

## Anterior Cut First Surgical Technique



## Introduction

The GENESIS<sup>®</sup> 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  
Associate 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  
Clinical Instructor  
University of Cincinnati  
Orthopaedic Surgeon  
Christ Hospital  
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

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

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

ACF Short Technique .....	4
Preop Planning .....	6
Femoral Preparation .....	7
Tibial Preparation .....	17
Tibial Sizing .....	26
Posterior-Stabilized Femoral Resection .....	28
Resurfacing Patellar Preparation .....	30
Biconvex Patellar Preparation .....	37
Component Trialing .....	39
Implantation .....	42
Appendix A: GENESIS <sup>®</sup> II P-S High Flex Insert Impaction Technique for MIS .....	45
Appendix B: Articular Insert Interchangeability Chart .....	46

**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.*

# Anterior Cut First Short Technique

## Femoral Preparation



Use the 9.5mm drill to open up the femoral canal and slide the valgus alignment assembly up the IM rod until it contacts the distal femur.



Place the anterior stylus tip on the lateral ridge of the anterior cortex to determine resection level.



Resect anterior cortex.



Attach distal cutting block and distal stylus to valgus alignment assembly.



Remove valgus alignment assembly and resect the distal femur.



Place the stylus tip of the femoral sizing guide on the provisional anterior cut surface. Read the size indicated by the line across the stylus shaft. If in-between sizes, choose the smaller size.



Place the correctly sized A-P cutting block on the distal femur and resect the femur.

## Tibial Preparation



### Extramedullary tibial alignment:

Assemble extramedullary tibial guide and place on tibia. Align guide over medial third of the tibial tubercle and parallel to the tibia.



### Intramedullary tibial alignment:

Place 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 lowest 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



Attach the P-S collet to the P-S housing block by tightening the gold thumbscrew, then pin to the distal femur.



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



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

## 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.

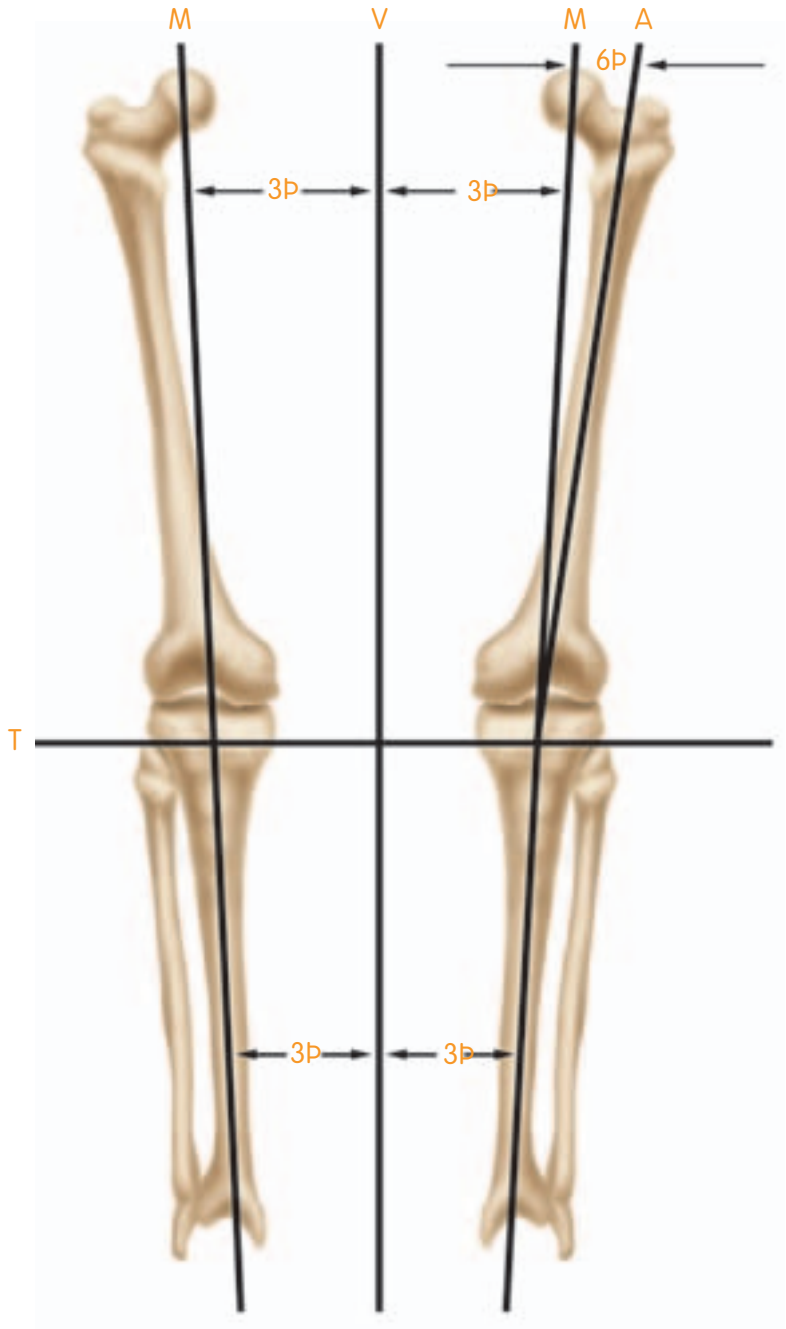
# Preop Planning

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<sup>®</sup> 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)
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. Identify the rotational reference landmarks:
  - A-P axis (as described by Whiteside)
  - Medial-lateral posterior femoral condyles
  - Epicondylar axis
2. Open the femoral canal (generally just anterior to the PCL insertion) with the 9.5mm drill (*Figure 1*).

### Instrument Assembly:

- a. Attach the modular T-handle to the intramedullary rod.
- b. Select the appropriate valgus angle bushing based on preoperative measurements.
- c. Slide the bushing into the valgus alignment guide (left or right). Make sure the bushing is positioned so that “left” is facing anteriorly when operating on a left knee and “right” is facing anteriorly when operating on a right knee.
- d. Attach a quick-connect handle to the valgus alignment guide.
- e. Slide the rod through the bushing (*Figure 2*).

3. Insert the intramedullary rod into the canal. Position the valgus alignment guide until it contacts the distal femur (*Figure 3*).

*Note: Do not engage the floating pins until rotation is set.*



Figure 1

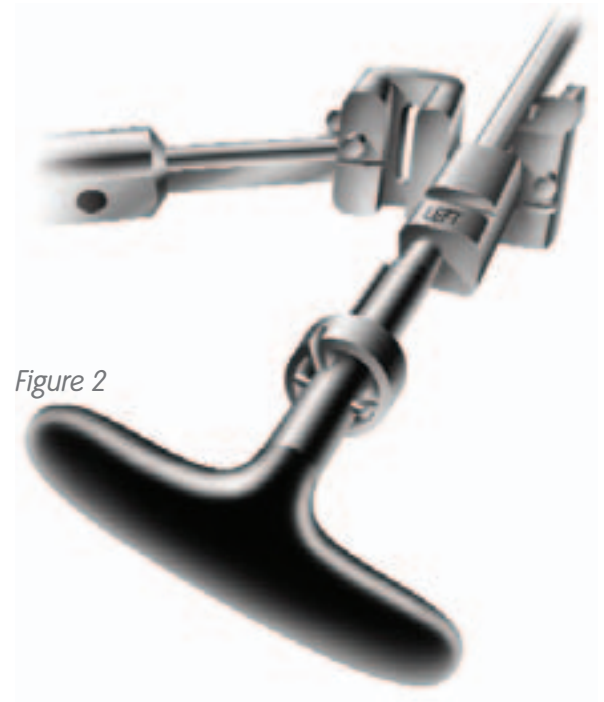


Figure 2



Figure 3

# Femoral Preparation

## Femoral Rotational Alignment Without Paddles

Rotation of the valgus alignment guide is set neutral to the posterior femoral condyles by using the landmarks described on page 7, step 1, either with or without rotational alignment paddles.

### Without Paddles

1. Flex the knee to 70°- 90°.

2. Align:

A. The femoral alignment stylus (*Figure 4*) with the A-P axis. The femoral alignment template is designed such that setting it parallel to the A-P axis aligns the valgus alignment guide in neutral rotation.

Use a bovie or pen to mark the A-P axis line (which is represented by the deepest part of the trochlear groove).

The femoral alignment stylus is placed over the valgus angle bushing to guide rotational alignment (*Figure 5*). Make sure that the template is positioned so that “left” is facing out when operating on a left knee and “right” is facing out when operating on a right knee. The valgus alignment guide is placed in neutral orientation by aligning the outrigger of the template with the A-P line (*Figure 6*).

B. The posterior aspect of the valgus alignment guide is parallel to the posterior condyles.

C. The line laser-etched across the distal surface of the valgus alignment guide parallel to the epicondylar axis. The line on the valgus alignment guide is drawn such that placing it parallel to the epicondylar axis aligns the guide in neutral rotation.

3. Secure the valgus alignment assembly on the distal femur by impacting the floating spikes.

*MIS Tip: The surgeon may use a pin driver or a tibial punch to gain clearance to impact the spikes.*



Figure 4



Figure 5

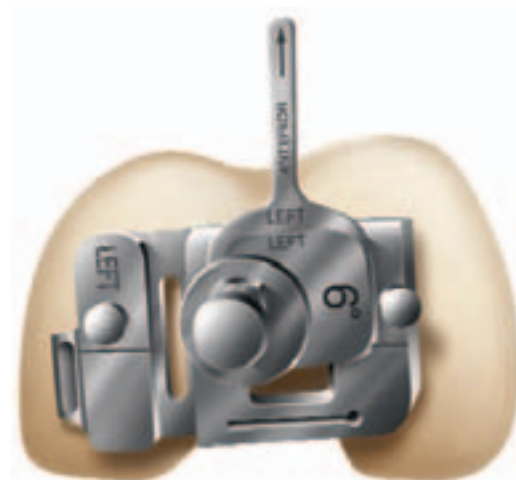


Figure 6

## With Paddles

### Instrument Assembly:

Unlock the capture mechanism on the modular paddles. The arm on the paddles distracts posteriorly and rotates to either side to unlock so the anterior lip can engage the slot in the posterior aspect of the valgus alignment guide.

1. Insert the anterior lip of the paddles into the slot in the valgus alignment guide. Rotating the arm back centrally into the recess will lock the paddles onto the valgus alignment guide (Figure 7).
2. Position the paddles under the posterior condyles (Figure 8).

*Tip: It may be helpful to flex the knee greater than 90°, as this will help fit the paddles under the femoral condyles.*

*Tip: Posterior condylar referencing may be less reliable in knees with deficient posterior condyles (e.g. severe valgus deformity). If the posterior condyles are deficient, the A-P or epicondylar axis should be used to determine alignment.*

3. Secure the valgus alignment assembly on the distal femur by impacting the floating spikes.

*MIS Tip: The surgeon may use a pin driver or a tibial punch to gain clearance to impact the spikes.*

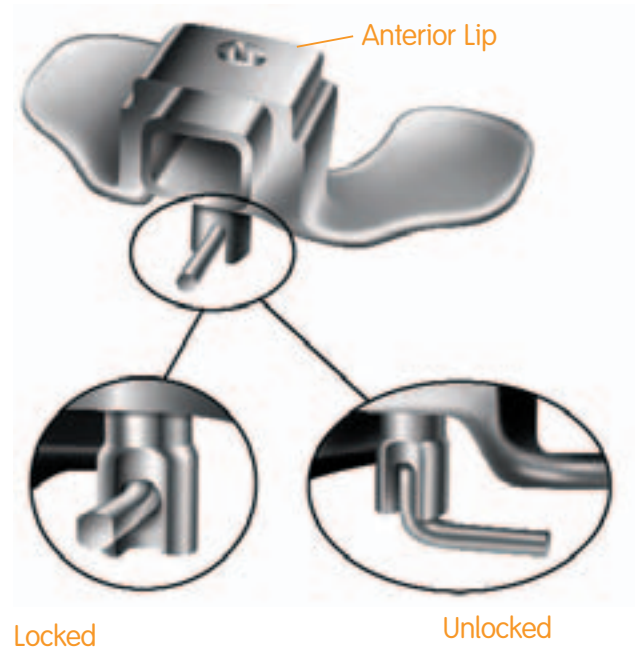


Figure 7



Figure 8

# Femoral Preparation

## Preliminary Anterior Femoral Resection

1. Release and remove the modular paddles, if applicable.

### Instrument Assembly:

Place the anterior resection guide into the valgus alignment guide (Figure 9) and attach the anterior stylus to the anterior resection guide by sliding the foot into the cutting slot (Figure 10).

2. Place the anterior stylus tip on the lateral ridge of the anterior femoral cortex. Pin the anterior resection guide with a 1/8" trocar pin in any available hole and remove the anterior stylus (Figure 11).

3. Resect the anterior cortex (Figure 12).

*Tip: Removing a small area of soft tissue down the bone over the distal and lateral anterior femur allows the stylus to fully seat. This will help prevent overestimating femoral sizing, which could lead to "over-stuffing" of the patellofemoral joint.*

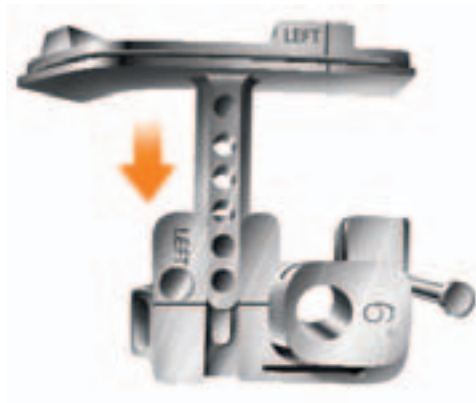


Figure 9

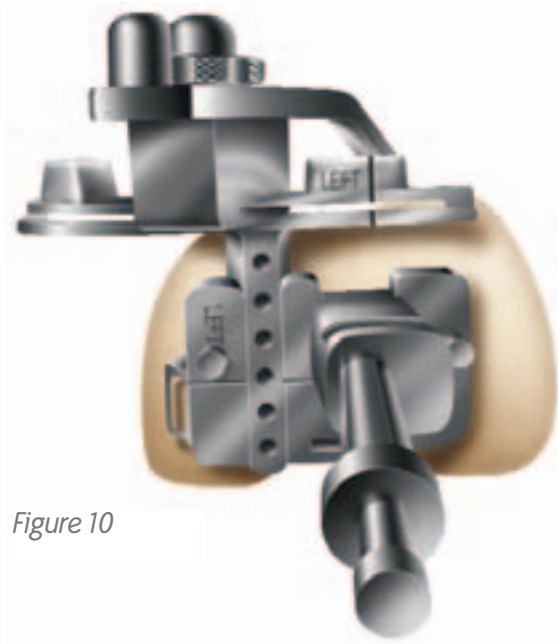


Figure 10



Figure 11

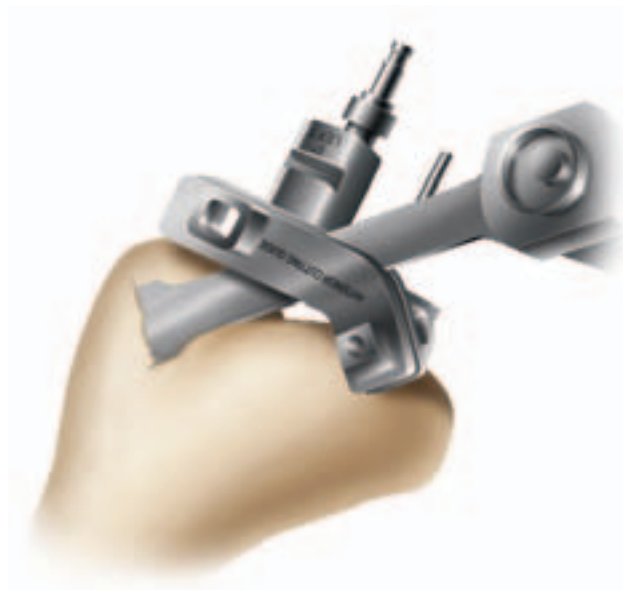


Figure 12

## Distal Femoral Resection

### Instrument Assembly:

- a. Assemble the distal femoral cutting block with the distal resection stylus by pressing the gold button and sliding the stylus until it hits a stop (*Figure 13*).
- b. The word “primary” should show through the cutting slot. This will resect the standard 9.5mm from the distal femur. For a large femur or in the case of flexion contracture, up to 7mm additional resection can be taken by sliding the cutting block proximally so that the desired resection level shows through the cutting slot.

1. Secure the distal femoral cutting block to the anterior cortex by impacting or drilling unheaded or headed pins through the holes marked “0.” Use of a third oblique pin is recommended for additional stability (*Figure 14*).



Figure 13

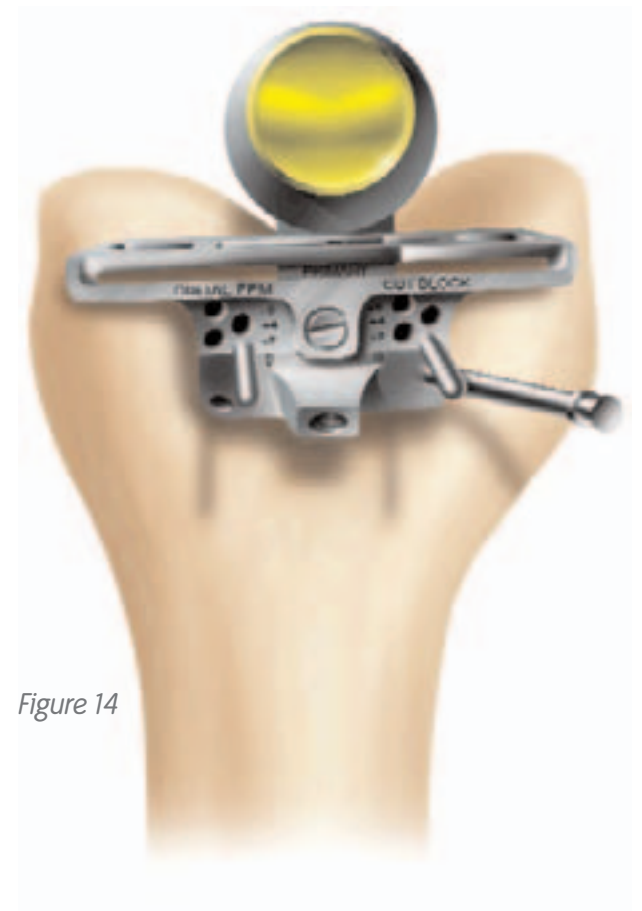


Figure 14

## Femoral Preparation

2. Attach the slap hammer to the valgus bushing and remove the rod, distal resection stylus and valgus alignment assembly (Figure 15).
3. Only the distal femoral cutting block should remain on the femur (Figure 16).
4. Resect the distal femur (Figure 17), then remove the distal femoral cutting block.

*Tip: To take an additional distal resection after resection, simply reposition the block through the pin holes marked +2, +4 or +6mm for the desired level of resection after removing the oblique pin.*



Figure 15



Figure 17



Figure 16

## Femoral Sizing

*MIS Surgical Tip: To make sizing easier, you may wish to resect the tibia before further femoral preparation.*

### Instrument Assembly:

Attach a quick-connect handle to the femoral sizing guide.

1. Place the femoral sizing guide on the distal femur, and place the stylus tip on the provisional anterior cut (Figure 18).
2. Read the size indicated by the line across the stylus shaft (not the retention pin) and choose the smaller size if in-between two sizes (Figure 19).

*Tip: Traditionally, surgeons using an Anterior Cut First/Anterior Referencing approach have always chosen the smaller size component between sizes. However, some surgeons choose to use the larger size, particularly when using a P-S component, as sacrificing the PCL can increase the flexion space from 4-6mm and could leave the knee loose in flexion if the smaller component is used.*



Figure 18

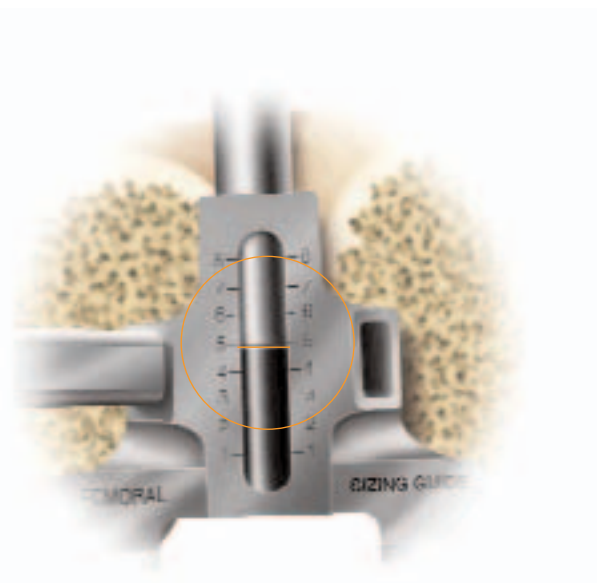


Figure 19

# Femoral Preparation

## A-P Femoral Resection

1. Choose the correct size A-P cutting block and place it on the distal femur in a medialized position. M-L positioning of this block is not critical.
2. Secure the A-P cutting block first with a straight pin through either the medial, lateral or central pin hole on the distal block surface. Pin through the angled holes in the ears on the medial and lateral sides of the block as bone quality dictates to achieve stability (*Figure 20*). Remove the pin(s) from the distal face before making chamfer cuts.

*Tip: The A-P cutting block should seat flush with the cut anterior and distal surfaces.*

3. Complete the anterior, posterior and chamfer cuts (*Figures 21-24*). If desired, the chamfer cuts may be made through the posterior-stabilized femoral housing block or a dedicated chamfer cutting block.



Figure 20



Figure 21



Figure 22



Figure 23



Figure 24

# Tibial Preparation

The system allows the surgeon to perform either extramedullary or intramedullary tibial alignment. For intramedullary tibial alignment, turn to page 21.

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 26).
- 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 26

## 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 27). 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.

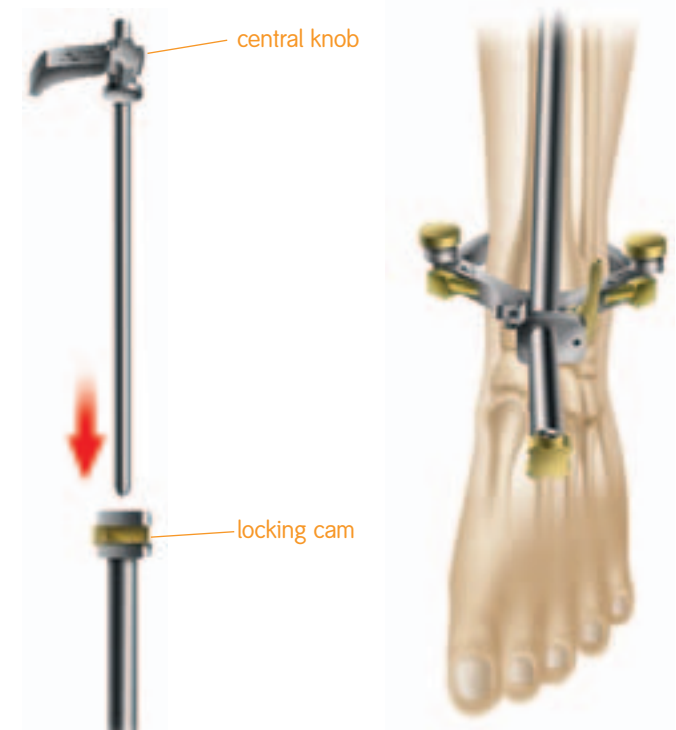


Figure 27

Figure 28

- 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 28). The cutting block on the proximal end of the assembly should be proximal to the tibial tubercle (Figure 29).



Figure 29

## 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 30*).
3. Rotational alignment is critical due to the 3° posterior sloped cut. The slope can be adjusted according to the patient's anatomy (*Figure 31*).

*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 30



Figure 31

## 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 32).

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 33). The cutting block on the proximal end of the assembly should be proximal to the tibial tubercle (Figure 34).
2. Impact the longer spike of the spiked fixation rod into the proximal tibia (Figure 35).



Figure 32



Figure 33



Figure 34



Figure 35

# 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 36).
4. Rotational alignment is critical due to the 3° posterior sloped cut. The slope can be adjusted according to the patient's anatomy (Figure 37). Impact the second spike to secure the assembly (Figure 38).

*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 36



Figure 37



Figure 38

## 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 39).
- b. Attach the T-handle to the IM rod and pass it through the cannulated alignment sleeve on the alignment assembly (Figure 40).

1. Make a 9.5mm pilot hole into the tibial canal (Figure 41) (generally 5mm medial to the midline). A preliminary resection of the tibial spine may facilitate seating of the tibial drill guide onto the proximal tibia.

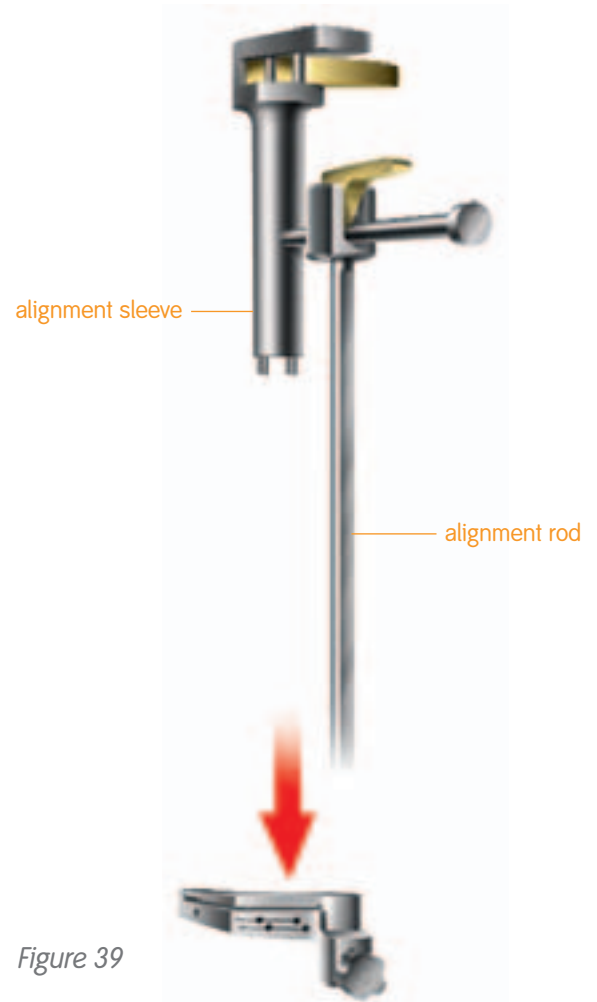


Figure 39



Figure 40



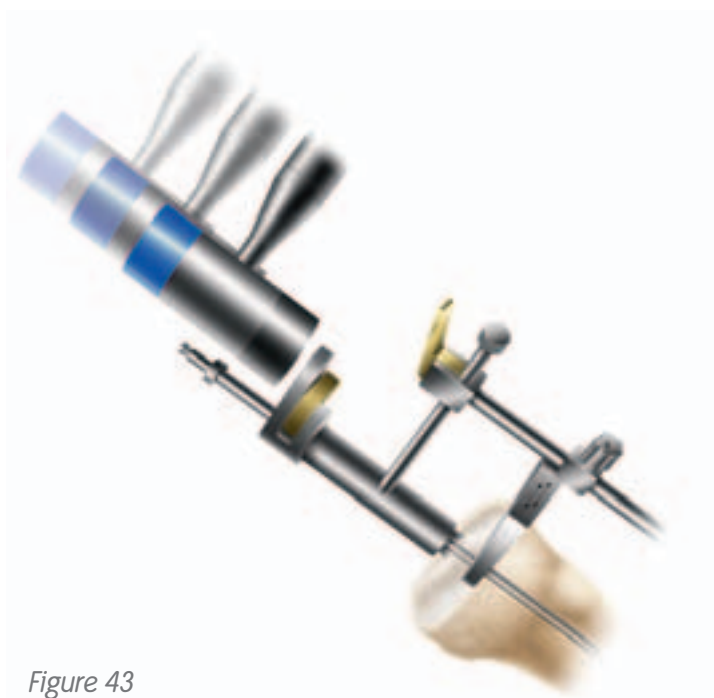
Figure 41

## 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 42*).
4. Impact the proximal end of the cannulated alignment sleeve to drive the distal spikes into the proximal tibia to lock rotational alignment (*Figure 43*).



*Figure 42*



*Figure 43*

## 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 (Figures 44). 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 45).*

*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 44



Figure 45

## 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 46*).
- b. For the extramedullary assembly with spiked rod, release the cam at the top of the alignment tube and use the slap hammer to remove the spiked fixation rod (*Figure 47*).
- 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 46*



*Figure 47*

5. Cut the tibia by first directing the blade in the posterior direction and then laterally (Figure 48).
6. Check alignment and balance with spacer block and rod (Figures 49 & 50). Balance ligaments in standard fashion.

*Tip: Since the spacer block has one end for flexion and one for extension, ensure that the appropriate end is used.*



Figure 48



Figure 49



Figure 50

# 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 51). 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 52). 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 40.

*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.*

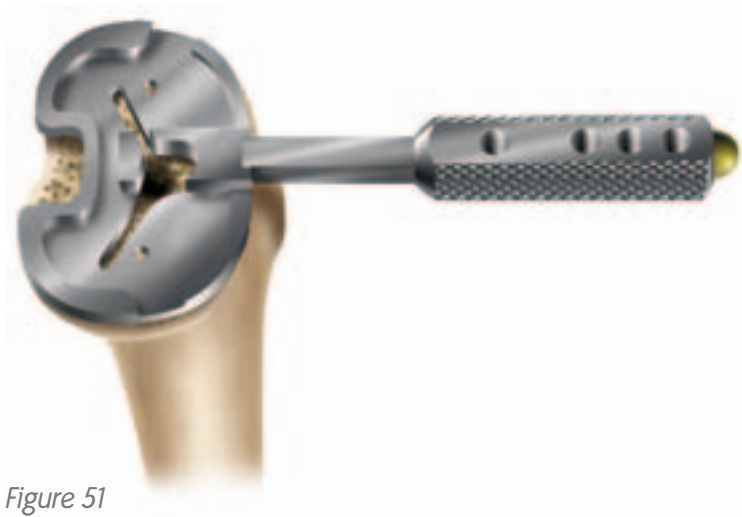


Figure 51

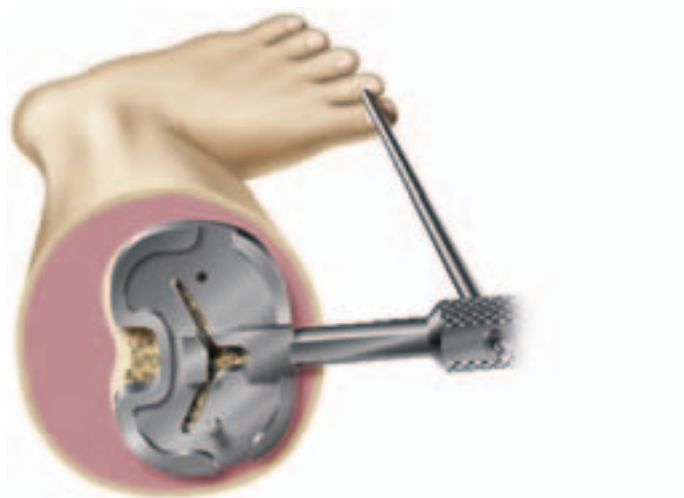


Figure 52

### 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 53*).
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 54*) and punch with the 11mm tibial punch (*Figure 55*). 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 40.

*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 53

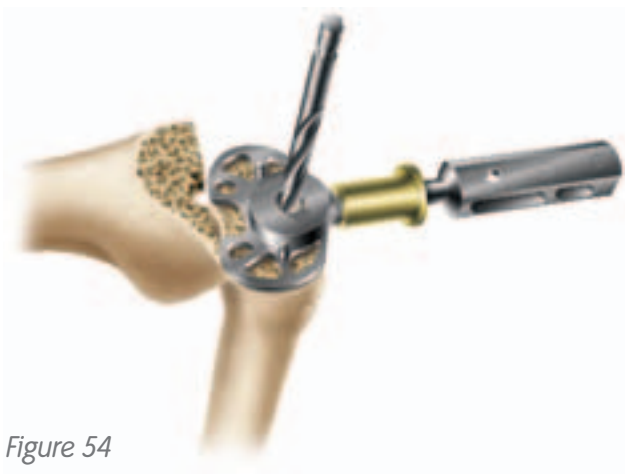


Figure 54

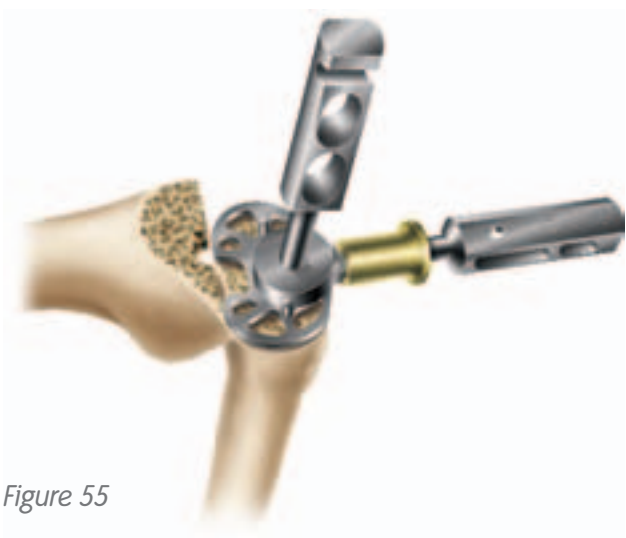


Figure 55

# 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 56*).
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 57*).

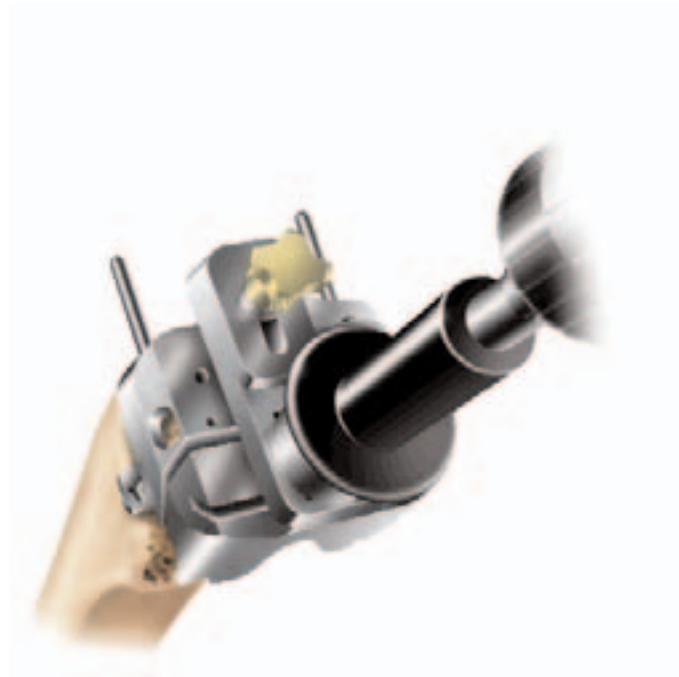


Figure 56

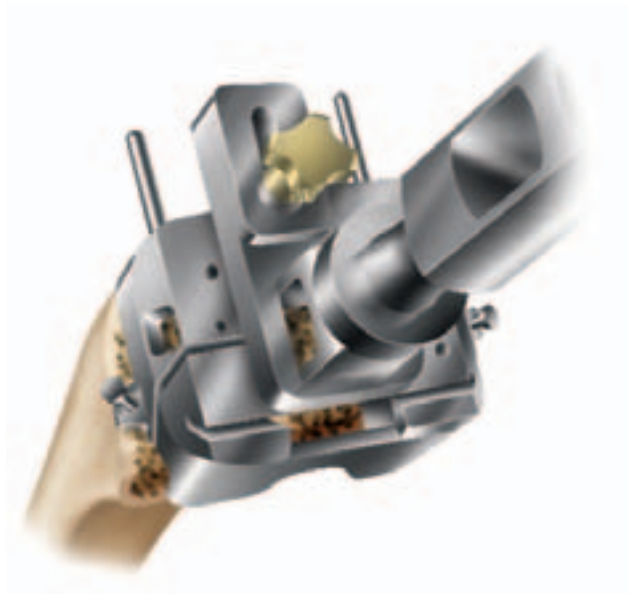


Figure 57

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 58*).
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 59*).
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 58*



*Figure 59*

# 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 60*).
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 9mm. The guide is set at this level by turning the knurled knob (*Figure 61*).

*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 60



Figure 61

4. Cut the patella through the dedicated saw guides (Figure 62).
5. Drill for the three pegs (Figure 63), insert the resurfacing patellar trial and remeasure. The overall thickness should be equivalent to the original thickness (Figure 64).

### 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 62



Figure 63



Figure 64

# 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 65).
2. Use a rongeur to remove osteophytes and reduce the patella to its true size (Figure 66). 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 67). 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 65

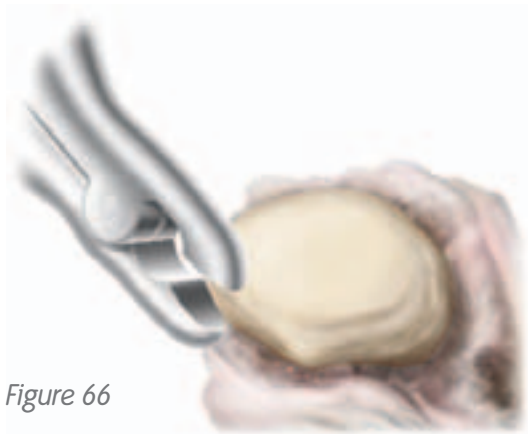


Figure 66



Figure 67

*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 68).

*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 is variable.

*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 69). Lower the depth stop by compressing the button until it meets the depth gauge (Figure 70). Remove the depth gauge from the assembly. Ream the patella until the depth stop engages the patellar reamer guide (Figure 71).

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



Figure 68



Figure 69

Figure 70



Figure 71

## Resurfacing Patellar Preparation

6. After reaming, the patella should have a completely flat articular surface (*Figure 72*). 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 73*).
8. Place the patellar trial into the prepared patella. If desired, use the calipers to remeasure the composite thickness of bone and trial.



*Figure 72*



*Figure 73*

## Oval 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 74 & 75*).

### 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 74



Figure 75

*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.*

## Resurfacing Patellar Preparation

3. Resect the patella using the preferred method.
4. Measure the diameter of the resected patella with the trial templates (*Figure 76*).
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 77*).
7. Place the trial on the patella and remeasure the patella if desired (*Figures 78 & 79*).



*Figure 76*



*Figure 77*



*Figure 78*



*Figure 79*

# 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 80).

1. Attach the patellar reamer guide to the patella. Tighten the patellar reamer guide on the patella (Figure 81).
2. Use the patellar calipers to measure the thickness of the patella (Figure 82).

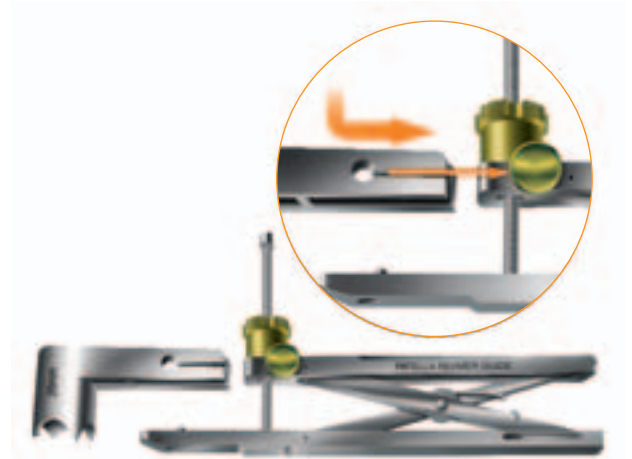


Figure 80

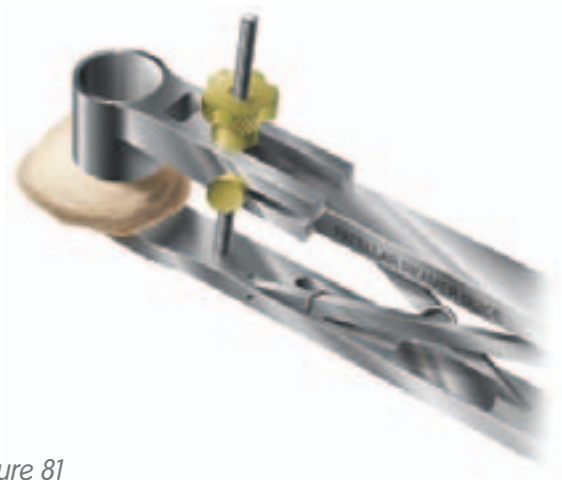


Figure 81

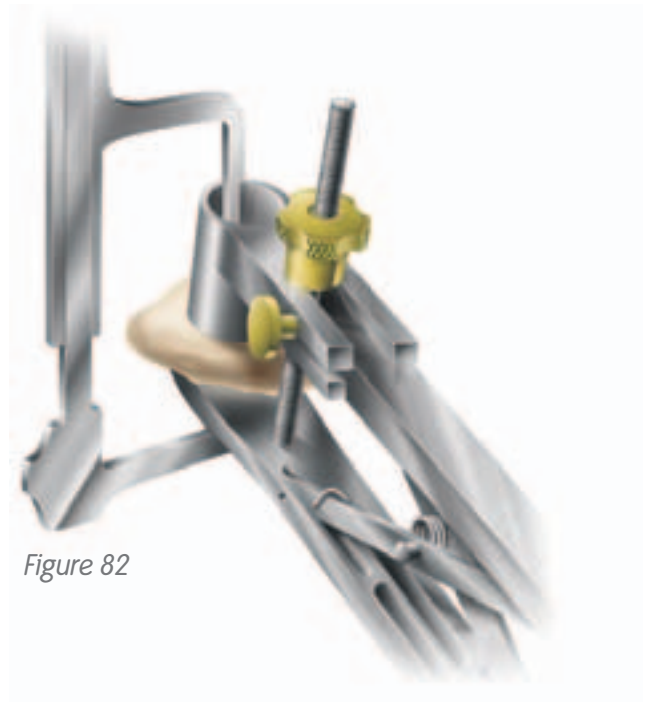


Figure 82

# Biconvex Patellar Preparation

## Instrument Assembly:

- a. Attach the BLUE patellar depth gauge to the reamer guide (Figure 83).
- b. Attach the matching sized patellar reamer dome and patellar depth stop to the patellar reamer shaft (Figures 84 & 85). 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 86).
5. Remove the depth gauge.
6. Ream the patella until the depth stop engages the patellar reamer guide.

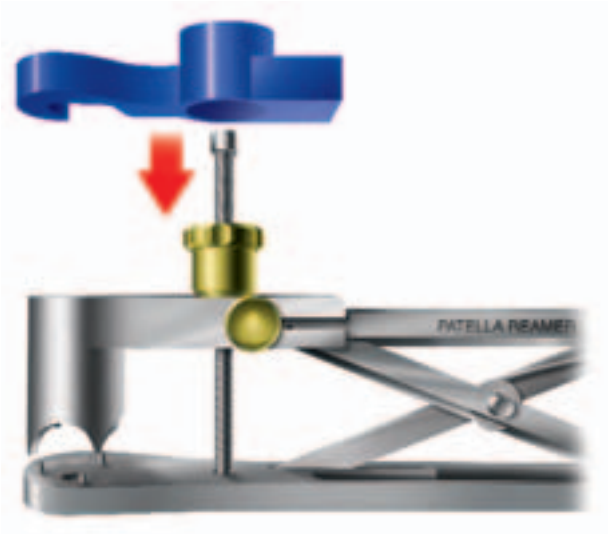


Figure 83



Figure 84



Figure 85

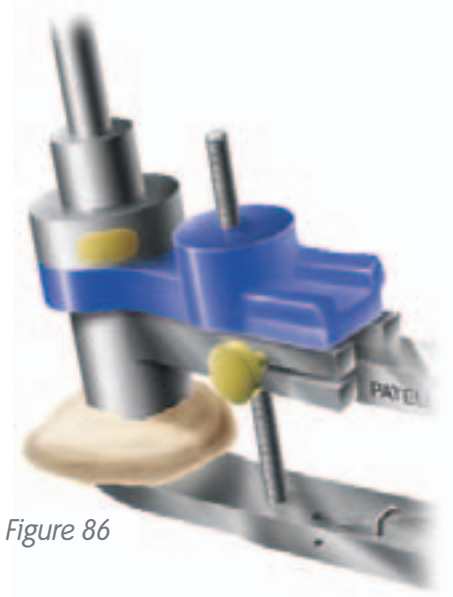


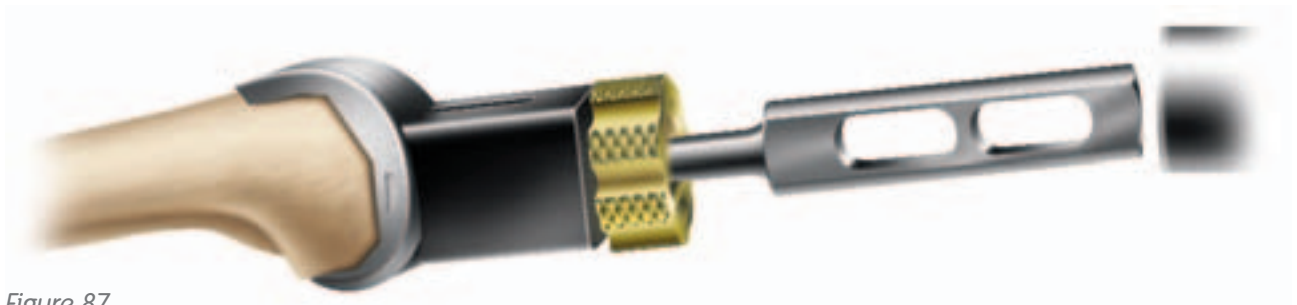
Figure 86

## Component Trialing

1. Flex the knee to 90° and insert the femoral trial using the femoral trial impactor (*Figure 87*).
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 88*). 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 89*).*

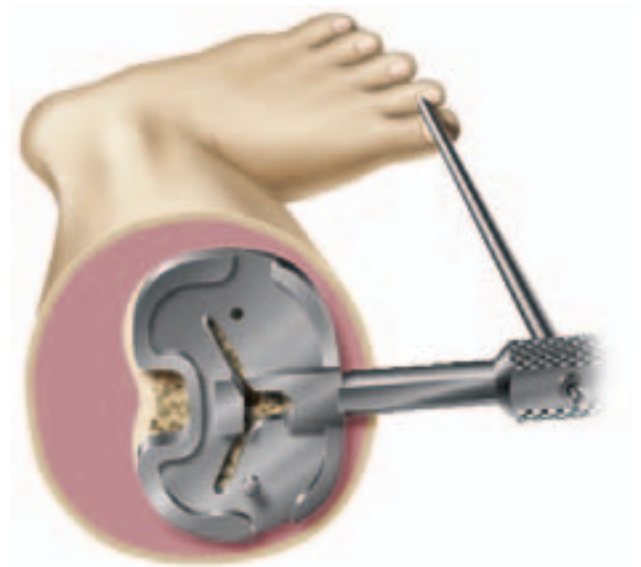
*Tip: The technique of tibial trial, then femoral trial and then trial insert works for all GENESIS® II inserts EXCEPT the dished inserts. For the deep dished, insert the trial bearing BEFORE the femoral trial.*



*Figure 87*



*Figure 88*



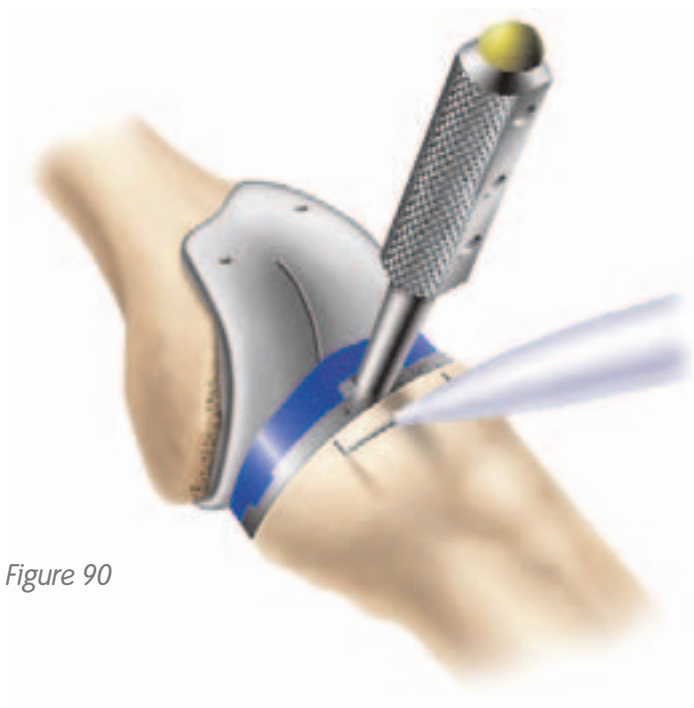
*Figure 89*

## Component Trialing

4. Mark correct tibial rotational alignment on the anterior tibia using a cautery knife (*Figure 90*).
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 91*).

*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 92*).



*Figure 90*



*Figure 91*



*Figure 92*

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 93*).

8. For cruciate-retaining femorals, prepare the femoral lug holes through the femoral trial with the femoral lug punch (*Figure 94*).

9. Remove the tibial trial. Attach the end of the universal extractor to the femoral trial (*Figure 95*). Remove the femoral trial. Use a towel clip to remove the patellar trial.



*Figure 93*



*Figure 94*



*Figure 95*

# Implantation

## Tibial Implantation

1. Apply cement on the proximal tibia and/or the implant and seat the tibial implant with the tibial impactor (*Figure 96*). 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 97*).
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 96



Figure 97

### 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 98*). 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 99*).

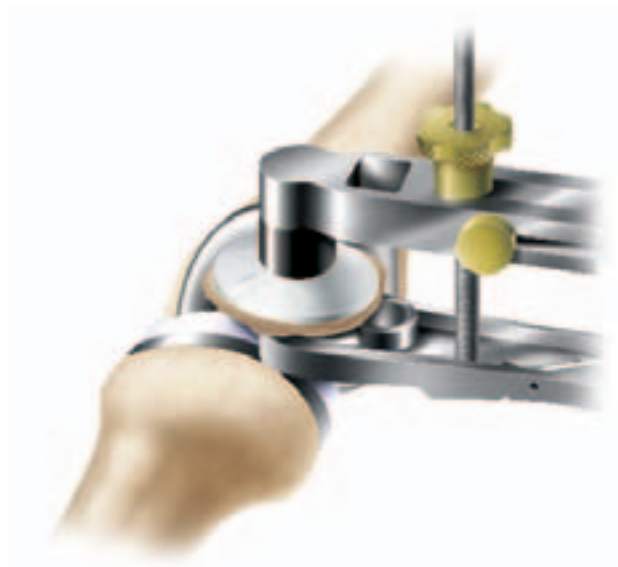


Figure 98



Figure 99

# 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 100 & 101*).
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 100*



*Figure 101*

## Appendix A

### GENESIS<sup>®</sup> 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 102*).

*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 103*), 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 104*).

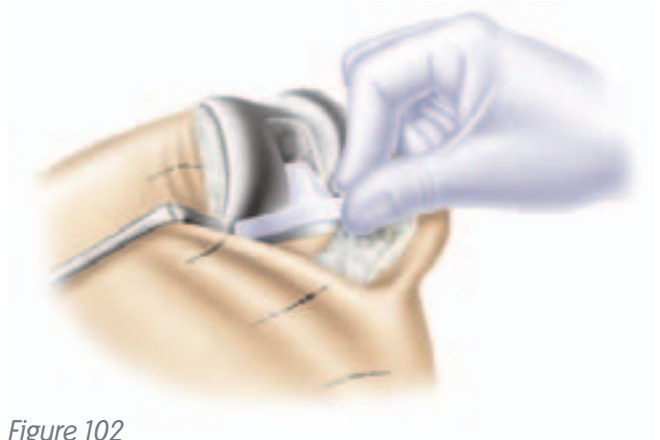


Figure 102

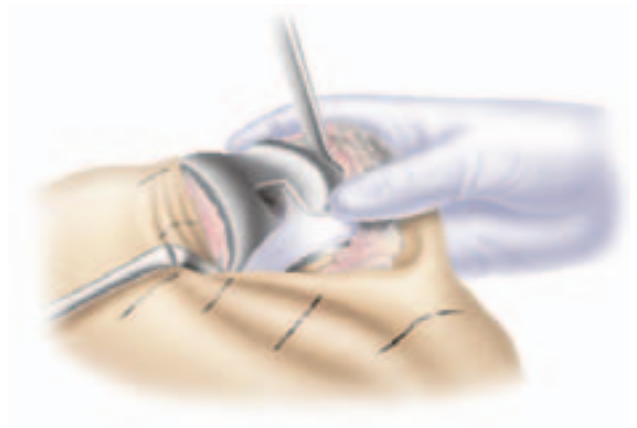


Figure 103



Figure 104

# Appendix B

## GENESIS<sup>®</sup> 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						●	●	●	●





**Orthopaedics**

Smith & Nephew, Inc.  
1450 Brooks Road  
Memphis, TN 38116  
USA

[www.smith-nephew.com](http://www.smith-nephew.com)  
[www.miknee.com](http://www.miknee.com)

Telephone: 1-901-396-2121  
Information: 1-800-821-5700  
Orders/Inquiries: 1-800-238-7538