

# Premier™ Total Knee Instrumentation

Vanguard® Complete Knee System

## Surgical Technique



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## INDICATIONS

1. Painful and disabled knee joint resulting from osteoarthritis, rheumatoid arthritis, traumatic arthritis where one or more compartments are involved.
2. Correction of varus, valgus, or posttraumatic deformity.
3. Correction or revision of unsuccessful osteotomy, arthrodesis, or failure of previous joint replacement procedure.

The Regenerex® Femoral Augments are indicated for use with the Vanguard Complete Knee System.

The Regenerex Tibial Augments are indicated for use with standard and offset Zimmer Biomet Tibial Trays.

Femoral components and tibial tray components with porous coatings are indicated for cemented and uncemented biological fixation application. Non-coated (Interlok®) devices and all-polyethylene patellar components are indicated for cemented application only. Regenerex components are intended only for uncemented biologic fixation application.

## CONTRAINDICATIONS

Absolute contraindications include: infection, sepsis, and osteomyelitis.

Relative contraindications include: 1) an uncooperative patient or a patient with neurologic disorders who is incapable of following directions, 2) osteoporosis, 3) metabolic disorders which may impair bone formation, 4) osteomalacia, 5) distant foci of infections which may spread to the implant site, 6) rapid joint destruction, marked bone loss or bone resorption apparent on roentgenogram, 7) vascular insufficiency, muscular atrophy, neuromuscular disease, and/or 8) incomplete or deficient soft tissue surrounding the knee.

Zimmer Biomet Microplasty® Tibial Trays are contraindicated for use with constrained bearings.

## Introduction

The Vanguard Knee System offers the flexibility to change from a cruciate retaining (CR) to a posterior stabilized (PS) or posterior stabilized constrained (PSC) knee within a single system. The transition between each constraint level can be made with ease, allowing the physician to evaluate soft tissue and bone deficiencies intraoperatively without making a preoperative commitment to the level of constraint.

## Patient Selection

Either a traditional or minimally invasive technique can be utilized with Premier Total Knee Instrumentation. It is important to note that minimally invasive methods can be utilized on nearly all patients undergoing total knee arthroplasty. However, it is important to have adequate patellar mobility, which can be assessed on physical examination prior to making the skin incision, as well as intraoperatively. If multiple scars from previous surgeries exist, skin incision placement will need to be evaluated, as well as elements of scarring, which may decrease soft tissue mobility. If a high tibial osteotomy has been performed previously, a more traditional exposure is recommended, as this may require reconstructive methods which may be different from primary total knee replacement.



Figure 1

### Preoperative Planning

In order to assess bone stock, potential ligament instability, and the anatomical axis, a 36 inch long standing A/P X-ray is recommended. Determine the angle between the anatomic and mechanical axis, assuring the distal femoral cut is perpendicular to the mechanical axis (Figure 1).

Estimate femoral component size preoperatively by using lateral view X-rays and radiographic templates. Confirmation of the appropriate size component intraoperatively is critical for normal kinematics.

## Approaches

Premier Total Knee Instruments are designed for use with both traditional surgical methods as well as minimally invasive techniques.

Three basic procedures can be utilized for total knee arthroplasty:

**Option 1:** Mini-medial parapatellar  
(See page 7 for surgical technique)

**Option 2:** Mid-vastus  
(See page 8 for surgical technique)

**Option 3:** Sub-vastus  
(See page 10 for surgical technique)

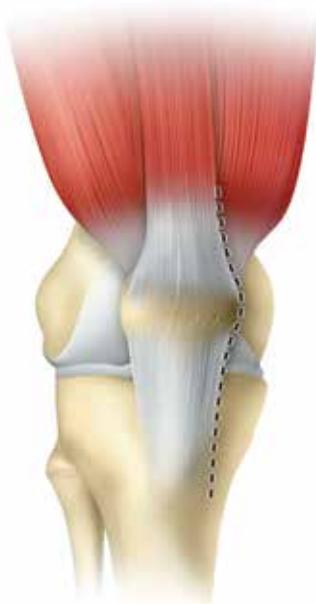


Figure 2

## Mini-medial Parapatellar Approach, Option 1

### Initial Skin Incision

Make the skin incision centered over the medial one-third of the patella extending from 1 cm above the superior pole of the patella to the tibial tubercle. The length of this incision will vary depending on the anatomy, but generally range between 4–6 inches. It is recommended to perform the skin incision in a flexed position which will help minimize the sensitivity with kneeling. It is extremely important to monitor the proximal and distal margins of the incision in order to make certain there is not increased tension from excessive retraction. Extension of the skin incision may be necessary during the procedure depending on the anatomy and the quality of the soft tissue.

### Approach

Make a mini-medial parapatellar arthrotomy, beginning at the top medial corner of the patella and continuing down along the patellar tendon, ending at the patellar tendon insertion (Figure 2).

Once the incision has been made, ensure the release of any soft tissue adhesions.

### Deep Exposure

With the knee in the extended position, perform the arthrotomy from 1–2 cm above the superior pole of the patella, extending to the level of the tibial tubercle. Perform fat pad excision to facilitate exposure and to improve patellar mobility. Perform a medial release at this time to only release what is necessary for the existing deformity. This will also allow for easy placement of the medial retractors for protection of the medial collateral ligament as well as exposure of the proximal tibia later in the procedure.

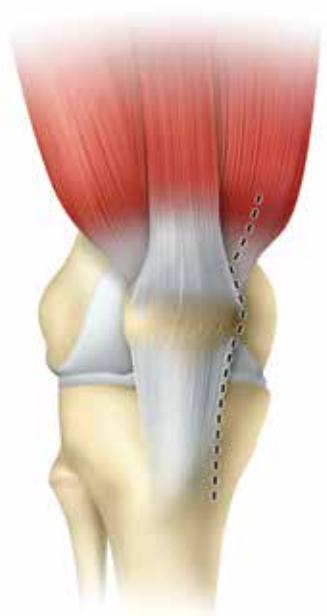


Figure 3

## Mid-vastus Approach, Option 2

### Initial Skin Incision

Make the skin incision centered over the medial one-third of the patella extending from 1 cm above the superior pole of the patella to the tibial tubercle (Figure 3). The length of this incision will vary depending on the anatomy, but generally range between 4–6 inches. It is recommended to perform the skin incision in a flexed position which will help minimize the sensitivity with kneeling.

It is extremely important to monitor the proximal and distal margins of the incision in order to make certain there is not increased tension from excessive retraction. Extension of the skin incision may be necessary during the procedure depending on the anatomy and the quality of the soft tissue.

## Mid-vastus Approach, Option 2 (cont.)

### Approach

Extend the capsular incision in a straight line proximally obliquely cutting across VMO muscle fibers. This is most easily performed with the knee flexed near 90 degrees. The VMO incision typically extends for a distance of 1–3 cm. This length is partially dependent on the VMO insertion site onto the patella. If the VMO has a proximal patellar insertion, the VMO incision may be only 1–2 cm. If the VMO inserts into the patella as far distally as mid-patella, the incision into the VMO may reach 3–4 cm. If it is later determined that a more extensile incision is required for proper exposure, the VMO incision can be continued straight proximally.

**Note:** The strongest fascia for closure is on the deep surface of the VMO. When the capsule is closed, this deep fascial layer must be included in the sutures. Typically only two or three sutures are required to close the mid-vastus VMO extension of the capsular incision.

Once the incision has been made, ensure the release of any soft tissue adhesions.

### Deep Exposure

With the knee in the extended position, perform the arthrotomy from 1–2 cm above the superior pole of the patella, extending to the level of the tibial tubercle. Perform fat pad excision to facilitate exposure and to improve patellar mobility. Perform a medial release at this time to only release what is necessary for the existing deformity. This will also allow for easy placement of the medial retractors for protection of the medial collateral ligament as well as exposure of the proximal tibia later in the procedure.



Figure 4

## Sub-vastus Approach, Option 3

### Initial Skin Incision

Make the skin incision centered over the medial one-third of the patella extending from 1 cm above the superior pole of the patella to the tibial tubercle. The length of this incision will vary depending on the anatomy, but generally range between 4–6 inches. It is recommended to perform the skin incision in a flexed position which will help minimize the sensitivity with kneeling. It is extremely important to monitor the proximal and distal margins of the incision in order to make certain there is not increased tension from excessive retraction. Extension of the skin incision may be necessary during the procedure depending on the anatomy and the quality of the soft tissue.

### Approach

Make a horizontal arthrotomy along the inferior border of the VMO leaving a cuff of retinaculum for closure (Figure 4). Complete the arthrotomy in a standard manner along the medial patellar tendon.

Once the incision has been made, ensure the release of any soft tissue adhesions.

## **Sub-vastus Approach, Option 3 (cont.)**

### **Deep Exposure**

With the knee in the extended position, perform the arthrotomy from 1–2 cm above the superior pole of the patella, extending to the level of the tibial tubercle. Perform fat pad excision to facilitate exposure and to improve patellar mobility.

Perform a medial release at this time to only release what is necessary for the existing deformity. This will also allow for easy placement of the medial retractors for protection of the medial collateral ligament as well as exposure of the proximal tibia later in the procedure.



Figure 5



Figure 6

## Distal Femoral Resection

Utilize the .375 inch intramedullary (IM) drill to penetrate the femoral canal to a depth of approximately 1.5 to 2 inches (3.5 to 5 cm). Place the canal entry location 1 cm above the insertion of the posterior cruciate ligament and slightly medial in the intercondylar notch (Figure 5).

### Intramedullary Adjustable Distal Resection Guide, Option 1

Set the adjustable distal femoral resection guide to the desired valgus angle by pressing and turning the valgus angle dial. A valgus angle setting of 0 to 9 degrees is available.

Select the depth of distal resection by turning the resection level dial. The distal resection depth can range from a simple 1 mm clean-up cut for revision scenarios up to 11 mm for severe flexion contractures (Figure 6).

**Note:** The standard distal resection is 9 mm, matching the distal thickness of the Vanguard Implant.

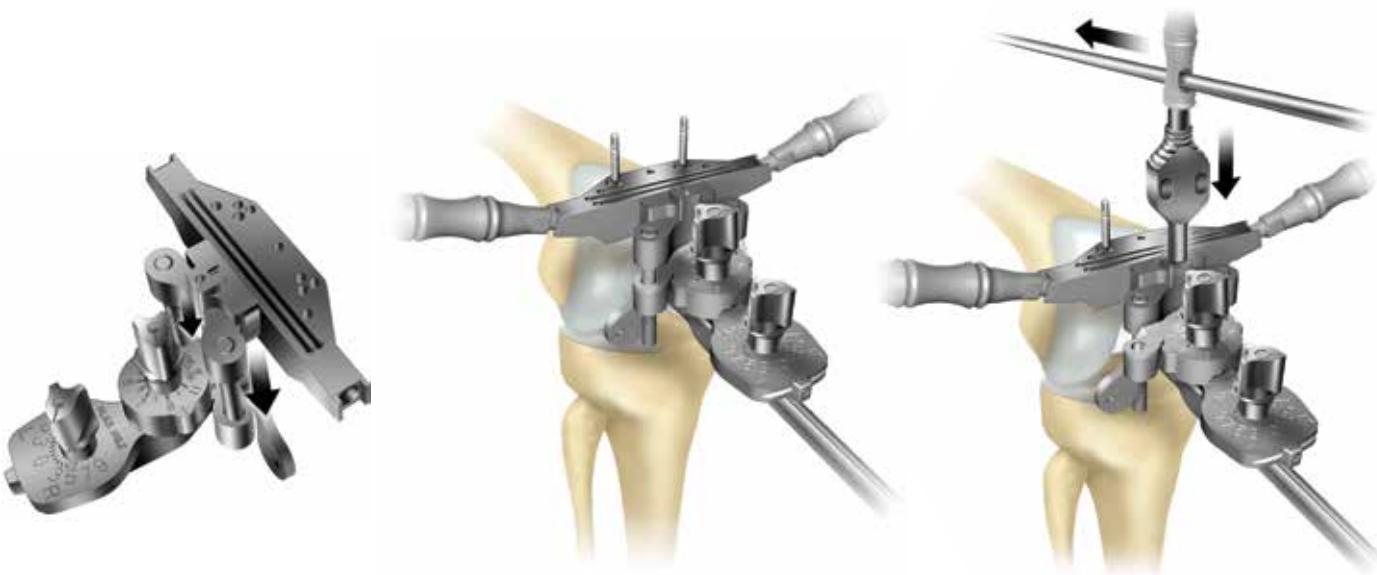


Figure 7

Figure 8

Figure 9

## Distal Femoral Resection (cont.)

### Intramedullary Adjustable Distal Resection Guide, Option 1 (cont.)

Assemble the IM rod and adjustable distal resection guide by inserting the IM rod through the central hole of the resection guide. Slowly introduce the IM rod to the femoral canal to depressurize the canal. Slide the adjustable resection guide until it rests flush with the distal femur. Attach the distal femoral cut block to the distal resection guide adaptor by sliding the magnetized distal block into the adjustable distal resection guide adaptor (Figure 7).

Attach the adjustable distal guide adaptor and cut block to the adjustable femoral resection guide by sliding the two legs on the adaptor through the anterior holes of the resection guide. Continue sliding the adaptor until the block is sitting against the anterior cortex. Pin the resection block into place using  $\frac{1}{8}$  inch quick release drill pins in the most proximal pin holes of the block (Figure 8).

To confirm the valgus angle, the alignment handle can be inserted into the adjustable distal resection guide adaptor and a  $\frac{1}{4}$  inch alignment rod can be inserted and extended to the center of the femoral head (Figure 9).

Remove the adjustable guide by disengaging the IM rod and pulling the guide and adaptor distally away from the distal resection block, leaving the distal resection block in place.

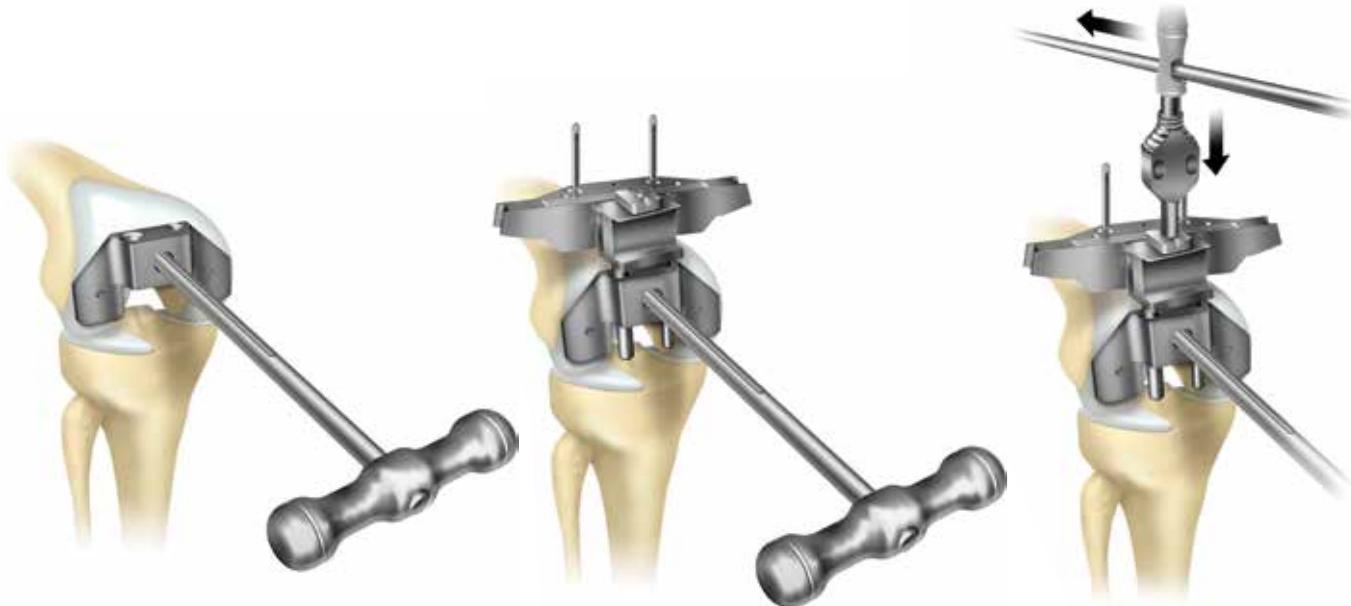


Figure 10

Figure 11

Figure 12

## Distal Femoral Resection (cont.)

### Intramedullary Fixed Distal Resection Guide, Option 2

Choose the appropriate left or right symmetrical valgus wing and slide it onto the IM rod. Introduce the IM rod to the femoral canal to depressurize the canal. Slide the valgus wing until it rests against the distal femur (Figure 10). The “left” or “right” engraving on the block must face distally based on the leg being prepared. By rotating, align the lower edge of the valgus wing with equal amounts of posterior condyle extending underneath the bottom of the block.

Slide the distal resection block and valgus block adaptor into the anterior holes of the valgus wing until the resection block contacts the anterior femur. Pin the resection block into place using  $\frac{1}{8}$  inch quick release drill pins in the most proximal pin holes of the block (Figure 11).

To confirm the valgus angle, the alignment handle can be inserted into the valgus block adaptor and a  $\frac{1}{4}$  inch alignment rod can be inserted and extended to the center of the femoral head (Figure 12).

Remove the valgus wing by removing the IM rod and pulling the valgus wing and valgus block adaptor distally away from the distal resection block, leaving the distal resection block in place.



Figure 13



Figure 14

## Distal Femoral Resection (cont.)

### Distal Resection

Two resection slots of 0 or +3 mm are available for the distal resection. The 0 mm slot will resect 9 mm from the most prominent part of the contacting distal condyle. If additional distal resection is required, the +3 mm slot will resect 12 mm. If additional distal resection is required beyond the +3 mm slot, shift the resection guide proximal by utilizing the +2 or +4 mm  $\frac{1}{8}$  inch pin holes. Use a .054 inch saw blade to complete the distal resection through the selected slot (Figure 13). Check the resected distal femur using a flat instrument. Recut or file as necessary to ensure proper resection.

**Note:** Two distal femoral resection blocks can be used. One block utilizes the assistance of handles and the other relies on pins for fixation and stability (Figure 14).



Figure 15

Figure 16

Figure 17

## Femoral Sizing

Place the adjustable A/P sizer flat against the resected distal surface with the feet in contact with posterior condyles of the femur.

### Fixed Rotation Feet, Option 1

Two options are available when utilizing posterior feet: 3 degree external rotation (left and right) and neutral (Figure 15).

### Adjustable Rotation Feet, Option 2

Adjustable dial feet can be used with the A/P sizer. They are available in left and right with the ability to set external rotation from 0 to 10 degrees. It is suggested that an initial setting of 3 degrees of external rotation be utilized (Figure 16).

The femoral component size can now be read from the central scale. If the size indicated is in-between standard sizing or a larger flexion gap is desired, a choice may be made to choose the smaller size and shift the femoral 4-in-1 block placement anteriorly.

To shift the component anteriorly, turn the screw mechanism in the central portion of the sizer, which in turn raises the level of drill holes in 1 mm increments (Figure 17). A scale is located on the sizer to indicate how far the component will be anteriorly shifted.



Figure 18



Figure 19

## Femoral Sizing (cont.)

### Adjustable Rotation Feet, Option 2 (cont.)

If M/L width is a concern, the appropriately sized M/L width checker can be inserted into the A/P sizer to further evaluate the proper size of the femur (Figure 18).

Drill the two 4-in-1 cutting block location holes utilizing the  $\frac{1}{8}$  inch drill pin (Figure 19).

**Note:** The final M/L position of the component is not determined during this step, but is addressed later in the technique.



Figure 20



Figure 21

## Femoral 4-in-1 Resections

Choose the slotted femoral A/P 4-in-1 block that matches the selected size on the A/P sizer and place it into the  $\frac{1}{8}$  inch holes drilled into the distal femur. A .054 inch feeler blade can be used to determine the amount of anterior bone resection (Figure 20).

If the feeler blade indicates a probability of notching, use the A/P femoral shift block to adjust the cut block holes anteriorly in 1 mm increments (Figure 21). Moving the block anteriorly will resect additional posterior condylar bone.



Figure 22



Figure 23

## Femoral 4-in-1 Resections (cont.)

Handles can be attached into the sides of the femoral 4-in-1 block (Figure 22). Ensure the A/P block is sitting flush against the distal femur. If additional stability is required,  $\frac{1}{8}$  inch drill pins can be placed in the side holes provided.

Once the block position is satisfactory, resect the anterior and posterior bone, and the anterior and posterior chamfers, with a .054 inch saw blade (Figure 23).



Figure 24

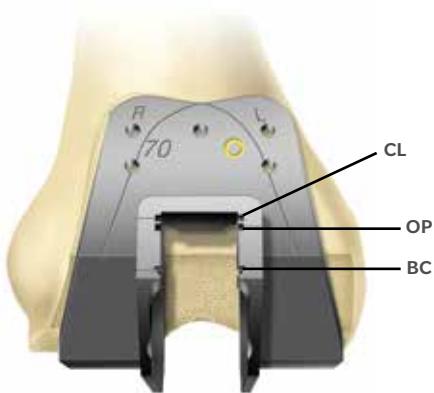


Figure 25



Figure 26

## PS Box Preparation

The M/L width of the standard PS box guide and mill PS box guides mimic the dimensions of the final implant. Take care to position the guide to avoid overhang.

### Standard PS Box Guide, Option 1

Impact the size-specific box resection guide on the prepared distal femur (Figure 24). Secure the box resection guide with two  $\frac{1}{8}$  inch drill pins through the holes located in the anterior flange.

Position the PS box chisel, with the beveled edge facing the distal femur, into the appropriate resection level; either bone conserving (BC), open box (OP), or closed box (CL) (Figure 25).

Impact the PS box chisel to a depth approximately one-half the thickness of the femur. Using a .054 inch sawblade, resect along the interior of the box guide with an oscillating saw to the depth of the box chisel. Continue both cuts from the anterior portion through to the posterior. Finish impacting the box chisel until the intercondylar bone is removed (Figure 26).



Figure 27



Figure 28



Figure 29

## PS Box Preparation (cont.)

### PS Box Preparation with Mill, Option 2

Impact the size-specific box resection mill guide on the prepared distal femur. Secure the box resection guide with two  $\frac{1}{8}$  inch drill pins through the holes located in the anterior flange.

Insert the appropriate size reamer into a power drill. Insert the tip of the reamer into the central hole in the posterior axle of the box resection guide (Figure 27).

Under power, rotate the reamer around the axle anteriorly into the box guide. To guard against potential damage to the reamer tip, ensure the reamer is fully seated on the PS box mill pivot, maintain the reamer position perpendicular to the axis of the pivot, and avoid applying excessive force when milling. Use only as much force as necessary to aid the reamer's advancement through the bone.

Repeat this step with the reamer inserted in both the medial and lateral positions. If a bone conserving resection is desired, insert the appropriate magnet stop guide prior to reaming (Figure 28).

Remove the box resection guide. Place the appropriate femoral box gauge into the resected intercondylar area to determine if appropriate depth and width of bone has been removed (Figure 29).

**Note:** The closed box femur of the Vanguard PS Knee requires the use of the CL resection level on the standard mill. The PS box mill removes sufficient bone for a closed box femoral component and can perform a BC resection by utilizing the appropriate size specific magnet stop.



Figure 30

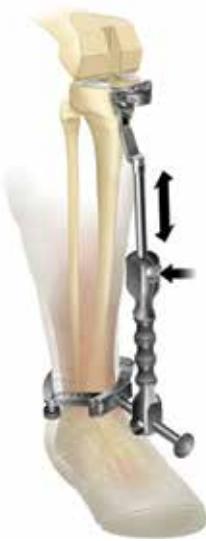


Figure 31



Figure 32

## Tibial Resection

### Extramedullary Tibial Resection, Option 1

With the knee flexed, place the spring loaded arms of the ankle clamp around the distal tibia just above the malleoli (Figure 30).

Press the silver button on the body of the tibial resector to change the height of the resection block (Figure 31). Place the tibial resection block against the proximal tibia (Figure 32).

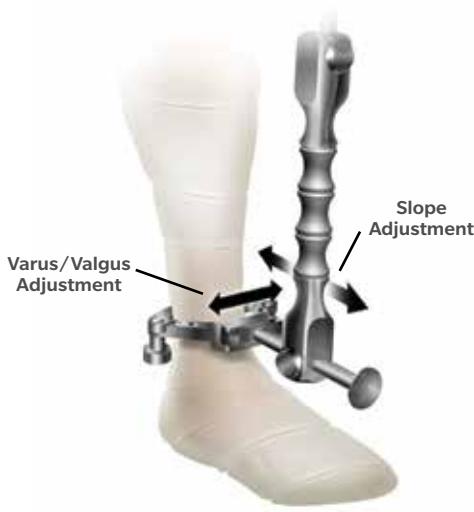


Figure 33



Figure 34

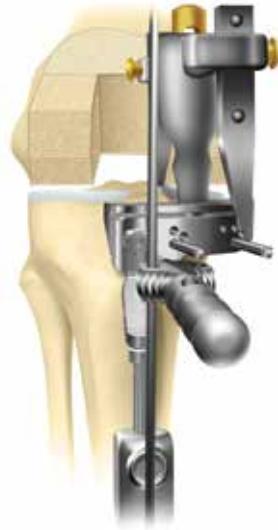


Figure 35

## Tibial Resection (cont.)

### Extramedullary Tibial Resection, Option 1 (cont.)

From the sagittal view, depress the side of the EM guide bottom and adjust the EM guide along the perpendicular shaft of the guide bottom until the tubular body is parallel (for 0 degree posterior slope) with the shaft of the tibia (Figure 33).

Once adjustment of the resector axis is correct in the M/L view, rotate the resector until the shaft of the resector is just medial to the tibial tubercle.

Push the gold button located on the top of the stylus to release the stylus locking mechanism and snap the stylus into the top of the cutting block (Figure 34).

When referencing the deepest portion of the unaffected condyle, set the stylus to read 8–10 mm. Set the stylus to read 2–4 mm when referencing the most affected condyle.

To confirm alignment, an alignment tower can be placed on the cut block and a  $\frac{1}{4}$  inch alignment rod can be inserted into the lateral hole of the guide (Figure 35).



Figure 36

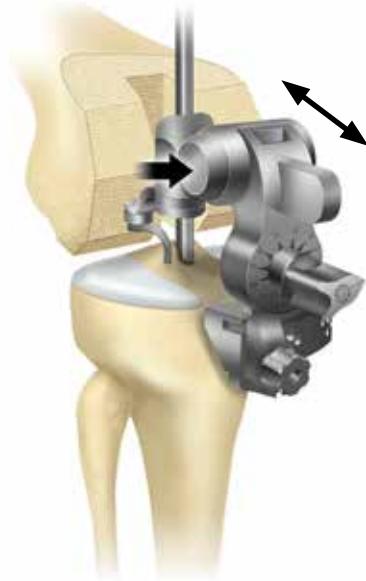


Figure 37

## Tibial Resection (cont.)

### Intramedullary Tibial Resection, Option 2

Fully flex the knee and identify the center of the tibial plateau. Utilize a .375 inch IM drill to enter the tibial canal. The point of entry is just posterior to the anterior cruciate ligament insertion (Figure 36).

Upon removal of the drill, slide the T-handle fluted rod through the body of the tibial resection guide with the tibial resection block in place and slowly introduce the IM rod to the tibial canal to depressurize the canal. To properly position the resection head, a silver button is located on the left side of the body of the guide. Press the button and slide the resection guide forward until the tibial cut block becomes flush with the anterior cortex of the tibia (Figure 37).

The posterior slope of the resection is controlled by using a cutting head with the desired slope.

**Note:** The standard Vanguard CR Tibial Insert has a 3 degree posterior slope built into the articular surface.

Place the stylus along the side of the resection guide on the preferred condyle. The tibial stylus reflects the total amount of bone to be resected.



Figure 38

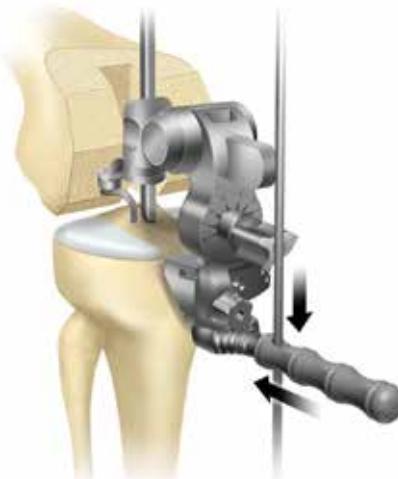


Figure 39

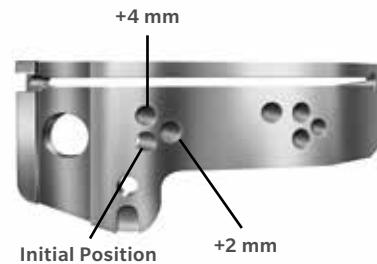


Figure 40

## Tibial Resection (cont.)

### Intramedullary Tibial Resection, Option 2 (cont.)

Change the resection level by pressing the dial and rotating to the appropriate level. The dial will snap into place at each 1 mm increment (Figure 38).

When referencing the deepest portion of the unaffected condyle, set the stylus to read 8–10 mm. Set the stylus to read 2–4 mm when referencing the most affected condyle.

To confirm alignment, an alignment tower can be placed on the cut block and a  $\frac{1}{4}$  inch alignment rod can be inserted into the lateral hole of the guide (Figure 39).

Once the correct position is established,  $\frac{1}{8}$  inch drill pins are used to secure the cutting block to the tibia through the most distal pin holes of the cut block. This will allow resection of +2 or +4 mm of the proximal tibial plateau (Figure 40).

Remove the tibial resection guide, alignment tower and rod, leaving the tibial resection block in place. Resect the plateau using a .054 inch sawblade.



Figure 41



Figure 42

## Tibial Sizing

After a flat tibial resection has been made, select the appropriate tibial base plate that provides the best tibial coverage both A/P and M/L.

Base rotation on position relative to the tibial tubercle and the malleolar axis. Make an extramedullary alignment check by placing the alignment rod through the lateral hole in the alignment handle (Figure 41).

Slight external rotation is preferred to optimize patellofemoral tracking. Perform an initial trial reduction to confirm proper rotation. When correct rotation has been determined, mark the position by extending the anterior mark of the baseplate onto the anterior tibia with electrocautery (Figure 42).

**Note:** Take extra caution to avoid internal rotation of the tibial tray due to the presence of lateral soft tissue.



Figure 43



Figure 44



Figure 45

## Tibial Stem Preparation

### I-beam Stem Punch, Option 1

Assemble the punch guide tower to the tibial template utilizing the quick release lock (Figure 43). Introduce the starter reamer to provide an initial hole into the tibia (Figure 44). The starter reamer should be fully engaged in the punch guide before power is started.

### Cruciate Stem Punch, Option 2

The starter reamer should not be used when preparing for insertion of the CoCr finned tray. In this case, only the finned stem punch should be used (Figure 45).

**Note:** To assemble the tibial punch, choose the appropriate tibial stem punch head. Attach the punch head by pressing the button on the top of the handle (inset, Figure 45). I-beam stems come in both cemented and noncemented punches.



Figure 46



Figure 47

## Tibial Stem Preparation (cont.)

### Cruciate Stem Punch, Option 2 (cont.)

Carefully drive the trial punch into the guide until it mechanically stops (Figure 46).

**Note:** A mechanical stop is designed to provide the correct punching depth.

After the punch is fully seated, press the button on top of the punch handle to release the punch head. The punch head sits in the tibial trial plate and acts as the trial stem (Figure 47).



Figure 48



Figure 49



Figure 50

## Patellar Resection

Tilt the patella to 90 degrees and remove the osteophytes and peripatellar tissues down to the level of the tendinous insertions of the quadriceps and patellar tendons. Determine the level of the cut through caliper measurement of the total patellar thickness (Figure 48).

### Surface Clamp

Perform the initial patellar resection utilizing the patella clamp surface cut guide. Clamp the guide to perform a flat cut across the patella. A magnetic depth stylus may be utilized to determine the appropriate resection level (Figure 49).

### Vanguard Patella Offerings

	Diameter (mm)					
	25	28	31	34	37	40
1-peg	Std.	N/A	8	8	8.4	10
	Thin	6.2	6.2	6.2	7.8	8.6
3-peg	Std.	N/A	8	8	8.4	10
	Thin	6.2	6.2	6.2	7.8	8.6

Care should be taken to restore original patella thickness to prevent overstuffed of the patellofemoral joint. If a 1-peg patellar component is utilized, use the 1-peg patellar drill guide to locate the placement of the central peg. Drill the central hole using the  $\frac{5}{16}$  inch Series A™ patellar drill. Select a trial patellar component to optimize coverage without increasing patellar thickness beyond pre-resection height.

If a 3-peg patellar component is to be implanted, place the appropriately sized 3-peg drill guide onto the resected patella and use the  $\frac{1}{4}$  inch patellar drill to prepare for the component pegs (Figure 50).



Figure 51



Figure 52

## Patella Milling

### Inset 1-Peg Patella using the Vanguard Patella Mill

Tilt the patella to 90 degrees and remove the osteophytes and peripatellar tissues down to the level of the tendinous insertions of the quadriceps and patellar tendon. Determine the patella thickness by using calipers.

Size the patella using the mill bushings (Figure 51). Attach the size-specific bushing to the mill handle after the appropriate size patella has been determined. Based on patella size and thickness, determine if a standard or thin patella should be used. Firmly clamp the patella with the mill handle paying careful attention not to tilt the patella.

Attach the appropriate size-specific patella reamer to the reamer shaft (Figure 52). Attach the proximal shaft to a power drill. Insert the reamer basket into the mill bushing and allow the reamer's central bit to rest on the apex of the patella bone.

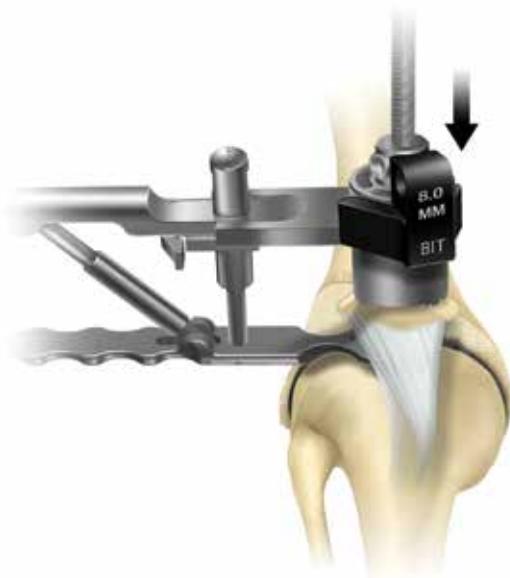


Figure 53

## Patella Milling (cont.)

### Inset 1-Peg Patella using the Vanguard Patella Mill (cont.)

Attach the appropriate thickness magnetic spacer (marked "Bit") to the adjustable depth stop. Set the adjustable stop by depressing the button on its side and slide the stop down until the bottom of the spacer touches the mill bushing (Figure 53).

**Note:** The magnetic spacer bit includes the depth of the peg. Do not sink the drill bit prior to setting the adjustable stop.

Remove the magnetic spacer and ream until the adjustable stop touches the mill bushing. Remove the reamer assembly and then disengage the mill handle by pulling the thumb trigger towards the handle.

**Note:** If a 3-peg patellar component is to be implanted, the appropriate sized surface reamer will be used to prepare the inset surface. The magnetic spacer marked with a red dot should be used to correctly establish the resection depth. The 3-peg drill guide is tapped into the prepared patella inset and the  $\frac{1}{4}$  inch patellar drill is used to make the holes for the component pegs.



Figure 54



Figure 55

## Trial Reduction

With all bony surfaces prepared and soft tissue debrided, complete a trial reduction with the trial components. Place and impact the trial femoral component on the femur with the femoral inserter (Figure 54).

Select trial bearing inserts to determine the appropriate thickness of the tibial component.

Select a 1-peg or 3-peg trial patellar component that corresponds to the diameter and thickness and place it onto the patella. When the trial components are in place, check range-of-motion and stability of the knee (Figure 55).

**Note:** If trialing a PS knee, insert the appropriate PS trial post to the insert bearing. If additional constraint is needed, utilize the PS Plus trial post.

**Note:** If distal femoral pegs are selected to be added to the femoral component, drill for pegs through the designated holes provided in the femoral trial (Figure 55).



Figure 56

## Tibial Implant Insertion

Assemble the modular tibial component, by choosing the appropriate stem (most primary cases will require a 40 mm stem). The locking screw for the stem is included in the stem's packaging. Place the stem taper on the bottom of the appropriate modular tibial baseplate. Be sure that the alignment keys match between stem and plate. Impact the tip of the stem once with a mallet to seat the stem taper.

**Note:** The stem taper will hold the stem and plate together during insertion. The screw is tightened into the threads of the stem for added stem fixation. Plugs can be left in the screw holes of the baseplate if screw fixation is not used. Utilize the tibial impactor to firmly seat the component (Figure 56). Remove excess cement with a curette.

Optional screw fixation: Using the drill guide and  $\frac{1}{8}$  inch drill, prepare a hole for screw acceptance.

**Note:** The low-profile screws may be angled at 15 degrees in any direction to engage the best available cancellous and/or cortical bone. Frequent reference to the X-rays will guide the drilling and screw insertion sequence.

With the baseplate firmly fixed, the provisional bearing may be reinserted, and a trial reduction performed to confirm joint tension and stability.



Figure 57



Figure 58

## Femoral Implant Insertion

Place the appropriate femoral component on the end of the femur and insert it manually as far as possible (until about 1 cm of space remains between the component and the distal femur). Fully seat the component using the control femoral impactor (Figure 57).

Remove the extruded cement with a curette. Running through a range-of-motion will help to pressurize the cement.

## Patellar Implant Insertion

Place the appropriate patellar component into the patella and push it into position with finger pressure so the peg(s) engage(s) the prepared hole(s).

Position the patellar clamp onto the component and tighten the handle until the clamp head contacts the component. Clamp tightly to compress the implant (Figure 58). Remove extruded cement with a curette. The clamp should be left in position until the cement cures.



Figure 59



Figure 60

## Locking Bar Insertion/Removal

Place the appropriate polyethylene bearing insert on the tibial baseplate and push posteriorly as far as possible using finger pressure. The polyethylene bearing must be flat on the baseplate in all directions. The locking bar, packaged with the tibial baseplate, is inserted into the medial side of the anterior tibial baseplate/polyethylene interface as far as possible using finger pressure (Figure 59). The locking bar must be tight upon insertion and should be too tight to insert completely with finger pressure only.

Place the large curved end of the locking bar insertion forceps in the notch on the locking bar. The smaller square end should be placed in the notch of the anterior post of the tibial baseplate. Make sure the smaller square end catches on the post of the tibial tray and does not block the path of the locking bar. Squeezing the forceps will gradually push the locking bar until it clicks into place (Figure 60). A visual and audible confirmation should be made to ensure complete locking bar insertion.

## Notes



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