



Microplasty[®] Elite Total Knee Instrumentation

Vanguard[®] Complete Knee System

Surgical Technique

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Introduction

The Vanguard Complete 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

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.

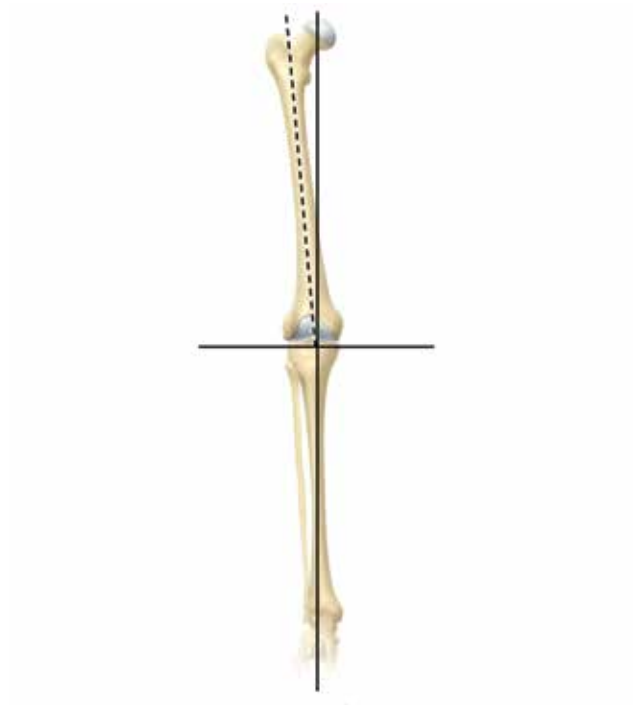


Figure 1

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

Microplasty Elite 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 minimally invasive 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.

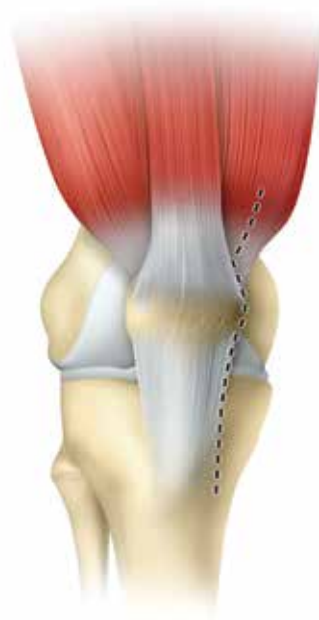


Figure 3

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. 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.

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 inches intramedullary (IM) drill to penetrate the intracondylar notch and dense cancellous bone of the distal femur to a depth of approximately 1.5–2 inches (3.5–5 cm) (Figure 5). Place the canal entry location 1 cm above the insertion of the posterior cruciate ligament and slightly medial in the intercondylar notch.

Assemble the valgus bushing (with the valgus angle noted during preoperative planning) into the valgus wing and insert the IM rod through the hole in the bushing.

Note: The valgus angle is pre-set within the bushing. A 4–7 degree range of bushings are available.

Insert the IM rod and valgus wing/bushing assembly into the prepared IM canal hole. Slowly advance and rotate the IM rod until the canal contents are aspirated. Slide the valgus wing until it rests against the medial distal condyle (Figure 6). The engraved “left” or “right” markings on the valgus wing and valgus bushing must face distally based upon the operative side. Rotate and align the T-handle so that it is roughly parallel to the epicondylar axis.



Figure 7



Figure 8

Distal Femoral Resection (cont.)

Intramedullary Anteromedial Distal Resection Guide, Option 1

Assemble the anteromedial distal resection block and resection block tower and place into the anterior holes of the valgus wing until the resection block contacts the anterior femur (Figure 7). The resection block may translate in the resection block tower to permit a variety of locations while maintaining the chosen valgus angle.

As the distal resection block is translated, it is possible for one of the hole locations to cause a pin collision with the IM rod. For this reason, three sets of pin holes are provided on the distal resection block. Pin the resection block into place using 1/8 inch quick release drill pins in the most proximal holes (Figure 8).

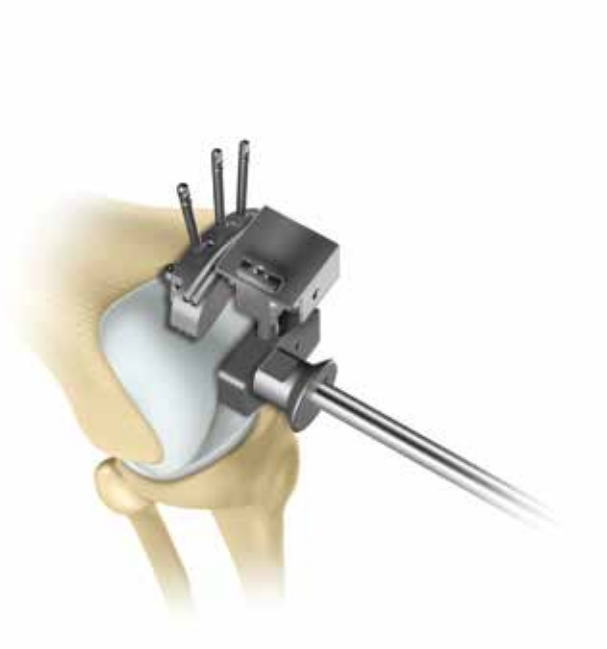


Figure 9



Figure 10

Distal Femoral Resection (cont.)

Intramedullary Anteromedial Distal Resection Guide, Option 1 (cont.)

Additional pins may be inserted through the rotating auxiliary pin locations to bolster fixation (Figure 9).

To confirm the valgus angle, insert the alignment tower handle into the resection block tower. Then insert a ¼ inch alignment rod and extend to the center of the femoral head (Figure 10).

Remove the resection block tower from the distal resection guide and valgus wing. Remove the T-handle, valgus bushing and valgus wing distally, leaving the distal resection block in place.



Figure 11

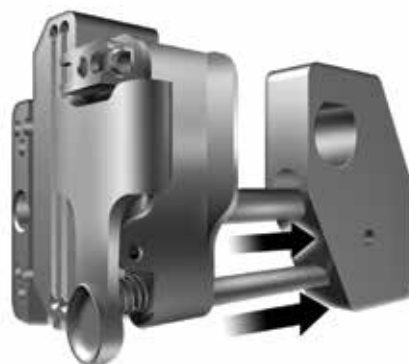


Figure 12

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 distal medial 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 mm $\frac{1}{8}$ inch pin holes.

Auxiliary pins must be removed to allow shifting of the resection guide. Use a .054 inch saw blade to complete the distal resection through the selected slot (Figure 11). Check the resected distal femur using a flat instrument. Recut or file as necessary to ensure proper resection.

Intramedullary Anterior Distal Resection Guide, Option 2

To assemble the Microplasty Distal Resection Block and Converter Tower, depress the button on the tower to elevate the claw. Use the magnetic interface to seat the resection block with the tower. Release the claw button.

Place the distal resection block assembly into the anterior holes of the valgus wing until the resection block contacts the anterior femur (Figure 12). Pin the resection block into place using $\frac{1}{8}$ inch quick release drill pins in the most proximal holes.

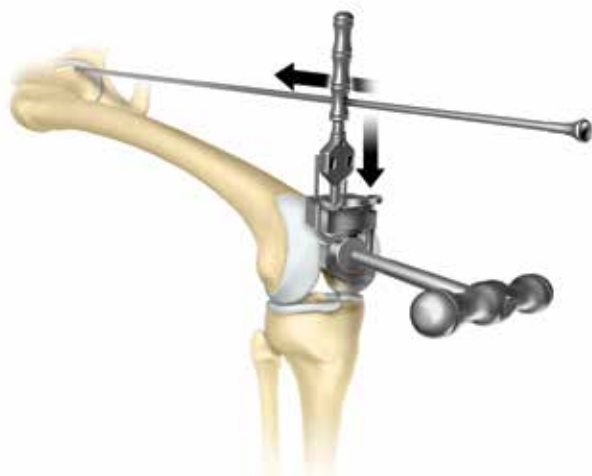


Figure 13



Figure 14

Distal Femoral Resection (cont.)

Intramedullary Anterior Distal Resection Guide, Option 2 (cont.)

To confirm the valgus angle, insert the alignment tower handle into the resection block tower. Insert a ¼ inch alignment rod and extend to the center of the femoral head (Figure 13). Depress the claw button and remove the T-handle, valgus bushing, valgus wing, and converter tower distally, leaving the distal resection block in place.

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 distal medial 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 ⅛ inch pin holes. Use a .054 inch saw blade to complete the distal resection through the selected slot (Figure 14). Check the resected distal femur using a flat instrument. Recut or file as necessary to ensure proper resection.



Figure 15

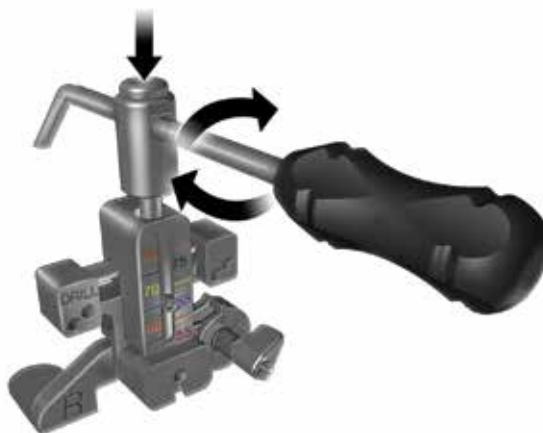


Figure 16

Femoral Sizing

Adjustable Rotation Feet, Option 1

With the epicondylar and/or A/P femoral axis marked, place the A/P sizer flat against the resected distal femoral surface with the posterior feet in contact with the posterior condyles of the femur. When a small incision has been made, the Vanguard Modular Handle may be used for positioning the A/P sizer under the posterior condyles (Figure 15). The adjustable rotation feet are right/left specific and may be externally rotated from 0–10 degrees. Adjust the dial to the desired rotation using a setting of 3 degrees as an initial setting.

The stylus may be rotated for ease of insertion under soft tissue. Depress the button on top of the stylus housing to permit rotation (Figure 16). The stylus will lock into place when in the vertical position. Place the tip of the stylus slightly lateral to the midline on the anterior femoral cortex. The femoral component size can now be read from the central scale. Adjust the stylus to the corresponding size indicator on top of the stylus to reference the appropriate resection level on the anterior cortex.

If the size indicated is between component sizes, the +2 holes may be utilized in combination with downsizing to the next smaller component size. This is accomplished by shifting the femoral component position 2 mm anteriorly (+2 holes) increasing the posterior condylar resection by 2 mm and increasing the flexion gap.



Figure 17



Figure 18

Femoral Sizing (cont.)

Adjustable Rotation Feet, Option 1 (cont.)

To further evaluate the proper size of femoral component in the M/L dimension, insert the appropriately sized M/L width checker into the A/P sizer (Figure 17). After confirming the femoral component size, use 1/8-inch drill pins to create the hole locations for the 4-in-1 cutting block utilizing the most posterior drill holes.

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

Fixed Rotation Feet, Option 2

Place the A/P sizer flat against the resected distal femoral surface with the posterior feet in contact with the posterior condyles of the femur. When a small incision has been made, the Vanguard Modular Handle may be used (Figure 18). The 0, 3, and 5 degree rotational feet are right/left specific and should correspond to the operative side.

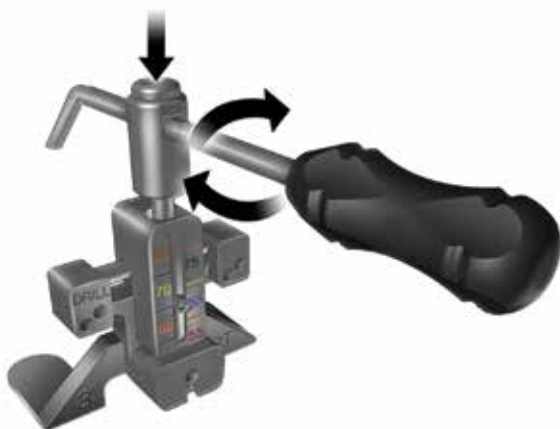


Figure 19



Figure 20

Femoral Sizing (cont.)

Fixed Rotation Feet, Option 2 (cont.)

The stylus may be rotated for ease of insertion under soft tissue. Depress the button on top of the stylus housing to permit rotation (Figure 19). The stylus will lock into place when in the vertical position. Place the tip of the stylus slightly lateral to the midline on the anterior femoral cortex. The femoral component size can now be read from the central scale. Adjust the stylus to the corresponding size indicator on top of the stylus to reference the appropriate resection level on the anterior cortex.

If the size indicated is in between component sizes, the +2 holes may be utilized in combination with downsizing to the next smaller component size. This is accomplished by shifting the femoral component position 2 mm anterior (+2 holes) increasing the posterior condylar resection by 2 mm and increasing the flexion gap.

To further evaluate the proper size of femoral component in the M/L dimension, insert the appropriately sized M/L width checker into the A/P sizer (Figure 20). After confirming the femoral component size, use 1/8-inch drill pins to create the hole locations for the 4-in-1 cutting block.

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



Figure 21



Figure 22

Femoral 4-in-1 Resections

Choose the femoral 4-in-1 cutting block that matches the selected size on the adjustable A/P sizing guide and impact it into the $\frac{1}{8}$ inch holes drilled into the distal femur (Figure 21). The slaphammer may be used for impaction and extraction of the femoral 4-in-1 block.

Use a .054 inch feeler blade to determine the amount of anterior cortex resection (Figure 22).

If the feeler blade indicates a probability of anterior femoral notch occurring, select the next larger size 4-in-1 block to move the anterior femoral resection an average of 2.3 mm anteriorly.

Note: When posterior referencing, the same amount of posterior condyle will be removed each time regardless of size (unless you have utilized the +2 holes on the A/P sizer).



Figure 23



Figure 24

Femoral 4-in-1 Resections (cont.)

If additional stability is desired, place 1/8-inch drill pins into the M/L converging pin holes provided (Figure 23).

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 24).

ⓘ **Note:** If implanting a CR femoral component, femoral trialing can be completed after femoral 4-in-1 resections are made.



Figure 25



Figure 26

PS Box Preparation

Universal Bone Conserving Guide

Place the universal PS box guide on the prepared distal femur (Figure 25).

A M/L width checker can be inserted into the PS box guide to aid in M/L positioning (Figure 26).



Figure 27



Figure 28

PS Box Preparation (cont.)

Universal Bone Conserving Guide (cont.)

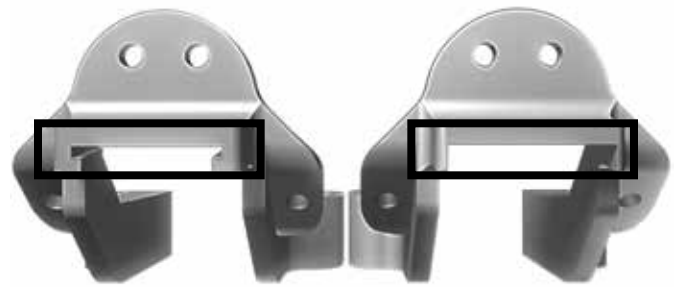
When the desired placement has been located, remove the M/L width checker. Secure the box resection guide with two $\frac{1}{8}$ inch bone nails through the holes located in the anterior flange. Position the PS box chisel with the beveled edge facing distally into the resection slot (Figure 27).

Note: The Microplasty Elite Universal PS Box Guide is a bone conserving cut and is only compatible with the Vanguard PS Open Box Femoral Component.

Impact the chisel to a depth approximately one-half the thickness of the femur. Using a .054 inch saw blade, resect along the interior of the box guide with an oscillating or reciprocating saw to the depth of the box chisel. Cuts should be made moving from the anterior to posterior portion (Figure 28). Continue impacting the chisel until the intercondylar bone is removed.



Figure 29



Captured

Uncaptured

Figure 30

PS Box Preparation (cont.)

Universal Bone Conserving Guide (cont.)

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

Note: The universal PS box guide only prepares the femur for a Vanguard PS Open Box Femoral Component. The universal PS box guide is available in captured or uncaptured configurations (Figure 30). An uncaptured universal PS box guide is available for use without a PS box chisel.



Figure 31



Figure 32

Tibial Resection

Extramedullary Fine-adjust Tibial Resection Guide, Option 1

With the knee flexed, place the spring loaded arms of the ankle clamp around the distal tibia just above the malleoli (Figure 31).

Adjust the height of the tibial resection block by pressing on the rapid-adjust mechanism extramedullary (EM) guide (Figure 32). Press the silver button on the body of the tibial resector to change the height of the resection block.



Figure 33

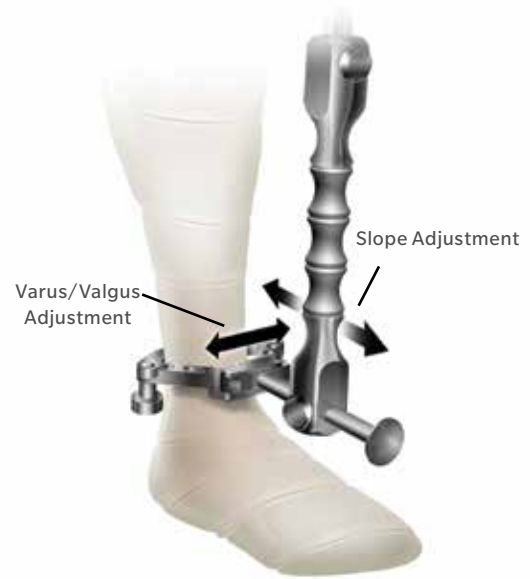


Figure 34

Tibial Resection (cont.)

Extramedullary Fine-adjust Tibial Resection Guide, Option 1 (cont.)

With the fine-adjust tibial resection guide in an upward position, place the tibial resection block against the proximal tibia (Figure 33).

From the sagittal view, depress the button on 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 34).

Once correct alignment of the EM guide is achieved from the sagittal view, rotate the resector until the shaft of the resector is just medial to the tibial tubercle in the coronal view. Adjust the varus/valgus slope of the resection head by changing the M/L position of the resector ankle clamp assembly (Figure 34).



Figure 35

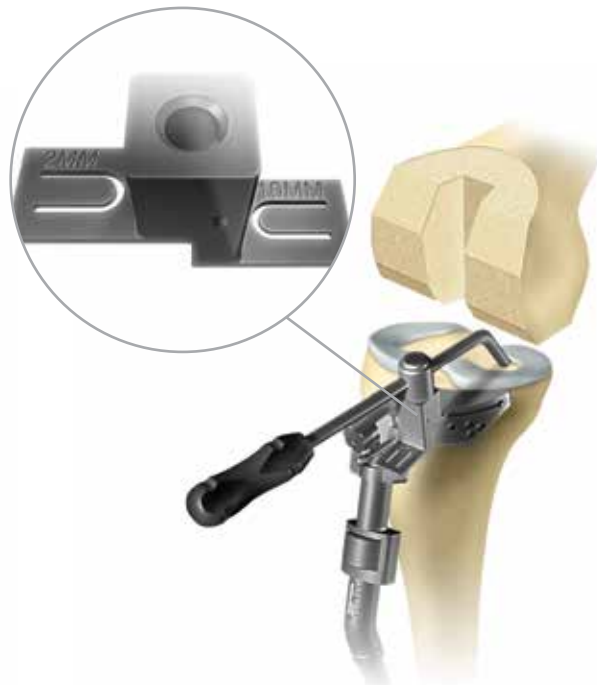


Figure 36

Tibial Resection (cont.)

Extramedullary Fine-adjust Tibial Resection Guide, Option 1 (cont.)

Confirm correct varus/valgus alignment, posterior slope, and rough resection level. Insert a 1/8-inch drill pin into the fine-adjust body (Figure 35). Fixation of the EM guide will aid in maintaining alignment and posterior slope while resection level is finely adjusted.

If referencing the unaffected tibial plateau, slide the 10 mm stylus foot into the saw capture. Rotate and telescope the stylus to reference the deepest portion of the unaffected plateau. If referencing the affected tibial plateau, utilize the 2 mm stylus foot (Figure 36).



Figure 37



Figure 38

Tibial Resection (cont.)

Extramedullary Fine-adjust Tibial Resection Guide, Option 1 (cont.)

Use the fine-adjust knob to achieve correct resection level. Pin the tibial cut block in the most distal pin holes using $\frac{1}{8}$ -inch drill pins (Figure 37).

Note: If a deeper tibial resection is required, the tibial cut head contains two sets of holes that allow for a +2 or +4 mm resection shift. Leaving the pins in place, remove the cut block by sliding it off the pins and repositioning it at the desired +2 or +4 mm holes.

Remove the stylus from the resector. The EM guide may be removed or left attached to the resector. Resect the tibial plateau through the slot in the resection head with a .054 inch saw blade (Figure 38).



Figure 39



Figure 40

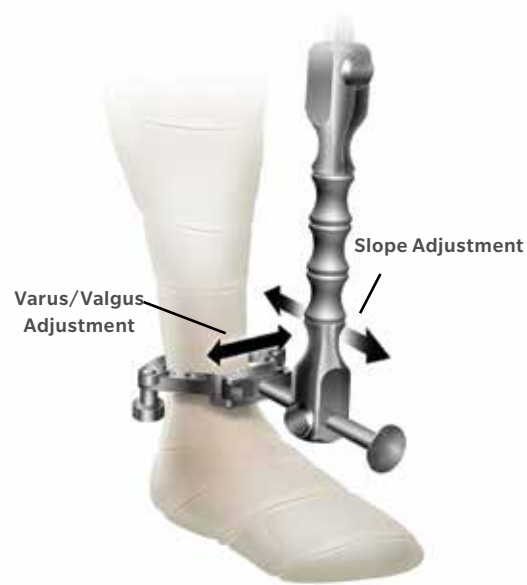


Figure 41

Tibial Resection (cont.)

Extramedullary Slidex Tibial Resection Guide, Option 2

With the knee flexed, place the spring loaded arms of the ankle clamp around the distal tibia just above the malleoli (Figure 39).

Adjust the height of the tibial resection block by pressing on the rapid-adjust mechanism EM guide (Figure 40). Press the silver button on the body of the tibial resector to change the height of the resection block.

With the EM tibial resection guide in an upward position, place the tibial resection block against the proximal tibia.

From the sagittal view, depress the button on 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 41).

Note: The average anatomy offset equals 5 mm medial.



Figure 42



Figure 43

Tibial Resection (cont.)

Extramedullary Slidex Tibial Resection Guide, Option 2 (cont.)

Once correct alignment of the EM guide is achieved from the sagittal view, rotate the resector until the shaft of the resector is just medial to the tibial tubercle in the coronal view (Figure 42).

Press the release button on the Microplasty Elite Slidex Tibial Resection Guide and insert the 0 mm modular capture into the resection guide (Figure 43).



Figure 44



Figure 45

Tibial Resection (cont.)

Extramedullary Slidex Tibial Resection Guide, Option 2 (cont.)

If referencing the unaffected tibial plateau, slide the 10 mm stylus foot into the saw capture. Rotate and telescope the stylus to reference the deepest portion of the unaffected plateau. If referencing the affected tibial plateau, utilize the 2 mm stylus foot (Figure 44).

Confirm correct varus/valgus alignment, posterior slope and resection level. Pin the resection guide with 1/8-inch drill pins beginning with the lateral hole, followed by the medial hole (Figure 45).

Note: If a greater tibial resection is required, the +1, +2, +3, or +4 mm modular captures may be used. Press the release button on the Microplasty Elite Slidex Tibial Resection Guide to remove or add modular captures. The resection guide without the modular capture attached represents a +5 mm surface resection.



Figure 46

Tibial Resection (cont.)

Extramedullary Slidex Tibial Resection Guide, Option 2 (cont.)

Remove the stylus from the modular capture. The EM guide may be removed or remain attached to the resector. Resect the tibial plateau through the slot in the modular capture with a .054 inch saw blade (Figure 46).



Figure 47

Tibial Sizing

Premier Total Knee Instrumentation, Option 1

Place the knee in maximum flexion and sublux the tibia anteriorly using a PCL retractor and placing a M/L and Z-retractor medially and laterally. Select the tibial tray size that provides the greatest amount of tibial coverage both in the M/L and A/P planes (Figure 47).



Figure 48



Figure 49

Tibial Sizing (cont.)

Premier Total Knee Instrumentation, Option 1 (cont.)

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 48).

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 49).

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



Figure 50



Figure 51

Tibial Sizing (cont.)

Microplasty Minimally Invasive Knee Instrumentation, Option 2

Place the knee in maximum flexion and sublux the tibia anteriorly using a PCL retractor and placing a Z-retractor medially and laterally. Using the tibial template, select the tibial tray size that provides the appropriate coverage in both the A/P and the M/L planes (Figure 50).

Base the rotation position relative to the tibial tubercle and the malleolar axis. Make an extramedullary alignment check by placing the alignment rod through the tibial baseplate handle (Figure 51). Slight external rotation is preferable to optimize patellofemoral tracking.



Figure 52

Tibial Sizing (cont.)

Microplasty Minimally Invasive Knee Instrumentation, Option 2 (cont.)

When correct rotation has been determined, mark the position by extending the anterior marks of the template onto the anterior tibia with electrocautery (Figure 52).

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



Figure 53

Tibial Stem Preparation

Premier Total Knee Instrumentation, Option 1 I-beam Stem Punch, Option A

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.

Assemble the punch guide tower to the tibial template utilizing the quick release lock (Figure 53).



Figure 54



Figure 55

Tibial Stem Preparation (cont.)

Premier Total Knee Instrumentation, Option 1 (cont.) Cruciate Stem Punch, Option B

Introduce the starter reamer to provide an initial hole into the tibia (Figure 54). The starter reamer should be fully engaged in the punch guide before power is started.

ⓘ **Note:** The starter reamer should not be used when preparing for insertion of the Zimmer Biomet CoCr Fanned Tray. In this case, only the fanned stem punch should be used (Figure 54).

ⓘ **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 55). I-beam stems come in both cemented and noncemented punches.



Figure 56



Figure 57

Tibial Stem Preparation (cont.)

Premier Total Knee Instrumentation, Option 1 (cont.) Cruciate Stem Punch, Option B (cont.)

Carefully drive the trial punch into the guide until it mechanically stops (a mechanical stop is designed to provide the correct punching depth) (Figure 56).

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 57).



Figure 58



Figure 59

Tibial Stem Preparation (cont.)

Microplasty Minimally Invasive Tibial Instrumentation, Option 2 I-beam Stem Punch, Option A

Assemble the I-beam punch guide mask onto the tibial template and pin in place using $\frac{1}{8}$ inch medium bone nails. Use the three-sided box chisel prior to the I-beam punch (Figure 58).

Impact the three-sided chisel with the A/P etching facing anterior and remove. Rotate the chisel 180 degrees and impact a second time to complete the cut for the I-beam punch.

Carefully impact the I-beam stem punch through the punch guide until it reaches the stop to achieve the appropriate depth (Figure 59).



Figure 60



Figure 61



Figure 62

Tibial Stem Preparation (cont.)

Microplasty Minimally Invasive Tibial Instrumentation, Option 2 (cont.) Cruciate Stem Punch, Option B

Assemble the finned punch guide mask onto the tibial template and pin in place using $\frac{1}{8}$ inch medium bone nails (Figure 60).

Use the cruciate punch to punch through the mask and tray template (Figure 61). While preparing the tibial stem, the tibial trial can be assembled. After the tibial instruments are removed, the trial can be inserted into the tibia (Figure 62).



Figure 63



Figure 64



Figure 65

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 63).

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 64).

Care should be taken to restore original patella thickness to prevent overstuffing 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 65).

Vanguard Patella Offerings

| | | Diameter (mm) | | | | | |
|-------|------|---------------|-----|-----|-----|------|------|
| | | 25 | 28 | 31 | 34 | 37 | 40 |
| 1-peg | Std. | N/A | 8.0 | 8.0 | 8.4 | 10.0 | 10.0 |
| | Thin | 6.2 | 6.2 | 6.2 | 7.8 | 8.6 | N/A |
| 3-peg | Std. | N/A | 8.0 | 8.0 | 8.4 | 10.0 | 10.0 |
| | Thin | 6.2 | 6.2 | 6.2 | 7.8 | 8.6 | N/A |



Figure 66

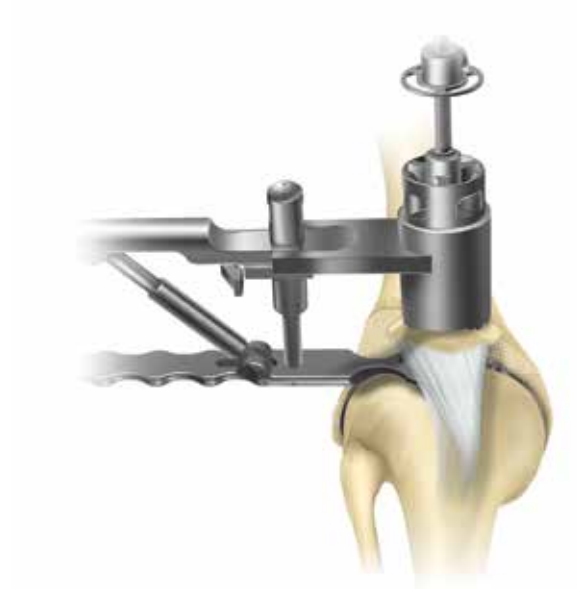


Figure 67

Patella Milling

Inset Single 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 66). 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 67). 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.

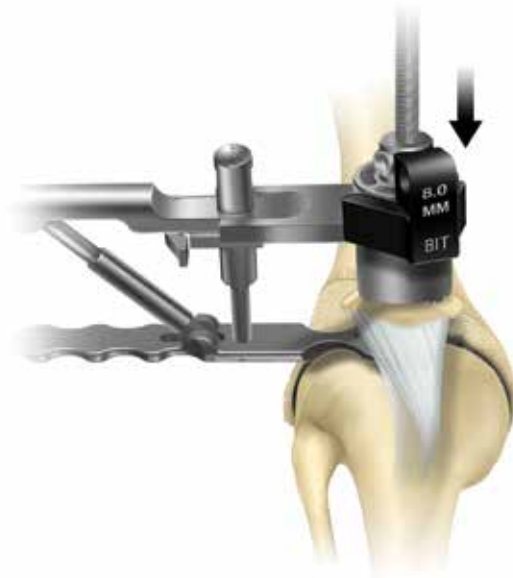


Figure 68

Patella Milling (cont.)

Inset Single 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 68).

ⓘ **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 ¼ inch patellar drill is used to make the holes for the component pegs.



Figure 69



Figure 70

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 69).

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 70).

ⓘ **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.



Figure 71

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 71). Remove excess cement with a curette.

Optional screw fixation: Using the drill guide and 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 72

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 72).

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



Figure 73

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 73). Remove extruded cement with a curette. The clamp should be left in position until the cement cures.



Figure 74



Figure 75

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 74). 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 75). A visual and audible confirmation should be made to ensure complete locking bar insertion.

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