GENESIS° II Distal Cut First Surgical Technique

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

Indications for Total Knee Replacement:
Rheumatoid arthritis. Post-traumatic arthritis, osteoarthritis, or degenerative arthritis in older patients whose age, weight, and activity level are compatible with an adequate long-term result. Failed osteotomies, unicompartmental replacement, or total knee replacement. Posterior stabilized knee systems are designed for use in patients in primary and revision surgery, where the anterior and posterior cruciate ligaments are incompetent and the collateral ligaments remain intact. Constrained knee systems are designed for use in patients in primary and revision surgery, where the posterior cruciate ligament and one or both of the collateral ligaments (i.e. medial collateral and/or lateral collateral ligament) are absent or incompetent.
**Short Technique**

**Distal Cut First Surgical Technique**

**Step 1**
Use the 9.5mm femoral drill to open the femoral canal.

**Step 2**
Slide the valgus alignment assembly with the intramedullary rod into the femoral canal. One side of the assembly should contact the distal femur.

**Step 3**
After the assembly is placed in neutral rotational orientation, impact the floating spikes into the distal femur.

**Step 7**
Place the sizing guide on the femur with the paddles seated against the posterior condyles and in neutral rotation.

**Step 8**
Move the sizing guide stylus until it contacts the highest point on the anterior cortex of the femur.

**Step 9**
Determine the size of the component from markings. If indicated size is between two sizes, select the larger size. Impact the floating spikes in place to mark the location holes for the A/P cutting block.

**Step 12b**
Intramedullary tibial alignment: Place intramedullary tibial guide over intramedullary rod and align over medial third of the tibial tubercle.

**Step 13**
Attach the primary tibial stylus to the tibial cutting block. Once the resection level is determined, insert pins through the central holes to secure.

**Step 14**
Remove the tibial alignment assembly, leaving the cutting block on the anterior tibia. Resect the proximal tibia.

**Step 18**
Place the patellar reamer into the patellar guide. Swing the depth gauge until it contacts the reamer shaft and lower the depth stop. Remove the depth gauge and ream the patella.

**Step 19**
Place all trials in position and perform trial range of motion. Alignment marks on the front of the trials should match up.

**Step 20**
Drill for femoral lugs through the femoral trial.
Step 17
After determining the correct diameter patella, secure the patellar reamer collet on the patellar reamer guide. Lock in place on the patellar surface.

Step 16
With the 1.1mm tibial collet in place, drill with the 1.1mm tibial drill and punch with the 1.1mm tibial punch.

Step 22
Implant the tibial component.

Step 23
Implant the femoral component.

Step 5
Remove the intramedullary rod and unlock the cam on the distal femoral cutting block. Use the universal extractor to remove the valgus alignment assembly.

Step 6
Resect the distal femur.

Step 21
Pin the tibial trial and impact the appropriate tibial fin punch. If sclerotic bone is encountered, soften the bone prior to punching by drilling 1/8" holes into the hard bone.

Step 10
Place the spikes on the back of the A/P cutting block into the location holes on the distal femur. Secure the A/P cutting block in place with angled pins.

Step 11
Make all A/P cuts on the femur, posterior, posterior chamfer, anterior and anterior chamfer.

Step 22
Implant the tibial component.

Step 12a
Extramedullary tibial alignment: Assemble extramedullary tibial alignment guide and place on tibia. Align guide over the medial third of the tibial tubercle and parallel to the tibia.

Step 4
Pin the distal femoral cutting block.

Step 5
Remove the intramedullary rod and unlock the cam on the distal femoral cutting block. Use the universal extractor to remove the valgus alignment assembly.

Step 6
Resect the distal femur.

Step 10
Place the spikes on the back of the A/P cutting block into the location holes on the distal femur. Secure the A/P cutting block in place with angled pins.

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

Step 4
Pin the distal femoral cutting block.

Step 5
Remove the intramedullary rod and unlock the cam on the distal femoral cutting block. Use the universal extractor to remove the valgus alignment assembly.

Step 6
Resect the distal femur.

Step 10
Place the spikes on the back of the A/P cutting block into the location holes on the distal femur. Secure the A/P cutting block in place with angled pins.

Step 11
Make all A/P cuts on the femur, posterior, posterior chamfer, anterior and anterior chamfer.

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Pin the tibial trial and impact the appropriate tibial fin punch. If sclerotic bone is encountered, soften the bone prior to punching by drilling 1/8" holes into the hard bone.

Step 12a
Extramedullary tibial alignment: Assemble extramedullary tibial alignment guide and place on tibia. Align guide over the medial third of the tibial tubercle and parallel to the tibia.

Step 4
Pin the distal femoral cutting block.

Step 5
Remove the intramedullary rod and unlock the cam on the distal femoral cutting block. Use the universal extractor to remove the valgus alignment assembly.

Step 6
Resect the distal femur.

Step 10
Place the spikes on the back of the A/P cutting block into the location holes on the distal femur. Secure the A/P cutting block in place with angled pins.

Step 11
Make all A/P cuts on the femur, posterior, posterior chamfer, anterior and anterior chamfer.

Step 21
Pin the tibial trial and impact the appropriate tibial fin punch. If sclerotic bone is encountered, soften the bone prior to punching by drilling 1/8" holes into the hard bone.

Step 12a
Extramedullary tibial alignment: Assemble extramedullary tibial alignment guide and place on tibia. Align guide over the medial third of the tibial tubercle and parallel to the tibia.
Step 1
Place the appropriate size housing resection block on the distal femur. Secure with 1/8” trocar pins through the angled holes in the sides of the block.

Step 2
Attach the posterior-stabilized housing resection collet to the housing resection block.

Step 3
Attach the housing reamer dome to the patellar reamer shaft. Ream through the posterior-stabilized housing resection collet. Ream until the automatic depth stop contacts the collet. Ensure that the entire length of the box is prepared.

Step 4
Impact the housing box chisel/sizer through the posterior-stabilized housing resection collet to square off the corners of the housing.

Step 5
If the chamfer resections have not been made, they can now be made by cutting through the chamfer slots in the housing resection block.
Step 1: Intramedullary Femoral Alignment

Objective — Align the distal femoral resection at the correct valgus angle using the femoral canal as a reference.

1 Use the 9.5mm femoral drill to open the femoral canal (Figure 1).

2 Assemble the appropriate valgus bushing (5°, 6°, 7°) and distal cutting block onto the valgus alignment assembly. Slide assembly with intramedullary rod into the femoral canal. One side of the assembly should contact the distal femur (Figure 2).

   Note: The valgus bushing is disassembled by pressing the small knurled knob and sliding the bushing out.

3 After the assembly is placed in neutral rotational orientation, impact the floating spikes into the distal femur. (Figure 3) If a posterior condyle is deficient, use the alignment viewing template to position guide.
Femoral Preparation

Step 2: Distal Femoral Resection

Objective — Resect the distal femur at the correct valgus angle.

1. Pin the distal femoral cutting block to the anterior femur (Figure 4).
2. Remove the intramedullar rod and unlock the cam on the distal femoral cutting block. Use the universal extractor to remove the valgus alignment assembly (Figure 5).
3. Resect the distal femur (Figure 6).
Femoral Preparation

Step 3: Femoral Sizing and Resection

Objective — Determine the correct size of the femoral implant and make the anterior, posterior and chamfer resections to prepare the bone for the femoral trial.

1 Place the sizing guide onto the femur with the paddles seated against the posterior condyles and in neutral rotation (Figure 7).

Note: If posterior condyles are deficient, use the femoral alignment template to reference trochlear line and/or epicondyles in order to determine neutral rotation (Figure 8).

2 Move the sizing guide stylus until it contacts the highest point on the anterior cortex of the femur (Figure 9).

Figure 7

Figure 8

Figure 9
3 Determine the size of the component from the markings. If the indicated size is between two sizes, select the larger size. (Shift plate should read "regular.") Impact the floating spikes in place to mark the location holes for the A/P cutting block (Figure 10). **Do not impact the floating spikes on the shift plate until the correct size is determined. This will prevent unnecessary holes in the femur.**

**Note:** If desired, the sizing guide shift plate can be turned over so that it reads "shift +2mm." Then impact the floating spikes to move the location holes for the A/P cutting block up 2mm. The smaller size A/P cutting block is placed on the femur.

4 Place the spikes on the back of the A/P cutting block into the location holes on the distal femur. Secure the A/P cutting block in place with angled pins (Figure 11).

5 Make all of the cuts on the femur: posterior, posterior chamfer, anterior and anterior chamfer (Figure 12).
Femoral Preparation

Step 4: Finishing Posterior-Stabilized Femoral Resection

Objective — Prepare for the posterior stabilized implant.

Posterior-Stabilized Technique

The only difference between the cruciate retaining femoral component and the posterior-stabilized femoral component is the addition of the housing for the cam mechanism. All other inner box dimensions are the same. The posterior-stabilized housing is prepared after the anterior and posterior resections are complete. However, the anterior and posterior chamfer resections can be finished before or after preparing for the posterior stabilized housing.

1 Before preparing for the posterior-stabilized housing, place the appropriate size housing resection block on the distal femur. Make sure the block is centered on the distal femur. (To help with centering, the housing resection blocks have the same M-L dimension as the implants.) Secure with 1/8” trocar pins through the angled holes in the sides of the block (Figure 13).

2 Attach the posterior-stabilized housing resection collet to the housing resection block (Figure 14).
3. Attach the housing reamer dome and posterior stabilized reamer sleeve to the patellar reamer shaft. The reamer dome is both an end-cutting and a side-cutting reamer.

4. Ream through the posterior stabilized housing resection collet (Figure 15). Ream until the automatic depth stop contacts the collet. Then move the reamer anterior and posterior until it contacts the automatic stop.

5. Impact the housing box chisel/sizer through the posterior stabilized housing resection collet to square off the corners of the housing (Figure 16). The housing box chisel/sizer may have to be impacted twice to ensure that the full length of the box is prepared.

6. If the chamfer resections have not been made, they can now be made by cutting through the chamfer slots in the housing resection block (Figure 17).

**Note:** If a nonslotted chamfer resection is preferred, you may attach the chamfer cutting block to the distal femur to perform the chamfer resections.
Step 1: Tibial Alignment

Objective — Align the resection for the tibial baseplate perpendicular to the mechanical axis.

The following describes the technique for extramedullary tibial alignment. If intramedullary tibial alignment is preferred, the intramedullary tibial alignment technique follows on page 12.

**Option A:**

**Extramedullary Tibial Alignment**

1. Assemble the extramedullary tibial alignment guide and place the guide onto the tibia (Figure 18). Make sure that the correct left or right tibial cutting block is chosen and that the alignment guide is correctly set distally for the left or right leg.

2. Impact the longer spike of the spiked fixation rod into the proximal tibia.

3. Assess rotation of the alignment guide and slope of the cutting plane and impact the second spike to secure the assembly. Rotational alignment is critical due to the 3° posterior sloped cut. The center of the cutting block will also be the center of the tibial tray and articular surface. The goal is to align the extramedullary alignment assembly rotationally so that it aligns over the medial third of the tibial tubercle and over the second toe. The slope can be adjusted according to the patient’s anatomy.

**Note:** 4° of slope is built into the articular insert and 3° of slope is built into the tibial cutting block. A neutral or slightly sloped alignment should be chosen.

Continued on next page
Tibial Preparation

Step 1: Tibial Alignment (continued)

Option B: 
Intramedullary Tibial Alignment

1 Make a 9.5mm pilot hole into the tibial canal (Figure 19). This can be made through the tibial drill guide with the "I/M" tibial collet in place to ascertain correct placement.

Note: A preliminary resection of the tibial spine may facilitate seating of the tibial drill guide onto the proximal tibia.

2 Attach the correct left or right tibial cutting block to the intramedullary tibial alignment assembly and pass the intramedullary rod through the cannulated alignment sleeve on the alignment assembly.

3 Slowly insert the rod into the tibial canal (Figure 20).

4 Assess rotation of the intramedullary tibial alignment guide. Rotational alignment is critical due to the 3° posterior sloped cut. The alignment rod of the intramedullary tibial alignment assembly should align with the medial third of the tibial tubercle.

5 Impact the proximal end of the cannulated alignment sleeve to drive the distal spikes into the proximal tibia to lock rotational alignment (Figure 21).
Tibial Preparation

Step 2: Tibial Resection

Objective — Resect the proper amount of tibia for the tibial implants.

1. Attach the primary tibial stylus to the tibial cutting block. Lower the cutting block until the stylus touches the less affected (less worn) side of the tibia (Figure 22). (This technique should allow the placement of the 9mm articular insert.)

2. Insert pins through the central holes to secure the tibial cutting block to the tibia (Figure 23).
Tibial Preparation

Step 2: Tibial Resection (continued)

3. Remove the alignment assembly leaving the tibial cutting block on the anterior tibia (Figure 24).

4. Attach the quick connect handle to the tibial cutting block. Pass the extramedullary rod through the hole in the handle to check tibial alignment (Figure 25).

5. Use the appropriate GENESIS® II sawblade to resect the proximal tibia (Figure 26).

Figure 24

Figure 25

Figure 26
Tibial Preparation

Step 3: Tibial Sizing

Objective — Select the appropriate size tibial implant and prepare for the tibial stem.

1. Select the appropriate tibial drill guide and place it on the proximal tibia.

2. Once the tibial drill guide has been centralized on the proximal tibia, pin the drill guide in place (Figure 27).

3. With the 11mm tibial collet in place, drill with the 11mm tibial drill (Figure 28) and punch with the 11mm tibial punch (Figure 29). If a 9.5mm hole already has been made for use with the intramedullary tibial alignment assembly, you only need to utilize the 11mm tibial punch at this time.

4. Remove the tibial drill guide.

5. Place the tibial trial onto the proximal tibia and assess coverage (Figure 30).
Objective — Confirm that implant fit and tibial rotation are correct and determine the appropriate insert thickness.

1. If femoral or tibial trials are not positioned, replace them at this time.

2. Use the appropriate insert trial to determine leg stability and alignment. Start with the 9mm insert trial (Figure 31).

3. Perform a trial range of motion. The alignment marks on the front of the femoral and tibial trials should line up (Figure 32).

The quick connect handle may be attached to the tibial trial and used to rotate the tibial trial to the appropriate rotational alignment.

Note: If necessary, the femoral component can be easily downsized. Attach the downsize plate to the cut femur, placing the spikes on the back of the plate into the same location holes used for the A/P cutting blocks. Drill new location holes through the block (shifted 2mm anterior) and place the smaller A/P cutting block into the new location holes. Redo the posterior, anterior and chamfer cuts (Figure 33).
4 With the handle attached to the tibial trial, take the knee into full extension. Pass the extramedullary rod through the handle to assess full leg alignment. Once correct tibial alignment has been selected, a rotational alignment mark can be made on the anterior tibia using a cautery knife.

If it is preferable to use a spacer block to check alignment, insert the block into the joint (Figure 34). Since the spacer block has two different ends, one for flexion and one for extension, check to make sure the appropriate end of the block is used.

5 Determine whether a porous or nonporous tibial implant will be used. Select the appropriate tibial fin punch to prepare the fins and punch through the tibial trial (Figure 35).

If the tibial bone is sclerotic, begin the fin slot with a burr or thin saw blade to prevent tibial fracture before using the fin punch.
Patellar Preparation

Step 1: Patellar Sizing

Objective — Determine proper placement for the patellar implant.

1. Determine the appropriate diameter patellar implant.
2. Select the correct patellar reamer collet and slide it into place on the patellar reamer guide.
3. Attach the patellar reamer guide to the patella. Tighten the patellar reamer guide on the patella (Figure 36).

Figure 36
Step 2: Ream the Patella

Objective — Determine proper reaming depth and prepare the patella to ensure the original patellar thickness has been restored.

1. Use the patellar calipers to measure the thickness of the patella (Figure 37).

2. Attach the patellar depth gauge to the reamer guide based on the selected patellar design. Both patellar designs have their own depth gauge. The depth of reaming for each design is as follows:
   - Biconvex patellae: 13mm
   - Resurfacing patellae: 9mm

3. Attach the patellar reamer dome and patellar depth stop to the patellar reamer shaft. Before the patellar reamer assembly is attached to power equipment, lower the assembly through the patellar reamer guide until the reamer dome contacts the patella (Figure 38).

Figure 37

Figure 38
4 Swing the patellar depth gauge around so that the "claw" surrounds the patellar reamer shaft.

5 Lower the patellar depth stop until it contacts the patellar depth gauge. The patellar depth stop will automatically lock in place (Figure 39).

6 Remove the depth gauge.

7 Attach the patellar reamer assembly to power equipment, making sure that the position of the patellar depth stop has not changed.

8 Ream the patella until the depth stop engages the patellar reamer guide.

Figure 39
Patellar Preparation

Step 3: Patellar Trialing

Objective — Confirm correct tracking of the patellar implant.

1. With the patellar reamer guide still in position, place the patellar trial into the prepared patella.
2. Use the patellar calipers to remeasure the composite thickness of bone and trial.
3. Remove the patellar reamer guide.
4. Perform a trial range of motion and assess patellar tracking. Medial-lateral placement of the femoral trial can be adjusted to maximize patellar tracking.
5. Drill for the femoral lugs through the femoral trial with the femoral lug drill (Figure 40).
6. Remove the tibial trial. Attach the T-shaped end of the universal extractor to the femoral trial (Figure 41). Remove the femoral trial. Use a towel clip to remove the patellar trial.
Step 1: Tibial Implantation

1. Mix and prepare cement for placement on the proximal tibia.

2. Use the tibial baseplate impactor to seat the tibial implant onto the prepared tibial surface (Figure 42).

3. If the porous tray and screws will be used, orient the tibial screw drill guide over each screw hole and drill using the tibial screw drill. The screws may be angled up to 10° to reach the cortex if desired.

4. Using the screw depth gauge, determine the depth of each screw hole to select the appropriate size screw. Insert and tighten screws of the tibial implant, alternating to avoid liftoff.

5. Remove excess cement.
Component Implantation

Step 2: Femoral Implantation

1 Mix and prepare bone cement for placement on the femoral component and distal femur.
2 Place the femoral implant onto the prepared femur.
3 Use the femoral impactor to fully seat the implant (Figure 43).
4 Remove excess cement.
5 Place the appropriate size tibial insert trial onto the tibial implant and take the leg into extension to pressurize the cement.

Step 3: Patellar Implantation

1 Assemble the patellar cement clamp to the patellar reamer guide.
2 Apply bone cement to the reamed patella.
3 Place the patellar implant onto the prepared patella.
4 Clamp the patellar implant into the bone and remove the extruded cement (Figure 44).
Component Implantation

Step 4: Insert Implantation

1. After determining the correct thickness of the articular insert, slide the insert into the tibial baseplate as far as possible, engaging the peripheral locking mechanism.

2. Attach the articular inserter/extractor to the tibial tray. Lift the articular inserter/extractor superiorly until the anterior lip of the articular insert is fully seated (Figure 45).

   **Note:** A mallet should not be used when inserting the polyethylene. A mallet can cause damage to the insert’s locking mechanism.

Closure

Close in the usual manner.