

OPTETRAK[®]

A COMPREHENSIVE KNEE SYSTEM

CR/PS

CRUCIATE RETAINING
POSTERIOR STABILIZED



The Right Track

*It's not just a road we're on,
it's a trail we're blazing.*



TABLE OF CONTENTS

INTRODUCTION.....	1
DESIGN RATIONALE.....	1
OPERATIVE TECHNIQUE OVERVIEW	2-3
PRE-OPERATIVE PLANNING.....	4
DETAILED OPERATIVE TECHNIQUE	4
APPROACH AND EXPOSURE.....	4
PREPARATION OF THE FEMUR.....	5
POSTERIOR STABILIZED FEMORAL PREPARATION	9
PREPARATION OF THE TIBIA	9
Extra-medullary Alignment.....	9
Intra-medullary Alignment.....	13
Placement and Sizing of Trial Components	17
PREPARATION OF THE PATELLA.....	17
FINAL PROSTHESIS TRIAL CHECK.....	20
FINAL BONE PREPARATION: FEMUR.....	22
FINAL BONE PREPARATION: TIBIA.....	22
PROSTHESIS IMPLANTATION	24
FINAL CHECK AND CLOSURE.....	26
INSTRUMENT SCOPE	27

THE OPTETRAK CR/PS TECHNIQUE WAS DEVELOPED
IN CONSULTATION WITH:

Albert Burstein, PhD
Sarasota, Fla.

Donald Bartel, PhD
Iowa City, Iowa

Ivan Gradisar, MD
Akron, Ohio

Gary Miller, PhD
Gainesville, Fla.

William Murray, PhD
Hershey, Pa.

William Petty, MD
Gainesville, Fla.

in cooperation with the Hospital for Special Surgery, New York

INTRODUCTION

Optetrak® is a comprehensive knee system, based on more than 20 years of clinical results from the Hospital for Special Surgery, that addresses your concerns for contact stress, patellar tracking, polyethylene wear, joint stability and bone preservation with streamlined instrumentation that lets you work quickly and efficiently.

The Optetrak primary (Cruciate Retaining or Posterior Stabilized) system is compatible with and may be upgraded to the Optetrak Non-Modular Constrained or Optetrak Constrained Condylar implants if collateral ligament stability is affected.

DESIGN RATIONALE

In the late 1980s, Dr. Albert Burstein of the Hospital for Special Surgery, New York, NY, and a colleague, Dr. Donald Bartel of Cornell University, reviewed the clinical performance of total knee replacements and studied the appearance of retrieved prosthesis specimens. This analysis led them to develop an improved articular design that results in very low Ultra High Molecular Weight Polyethylene (UHMWPE) stresses.

Articular Design

The bi-concave contour of the prosthesis results in reduced polyethylene stress in all loading modes.

The condylar radii have been precisely machined and matched to reduce stress further, while maintaining proven kinematics.

Bone Fit

The bone-mating surfaces have been accurately controlled to assure precise fit.

The implant has seven sizes for both the femoral and tibial components and six sizes for the patellar components, providing anatomical matching of the knee system to bone.

Easy down-sizing of the femoral component allows the surgeon to relieve tight flexion gaps.

Femoral Component

The system includes cruciate retaining, posterior stabilized and constrained condylar options, all with optimized articular geometry.

The bone-mating surfaces are either bead-blasted or porous-coated.

Tibial Component

The articular surface is precisely matched to the geometry of the femoral component.

The modular base plates are supplied with a trapezoid or finned (stem) system; the finned version includes a porous-coated option.

An all-polyethylene and a molded on metal back option is available.

Versatility

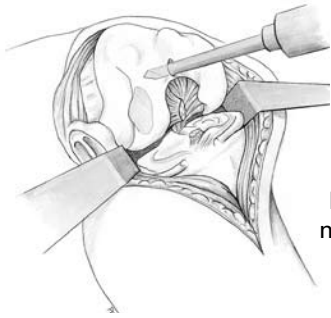
The system includes stem and augmentation options for both femur and tibia for revision and special problems and NMC.

Instruments

Instruments supplied with the Optetrak® Knee System have been designed to provide the surgeon the tools for accurate and efficient placement of the implant. These instruments allow the surgeon to take full advantage of the advanced benefits of the prosthesis design. Correct placement allows the system to reproduce the normal mechanical alignment of the limb. The instrument system is versatile, yet includes a minimum number of instruments.

For Cemented Use only.

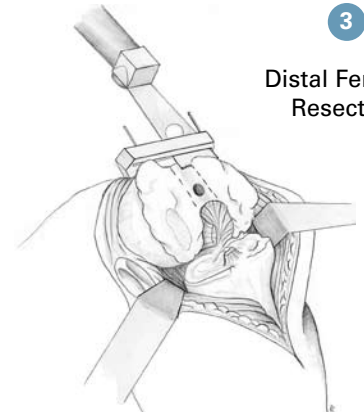
OPERATIVE TECHNIQUE OVERVIEW



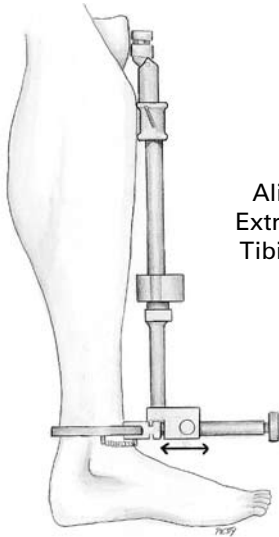
1
Perforate
Femoral Intra-
medullary Canal



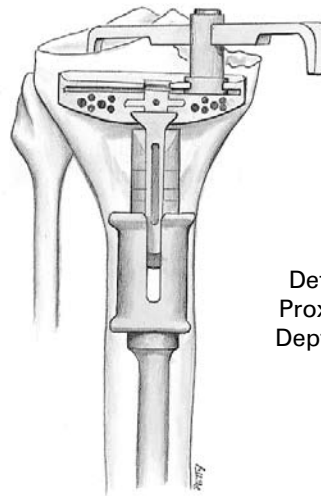
2
Setting Distal
Femoral
Alignment Angle



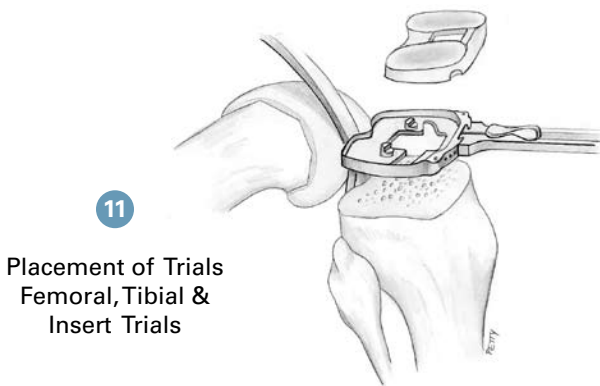
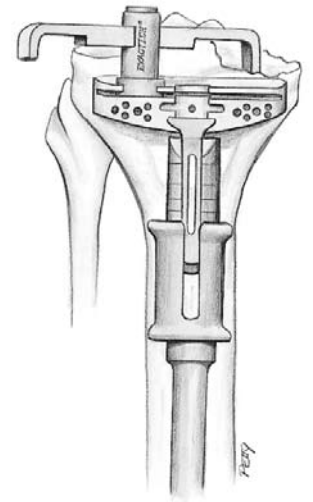
3
Distal Femoral
Resection



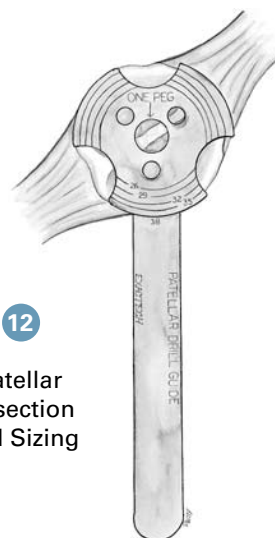
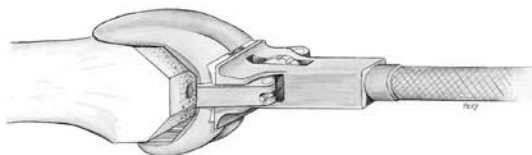
7
Alignment of
Extra-medullary
Tibia Resection
Guide



8
Determination of
Proximal Tibial Cut
Depth Using Stylus



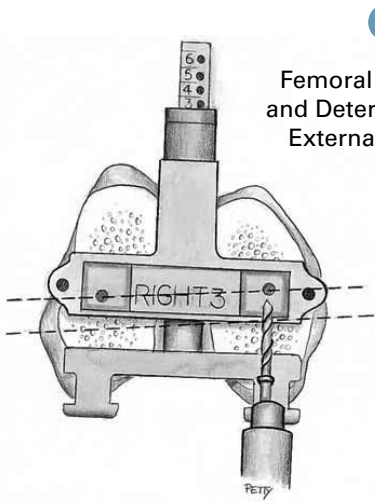
11
Placement of Trials
Femoral, Tibial &
Insert Trials



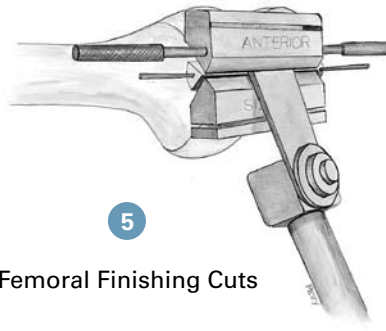
12
Patellar
Resection
and Sizing

13
Trial Reduction
and Assessment
of Alignment
and Tibial
Rotation

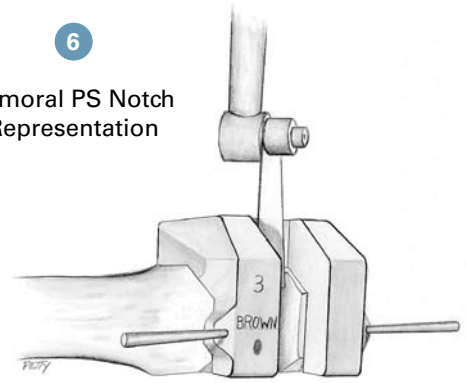




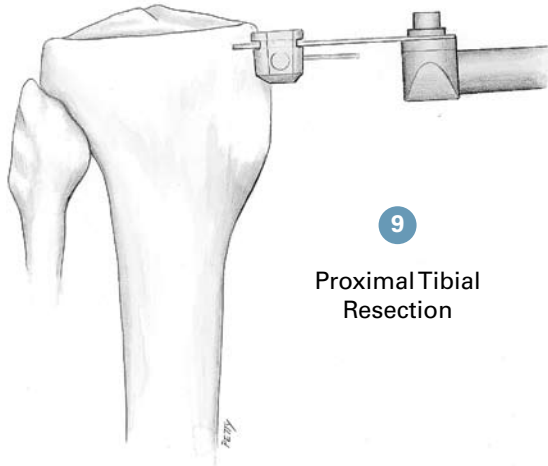
4
Femoral A/P Sizing
and Determination of
External Rotation



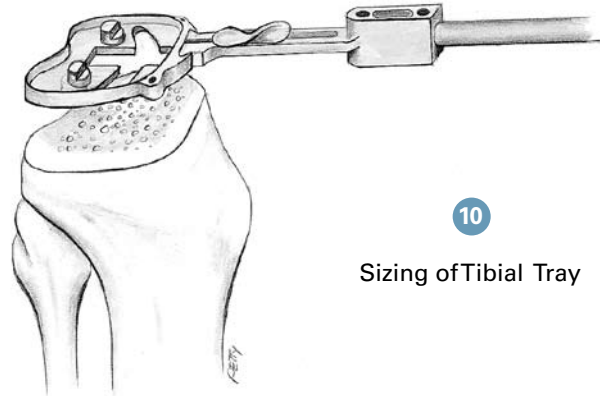
5
Femoral Finishing Cuts



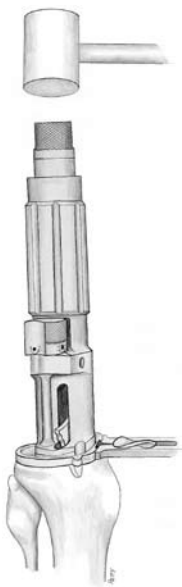
6
Femoral PS Notch
Representation



9
Proximal Tibial
Resection



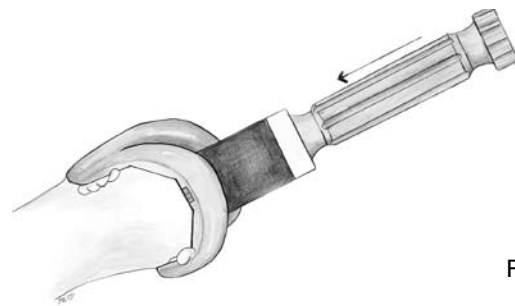
10
Sizing of Tibial Tray



14
Final Tibial
Preparation



15
Cementation



16
Patella Cementing



PRE-OPERATIVE PLANNING

RADIOGRAPHS

High-quality radiographs are essential for precise pre-operative planning. Films of the full length of the limb will allow the surgeon to determine the mechanical and anatomical axis of the knee more accurately (*Figure 1*).

TEMPLATING

Templating is done in both the anterior/posterior and lateral planes to estimate implant size for both the femur and tibia.

DETAILED OPERATIVE TECHNIQUE

APPROACH AND EXPOSURE

The surgeon may use either a straight or medial parapatellar skin incision (*Figure 2*).

The joint is entered through a medial parapatellar incision in the capsule. The incision should be extended proximally in the quadriceps tendon and distally along the medial border of the patellar tendon to the tibial tubercle (*Figure 3*).

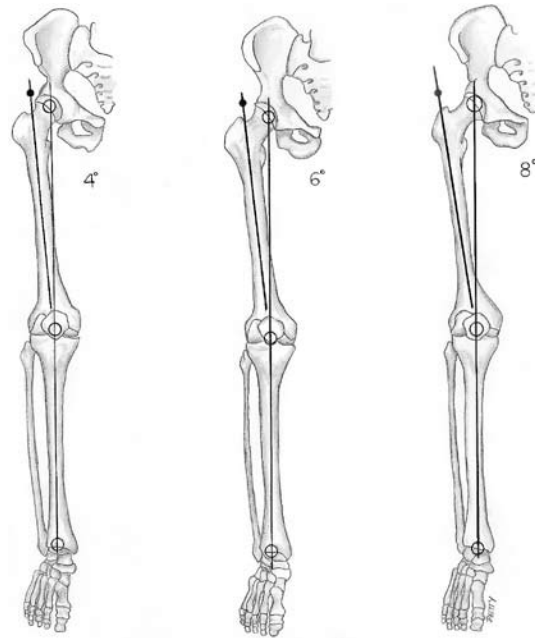


Figure 1
Pre-operative Full Limb Length Radiographs

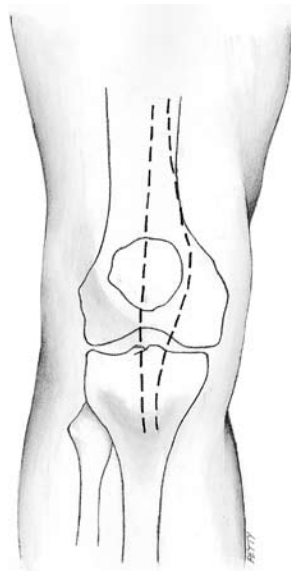


Figure 2
Skin Incisions

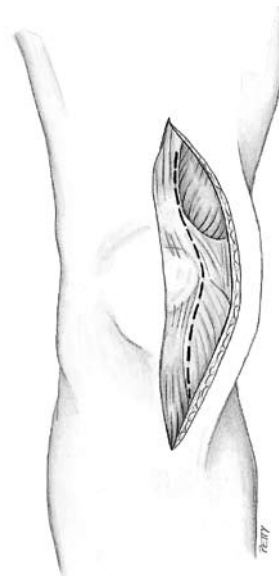


Figure 3
Incision of the Medial Parapatellar Capsule

PREPARATION OF THE FEMUR

Step 1: Opening the Intra-medullary Canal

The **Intra-medullary Pilot Drill** should be used to drill a hole in the distal femur coaxially with the femoral endosteal canal. The entry point for this drill is located in the intercondylar groove 5 to 10mm anterior to the intercondylar notch. This entry point may be more accurately located by one of two methods:

- 1) palpating the femur in the cephalad portion of the exposure or
- 2) by opening the cortex anterior to the femoral notch with a rongeur, osteotome, or gouge. The intra-medullary canal can then be probed with a small curette prior to drilling.

The intra-medullary canal is entered with the Intra-medullary Pilot Drill (*Figure 4*).

After the canal has been opened with the pilot drill, the **T-Handled Rod** should be inserted into the femoral canal to be sure it passes easily. Then, the T-Handled Rod should be removed from the canal (*Figure 5*).

Step 2: Femoral Alignment Assembly

The **Femoral Intra-medullary Alignment Guide** should be set for the right or left knee and for the appropriate valgus angle that was determined during pre-operative planning. Typically, this angle is 5, 6 or 7 degrees (*Figure 6*).

Instrument Setup

To set the valgus angle, rotate the distal thumb knob in a counter clockwise direction until the knurled knob rotates freely. Rotate the knurled knob to the proper side (right or left) and the appropriate valgus angle. Tighten the thumb knob.

The Femoral Intra-medullary Alignment Guide is assembled to the T-Handled Rod and the rod is introduced into the femoral canal (*Figure 7*). The alignment assembly should be brought into contact with the subchondral plate on the distal surface of both femoral condyles. The fixture is then rotated so that its posterior aspect is co-planar with a line drawn across the posterior condyles of the femur. Rotation should be approximately correct, but is not critical in this step (as it will be in Step 5, page 7). The alignment assembly may be pinned to the distal condyles if added stability is desired.

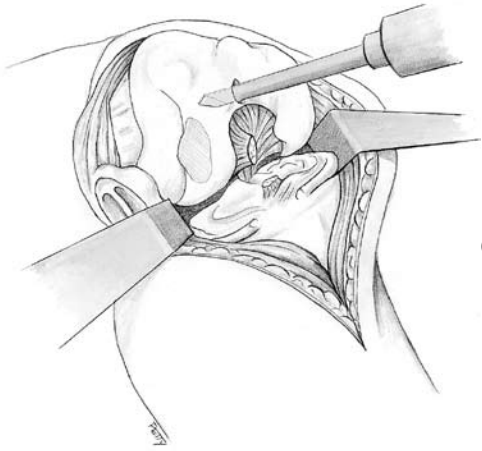


Figure 4
Entry of Intra-medullary
Canal with Intra-medullary
Pilot Drill

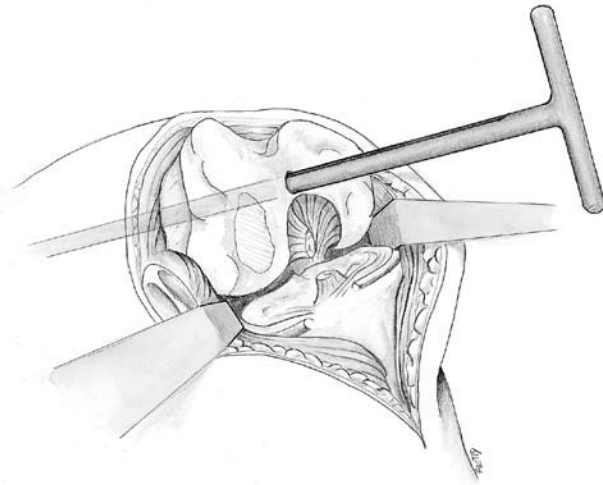


Figure 5
T-Handled Rod is Placed in Femoral Canal



Figure 6
Setting the Femoral
Valgus Angle

Step 3: Resection of Distal Femoral Bone

The **Distal Femoral Cutting Block** should be placed on the assembly and secured to the femur with headless drive pins or 1/8-inch drill bits (*Figure 8*). (The block may also be placed on the alignment assembly before the assembly is placed in the femur.) The preferred position for the pins is in the holes marked with a "0". This pin position allows the block to be relocated in a distal or proximal direction in 2mm increments, in case a longer or shorter femoral resection is needed. In the neutral ("0") position, 10mm of distal bone is resected. The standard 10mm distal cut established with this instrument system is 2mm greater than the thickness of the femoral component.

Distal femoral bone should be resected using an oscillating saw blade placed through the cutting slots of the cutting block (*Figure 9*). A sawblade of the appropriate thickness (.050" or 1.27mm) is crucial to achieving a precise cut in the slotted blocks. If the surgeon prefers to cut the distal femur without using a slot, the same block may be used. The open cutting surface of the distal femoral resection block is 8mm distal to the cutting slot. To establish the appropriate bone resection for cutting on the surface of the block, the surgeon should move the block 8mm proximally on the femoral alignment guide before pinning the block.

To be sure that the resected surfaces of the medial and lateral femoral condyles are flat and coplaner, a flat cutting block may be used to check the cuts. If necessary, refinements of the cut may be made.

Figure 7
The Femoral Alignment Guide is Assembled to T-Handled Rod, Inserted into Femoral Canal, and Seated Against Distal Femur. Pinning is Optional

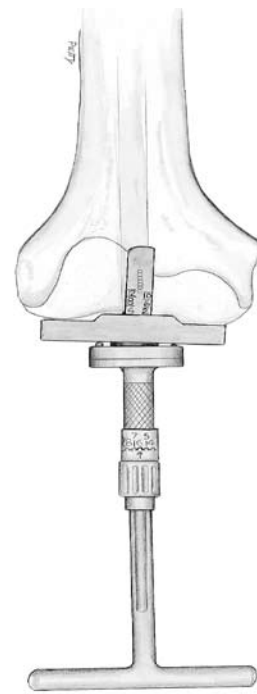


Figure 8
Placement and Pinning of the Distal Femoral Cutting Block

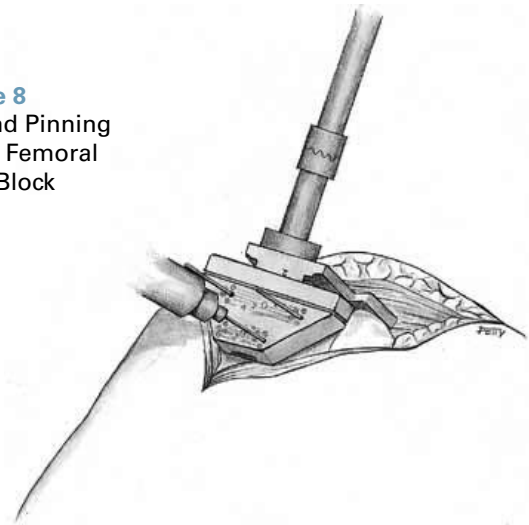
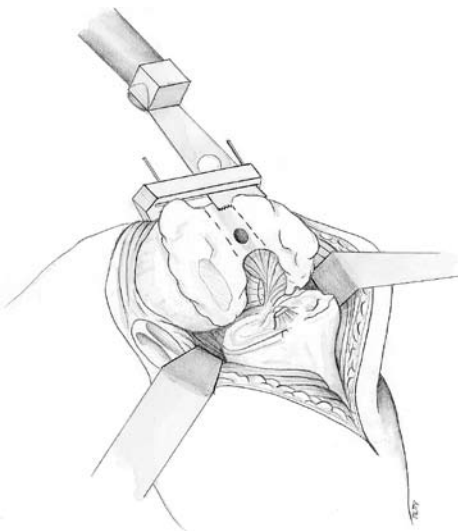


Figure 9
Distal Femoral Cut



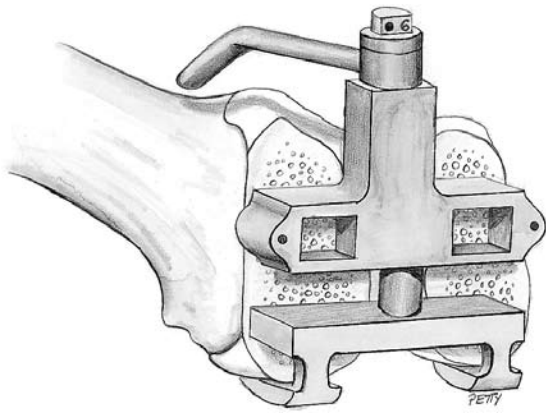


Figure 10
Femoral Sizing Guide Placement on the Distal Femur

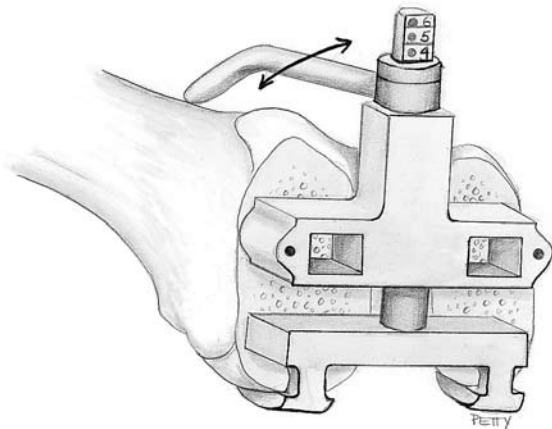


Figure 11
Establishment of Anterior Limit of Femoral Size

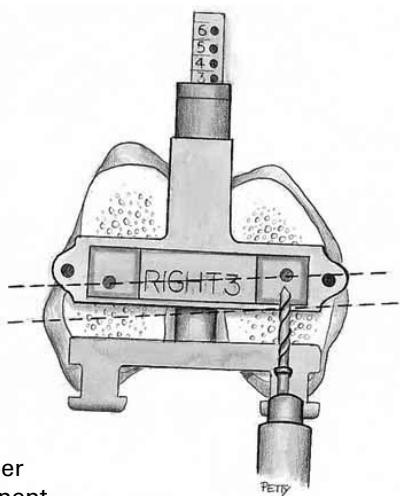


Figure 12
Establish Proper
Femoral Component
Rotation

Recutting the Distal Femur

There are two pin holes in the Distal Femoral Cutting Block distal to the cutting slot. If the original pins have been removed and holes cannot be relocated, the headed pins can be placed in these holes to relocate the block. With the headed pins hanging in the holes, the pins should be placed against the resected distal bone surface. This locates the slot 2mm proximal to the original distal resection. The block may then be repinned in the zero holes as before and additional cuts can be made as necessary.

Step 4: Sizing of Femoral Component

The **Femoral Sizing Guide** should be brought flush against the resected surface of the distal femur (*Figure 10*). The posterior flanges should then be pulled up against the posterior femoral condyles. If a posterior condylar defect is present, the sizing guide should be rotated to a position that accommodates the defect. The guide should be placed in the medial/lateral position as though it were a continuation of the femur. The guide may be stabilized with pins if the surgeon desires.

The stylus should be placed between the highest and lowest points on the anterior femoral cortex (*Figure 11*). The guide should be stabilized by hand. Femoral size may be read from the color-coded scale. If the reading is between sizes, it is usually preferable to choose the smaller size.

Step 5: Establishment of Rotation of Femoral Component

Correct rotation of the femoral component is best established by using the transepicondylar axis as a guide (*Figure 12*). A drill bushing should be selected for 0 or 3 degrees of external rotation. The right or left bushing may then be inserted into the guide. Two 0.156-inch (4mm) holes are drilled and the guide is then removed. The femur is now ready for anterior/posterior and chamfer bone resection.

Step 6: Resection of Anterior, Posterior, and Chamfer Femoral Bone

The surgeon should secure the **Femoral Finishing Guide** of the previously determined size to the distal surface of the femur by driving the guide pins into the drilled holes (*Figure 13*). The guide may be further secured by holding it with the removable handles or by placing outrigger pins.

The anterior and posterior femoral surfaces should be resected with an .050" sawblade (*Figures 14 and 15*). The chamfer cuts should then be made. Femoral preparation is now complete for the posterior cruciate retaining prosthesis. If the posterior stabilized femoral component has been selected, the box cut for this component is described on page 9.

The trial femoral component is placed (*Figure 16*). Use of a Bone Hook or a **Locking Femoral Impactor** may help avoid tipping of the prosthesis into flexion.

Note: Non-slotted blocks are available for the anterior/posterior and chamfer cuts for the surgeon who prefers to use these.

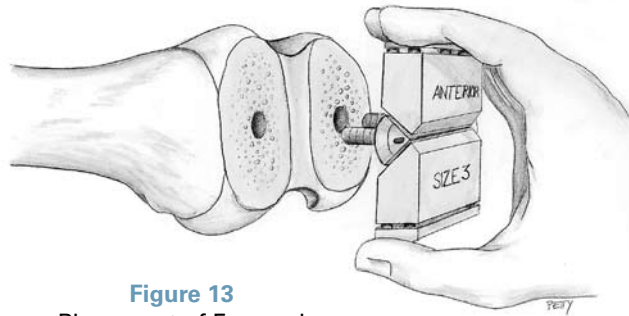


Figure 13
Placement of Femoral Finishing Guide

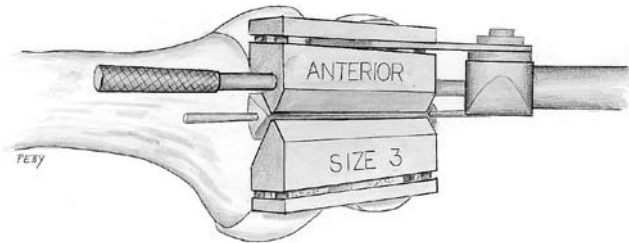


Figure 14
Anterior and Posterior Femoral Resection

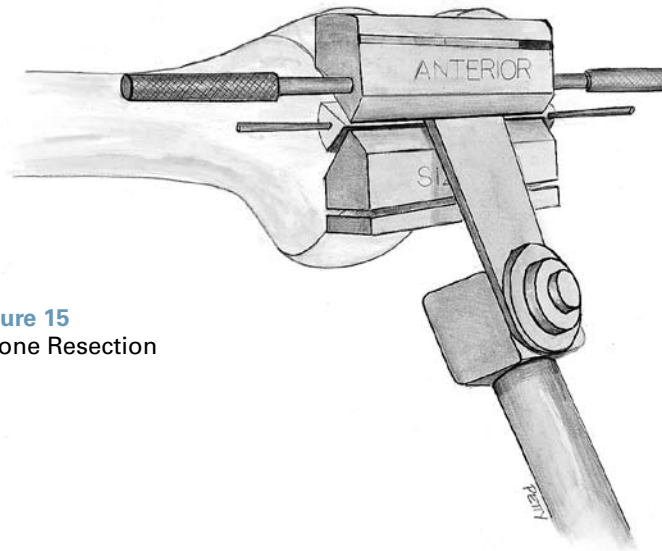


Figure 15
Chamfer Bone Resection

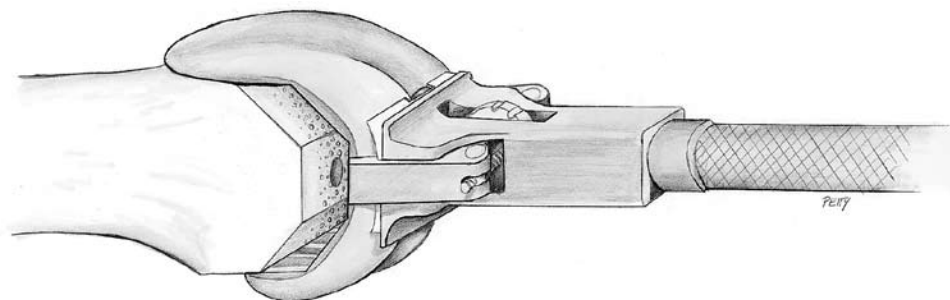


Figure 16
Placement of Femoral Trial

POSTERIOR STABILIZED FEMORAL PREPARATION

After the anterior, posterior and chamfer femoral resections have been completed, the following steps should be taken to prepare the femur for the posterior stabilized femoral component. If the surgeon decides to change to a posterior stabilized prosthesis intra-operatively after all cuts have been made, a similar technique is followed.

The **Femoral PS Notch Resection Guide** should be placed on the resected anterior surface of the femur and carefully centered on the condyles (Figure 17). The guide should be held with fixation pins.

An oscillating saw with a narrow blade should be used to make the cuts necessary to accommodate the box of the posterior stabilized femoral implant.

Preparation for the posterior stabilized femoral component is now complete (Figure 18).

The trial femoral component is placed (Figure 19).

PREPARATION OF THE TIBIA

The surgeon may select either extra-medullary or intra-medullary alignment for placement of the **Tibial Cutting Guide**. The extra-medullary technique will be described first. Description of the intra-medullary technique will follow.

EXTRA-MEDULLARY ALIGNMENT

Step 1: Placement and Distal Alignment of the Extra-medullary Tibial Alignment Guide

Instrument Setup

The Tibial Cutting Guide is attached by sliding it onto the dovetail of the **Adjustable Tibial Resector**, then sliding the Tibial Guide Shaft into the **Tibial Resector Ankle Clamp**. The shaft of the guide must be rotated 180 degrees within the tibial resector in order to slide into position.

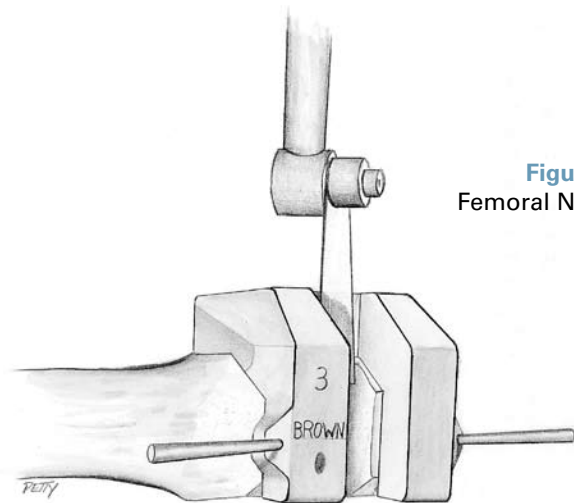


Figure 17
Femoral Notch Guide

Figure 18
Completed Posterior Stabilized
Femoral Preparation

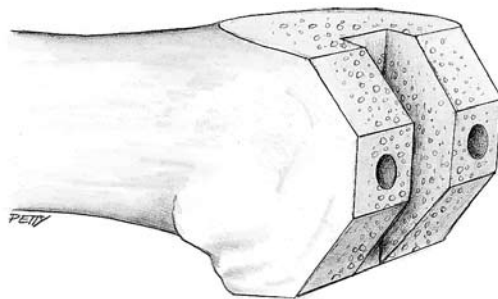
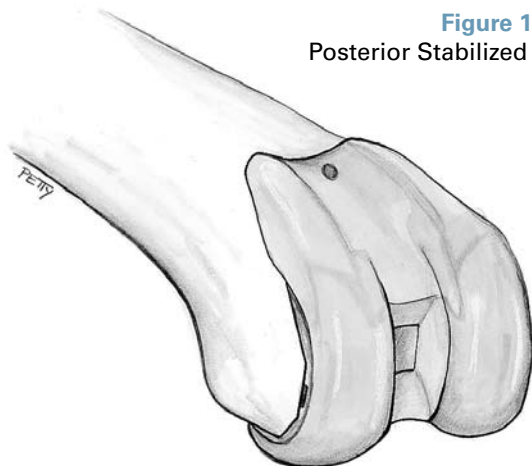


Figure 19
Posterior Stabilized Femoral Trial



The Extra-medullary Tibial Guide Assembly should be placed on the front of the tibia and secured by placing the spring-loaded arms around the ankle in the supramalleolar position (*Figure 20*).

The guide should be centered over the ankle joint (*Figure 21*). This center is located in the depression between the extensor hallucis longus and the extensor digitorum longus tendons. The guide may be adjusted by loosening the anterior knob on the ankle clamp. In most instances, the guide will read 2 to 5mm medial to "0" when properly centered.

In the sagittal plane, the Tibial Resector Shaft should be aligned parallel to a line extending from the center of the knee joint to the center of the ankle joint (*Figure 22*). If the surgeon prefers, a posterior tilt may be added at this point by sliding the vertical bar slightly more anteriorly (*Figure 25*).

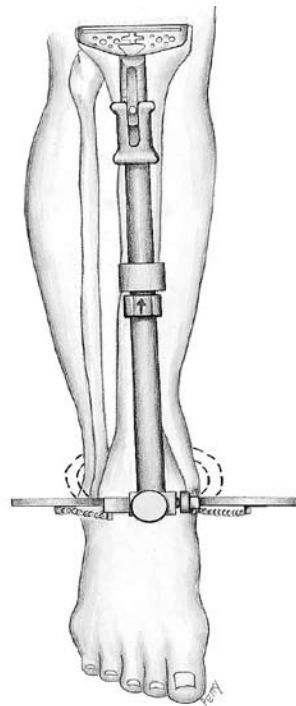


Figure 20
Placement of Extra-medullary Tibial Alignment Guide

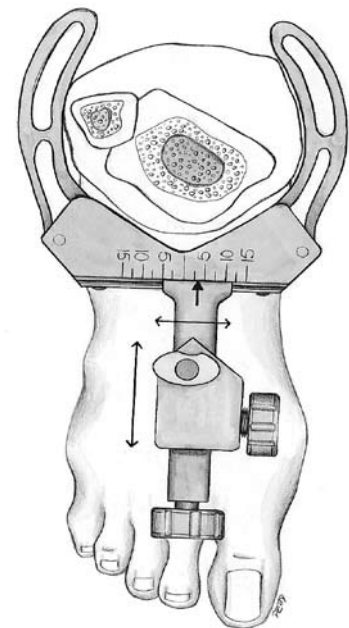


Figure 21
Setting Medial/Lateral Alignment at Ankle

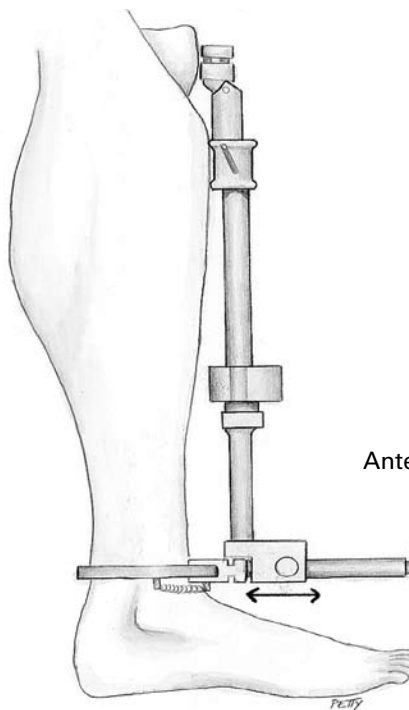


Figure 22
Anterior/Posterior Tibial Alignment

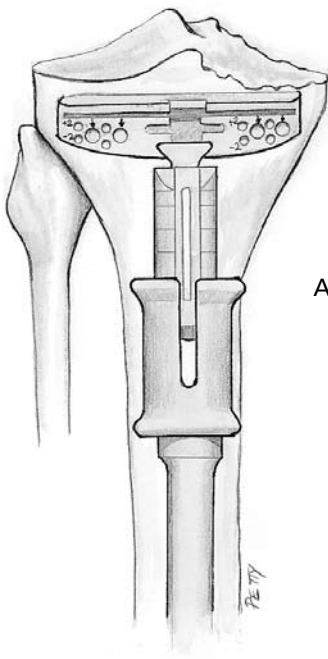


Figure 23
Proximal Alignment of
the Extra-medullary Tibial
Alignment Guide in the Frontal
Plane

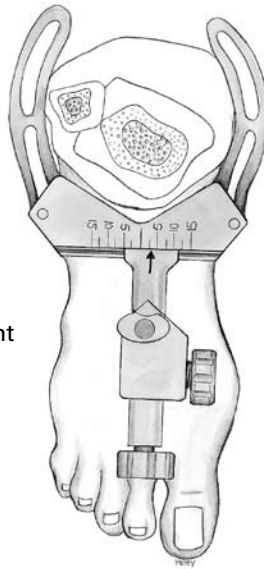


Figure 24
Rotational Alignment

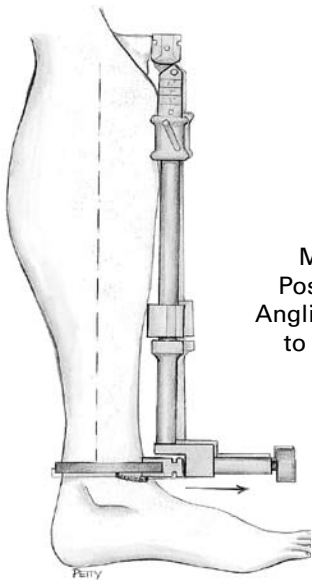


Figure 25
Method 1: Anterior/
Posterior Alignment by
Angling the Alignment Rod
to Create Posterior Tilt

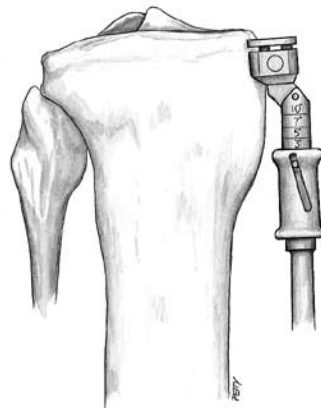


Figure 26
Method 2: Anterior/Posterior
Alignment Using the Cam on the
Tibial Alignment Guide

Step 2: Proximal Alignment

In the frontal plane, the Tibial Resector Shaft should be aligned with the long axis of the tibia (Figure 23). Normally, this may be accomplished by centering the vertical Alignment Rod on the center of the tibial plateau.

The guide should be set rotationally by aligning it with the second toe or, if there is an ankle or foot deformity, by pointing it in the same direction that the tibial tubercle points (Figure 24).

The posterior slope present in the individual tibia should, in most cases, be reproduced in the proximal tibial resection. In most tibiae, this is a 3 to 5 degree angle. The surgeon may choose one of two methods for establishing the posterior slope of the proximal tibia.

Method 1: The Tibial Resector Shaft should be set so that it is parallel with the long axis of the tibia in the anterior/posterior plane (Figure 25). The posterior slope may then be set by leaving the cam adjustment on "0" and adjusting the alignment rod more anteriorly at the ankle. To make this adjustment, loosen the thumb screw on the side of the ankle clamp, set the alignment in the desired position, and tighten the thumb screw.

Method 2: The Tibial Resector Shaft should be placed parallel to the long axis of the tibia (Figure 26). The posterior slope should be set by dialing the selected degree of slope with the cam adjustment. This slope angle is normally 3 to 5 degrees.

Step 3: Determination of Tibial Resection Depth

The Tibial Cutting Guide should be placed on the dovetail of the alignment guide if the guide was not pre-assembled. The depth resection stylus should be placed in the cutting slot of the guide so that either the side marked "most normal" or the side marked "most defective" extends over the tibial plateau.

If the surgeon chooses to measure depth resection from the most normal tibial plateau, the end of the stylus marked “most normal” should be placed on the center of the most normal plateau (*Figure 27*). This level provides for 10mm of bone resection.

If depth resection is measured from the more defective plateau, the end of the stylus marked “most defective” should be placed on the defective tibial plateau (*Figure 28*). The level of bone resection is 1mm below the defective area of plateau on which the stylus rests.

Step 4: Securing Tibial Cutting Guide to Tibia and Final Checking

When the proper positioning of the Tibial Cutting Guide has been assured, drill pins should be placed through the guide into the tibia (*Figure 29*). After the drill holes marked with arrows have been selected, the surgeon may make a 10mm resection from the most normal side of the tibial plateau or a 1mm resection from the most defective side of the tibial plateau. The guide may be adjusted proximally or distally in 2mm increments to either decrease or increase the tibial resection. If the surgeon prefers to resect from the top of the guide, the surface cut will be 4mm more proximal than a cut through the slot.

The Extra-medullary Alignment Guide may be removed by first opening the ankle clamp, then sliding the guide forward off the resection guide (*Figure 30*).

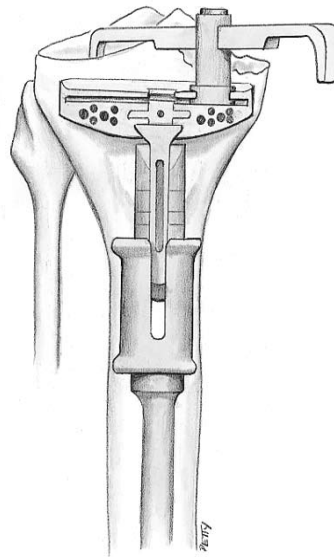


Figure 27
Tibial Depth Resection Measured from the Most Normal Tibial Plateau

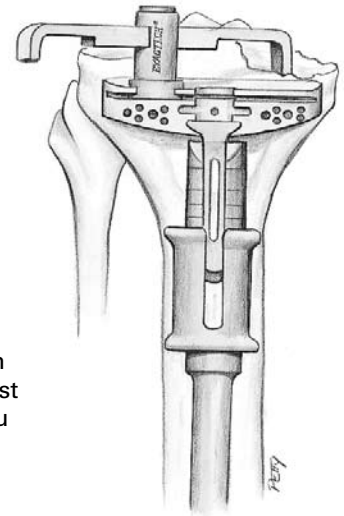


Figure 28
Tibial Depth Resection Measured from the Most Defective Tibial Plateau

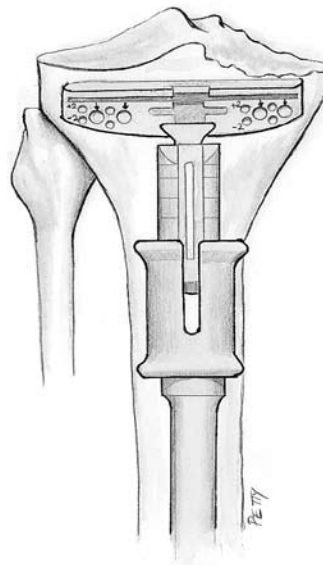


Figure 29
Securing the Tibial Cutting Guide to the Tibia

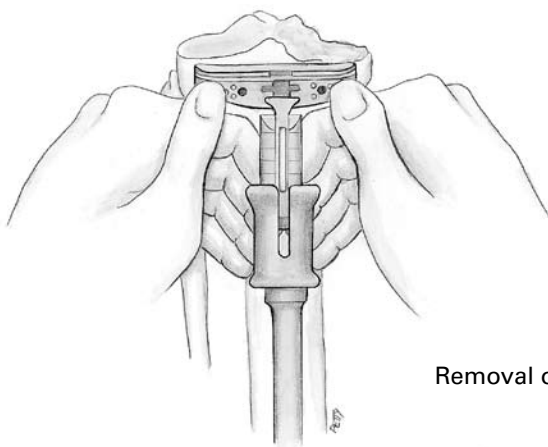


Figure 30
Removal of the Extra-medullary Alignment Guide

Figure 31
Final Alignment Check

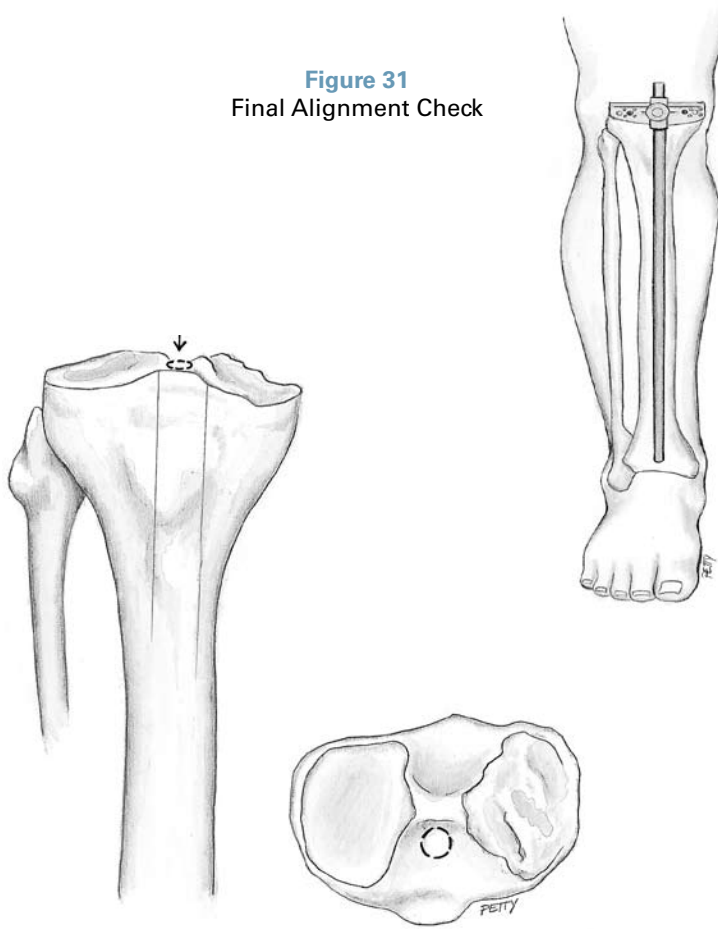


Figure 32
Locating the Entry Point for the Pilot Drill

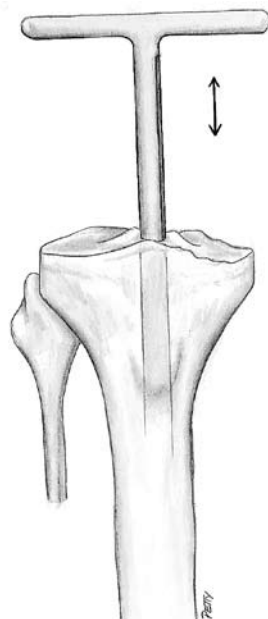


Figure 33
T-Handled Rod in Tibial Canal

The surgeon should make a final check for proper alignment by securing the Mauldin Handle to the resection guide and placing an Alignment Rod through one of the holes in the handle (*Figure 31*). Alignment can also be checked by placing the intra-medullary T-Handled Bar over the drill points that secure the proximal Tibial Cutting Guide. This T-bar may be allowed to dangle from the drill points. Assuming the T-bar lies proximally in the sagittal midline of the proximal tibial plateau, the distal tip of the bar should lie over the center of the ankle joint. The Alignment Rod in the handle shows alignment in both planes while the T-Handled Bar shows alignment in only the frontal plane.

INTRA-MEDULLARY ALIGNMENT

Step 1: Opening of the Intra-medullary Canal

The Intra-medullary Pilot Drill is used to drill a hole in the proximal tibia coaxially with the tibial endosteal canal (*Figure 32*). The entry point for the drill is most accurately located by finding the proximal extension of the center of the intra-medullary canal on the pre-operative X-ray films. This point often lies between the tibial spines in the frontal plane and just anterior to them in the sagittal plane.

The surgeon may use an awl, rongeur, osteotome, or gouge to help open the entry point for the drill. The intra-medullary canal may then be probed with a small curette prior to drilling. The canal is then entered with the Intra-medullary Drill.

After opening the canal with the Pilot Drill, the surgeon should insert the T-Handled Rod into the tibial canal to be sure it passes easily (*Figure 33*). Then the T-Handled Rod should be removed from the canal.

Step 2: Assembly and Placement of Alignment Guide

Instrument Setup

Slide the Tibial Cutting Guide onto the anterior dovetail of the IM Guide and tighten the Anterior Knurled Knob. Rotate the superior knob clockwise until the resection head is in its highest position. Assure that the varus/valgus adjustment is set at "0". Rotate the slope selection knob to the desired position. Loosen the rod locking knob and slide the rod into the guide.

The Intra-medullary T-Handled Rod should be inserted into the guide and again inserted into the tibial intra-medullary canal (*Figure 34*).

Step 3: Guide Alignment and Stabilization

The guide should be aligned rotationally by aligning it with the second toe or, if there is a foot or ankle deformity, by pointing it in the same direction as the tibial tubercle points.

After rotational alignment has been set, the flutes of the guide should be slightly tapped into the tibial plateau to stabilize the guide (*Figure 35*).

To be sure that varus/valgus alignment is correct, the surgeon should place an Alignment Rod in the anterior hole of the guide (*Figure 36*). The rod should be aligned with the center of the ankle joint. This center lies in the depression between the extensor hallucis longus and extensor digitorum longus tendons at the ankle.

The posterior slope should be adjusted by dialing the appropriate degrees on the posterior slope adjustment knob (*Figure 37*). The Alignment Rod will show the slope compared with the sagittal plane of the intra-medullary canal of the tibia.

Step 4: Determination of Tibial Resection Depth

The Tibial Resection Guide should be placed on the dovetail of the alignment guide if the block was not pre-assembled. The depth resection stylus should be placed in the cutting slot of the block with either the side marked "most normal" or "most defective" extending over the tibial plateau. Depth resection should be set using the adjustment knob near the top of the guide.

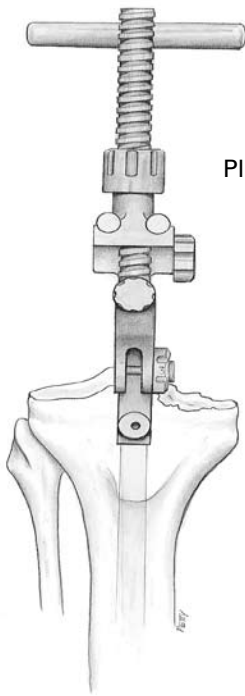


Figure 34
Placement of Intra-medullary Guide into Tibia

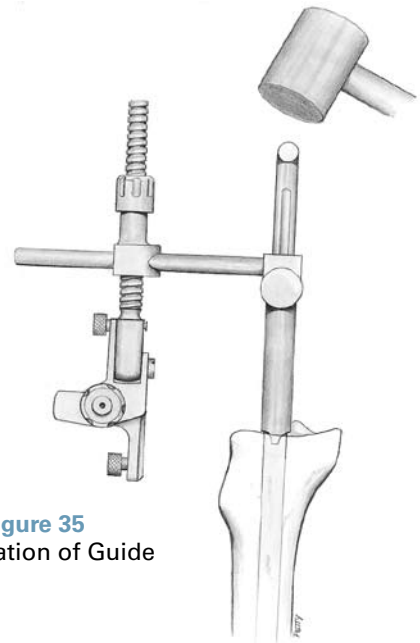


Figure 35
Stabilization of Guide

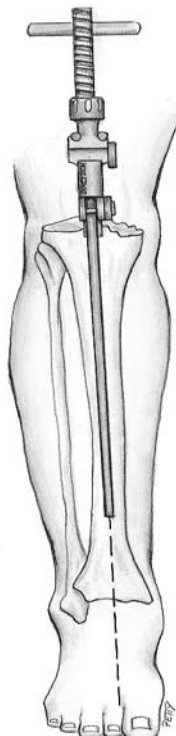


Figure 36
Varus/Valgus Alignment

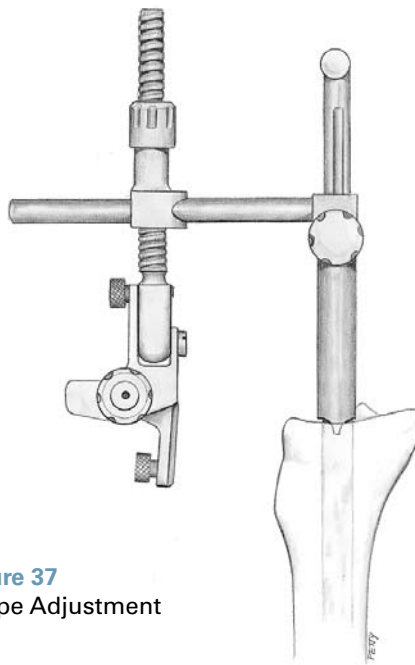


Figure 37
Posterior Slope Adjustment

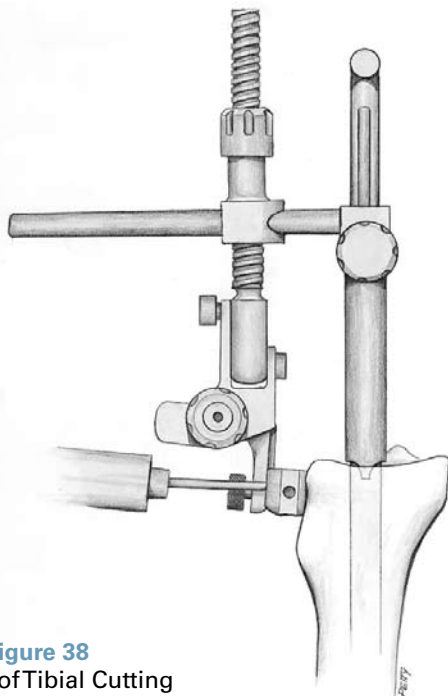


Figure 38
Fixation of Tibial Cutting
Guide to Tibia

If the surgeon chooses to measure depth resection from the most normal tibial plateau, the most normal end of the stylus should be placed on the center of the most normal plateau. This level provides for 10mm of bone resection.

Note: See page 12, Figure 27

If depth resection is measured from the more defective plateau, the side marked "most defective" of the stylus should be placed on the defective tibial plateau. The level of bone resection is 1mm below the defective area of plateau on which the stylus rests.

Note: See page 12, Figure 28

Step 5: Pinning of Guide, Removal of Intra-medullary Guide and Final Checking

When the proper positioning of the Tibial Resection Guide has been assured, Drill Pins are placed through the guide into the tibia through the holes marked with an arrow (Figure 38). After the drill holes marked with arrows have been selected, 10mm resection may be accomplished from the end of the stylus marked "most normal" or 1mm from the end of the stylus marked "most defective". The amount of tibia resected may be decreased or increased by proximal or distal adjustment of the guide in 2mm increments.

If the surgeon prefers to resect from the top of the guide, the surface cut will be 4mm more proximal than a cut through the slot.

To remove the Intra-medullary Alignment Guide, the knob which holds the guide on the Intra-medullary T-Handle Rod should be loosened and the T-Handle Rod should be removed. The guide and T-Handle Rod should be removed together as the end of the rod is loosened in the intra-medullary canal. An Extractor Hook and Slap Hammer are available to aid in removing the T-Handle Rod and Intra-medullary Guide if necessary. Alternatively, both the T-Handle Rod and the guide may be tapped lightly with a mallet to remove.

A final check for proper alignment should be performed by securing the Mauldin Handle to the resection guide and placing an Alignment Rod through one of the holes in the handle (*Figure 39*). Alignment may also be checked by placing the Intra-medullary T-handled Bar over the drill points that secure the proximal Tibial Cutting Guide. This T-bar may be allowed to dangle from the drill points and, assuming that the T-bar lies proximally in the sagittal midline of the proximal tibial plateau, the distal tip of the bar should lie over the center of the ankle joint.

The alignment rod in the handle shows alignment in both planes while the T-handled bar shows alignment in only the frontal plane.

Step 6: Proximal Tibial Bone Resection

Bone resection should be performed by cutting through the slot of the Tibial Resection Guide with an oscillating saw (*Figure 40*). (If the surgeon chooses to cut on the upper surface of the guide, 4mm less bone will be resected so the appropriate adjustment should be made). The surgeon should take care during the tibial resection to avoid injury to the collateral structures and the posterior neural and vascular structures. The tibial attachment of the posterior cruciate ligament should be saved when cruciate retaining prostheses are to be used.

The cut tibial surface should be sized using the Trial Tibial Trays (*Figure 41*). For a given size of femoral component, the surgeon has a choice of three tray sizes: these include the same nominal size as the femoral component, one size larger, and one size smaller. This system provides for a tibial articular surface that is precision-matched for its mating femoral component; this results in the low articular stresses seen with the Optetrak® prosthesis. The Tibial Trays have a color code that matches the femoral trial component. The surgeon should choose the largest tray that fits within the borders of the resected tibial surface, without any overhang.

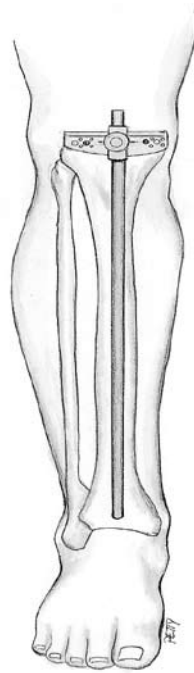


Figure 39
Final Alignment Check

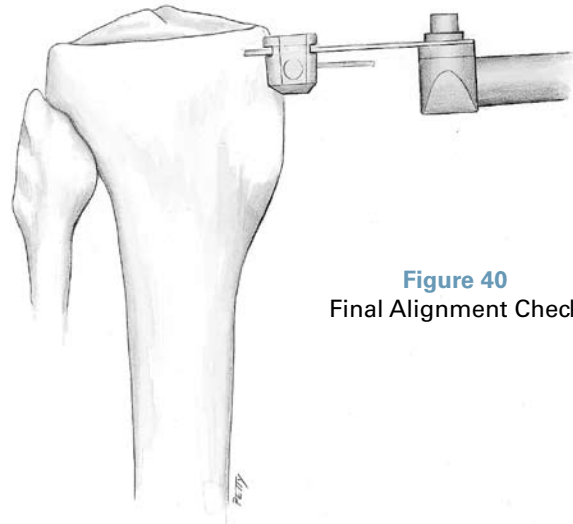


Figure 40
Final Alignment Check

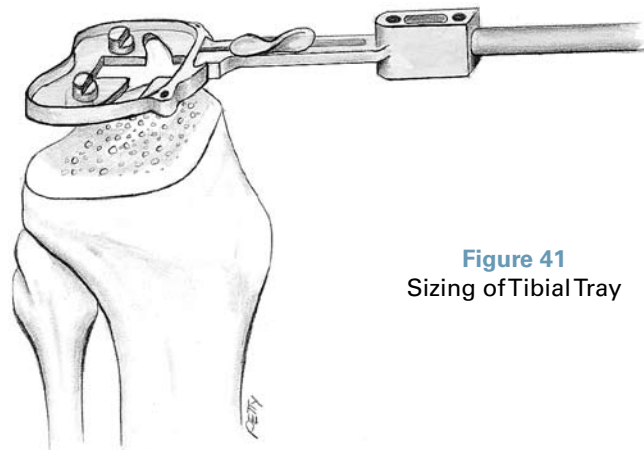


Figure 41
Sizing of Tibial Tray

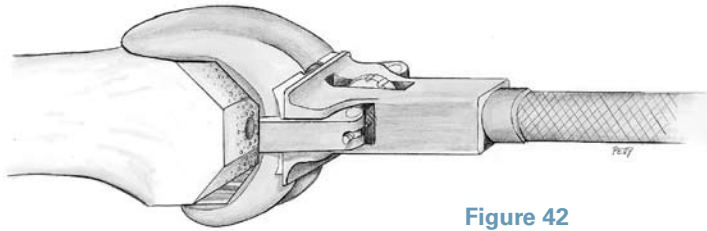


Figure 42
Placement of Femoral Trial

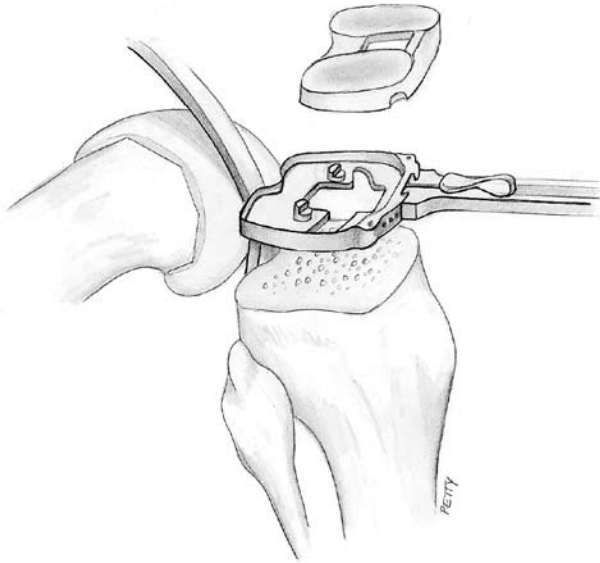


Figure 43
Selection of Proper Tibial Insert

PLACEMENT AND SIZING OF TRIAL COMPONENTS

The Femoral Trial is placed with the Locking Femoral Component Impactor or by hand (*Figure 42*). If placed by hand, it is helpful to pull proximally on the component with a bone hook in the intercondylar notch to assure the component goes straight on the prepared bone surfaces, avoiding the tendency that femoral components sometimes exhibit of rotating slightly into flexion. Ensure that the component is centered on the condyles in the medial/lateral direction. When correct positioning is assured, the component is fully seated with the femoral impactor and a mallet.

The size, number and color of the Tibial Insert Trial matches that of the size, number and color dot on the femoral trial (*Figure 43*). The surgeon should assess the different thicknesses of Tibial Insert, usually beginning with the 9mm Insert Trial. The correct selection is the insert that allows for full extension and slight laxity (similar to that of a typical normal knee) in both extension and flexion. The range of motion may be checked at this stage, but the final check for kinematics is best completed after patellar preparation.

PREPARATION OF THE PATELLA

Step 1: Resection of the Patellar Articular Surface

The articular surface of the patella may be resected with or without the use of the Patellar Resection Guide, depending on the surgeon's preference. Resection may be done with the knee either flexed or extended.

METHOD 1: FREE-HAND RESECTION

For patellar resection performed without the guide ("free hand"), the patella should be stabilized with large towel clips or similar instruments (*Figure 44*). Either of two landmarks should be used:

- 1) from edge of medial articular surface to edge of lateral articular surface or,
- 2) beginning just posterior to the patellar tendon origin at the inferior pole of the patella and cutting superiorly, parallel to the plane of the patella. The posterior patellar surface should be resected with an oscillating saw.

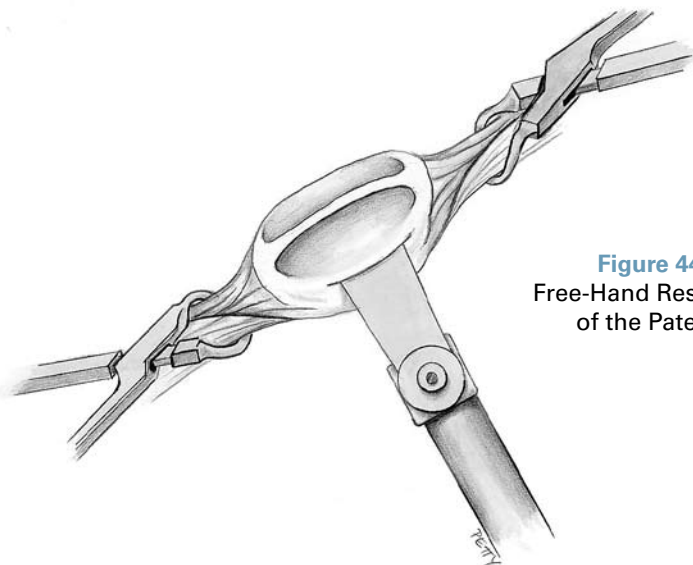


Figure 44
Free-Hand Resection
of the Patella

METHOD 2: WITH RESECTION GUIDE

The patellar resection guide for the Optetrak Knee System provides accurate measurement of patellar thickness and the amount of bone resected so that the amount of patella remaining after resection is easily calculated.

The thickness of the patellar prosthesis increases with increasing diameter—just as it does with the normal patella and most other total knee systems (*Figure 45*). Patellar diameter may be determined by placing the Patellar Drill Template over the patella. Osteophytes must be removed prior to this measurement to assure accuracy.

Resection depth of the patella is based on the estimated patellar diameter measured (*Figure 46*). Depth can be determined from the chart in *Figure 46*.

The Patellar Resection Guide consists of a Patellar Clamp combined with a Measuring Device and Saw Guide (*Figure 47*). The clamp should be positioned with the saw guide ring circumferentially placed on the patella. Care should be taken not to squeeze the handles too tightly during sawing to avoid displacing the guide surface location. The guide may be held in the center (at the pivot position) to maintain the guide's stability and position.

After the clamp is placed around the patella and tightened, the clamp adjustment knob should be turned to lock the clamp. Patellar thickness should be read from the "Patellar Thickness" gauge.

The "wing-nut" knob for resection depth adjustment should be turned to the desired resection depth (*Figure 48*). If the surgeon prefers to resect the amount of bone which will be replaced by a specific diameter patellar component, the thicknesses are listed in *Figure 46*. After the resection depth is selected, the patella is ready for resection.

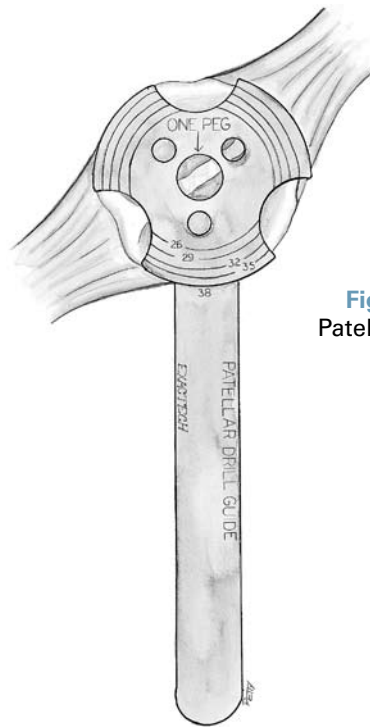
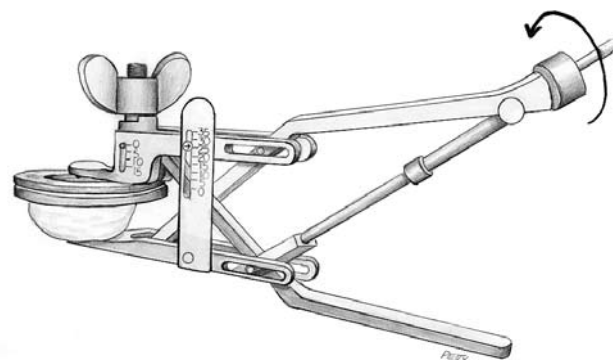


Figure 45
Patellar Sizing

Diameter (mm)	Thickness (mm)
26	5.1
29	6.1
32	7.2
35	8.5
38	10.0
41	11.1

Figure 46
Relationship of Patellar Prosthesis
Diameter to Thickness

Figure 47
Placement of Patellar Resection Guide and
Measurement of Patella



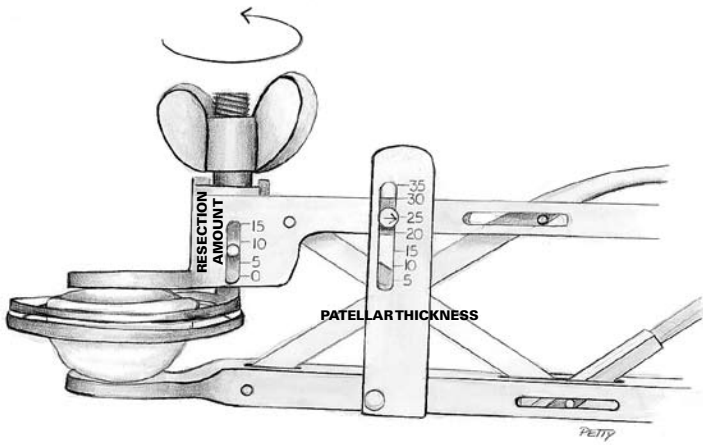


Figure 48
Setting of Patellar Resection Depth

The patellar surface should be resected with an oscillating saw (Figure 49). The sawblade should be placed through the cutting slot of the saw guide ring for resection.

Step 2: Final Sizing and Drilling of Patella
When patellar resection is complete, final determination of size and hole preparation should be performed using the patellar template (Figure 50). The template should be placed on the resected patellar surface, providing a size check for all sizes of patella. It also provides guide holes for the drill for three-peg or single-peg prostheses.

Holes should be drilled through the patellar template in either the three-hole or single-hole configuration (Figures 51 and 52).

Step 3: Patellar Trial Placement
The appropriate size of trial prosthesis should be placed on the patella.

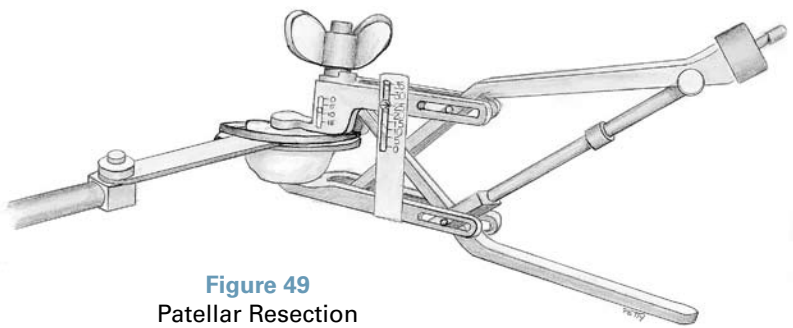


Figure 49
Patellar Resection

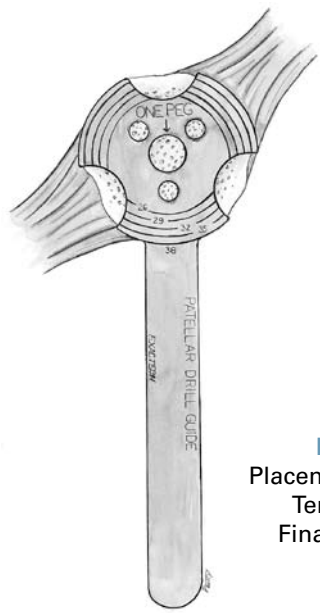


Figure 50
Placement of Patellar Template and Final Size Check

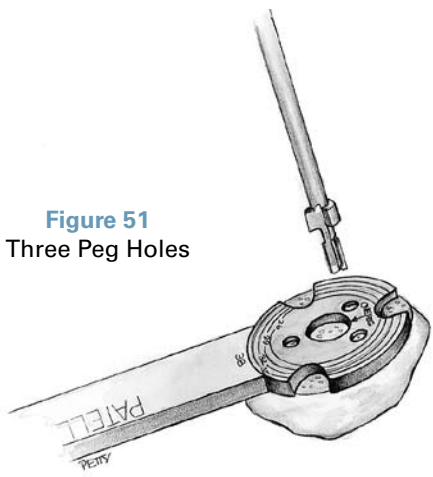


Figure 51
Three Peg Holes

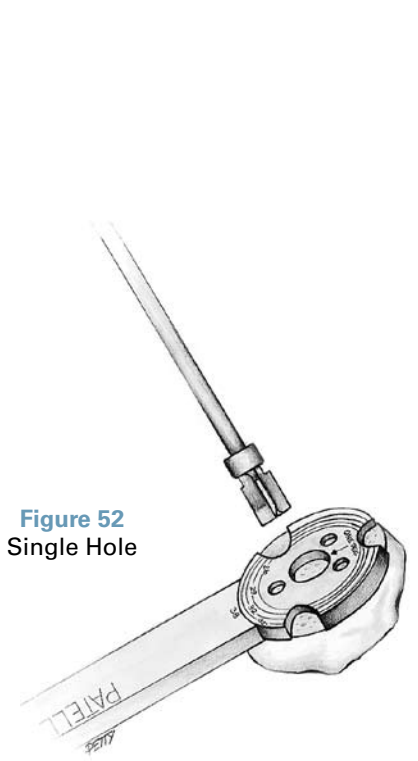


Figure 52
Single Hole

FINAL PROSTHESIS TRIAL CHECK

Final prosthesis trial check should include assessment of:

ALIGNMENT,
STABILITY,
MOTION, and
PATELLAR TRACKING

ALIGNMENT CHECK

With the knee in full extension and the Mauldin Handle assembled to the Tibial Base Plate, Alignment Rods should be placed in the holes in the Mauldin Handle and the alignment should be assessed (*Figure 53*). Proper rotation of the tibial component should be determined by its congruency with the femoral component. Normally, the anterior plane of the tibial component will point approximately in the direction of the tibial tubercle and second toe when congruency is established. When proper alignment is achieved, the alignment rods will be centered over the ankle and estimated location of the center of rotation of the femoral head.

STABILITY CHECK

The knee should be assessed for stability in both extension and flexion (*Figures 54 and 55*). The extension check should be performed with the knee flexed a few degrees to relax the posterior capsule. However, the knee should extend fully. The flexion check should be performed with the knee flexed to 90 degrees. The most appropriate stability is achieved when the medial and lateral opening is similar to that of a normal knee during application of valgus and varus stress. An adjustment of ligament balance may be needed, if there is differential ligament tightness between varus and valgus in flexion or extension.

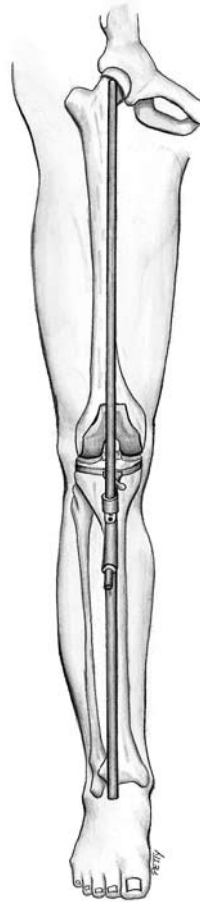


Figure 53
Assessment of Alignment

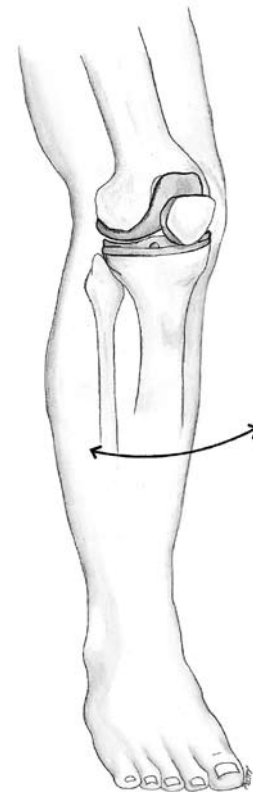


Figure 54
Stability Check in
Extension



Figure 55
Stability Check in Flexion

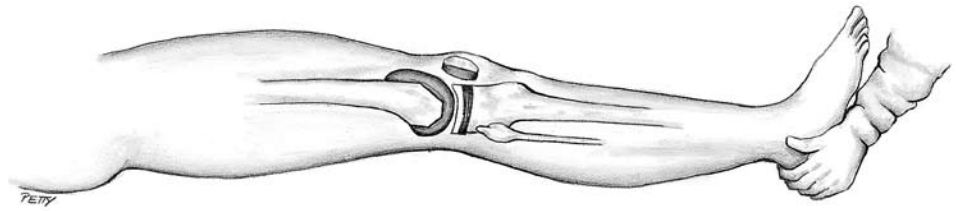


Figure 56
Extension Check



Figure 57
Flexion Check

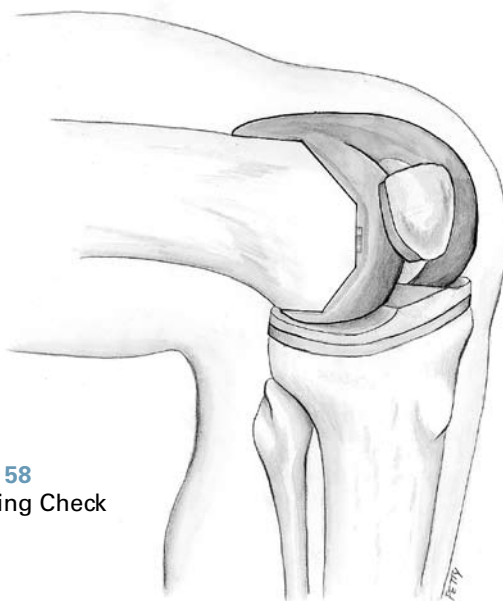


Figure 58
Patellar Tracking Check

MOTION CHECK

The knee should extend fully without force (*Figures 56 and 57*). To check flexion, the surgeon should elevate the thigh and allow the leg to flex by the pull of gravity. The amount of flexion determined in this manner is the best intra-operative predictor of the flexion that will ultimately be achieved.

PATELLAR TRACKING CHECK

As the knee is put through a range of motion, the patella should track smoothly in the patellar groove of the femoral prosthesis with little or no pressure exerted against its lateral edge and without it being held medially (*Figure 58*). If there is a tendency to lateral subluxation, lateral retinacular release should be performed. Because of the system's advanced patellar groove and condylar design, lateral retinacular release is unlikely to be needed as often as it is with most other knee systems.

FINAL BONE PREPARATION: FEMUR

FEMORAL PEG HOLE PREPARATION

When all checks are completed, holes may be drilled for the pegs of the cruciate-retaining femoral component (*Figure 59*). If the surgeon prefers a tighter fit for the pegs and less cement intrusion into the holes, a small punch may be used to create these holes. Alternatively, if the small holes created for the cutting blocks are in the correct medial/lateral location, they may be used for the pegs of the cruciate retaining femoral prosthesis. (This step is not necessary for the posterior stabilized femoral component).

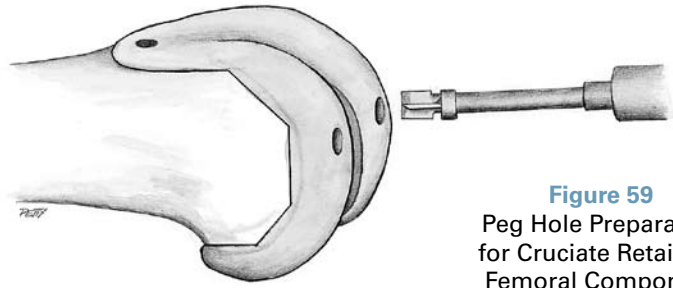


Figure 59
Peg Hole Preparation
for Cruciate Retaining
Femoral Component

FINAL BONE PREPARATION: TIBIA

Step 1: Fixation of Tibial Tray Trial

When all checks have been completed, pins may be drilled or driven into the medial and lateral outrigger holes on the tibial trial tray (*Figure 60*). Sometimes it is difficult to place the lateral pin in patients with a large or tight patellar tendon until the knee is flexed and the femoral trial prosthesis and tibial insert trial are removed. If this is the case, the surgeon should place the medial pin, hold the proper rotation of the tibial trial tray while these other trial components are removed, and then place the lateral pin. Once the tibial trial tray insert is removed, the surgeon will have access to additional pin fixation holes in the bottom of the tray, should these be needed. At this point, the patellar trial prosthesis should be removed.

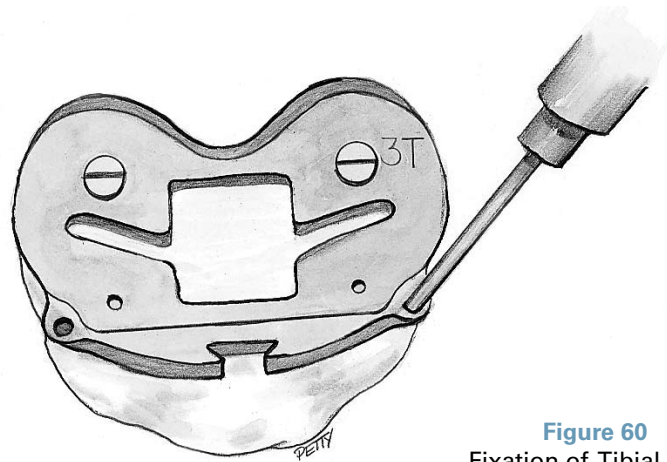


Figure 60
Fixation of Tibial Base
Plate Trial

Step 2: Drilling the Central Cavity

The Tibial Pilot Drill Guide should be assembled to the Trial Tibial Tray and the Intra-medullary Pilot Drill is drilled to the depth that matches the tray size (*Figure 61*).

Step 3: Tamping for Tibial Stem

Whether the finned or trapezoid-shaped stem tibial prosthesis is used, the same technique for preparation is followed. The different shapes are created by selecting the appropriate shape of tamp.

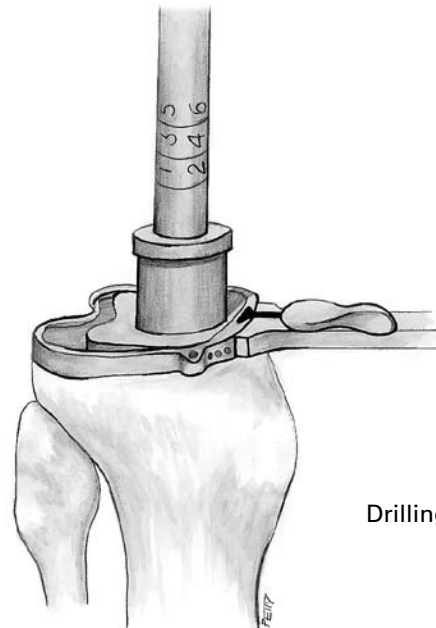


Figure 61
Drilling Central Cavity

Figure 62
Tibial Tamp Assembly and Setting of
Tamp for Selected Tray Size

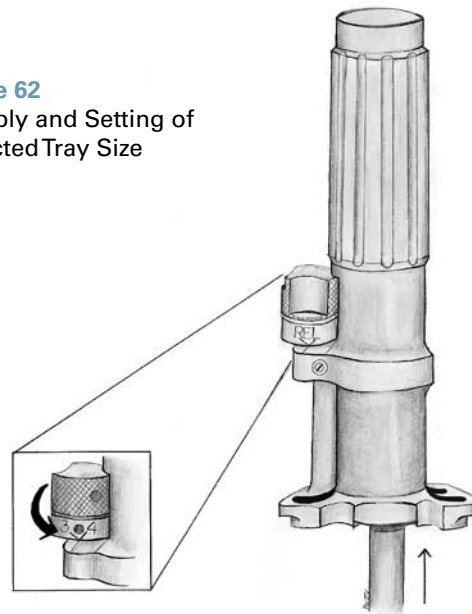


Figure 63
Tamping the Tibia for Tibial Stem

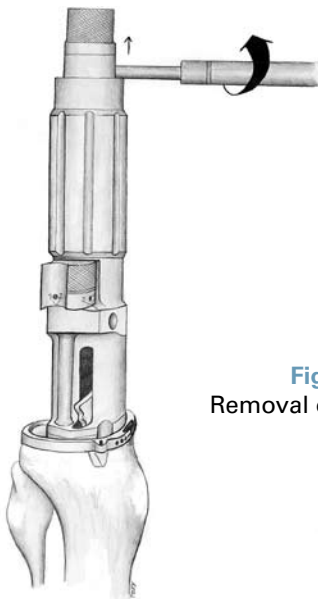
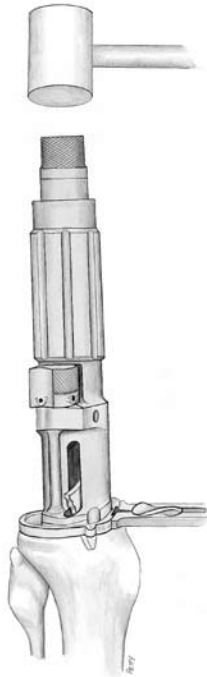


Figure 64
Removal of Tibial Tamp

The selected tamp is assembled to the Tamp Guide by dialing REL (release) on the tray-size adjustment knob (Figure 62). Then, the Tamp is inserted into the Tamp Guide. After assembly, the Tibial Tamp Guide should be set for the tibial tray size being used by dialing the proper number on the tray size adjustment knob. This accomplishes three things:

- 1) secures the Tamp to the Tamp Guide;
- 2) assures proper bone penetration for the Tamp; and
- 3) sets the Tamp Guide so that it will seat properly on the Tibial Base Plate Trial.

If the correct size is not set for the tray being used, the Tamp Guide will not seat properly on the tray. This is a safety check to be certain tamping is correct for the selected Tibial Tray.

The Tamp Guide should be seated on the Tibial Tray Trial and the Tamp driven into the tibia until the stop is reached (Figure 63). The appropriate size is marked by a line at the top of the Tamp Guide; this serves as an additional check to indicate when the Tamp is fully seated.

The Tamp should be removed by inserting the small stud on the end of the Mauldin Handle into the hole in the handle of the Tibial Tamp, then rotating the Mauldin Handle to loosen the Tibial Tamp (Figure 64). If needed, a threaded hole is available for attachment of a Slap Hammer to remove the Tamp. However, it is usually easily removed after loosening with the Mauldin Handle. The Tamp and Tamp Guide may be removed. At this point, the fixation pins and base plate trial should be removed. Next, the prostheses will be implanted.

PROSTHESIS IMPLANTATION

Surgeons have different preferences in regard to the sequences used to place the prosthesis components. A standard, successful technique sequence is described here. If the surgeon prefers another sequence, the Optetrak Knee System provides sufficient flexibility to accommodate adjustments in the implantation technique.

Step 1: Final Bone Preparation

Retractors should be placed to expose the proximal tibia (Figure 65).

All tissue debris should be removed from resected bone surfaces. With saline, cleanse all bone surfaces that will have cement applied. Pulsed lavage most effectively cleanses the trabeculae.

Step 2: Placement of Cement and Tibial Prosthesis

The cement should be mixed and placed in and on the proximal tibia by hand or syringe.

The tibial prosthesis should be placed and impacted into place with the Tibial Impactor (Figure 66). If the metal-backed tibial component is being used, the metal tray and polyethylene insert may be coupled before cementing, if desired.

All extraneous cement should be removed from the borders of the tibial component, starting posteriorly and working around to the sides and front.

The tibial polyethylene insert should be slid posteriorly so that the posterior portion slides under the rail of the metal base plate (Figure 67). It should then be impacted with a sharp blow from the mallet. This may be done with the femoral impactor at a 45 degree angle. The surgeon should check to be certain that the insert is fully seated in the base plate. If preferred, the polyethylene insert may

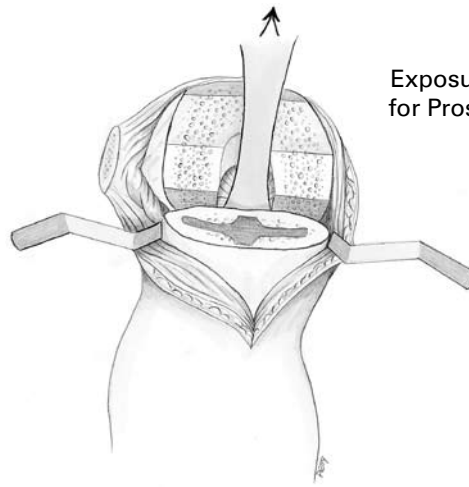


Figure 65
Exposure of Proximal Tibia
for Prosthesis Implantation

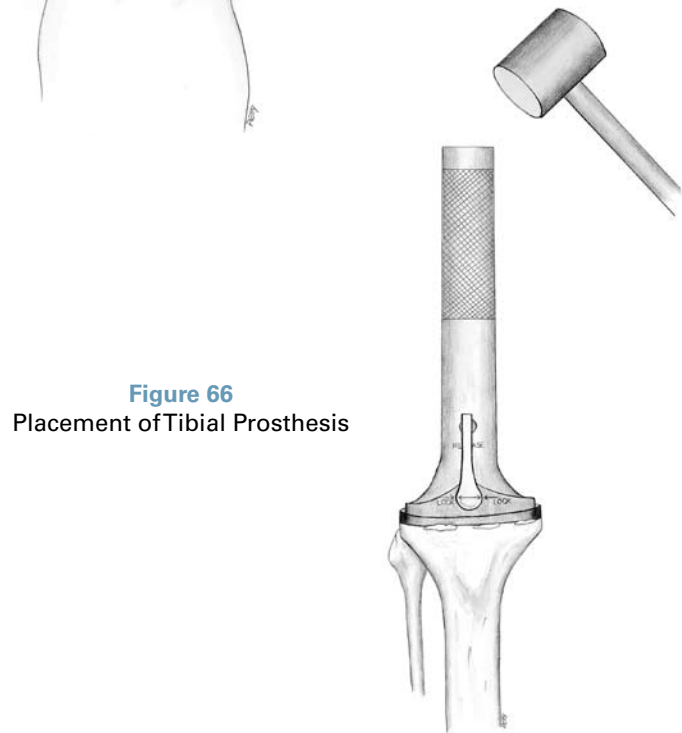


Figure 66
Placement of Tibial Prosthesis

Figure 67
Installation of Polyethylene Insert



Figure 68
Insertion of Pre-Assembled
or All-Polyethylene Tibial
Component



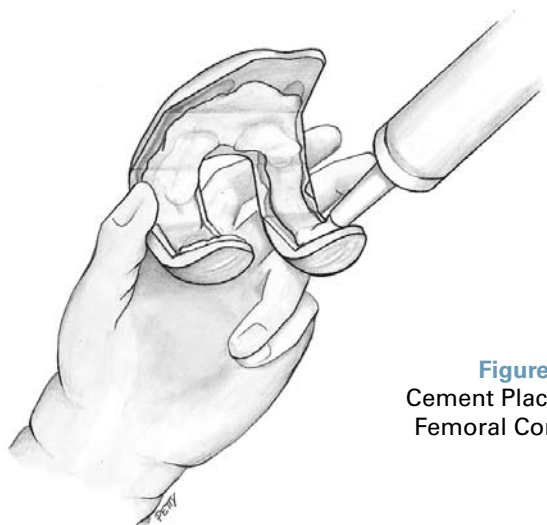


Figure 69
Cement Placement on
Femoral Component

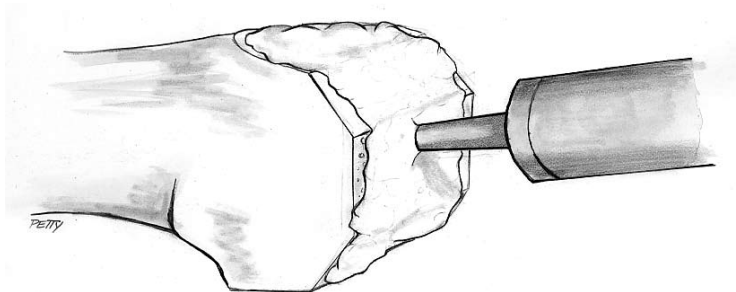


Figure 70
Cement Placement on Distal Femur

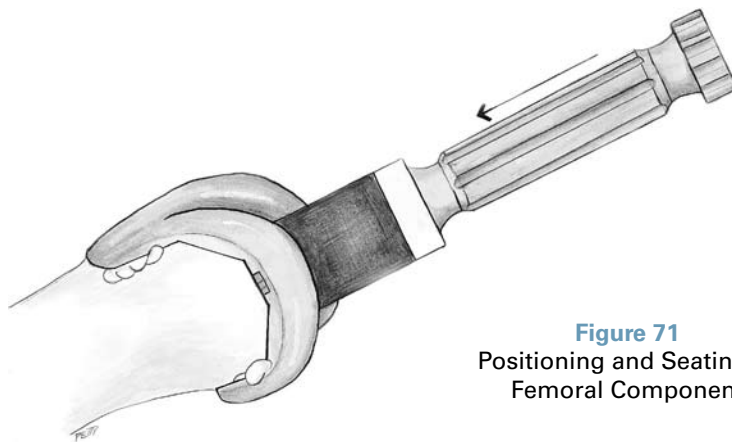


Figure 71
Positioning and Seating of
Femoral Component

be assembled to the base plate prior to implantation (*Figure 68*). The all-polyethylene tibial component may be used rather than the modular one.

Step 3: Implantation of Femoral Component

A layer of cement may be placed on the bone-mating surface of the femoral component, especially the posterior condylar surface (*Figure 69*). Only a thin layer of cement should be placed on this posterior surface, however, to avoid excessive cement extrusion posteriorly where it is more difficult to reach and remove.

Bone cement should be placed on the anterior, distal, and chamfer surfaces of the distal femur (*Figure 70*). To avoid cement extrusion posteriorly, refrain from placing cement on posterior bone surface.

The femoral component should be guided onto the distal femur by hand or with a femoral holder (*Figure 71*). When proper positioning has been assured, the prosthesis may be fully seated with the femoral impactor and mallet.

Excess cement should be cleared from all edges of the prosthesis.

Step 4: Implantation of Patellar Component

The patellar surface should be coated with cement and the patellar component implanted (*Figure 72*). The surgeon should take care to align the peg(s) with the previously drilled peg hole(s).

The patella should be held securely with the Patellar Clamp (*Figure 73*). The surgeon should avoid excessive pressure with the clamp as it may damage the patella, especially when the bone is soft. Excess cement is removed.

Step 5: Polymerization of Cement

Most surgeons prefer to hold the knee in extension while the cement is curing. To avoid possible tilt of the tibial component, forced hyperextension should be avoided. Axial compression may be added to hold the cement under further pressure while it polymerizes.

FINAL CHECK AND CLOSURE

Final check includes the following:

- 1) Removal of any remaining extruded cement
- 2) Final assessment of:

- ALIGNMENT
- STABILITY
- MOTION and
- PATELLAR TRACKING

Closure:

Standard closure techniques preferred by the surgeon may be used.

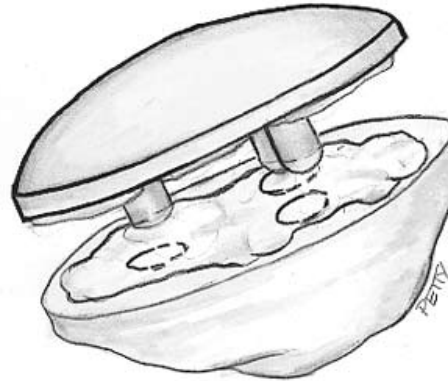


Figure 72
Implantation of Patellar Prosthesis



Figure 73
Secure Patellar Prosthesis
with Patellar Clamp

INSTRUMENT SCOPE

201-40-00 Intra-medullary Pilot Drill (Standard Hudson)



201-41-00 Femoral Intra-medullary Rod, Long (T-Handled Rod)



201-42-00 Femoral Intra-medullary Alignment Guide



201-43-00 Distal Femoral Cutting Block



201-47-00 Femoral Sizing Guide



201-44-00 Mauldin Multi-Tool



201-45-00 Drill, Saw Guide, 1/8 in. Diameter



201-48-00 Drill Bushing, 0 Degree



INSTRUMENT SCOPE (contd)

201-49-01 Drill Bushing, 3 Degree



201-50-00 Drill, A/P Sizer 4 mm



201-51-01 Femoral Finishing Guide Size 1
201-51-02 Femoral Finishing Guide Size 2
201-51-03 Femoral Finishing Guide Size 3
201-51-04 Femoral Finishing Guide Size 4
201-51-05 Femoral Finishing Guide Size 5
201-51-06 Femoral Finishing Guide Size 6



201-52-00 Tibial Resector Ankle Clamp, Extra-medullary



201-52-02 Tibial Resector, Adjustable



201-53-00 Tibial Stylus, Fixed



201-54-00 Tibial Cutting Guide, Standard, Slotted



201-58-01 Alignment Rod/Coupler, Extra-medullary



201-58-02 Alignment Rod, Extra-medullary



201-60-00 Patellar Drill Guide, Non-Clamping



201-61-03 Patellar Drill, Three-Peg, .188 in diameter, Hudson



201-62-00 Patellar Cement Clamp



201-64-00 Femoral Impactor, Non-Locking



201-64-01 Femoral Impactor, Locking



201-65-00 Tibial Tray Impactor, Locking



201-69-01 Pin Puller



INSTRUMENT SCOPE (contd)

- 201-70-01 Trial Tibial Tray, Size 1
- 201-70-02 Trial Tibial Tray, Size 2
- 201-70-03 Trial Tibial Tray, Size 3
- 201-70-04 Trial Tibial Tray, Size 4
- 201-70-05 Trial Tibial Tray, Size 5
- 201-70-06 Trial Tibial Tray, Size 6



- 201-71-00 Tibial Pilot Drill Guide



- 201-72-00 Tibial Finned Tamp



- 201-73-00 Tibial Trapezoid Tamp



- 201-74-00 Tibial Tamp Guide



- 201-77-00 Cut Line Predictor



- 201-85-00 Femoral Saw Guide Handles



201-90-00 Tibial Insert Impactor



201-90-01 Tibial Insert Driver



205-01-01 Trial PS Femur Size 1
205-01-02 Trial PS Femur Size 2
205-01-03 Trial PS Femur Size 3
205-01-04 Trial PS Femur Size 4
205-01-05 Trial PS Femur Size 5
205-01-06 Trial PS Femur Size 6



201-21-07 Trial Modular Tibial Insert, Size 1, 7mm
201-21-09 Trial Modular Tibial Insert, Size 1, 9mm
201-21-11 Trial Modular Tibial Insert, Size 1, 11mm
201-21-13 Trial Modular Tibial Insert, Size 1, 13mm
201-21-15 Trial Modular Tibial Insert, Size 1, 15mm
201-21-18 Trial Modular Tibial Insert, Size 1, 18mm
201-21-22 Trial Modular Tibial Insert, Size 1, 22mm
201-21-26 Trial Modular Tibial Insert, Size 1, 26mm
201-21-30 Trial Modular Tibial Insert, Size 1, 30mm

201-22-07 Trial Modular Tibial Insert, Size 2, 7mm
201-22-09 Trial Modular Tibial Insert, Size 2, 9mm
201-22-11 Trial Modular Tibial Insert, Size 2, 11mm
201-22-13 Trial Modular Tibial Insert, Size 2, 13mm
201-22-15 Trial Modular Tibial Insert, Size 2, 15mm
201-22-18 Trial Modular Tibial Insert, Size 2, 18mm
201-22-22 Trial Modular Tibial Insert, Size 2, 22mm
201-22-26 Trial Modular Tibial Insert, Size 2, 26mm
201-22-30 Trial Modular Tibial Insert, Size 2, 30mm



201-23-07 Trial Modular Tibial Insert, Size 3, 7mm
201-23-09 Trial Modular Tibial Insert, Size 3, 9mm
201-23-11 Trial Modular Tibial Insert, Size 3, 11mm
201-23-13 Trial Modular Tibial Insert, Size 3, 13mm
201-23-15 Trial Modular Tibial Insert, Size 3, 15mm
201-23-18 Trial Modular Tibial Insert, Size 3, 18mm
201-23-22 Trial Modular Tibial Insert, Size 3, 22mm
201-23-26 Trial Modular Tibial Insert, Size 3, 26mm
201-23-30 Trial Modular Tibial Insert, Size 3, 30mm

INSTRUMENT SCOPE (contd)

201-24-07 Trial Modular Tibial Insert, Size 4, 7mm
201-24-09 Trial Modular Tibial Insert, Size 4, 9mm
201-24-11 Trial Modular Tibial Insert, Size 4, 11mm
201-24-13 Trial Modular Tibial Insert, Size 4, 13mm
201-24-15 Trial Modular Tibial Insert, Size 4, 15mm
201-24-18 Trial Modular Tibial Insert, Size 4, 18mm
201-24-22 Trial Modular Tibial Insert, Size 4, 22mm
201-24-26 Trial Modular Tibial Insert, Size 4, 26mm
201-24-30 Trial Modular Tibial Insert, Size 4, 30mm

201-25-07 Trial Modular Tibial Insert, Size 5, 7mm
201-25-09 Trial Modular Tibial Insert, Size 5, 9mm
201-25-11 Trial Modular Tibial Insert, Size 5, 11mm
201-25-13 Trial Modular Tibial Insert, Size 5, 13mm
201-25-15 Trial Modular Tibial Insert, Size 5, 15mm
201-25-18 Trial Modular Tibial Insert, Size 5, 18mm
201-25-22 Trial Modular Tibial Insert, Size 5, 22mm
201-25-26 Trial Modular Tibial Insert, Size 5, 26mm
201-25-30 Trial Modular Tibial Insert, Size 5, 30mm

201-26-07 Trial Modular Tibial Insert, Size 6, 7mm
201-26-09 Trial Modular Tibial Insert, Size 6, 9mm
201-26-11 Trial Modular Tibial Insert, Size 6, 11mm
201-26-13 Trial Modular Tibial Insert, Size 6, 13mm
201-26-15 Trial Modular Tibial Insert, Size 6, 15mm
201-26-18 Trial Modular Tibial Insert, Size 6, 18mm
201-26-22 Trial Modular Tibial Insert, Size 6, 22mm
201-26-26 Trial Modular Tibial Insert, Size 6, 26mm
201-26-30 Trial Modular Tibial Insert, Size 6, 30mm

205-52-01 Trial PS Spine, Size 1
205-52-02 Trial PS Spine, Size 2
205-52-03 Trial PS Spine, Size 3
205-52-04 Trial PS Spine, Size 4
205-52-05 Trial PS Spine, Size 5
205-52-06 Trial PS Spine, Size 6

213-53-01 Femoral PS Notch Resection Guide, Size 1
213-53-02 Femoral PS Notch Resection Guide, Size 2
213-53-03 Femoral PS Notch Resection Guide, Size 3
213-53-04 Femoral PS Notch Resection Guide, Size 4
213-53-05 Femoral PS Notch Resection Guide, Size 5
213-53-06 Femoral PS Notch Resection Guide, Size 6



REFERENCES

1. **Scuderi GR, Insall JN, Windsor RE, Moran MC.** Survivorship of cemented knee replacements. *J Bone Joint Surg Br.* 1989 Nov;71(5):798-803.
2. **Stern SH, Insall JN.** Posterior stabilized prosthesis. Results after follow-up of nine to twelve years. *J Bone Joint Surg Am.* 1992 Aug;74(7):980-6.
3. **Ranawat CS, Boachie-Adjei O.** Survivorship analysis and results of total condylar knee arthroplasty. Eight- to 11-year follow-up period. *Clin Orthop Relat Res.* 1988 Jan;(226):6-13.
4. **Bartel DL, Bicknell VL, Wright TM.** The effect of conformity, thickness, and material on stresses in ultra-high molecular weight components for total joint replacement. *J Bone Joint Surg Am.* 1986 Sep;68(7):1041-51.
5. **Bartel DL, Rawlinson JJ, Burstein AH, Ranawat CS, Flynn WF Jr.** Stresses in polyethylene components of contemporary total knee replacements. *Clin Orthop Relat Res.* 1995 Aug;(317):76-82.
6. Patello-femoral resistance to lateral subluxation, contact areas and surface stress of the Exactech total knee system. A pre-market analysis. Mt. Sinai Medical Center. Orthopaedic Research Laboratories. 1994.
7. **Miller GJ.** The effect of TKA congruity and alignment on contact pressure. Proceedings of the 59th Annual Current Concepts in Joint Replacement Meeting. Orlando, Fla. 1994.
8. **Petty RW.** Caveats in patello-femoral design. Proceedings of the 10th Annual Current Concepts in Joint Replacement Meeting. Orlando, Fla. 1994.
9. **Ray JD.** Comparison of tibial tray shape coverage of proximal tibia. Poster presentation, 61st Annual American Academy of Orthopaedic Surgeons Meeting. New Orleans, La. 1994.
10. **Robinson R.** Five-year follow-up of primary Optetrak Posterior Stabilized total knee arthroplasties in osteoarthritis. *J Arthroplasty.* 2005 Oct;20(7):927-31.

CREDITS

Exactech is grateful to all Optetrak Clinical Evaluators. This group offered many valuable suggestions for the refinement of instrumentation. In addition, Exactech appreciates the original concepts and initial design direction for specific instruments contributed by the following surgeons:

Andrew R Bishop, MD
Michael J Christie, MD
Ivan A Gradisar, MD
Edwin A Hissa, MD

Michael Levine, MD
Sam S Messieh, MD
Wayne A Moody, MD
William R Murray, MD

Calvin Oishi, MD
Kenneth P Pohl, MD
Albert A Reff, MD
Raymond P Robinson, MD

US Patents 5,732,992; 5,688,281; 5,910,143; 6,193,723B1; 5,725,580; 4,298,992; 5,702,458.
Other US and foreign patents pending.

For additional device information, refer to the Exactech Optetrak[®] Comprehensive Knee System – Instructions for Use.

For further product information, please contact Customer Service, Exactech, Inc. 2320 NW 66th Court, Gainesville, Florida 32653-1630, USA. (352) 377-1140, (800) 392-2832 or FAX (352) 378-2617.

Authorized European Representative
MediMark[®] Europe
11, rue Emile Zola B.P. 2332
38033 Grenoble Cedex 2
France

352-377-1140
1-800-EXACTECH
www.exac.com



712-01-30 Rev. B
CRPS Operative Technique 0908



©2008 Exactech, Inc. • ISO 13485 Certified

A Great Day in the O.R.™