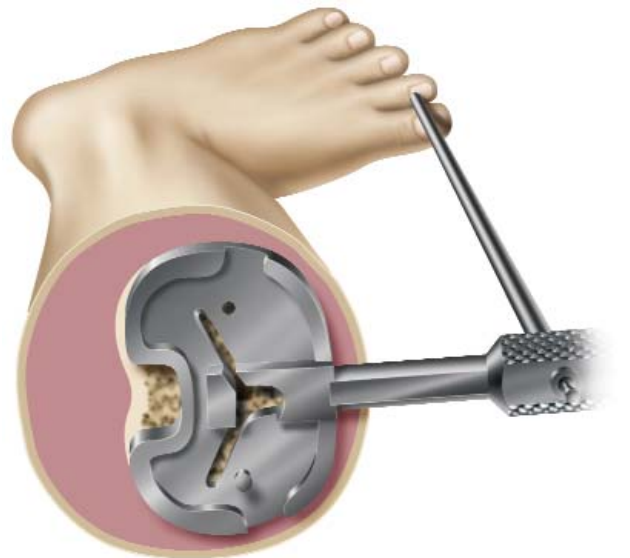


Figure 87

Component Trialing

4. Mark correct tibial rotational alignment on the anterior tibia using a cautery knife (*Figure 88*).
5. Determine whether a porous or nonporous tibial implant will be used. Select the appropriate tibial fin punch to prepare the fins and punch through the tibial trial (*Figure 89*).

Tip: If the tibial bone is sclerotic, begin the fin slot with a burr or thin sawblade before using the fin punch to prevent tibial fracture.

6. Place the patellar trial into the prepared patella (*Figure 90*).

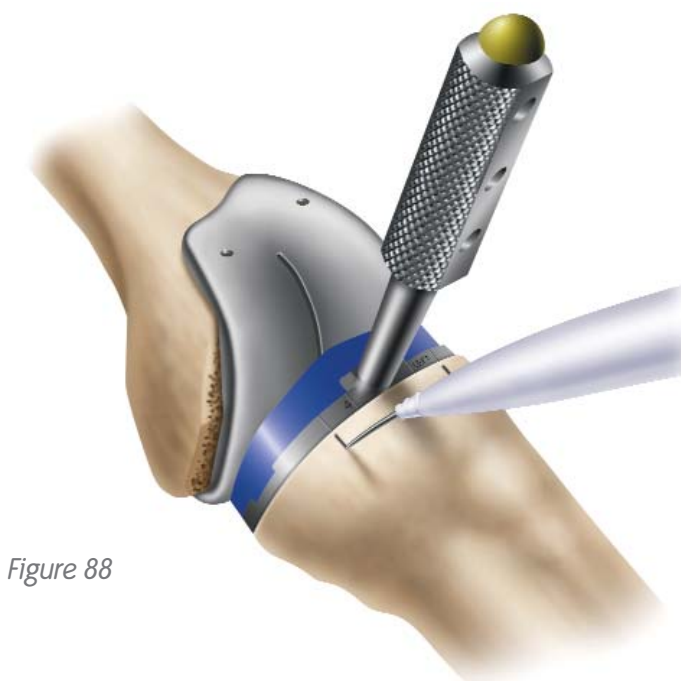


Figure 88



Figure 89



Figure 90

7. Perform a trial range of motion to assess patellar tracking. With cruciate-retaining knees, medial-lateral placement of the femoral trial can be adjusted to optimize patellar tracking (*Figure 91*).
8. For cruciate-retaining femorals, prepare the femoral lug holes through the femoral trial with the femoral lug punch (*Figure 92*).
9. Remove the tibial trial. Attach the end of the universal extractor to the femoral trial (*Figure 93*). Remove the femoral trial. Use a towel clip to remove the patellar trial.

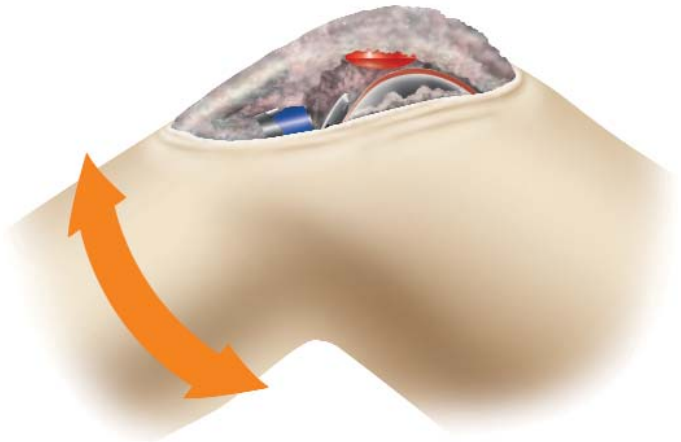


Figure 91



Figure 92



Figure 93

Implantation

Tibial Implantation

1. Apply cement on the proximal tibia and/or the implant and seat the tibial implant with the tibial impactor (*Figure 94*). Remove excess cement.
2. If using the porous tray and screws, orient the tibial screw drill guide over the holes and drill using the tibial screw drill. Determine the appropriate screw length using the screw depth gauge. Insert screws with alternating tightening to avoid liftoff.

Femoral Implantation

1. Mix and prepare bone cement for femoral component and distal femur. Apply to the femoral component or prepared bone, based on the surgeon's preference.
Tip: Many surgeons put cement on the bone rather than, or supplemental to, cement on the underside of the implant.
2. Place the femoral implant onto the femur and use the femoral impactor to fully seat the implant (*Figure 95*).
3. Remove excess cement. Extend the knee to remove cement anteriorly without retracting the proximal soft tissue.
4. Place the tibial insert trial onto the tibial implant and extend the leg to pressurize the cement.

Tip: Place the C-R tibial trial in the tibial implant tray to assist with aligning the femoral component during implantation.

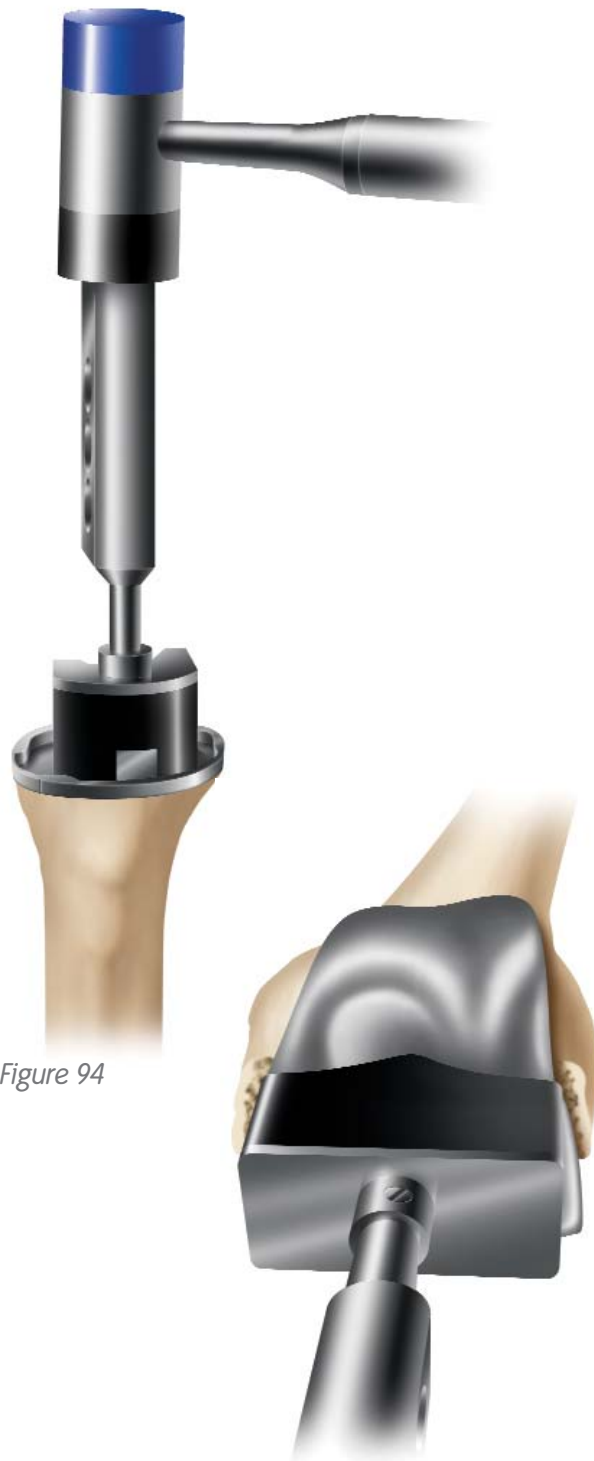


Figure 94

Figure 95

Patellar Implantation

1. Assemble the patellar cement clamp to the patellar reamer guide.
2. Apply bone cement to the patella.
3. Place the patellar implant onto the patella and clamp into the bone (*Figure 96*). Remove excess cement.

Cruciate-Retaining, Dished and Posterior-Stabilized Insert Placement

1. Determine the correct articular insert thickness.
2. Clear any debris from the locking mechanism and slide the insert into the tibial baseplate engaging the locking mechanism. For the P-S insert, begin insertion in flexion and extend the leg to engage the locking mechanism.
3. Attach the articular inserter/extractor to the tibial tray. Lift the inserter superiorly until the anterior lip of the articular insert is fully seated (*Figure 97*).

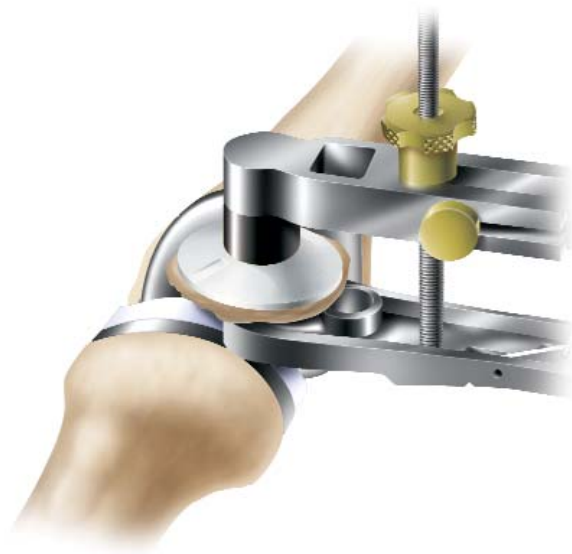


Figure 96



Figure 97

Implantation

P-S High Flex and C-R Deep Flex Insert Placement

1. Attach the appropriately sized bumper (either 1-2 or 3-8) to the impactor handle.
2. Position the knee in approximately 90° flexion.
3. Align the articular insert with the locking mechanism of the tibial baseplate.
4. Push the insert posteriorly until the top of the anterior rail of the baseplate is visible.
5. Place the bumper on the anterior chamfer of the insert. The mating surfaces should be very conforming (*Figures 98 & 99*).
6. Impact the handle until the insert is fully seated.

MIS Note: To use the P-S High Flexion Insert in minimally invasive surgery, please see the technique described in Appendix A.

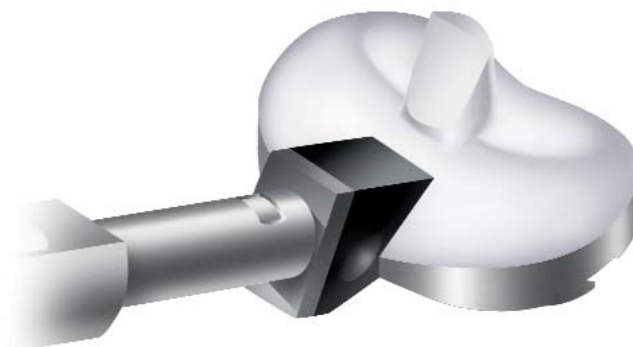


Figure 98



Figure 99

Appendix A

GENESIS[®] II P-S High Flex Insert Impaction Technique for MIS

When using the P-S High Flex Insert in a minimally invasive procedure, the femoral cam mechanism is likely to prevent the insert from fully seating into the locking mechanism while the knee is in flexion. To use the P-S High Flex Insert in a MIS case:

1. Flex the knee to 90° and push the insert as far back as it will go posteriorly with the knee in flexion (*Figure 100*).

Tip: Lift the distal femur to prevent scratching of the posterior condyle of the component.

2. Placing your thumb on the anterior of the insert to hold it on the baseplate (*Figure 101*), move the knee into extension.
3. Use the impactor handle with the appropriately sized bumper to fully seat the insert and engage the anterior portion of the dovetail locking mechanism (*Figure 102*).

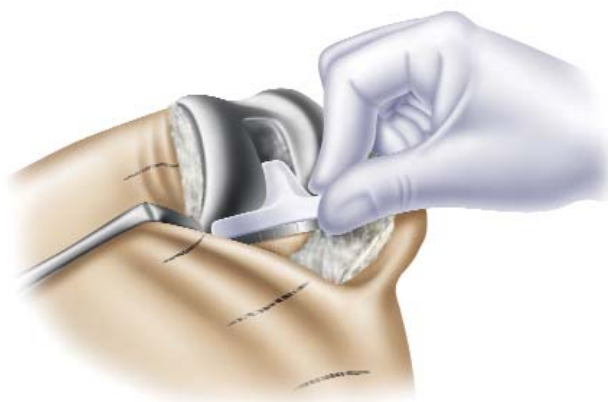


Figure 100

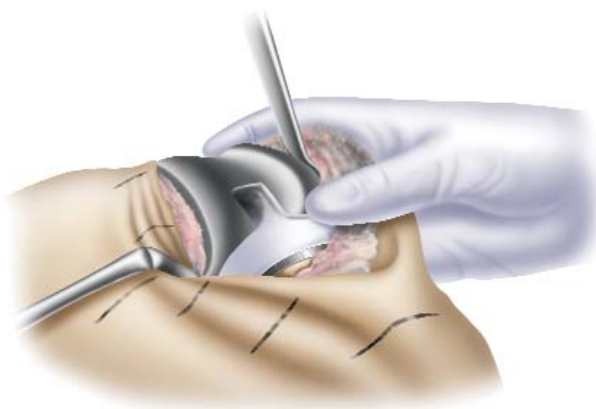


Figure 101



































Figure 102

Appendix B

GENESIS[®] II Articular Insert Interchangeability Chart

Cruciate-Retaining Inserts: Completely interchangeable with all size femoral components

Posterior-Stabilized (PS), Dished (DD) and Constrained (Con), High Flex Posterior-Stabilized (HFPS) and Cruciate-Retaining Deep Flex (CRDF): Limited interchangeability; chart applies.

	Femoral Size								
Insert Size	1	2	3	4	5	6	7	8	9
1-2 PS, DD, Con									
1-2 HFPS, CRDF									
3-4 PS, DD, Con									
3-4 HFPS, CRDF									
5-6 PS, DD, Con									
5-6 HFPS, CRDF									
7-8 PS, DD, Con									
7-8 HFPS, CRDF									

Appendix C

Anterior and Posterior Referencing

Anterior Referencing

An anterior referencing technique is based on the anterior cortex, which serves as the primary reference point. The anterior resection is fixed while the posterior resection varies with size. Because the component will be flush against the anterior cortex, this will enable the reapproximation of the patellofemoral joint. When the sizing guide indicates the femoral implant is between two sizes, the smaller size should be selected. Choosing the smaller size results in more bone resection from the posterior condyles thereby increasing the flexion space.

Anterior Referencing	
Advantages	Disadvantages
Reapproximation of the patellofemoral joint	Knee may be loose in flexion
Reduced chance of notching the anterior cortex	

Posterior Referencing

A posterior referencing technique is based on the posterior femoral condyles which serve as the reference point. The posterior resection remains constant while the anterior resection varies with respect to the anterior cortex. Therefore, the posterior resection will equal the posterior thickness of the prosthesis, resulting in a balanced flexion-extension space. When the sizing guide indicates the femoral implant is between two sizes, the larger size should be chosen. Even though there is a slight chance in overstuffing the patellofemoral joint with a larger size, there is a reduced risk in notching the anterior cortex of the femur.

Posterior Referencing	
Advantages	Disadvantages
Balanced flexion and extension spaces	May overstuff the patellofemoral joint

Appendix D: Posterior-Stabilized Femoral Resection

1. Attach the P-S housing resection collet to the housing resection block by tightening the gold thumbscrew in the most anterior position (*Figure 103*).
2. The P-S housing resection block must be centered on the femur, as this will determine component position.

Tip: The housing resection blocks have the same M-L dimension as the implants.

Tip: The only difference between the cruciate-retaining and the posterior-stabilized femoral components is the addition of the housing for the cam mechanism. All other box dimensions are the same. The anterior and posterior chamfer resections can be made through the posterior-stabilized housing resection block.

3. Secure with 1/8" trocar pins through the straight holes in the front of the block. If the chamfer cuts are made through this block, the angled holes in the sides of the block should be used.

Instrument Assembly:

Attach the housing reamer dome and the P-S reamer sleeve to the patellar reamer shaft (*Figure 104*).

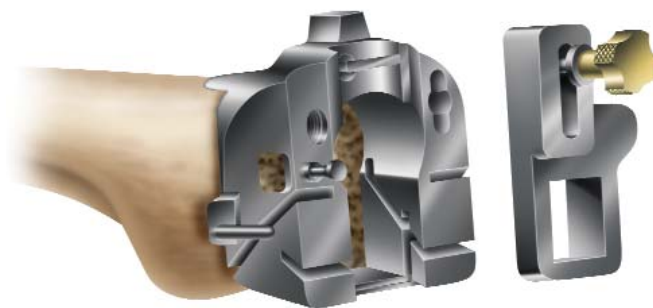


Figure 103



Figure 104

4. Ream through the housing resection collet until the automatic depth stop contacts the collet, loosen the thumbscrew and then move the reamer anterior and posterior until it contacts the automatic stop (*Figure 105*).
5. Impact the housing box chisel through the housing resection collet to square the corners of the housing. The housing box chisel should be used anteriorly and posteriorly to ensure that the full length of the box is prepared (*Figure 106*).
6. If the chamfer resections have not been made, they can now be made by cutting through the chamfer slots in the housing resection block.



Figure 105

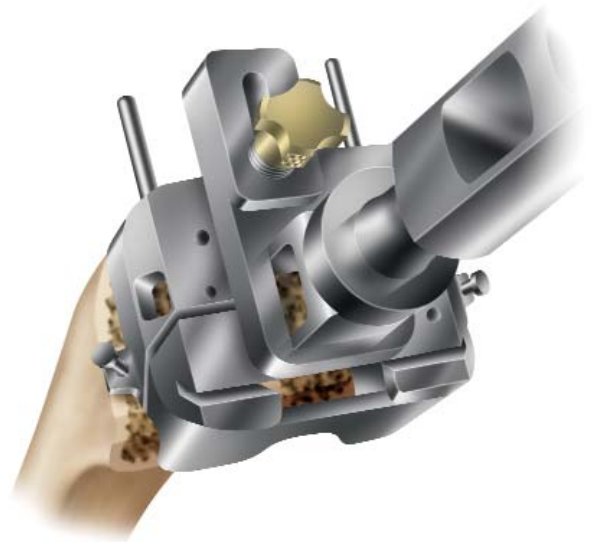


Figure 106

Orthopaedics Reconstruction

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