Zimmer® NexGen® CR-Flex and LPS-Flex Knees
Surgical Technique with Posterior Referencing Instrumentation
Introduction

Instrumentation
This Instrumentation provides for a simplified, yet versatile surgical experience for use with NexGen CR-Flex and LPS-Flex Knee components.

Instrument designs feature intuitive attachment and adjustment functionality for improved ease-of-use and speed for the surgeon and the OR staff.

Instrument case designs facilitate pre-operative setup in an efficient 4-case configuration.

These instruments are not approved for use with the LPS-Mobile or LPS-Flex Mobile Knee implants.

A limited percentage of the Posterior Referencing Instruments available may have a bright finish on subcomponents rather than the more common black coating. There is no difference in instrument functionality.
Symbols

As part of a new standard, symbols have been established for several words.

- Left
- Right
- Anterior/Posterior
- Medial/Lateral
- Flex
- Standard
- Lock
- Unlock
- Do not implant – Not for implant
- Do not impact
- Posterior Referencing
- Varus/Valgus
- Inset Only

Pin and Screw Information

The Pin/Screw Inserter has 2 self-contained hex drives.

33mm x 3.2mm screw with 3.5mm Hex Drive which:

- Engages at distal end of the Pin/Screw Inserter
- Must be used with inserter for insertion and removal
- Must not be over torqued
- Cannot be impacted
- Cannot be used with Multi Pin Puller
- Is available sterile and disposable in a 2-pack configuration for single surgical use

75mm x 3.2mm with 2.5mm hex Trocar-Tipped Pin which:

- Engages within the sleeve of the inserter for insertion and removal
- Should not be impacted
- Leaves 12.5mm of exposed pin for removal when fully seated with inserter
- With the use of other drivers may not leave enough exposed pin for removal
- May use Multi Pin Puller for removal
- Available sterile and disposable in a 4-pack configuration for single surgical use

TECHNIQUE TIP

Insert trocar-tipped pin until inserter is flush with the associated instrument. To facilitate trocar-tipped pin removal, apply slight side pressure at the inserter/pin interface while removing the pin.
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Establish Femoral Alignment

After attaining the desired soft tissue exposure, use the 8mm IM Step Drill to make a starter hole (Fig. 1). Suction the canal to remove medullary contents.

Insert the Femoral IM Rod into the Modular T-Handle (Fig. 2) and insert the IM rod into the femur far enough to ensure the most accurate replication of the anatomic axis, then remove the T-handle. (Fig. 3)

TECHNIQUE TIP

As the symbol on the T-handle indicates – do not impact the T-Handle.

Instruments

Femoral IM Rod
00-5901-060-00

Modular T-Handle
00-5901-061-00

8mm IM Step Drill
00-5978-014-00
Retract the spring-loaded button on the top of the Femoral Valgus Alignment Guide and rotate the valgus adjustment dial to the desired valgus angle and release the button to lock the valgus angle from 0° to 9°, ensuring that the proper left or right setting is attained. (Fig. 4)

Place the Femoral Valgus Alignment Guide on the IM Rod against the most prominent condyle and confirm the desired valgus setting. (Fig. 5)

**TECHNIQUE TIP**

*If the epicondyles are visible, the epicondylar axis may be used as a guide in setting the orientation of the Femoral Valgus Alignment Guide. This does not set the rotation of the femoral component, but keeps the distal cut oriented to the final component rotation. If desired, the guide can be pinned to provide rotational stability. (Fig. 6)*
Resect Distal Femur

While the Femoral Valgus Alignment Guide is being inserted by the surgeon, the scrub nurse can attach the 0° Captured Cutting Head to the Distal Femoral Resection Guide (Fig. 7). The adjustment dial on the resection guide can be set from “-2” to “+4”; “0” represents a 10mm distal resection. (Fig. 8) The +4 setting represents a 14mm resection. Upon rotation, the dial has palpable stops and clear markings at each 2mm location. One half rotation creates 1mm of adjustment.

Insert the resection guide with the cutting head into the alignment guide until the cutting head rests on the anterior femoral cortex. Verify the desired resection setting on the resection guide and/or rotate the adjustment dial to attain the desired setting. (Fig. 9)

The 3° Captured Cutting Head can be used to cut the distal femur in 3° of additional flexion to protect from notching the anterior cortex.

**TECHNIQUE TIP**

**2.A**

*Make sure the desired captured cutting head is used, either 0° or 3°.*

Insert trocar-tipped pins through the two standard pin holes marked “0” on the anterior surface of the cutting head. (Fig. 10)

Additional 2mm adjustments may be made by using the sets of holes marked -2, +2, and +4. The markings on the cutting head indicate, in millimeters, the amount of bone resection each will yield relative to the standard 10mm distal resection if the dial on the resection guide is set at “0”.

**TECHNIQUE TIP**

**2.B**

*If more fixation is needed, insert trocar-tipped pins in the small oblique holes on the cutting head.*

If pins were used to maintain rotational alignment of the alignment guide use the Multi Pin Puller to remove the pin(s). Alternatively, the Pin/Screw Inserter can be used to remove these pins.

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**Instruments**

- Femoral IM Rod 00-5901-060-00
- Modular T-Handle 00-5901-061-00
- Femoral Valgus Alignment Guide 00-5901-067-00
- Distal Femoral Resection Guide 00-5901-063-00
- 0° Captured / Uncaptured Cutting Head 00-5901-064-00
- 3° Captured / Uncaptured Cutting Head 00-5901-065-00
Squeeze the button on the resection guide (Fig. 11) to release and remove the alignment guide and resection guide assembly from the cutting head. The modular T-handle is used to remove the IM Rod, prior to the distal femoral resection. Alternatively, the T-handle can be used to remove the IM Rod while the button on the resection guide is squeezed to facilitate rapid removal of the IM rod, the alignment guide and the resection guide at the same time. If necessary, the round end of the Slaphammer Extractor can be used in conjunction with the central hole in the T-Handle to remove the IM rod.

Cut the distal femur through the cutting slot in the cutting head, using a 1.27mm (0.050 in.) oscillating saw blade (Fig. 12). If the optional uncaptured technique is used, the distal femur should be cut on the outside surface of the capture. (see bottom of this page for optional technique)

**TECHNIQUE TIP 2.C**

**Check the flatness of the distal femoral cut with a flat surface, such as the top of one of the Tibial Cut Guides. If necessary, modify the distal femoral surface so that it is completely flat. This is extremely important for the placement of subsequent guides and for proper fit of the implant.**

After completing the cut, remove pins and the cutting head.

**Optional Technique:** The cutting head can be used in an uncaptured manner, as the face of the cutting head is offset by 4mm from the capture. This can be accomplished by rotating the adjustment dial on the resection guide to the +4mm position prior to pinning the cutting head in place, which would result in a 14mm distal femoral resection if using the capture and a 10mm resection if cutting on the outside surface of the capture. Alternatively, the adjustment dial on the resection guide can be set at “0”, the cutting head can be pinned through the “0” holes, then moved to the +4 holes and the resection can be made on the outside surface of the capture. Both optional methods described provide a 10mm distal resection.

**Instruments**

- 3.2mm x 75mm Trocar Tipped Drill Pin (2.5mm hex) 00-5901-020-00
- Pin/Screw Inserter 00-5901-021-00
- Multi Pin Puller 00-5901-022-00
- Slaphammer Extractor 00-5901-024-00
Size Femur and Establish External Rotation

Assemble the Posterior Referencing Sizer Boom with the Posterior Referencing Sizer (Fig. 13) Establish the initial external rotation setting by holding the body (silver portion) of the sizer in one hand, positioning the opposite index finger behind the “L” or “R” with the thumb over the “L” or “R”, squeeze, adjust to desired setting and release. (Fig. 14) External rotation can be set at 0°, 3°, 5°, 7°, or 9° left or right.

Apply the sizer so that the flat surface of the sizer is flush against the resected surface of the distal femur and the feet of the sizer are flush against the posterior condyles. Center the sizer mediolaterally. After positioning the sizer, the external rotational setting can be verified or adjusted. Both the vertical and horizontal portions of the sizer provide visual cues relative to the AP and epicondylar axes of the femur to help ensure that desired rotational adjustment is attained.

While holding the guide in place and if necessary, secure the sizer to the femur using 33mm x 3.2mm (3.5mm hex) screws (Fig. 15) in one or both of the holes on the lower portion of the guide to help draw the sizer adjacent to the distal femur, particularly in MIS situations.

TECHNIQUE TIP 3.A
Remove any osteophytes that interfere with instrument positioning.

Slightly extend the knee and retract soft tissues to expose the anterior femoral cortex. Clear any soft tissue from the anterior cortex. Ensure that the leg is in less than 90° of flexion (70°-80°). This will decrease the tension of the patellar tendon to facilitate placement of the sizing boom. The position of the boom tip approximates the proximal position of the anterior flange of the femoral component. The sizing boom can be rotated to facilitate insertion under the soft tissue envelope. A palpable indication, as well as size markings on the top portion of the sizing boom ensures that the sizing boom is rotated to the correct position.

TECHNIQUE TIP 3.B
Do not impact the sizer onto the femur.

Instruments

- Posterior Referencing Sizer
  00-5901-040-00
- Posterior Referencing Sizer Boom
  00-5901-040-10
- 33mm x 3.2mm Hex Headed Screw (3.5mm hex)
  00-5901-035-33
- Pin/Screw Inserter
  00-5901-021-00
Instruments

**3.2mm Drill**
00-5120-085-00

**Section 3**

**Size Femur and Establish External Rotation**

**Technique Tip 3.C**

*Positioning the sizing boom tip on the “high” part of the femur by lateralizing the location of the sizing boom tip can often lessen the likelihood of notching the femur.*

After the sizing boom is appropriately positioned, read the femoral size directly from the sizer, between the arrowed engraved lines on the sizer tower (Fig. 16). There are six sizes labeled “C” through “H”. The same size markings are present on the anterior surface of the sizing boom and approximate the proximal position of the anterior flange of the femoral component when telescoped to the same size that has been determined by the vertical A/P sizing tower. (Fig. 17) The “0” holes in the midline of the A/P portion of the sizer are used to drill 3.2mm holes for pegs on the Posterior Referencing 4-in-1 Flex Femoral Cut Guides. (Fig. 18)

In situations where the A/P dimension of the bone is between sizes and there is a desire to reduce the possibility of notching, the “+2mm” holes can be drilled to “anteriorize” the position of the Posterior Referencing 4-in-1 Flex Femoral Cut Guide by 2mm, in which case the smaller-sized Flex femoral cut guide should be used.

Alternatively, the larger size can be chosen to help prevent notching of the anterior femoral cortex. After drilling through the desired “0” or “+2mm” holes, the sizer can be removed. If necessary, remove the screws, then remove the sizer.

**Technique Tip 3.D**

*The Multi Pin Puller cannot be used to extract the screw(s).*

**Technique Tip 3.E**

*This NexGen Posterior Referencing Sizer works only with the NexGen Posterior Referencing 4-in-1 Flex Femoral Cut Guides.*

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**Fig. 16**

**Fig. 17**

**Fig. 18**
Complete Femoral A/P and Chamfer Resections

Attach the Quick Connect Handle to the appropriate Posterior Referencing 4-in-1 Flex Femoral Cut Guide. (Fig. 19)

- Unlock collar and hold
- Insert handle into femoral cut guide
- Release collar
- Rotate handle until “click” is heard

Place the 4-in-1 cut guide on the femur by aligning the 2 pins on the back of the guide with the previously drilled positioning holes. (Fig. 20)

Impact the handle until the guide is flush with the femur.

Place the Resection Guide through the anterior slot of the cut guide to ensure the desired anterior resection. (Fig. 21) If the “0” holes were drilled during the sizing step and there is a risk of unacceptable notching, use the handle to axially remove the cut guide.

**TECHNIQUE TIP**

*Do not impact the handle during removal.*
Place the next larger-sized femoral cut guide on the femur and recheck the anterior resection level with the Resection Guide.

If unacceptable “oversizing” of the component will occur, drill through the holes marked “+2mm” on the anterior face of the cut guide, remove the cut guide and replace the original cut guide in the “anteriorized” holes in the femur. (Fig. 22a & b)

After final placement of the desired cut guide, insert 3.2mm trocar-tipped pins through the oblique holes in the cut guide. (Fig. 23)

Use a 1.27mm (.050 in.) thick oscillating saw blade to complete the anterior, posterior, posterior chamfer and anterior chamfer resections. (Fig. 24) Upon completion of the cuts, use the Multi Pin Puller or pin inserter to remove the oblique pins. Attach the handle to the cut guide and remove from the femur.

**Instruments**

- 3.2mm drill
  - 00-5120-085-00
- 3.2mm x 75mm trocar-tipped drill pin (2.5mm hex)
  - 00-5901-021-00
- Pin/screw inserter
  - 00-5901-022-00
CR-Flex Femoral Trialing and Trochlear Recess Preparation

**TECHNIQUE TIP 5.A**
Reference the orientation, size, and gender etch and engraved markings to identify the correct provisional/cut guide.

Attach the Femoral and Provisional Impactor/Extractor to the correct Provisional/Cut Guide by inserting the tabs on the inserter arm into the notches in the provisional/cut guide and tighten the knob on the impactor. Place the correct CR-Flex Femoral Provisional/Cut Guide on the femur in the desired medial/lateral position. (Fig. 25) The impactor/extractor is impacted to fully seat the CR-Flex Femoral Provisional/Cut Guide.

**TECHNIQUE TIP 5.B**
Do not impact the anterior flange of the CR-Flex Femoral Provisional/Cut Guide or the medial or lateral arms or the knob of the femoral impactor/extractor.

Secure the fully seated provisional/cut guide to the femur by inserting the 33mm x 3.2mm screw (3.5mm hex) with the pin/screw inserter through the hole in the lateral anterior flange of the femoral provisional/cut guide. (Fig. 26)

If the tibia has been prepared, a trial range of motion can be performed to assure proper positioning of the femoral provisional/cut guide prior to bone preparation.

Insert and hold the correct-sized Femoral Provisional Cutting Guide Plate in the distal slot by hand. (Fig. 27)

Separate Femoral Provisional Cutting Guide Plates exist for the C/D, E/F, and G/H femoral provisionals/cut guides, respectively.

**TECHNIQUE TIP 5.C**
Do not impact the Femoral Provisional Cutting Guide Plate into the Femoral Provisional/Cut Guide.

Instruments

- Femoral and Provisional Impactor/Extractor 00-5901-026-00
- CR-Flex Femoral Provisional/Cut Guide, Size E, Right 00-5955-015-92
- 33mm x 3.2mm Hex Headed Screw (3.5mm hex) 00-5901-035-33
- Pin/Screw Inserter 00-5901-021-00
- Femoral Provisional Cutting Guide Plate for C-D, E-F, G-H 00-5901-099-01/02/03
Rest a 1.27mm (.050 in.) thick, ½” wide oscillating or reciprocating saw blade on the top of the femoral provisional cutting guide plate in a parallel manner in the same plane as the etched lines on the provisional/cut guide and cut the bottom of the trochlear recess. (Fig. 28)

Remove the provisional cutting guide plate and mark the vertical wall cuts for the trochlear recess through the anterior slots in the femoral provisional/cut guide with a 1.27mm (.050 in.) thick reciprocating saw blade. (Fig. 29)

Drill the peg holes for the femoral component through the femoral provisional/cut guide with the NexGen 6.4mm Patella/Femoral Drill. (Fig. 30)

Remove the screw from the anterior flange in the femoral provisional/cut guide. Reattach the impactor/extractor to the femoral provisional/cut guide to remove from the bone. If necessary, place the round end of the Slaphammer Extractor in the extraction hole of the impactor/extractor to facilitate removal.

Also, the slaphammer can be inserted into the notch on medial or lateral side of the provisional/cut guide for removal.

**TECHNIQUE TIP 5.D**

*The trochlear recess vertical wall cuts must be completed after the provisional/cut guide is removed to ensure proper bone removal to allow the femoral component to fully seat.*

**TECHNIQUE TIP 5.E**

*Do not impact the anterior flange of the CR-Flex Femoral Provisional/Cut Guide for removal.*
LPS-Flex Femoral Trialing, Trochlear Recess and LPS Box Preparation

TECHNIQUE TIP 5.F

Reference the orientation, size, and gender etch and engraved markings to identify the correct provisional/cut guide.

Attach the Femoral and Provisional Impactor/Extractor to the correct Provisional/Cut Guide by inserting the tabs on the inserter arm into the notches in the provisional/cut guide and tighten the knob on the impactor. Place the correct LPS-Flex Femoral Provisional/Cut Guide on the femur in the desired medial/lateral position. (Fig. 31) The impactor/extractor is impacted to fully seat the LPS-Flex Femoral Provisional/Cut Guide.

TECHNIQUE TIP 5.G

Do not impact the anterior flange of the LPS-Flex Femoral Provisional/Cut Guide or the medial or lateral arms or the knob of the femoral impactor/extractor.

Secure the fully seated provisional/cut guide to the femur by inserting the 33mm x 3.2mm screw (3.5mm hex) with the pin/screw inserter through the hole in the lateral anterior flange of the femoral provisional/cut guide. (Fig. 32)

If the tibia has been prepared, a trial range of motion can be performed to assure proper positioning of the femoral provisional/cut guide prior to bone preparation.

Insert and hold the correct-sized Femoral Provisional Cutting Guide Plate in the distal slot by hand. (Fig. 33)

Separate Femoral Provisional Cutting Guide Plates exist for the C/D, E/F, and G/H femoral provisionals/cut guides, respectively.

TECHNIQUE TIP 5.H

Do not impact the Femoral Provisional Cutting Guide Plate into the Femoral Provisional/Cut Guide.

Instruments

- Femoral and Provisional Impactor/Extractor
  - 00-5901-026-00
- LPS-Flex Femoral Provisional/Cut Guide, Size E, Right
  - 00-5961-015-92
  - 00-5961-015-82
- LPS-Flex Modular Box Provisional, Size E, Right
  - 00-5961-015-92
- 33mm x 3.2mm Hex Headed Screw (3.5mm hex)
  - 00-5901-035-33
- Pin/Screw Inserter
  - 00-5901-021-00
- Femoral Provisional Cutting Guide Plate for C-D, E-F, G-H
  - 00-5901-099-01/02/03
Establish the Tibial Platform

LPS-Flex Femoral Trialing, Trochlear Recess and LPS Box Preparation

TECHNIQUE TIP 5.1
If the appropriately sized LPS-Flex modular box provisional does not easily seat into the provisional/cut guide perform clean up cuts to assure adequate bone has been removed. Do NOT impact the modular box provisional.

In Instruments

Drill the peg holes for the femoral component through the femoral provisional/cut guide with the NexGen 6.4mm Patella/Femoral Drill.

Remove the screw from the anterior flange in the femoral provisional/cut guide. Reattach the impactor/extractor to the femoral provisional/cut guide to remove from the bone. If necessary, place the round end of the Slaphammer Extractor in the extraction hole of the impactor/extractor to facilitate removal.

Also, the slaphammer can be inserted into the notch on medial or lateral side of the provisional/cut guide for removal.

TECHNIQUE TIP 5.2
Do not impact the anterior flange of the LPS-Flex Femoral Provisional/Cut Guide for removal.
Alternate Method for Trochlear Recess Preparation for CR-Flex or LPS-Flex Provisional/Cut Guides

Place and affix the appropriate femoral provisional/cut guide.

(See steps 5A and 5B for placement and fixation instructions for CR-Flex and LPS-Flex provisionals/cut guides, respectively.)

By hand, fully seat the Captured Trochlear Cut Guide into the femoral provisional/cut guide in the proper orientation. (Fig. 37)

**TECHNIQUE TIP 5.K**

*Do not impact the Captured Trochlear Cut Guide.*

Secure with the 33mm x 3.2mm screw (3.5mm hex) through the medial hole of the cut guide with the Pin/Screw Inserter. (Fig. 38)

**TECHNIQUE TIP 5.L**

*Do not use a longer screw.*

Insert a 1.27mm (.050 in.) thick, ½" wide oscillating or reciprocating saw blade into the capture to make the bottom of the trochlear recess cut. (Fig. 39)

After completing the cut, use the pin/screw inserter to remove the screw.

**TECHNIQUE TIP 5.M**

*The Multi Pin Puller cannot be used to extract the screw.*

Remove the Captured Trochlear Cut Guide from the femoral provisional/cut guide.

Refer to step 5A, page 9, for remaining CR-Flex femoral preparation.

Refer to step 5B, page 11, for remaining LPS-Flex femoral preparation.
Alternate Method for LPS-Flex Box Preparation

**TECHNIQUE TIP 5.N**
*Make sure that the bottom of the trochlear recess cut for the LPS-Flex component has already been completed in either Step 5B or the alternate method described on the opposite page.*

By hand, fully seat the Captured LPS-Flex Box Cut Guide into the appropriate LPS-Flex provisional/cut guide in the proper orientation. *(Fig. 40)*

**TECHNIQUE TIP 5.O**
*Do not impact the LPS-Flex box cut guide.*

Secure the Captured LPS-Flex box cut guide though the lateral anterior flange with a 33mm x 3.2mm screw (3.5mm hex) with the pin/screw inserter. *(Fig. 41)*

**TECHNIQUE TIP 5.P**
*Do not use a longer screw.*

Insert a 1.27mm (.050 in.) thick, ½" wide oscillating or reciprocating saw blade into the capture to make the anterior to posterior portion of the LPS box cut *(Fig. 42).*

After completing the cut, use the pin/screw inserter to remove the screw.

**TECHNIQUE TIP 5.Q**
*The Multi Pin Puller cannot be used to extract the screw.*

Remove the Captured LPS-Flex box cut guide from the femoral provisional/cut guide.

Refer to step 5B, page 11, for remaining LPS-Flex femoral preparation.

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**Instruments**

- Captured LPS Box Cut Guide
  - 00-5901-098-00
- 33mm x 3.2mm Hex Headed Screw
  - 00-5901-035-33
- Pin/Screw Inserter
  - 00-5901-021-00
- LPS-Flex Femoral Provisional/Cut Guide, Size E, Right
  - 00-5961-015-92
Resect Proximal Tibia without Spike Arm

Extramedullary (EM) Technique without Spike Arm

Assemble Alignment Guide
Assemble the EM Tibial Alignment Guide. (Fig. 43 and Fig. 44)

1. Depress and hold the button, insert the threaded rod on the Ankle Clamp into the EM Distal Telescoping Tube and release the button.

2. Depress and hold the button on the proximal end of the distal tube, and insert the EM Proximal Telescoping Rod and release the button.

3. Attach the selected Captured Tibial Cutting Guide.

**TECHNIQUE TIP 6.A**
The button shown in step one is used for adjusting the varus-valgus angle of the captured tibial cutting guide.

**TECHNIQUE TIP 6.B**
The button shown in step two is used for adjusting the height of the captured tibial cutting guide. It can be depressed for macro-adjustment and rotated for micro-adjustment. One rotation equals 1mm of adjustment.

**TECHNIQUE TIP 6.C**
The button on the distal anterior portion of the assembly is depressed to adjust the slope of the captured tibial cutting guide.

**Instruments**

- Ankle Clamp: 00-5901-070-00
- EM Distal Telescoping Tube: 00-5901-071-00
- EM Proximal Telescoping Rod: 00-5901-072-00
- Tibial Cut Guide, 7°, Universal: 00-5901-080-00
- Tibial Cut Guide, 7°, Left: 00-5901-077-00
- Tibial Cut Guide, 7°, Right: 00-5901-078-00
- Tibial Cut Guide, 0°, Left: 00-5901-075-00
- Tibial Cut Guide, 0°, Right: 00-5901-076-00
- Tibial Cut Guide, 0°, Universal: 00-5901-079-00
- Tibial Depth Resection Stylus: 2/10mm 00-5901-081-00
- Tibial Depth Resection Stylus: 4/6mm 00-5901-082-00
- 3.2mm Drill: 00-5120-085-00
Position Alignment Guide

To improve the exposure of the tibial surface, retract the tibia anteriorly. Carefully position the retractor against the posterior cortex of the tibia subperiosteally to prevent neurovascular injury. Retract the patella laterally.

Adjust the telescoping rod to the approximate length of the tibia. Place the spring arms of the Ankle Clamp around the ankle proximal to the malleoli.

Align the rod with the medial third of the tibial tubercle or just medial to the tubercle. Push the varus/valgus button on the distal posterior portion of the EM Alignment Guide to adjust the rod mediolaterally so the guide is aligned with the mechanical axis of the tibia. The longitudinal axis of the rod will usually lie just medial to the mid-point of the tibial tubercle and be centered in line with the intercondylar eminence.

The foot of the rod should be positioned about 5mm-10mm medial to the midpoint between the palpable medial and lateral malleoli.

Depress or rotate the button on the proximal portion of the EM Distal Telescoping Tube to position the Captured Cut Guide proximal to the tibial tubercle. (Fig. 45)

The posterior cortex of the tibia can also be used as a rotational check. (Fig. 46) Push the button on the distal anterior portion of the EM Alignment Guide and adjust the rod in the sagittal plane so the rod is parallel to the anterior tibial shaft. A 3.2mm drill bit or the 3.2mm pin can be placed through the hole in the slot of the Captured Cutting Guide to help assess the expected slope of the tibial resection. (Fig. 47) As necessary, adjust the tibial slope of the alignment guide.
Set Resection Level

Each tip of the Tibial Depth Resection Stylus indicates a different depth. The 2mm tip is used to check the depth from the defective tibial condyle for a minimal cut. The 10mm tip is used to check the depth from the least involved tibial condyle for an anatomic cut.

Insert the plate on the Tibial Depth Resection Stylus into the slot of the Captured Cut Guide. (Fig. 48). The 2mm tip should rest on the tibial condyle (Fig. 49). This positions the slot of the Cut Guide to remove 2mm of bone below the tip of the stylus. Alternatively, rest the 10mm tip of the stylus on the cartilage of the least involved condyle (Fig. 50). This will allow the removal of the same amount of bone that the thinnest tibial component will replace. These two points of resection will usually not coincide. The surgeon must determine the appropriate level of resection based on patient’s needs, such as: age, bone quality, and the type of prosthetic fixation planned.

Depress or rotate the button on the proximal portion of the EM Distal Telescoping Tube to position the Tibial Depth Resection Stylus and the Captured Cut Guide to the desired level.

Insert 3.2mm trocar-tipped pins through the "0" holes in the Captured Cut Guide with the Pin/Screw Inserter (Fig. 51).

TECHNIQUE TIP 6.D

Care should be taken to prevent overdriving the pins to avoid posterior vascular and neural structures.

Remove the Tibial Depth Resection Stylus.

Instruments

- Ankle Clamp 00-5901-070-00
- EM Distal Telescoping Tube 00-5901-071-00
- EM Proximal Telescoping Rod 00-5901-072-00
- Tibial Cut Guide, 7°, Left 00-5901-077-00
- Tibial Cut Guide, 7°, Right 00-5901-078-00
- Tibial Cut Guide, 7°, Universal 00-5901-080-00
- Tibial Cut Guide, 0°, Left 00-5901-075-00
- Tibial Cut Guide, 0°, Right 00-5901-076-00
Resect Proximal Tibia

Push the button on the anterior proximal portion of the Alignment Guide assembly to remove the EM Tibial Alignment Guide (Fig. 52), while leaving the Captured Cut Guide in place on the bone.

 Optionally, the entire assembly can be left in place for additional stability during resection.

If the EM alignment guide has been removed, additional 2mm adjustments may be made by using the sets of holes marked “+2”, and “+4”. The markings on the Cut Guide indicate, in millimeters, the amount of bone resection relative to the standard tibial resection set by the Captured Cut Guide and Tibial Depth Resection Stylus.

Once the tibial resection has been determined, insert a 3.2mm trocar-tipped in the oblique hole to further secure the Captured Cut Guide. (Fig. 53)

TECHNIQUE TIP 6.E

Be careful to avoid cutting the patellar tendon when cutting the lateral side of the tibial.

Use a 1.27mm (.050-inch) oscillating saw blade through the slot on the Captured Cut Guide to resect the proximal surface of the tibia. (Fig. 54) Prior to removing the Captured Cut Guide, another Captured Cutting Guide can be inverted and placed on the resected tibia to assure that a planar cut has been achieved. If necessary, perform a clean-up cut. Remove pins and the captured cut guide.

TECHNIQUE TIP 6.F

After cutting through the medial side and as far as possible into the lateral side, remove the cut guide assembly. Extend the knee and retract soft tissue on the lateral side. If necessary use an osteotome to complete the cut.

For an uncaptured tibial cut – see the “Optional Uncaptured Tibial Cut” section on page 20.

Instruments

- Tibial Cut Guide, 0°, Universal 00-5901-079-00
- Tibial Depth Resection Stylus 2/10mm 00-5901-082-00
- Tibial Depth Resection Stylus 4/6mm 00-5901-081-00
- Pin/Screw Inserter 00-5901-021-00
- 3.2mm x 75mm Trocar Tipped Drill Pin (2.5mm hex) 00-5901-020-00
- Alignment Adapter 00-5901-086-00
- Alignment Rod with Coupler 00-5785-080-00
- Multi Pin Puller 00-5901-022-00
Resect Proximal Tibia with Spike Arm

EM Technique with Spike Arm

**Extramedullary (EM) Technique with Spike Arm**

Assemble the EM Tibial Alignment guide and place on the tibia, as described in step 6A.

Depress the button on the Spike Arm Post and insert the EM Tibial Spike Arm. *(Fig. 55)* Insert the Spike Arm Post into the EM Proximal Telescoping Rod and stabilize the alignment guide, by tapping in only the longest spike on the Spike Arm into the central tibial plateau just anterior to the tibial spine in the mediolateral midline. *(Fig. 56)* Depress the button on the the Spike Arm Post and slide the Captured Cut Guide so that it is adjacent to the proximal anterior tibia.

Make final varus/valgus and slope adjustments as described in step 6A. Fully impact the Spike Arm. Depress or rotate the button on the proximal portion of the EM Distal Telescoping Tube to position the Tibial Depth Resection Stylus and the Captured Cut Guide to the desired level.

Insert 3.2mm trocar-tipped pins through the "0" holes in the Captured Cut Guide. *(Fig. 57)*

**TECHNIQUE TIP 6.G**

*Care should be taken to prevent overdriving the pins to avoid posterior vascular and neural structures.*

**Instruments**

- EM Modular Spike Arm Post 00-5901-074-00
- EM Modular Spike Arm 00-5901-073-00
- Ankle Clamp 00-5901-070-00
- EM Distal Telescoping Tube 00-5901-071-00
- EM Proximal Telescoping Rod 00-5901-072-00
- Tibial Cut Guide, 7°, Left 00-5901-077-00
- Tibial Cut Guide, 7°, Right 00-5901-078-00
- Tibial Cut Guide, 7°, Universal 00-5901-080-00
- Tibial Cut Guide, 0°, Left 00-5901-075-00
- Tibial Cut Guide, 0°, Right 00-5901-076-00
- Tibial Cut Guide, 0°, Universal 00-5901-079-00
- Tibial Depth Resection Stylus 2/10mm 00-5901-082-00
Remove Spike Arm
Remove the Spike Arm with the Slaphammer Extractor while simultaneously applying upward pressure on the opposite end of the Spike Arm (Fig. 58).

Optionally, the entire assembly can be left in place for additional stability during resection.

Refer to page 15 for remaining tibial resection steps under “Resect the Proximal Tibia”.

Optional Uncaptured Tibial Cut
If desired, the cut can be made from the top surface of the Captured Cut Guide. The top surface of the guide is 4mm above the slot (Fig. 59), so the position of the guide must be adjusted to account for this difference.

The adjustment can be made after the alignment guide assembly is removed by removing the Captured Cut Guide from the pins, which were inserted through the “0” holes, and then reapplying the guide through the holes marked “+4”. (Fig. 60)

Instruments

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Tibial Depth Resection Stylus</td>
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<td>4/6mm</td>
</tr>
<tr>
<td>Pin/Screw Inserter</td>
<td>00-5901-021-00</td>
<td></td>
</tr>
<tr>
<td>3.2mm x 75mm Trocar Tipped Drill Pin (2.5mm hex)</td>
<td>00-5901-020-00</td>
<td></td>
</tr>
<tr>
<td>Alignment Adapter</td>
<td>00-5901-086-00</td>
<td></td>
</tr>
<tr>
<td>Alignment Rod with Coupler</td>
<td>00-5901-022-00</td>
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<tr>
<td>Multi Pin Puller</td>
<td>00-5901-022-00</td>
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<tr>
<td>Slaphammer Extractor</td>
<td>00-5901-024-00</td>
<td></td>
</tr>
</tbody>
</table>
Prepare the Patella

SECTION 7

Prepare the Patella

TECHNIQUE TIP 7.1

These instruments are designed for onlaying all-poly patella only.

Place the leg in full extension, evert the patella to at least 90°. Stabilize the patella, using two inverted towel clips.

Incise the soft tissue around the patella down to the insertion of the quadriceps and patellar tendons using an electrocautery knife.

Before making any bone cuts, determine the maximum thickness of the patella by using the Femur Caliper to measure the most prominent anterior-to-posterior dimension. (Fig. 61)

TECHNIQUE TIP 7.2

The Femur Caliper has a tolerance of ± 0.25mm.

Refer to the sizing chart for patella dimensions. (Fig. 62)

Use a 3.2mm drill to drill the highest portion of the medial facet perpendicular to the articular surface approximately 12mm deep centered on the medial sagittal ridge. (Fig. 63) This acts as a guide for proper medialization of the patella.

Patella Size and Thickness

<table>
<thead>
<tr>
<th>NexGen Standard Implant</th>
<th>Natural-Knee® Flex Implant</th>
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</thead>
<tbody>
<tr>
<td>29mm x 8.0mm</td>
<td>0 (28mm) x 8.0mm</td>
</tr>
<tr>
<td>32mm x 8.5mm</td>
<td>1 (32mm) x 8.0mm</td>
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<tr>
<td>35mm x 9.0mm</td>
<td>2 (35mm) x 8.0mm</td>
</tr>
<tr>
<td>38mm x 9.5mm</td>
<td>3 (38mm) x 8.0mm</td>
</tr>
<tr>
<td>41mm x 10.0mm</td>
<td></td>
</tr>
</tbody>
</table>

Instruments

Femur Caliper 00-5903-030-00
3.2mm Drill 00-5120-085-00
Use the Patella Osteotomy Guide with the stylus set for the desired amount of resection. Depress the button on the stylus while twisting to set the stylus at the desired resection level (Fig. 64). If the patella is very worn, resect less bone.

**TECHNIQUE TIP 7.C**

_Assure that the stylus is referencing the most prominent point on the patella before resecting._

Apply the Patella Osteotomy Guide medially and laterally with the jaws at the osteochondral juncture with the handles of the jig oriented toward the foot. Apply the guide with the jaws parallel to the dorsal surface of the patella, while positioning the stylus over the most prominent point on the patella.

Make the resection with a 1.27mm (.050 in) thick saw blade (Fig. 65). Cut the patella flat so that a smooth surface remains.

**TECHNIQUE TIP 7.D**

_To facilitate unlocking the guide from the patella, apply slight gripping pressure on the handles of the guide, and depress the release lever to unlock the guide. (Fig. 66)_

**Instruments**

Patella Osteotomy Guide
00-5903-010-00
SECTION 7

Prepare the Patella

Using the *NexGen* Patella Sizing Template, select the maximum-sized patella that does not overhang, centered over the 3.2mm drill hole as a reference for proper medialization. *(Fig. 67)*

**TECHNIQUE TIP 7.E**

*Do not drill through the center hole of the sizing template.*

**TECHNIQUE TIP 7.F**

*Eccentric placement of the patella 3-4mm medially allows for better patella tracking.*

Insert the appropriately-sized *NexGen* Patella Peg Drill Guide into the Patella Clamp in the proper orientation. *(Fig. 68)* Place the Patellar Clamp with the drill guide over the cut surface of the patella, centered slightly toward the medial facet over the 3.2mm drill hole with the clamp oriented so two of the holes are biased toward the medial side of the patella *(Fig. 69).*

**TECHNIQUE TIP 7.G**

*For hard/sclerotic bone it may be necessary to impact the drill guide face to fully seat the drill guide. This is necessary to assure that adequate bone removal is attained during drilling to fully seat the implant.*

---

**Instruments**

- *NexGen Patella Sizing Template*
  - 00-5903-041-00

- *NexGen Patella Peg Drill Guide Sizes*
  - 29, 32, 35, 38, 41
  - 00-5903-023-29/41

- *Patella Clamp*
  - 00-5903-020-00
Use the *NexGen 6.4mm Patella/Femoral Drill* to drill through the 3 peg holes in the Drill Guide. *(Fig. 70)*

**TECHNIQUE TIP 7.H**

To facilitate unlocking the clamp from the patella, apply slight gripping pressure on the handles of the guide, and depress the release lever to unlock guide. *(Fig. 71)*

Alternate Technique: The desired *NexGen* Drill Guide can be inserted into the Peg Hole Drill Guide Handle and placed onto the resected patella in the proper orientation for peg hole preparation. *(Fig. 72)* The face of the drill guide should be tapped until fully seated.

**TECHNIQUE TIP 7.J**

If the *Natural-Knee Flex patella* is used the *Natural-Knee instruments from the self-contained mini-instrument kit* must be used. This kit contains the following *Natural-Knee specific instruments*: sizing template, patella peg drill, patella peg drill guide, and *Natural-Knee Flex provisionals*.

**TECHNIQUE TIP 7.K**

Sizing templates are marked with their respective brand names. Drill guides and patella drills are **NOT** interchangeable between the two systems.

**TECHNIQUE TIP 7.I**

For patella compatibilities see implant labeling.

---

**Instruments**

* NexGen 6.4mm Patella/Femoral Drill  
  00-5120-052-01

* Peg Hole Drill Guide Handle  
  00-5903-060-00
Size and Position Tibial Component

Position Tibial Sizing Plate Based on Trial Range of Motion

Select the appropriate sizing plate that provides the desired tibial coverage. Attach the Offset Sizing Plate Handle to the Sizing Plate (Fig. 73). The handle should be inserted on the medial side of the sizing plate to provide clearance for the patella. If a lateral incision is used, then attach to the lateral side of the sizing plate. Extend the lever on the handle and engage the tabs on the handle with the grooves on the sizing plate by positioning the lever lateral to the dovetail, and clamp the lever to secure.

**TECHNIQUE TIP 8.A**

_The offset handle contains several moving parts. If trigger becomes hard to engage, apply instrument lubrication._

**TECHNIQUE TIP 8.B**

_Do not impact or lever the Offset Sizing Plate Handle; this instrument is designed for alignment purposes only. Use the alignment rod in the hole or slot in the sizing plate Handle to verify proper tibial plate varus/valgus and rotational alignment. See Appendix A for correcting varus/valgus resections._

Insert the appropriate Femoral Provisional/Cut Guide, Patellar Provisional, and Articular Surface Provisional. If the Articular Surface Provisional has both the femoral sizes (alpha) and tibial sizes (numeric), then use these alphanumeric codes to match the 3 components. If the alphabetic and numeric sizes are not on the Articular Surface Provisional Component, then use the color code to match the sizing plate. If there is no match between the Femoral Provisional and Sizing Plate, adjust the size of the Sizing Plate to obtain a match. Flex and extend the knee with the provisionals in place. Check the range of motion and ligament stability. Perform any necessary soft tissue releases. With proper soft tissue balancing complete, the tibial component tends to seat itself in the position where it best articulates with the femur (Fig. 74).

---

**Instruments**

- Offset Sizing Plate Handle
  - 00-5953-096-00
- Tibial Sizing Plate w/out Posterior Tabs, Size 2-8
  - 00-5951-019-02/08
- Standard All-Poly Patella Provisional, Size 32mm x 8.5mm
  - 00-5971-065-32
- CR Articular Surface Provisional C-H 5-6, 10mm
  - 00-5971-040-10
- CR-Flex Femoral Provisional/Cut Guide, Size E, Right
  - 00-5955-015-92
- Femoral and Provisional Impactor/Extractor
  - 00-5901-026-00
During the trial reduction, observe the relative position of the Femoral Provisional/Cut Guide on the Tibial Articular Surface Provisional by using the lines on both provisionals. The lines can be used to determine if posterior rollback is occurring, whether the PCL is functional, and if the femoral component will contact the tibial articular surface in the proper location. If the PCL is properly balanced, the Femoral Provisional should sit near the anterior or center lines on the tibial Articular Surface Provisional in extension and near the posterior line in flexion. If the Femoral Provisional/Cut Guide sits posterior to the lines, the PCL may be too tight or the articular surface may be too thick. If the Femoral Provisional/Cut Guide sits anterior to the lines, the PCL may be too loose.

After this self-centering process has occurred, mark the position of the sizing plate with methylene blue or electrocautery or secure the sizing plate by placing a 33mm x 3.2mm screw (3.5mm hex) in one of the anterior holes in the sizing plate (Fig. 75) and remove the remaining provisional components. Pin the sizing plate in place with a 25mm Shorthead Holding Pin (Fig. 76).

**TECHNIQUE TIP 8.C**

*It is recommended to use the screw on one anterior pin hole and a Shorthead holding pin on the opposite side of the sizing plate face to assure plate stability. Ensure that the sizing plate remains in the proper position when pinning.*

**TECHNIQUE TIP 8.D**

*When pinning the sizing plate to the bone through the anterior angled pin holes, verify the posterior edge of the sizing plate does not lift-off from the bone from overtightening.*

Once desired alignment has been verified with the Drop Rod, remove the sizing plate handle from the sizing plate.
Position Tibial Sizing Plate based on Anatomic Landmarks

The position of the tibial component can be determined based on anatomic landmarks prior to trial reduction. Select the appropriate sizing plate that provides the desired tibial coverage. Attach the Offset Sizing Plate Handle to the sizing plate (Fig. 77). The handle should be inserted on the medial side of the sizing plate to provide clearance for the patella. If lateral incision, then attach to lateral side of sizing plate. Extend the lever on the handle and engage the tabs on the handle with the grooves on the sizing plate by positioning the lever lateral to the dovetail, and clamp the lever to secure.

TECHNIQUE TIP 8.E

The offset handle contains several moving parts. If trigger becomes hard to engage, apply instrument lubrication.

TECHNIQUE TIP 8.F

Do not impact or lever the Offset Sizing Plate Handle; this instrument is designed for alignment purposes only.

Generally, the handle aligns with the anterior aspect of the tibia. Rotate the sizing plate/provisional so the handle points at, or slightly medial to, the tibial tubercle.

Instruments

Offset Sizing Plate Handle
00-5953-096-00

Tibial Sizing Plate w/out Posterior Tabs, Sizes 2-8
00-5951-019-02/08

33mm x 3.2mm Hex Headed Screw (3.5mm hex)
00-5901-035-33

Pin/Screw Inserter
00-5901-021-00
SECTION 1
Establish the Tibial Platform

SECTION 2
Size and Position Tibial Component

TECHNIQUE TIP 8.G
Do not impact or lever the Offset Sizing Plate Handle; this instrument is designed for alignment purposes only. Use the alignment rod in the hole or slot in the sizing plate Handle to verify proper tibial plate varus/valgus and rotational alignment. (Fig. 78) See Appendix A for correcting varus/valgus resections.

When the desired position has been attained, secure the sizing plate by placing a 33mm x 3.2mm screw (3.5mm hex) in one of the anterior holes in the sizing plate (Fig. 79) and a 25mm Shorthead Holding Pin on the opposite side of the sizing plate face. (Fig. 80) Ensure that the sizing plate remains in the proper position when pinning.

TECHNIQUE TIP 8.H
It is recommended to use the screw on one anterior pin hole and a Shorthead holding pin on the opposite side of the sizing plate face to assure plate stability. Ensure that the sizing plate remains in the proper position when pinning.

TECHNIQUE TIP 8.I
When pinning the sizing plate to the bone through the anterior angled pin holes, verify the posterior edge of the sizing plate does not lift-off from the bone from overtightening.

Once desired alignment has been verified with the Drop Rod, remove the MIS Sizing Plate Handle from the sizing plate.

Instruments
Alignment Rod with Coupler
25mm Shorthead Holding Pin
Multi Pin Puller
00-5785-080-00
00-5977-056-03
00-5901-022-00
Broach Tibia

Place and hold the 16.7mm Drill Bushing on the Tibia Sizing Plate without Posterior Tabs. (Fig. 81) The Peg Hole Drill Guide Handle can also be attached to the drill bushing and placed on the sizing plate. (Fig. 82)

Use the 16.7mm Cemented Stemmed Tibial Drill and drill until the engraved line on the drill is in line with the top of the 16.7mm Drill Bushing. (Fig. 83)

**TECHNIQUE TIP 9.A**

*Hold the drill bushing flush against the sizing plate while drilling.*

Assemble the Tibial Broach Impactor to the correct-sized Stemmed Tibial Broach, by retracting the locking button on the impactor, inserting the broach and releasing the locking button. (Fig. 84)

**TECHNIQUE TIP 9.B**

*Make sure that the broach handle remains flush against the sizing plate and in full contact with the sizing plate and that the broach handle does not toggle during impaction.*
Impact the tibial broach impactor assembly with care to prevent fracture of the tibia (Fig. 85). Impact until the instrument bottoms out on the handle stop (Fig. 85 inset).

**TECHNIQUE TIP 9.C**

*Keep the broach impactor as close to vertical as possible to facilitate proper broach position. The orientation of the broach handle is important to ensure proper and complete broaching resulting in full seating of the tibial implant on the bone.*

Remove the tibial broach impactor and the bone plug.

**TECHNIQUE TIP 9.D**

*Impact the under surface of the impaction head in the center of the anterior portion of the collar beneath the impaction head. Maintain a vertical impact direction in order to extract the broach straight out of the bone and avoid disruption of the broach preparation. Vertical extraction will also reduce stress on the instrument (Fig. 86). DO NOT extract with mallet blows on either the medial or lateral side of the under surface of the impaction head. DO NOT attempt to extract the broach with a horizontal or angled blow on any side of the broach impactor handle.*
Perform Trial Reduction

In this step, a trial reduction is performed to check component position, patellar tracking, ROM, and joint stability. The tibial sizing plate is in place.

With the knee in 70°-90° of flexion, place the Collateral Retractor laterally, an Army-Navy retractor anteriorly, and a rake retractor on the meniscal bed medially. Attach the Femoral and Provisional Impactor/Extractor to the appropriate femoral provisional/cut guide and insert on the bone in the correct position. (Fig. 87)

Instruments

- Tibial Sizing Plate w/out Posterior Tabs, Sizes 2-8
  - 00-5951-019-02/08
- Standard All-Poly Patella Provisional, Size 35mm x 9mm
  - 00-5971-065-35
- CR Articular Surface Provisional C-H 5-6, 10mm
  - 00-5971-040-10
- CR-Flex Femoral Provisional/Cut Guide, Size E, Right
  - 00-5955-015-92
- Femoral and Provisional Impactor/Extractor
  - 00-5901-026-00

Remove the impactor/extractor from the provisional/cut guide.

With the knee in extension, check to ensure that the provisional is flush against the resected surface of the femur on the medial condyle. Retract the lateral side and check to make sure it is flush on the lateral side. Insert the appropriate tibial articular surface provisional and perform a trial reduction. Check ligament stability in extension and in 30°, 60°, and 90° flexion. (Fig. 88)

Attempt to distract the joint in flexion to ensure that it will not distract. If a posterior stabilized component is used, hyperflex the knee and check to make sure that the spine still engages the cam. Insert the patellar provisional onto the resected patellar surface. Perform a ROM to check patellar tracking.

When component position, ROM, and joint stability have been confirmed, remove all provisional components.

TECHNIQUE TIP 10.A

Be sure that soft tissue is not trapped beneath the provisional. Impact until fully seated.
Implant Components

Prior to cementing components, use pulse lavage to remove unwanted debris from the resected bone surfaces and the joint space.

In this step, the final components are implanted, and the tibial articular surface is secured to the implanted tibial base plate. When using cemented components, it is recommended to use two batches of cement. After the implants have been chosen, make a final check to ensure that all components are compatible.

If using a cemented component, mix the first batch of cement. The cement should have a doughy consistency when ready for use.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Code</th>
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<tbody>
<tr>
<td>33mm x 3.2mm Hex Headed Screw</td>
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<tr>
<td>Pin/Screw Inserter</td>
<td>00-5901-021-00</td>
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<tr>
<td>25mm Shorthead Holding Pin</td>
<td>00-5977-056-03</td>
</tr>
<tr>
<td>Multi Pin Puller</td>
<td>00-5901-022-00</td>
</tr>
</tbody>
</table>
Tibial Plate

If a stemmed tibial base plate will be used with a stem extension, attach the desired stem extension to the stem and strike it once with a mallet. If a 10mm-14mm thick tibial articular surface will be used, insert the locking screw for the stem extension. If a stemmed tibial base plate will be used without a stem extension, consider the need for a taper plug. If a 17mm or 20mm articular surface will be used, a stem extension or taper plug is required. A taper plug can also be used with the 10mm-14mm tibial articular surface. If it is planned to use a 14mm articular surface or if the flexion and extension gaps are not balanced, consider using the taper plug in case the final reduction reveals that it is necessary to switch to a 17mm or 20mm articular surface. Furthermore, if the articular surface should ever require revision with a 17mm or 20mm thick component, the taper plug is already in place and revision of the tibial base plate may not be necessary.

Assemble the taper plug onto the tibial plate by striking it several times with a mallet to allow the ring on the taper to deform. Position the PCL Retractor posteriorly, the Collateral Soft Tissue Protector laterally, and the Collateral Retractor medially. Sublux the tibia anteriorly. Place a layer of cement on the underside of the tibial base plate, around the keel, on the resected tibial surface and in the tibial IM canal. Assemble the Quick Connect Handle to the Tibial Impactor Head. (Fig. 89)

• Unlock collar and hold
• Insert handle into impactor head
• Release collar
• Rotate handle until “click” is heard

Position the tibial plate onto the tibia and use the Tibial Impactor to impact it until fully seated (Fig 90). Thoroughly remove any excess cement in a consistent manner.

Instruments

Tibial Impactor Head 00-5901-033-00
Quick Connect Handle 00-5901-034-00
NexGen Precoat Stemmed Tibial Plate 00-5980-047-01
Femoral Component

With the knee in 70°-90° of flexion, place the Collateral Retractor laterally, an Army-Navy retractor anteriorly, and a rake retractor on the meniscal bed medially. Place a layer of cement on the underside of the prosthesis and in the holes drilled in the femur. Attach the Femoral and Provisional Impactor/Extractor to the femoral component. (Fig. 91) Insert the femoral component onto the distal femur by translating the component laterally until the lateral peg aligns with the drill hole in the lateral femoral condyle. Take care to avoid scratching the implant component surfaces. Disposable, plastic Tibial Plate Protectors may be temporarily inserted onto the Tibial Base Plate to protect the implant surfaces during insertion of the femoral component. Remove the Tibial Plate Protector after the femur is seated. Be sure that soft tissue is not trapped beneath the implant. Assemble the Quick Connect Handle to the Femoral Impactor Head (Fig. 92)

Use the Femoral Impactor Head assembly to fully seat the femoral component (Fig. 93) Remove the retractors. Check the medial and lateral sides to make sure the femoral component is fully impacted. Remove any excess cement in a thorough and consistent manner.
Articular Surface

The Articular Surface Inserter applies both downward and rearward forces to aid in the insertion of the articular surface onto the tibial base plate. Push the lever on the inserter fully to either side. Place the articular surface onto the tibial base plate, engaging the dovetails (Fig. 94) Steady the surface on the base plate with one hand by applying downward pressure near the posterior cruciate cutout. Engage the hook on the inserter with the mating slot in the front of the base plate and close the lever with your index finger. This locks the inserter to the tibial plate. Squeeze the handles of the inserter to seat the articular surface (Fig. 95). Open the lever and remove the inserter.

Alternatively the articular surface can be locked into the tibial plate after tibial plate implantation.

Patellar Component

NexGen All-Polyethylene Patella

With the knee in 70°-90° of flexion apply cement to the anterior surface and pegs of the patellar component while in a doughy consistency. Locate the drilled peg holes and use the Patella Clamp Assembly to insert and secure the patella in place. Fully open the jaws of the clamp and align the tooth to the anterior surface of the patella and the Patella Clamp Head to the posterior surface of the implant. (Fig. 96) Use the clamp to apply a significant amount of pressure to the implant to fully seat the implant on the patellar surface. Remove any excess cement in a thorough and consistent manner.

TECHNIQUE TIP

11.B

Insert an articular surface only once. Never reinsert the same articular surface onto a tibial base plate.

Instruments

- NexGen Precocat Stemmed Tibial Plate 00-5980-047-01
- NexGen CR/CR-Flex Prolong® Tibial Articular Surface 00-5952-040-12
- Articular Surface Inserter 00-5977-020-00
- NexGen Prolong All-Poly Patella 00-5972-066-35
- Patella Clamp 00-5903-020-00
- Patella Clamp Head 00-5903-021-00
**Technique for 17mm and Thicker Tibial Articular Surface Assemblies**

A secondary locking screw is required for the 17mm and thicker Tibial Articular Surface components if using a Flex Femoral Component. Therefore, stemmed tibial plates with either a stem extension or taper plug must be used with these thicker components (Fig. 97) This assists in lift off resistance at higher flexion positions.

**TECHNIQUE TIP 11.C**

The pegged plate cannot be used with the 17mm or thicker Net-Shape molded or Prolong Highly Crosslinked Polyethylene articular surface.

**Technique for 17mm and Thicker Tibial Articular Surface Assemblies**

With the *Prolong* Highly Crosslinked Polyethylene Articular Surface Component (17mm and thicker only), the metal locking clip and screw are packaged separately from the tibial articular surface container, but in the same box. Before inserting the tibial articular surface, insert the metal locking clip into the anterior slot of the compartment. The rail should be aligned with the space in the slot. There is an arrow on the superior side of the locking clip that indicates the correct direction for insertion. The purpose of the rail is to prevent the clip from being assembled incorrectly. The metal locking clip should glide easily into the slot. The clip is properly seated when a click is heard. For the molded tibial articular surface, the metal locking clip is preassembled into the component. A taper plug can also be used with the 10mm to 14mm articular surface components.

If you plan to use a 14mm component or the flexion and extension gaps are not balanced, consider using the taper plug in case, during final reduction, it would be necessary to use a 17mm or thicker component. If the articular surface should ever require revision with a 17mm or thicker component, the taper plug is already in place and revision of the tibial plate component may not be necessary.
For Back Table Assembly:

Assemble the stem extension or the taper plug onto the tibial plate by striking it with a mallet once for the stem extension or several times for the taper plug to allow the ring on the taper plug to deform. Use the articular surface Inserter to insert the articular surface onto the tibial plate. With the articular surface in place, insert the secondary locking screw (packaged with the articular surface). Use the LCCK Deflection Beam Torque Wrench with the 4.5mm Hex Driver Bit attached to torque the screw to 95 in.-lbs. Alternatively, if using a stem extension, use the Tibial Plate Wrench to assist when torquing the screw. Do not over or under torque.

For in vivo Assembly:

If preferred, 17mm or thicker articular surface can be inserted after the tibial plate has been implanted.

1. Assemble the stem extension or the taper plug onto the tibial plate by striking it with a mallet once for the stem extension or several times for the taper plug to allow the ring on the taper plug to deform. It is recommended to secure the taper plug/stem extension using a Replacement Stem Extension Locking Screw: 00-5980-090-00 (available as a separate sterile item) before implanting the tibial component. This screw will hold the taper plug/stem extension in place when the tibial plate is impacted.

2. Implant the tibial plate. For cemented applications, apply a layer of bone cement to the underside of the tibial plate, around the keel, on the resected tibial surface and in the tibial IM canal. Remove the excess cement. Recheck the ROM and stability of the knee. Remove the Replacement Stem Extension Locking Screw and discard. If bone cement is being used, wait for the cement to completely cure before inserting the articular surface. An articular surface provisional may be inserted to use as space while the cement cures.

3. Remove the articular surface provisional and insert the articular surface onto the plate using the Articular Surface Inserter.

4. Select the Tibial Plate Wrench that matches the size of the implant to be assembled. Place the end of the wrench over the tibial plate. Ensure that the wrench is in line with the base of the tibial plate.

5. Place the locking screw (packaged with the articular surface) through the hole in the articular surface.

6. Use the LCCK Deflection Beam Torque Wrench attached to the 4.5mm Hex Driver Bit to torque the screw to 95 in.-lbs.

Surgeon Notes & Tips

Take care that the retractor do not inadvertently dislodge the tibial baseplate, particularly on the posterolateral corner. Verify that the femoral component is fully seated before closing the wound. Confirm that no portion of the quadriceps mechanism has been pinned beneath the femoral component.

Close Incision

Freely irrigate the wound with the solution of choice. A drain may be placed intracapsularly. Then close the wound with sutures, and apply a bandage.

Please refer to package insert for complete product information, including contraindications, warnings, precautions, and adverse effects.
**2° Valgus Recut Guide**

Insert the Alignment Adapter into the tibial cut guide. Place the Alignment Rod with Coupler into the alignment adapter and assess the cut. **(Fig. 98)** If a valgus correction cut is needed, place the 2° Valgus Recut Guide on the resected tibial plateau and affix with 3.2mm trocar-tipped pins with the Pin and Screw Inserter.

**TECHNIQUE TIP A.1**

The fixation holes for the recut guide are at oblique angles to improve fixation of the guide.

Insert the alignment adapter into the recut guide. Place the alignment rod into the alignment adapter and verify the desired alignment. **(Fig. 99)** Remove the alignment adapter and alignment rods, perform resection, remove the trocar-tipped pins and the guide.

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**Instruments**

- Alignment Adapter 00-5901-086-00
- Alignment Rod with Coupler 00-5785-080-00
- 2° Valgus Recut Guide 00-5901-090-00
- Tibial Cut Guide, 7°, Left 00-5901-077-00
- Tibial Cut Guide, 7°, Right 00-5901-078-00
- Tibial Cut Guide, 7°, Universal 00-5901-080-00
- Tibial Cut Guide, 0°, Left 00-5901-075-00
- Tibial Cut Guide, 0°, Right 00-5901-076-00
- Tibial Cut Guide, 0°, Standard 00-5901-079-00
- Pin/Screw Inserter 00-5901-021-00
- 3.2mm x 75mm Trocar Tipped Drill Pin (2.5 hex) 00-5901-020-00
- Multi Pin Puller 00-5901-022-00

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**Fig. 98**

**Fig. 99**
**2° Varus Recut Guide**

Insert the Alignment Adapter into the tibial cut guide. Place the Alignment Rod with Coupler into the alignment adapter and assess the cut. (Fig. 100) If a varus correction cut is needed, place the 2° Varus Recut Guide on the resected tibial plateau and affix with 3.2mm trocar-tipped pins with the Pin and Screw Inserter.

**TECHNIQUE TIP**

The fixation holes for the recut guide are at oblique angles to improve fixation of the guide.

Insert the alignment adapter into the recut guide. Place the alignment rod into the alignment adapter and verify the desired alignment. (Fig. 101) Remove the alignment adapter and alignment rods, perform resection, remove the trocar-tipped pins and the guide.

**Instruments**

- Alignment Adapter 00-5901-086-00
- Alignment Rod with Coupler 00-5785-080-00
- 2° Varus Recut Guide 00-5901-090-01
- Tibial Cut Guide, 7°, Left 00-5901-077-00
- Tibial Cut Guide, 7°, Right 00-5901-078-00
- Tibial Cut Guide, 7°, Universal 00-5901-080-00
- Tibial Cut Guide, 0°, Left 00-5901-075-00
- Tibial Cut Guide, 0°, Right 00-5901-076-00
- Pin/Screw Inserter 00-5901-021-00
- Multi Pin Puller 00-5901-022-00
- 3.2mm x 75mm Trocar Tipped Drill Pin (2.5 hex) 00-5901-020-00

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**Fig. 100**

Varus Recut Needed

**Fig. 101**

Correction Resection
Replacement of Femoral/Femoral Provisional Inserter Jaws

To replace the Femoral/Provisional Inserter Jaw on the Femoral and Provisional Impactor/Extractor, use a standard screwdriver to disengage the locking mechanism of the jaw. (Fig. 102). Remove the jaw.

Insert the replacement jaw into the femoral inserter (Fig. 103).

By hand engage the locking mechanism to secure the replacement jaw to the femoral inserter (Fig. 104).

**TECHNIQUE TIP**

Do not disassemble for cleaning and sterilization as this may cause damage to the spring clip pin.
Alternate Femoral Provisional Insertion and Extraction

Attach the Quick Connect Handle to the Femoral Provisional Inserter/Extractor (Fig. 105).
- Unlock collar and hold
- Insert handle into Femoral Provisional Inserter/Extractor
- Release collar
- Rotate handle until “click” is heard

Attach the assembly to the correct Femoral Provisional/Cut Guide by depressing the button on the side of the Femoral Provisional Inserter/Extractor and inserting it into the Femoral Provisional/Cut Guide (Fig. 106).

Place the CR-Flex or LPS-Flex Provisional/Cut Guide on the femur in the desired medial/lateral position (Fig. 107a and Fig. 107b). The Quick Connect handle should be impacted to fully seat the Femoral Provisional/Cut Guide.
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