



Zimmer® NexGen® LCCK

Surgical Technique
for use with LCCK 4-in-1
Instrumentation



Introduction

The *NexGen® Legacy®* Constrained Condylar Knee (LCKK) components are designed for use in both primary and revision surgeries (Fig. 1).

The *NexGen* Revision Instruments are an intramedullary referencing system. All femoral and tibial cuts are based from Reamers or Stem Extension Provisionals located within the medullary canal.

The *NexGen* Revision Instruments allow the surgeon to convert from a *NexGen* primary implant to a stemmed LCKK implant intraoperatively. This crossover can be accomplished after the tibial preparation has been accomplished and the femoral cuts have been made via any of the *NexGen* primary techniques. If this is the case, proceed to "Prepare the Femoral Canal" on page 21 of this technique.

The four main objectives when using the *NexGen* Revision instruments are:

- **Step 1 - Re-Establish the Tibial Platform - Section 1**
 - The first goal is to establish a prosthetic platform on solid existing tibial bone stock. This will provide a reference plane for evaluating the flexion and extension gaps.
- **Step 2 - Stabilize the Knee in Flexion - Section 2**
 - Next, the femoral component size that will stabilize the knee in flexion is chosen and, if needed, augmentation to fit the femoral condylar bone stock is determined.
- **Step 3 - Stabilize the Knee in Extension - Section 3**
 - Next, the knee is stabilized in full extension to achieve collateral ligament symmetry and balance. Finally, flexion and extension gaps are balanced. An acceptable position for the joint line is estimated to optimize patello-femoral tracking. This will aid in the determination of the proper articular surface thickness, distal femoral position (augments may be necessary), and femoral size that will stabilize the knee in extension.

- **Step 4 - Implantation - Section 4**

To further accommodate the specific needs of each patient, six tibial plate styles are compatible for use with the LCKK Femoral Component (Fig. 2).

The Part numbers listed are representative part numbers for shown procedures. See the *NexGen* Knee Profiler for a complete listing of part numbers.

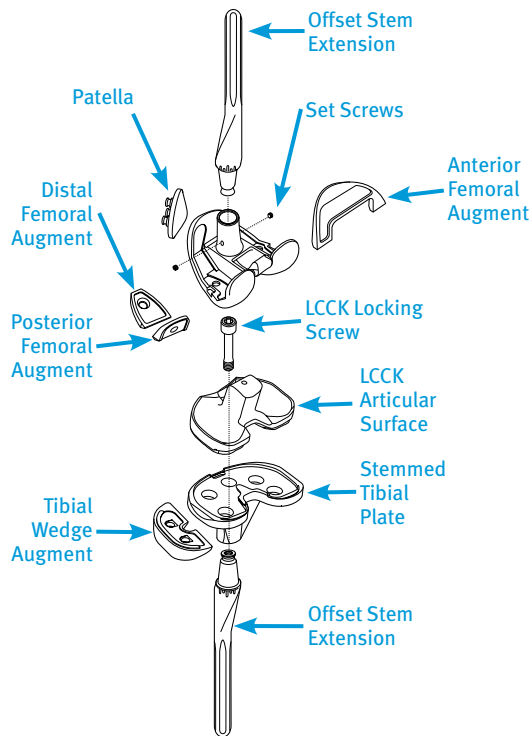







Fig. 1





Fig. 2

Table of Contents

SECTION		PAGE	SECTION		PAGE
1	Establish the Tibial Platform	1		Drill the Stem Base	7
	Finish the Tibia	4		Trial Prosthesis	7
	Offset Stem	5			
	Tibial Augmentation	6			

or

SECTION - Revision		PAGE
2	Stabilize the Knee in Flexion	9
	Prepare the Femoral Canal	9
	Evaluate Femoral Size	10
	Prepare for Femoral Trialing	10
	Establish Flexion Gap and Stability	11


















SECTION - Primary		PAGE
2	Stabilize the Knee in Flexion	21
	Prepare the Femoral Canal	21
	Resect the Distal Femur	22
	Evaluate Femoral Size	24
	Verify Femoral Rotation and Position Using the 4-in-1 Instruments	26
	Offset Stem Technique	28
	Make the Anterior Cut	29

Table of Contents

SECTION - Revision		PAGE
3	Stabilize the Knee in Extension	13
	Establish Extension Gap and Stability	13
	Make Femoral Augment Cuts	14
	Prepare for the LCCCK Box	16
	Make the LCCCK Box Cut	18
	Perform Trial Reduction	19
	Prepare the Patella	37

SECTION - Primary		PAGE
2	Stabilize the Knee in Flexion - cont.	30
	Make the Posterior Cut	30
	Make the Chamfer Cuts	30
	Make the LCCCK Box Cut	31
	Drill the Femoral Stem Base	31
	Perform Trial Reduction	32
	Establish Flexion Gap and Stability	33

SECTION - Primary		PAGE
3	Stabilize the Knee in Extension	35
	Establish Extension Gap and Stability	35
	Prepare the Patella	37

SECTION		PAGE		PAGE
4	Component Implantation	39		Femoral Component Preparation
	Tibial Component Preparation	39		Attachment of Augments
	Technique 1 - "Back Table" Technique (Recommended)	40		
	Technique 2 - Intraoperative Technique	42		

Establish the Tibial Platform

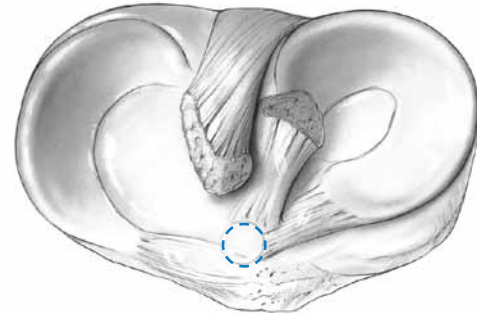
The tibial platform is re-established first, as its articular surface is always part of the articulation, irrespective of the position of flexion or extension. By contrast, the distal femur comprises part of the articular surface only in extension, and the posterior femur only in flexion.

- If necessary, create a starter hole by positioning the 8mm IM Step Drill approximately 15mm from the anterior cortex just over the midpoint of the isthmus of the tibial canal. In a primary case, this is just anterior to the insertion of the anterior cruciate ligament (Fig. 3). Open up the medullary canal.

TECHNIQUE TIP

1.A

If the center of the tibia diaphysis and the center of the medullary canal do not coincide, an Offset Stem Extension will be required.


Fig. 3

TECHNIQUE TIP

1.B

Reamer diameters start at 9mm and increase by 1mm increments up to 24mm. Note: a 9mm Reamer reams 9mm in true diameter.

- When initially reaming the canal, start with the 9mm Reamer and progressively ream until cortical contact is made. The cutting flutes should be buried, without removing a significant amount of bone (Fig. 4).

Warning: There is relatively scant bone available in the tibia, and perforation or fracture can easily result from aggressive reaming.

- Leave the Reamer in place as it will serve as a stable aligned anchor for the Tibial Resection Guide and the rest of the instrumentation necessary for the tibial preparation.


Fig. 4

TECHNIQUE TIP

1.C

The largest reamer that can be completely buried for tibial preparation may be smaller than the reamer used to prepare for the final diameter and depth of the Stem Extension Provisional and Implant.

Instruments



8mm IM Step Drill
00-5978-014-00

NexGen Reamer
00-5125-010-09
See Profiler

- For reaming depths prior to final provisional trialing (**Fig. 5**).
 - The 1st engraved line reams to the correct depth of 90mm for a 75mm *NexGen Sharp Fluted Stem Extension*.
 - The 2nd engraved line reams to the correct depth for a 145mm *NexGen Stem Extension*.
 - The 3rd engraved line reams to the correct depth for the 200mm *NexGen Stem Extension*.
 - Laying the desired Tibial Provisional Assembly next to the Reamer, and marking the depth to ream with a marking pen can also aid in reaming depth visualization.

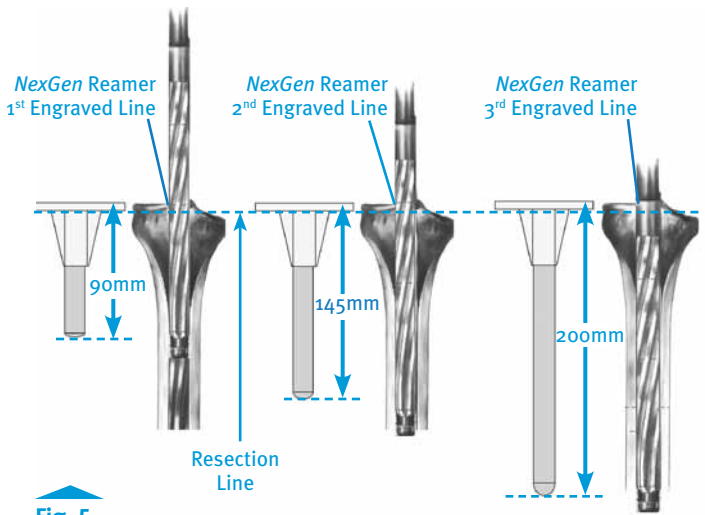


Fig. 5

TECHNIQUE TIP

1.D

Be sure that the Reamer remains in line with the tibial shaft based on external tibial landmarks.

A method of checking the reamer alignment with the canal is to use a Spacer Block fitted with an Extramedullary Alignment Rod (**Fig 6**).



Fig. 6

TECHNIQUE TIP

1.E

If necessary, apply a Tibial Wedge Augment Provisional to defective bone to assure the Reamer is correctly oriented.

- Leave the final Reamer in place, or remove the Reamer and attach the Straight Stem Extension Provisional that corresponds to the last Reamer size used to the Stem Provisional Adapter.
- Insert the Stem Extension Provisional Assembly into the reamed canal (**Fig. 7**).

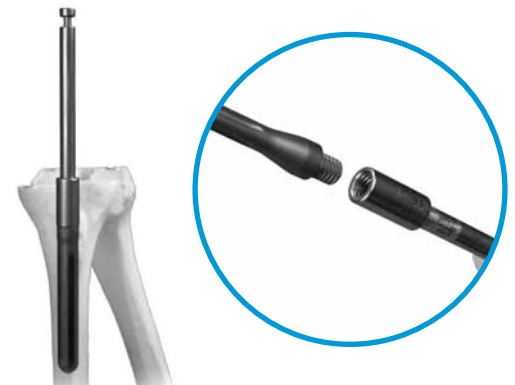


Fig. 7

Instruments



NexGen Reamer
00-5125-010-09
See Profiler



Spacer Block
00-5977-019-10
See Profiler



Alignment Rod with Coupler
00-5785-080-00



Tibial Wedge Augment Provisional
00-5989-003-20
See Profiler



Straight Stem Extension Provisional
00-5989-010-10
See Profiler



Stem Provisional Adapter
00-5987-016-00

- Slide the appropriate Revision Tibial Boom (0°, 3°, or 7°) over the Reamer or Stem Extension Provisional Assembly. Use the standard cut slot on any of the Tibial Cutting Guides for a flat cut.
- Slide the selected Tibial Cutting Guide onto the appropriate Tibial Boom until it contacts the anterior tibia. Then tighten the thumb screw (Fig. 8).
- Attach the Extramedullary Alignment Arch to the Tibial Boom and tighten the thumb screw. Then insert the Alignment Rod with Coupler through the Arch (Fig. 9). Insure the resection surface will be 90° to the tibial mechanical axis, by palpating the malleoli and noting the midpoint.

TECHNIQUE TIP

1.F

The Tibial Cutting Guide should be positioned so the Alignment Rod follows the anterior tibial crest and points about 7mm-10mm medial to the midpoint between the malleoli, and is also in line with the tibialis anterior tendon.

- After proper rotation and varus/valgus orientation has been achieved, determine the appropriate depth of resection.

TECHNIQUE TIP

1.G

In a revision case, minimal bone removal is recommended. The purpose of this cut is to create a flat surface only.

- In a primary case, use the Tibial Depth Resection Gauge to define where the saw cut will be made. Insert the 10mm tab of the Gauge into the cutting slot (Fig. 10). Readjust and tighten the thumb screw on the Boom when the appropriate depth has been determined.

TECHNIQUE TIP

1.H

When the A/P Wedge or 3° Fluted Tibial Component has been chosen, the depth resection measurements should be taken as far back as possible. This will help re-establish the joint line since the posterior slope is built into the implant and not cut into the bone (Fig. 10).

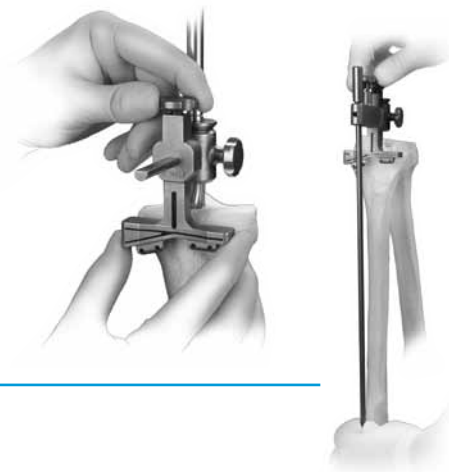


Fig. 8

Fig. 9

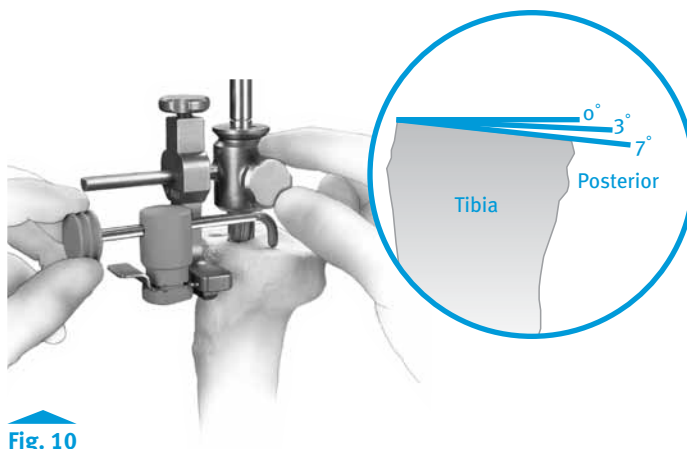


Fig. 10

Instruments



- Fasten the appropriate Tibial Cutting Guide (wedge or block) to the bone securely with two Headless Holding Pins or two Hex-headed Screws. Use an oscillating saw with a 0.050 inch/1.27mm blade to cut through the slots (**Fig. 11**).

TECHNIQUE TIP

1.1

Hex-headed Screws will provide a more stable Tibial Cutting Guide during tibial resection.

- Cut the medial and lateral tibia then remove the Boom and Reamer or Stem Extension Provisional Assembly. Finish the cut and remove the Tibial Cutting Guide.

Finish the Tibia

- Attach the appropriate Sizing Plate Handle to the selected Tibial Sizing Plate (**Fig. 12**). The Alignment Rod is used through the slot in the Sizing Plate Handle to aid in confirming varus/valgus alignment.
- Reinsert the last Reamer or Stem Extension Provisional Assembly used, parallel to the long axis of the bone.



Fig. 11



Fig. 12

Instruments



NexGen Reamer
00-5125-010-09
See Profiler



Straight Stem
Extension
Provisional
00-5989-010-10
See Profiler



Stem Provisional
Adapter
00-5987-016-00



Revision Tibial
Boom
00-5125-060-00, 0°
00-5977-005-00, 3°
00-5987-010-00, 7°



Tibial Wedge
Cutter
00-5987-015-00
See Profiler



Headless
Holding Pins
00-5222-039-00, 48mm
00-5997-084-00, 75mm



MIS Screw
Inserter/Extractor
00-5983-049-00



Hex-headed
Screws
00-5983-040-27, 27mm
00-5983-040-33, 33mm
00-5983-040-48, 48mm



Sizing Plate
Handle
00-5977-096-00



Tibial Sizing
Plate
00-5977-012-03
See Profiler



Alignment Rod
with Coupler
00-5785-080-00

Tibial Platform Decision Points

- If the Straight Bushing allows for optimal Sizing Plate positioning, pin the plate with two Short-head Holding Pins and proceed to "Drill the Stem Base" on page 7.
- If the position is satisfactory, but tibial augmentation is necessary, proceed to the "Tibial Augmentation" procedure on page 6.
- If the position of the Sizing Plate is not optimal, continue with the "Offset Stem" procedure below.

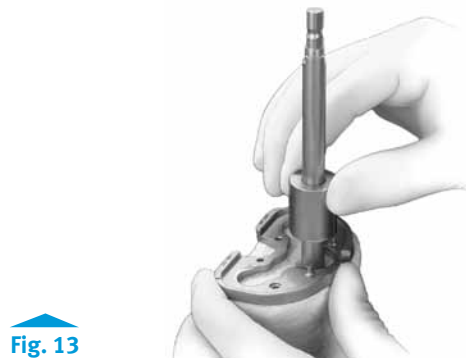


Fig. 13

Offset Stem

- Remove the Straight Bushing, leaving the Reamer or Stem Extension Provisional Assembly, and the Sizing Plate.
- Slide the Offset Bushing over the Reamer or Stem Provisional Adapter until it seats into the circular step of the Sizing Plate.
- When optimal coverage is achieved, note the position of the etched marks on the Bushing relative to the etched mark on the center of the anterior portion of the Sizing Plate (see arrow Fig. 14).



Fig. 14

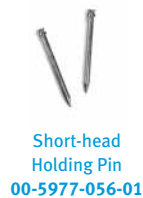
TECHNIQUE TIP

1.J

Pins should not be used on the side of the tibia requiring augmentation. Proceed to "Tibial Augmentation" on page 6.

- Pin the Sizing Plate with two Short-head Holding Pins.

Instruments



TECHNIQUE TIP

1.K

The sizing plate must be removed prior to the Reamer or Stem Extension Provisional Assembly if their diameter exceeds 19mm.

- Remove the Bushing and the Reamer or Stem Extension Provisional Assembly leaving only the Sizing Plate, and proceed to “Drill the Stem Base” on page 7.

Tibial Augmentation

- Slide the appropriate Offset Revision Tibial Boom (0°, 3°, or 7°) over the Reamer or Stem Provisional Adapter, and the Straight or Offset Bushing (Fig. 15).
- Tighten the thumb screw on the Boom and attach the appropriate Tibial Cutting Guide. Tighten the thumb screw (Fig. 16).
- Fasten the appropriate Tibial Cutting Guide (wedge or block) to the bone securely with two Headless Holding Pins or two Hex-headed Screws.
- Use an oscillating saw with a 0.050 inch/1.27mm blade to begin the augmentation cut. Remove the Boom, Reamer or Stem Extension Provisional Assembly, Bushing, and Sizing Plate. Finish the cut and remove the Tibial Cutting Guide.
- Attach the appropriate Tibial Augment Provisionals to the Sizing Plate and pin the Plate to the bone with two Short-head Holding Pins.



Fig. 15

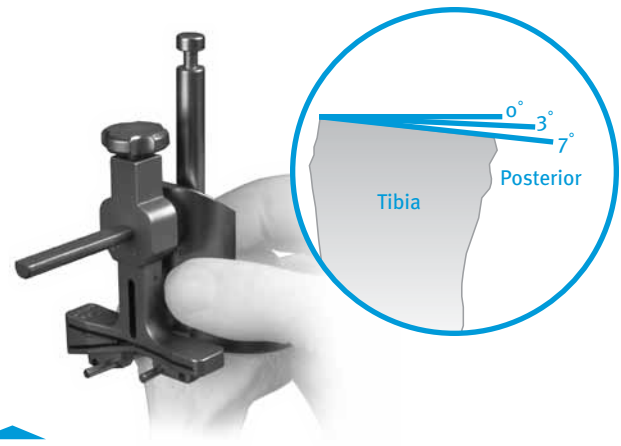


Fig. 16

Instruments



NexGen Reamer
00-5125-010-09
See Profiler



Straight Stem
Extension
Provisional
00-5989-010-10
See Profiler



Stem Provisional
Adapter
00-5987-016-00



Tibial Sizing Plate
00-5977-012-03
See Profiler



Straight Bushing
00-5987-003-00



Offset Bushing
00-5987-004-00



Short-head
Holding Pin
00-5977-056-01



Offset Revision
Tibial Boom
00-5987-018-00, 0°
00-5977-013-00, 3°
00-5987-017-01, 7°



Tibial Wedge
Cutter
00-5987-015-00
See Profiler



Headless
Holding Pins
00-5222-039-00, 48mm
00-5997-084-00, 75mm



MIS Screw
Inserter/Extractor
00-5983-049-00



Hex-headed
Screws
00-5983-040-27, 27mm
00-5983-040-33, 33mm
00-5983-040-48, 48mm

TECHNIQUE TIP

1.L

One of the pins can be inserted through the Tibial Augment Provisionals.

Drill the Stem Base

- Place the appropriate Tibial Drill Guide (stemmed or fluted) onto the Sizing Plate (Fig. 17) and drill for the tibial stem base with the corresponding Stem Drill.
- Drill approximately 10mm deeper than the engraved line on the drill (Fig. 18A). This step ensures adequate clearance for the transition length of the proximal and distal diameters of the stem extension.

If using a 12.7mm x 30mm stem extension, place the Porous Stem Tibial Drill Guide on the sizing plate and drill for the stem with the Porous Stem Tibia Drill. Drill until the top of the drill is flush with the top of the drill guide (Fig. 18B).

Failure to attain the correct drill depth may cause slight interference fit during implantation. Remove the drill and drill guide. If the tibia has already been reamed to a 17mm diameter or greater, this drilling step is not required.

Trial Prosthesis

- Attach the proper size and style Tibial Broach to the Broach Impactor (Fig. 19).
- Seat the Impactor over the location pegs on the Sizing Plate, and impact the Broach (see arrow Fig. 20). The Broach has a built-in stop to prevent over impaction.
- Remove the Broach Impactor Assembly and Sizing Plate.

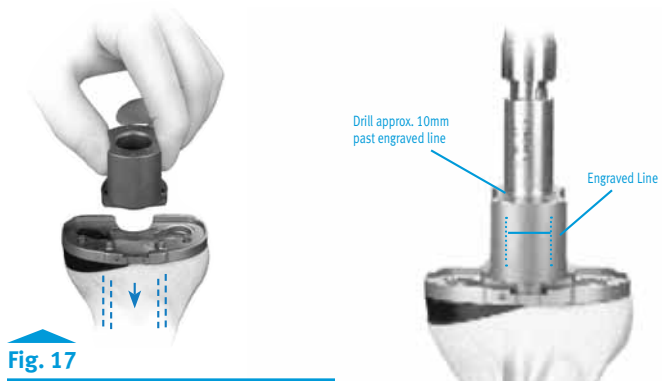


Fig. 17



Fig. 18A

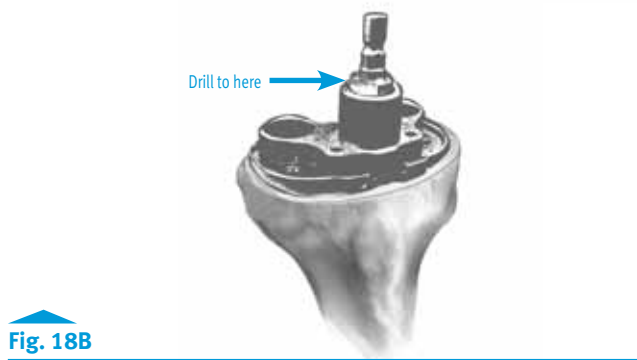


Fig. 18B

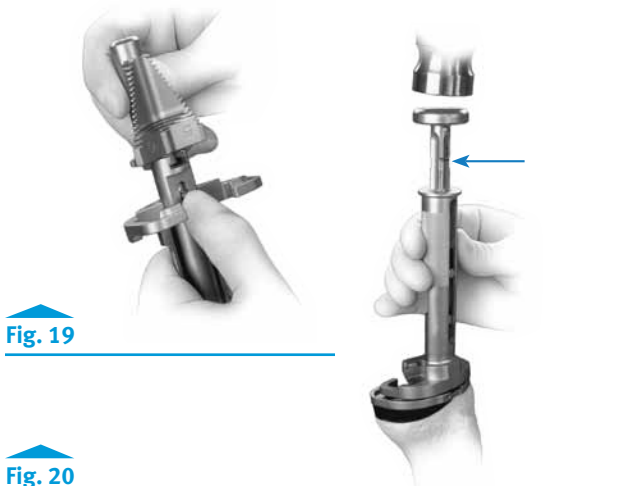


Fig. 19

Fig. 20

Instruments

							
Tibial Wedge Augment Provisional 00-5989-003-20 See Profiler	Tibial Sizing Plate 00-5977-012-03 See Profiler	Short-head Holding Pin 00-5977-056-01	Tibial Drill Guide 00-5977-014-00 Stemmed 00-5977-014-02 Fluted	Tibial Stem Drill 00-5977-010-00 Stemmed Commented 00-5977-010-01 Stemmed 00-5977-010-02 Fluted	Tibial Broach 00-5977-013-03 See Profiler	Tibial Broach Impactor 00-5977-011-00	Mallet 00-0155-002-00

- Assemble the appropriate Tibial Provisional, Stem Extension Provisional, and Tibial Augment Provisional, if needed, for which the bone has been prepared. Use the 3.5mm Hex-head Screwdriver to secure the Stem Extension Provisional in place.
- If final reaming has not been completed, refer to back page 2 (Fig 4).
- For an Offset Stem, line up the appropriate mark on the Offset Stem Extension Provisional with the etch mark on the Tibial Provisional (see arrow Fig. 21). This mark should correspond to the mark noted earlier on the Offset Bushing.

TECHNIQUE TIP

1.M

If using an Offset Stem Provisional, **do not fully tighten the Stem Extension**. This will allow the Tibial Provisional to rotate to an optimal position.

- Insert the final Tibial Provisional Assembly into the tibia.
- Impact the Tibial Provisional with the Tibial Provisional Impactor (Fig. 22).
- Use the 3.5mm Hex-head Screwdriver to secure the Stem Extension Provisional in place.

TECHNIQUE TIP

1.N

Upon removal of the Tibial Provisional Assembly, note the etch mark location on the Stem Extension Provisional relative to the tibial provisional alignment mark (see arrow Fig. 21). This will be used as the alignment of the Offset Stem Extension Implant.

TECHNIQUE TIP

1.O

Leaving the Tibial Provisional Assembly in place for the remainder of the procedure will protect the freshly resected tibial bone.

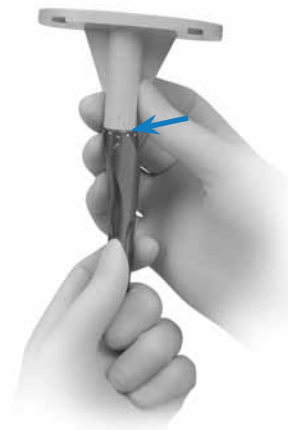


Fig. 21

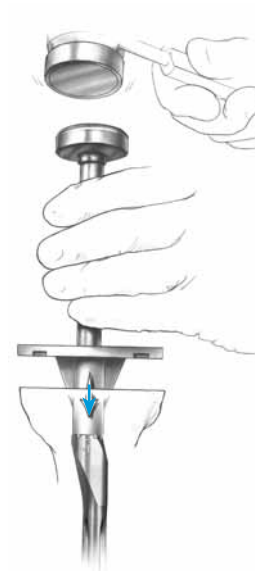


Fig. 22

Instruments



Tibial Provisional
00-5981-037-01
See Profiler



Straight Stem
Extension
Provisional
00-5989-010-10
See Profiler



Offset Stem
Extension
Provisional
00-5987-020-11
See Profiler



Tibial Wedge
Augment
Provisional
00-5989-003-20
See Profiler



3.5mm Hex-head
Screwdriver
00-5987-089-00



Tibial Provisional
Impactor
00-5977-009-00



Mallet
00-0155-002-00

Stabilize the Knee in Flexion

Prepare the Femoral Canal

- If necessary, use the 8mm IM Step Drill to make a starter hole (Fig. 23).
- When initially reaming the canal, start with the 9mm Reamer and progressively ream until cortical contact is made at the desired depth and reamer diameter. (Fig. 23 & Fig. 24).

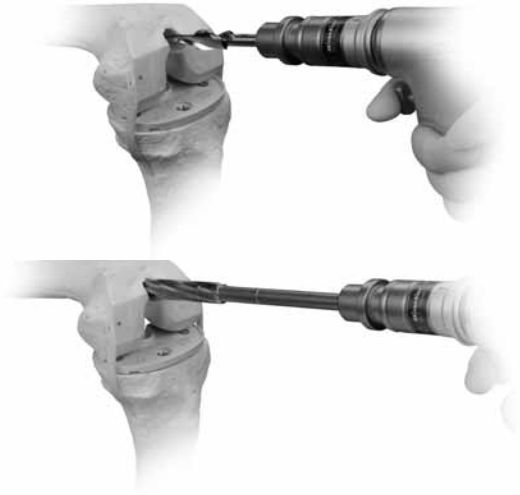


Fig. 23

TECHNIQUE TIP

2.A

Reamer diameters start at 9mm and increase by 1mm increments up to 24mm. Note: a 9mm Reamer reams 9mm in true diameter.

- For reaming depths prior to final provisional trialing (Fig. 24).
 - The 1st engraved line reams to the correct depth of 90mm for a 75mm NexGen Sharp Fluted Stem Extension.
 - The 2nd engraved line reams to the correct depth for a 145mm NexGen Stem Extension.
 - The 3rd engraved line reams to the correct depth for the 200mm NexGen Stem Extension.
 - Laying the desired Femoral Provisional Assembly next to the Reamer, then marking the depth to ream with a marking pen can also aid in reaming depth visualization.

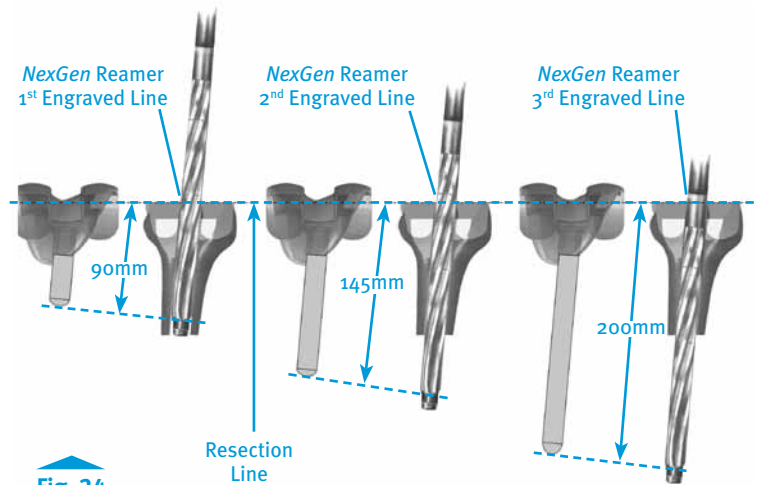


Fig. 24

TECHNIQUE TIP

2.B

Note the diameter and depth reamed of the last Reamer used once final reaming is complete.

Instruments



8mm IM Step Drill
00-5978-014-00



NexGen Reamer
00-5125-010-09
See Profiler



Tibial Provisional
00-5981-037-01
See Profiler



Femoral Provisional/Cutting Guide
00-5995-013-91, Lt
00-5995-013-92, Rt
See Profiler



Straight Stem Extension Provisional
00-5989-010-10
See Profiler

Evaluate Femoral Size

1. Previous Prosthesis

Measure the size of the revised previous prosthesis.

Caution: When using the previous prosthesis to determine size, note the primary TKA failure may have been caused by the component being over or undersized.

2. Epicondylar Width

The epicondylar width of the femur also aids in selecting the appropriate femoral size. Measure the width of the epicondyles and use the following chart to assist in defining the appropriate size (**Fig. 25**). By measuring the epicondyles, the maximum size has been determined.

TECHNIQUE TIP**2.C**

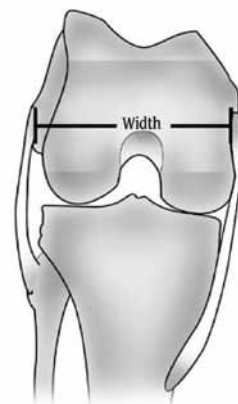
Evaluation of the pre-op x-ray of the patient's other knee may help in making the final sizing decision.

Prepare for Femoral Trialing

- Insert the appropriate size Straight Stem Extension Provisional into the appropriate size LCCK Femoral Provisional/Cutting Guide (**Fig. 26**).

TECHNIQUE TIP**2.D**

If the Straight Stem Extension Provisional does not provide adequate coverage, use an Offset Stem Extension Provisional.



NexGen Femoral Component Size Related to the Transepicondylar Width

Transepicondylar Width (mm)	Female Size	Male Size
75	C	–
80	D	C
85	E	D
90	F	E
95	G	F
100	–	G

Fig. 25**Fig. 26****Instruments**

Straight Stem
Extension
Provisional
00-5989-010-10
See Profiler



Femoral Provisional/
Cutting Guide
00-5995-013-91, Lt
00-5995-013-92, Rt
See Profiler



Offset Stem
Extension
Provisional
00-5989-020-11
See Profiler

TECHNIQUE TIP

2.E

If you can't insert the Femoral Provisional, or if the rotation is incorrect, proceed to page 22 and make the femoral bone cuts.

- With the knee in flexion, insert the Femoral Provisional/Cutting Guide Assembly onto the distal femur. Seat the Femoral Provisional Assembly on the existing bone. If the components will not seat, use a rongeur to carefully remove any anterior or posterior bone that is preventing insertion.

Caution: Be careful not to over resect.

- Insert the tabs of the Revision Rotational Alignment Guide into the posterior augment resection slots of the Femoral Provisional (Fig. 27).
- The handles of the Alignment Guide should line up with the transepicondylar axis.
- Insert the Headless Holding Pins to set femoral rotation (Fig. 28).
- These Pins can be used later to position the LCCK 4-in-1 Femoral Cut Block.

Establish Flexion Gap and Stability

- Begin by inserting the thinnest LPS Articular Surface Provisional of the color indicated on the Tibial Provisional and Femoral Provisional.

TECHNIQUE TIP

2.F

The LCCK Articular Surface Provisionals cannot be used because the intercondylar box cut has not yet been made.

- Evaluate the stability in flexion (Fig. 29).



Fig. 27

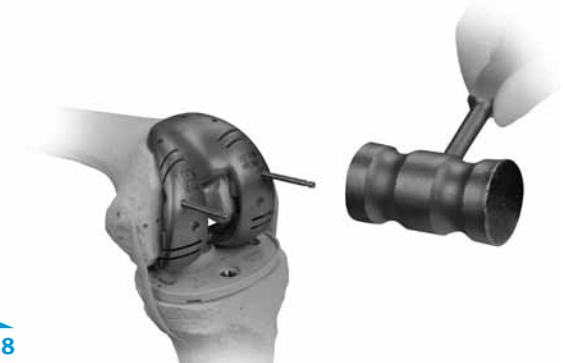


Fig. 28



Fig. 29

Instruments

Straight Stem
Extension
Provisional
00-5989-010-10
See Profiler



Offset Stem
Extension
Provisional
00-5989-020-11
See Profiler



Femoral
Provisional/
Cutting Guide
00-5995-013-91,Lt
00-5995-013-92,Rt
See Profiler



Tibial Provisional
00-5981-037-01
See Profiler



Rotational
Alignment Guide
00-5987-051-01



Headless
Holding Pins
00-5222-039-00, 48mm
00-5997-084-00, 75mm



Mallet
00-0155-002-00



LPS Articular
Surface Provisional
00-5996-030-10
See Profiler



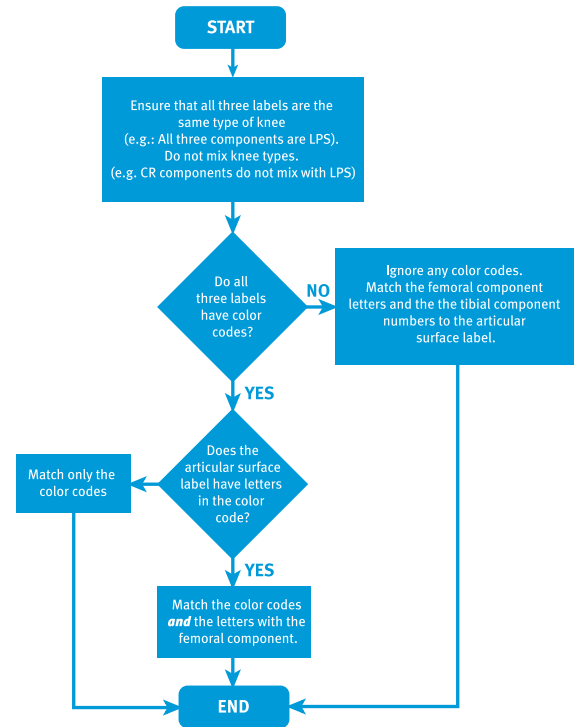
Distal Femoral
Augment
Provisional
00-5987-090-05
See Profiler



Posterior
Femoral Augment
Provisional
00-5987-089-05
See Profiler

- If the thinnest Articular Surface cannot be inserted consider the following:
 - Downsize the Femoral Component
 - Lower the tibial plateau/joint line
- If the thinnest Articular Surface does not tense the flexion gap adequately, insert progressively thicker Articular Surface Provisionals until adequate stability is obtained.
- If the thickest Articular Surface does not tense the flexion gap consider the following:
 - Augment the Tibial Provisional with a 5mm or 10mm Block on both the medial and lateral sides
 - Select the next larger Femoral Provisional/ Cutting Guide
- The color key for matching Components within the LCKC system which follows should be used.

NexGen Complete Knee Solution Component Matching Flowchart



NexGen Legacy Knee Constrained Condylar LCKC

		Femoral Size				
		C	D	E	F	G
Tibial Size	1-2	CD/1-2 STRIPED PURPLE	CD/1-2 STRIPED PURPLE	E/1-2*		
	3-4	CD/3-4 SOLID YELLOW	CD/3-4 SOLID YELLOW	EF/3-4 STRIPED YELLOW	EF/3-4 STRIPED YELLOW	G/3-4*
	5-6	CD/5-6 STRIPED GREEN	CD/5-6 STRIPED GREEN	EF/5-6 SOLID GREEN	EF/5-6 SOLID GREEN	G/5-6 STRIPED GREEN
	7-10			EF/7-10 STRIPED BLUE	EF/7-10 STRIPED BLUE	G/7-10 SOLID BLUE
Patella Size		Use <u>standard size</u> Patellas with all LCKC Femoral Components		26mm (inset only) [†] 29mm [†]	32mm [†] 35mm	38mm 41mm

[†] For G Femoral Components, the 26, 29 and 32mm patellar components must be inset.

Stabilize the Knee in Extension

Establish Extension Gap and Stability

- After achieving the appropriate stability in flexion, leave the final LPS Articular Surface Provisional in place and bring the knee to full extension. A symmetrical and balanced extension gap should be created.
- As the revision knee arthroplasty is extended, assess the full extension, the desired valgus alignment, and adequate varus-valgus stability (**Fig. 30**).

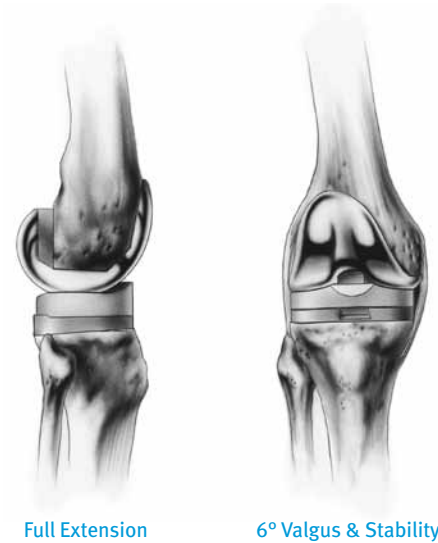


Fig. 30

TECHNIQUE TIP

3.A

The Distal Femoral Augment Provisionals may be used as spacers to create added stability in extension. (Fig. 31)

- If the gap exceeds the maximum Augment available, 20mm, then evaluate the next smaller femoral provisional size. This will allow the use of a thicker Articular Surface Provisional and will necessitate a reassessment of the flexion gap.

Balance Soft Tissues

- Unless large deformities are due exclusively to bone loss and the subsidence of the Components, conventional soft tissue releases will be necessary.
- With the knee in extension, perform the necessary ligament releases to achieve symmetric and adequate tension in a manner similar to that in a primary arthroplasty.



Fig. 31

Instruments



Femoral Provisional/
Cutting Guide
00-5995-013-91,Lt
00-5995-013-92,Rt
See Profiler



Straight Stem
Extension
Provisional
00-5989-010-10
See Profiler



LPS Articular
Surface Provisional
00-5996-030-10
See Profiler



Tibial Provisional
00-5981-037-01
See Profiler



Distal Femoral
Augment
Provisional
00-5987-090-05
See Profiler



Posterior
Femoral Augment
Provisional
00-5987-089-05
See Profiler

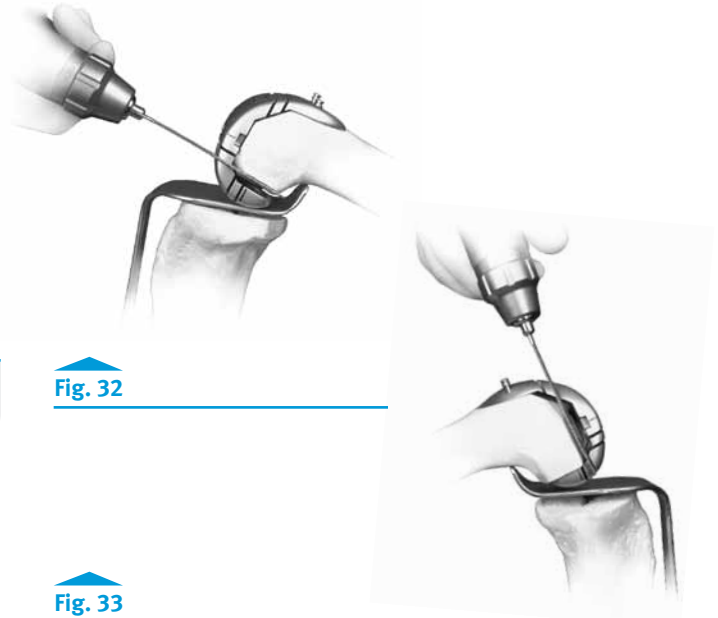
Make Femoral Augment Cuts

- Insert a retractor to protect the posterior capsule, and tibial bone or Provisional.
- Make any necessary posterior or distal femoral augment cuts through the Femoral Provisional/Cutting Guide using a 0.050 inch/1.27mm thick reciprocating saw blade (Fig. 32 & Fig. 33).

TECHNIQUE TIP

3.B

It may be necessary to remove the Femoral Provisional/Cutting Guide to complete any distal femoral augment cuts.

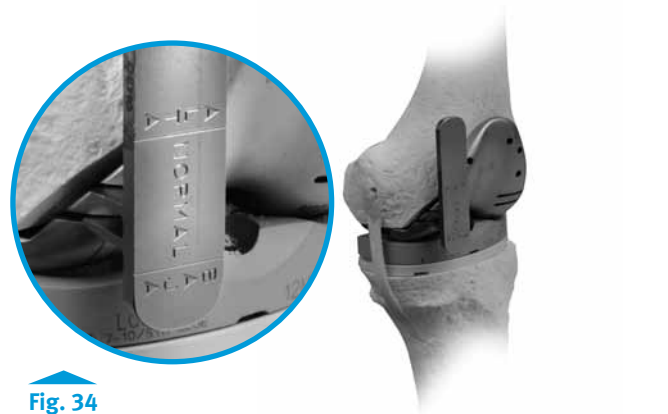
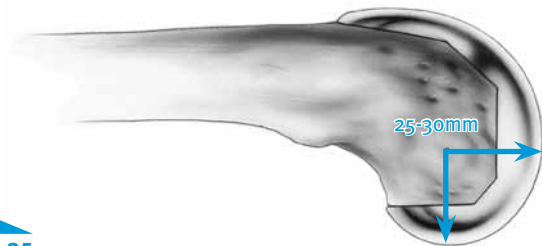

Fig. 32
Fig. 33

Joint Line

If desired, use the Patella Joint Line Gauge to assess the position of the patella.

- With the tabs of the Gauge positioned in the two slots on the anterior flange of the Femoral Provisional/Cutting Guide, the inferior pole of the Patellar Provisional or unresurfaced patella should fall between the two “Normal” marks on the Gauge (Fig. 34).

The epicondyles also provide a reference point for distal positioning of the Femoral Component. The distal joint line averages 25mm from the lateral epicondyle and 30mm from the medial epicondyle. This is very similar to the average distance to the posterior joint line and this distance may be used to check femoral component size (Fig. 35).


Fig. 34

Fig. 35

Instruments



Femoral
Provisional/Cutting
Guide
00-5995-013-91,Lt
00-5995-013-92,Rt
See Profiler



Straight Stem
Extension
Provisional
00-5989-010-10
See Profiler



LPS Articular
Surface Provisional
00-5996-030-10
See Profiler



Tibial Provisional
00-5981-037-01
See Profiler



Patella Joint Line
Gauge
00-5987-099-00

Balancing Flexion/Extension Gaps

It is important to remember that adjustments to the femoral side of the arthroplasty can affect the knee in either flexion or extension, while any change to the tibia affects both flexion and extension. This is part of the rationale for reconstructing the tibial side of the joint first. The following matrix (Fig. 36) suggests the nine situations that can occur during a trial reduction in a revision knee.

		Extension		
		Tight	OK	Loose
Flexion	Tight	1	2	3
	OK	4	5	6
	Loose	7	8	9

Fig. 36

TECHNIQUE TIP

3.C

Perform a trial reduction after implementing any of these solutions. This will verify the solution or identify any new problems and/or a variation of the initial problem that may still exist.

- Two options exist
 - Use a thinner Articular Surface.
 - Resect more tibia.
- Three options exist
 - Use an Offset Stem Extension to move the Femoral Component anteriorly.
 - Use a smaller Femoral Component.
 - Use a Distal Femoral Augment to move the Femoral Component distally and use a thinner Articular Surface.
- Three options exist
 - Use a Distal Femoral Augment to lower the joint line and allow use of a thinner Articular Surface.
 - Use a thicker Articular Surface and use a smaller Femoral Component.
 - Use an Offset Stem Extension to move the Femoral Component anteriorly and use a thicker Articular Surface.
- Two options exist
 - Release the posterior capsule from the femur.
 - Resect additional distal femoral bone and move the Femoral Component proximally.
- No further modification is necessary
- Two options exist
 - Use a Distal Femoral Augment with the same Articular Surface. This drops the joint line and tightens the extension gap.
 - Downsize the Femoral Component and use a thicker Articular Surface. This will probably raise the joint line.
- Three options exist
 - Resect additional distal femoral bone and use a larger Femoral Component with Posterior Femoral Augments.
 - Resect additional femoral bone and use a thicker Articular Surface with a more proximal femoral position.
 - Resect additional distal femoral bone and use an Offset Stem Extension to move the Femoral Component posteriorly. Use Posterior Femoral Augments.
- Four options exist
 - Use a larger Femoral Component with Posterior Femoral Augments. This may equalize gaps.
 - Resect additional distal femoral bone and use a thicker Articular Surface with a more proximal femoral position.
 - Use an Offset Stem Extension to move the Femoral Component posteriorly. Use Posterior Femoral Augments.
 - Choose to accept the current balance if it is only of a mild degree, particularly in a highly constrained component.
- Use a thicker Articular Surface

Always consider the position of the patella and joint line in the final soft tissue balancing.

Prepare for the LCCK Box

- Remove the Femoral Provisional/Cutting Guide Assembly from the bone.
- If an Offset Stem was used, note the stem location number relative to the etched line on the posterior stem base housing (Fig. 37).
- Remove the Stem Extension Provisional from the Femoral Provisional Cutting Guide and insert it into the Stem Extension Bushing (Fig. 38).
- Reinsert one or two of the Headless Holding Pins (Fig. 39). These pins will serve to provide rotational alignment for the LCCK Notch Cut Guide/4-in-1 Femoral Cut Block Assembly.

TECHNIQUE TIP

3.D

One Headless Pin will also provide sufficient rotational alignment along with the central stem base and Stem Extension Provisional.

- When using an Offset Stem Extension, fully thread the Offset Stem Locknut onto the appropriate size Offset Stem Extension Provisional.
- Thread the Offset Stem Extension Provisional onto the Stem Extension Bushing and rotate it so the appropriate number is lined up to the position noted earlier on the Femoral Provisional Cutting/Guide (Fig. 37).
- Then back thread the Locknut against the Stem Extension Bushing and use the Offset Stem Wrench to tighten the Locknut against the Stem Extension Bushing.

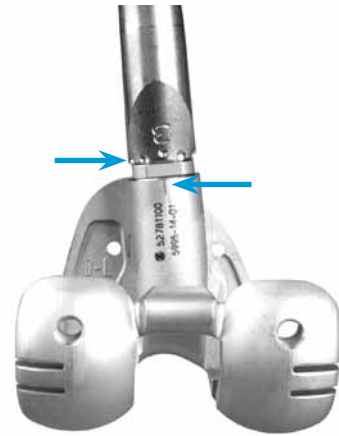

Fig. 37

Fig. 38

Fig. 39

Instruments



Femoral Provisional/Cutting Guide
00-5995-013-91,Lt
00-5995-013-92,Rt
See Profiler



Straight Stem Extension Provisional
00-5989-010-10
See Profiler



LCCK Stem Extension Bushing
00-5987-070-00



Headless Holding Pins
00-5222-039-00, 48mm
00-5997-084-00, 75mm



Mallet
00-0155-002-00



Offset Stem Extension Provisional
00-5989-020-11
See Profiler



Offset Stem Locknut
00-5987-080-00



Offset Stem Wrench
00-5987-079-00

- If the Distal Femoral Augment Provisionals were used on the Femoral Provisional/Cutting Guide, remove and install them on the LCCK 4-in-1 Femoral Cut Block. These Provisionals should correspond to the augment cuts that were made on page 14 (fig. 32 & 33) of this technique.

TECHNIQUE TIP

3.E

When removing the Femoral Augment Provisionals from any instrument, use the 3.5mm Hex-head Screwdriver to push the peg of the Augment from the opposite side (Fig. 40).

- Insert the appropriate size LCCK Notch Cut Guide until it is fully seated in the LCCK 4-in-1 Femoral Cut Block.
- Insert the Stem Extension Bushing Assembly into the LCCK Notch Cut Guide/4-in-1 Femoral Cut Block Assembly.
- Ensure that the proper "R" or "L" engraving is showing anteriorly for a right or left knee respectively
- Insert the entire LCCK Notch Cut Guide/4-in-1 Femoral Cut Block Assembly into the femoral canal over the Headless Pins (Fig. 41 & 42). Be sure that the Pins protrude beyond the face of the LCCK 4-in-1 Femoral Cut Block so they can be grasped with a Pin Puller for extraction.

TECHNIQUE TIP

3.F

The A/P position of the LCCK Notch Cut Guide/4-in-1 Femoral Cut Block Assembly is determined by the orientation of the medullary canal. Therefore, the anterior flange of the guide is **not designed to sit flush** with the cut surface of the anterior femoral bone.



Fig. 40



Fig. 41



Fig. 42

Instruments



Femoral Provisional/
Cutting Guide
00-5995-013-91,Lt
00-5995-013-92,Rt
See Profiler



LCCK 4-in-1
Femoral Cut Block
00-5987-021-03
See Profiler



Distal Femoral
Augment
Provisional
00-5987-090-05
See Profiler



LCCK Notch Cut
Guide
00-5987-022-01
See Profiler



Straight Stem
Extension
Provisional
00-5989-010-10
See Profiler



Headless
Holding Pins
00-5222-039-00, 48mm
00-5997-084-00, 75mm



LCCK Stem
Extension
Bushing
00-5987-070-00



3.5mm Hex-head
Screwdriver
00-5987-089-00



Tibial Provisional
00-5981-037-01
See Profiler

TECHNIQUE TIP

3.G

The 15mm and 20mm Distal Femoral Augment Provisionals will block access through the screw fixation holes in the 4-in-1 Femoral Cut Block.

TECHNIQUE TIP

3.H

The inside screw holes should be used for all revision cases that do not require Distal Femoral Augments. The outside screw holes should be used with 5mm or 10mm Distal Femoral Augment Provisionals.

TECHNIQUE TIP

3.I

The first set of holes on the Notch Cut Guide should not be used if any augmentation is used on the 4-in-1 Femoral Cut Block (see arrows Fig. 44).

- Use two Hex-headed Screws to secure the 4-in-1 Femoral Cut Block to the distal femoral bone (Fig. 43).
- Use two 33mm Hex-headed Screws through the top of the Notch Cut Guide (Fig. 44).
- Once the LCKK Notch Cut Guide/4-in-1 Femoral Cut Block Assembly is secured, remove the Stem Extension Bushing and the Stem Extension Provisional by pulling the assembly out of the 4-in-1 Femoral Cut Block. The Femoral Extractor may be used.

Make the LCKK Box Cut

- Use the reciprocating saw to cut the sides and base of the LCKK box (Fig. 45).
- Remove the LCKK Notch Cut Guide/4-in-1 Femoral Cut Block Assembly.



Fig. 43

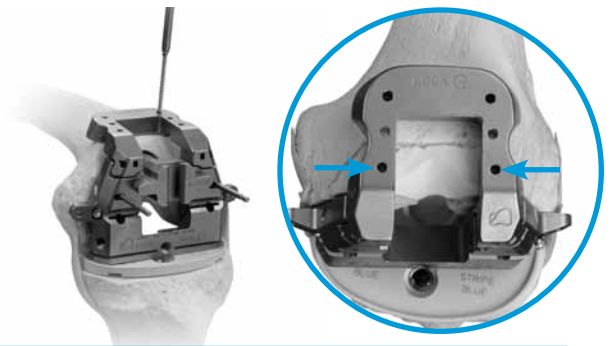


Fig. 44



Fig. 45

Instruments



Distal Femoral Augment Provisional
00-5987-090-05
See Profiler



MIS Screw Inserter/Extractor
00-5983-049-00



Hex-headed Screws
00-5983-040-27, 27mm
00-5983-040-33, 33mm
00-5983-040-48, 48mm



LCKK 4-in-1 Femoral Cut Block
00-5987-021-03



LCKK Notch Cut Guide
00-5987-022-01
See Profiler



Tibial Provisional
00-5981-037-01
See Profiler



Straight Stem Extension Provisional
00-5989-010-10
See Profiler



LCKK Stem Extension Bushing
00-5987-070-00



Femoral Extractor
00-5785-097-00

Perform Trial Reduction

- Slide the appropriate size Modular Box Provisional onto the Femoral Provisional/Cutting Guide (Fig.46).
- Attach the appropriate Posterior Femoral Augment Provisionals, then the Distal Femoral Augment Provisionals (Fig. 46).
- If distal femoral augmentation is not necessary, use a Femoral Augment Provisional Screw to secure the Provisional Box (Fig. 46).



Fig. 46

TECHNIQUE TIP

3.J

*The Modular Box Provisional is angled to match the bone cut.
The Provisional Box does not match the Femoral Implant.*

If necessary, use the appropriate Anterior Femoral Augment Provisional.

- Assemble the Stem Extension Provisional to the Femoral Provisional/Cutting Guide (Fig. 47).



Fig. 47

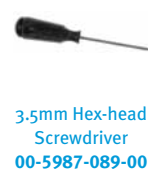
TECHNIQUE TIP

3.K

If it was determined an Offset Stem Extension would be needed, insert the appropriate diameter and set it to the orientation noted on page 16 (Fig. 37).

- Insert the Femoral Provisional/Cutting Guide Assembly onto the bone to check for proper fit.

Instruments



- Insert the correct size and style Tibial Provisional with the selected Tibial Augment Provisional, if needed, and Stem Extension Provisional.
- Attach the proper height and style of Articular Surface Provisional onto the Tibial Provisional.

When implanting an LCKK Femoral Component, insert the LPS Articular Surface Provisional. If more constraint is needed, remove the LPS Provisional and insert the LCKK Articular Surface Provisional. For either the LPS or LCKK Articular Surface Provisional, insert the Locking Screw through the Articular Surface and tighten with the 3.5mm Hex-head Screwdriver, if desired (Fig. 48).

To assess patellar tracking, proceed to "Prepare the Patella" on page 37.



Fig. 48

Instruments



Femoral Provisional/Cutting Guide
00-5995-013-91, Lt
00-5995-013-92, Rt
See Profiler



LPS Articular Surface Provisional
00-5961-030-10
See Profiler



LCKK Articular Surface Provisional
00-5995-022-10
See Profiler



Tibial Provisional
00-5981-037-01
See Profiler



Straight Stem Extension Provisional
00-5989-010-10
See Profiler



Articular Surface Provisional Locking Screw
00-5995-075-00



3.5mm Hex-head Screwdriver
00-5987-089-00

Stabilize the Knee in Flexion

Prepare the Femoral Canal

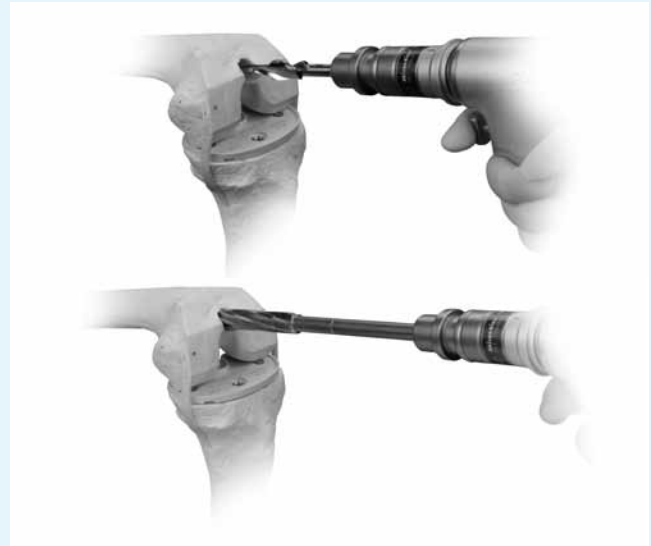
- If necessary, use the 8mm IM Step Drill to make a starter hole (Fig. 49).
- When initially reaming the canal, start with the 9mm Reamer and progressively ream until cortical contact is made. The cutting flutes should be completely buried. (Fig. 49).

TECHNIQUE TIP

2.A

Reamer diameters start at 9mm and increase by 1mm increments up to 24mm. Note: a 9mm Reamer reams 9mm in true diameter.

- Leave the Reamer in place as it will serve as a stable aligned anchor for the Distal Femoral Resection Guide and the rest of the instrumentation necessary for the femoral bone preparation.

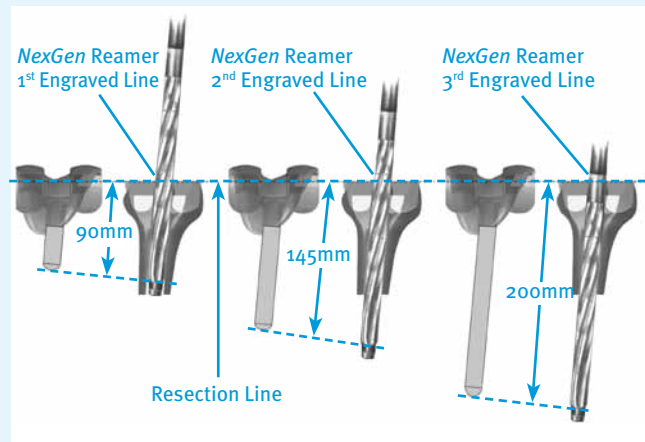

Fig. 49

TECHNIQUE TIP

2.B

The largest reamer that can be completely buried for femoral preparation may be smaller than the reamer used to prepare for the final diameter and depth of the Stem Extension Provisional and Implant.

- For reaming depths prior to final provisional trialing (Fig. 50).
 - The 1st engraved line reams to the correct depth of 90mm for a 75mm NexGen Sharp Fluted Stem Extension.
 - The 2nd engraved line reams to the correct depth for a 145mm NexGen Stem Extension.
 - The 3rd engraved line reams to the correct depth for the 200mm NexGen Stem Extension.
 - Laying the desired Femoral Provisional Assembly next to the Reamer, then marking the depth to ream with a marking pen can also aid in reaming depth visualization.


Fig. 50

TECHNIQUE TIP

2.C

Note the diameter and depth reamed of the last Reamer used once final reaming is complete.

Instruments



8mm IM Step Drill
00-5978-014-00



NexGen Reamer
00-5125-010-09
See Profiler



Tibial Provisional
00-5981-037-01
See Profiler



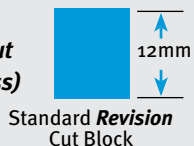
Femoral Provisional/
Cutting Guide
00-5995-013-91, Lt
00-5995-013-92, Rt
See Profiler



Straight Stem
Extension
Provisional
00-5989-010-10
See Profiler

TECHNIQUE TIP**2.D**

Note: If recutting the distal femur for a Revision use the **Standard Revision Cut Block** (approximately 12mm in thickness)

**Resect the Distal Femur**

- Screw the Mini Handles into the side of the appropriate LCCK 6° Distal Femoral Guide (**Fig. 51**).

To ensure a 6° valgus angle, attach the Mini Standard Cut Block (approximately 3mm in thickness) to the appropriate 6° Distal Femoral Guide (**Fig. 51**). Ensure the proper “Left” or “Right” engraving is showing anteriorly.

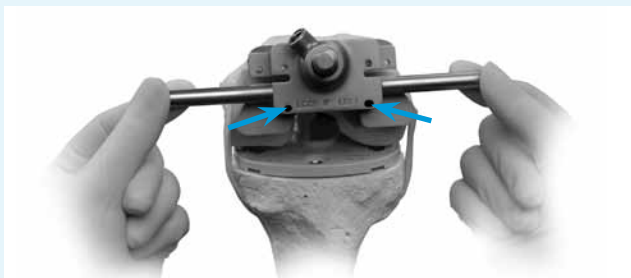
- Slip the Distal Femoral Guide Assembly over the Reamer or Stem Extension Provisional Assembly and align the Mini Handles with the epicondylar axis (**Fig. 52**).
- Use the 3.5mm Hex-head Screwdriver to tighten the 6° Distal Femoral Guide to the Reamer or Stem Extension Provisional Assembly once it is in the desired rotation (**Fig. 53**).
- To check the varus/valgus alignment, insert the Extramedullary Alignment Arch into the 6° Distal Femoral Guide. Insert the Alignment Rod with Coupler through the Arch, passing it proximally toward the femoral head to verify proper instrument alignment (**Fig. 54**).

TECHNIQUE TIP**2.E**

For additional stability, 27mm Hex-head screws can be put in through the Distal Guide (see arrows **Fig. 52**)

Primary Case

3mm
Mini Standard Cut Block

**Fig. 51****Fig. 52****Fig. 53****Fig. 54****Instruments**

Mini Handle
00-5967-046-00



LCCK 6° Distal Femoral Guide
00-5987-061-01, Lt
00-5987-061-02, Rt



Mini Standard Cut Block
00-5967-045-00



Standard Revision Cut Block
00-5969-005-09



Tibial Provisional
00-5981-037-01
See Profiler



NexGen Reamer
00-5125-010-09
See Profiler



Straight Stem Extension Provisional
00-5989-010-10
See Profiler



Stem Provisional Adapter
00-5987-016-00



3,5mm Hex-head Screwdriver
00-5987-089-00



Extramedullary Alignment Arch
00-5977-024-00



Alignment Rod with Coupler
00-5785-080-00



MIS Screw Inserter/Extractor
00-5983-049-00



Hex-headed Screws
00-5983-040-27, 27mm

- Attach the Mini Distal Femoral Cutting Guide to the 0° Distal Placement Guide (Fig. 55) and slide the assembly into the 6° Distal Femoral Guide.



Fig. 55

- Insert two 33mm Hex-headed Screws through the holes marked "0" in the top of the Cutting Guide (see arrows Fig. 56). Additional Hex-headed Screws or Headless Holding Pins may be used for increased stability during cutting.

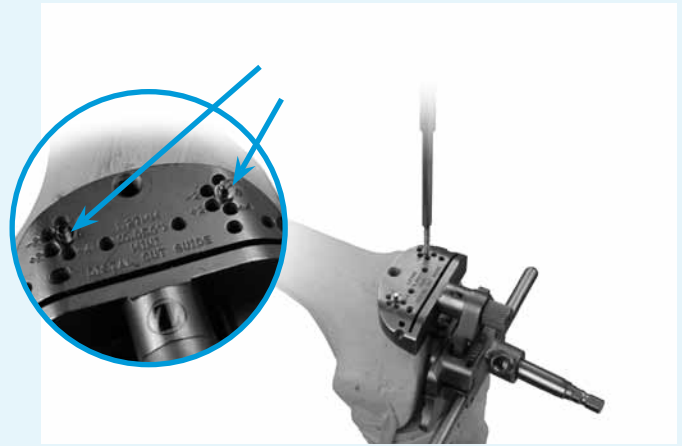


Fig. 56

TECHNIQUE TIP

2.F

Leave the instrumentation in place for added fixation while making the majority of the distal cut.

Instruments



Mini Distal
Femoral
Cutting Guide
00-5967-036-00



0° Distal
Placement Guide
00-5967-031-00



LCCK 6° Distal
Femoral Guide
00-5987-061-01, Lt
00-5987-061-02, Rt



Mini Standard
Cut Block
00-5967-045-00



NexGen Reamer
00-5125-010-09
See Profiler



Straight Stem
Extension
Provisional
00-5989-010-10
See Profiler



Stem Provisional
Adapter
00-5987-016-00



MIS Screw
Inserter/Extractor
00-5983-049-00



Hex-headed
Screws
00-5983-040-27, 27mm
00-5983-040-33, 33mm
00-5983-040-48, 48mm



Tibial Provisional
00-5981-037-01
See Profiler

- Use a 0.050 inch/1.27mm oscillating saw blade to start the resection of the distal femur through the slot in the Mini Distal Femoral Cutting Guide (Fig. 57).
- Loosen the thumb screw on the 0° Distal Placement Guide.
- Remove the 6° Distal Femoral Guide and 0° Distal Placement Guide from the Reamer or Stem Extension Provisional Assembly and finish the cut (Fig. 57).
- Remove the Mini Distal Femoral Cutting Guide, leaving the Reamer or Stem Extension Provisional Assembly in place.

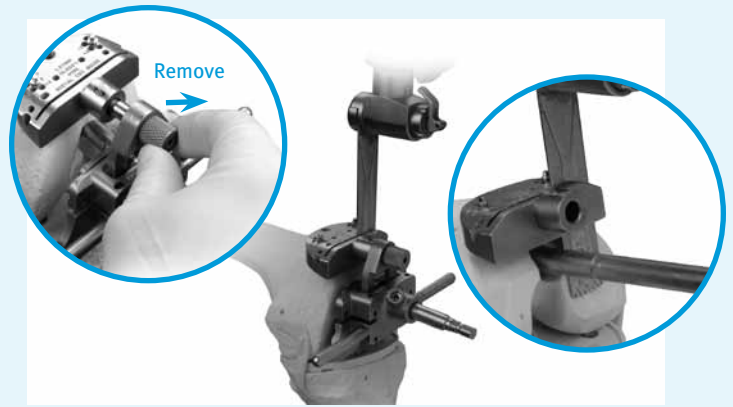


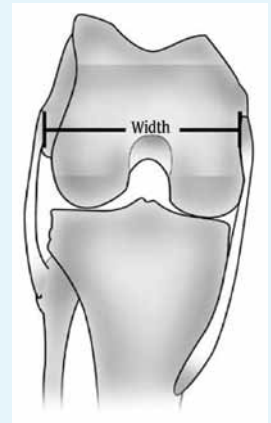
Fig. 57

Evaluate Femoral Size

1. Epicondylar Width

The epicondylar width of the femur also aids in selecting the appropriate femoral size. Measure the width of the epicondyles and use the following chart to assist in defining the appropriate size (Fig. 58). By measuring the epicondyles, the maximum size has been determined.

NexGen Femoral Component Size Related to the Transepicondylar Width



Transepicondylar Width (mm)	Female Size	Male Size
75	C	–
80	D	C
85	E	D
90	F	E
95	G	F
100	–	G

Fig. 58

TECHNIQUE TIP

2.G

Evaluation of the pre-op x-ray of the patient's other knee may help in making the final sizing decision.

Instruments



2. Femoral Sizer

- Place the Mini A/P Sizing Guide flat on the smoothly cut distal femur so the feet are flush against the posterior condyles.

TECHNIQUE TIP

2.H

Check the position by looking through both windows of the Mini A/P Sizing Guide to ensure the medullary canal is not visible through either.

- Use the Hex-headed Screws to fix the Mini A/P Sizing Guide to the distal femur.

TECHNIQUE TIP

2.I

Do not overtighten the Screws or the anterior portion of the Mini A/P Sizing Guide will not slide on the distal femur.

- Attach the MIS Locking Boom to the Mini A/P Sizing Guide. Lock the Boom when it is appropriately positioned (Fig. 59).
- Read the femoral size directly from the Guide between the engraved lines on the sizing tower (Fig. 60).

TECHNIQUE TIP

2.J

If the indicator is between two sizes, the smaller size is typically chosen to help prevent excessive ligament tightness in flexion.

TECHNIQUE TIP

2.K

Although the Mini A/P Sizing Guide has eight engraved sizes, the LCCK system only contains sizes C-G.



Fig. 59



Fig. 60



Mini A/P Sizing Guide
00-5967-055-00



MIS Screw Inserter/Extractor
00-5983-049-00



Hex-headed Screws
00-5983-040-27, 27mm
00-5983-040-33, 33mm
00-5983-040-48, 48mm



MIS Locking Boom
00-5983-028-30



Tibial Provisional
00-5981-037-01
See Profiler

Verify Femoral Rotation and Position Using the 4-in-1 Instruments

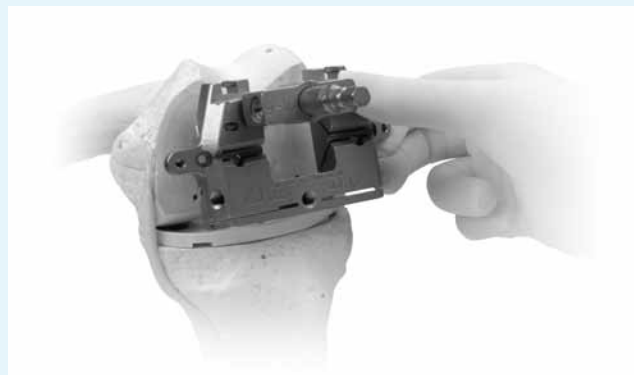
- If removed, reinsert the appropriate Reamer or Stem Extension Provisional Assembly into the reamed canal (Fig. 61).

TECHNIQUE TIP

3.A

The Reamer or Stem Provisional Adapter should have minimal distal protrusion.

- Insert the 4-in-1 9-10mm Bushing into the appropriate size 4-in-1 Femoral Cut Block.
- Ensure that the proper “Right” or “Left” engraving is showing anteriorly. Also, verify the correct orientation with the IM canal by using the engraved axis to align the Bushing.
- Slide the LCCK 4-in-1 9-10mm Bushing/ 4-in-1 Femoral Cut Block Assembly over the Reamer or Stem Extension Provisional Assembly (Fig. 62). The 4-in-1 Femoral Cut Block should be flush against the distal femur.


Fig. 61

Fig. 62

TECHNIQUE TIP

3.B

If the LCCK 4-in-1 Femoral Cut Block does not sit flush, due to missing or poor quality bone on the condyles, consider adding Distal Femoral Augment Provisionals (5, 10, 15, or 20mm).

Instruments



NexGen Reamer
00-5125-010-09
See Profiler



Straight Stem
Extension
Provisional
00-5989-010-10
See Profiler



Stem Provisional
Adapter
00-5987-016-00



Tibial Provisional
00-5981-037-01
See Profiler



LCCK 4-in-1
9-10mm Bushing
00-5987-026-00



LCCK 4-in-1
Femoral Cut
Block
00-5987-021-03
See Profiler



Distal Femoral
Augment
provisional
00-5987-090-05

- Verify the alignment of the 4-in-1 Femoral Cut Block by inserting the tabs of the Revision Rotational Alignment Guide into the posterior cut slot and aligning it with the transepicondylar axis (Fig. 63).

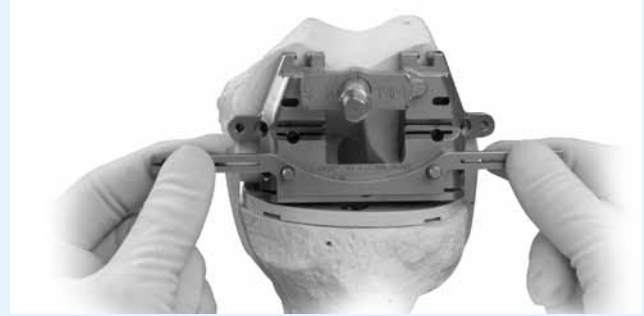


Fig. 63

- Use the 3.5mm Hex-head Screwdriver to tighten the 4-in-1 9-10mm Bushing to the Reamer or Stem Extension Provisional Assembly (Fig. 64).



Fig. 64

TECHNIQUE TIP

3.C

The 15 and 20mm Distal Femoral Augment Provisionals will block access through the screw fixation holes in the 4-in-1 Femoral Cut Block.

- Use two Hex-headed Screws to secure the 4-in-1 Femoral Cut Block to the distal femoral bone (Fig. 65).
- If the 4-in-1 Femoral Cut Block indicates a less than optimal position for the Femoral Component with the 9-10mm Bushing, the use of an Offset Stem Extension will be required. Proceed to the "Offset Stem Technique" on the following page to determine the stem alignment with optimal coverage.



Fig. 65

Instruments



Offset Stem Technique

- Insert the Femoral Offset Bushing into the LCCK Straight/Offset Bushing Adapter.
- Remove the Headless Holding Pins, if used.
- Insert the Straight/Offset Bushing Adapter and the Femoral Offset Bushing into the appropriate size 4-in-1 Femoral Cut Block.
- Ensure that the proper “Right” or “Left” engraving is showing anteriorly. Also, verify the correct orientation with the IM canal by using the engraved axis to align the Bushing.
- Slide the Straight/Offset Bushing Adapter/4-in-1 Femoral Cut Block Assembly over the Reamer or Stem Extension Provisional Assembly.
- Rotate the Femoral Offset Bushing within the Straight/Offset Bushing Adapter until an optimal position is determined (Fig. 66).
- Verify the adjustment of the 4-in-1 Femoral Cut Block by inserting the Revision Rotational Alignment Guide into the posterior cut slot and aligning it with the transepicondylar cuts.
- Use the 3.5mm Hex-head Screwdriver to tighten the Straight/Offset Bushing Adapter to the Femoral Offset Bushing (Fig. 67). This will ensure that the correct rotation reading is maintained.



Fig. 66



Fig. 67

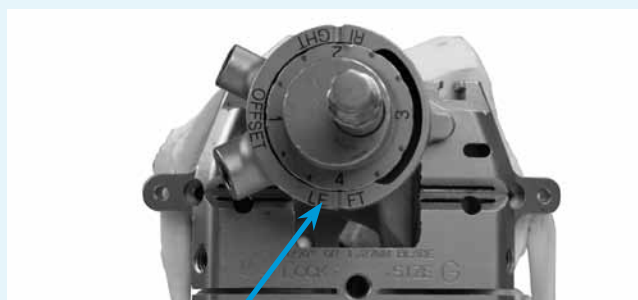


Fig. 68

TECHNIQUE TIP

3.D

The reading on the Femoral Offset Bushing should be taken from the engraved line on the posterior face of the Straight/Offset Bushing Adapter (see arrow Fig. 68). This reading will be used to set the Provisional and Implant Offset Stem rotations.

Instruments



Femoral Offset Bushing
00-5987-014-00



Straight/Offset Bushing Adapter
00-5987-025-00



LCCK 4-in-1 Femoral Cut Block
00-5987-021-03
See Profiler



NexGen Reamer
00-5125-010-09
See Profiler



Straight Stem Extension Provisional
00-5989-010-10
See Profiler



Stem Provisional Adapter
00-5987-016-00



Tibial Provisional
00-5981-037-01
See Profiler



Rotational Alignment Guide
00-5987-051-01



3.5mm Hex-head Screwdriver
00-5987-089-00

TECHNIQUE TIP

3.E

The inside screw holes should be used for all primary cases that do not require Distal Femoral Augments. The outside screw holes should be used with 5mm or 10mm Distal Femoral Augment Provisionals (Fig. 69).

- Use two Hex-headed Screws to secure the 4-in-1 Femoral Cut Block to the distal femoral bone (Fig. 69).

Make the Anterior Cut

- Remove the 4-in-1 9-10mm Bushing or the Straight/Offset Bushing Adapter and Femoral Offset Bushing.
- Remove the Reamer or Stem Extension Provisional Assembly.
- Lay the Resection Guide on top of the 4-in-1 Femoral Cut Block, and check the medial and lateral sides to be sure the cut will not notch the anterior cortex (Fig. 70).
- Attach the Mini Handles to the LCCK Anterior Cut Guide (Fig. 71).
- Slide the Anterior Cut Guide into the keyed slots in the 4-in-1 Femoral Cut Block (Fig. 71).

TECHNIQUE TIP

3.F

Hold the Mini Handles on the Anterior Cut Guide and the 4-in-1 Femoral Cut Block for added stability while cutting.

Use a 0.050 inch/1.27mm oscillating saw to clean up the anterior condyles (Fig. 71).

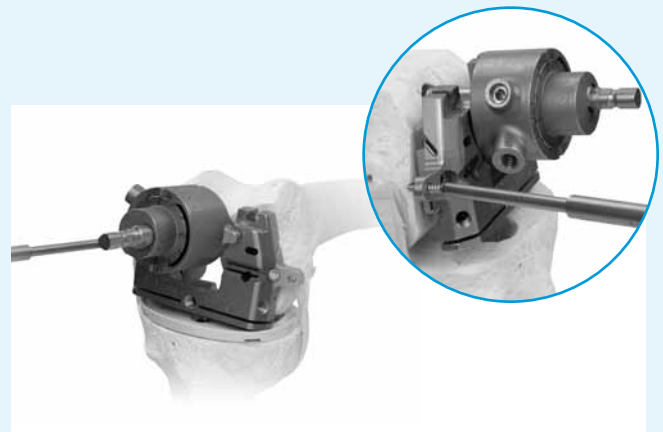


Fig. 69



Fig. 70

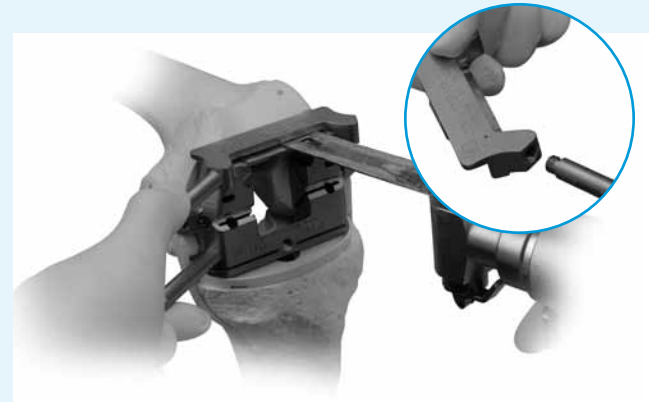


Fig. 71

Instruments



Distal Femoral Augment Provisional
00-5987-090-05
See Profiler



LCCK 4-in-1 Femoral Cut Block
00-5987-021-03
See Profiler



Tibial Provisional
00-5981-037-01
See Profiler



Straight/Offset Bushing Adapter
00-5987-025-00



Femoral Offset Bushing
00-5987-014-00



MIS Screw Inserter/Extractor
00-5983-049-00



Hex-headed Screws
00-5983-040-27, 27mm
00-5983-040-33, 33mm
00-5983-040-48, 48mm



Resection Guide
00-5977-084-00



Mini Handle
00-5967-046-00



LCCK Anterior Cut Guide
00-5987-023-00

Make the Posterior Cut

- Remove the Anterior Cut Guide.

TECHNIQUE TIP

3.G

The A/P position of the LCCK Notch Cut Guide/4-in-1 Femoral Cut Block Assembly is determined by the orientation of the medullary canal. Therefore, the anterior flange of the guide is **not designed to sit flush** with the cut surface of the anterior femoral bone.

- Insert the appropriate size LCCK Notch Cut Guide until fully seated in the 4-in-1 Femoral Cut Block.

TECHNIQUE TIP

3.H

The first set of holes on the Notch Cut Guide should not be used if any augmentation is used on the 4-in-1 Femoral Cut Block (see arrows Fig. 72).

- Use two 33mm Hex-head Screws for fixation (Fig. 72).
- Use the oscillating saw to clean-up the posterior condyles (Fig. 73).

TECHNIQUE TIP

3.I

For sizes C and D, if snap-in distal augments have been used, care must be taken to avoid the peg if it enters the slot with the saw blade (see arrows Fig. 73).

Make the Chamfer Cuts

TECHNIQUE TIP

3.J

If Screws were put in the first two sets of holes on the LCCK Notch Cut Guide, they will need to be removed prior to making the anterior chamfer cut (Fig. 74).

- Use a reciprocating saw or an oscillating saw to cut the anterior and posterior chamfers (Fig. 75).

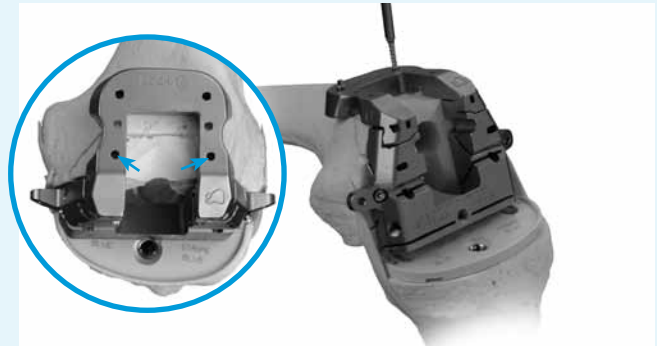

Fig. 72

Fig. 73

Fig. 74

Fig. 75

Instruments



LCCK Anterior
Cut Guide
00-5987-023-00



LCCK Notch Cut
Guide
00-5987-022-01
See Profiler



LCCK 4-in-1
Femoral Cut Block
00-5987-021-03
See Profiler



Tibial Provisional
Augment
00-5981-037-01
See Profiler



Distal Femoral
Augment
Provisional
00-5987-090-05
See Profiler



MIS Screw
Inserter/Extractor
00-5983-049-00



Hex-headed
Screws
00-5983-040-27, 27mm
00-5983-040-33, 33mm
00-5983-040-48, 48mm

Make the LCCK Box Cut

- Use the reciprocating saw to cut the sides and base of the LCCK box (Fig. 76).

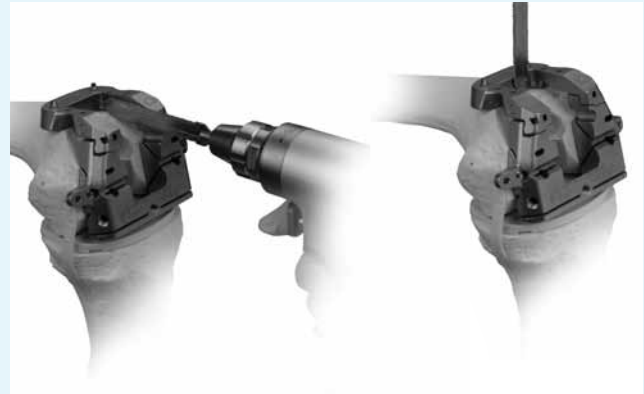


Fig. 76

Drill the Femoral Stem Base

If the canal is not already reamed to 18mm use the LCCK 18mm Femoral Drill Bushing to drill to the indicated depth for an LCCK Femoral Component.

- Attach the MIS Threaded Handle to the 18mm Femoral Drill Bushing (Fig. 77).
- Ensure that the proper “Right” or “Left” engraving is showing anteriorly. Also, verify the correct orientation with the IM canal by using the engraved axis to align the Bushing.
- Insert the LCCK 18mm Femoral Drill Bushing into the 4-in-1 Femoral Cut Block.
- Drill the canal to the second engraved line for an LCCK Femoral Component. The depth for an LCCK Component is indicated on the Drill Bit (Fig. 77).



Fig. 77

TECHNIQUE TIP

3.K

When removing the Femoral Augment Provisionals from any instrument, use the 3.5mm Hex-head Screwdriver to push the peg of the Augment from the opposite side (Fig. 78).

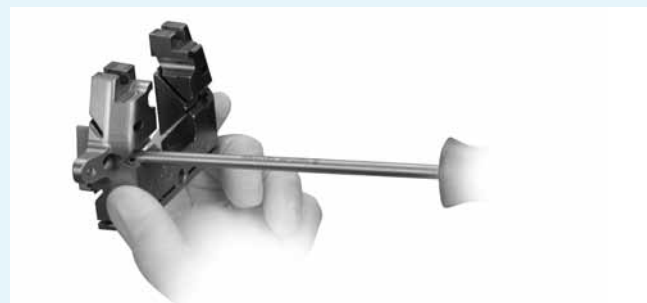


Fig. 78

Instruments



LCCK 4-in-1
Femoral Cut Block
00-5987-021-03
See Profiler



LCCK Notch Cut
Guide
00-5987-022-01
See Profiler



Hex-headed
Screws
00-5983-040-27, 27mm
00-5983-040-33, 33mm
00-5983-040-48, 48mm



MIS Threaded
Handle
00-5983-002-01



LCCK 18mm
Femoral Drill
Bushing
00-5987-024-00



18mm Femoral
Stem Drill
00-5987-010-01



Distal Femoral
Augment
Provisional
00-5987-090-05
See Profiler



3.5mm Hex-head
Screwdriver
00-5987-089-00

Perform Trial Reduction

- Slide the appropriate size Modular Box Provisional onto the Femoral Provisional/Cutting Guide (Fig. 79).
- Attach the appropriate Posterior Femoral Augment Provisionals, then the Distal Femoral Augment Provisionals (Fig. 79).
- If distal femoral augmentation is not necessary, use a Femoral Augment Provisional Screw to secure the Provisional Box (Fig. 79).

TECHNIQUE TIP

3.L

*The Modular Box Provisional is angled to match the bone cut.
The Provisional Box does not match the Femoral Implant.*

If necessary, use the appropriate Anterior Femoral Augment Provisional.

- Assemble the Stem Extension Provisional to the Femoral Provisional/Cutting Guide (Fig. 80).

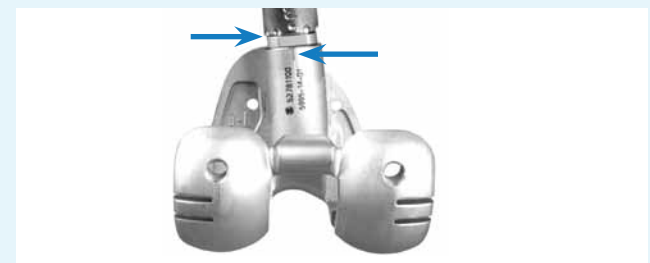
TECHNIQUE TIP

3.M

If it was determined an Offset Stem Extension would be needed, fully thread the Offset Locknut onto the appropriate size Offset Stem Extension Provisional and thread it into the Femoral Provisional/Cutting Guide. Rotate the Offset Stem Extension Provisional to the position noted earlier on the Femoral Offset Bushing (page 28 Fig. 68) and back thread the locknut until it engages the first thread. Use the Offset Stem Wrench to tighten the Locknut against the Provisional Stem once it is lined up correctly with the posterior mark on the stem base (Fig. 81).

- Insert the Femoral Provisional/Cutting Guide Assembly onto the bone to check for proper fit.


Fig. 79

Fig. 80

Fig. 81

Instruments



Modular Box Provisional
00-5995-013-00
See Profiler



Femoral Provisional/Cutting Guide
00-5995-013-91, Lt
00-5995-013-92, Rt
See Profiler



Posterior Femoral Augment Provisional
00-5987-089-05
See Profiler



Distal Femoral Augment Provisional
00-5987-090-05
See Profiler



Femoral Augment Provisional Screw
00-5987-085-00



3.5mm Hex-head Screwdriver
00-5987-089-00



Anterior Femoral Augment Provisional
00-5989-033-31
See Profiler



Straight Stem Extension Provisional
00-5989-010-10
See Profiler



Offset Stem Extension Provisional
00-5989-020-11
See Profiler



Offset Stem Locknut
00-5987-080-00



Offset Stem Wrench
00-5987-079-00

Establish Flexion Gap and Stability

- Insert the correct size and style of Tibial Provisional with the selected Tibial Augment Provisional, if needed, and Stem Extension Provisional.
- Begin by inserting the thinnest LPS Articular Surface Provisional of the color indicated on the Tibial Provisional and Femoral Provisional.

When implanting an LCCK Femoral Component, insert the LPS Articular Surface Provisional. If more constraint is needed, remove the LPS Provisional and insert the LCCK Articular Surface Provisional. For either the LPS or LCCK Articular Surface Provisional, insert the Locking Screw through the Articular Surface and tighten with the 3.5mm Hex-head Screwdriver, if desired (Fig. 82).

- Evaluate the stability in flexion (Fig. 83).



Fig. 82



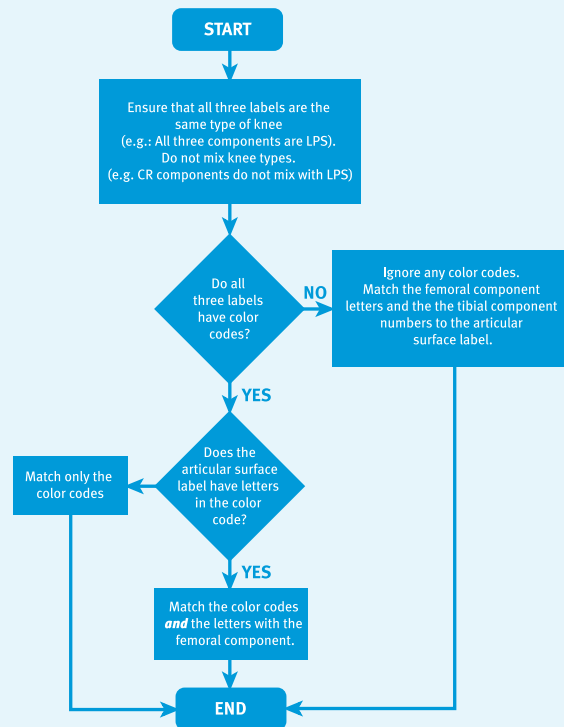
Fig. 83

Instruments

							
Femoral Provisional/Cutting Guide 00-5995-013-91, Lt 00-5995-013-92, Rt See Profiler	LPS Articular Surface Provisional 00-5961-030-10 See Profiler	LCCK Articular Surface Provisional 00-5995-022-10 See Profiler	Tibial Provisional 00-5981-037-01 See Profiler	Straight Stem Extension Provisional 00-5989-010-10 See Profiler	Articular Surface Provisional Locking Screw 00-5995-075-00	3.5mm Hex-head Screwdriver 00-5987-089-00	Distal Femoral Augment Provisional 00-5987-090-05 See Profiler

- If the thinnest Articular Surface cannot be inserted consider the following:
 - Downsize the Femoral Component
 - Lower the tibial plateau/joint line
- If the thinnest Articular Surface does not tense the flexion gap adequately, insert progressively thicker Articular Surface Provisionals until adequate stability is obtained.
- If the thickest Articular Surface does not tense the flexion gap consider the following:
 - Augment the Tibial Provisional with a 5mm or 10mm Block on both the medial and lateral sides
 - Select the next larger Femoral Provisional/ Cutting Guide
- The color key for matching Components within the LCKK system which follows should be used.

NexGen Complete Knee Solution Component Matching Flowchart



NexGen Legacy Knee Constrained Condylar LCKK

		Femoral Size				
		C	D	E	F	G
Tibial Size	1-2	CD/1-2 STRIPED PURPLE	CD/1-2 STRIPED PURPLE	E/1-2*		
	3-4	CD/3-4 SOLID YELLOW	CD/3-4 SOLID YELLOW	EF/3-4 STRIPED YELLOW	EF/3-4 STRIPED YELLOW	G/3-4*
	5-6	CD/5-6 STRIPED GREEN	CD/5-6 STRIPED GREEN	EF/5-6 SOLID GREEN	EF/5-6 SOLID GREEN	G/5-6 STRIPED GREEN
	7-10			EF/7-10 STRIPED BLUE	EF/7-10 STRIPED BLUE	G/7-10 SOLID BLUE
Patella Size		Use <u>standard size</u> Patellas with all LCKK Femoral Components		26mm (inset only) [†] 29mm [†]	32mm [†] 35mm	38mm 41mm

[†] For G Femoral Components, the 26, 29 and 32mm patellar components must be inset.

Stabilize the Knee in Extension

Establish Extension Gap and Stability

- After achieving the appropriate stability in flexion, leave the final LPS Articular Surface Provisional in place and bring the knee to full extension. A symmetrical and balanced extension gap should be created.
- As the revision knee arthroplasty is extended, assess the full extension, the desired valgus alignment, and adequate varus-valgus stability (**Fig. 84**).



Fig. 84

TECHNIQUE TIP

3.N

The Distal Femoral Augment Provisionals may be used as spacers to create added stability in extension. (Fig. 85)

- If the gap exceeds the maximum Augment available, 20mm, then evaluate the next smaller femoral provisional size. This will allow the use of a thicker Articular Surface Provisional and will necessitate a reassessment of the flexion gap.

Balance Soft Tissues

- Unless large deformities are due exclusively to bone loss and the subsidence of the Components, conventional soft tissue releases will be necessary.
- With the knee in extension, perform the necessary ligament releases to achieve symmetric and adequate tension.



Fig. 85

Instruments



Femoral Provisional/
Cutting Guide
00-5995-013-91,Lt
00-5995-013-92,Rt
See Profiler



Straight Stem
Extension
Provisional
00-5989-010-10
See Profiler



LPS Articular
Surface Provisional
00-5996-030-10
See Profiler



Tibial Provisional
00-5981-037-01
See Profiler



Distal Femoral
Augment
Provisional
00-5987-090-05
See Profiler



Posterior
Femoral Augment
Provisional
00-5987-089-05
See Profiler

Balance Flexion/Extension Gaps

It is important to remember that adjustments to the femoral side of the arthroplasty can affect the knee in either flexion or extension, while any change to the tibia affects both flexion and extension. This is part of the rationale for reconstructing the tibial side of the joint first. The following matrix (Fig. 86) suggests the nine situations that can occur during a trial reduction in a revision knee.

		Extension		
		Tight	OK	Loose
Flexion	Tight	1	2	3
	OK	4	5	6
	Loose	7	8	9

Fig. 86

TECHNIQUE TIP

3.0

Perform a trial reduction after implementing any of these solutions. This will verify the solution or identify any new problems and/or a variation of the initial problem that may still exist.

- Two options exist
 - Use a thinner Articular Surface.
 - Resect more tibia.
- Three options exist
 - Use an Offset Stem Extension to move the Femoral Component anteriorly.
 - Use a smaller Femoral Component.
 - Use a Distal Femoral Augment to move the Femoral Component distally and use a thinner Articular Surface.
- Three options exist
 - Use a Distal Femoral Augment to lower the joint line and allow use of a thinner Articular Surface.
 - Use a thicker Articular Surface and use a smaller Femoral Component.
 - Use an Offset Stem Extension to move the Femoral Component anteriorly and use a thicker Articular Surface.
- Two options exist
 - Release the posterior capsule from the femur.
 - Resect additional distal femoral bone and move the Femoral Component proximally.
- No further modification is necessary
- Two options exist
 - Use a Distal Femoral Augment with the same Articular Surface. This drops the joint line and tightens the extension gap.
 - Downsize the Femoral Component and use a thicker Articular Surface. This will probably raise the joint line.
- Three options exist
 - Resect additional distal femoral bone and use a larger Femoral Component with Posterior Femoral Augments.
 - Resect additional femoral bone and use a thicker Articular Surface with a more proximal femoral position.
 - Resect additional distal femoral bone and use an Offset Stem Extension to move the Femoral Component posteriorly. Use Posterior Femoral Augments.
- Four options exist
 - Use a larger Femoral Component with Posterior Femoral Augments. This may equalize gaps.
 - Resect additional distal femoral bone and use a thicker Articular Surface with a more proximal femoral position.
 - Use an Offset Stem Extension to move the Femoral Component posteriorly. Use Posterior Femoral Augments.
 - Choose to accept the current balance if it is only of a mild degree, particularly in a highly constrained component.
- Use a thicker Articular Surface

Always consider the position of the patella and joint line in the final soft tissue balancing.

Prepare the Patella

It is not always necessary to revise the Patellar Component. A well-fixed component from the *NexGen* system may be left. If the Component is loose or found to be incompatible, determine if there is enough bone remaining to implant a new Patellar Component. The *NexGen* Patellar Component requires a minimum of 11mm of remaining bone to allow for the implant pegs (**Fig. 87**).

- If the decision is made to replace the primary Patellar Component with a *NexGen* Patellar Component, prepare the patellar peg holes by centering the appropriate Patellar Drill Guide over the patella. It may be necessary to rotate the guide to find the best location for fixation.
- Holding the Guide firmly in place, drill the three peg holes using the Patellar/Femoral Drill Bit.
- If inadequate bone remains, trim the surface and either leave the residual bone or consider use of a Patellar Component that has been designed to compensate for defects in the patella (**Fig. 88**).



Fig. 87



Fig. 88

Instruments



Patellar Drill
Guide
00-5979-001-26
See Profiler



Patellar/Femoral
Drill Bit
00-5120-052-01

To compensate for gross bone deficiency, the *NexGen Augmentation Patella** provides the additional option of suturing the patella base to the extensor tendon to provide adjunctive fixation (**Fig. 89**). Refer to the *NexGen Augmentation Patella Surgical Technique* for additional information.

Patellar Tracking

Evaluate the tracking of the Patellar Provisional against the Femoral Provisional/Cutting Guide.

The patella must track centrally. Simulate closure of the capsule with either a single suture or by attaching a towel clip. If additional pressure is needed to hold the patella reduced, or if the patella tends to sublux or tilt laterally, perform a lateral retinacular release. Be careful not to create any defect in the skin. Extend the release until the patella tracks satisfactorily. If a lateral retinacular release fails to correct patellar tracking reassess the rotation of the Femoral and Tibial Components. Also check the orientation of the tibial tubercle.

- Insert the Patellar Provisional. With all Provisionals in place, check the range of motion and joint stability (**Fig. 90**).
- Perform any necessary soft tissue releases.

Remove all Provisionals.



Fig. 89



Fig. 90

*Indicated for use with bone cement in the USA.

Instruments



Patellar Provisional
00-5971-065-26
See Profiler



Femoral Provisional/
Cutting Guide
00-5995-013-91,Lt
00-5995-013-92,Rt
See Profiler



LCCK Articular
Surface Provisional
00-5995-022-10
See Profiler



Tibial Provisional
00-5981-037-01
See Profiler

Component Implantation

After the Implants have been chosen, make one last check to ensure that the Femoral, Tibial, and Articular Surface Components match. There should be a three-of-a-kind color match between the squares on each box.

TECHNIQUE TIP

4.A

The Tibial Component, if implanted first, does not compromise access to the femoral component. However, implantation of the femoral component first may compromise access for the tibial component.

Tibial Component Preparation

Tibial Augments are designed to be secured to the Tibial Plate with Screws or bone cement. As with the Stem Extensions, the Augment Screws are packaged with the Augment. If cement is used to attach the Augment, use the Augment Assembly Clamp to stabilize the Augment while the cement is curing. All Augments are PMMA precoated to enhance fixation to the bone cement.

There are two techniques for inserting the Articular Surface onto the Tibial Plate.

- The recommended method is to assemble and tighten the Articular Surface, Tibial Plate, and Stem Extension on the back table.
- The alternative method is to insert the Articular Surface intraoperatively, after the Tibial Plate has been cemented.

Instruments



Augment
Assembly Clamp
00-5977-030-00



Augment Holding
Clamp Head
00-5987-086-00

Technique 1- “Back Table” Technique (Recommended)

- Remove the Locking Screw from the Stem Extension Implant and discard. The Locking Screw that will be used is packaged with the LCCK Articular Surface Implant.
- Insert the Stem Extension Implant into the base of the Tibial Plate Implant.

When using an Offset Stem Extension, use the stem location referenced earlier and line up that stem location number with the etched line on the anterior distal Tibial Component (**Fig. 91**).

- Wrap the Tibial Component in a cloth and place it on a surgical cart.

The surgical cart will provide a rigid surface on which to impact the taper and assure that the impact is delivered to the taper connection and it is full seated.

Caution: Hitting the Stem more than once may loosen the taper connection.

- While protecting the Stem Extension, strike it solidly **one time** with a two-pound Mallet. The two-pound Mallet will assure the proper amount of impact force is delivered to the taper connection.
- By hand, assemble the LCCK Articular Surface onto the Implant Tray applying downward and posterior force (**Fig. 91**).

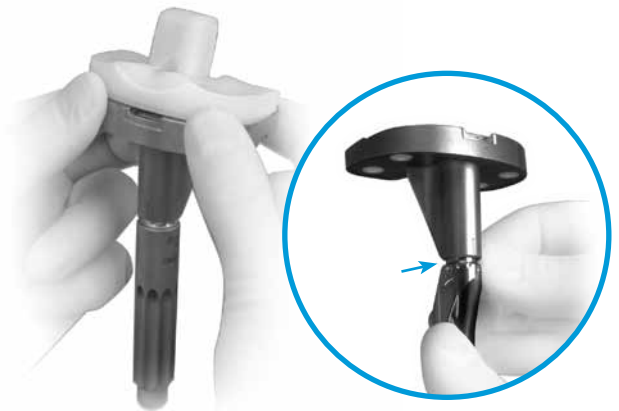


Fig. 91

Instruments



Mallet

00-0155-002-00

TECHNIQUE TIP

4.B

The Articular Surface must be completely seated in the Tibial Tray prior to torquing the Screw. The Screw is not intended to pull the Articular Surface down into the Tibial Plate.

- Insert the Locking Screw packaged with the LCCCK Articular Surface, and hand tighten with the 4.5mm Hex Driver Bit (Fig. 92).
- Leave the Driver Bit set in the screw head.
- Select the LCCCK Tibial Plate Wrench that has the stem extension diameter that matches that of the Implant to be assembled.
- Insert the Stem Extension through the Stem Protector Sleeve and into the hole in the Wrench that corresponds to the stem extension diameter.

Caution: Do not over or under torque. Undertightening of the Screw may allow it to loosen over time. Overtightening may cause the Screw to fracture intraoperatively.

- Attach the Deflection Beam Torque Wrench to the 4.5mm Hex Driver Bit (Fig. 93).
- Apply 95 in. lbs. of torque with the Wrench to assure the Screw is properly tightened (Fig. 93).
- For cemented applications, a layer of cement should be placed on the underside of the Tibial Plate, around the keel, on the resected tibia surfaces, and in the tibial IM canal (Fig. 94).
- Implant the Tibial Plate and Stem Extension.
- Remove any excess bone cement from the Implant/bone interface.



Fig. 92



Fig. 93



Fig. 94

Instruments



4.5mm Hex
Driver Bit
00-5987-036-00



Tibial Plate
Wrench
00-5995-037-01
See Profiler



Stem Protector
Sleeve
00-5987-038-00



Deflection Beam
Torque Wrench
00-5987-035-00

Technique 2- Intraoperative Technique

Caution: Use of this technique risks disturbing the bone/cement/implant interface.

- Remove the Locking Screw from the Stem Extension Implant and set it on the back table for later use.
- Insert the Stem Extension Implant into the Tibial Plate Implant. When using an Offset Stem Extension, use the stem location referenced earlier and line up that stem location number with the etched line on the anterior distal Tibial Component.
- Wrap the Tibial Component in a cloth and place it on a surgical cart. The surgical cart will provide a rigid surface on which to impact the taper and assure that the impact is delivered to the taper connection and it is full seated.

Caution: Hitting the Stem more than once may loosen the taper connection.

- While protecting the Stem Extension, strike it solidly **one time** with a two-pound Mallet. The two pound Mallet will assure the proper amount of impact force is delivered to the taper connection.
- Insert the Locking Screw packaged with the Stem Extension and hand tighten it with the 3.5mm Hex-head Screwdriver. This will serve as a temporary Screw which will be replaced upon insertion of the LCCK Articular Surface Implant.
- For cemented applications, a layer of cement should be placed on the underside of the Tibial Base Plate, around the keel, on the resected tibia surfaces, and in the tibial IM canal ([Fig.90 on page 41](#)).
- Implant the Tibial Plate and Stem Extension. Remove any excess bone cement from the implant/bone interface.

TECHNIQUE TIP

4.C

Cement must be cured prior to using this technique. If a leg holder is used, the leg should be removed, and be free to rotate. This will promote proper Tibial Plate Wrench use and help prevent loads from developing at the bone/cement/Implant interface.

- Remove the temporary Locking Screw from the Stem Extension.
- By hand, assemble the LCCK Articular Surface onto the Implant Tray applying downward and posterior force.
- Insert the Locking Screw packaged with the LCCK Articular Surface and hand tighten it with the 4.5mm Hex Driver Bit. Leave the Driver Bit set in the screw head.
- Select the LCCK Tibial Plate Wrench that has the tibial plate size that matches that 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.

Instruments



Mallet
00-0155-002-00



3.5mm Hex-head
Screwdriver
00-5987-089-00



4.5mm Hex
Driver Bit
00-5987-036-00



Tibial Plate
Wrench
00-5995-037-01
See Profiler

Caution: Do not over or under torque. Undertightening of the Screw may allow it to loosen over time. Over-tightening may cause the screw to fracture intraoperatively.

- Attach the Deflection Beam Torque Wrench to the 4.5mm Hex Driver Bit (Fig. 95).
- Apply 95 in. lbs. of torque with the Wrench to assure the Screw is properly tightened (Fig. 95).

Femoral Component Preparation

It is required that a Stem Extension always be used with an LCCK Femoral Component.

Stem Extension

The locking mechanism between the Femoral Implant and the Stem Extension Implant is a combination of a Morse-type taper and two Set Screws.

- Remove the Stem Extension Locking Screw from the Stem Extension and discard. The Stem Extension Screw is not used with the Femoral Component.
- Check to ensure that the Set Screws have not migrated or fallen into the femoral stem base taper prior to inserting the Stem Extension.
- Insert the Stem Extension into the base of the Femoral Component.



Fig. 95

Instruments



4.5mm Hex
Driver Bit
00-5987-036-00



Tibial Plate
Wrench
00-5995-037-01
See Profiler



Deflection Beam
Torque Wrench
00-5987-035-00

- When using the Offset Stem Extension, use the stem location referenced earlier and line up that stem location number with the etched line on the posterior stem base housing (Fig. 96).
- The Stem Extension should be “snug” in the femoral component base. If toggle exists, back out one or both of the Set Screws one half turn.
- When a “snug” fit is achieved, wrap the Femoral Component in a cloth and place it on a surgical cart.

Caution: Hitting the Stem more than once may loosen the taper connection.

- While protecting the Stem Extension, strike it solidly **one time** with a two-pound Mallet.

Caution: The Femoral Set Screw Hex Driver is designed to limit the amount of torque which can be applied to the Set Screws. Torque by hand only.

- After seating the Morse-type taper, tighten the two Set Screws located in the base of the Femoral Component. Use the Femoral Set Screw Hex Driver and apply moderate torque to tighten each of the two Set Screws (Fig. 96).

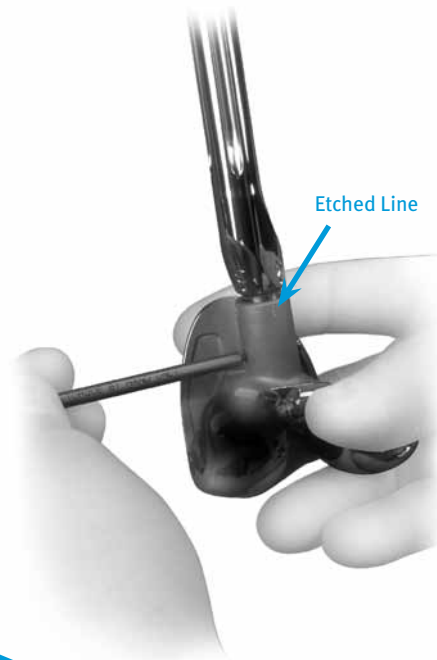


Fig. 96

Instruments



Mallet
00-0155-002-00



Femoral Set
Screw Hex Driver
00-5987-071-00

Attachment of Augments

When using multiple Augments, the order in which they are positioned is important. The Distal Femoral Augments must be positioned first, followed by the Posterior Femoral Augments, and then the Anterior Femoral Augment.

TECHNIQUE TIP

4.D

Posterior-only and Distal-only Augments are not to be used in combination with other Distal or Posterior Augments, as they were not designed to be used together.

The locking mechanism between the Femoral Implant and the Femoral Augment Implant is a single Fixation Screw (except the Anterior Augment which is cemented only). The Fixation Screw is packaged with the Augment.

The Augment Starter Screwdriver can be used to assist in “starting” the Screws through the Augments into the Femoral Component (**Fig. 97**). Final tightening of the Attachment Screw must be done with the 3.5mm Hex-head Screwdriver.



Fig. 97

Instruments



Femoral
Augment Starter
Screwdriver
00-5987-092-03



3.5mm Hex-head
Screwdriver
00-5987-089-00

Augments may also be cemented in place and are precoated for enhanced cement fixation.

- If Augments are to be cemented, apply cement between the Augment and Femoral Component, around the sides of each Augment, and to the rails of the Femoral Component.
- Use the Femoral Augment Holding Clamp Head with the Augment Assembly Clamp to achieve intimate contact between the Augment and the Femoral Component until the cement is cured.
- Implant the Femoral Component and Stem Extension. Cement may be applied to the posterior condyles of the Femoral Component. More cement will usually be required than in the fixation of a Primary Component because of larger voids. Cement is prevented from entering the medullary canal, but is applied around the intercondylar housing and stem base of the Femoral Component.

Full cementation of the Stem Extension is possible, but is usually avoided because of the anticipated difficulty of later cement removal and the enhanced capability of solid press fit with the wide selection of stem lengths, diameters, and offset geometries.

In some patients with poor bone quality, or in low-demand patients where large bone defects are filled with cement, full cement fixation can be used. In these situations, the medullary canal should be prepared attentively, with techniques used in hip arthroplasty such as pulsatile lavage, packaging and pressurization. Narrow diameter, standard length stems should be used for this technique.

Instruments



Augment
Assembly Clamp
00-5977-030-00



Augment Holding
Clamp Head
00-5987-086-00

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