

NexGen® RH Knee Primary/Revision

Surgical Technique



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Introduction

The NexGen Rotating Hinge Knee (RH Knee) is designed for revision, difficult primary, and limb salvage surgeries in patients with significant bone loss and/or ligament deficiencies.

Although most RH Knee surgeries involve revision arthroplasty, this document provides options for all procedure types (Table 1).

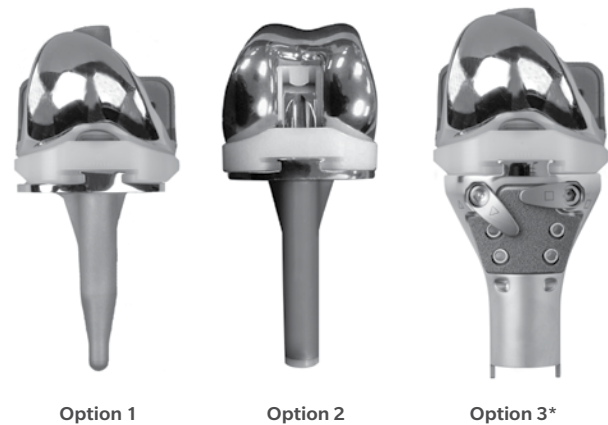
- **Revision:** the RH Knee is implanted using the NexGen Revision Instrumentation System, an intramedullary referencing system with all femoral and tibial cuts based from a reamer or stem extension provisional located within the medullary canal.
- **Difficult Primary:** the RH Knee is implanted using either the NexGen Revision Instrumentation System or the Multi-Reference® 4-in-1 Femoral Instrumentation System.
- **Limb Salvage:** The RH Knee is also available for use in Proximal Tibial Replacements (PTR) in conjunction with the Zimmer® Segmental System Trabecular Metal™ Proximal Tibial Component (Refer to the Segmental System Trabecular Metal Proximal Tibial Component Surgical Technique (97-5850-006-00). The Zimmer Segmental Distal Femur is also compatible with the RH Knee Tibial Components (Refer to the Segmental System Distal Femoral Component Surgical Technique 97-5850-004-00).

For all procedures, the tibial platform is established first because the tibial articular surface affects both the flexion and extension gaps, whereas the femoral component affects either the flexion or extension gap. The Zimmer Revision Knee Arthroplasty Surgical Guidelines booklet 97-5224-003-00 is recommended for a more complete discussion on revision total knee arthroplasty technique.

The RH Knee prosthesis is constrained both mediolaterally and anteroposteriorly, but allows flexion/extension and rotation between the femoral and tibial components. To further accommodate the needs of each patient, the RH Knee system is compatible with a wide variety of NexGen Revision implants and the Zimmer Segmental System (Table 2).

Procedure	Instrumentation	Reference
Revision	NexGen Revision Instrumentation System	Main Body
Difficult Primary	RH Knee Instrumentation	Appendix B
	LCCK 4-in-1 Instrumentation	Appendix C
Limb Salvage (PTR)	RH Knee / LCCK 4-in-1 & Zimmer Segmental System	Appendix D
Servicing the Hinge	RH Knee & Zimmer Segmental System Instrumentation	Appendix G

Table 1 Procedure References



Procedure	Instrumentation	Reference
Tibial Component	RH Knee Modular (Option 1) or non-Modular (Option 2) Tibial Component	Main Body
	Segmental Trabecular Metal Proximal Tibial Component (Option 3)	Appendix D
Articular Surface	RH Knee Articular Surface	Main Body
	Segmental Articular Surface (extended sizing options)	
Hinge Post	RH Knee Modular Hinge Post Extension	Main Body
	Segmental One-piece Hinge Post (Back Table Assembly)	Appendix E
	Segmental One-piece Hinge Post (In vivo Assembly)	Appendix F
Bone loss solutions	NexGen Augments & Cones	Main Body

Table 2 RH Knee Compatibility
(Segmental Distal Femur Compatibility not shown)

* Refer to the Segmental System Trabecular Metal Proximal Tibial Component Surgical Technique (97-5850-006-00)

Revision Arthroplasty Using RH Knee Instrumentation



Figure 1

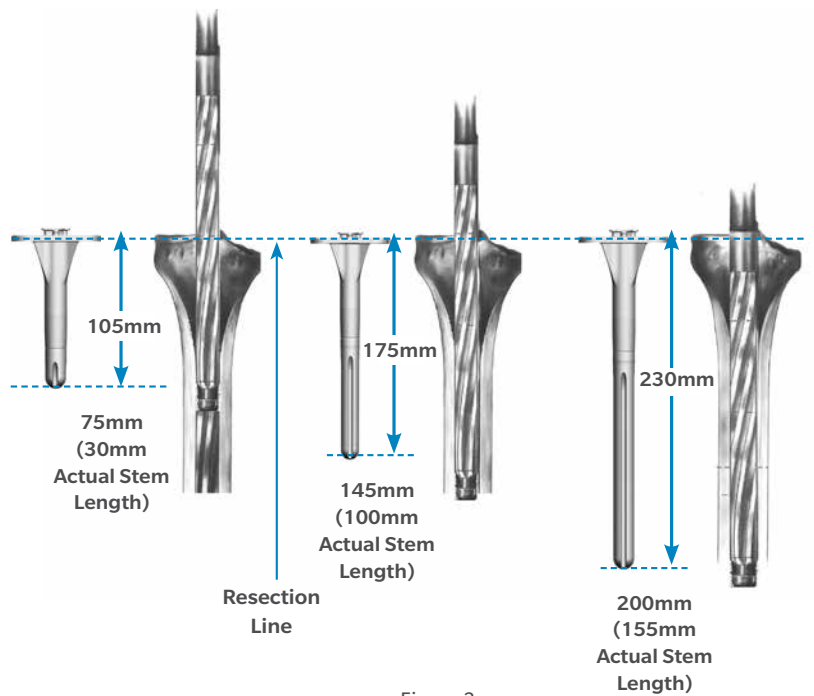


Figure 2

Step 1: Establish Tibial Platform

If necessary, drill a starting hole with the 8mm IM step drill centered mediolaterally over the midpoint of the isthmus of the tibial canal.

Beginning with the 9mm intramedullary reamer, progressively ream the tibial canal.

- Ream until cortical contact is achieved.
- Ream at least 1cm greater than the overall length of the selected components, burying the cutting flutes beneath the bone surface (Figure 1).

Warning: Because there is relatively little bone available in the tibia, perforation or fracture can occur with aggressive reaming.

Technique Tip: Use external tibial landmarks to help ensure that the reamer remains in line with the tibial shaft.

Technique Tip: To help visualize reaming depth, lay the desired tibial provisional assembly next to the reamer and use a pen to mark the depth (Figure 2).

Notes:

- If the center of the tibial diaphysis and the center of the medullary canal do not coincide, an offset stem extension is available.
- Reamer diameters start at 9mm and increase by 1mm increments up to 24mm. The reamers will ream line-to-line, ie, a 9mm reamer reams to a true 9mm diameter.
- When initially reaming the canal, ream based on the center of the canal.
- 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.

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

NexGen Reamer (See Profiler)
00-5125-010-XX



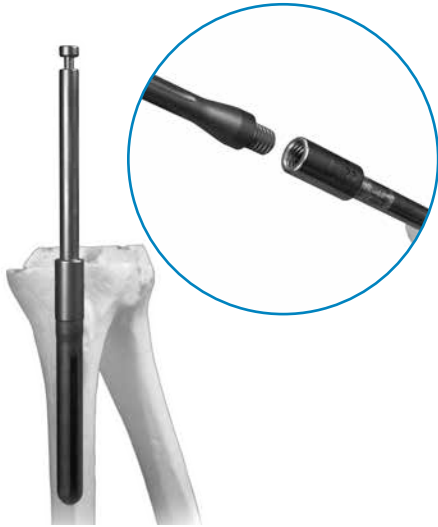


Figure 3



Figure 4



Figure 5

The final reamer or the stem provisional adaptor may be used for subsequent steps.

If all the reamer flutes cannot be buried in the bone, remove the reamer and insert the corresponding size straight stem extension provisional with the stem provisional adapter attached (Figure 3).

If desired, remove the reamer and check alignment by using a Spacer Block with the extramedullary alignment rod (Figure 4).

Attach the 0° revision tibial boom to the reamer shaft (Figure 5) or the stem extension provisional assembly.

ⓘ Technique Tip: The standard cutting slot on any of the tibial cutting guides can be used for a flat cut. For a revision case, minimal bone removal is recommended. The purpose of this cut is to create a flat surface only.

NexGen Reamer
(See Profiler)
00-5125-010-XX



Spacer Block
(See Profiler)
00-5977-019-XX



Alignment Rod with
Coupler
00-5785-080-00



0° Revision
Tibial Boom
00-5125-060-00



Straight Stem Extension
Provisional
(See Profiler)
00-5989-010-XX



Stem Provisional
Adapter
00-5987-016-00





Figure 6



Figure 7

Step 1: Establish Tibial Platform (cont.)





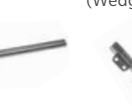



Slide the appropriate tibial cutting guide (wedge or block) onto the tibial boom until it contacts the anterior tibia, and tighten the thumb screw (Figure 6).

Rotate the tibial boom so the cutting guide is oriented to achieve a direct front-to-back cut.

Attach the extramedullary alignment arch to the tibial boom, tighten the thumb screw, and insert the alignment rod with coupler through the arch (Figure 7).

Confirm that the resected surface will be 90° to the tibial mechanical axis by ensuring that the alignment rod follows the anterior tibial crest, points about 7mm-10mm medial to the midpoint between the malleoli, and is in line with the tibialis anterior tendon. If the cut is not 90°, recut.

For a primary case, insert the 10mm tab of the tibial depth resection gauge into the cutting slot and check the depth with the probe at the lowest point on the condyle (Figure 8).

NexGen Reamer (See Profiler) 00-5125-010-XX	Straight Stem Extension Provisional (See Profiler) 00-5989-010-XX	Stem Provisional Adapter 00-5987-016-00	0° Revision Tibial Boom 00-5125-060-00	Tibial Cutting Guide (See Profiler) 00-5987-015-00 (Wedge)	Extramedullary Alignment Arch 00-5125-081-00	Alignment Rod with Coupler 00-5785-080-00	Tibial Depth Resection Gauge 00-5987-040-00
							

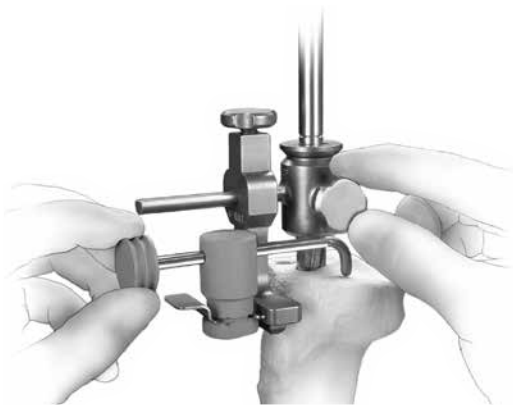


Figure 8



Figure 9

Step 1: Establish Tibial Platform (cont.)

For a revision case, insert the 2mm tab of the tibial depth resection gauge into the cutting slot and check the depth with the probe as far back as possible on the defective condyle.

ⓘ Technique Tip: The thinnest available RH Knee Articular Surface is 12mm. For a primary case, the tibial depth resection gauge will allow only a 10mm resection. Therefore, lower the tibial cutting guide an additional 2mm to remove the additional bone necessary to accommodate the thinnest articular surface.

Tighten the thumb screw on the tibial boom.

Securely pin the tibial cutting guide to the tibia with two headless holding pins or hex-head screws.

Use a 0.050 in. (1.27mm) oscillating saw blade to make the medial and lateral tibial cuts through the slots (Figure 9).

Remove the reamer or provisional assembly, and the tibial boom, leaving the tibial cutting guide in place.

Finish the cut and remove the cutting guide.

ⓘ Note: Using the hex-head screws to secure the cutting guide to the bone will improve the stability of the guide.

<p>NexGen Reamer (See Profiler) 00-5125-010-XX</p> 	<p>Straight Stem Extension Provisional (See Profiler) 00-5989-010-XX</p> 	<p>Stem Provisional Adapter 00-5987-016-00</p> 	<p>0° Revision Tibial Boom 00-5125-060-00</p> 	<p>Tibial Cutting Guide (See Profiler) 00-5987-015-00 (Wedge)</p> 	<p>Extramedullary Alignment Arch 00-5125-081-00</p> 	<p>Alignment Rod with Coupler 00-5785-080-00</p> 	<p>Tibial Depth Resection Gauge 00-5987-040-00</p> 
<p>Headless Holding Pins 00-5222-039-00, 48mm 00-5997-084-00, 75mm</p> 	<p>Hex-headed Screws 00-5983-040-27, 27mm 00-5983-040-33, 33mm 00-5983-040-48, 48mm</p> 	<p>MIS Screw Inserter/Extractor 00-5983-049-00</p> 					

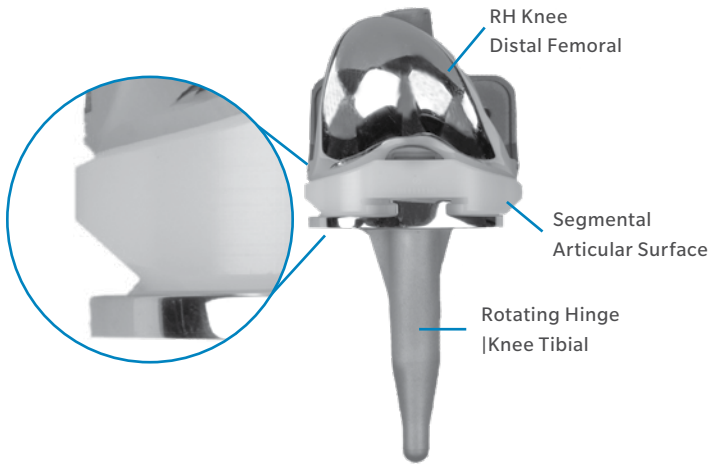


Figure 10



Figure 11

Step 2: Finish Tibia

2.1 Insert Tibial Sizing Plate

Select the tibial sizing plate and compare the size designation on the plate to that of the preoperatively estimated femoral size to ensure that the components will be kinematically matched (Table 3).

If there is no match, adjust the size of the femoral provisional or the sizing plate to yield a match.

ⓘ Technique Tip: To enhance sizing options, consider using a Segmental Tibial Articular Surface in place of the RH Knee Tibial Articular Surface (See Appendix D). The tapered edges on the Segmental Articular Surface allow more sizing options (Figure 10) (Table 4).

Reinsert the last intramedullary reamer or the stem extension provisional assembly. Attach the sizing plate handle to the sizing plate (Figure 11). Place the sizing plate over the reamer shaft or stem provisional adapter and assess rotation and subsequent coverage.

NexGen RH Knee Size Chart

		Femoral Size				
		B	C	D	E	F
RH Knee Tibial Size	1	B				
	2	B	C			
	3	B	C	D		
	4	B	C	D	E	
	5	B	C	D	E	F
	6	B	C	D	E	F
		Articulating Surface Size				

Table 3

NexGen RH Knee Compatibility with Segmental Articular Surface (using RH Knee Tibial Component)

		RH Knee Femoral Size				
		B	C	D	E	F
RH Knee Tibial Size	1	B/123456	C/123456	D/123456		
	2	B/123456	C/123456	D/123456	E/23456	
	3	B/123456	C/123456	D/123456	E/23456	F/3456
	4	B/123456	C/123456	D/123456	E/23456	F/3456
	5	B/123456	C/123456	D/123456	E/23456	F/3456
	6	B/123456	C/123456	D/123456	E/23456	F/3456

Table 4

RH Knee Tibial Sizing Plate
(See Profiler)
00-5881-04X-00





Figure 12



Figure 13

Step 2: Finish Tibia (cont.)

2.1 Insert Tibial Sizing Plate (cont.)

Once the final sizing plate position is determined, slide the straight bushing over the reamer shaft or adapter until it seats into the circular step of the sizing plate (Figure 12).

If the straight bushing allows for optimal sizing plate positioning, pin the plate with two short-head holding pins, remove the intramedullary assembly, and proceed to “2.4 Drill Stem Base.”

If sizing plate positioning is satisfactory, but tibial augmentation is necessary, proceed to “2.3 Prepare for Tibial Augmentation.”

If sizing plate positioning is not optimal, proceed to “2.2 Prepare for Offset Stem.”

2.2 Prepare for Offset Stem

A straight stem extension is typically used with a RH Knee Tibial Component. An offset stem extension can be used only if the diameter of the medullary canal is sufficient to allow for the offset.

Remove the straight bushing and slide the offset bushing over the reamer or adapter until it seats into the circular step of the sizing plate.

Rotate the bushing within the sizing plate until optimal coverage is achieved.

Note the position of the etch marks on the bushing relative to the etch mark on the center of the anterior portion of the sizing plate (Figure 13).

Pin the sizing plate with two short-head holding pins.

⚠ Warning: Do not use pins on the side of the tibia requiring augmentation.

If augmentation is required proceed to “2.3 Prepare for Tibial Augmentation.”

If augmentation is not required, remove the bushing and the reamer or provisional assembly, leaving only the sizing plate, and proceed to “2.4 Drill Stem Base.”

ⓘ Note: If the diameter of the reamer or stem extension provisional exceeds 19mm, the sizing plate must be removed first.

NexGen Reamer (See Profiler) 00-5125-010-XX	Straight Stem Extension Provisional (See Profiler) 00-5989-010-XX	Stem Provisional Adapter 00-5987-016-00	RH Knee Tibial Sizing Plate (See Profiler) 00-588* 14X-00	Sizing Plate Handle 00-5977-096-00	Straight Bushing 00-5987-003	Short-headed Holding Pin 00-5977-056-01	Offset Bushing 00-5987-004-00
							



Figure 14



Figure 15

Step 2: Finish Tibia (cont.)

2.3 Prepare for Tibial Augmentation

Slide the 0° revision tibial boom over the reamer or adapter and bushing. Then tighten the thumb screw (Figure 14).

Slide the appropriate tibial cutting guide (wedge or block) onto the boom, and tighten the thumb screw on the guide (Figure 15).

Secure the cutting guide to the bone with two headless holding pins or two hex-head screws.

Use a 0.050 in. (1.27mm) oscillating saw blade to begin the augmentation cut.

Remove the reamer or stem extension provisional assembly, boom, bushing, and sizing plate.

Finish the cut and remove the tibial cutting guide.

Attach the tibial augment provisionals to the sizing plate and pin the plate to the bone with two short-head holding pins referencing the NexGen Tibial Augment Interchangeability chart (Table 5).

NexGen RH Knee Tibial Augment Interchangeability Chart

Size	Tibial Plate (mm)	RH Knee Full Augment	NexGen Partial Augment
1	56 x 41	Size 1	Size 1
2	62 x 41	Size 2	Size 2
3	67 x 46	Size 3	Size 4
4	70 x 46	Size 4	Size 4
5	74 x 50	Size 5	Size 6
6	77 x 50	Size 6	Size 6

Table 5

RH Knee Dimensions. Size Based on Transepicondylar Width

Notes:

- NexGen Partial Tibial Augments and RH Knee Full Block Augments are used with the RH Knee.
- A 7° full wedge augment from the NexGen Knee System cannot be used with the RH Knee.
- The RH Knee uses different 10mm full block augments from those used with other NexGen Knees.
- The sizing plate must be removed before the reamer or stem extension provisional assembly if their diameter exceeds 19mm.

Note: Augment options can be found within Appendix I-Augment Compatibility











<p>NexGen Reamer (See Profiler) 00-5125-010-XX</p> 	<p>Straight Stem Extension Provisional (See Profiler) 00-5989-010-XX</p> 	<p>Stem Provisional Adapter 00-5987-016-00</p> 	<p>0° Revision Tibial Boom 00-5881-086-00</p> 	<p>RH Knee Tibial Sizing Plate (See Profiler) 00-5881-04X-00</p> 	<p>Straight Bushing 00-5987-003</p> 	<p>Headless Holding Pins 00-5222-039-00, 48mm 00-5997-084-00, 75mm</p> 
<p>Hex-headed Screws 00-5983-040-27, 27mm 00-5983-040-33, 33mm 00-5983-040-48, 48mm</p> 	<p>MIS Screw Inserter/Extractor 00-5983-049-00</p> 	<p>Short-headed Holding Pin 00-5977-056-01</p> 	<p>Offset Bushing 00-5987-004-00</p> 	<p>Tibial Cutting Guide (See Profiler) 00-5987-015-00 (Wedge)</p> 	<p>Tibial Augment Provisional (See Profiler) 00-5989-003-20 (wedge)</p> 	



Figure 16



Figure 17a



Figure 17b

Step 2: Finish Tibia (cont.)

2.4 Drill Stem Base

Place the RH Knee Tibial Stem Base Drill onto the sizing plate (Figure 16).

If using a nonmodular tibial base plate (sizes 1, 2, and 3 only), use the corresponding RH Knee Nonmodular Tapered Tibial Drill in place of the stem base drill (Figure 17a).

Use the RH Knee Tibial Stem Base Drill to drill until the engraved line labeled “RH Knee” on the drill is in line with the top of the bushing (Figure 17b).

RH Knee Tibial Sizing Plate (See Profiler) 00-5881-04X-00



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



Tibial Augment Provisional (See Profiler) 00-5989-003-20 (wedge)



Straight Bushing 00-5987-003



Offset Bushing 00-5987-004-00



RH Knee Nonmodular Tapered Tibial Drill 00-5881-081-01



RH Knee Tibial Stem Base Drill 00-5881-081-00



Tibial Stem Base Drill Bushing 00-5881-082-00



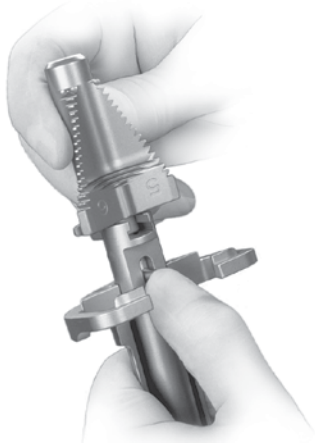


Figure 18



Figure 19



Figure 20

Step 2: Finish Tibia (cont.)

2.4 Drill Stem Base (cont.)

Attach the appropriate size tibial broach to the RH Knee 0° Broach Impactor (Figure 18).

Impact the broach to the depth mark on the impactor. The broach has a built in stop to prevent over impaction (Figure 19).

Use the tibial provisional extractor and sizing plate extractor to remove the broach impactor assembly and sizing plate (Figure 20).

Note: Use the arrows on the broach and broach impactor to guide alignment .

RH Knee Tibial Sizing Plate (See Profiler)
00-5881-04X-00



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



Tibial Broach (See Profiler)
00-5977-013-0X



RH Knee 0° Broach Impactor
00-5881-080-00



Tibial Provisional Extractor
00-5881-085-00



Sizing Plate Extractor
00-5881-087-00





Figure 21

Step 2: Finish Tibia (cont.)

2.5 Insert Trial Tibia Prosthesis

Assemble the appropriate tibial provisional, stem extension provisional, and tibial augment provisional.

If final reaming has not been completed, return to “Step 1: Establish Tibial Platform.”

In the rare case an offset stem is used, align the appropriate mark on the offset stem extension provisional with the center of the anterior portion of the tibial component.

ⓘ **Technique Tip:** If using an offset stem extension provisional, do not fully tighten the provisional. This will allow the tibial provisional to rotate to an optimal position. See Step 9 on page 22 for offset stem extension provisional assembly.

Insert the final provisional assembly into the tibia, and impact it with the tibial provisional impactor (Figure 21).

ⓘ **Technique Tip:** If using an offset stem extension, note the alignment mark on the stem extension provisional when removing the tibial provisional assembly. The mark on the offset stem extension Provisional should correspond to the mark noted earlier on the offset bushing (this mark aligns to the center of the anterior aspect of the tibial component).

ⓘ **Technique Tip:** Leave the tibial provisional assembly in place for the remainder of the procedure to protect the resected tibial surface.

RH Knee Tibial
Provisional (See Profiler)
00-5881-00X-00



Straight Stem Extension
Provisional (See Profiler)
00-5989-010-XX



Tibial Augment Provisional
(See Profiler)
00-5989-003-20 (wedge)



Offset Stem Extension
Provisional (See Profiler)
00-5987-020-XX



Tibial Provisional
Impactor
00-5881-084-00



Mallet
00-0155-002-00





Figure 22



Figure 23

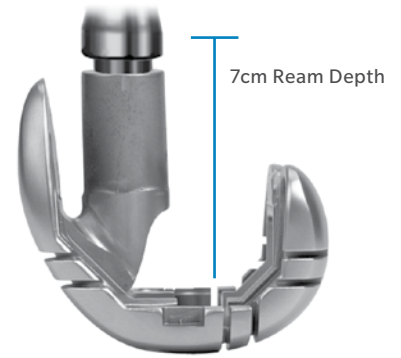


Figure 24

Step 3: Prepare Femoral Canal

Use the 8mm IM step drill to drill a starting hole in the center of the patellar sulcus (Figure 22).

Beginning with the 9mm intramedullary reamer, progressively ream the femoral canal until cortical contact is made at the desired depth and reamer diameter (Figure 23).

Note the diameter of the last reamer used.

Ream at least 1cm deeper than the overall length of the selected components.

ⓘ Technique Tip: To help visualize the reaming depth, lay the desired Femoral Provisional assembly next to the reamer and mark the reaming depth on the reamer.

If the last reamer used is less than 18mm, ream the first 7cm of the canal from the jointline to a diameter of 18mm to accommodate the stem base of the RH Knee Femoral Component and the stem extension shoulder (Figure 24).

ⓘ Note: Reamer diameters start at 9mm and increase by 1mm increments up to 24mm. The reamers will ream line-to-line, ie, a 9mm reamer reams to a true 9mm diameter.

RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00



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



NexGen Reamer
(See Profiler)
00-5125-010-XX



RH Knee Femoral
Provisional/Cutting Guide
(See Profiler)
00-5881-013-01



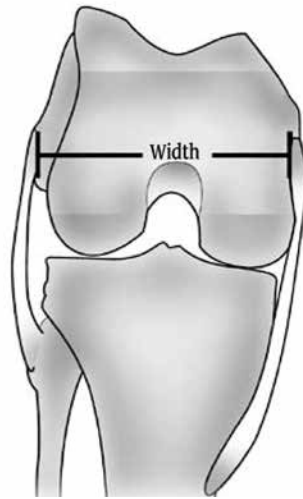


Figure 25

Step 4: Determine Femoral Size

Use one of the following methods to determine the femoral size.

Previous Prosthesis Method

Measure the size of the previous prosthesis.

ⓘ Caution: When using the previous prosthesis to determine size, note that the failure of the primary arthroplasty may have been caused by the component being oversized or undersized.

ⓘ Technique Tip: To help with the final sizing decision, evaluate the preoperative radiograph of the contralateral knee.

RH Knee Dimensions. Size Based on Transepicondylar Width

Size	M/L	A/P	Distal Thickness
B	58	50	9
C	64	54.5	10.5
D	68	58	10.5
E	72	62	10.5
F	76	66	10.5

Table 6

Epicondylar Width Method

Measure the width of the epicondyles and use the table to help determine the maximum possible size (Table 6).

ⓘ Note: By measuring the epicondyles, the maximum size will be determined.

The recommended method for establishing femoral component rotation is to use the epicondyles, the attachment points for the collateral ligaments (Figure 25).¹

Identifying the epicondylar axis may require additional soft tissue dissection.

The center of the medial epicondyle is located in the sulcus between the proximal and distal origins of the deep MCL.

The lateral epicondyle is the most prominent lateral point on the distal femur.

The posterior femoral condyles should be parallel to the transepicondylar axis.



Figure 26

Step 5: Confirm Femoral Position & Establish Rotation

Inappropriate femoral component rotation may create a flexion imbalance and/or compromise patellofemoral kinematics.^{1,2} Therefore, it is important to pay particular attention to femoral rotation. It is especially important to avoid inappropriate internal rotation.²

5.1 Insert Femoral Provisional/Cutting Guide

It is required that a Stem Extension always be used with the RH Knee Femoral.

Insert the appropriate straight stem extension Provisional into the appropriate (size/left/right) RH Knee Femoral Provisional/Cutting Guide (Figure 26).

Flex the knee and insert the provisional assembly onto the distal femur, seating it against the existing bone.

If the provisional assembly cannot be inserted, proceed to Appendix C and revise the femoral bone cuts via the NexGen LCKK 4-in-1 Instrumentation.

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.

⊖ Technique Tip: If the straight stem extension Provisional does not allow adequate coverage use an offset stem extension provisional. If using an offset stem extension, note the alignment mark on the stem extension provisional when removing the offset stem extension provisional assembly. The mark on the offset stem extension provisional should correspond to the mark noted earlier on the offset bushing.

If the provisional assembly seats properly and provides appropriate coverage, proceed to “5.2 Establish Femoral Rotation.”

RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00

Tibial Augment Provisional
(See Profiler)
00-5989-003-20 (wedge)

Straight Stem Extension
Provisional (See Profiler)
00-5989-010-XX

Offset Stem Extension
Provisional(See Profiler)
00-5987-020-XX

RH Knee Femoral
Provisional/Cutting Guide
(See Profiler)
00-5881-013-01





Figure 27

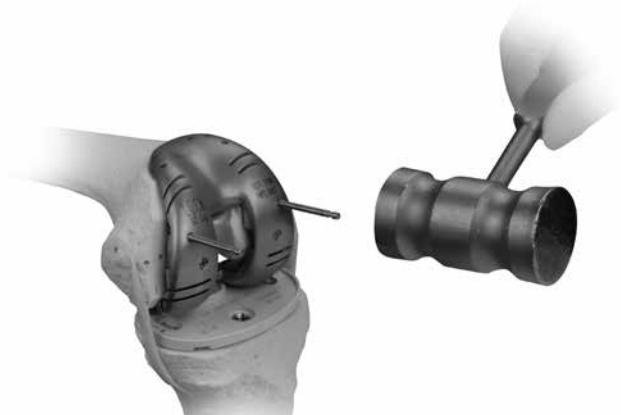


Figure 28

Step 5: Confirm Femoral Position & Establish Rotation (cont.)

5.2 Establish Femoral Rotation

Insert the tabs of the revision rotational alignment guide into the posterior augment resection slots of the femoral provisional/cutting guide (Figure 27).

If the handles of the alignment guide line up with the transepicondylar axis, insert the headless holding pins to set femoral rotation (Figure 28).

If the rotation is incorrect, proceed to Appendix C and revise the femoral bone cuts via the NexGen LCCK 4-in-1 Instrumentation.

Note: The headless holding pins can be used later to position the LCCK 4-in-1 or RH Knee Femoral Cutting Block.

RH Knee Tibial Provisional (See Profiler)
00-5881-00X-00



Tibial Augment Provisional (See Profiler)
00-5989-003-20 (wedge)



Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX



Offset Stem Extension Provisional (See Profiler)
00-5987-020-XX



RH Knee Femoral Provisional/Cutting Guide (See Profiler)
00-5881-013-01



Revision Rotational Alignment Guide
00-5987-051-01



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



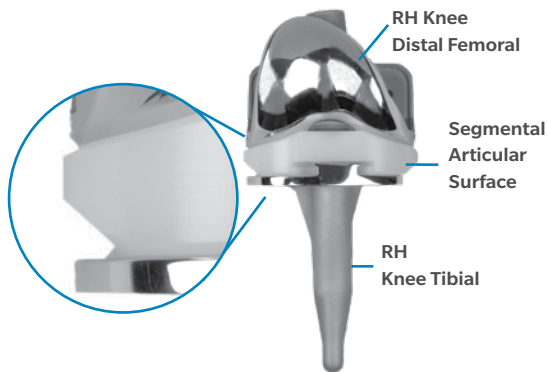


Figure 29



Figure 30

NexGen RH Knee Compatibility with Segmental Articular Surface (using RH Knee Tibial Component)

		RH Knee Femoral Size				
		B	C	D	E	F
RH Knee Tibial Size	1	B/123456	C/123456	D/123456		
	2	B/123456	C/123456	D/123456	E/23456	
	3	B/123456	C/123456	D/123456	E/23456	F/3456
	4	B/123456	C/123456	D/123456	E/23456	F/3456
	5	B/123456	C/123456	D/123456	E/23456	F/3456
	6	B/123456	C/123456	D/123456	E/23456	F/3456

Table 8

Step 6: Establish Flexion Gap & Stability

Insert the thinnest articular surface provisional that matches the femoral provisional size and is compatible with the tibial plate size (Tables 7 and 8).

Technique Tip: To enhance sizing options, consider using a Segmental Tibial Articular Surface in place of the RH Knee Tibial Articular Surface (see Appendix D). The tapered edges on the Segmental Articular Surface (Figure 29) allow more sizing options and may be used either with the Segmental One-piece Hinge Post or the RH Knee Modular Hinge Post (Table 7).

NexGen RH Knee Size Chart

		Femoral Size				
		B	C	D	E	F
Tibial Base Plate	1	B				
	2	B	C			
	3	B	C	D		
	4	B	C	D	E	
	5	B	C	D	E	F
	6	B	C	D	E	F

Table 7

If the thinnest articular surface provisional cannot be inserted, consider the following:

- Downsize the femoral component (each size is 4mm different in the A/P dimension).
- Lower the tibial plateau/joint line and repeat Step 2, "Finish Tibia."

Evaluate the stability in flexion (Figure 30).

If the thinnest articular surface provisional does not provide adequate tension, insert progressively thicker provisionals until adequate stability is obtained.

If the thickest articular surface provisional does not provide adequate tension, consider the following:

- Augment the tibial provisional with a 5mm or 10mm half block augment on both the medial and lateral sides or with a 10mm full block augment.
- Select the next larger femoral provisional/cutting guide.

RH Knee Tibial Provisional (See Profiler)
00-5881-00X-00



Tibial Augment Provisional (See Profiler)
00-5989-003-20 (wedge)



Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX



Offset Stem Extension Provisional (See Profiler)
00-5987-020-XX



RH Knee Femoral Provisional/Cutting Guide (See Profiler)
00-5881-013-01



RH Knee Articular Surface Provisional (See Profiler)
00-5881-0XX-XX



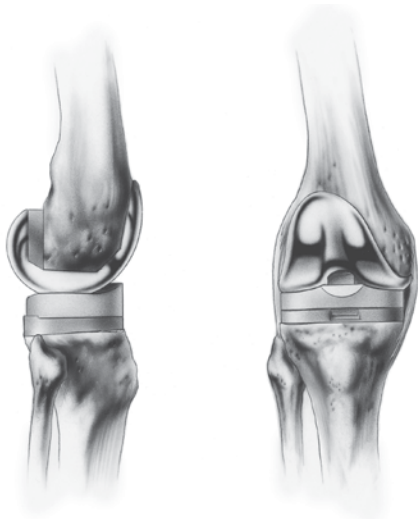


Figure 31



Figure 32

Step 7: Establish Extension Gap & Stability

7.1 Evaluate Extension Gap

With the final articular surface provisional in place, fully extend the knee and check for a symmetrical extension gap.

Ensure that the leg has the desired valgus alignment with adequate varus-valgus stability (Figure 31).

ⓘ Technique Tip: Use the distal and posterior augment provisionals as spacers to create added stability in flexion and extension (Figure 32).

If hyperextension exists, move the femoral provisional more distally and evaluate the resulting space between the femoral provisional and the distal femur.

If the gap exceeds 20mm, which is the maximum augment size available, evaluate the next smaller femoral component size, which will allow the use of a thicker articular surface. Then repeat Steps 4, 5, and 6.

If full extension is not possible, consider the following options:

- Move the femoral provisional more proximally.
- Use a thinner articular surface provisional.
- Perform a posterior capsule release.

ⓘ Note: NexGen Anterior Augments are not compatible with the RH Knee Femoral Component.

ⓘ Note: Augment options can be found within Appendix I-Augment Compatibility.

RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00



Tibial Augment Provisional (See Profiler)
00-5989-003-20 (wedge)



Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX



Offset Stem Extension Provisional (See Profiler)
00-5987-020-XX



RH Knee Femoral Provisional/
Cutting Guide (See Profiler)
00-5881-013-01



RH Knee Articular Surface Provisional
(See Profiler)
00-5881-0XX-XX



Distal Femoral Augment Provisional (See Profiler)
00-5987-0XX-XX



Posterior Femoral Augment Provisional
(See Profiler)
00-5987-0XX-XX



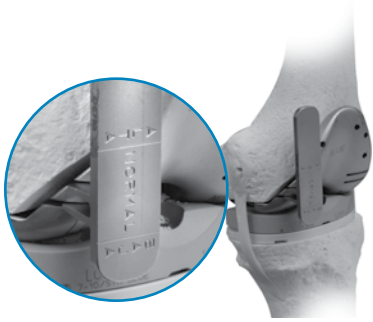


Figure 33

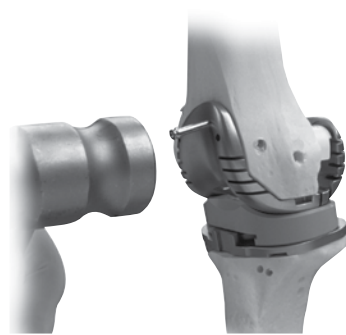


Figure 34

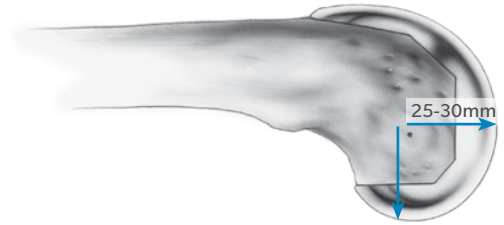


Figure 35

Step 7: Establish Extension Gap & Stability (cont.)

7.2 Balance Soft Tissues

Unless large deformities are due exclusively to bone loss and component subsidence, 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.

7.3 Reestablish Joint Line

If desired, assess the position of the patella by inserting the tabs of the patella joint line gauge into the two distal slots on the anterior flange of the femoral provisional/cutting guide, and ensure that the inferior pole of the Patellar Provisional or unresurfaced patella falls between the two “Normal” marks on the gauge (Figure 33).

When both the flexion and extension gaps are balanced, and the limb alignment and joint line are accurate, pin the femoral provisional/cutting guide anteriorly using the short-head holding pins (Figure 34).

Perform a trial range of motion and confirm that the soft tissue tension, balance, and joint line are appropriate.

Note: 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 (Figure 35). This is very similar to the average distance to the posterior joint line, and this distance can also be used to check femoral component size.

Refer to Appendix A for Troubleshooting Flexion/Extension Gaps.

RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00



Tibial Augment Provisional
(See Profiler)
00-5989-003-20 (wedge)



Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX



Offset Stem Extension Provisional (See Profiler)
00-5987-020-XX



RH Knee Femoral Provisional/Cutting Guide (See Profiler)
00-5881-013-01



RH Knee Articular Surface Provisional (See Profiler)
00-5881-0XX-XX



Distal Femoral Augment Provisional (See Profiler)
00-5987-0XX-XX



Posterior Femoral Augment Provisional (See Profiler)
00-5987-0XX-XX



Patella Joint Line Gauge
00-5987-099-00



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



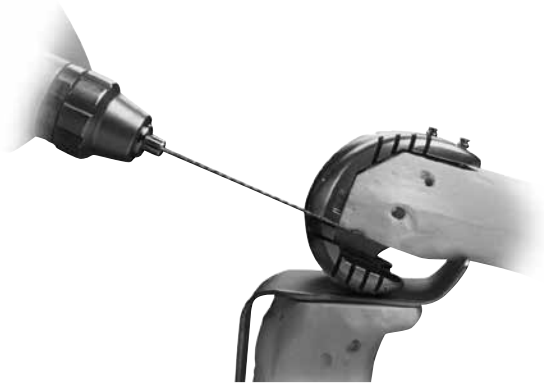


Figure 36



Figure 37

Step 8: Make Femoral Augment Cuts

Remove any augment provisionals from the femoral provisional/cutting guide.

ⓘ Technique Tip: When removing the femoral augment provisionals from any instrument, use the 3.5mm hexhead screwdriver to push the peg of the augment from the opposite side.

Insert a retractor to protect the posterior capsule, and tibial bone or provisional.

Use a 0.050 in. (1.27mm) reciprocating saw blade to make any necessary posterior or distal augment cuts through the cutting slots in the femoral provisional/cutting guide (Figs. 36 and 37). Then remove the retractor.

ⓘ Technique Tip: Begin the cuts with the cutting guide in place, then remove the guide to complete the cuts.

RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00



Tibial Augment Provisional
(See Profiler)
00-5989-003-20 (wedge)



Straight Stem Extension
Provisional (See Profiler)
00-5989-010-XX



Offset Stem Extension
Provisional (See Profiler)
00-5987-020-XX



RH Knee Femoral Provisional/
Cutting Guide (See Profiler)
00-5881-013-01



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





Figure 38

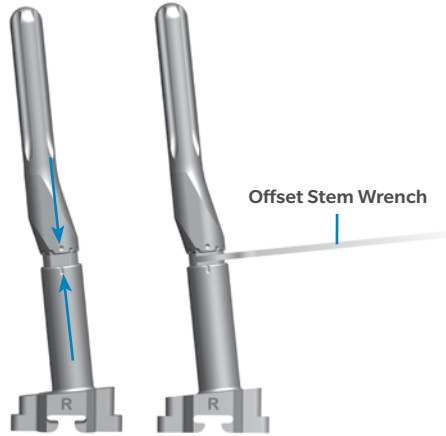


Figure 39

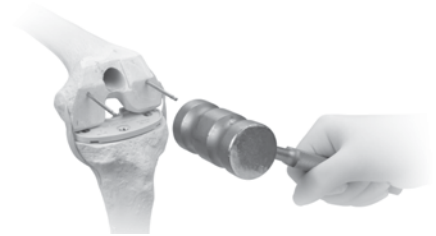


Figure 40

Step 9: Prepare for RH Knee Box

9.1 Attach Notch/Chamfer Guide

Remove the femoral provisional assembly from the bone.

Remove the stem extension provisional from the femoral provisional/cutting guide, noting the offset setting if using an offset stem. The setting is read at the posterior mark on the femoral stem base.

For a straight stem extension, thread the straight stem extension provisional into the stem extension bushing (Figure 38).

For an offset stem extension:

- Fully thread the offset stem locknut onto the offset stem extension provisional.
- Thread the offset stem extension provisional onto the stem extension bushing.
- Rotate the offset stem extension provisional so the appropriate number is lined up to the position noted earlier (Figure 39).
- Back thread the locknut against the stem extension bushing and use the offset stem wrench to tighten the locknut against the stem extension bushing.
- Reinsert the headless holding pins (Figure 40).

🔑 **Technique Tip:** One headless pin will also provide sufficient rotational alignment along with the central stem base and stem extension provisional.

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



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



Stem Extension Bushing
00-5987-070-00
00-5987-070-01(Size B)



Offset Stem locknut
00-5987-080-00



Offset Stem Wrench
00-5987-079-00



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



Mallet
00-0155-002-00





Figure 41



Figure 43



Figure 42



Figure 44

Step 9: Prepare for RH Knee Box (cont.)

If distal femoral augment provisionals were used on the femoral provisional/cutting guide, remove and attach to the RH Knee Notch/Chamfer Guide (Figure 41).

ⓘ Technique Tip: 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 (Figure 42).

Insert the stem/bushing assembly into the RH Knee Notch/Chamfer Guide (Figure 43), ensuring that the proper “R” or “L” (right or left) designation is showing anteriorly.

Insert the entire assembly into the femoral canal over the headless pins (Figure 44).

ⓘ Technique Tip: Be sure that the headless holding pins protrude beyond the face of the guide so they can be grasped with a pin puller for extraction.

ⓘ Technique Tip: The A/P position of the RH Knee Notch/Chamfer Guide 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.

ⓘ Note:

- Ensure that the augment provisionals correspond to the augment cuts that were made in the previous step.
- The 15mm and 20mm distal femoral augment provisionals will block access through the screw fixation holes in the RH Knee Notch/Chamfer Guide; use other available pin holes.
- The size B Notch/Chamfer Guide has two sets of pin holes on the distal tabs to help secure the Guide when used with small femurs.

<p>RH Knee Notch/Chamfer Guide (See Profiler) 00-5881-01X-10</p> 	<p>3.5mm Hex Head Screwdriver 00-5987-089-00</p> 	<p>Straight Stem Extension Provisional (See Profiler) 00-5989-010-XX</p> 	<p>Offset Stem Extension Provisional (See Profiler) 00-5987-020-XX</p> 	<p>Stem Extension Bushing 00-5987-070-00 00-5987-070-01(Size B)</p> 
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<p>Offset Stem locknut 00-5987-080-00</p> 	<p>Headless Holding Pins 00-5222-039-00, 48mm 00-5997-084-00, 75mm</p> 	<p>Distal Femoral Augment Provisional (See Profiler) 00-5987-0XX-XX</p> 
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Figure 45

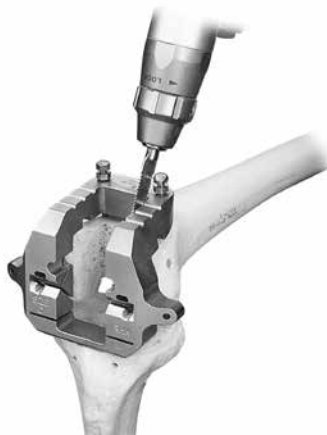


Figure 46



Figure 47

Step 9: Prepare for RH Knee Box (cont.)

Insert hex-head holding pins through the anterior or distal tab holes in the guide (Figure 45)

If necessary, use two hex-headed screws on the medial/lateral sides of the distal surface to secure the block to the bone.

Use the slaphammer extractor to pull the stem extension bushing/provisional assembly out of the guide and remove the headless holding pins

ⓘ Technique Tip: If a straight stem extension provisional larger than 22mm in diameter or an offset stem extension provisional larger than 17mm in diameter is used, remove the notch guide before pulling out the bushing and stem provisional.

9.2 Make the RH Knee Box Cut

Use a reciprocating or narrow oscillating saw blade to cut the sides and base for the RH Knee box (Figure 46).

Use an oscillating saw to cut the anterior and posterior chamfers, if necessary (Figure 47).

ⓘ Caution: For sizes B, C, and D, if snap-in distal femoral augments have been used, care must be taken to avoid the peg if it enters the slot with the saw blade.

Remove the holding pins and the notch/chamfer guide.












<p>RH Knee Notch/ Chamfer Guide (See Profiler) 00-5881-01X-10</p> 	<p>3.5mm Hex Head Screwdriver 00-5987-089-00</p> 	<p>Straight Stem Extension Provisional (See Profiler) 00-5989-010-XX</p> 	<p>Offset Stem Extension Provisional (See Profiler) 00-5987-020-XX</p> 	<p>Stem Extension Bushing 00-5987-070-00 00-5987-070-01(Size B)</p> 	<p>Offset Stem locknut 00-5987-080-00</p> 	<p>Headless Holding Pins 00-5222-039-00, 48mm 00-5997-084-00, 75mm</p> 
<p>MIS Screw Inserter/ Extractor 00-5983-049-00</p> 	<p>Slaphammer Extractor 00-5785-097-00</p> 	<p>Hex-head Holding Pins 00-5061-063-00</p> 	<p>Hex-headed Screws 00-5983-040-27, 27mm 00-5983-040-33, 33mm 00-5983-040-48, 48mm</p> 			



Figure 45



Figure 46



Figure 47

Step 10: Prepare Patella

The RH Knee is designed to be used with NexGen Patellar Components. The NexGen Patellar Component requires a minimum of 11mm of remaining bone to allow for the implant pegs (Figure 48). Sizes 32-41 may be used with either the onlay or inset technique. Smaller diameter patella components must not be used unless using the inset technique. The RH Knee Femoral Component has a wider intercondylar width, so inseting is required on smaller patellar sizes to provide adequate patellar support.

Prepare the patella peg holes by centering the appropriate patella drill guide over the patella, rotating the guide if necessary to find the best location for fixation.

Holding the guide firmly in place, drill the three peg holes using the patella/femoral drill bit.

If inadequate bone remains, trim the surface and either leave the inadequate bone or consider use of an augmentation patella (Figure 49).

To compensate for gross bone deficiency, the NexGen Augmentation Patella is available (Figure 50). The augmentation patella provides the additional option of suturing the patella base to the bone remnant or extensor mechanism to provide adjunctive fixation. Refer to the NexGen Augmentation Patella Surgical Technique (97-5988-102-00) for additional information.

Patella Drill Guide
(See Profiler)
00-5979-001-26



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





Figure 51



Figure 52



Figure 53

Step 11: Perform Trial Reduction

11.1 Assemble & Insert Provisional Components

Slide the modular box provisional onto the RH Knee Femoral Provisional/Cutting Guide (Figure 51) and snap the clip on the box securing it to the femoral provisional/guide.

Snap the posterior augment provisionals, then the distal augment provisionals onto the femoral provisional/cutting guide.

Attach the stem extension provisional to the provisional/guide (Figure 52). If an offset stem will be used, insert the offset stem extension provisional and set it to the orientation noted previously.

Insert the femoral provisional assembly onto the bone to check the fit. Attach the tibial augment provisional and stem extension provisional onto the RH Knee Tibial Provisional.

Insert the tibial provisional assembly onto the tibia if not already present.

Insert the articular surface provisional, ensuring that the size is compatible with the tibial provisional (Figure 53).

11.2 Confirm Flexion/Extension Balance & Stability

Check the stability of the joint in both flexion and extension. If there is any instability or imbalance between flexion and extension, return to Step 6 “Establish Flexion Gap & Stability” or Step 7 “Establish Extension Gap & Stability.”

Note: For additional information about balancing flexion and extension gaps, see Appendix A.

The RH Knee is not compatible with NexGen Anterior Augments.

11.3 Insert Hinge Post Extension Provisional

Flex the knee to approximately 90° and ensure that the tibia is free to move medially and laterally so it can be centered under the femur.

Insert the femoral hinge post extension provisional through the hinge post on the femoral provisional, through the tibial articular surface provisional, and then into the tibial provisional.

If the hinge post will not line up with the hole in the tibial provisional, reposition the tibia under the femur. Use the 4.5mm hex head screwdriver to tighten the hinge post provisional by hand (Figs. 54 and 55).

<p>RH Knee Modular Box Provisional (See Profiler) 00-5881-01X-00</p> 	<p>RH Knee Femoral Provisional/Cutting Guide(See Profiler) 00-5881-013-01</p> 	<p>Posterior Femoral Augment Provisional (See Profiler) 00-5987-0XX-XX</p> 	<p>Distal Femoral Augment Provisional (See Profiler) 00-5987-0XX-XX</p> 	<p>Straight Stem Extension Provisional (See Profiler) 00-5989-010-XX</p> 	<p>Offset Stem Extension Provisional (See Profiler) 00-5987-020-XX</p> 
<p>Tibial Augment Provisional (See Profiler) 00-5989-003-20 (wedge)</p> 	<p>RH Knee Tibial Provisional (See Profiler) 00-5881-00X-00</p> 	<p>RH Knee Articular Surface Provisional (See Profiler) 00-5881-0XX-XX</p> 	<p>3.5mm Hex Head Screwdriver 00-5987-089-00</p> 	<p>Offset Stem locknut 00-5987-080-00</p> 	<p>Femoral Hinge Post Extension Provisional 00-5881-011-00</p> 



Figure 54



Figure 55

Step 11: Perform Trial Reduction (cont.)

Note:

- The RH Knee is a linked design that will force the tibia to be in alignment directly under the femur (on the mechanical axis) by virtue of the femoral hinge post that links the femoral and tibial components.
- To enhance sizing options, consider using a Segmental Tibial Articular Surface in place of the RH Knee Tibial Articular Surface and Modular Hinge Post (see Appendix D). The tapered edges on the Segmental Articular Surface allow more sizing options (refer to page 18).
- Use of leg holders during the assembly process is not recommended.
- It is not necessary to use the torque wrench to tighten the hinge post provisional.

11.4 Evaluate Patellar Tracking

Simulate closure of the capsule with either a single suture or by attaching a towel clip.

Insert the patella provisional and evaluate the tracking against the femoral provisional/cutting guide to ensure that it tracks centrally.

If additional pressure is needed to maintain patellar reduction, or if the patella tends to sublux or tilt laterally, perform a lateral retinacular release, being careful not to create a 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, and check the orientation of the tibial tubercle.

Remove all provisional components.

RH Knee Modular Box Provisional (See Profiler)
00-5881-01X-00



RH Knee Femoral Provisional/Cutting Guide (See Profiler)
00-5881-013-01



Posterior Femoral Augment Provisional (See Profiler)
00-5987-0XX-XX



Distal Femoral Augment Provisional (See Profiler)
00-5987-0XX-XX



Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX



Offset Stem Extension Provisional (See Profiler)
00-5987-020-XX



Tibial Augment Provisional (See Profiler)
00-5989-003-20 (wedge)



RH Knee Tibial Provisional (See Profiler)
00-5881-00X-00



RH Knee Articular Surface Provisional (See Profiler)
00-5881-0XX-XX



Femoral Hinge Post Extension Provisional
00-5881-011-00



4.5mm Hex Head Screwdriver
00-5881-026-00



Patellar Provisional (See Profiler)
00-5971-065-26



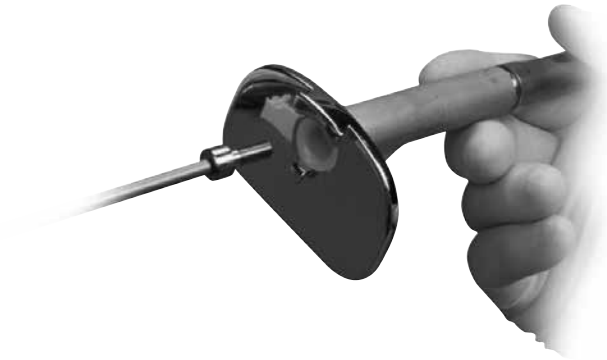


Figure 56a

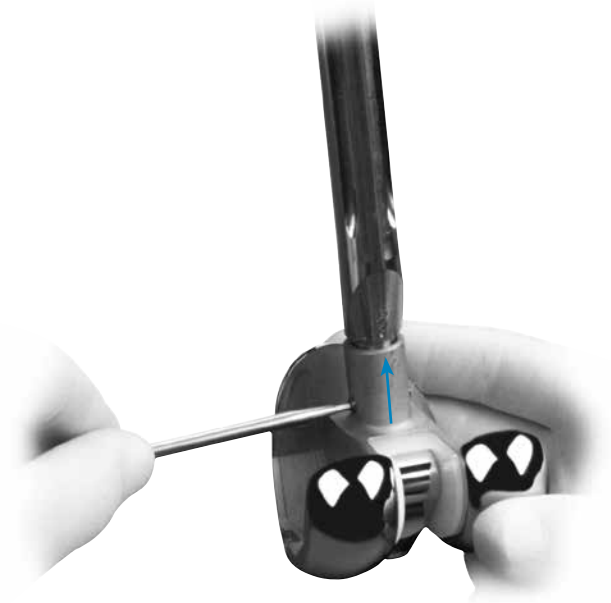


Figure 56b

Step 12: Implant Components

Make a final check to ensure that the femoral, tibial, and articular surface components match (refer to page 18).

12.1 Prepare Tibial Component

Tibial augments are secured to the tibial plate with bone cement.

Apply cement to the augment and to the underside of the tibial component, and use the augment assembly clamp to stabilize the augment while the cement cures. Allow cement to harden fully before proceeding.

Remove locking screw from stem extension, and set aside for use after stem extension impaction.

Insert the stem extension implant into the base of the tibial plate implant.

If using an offset stem extension, align the stem location to the position noted earlier.

Wrap the tibial component in a cloth and place it on a surgical cart.

While protecting the stem extension, strike it solidly one time with a two-pound mallet.

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

Insert the locking screw into the tibial plate and tighten it with the screwdriver to secure the stem extension (Figure 56a).

12.2 Prepare Femoral Component

ATTACH STEM EXTENSION

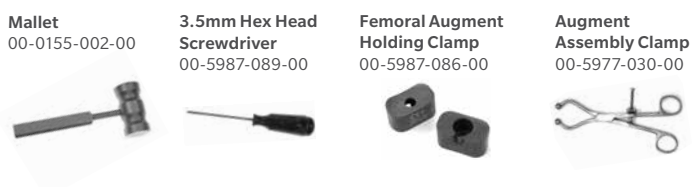
The locking mechanism between the femoral implant and the stem extension implant is a combination of a Morse-type taper and two set screws.

Remove and discard the stem extension locking screw from the stem extension.

Check to ensure that the set screws have not migrated into the femoral stem base taper.

Insert the stem extension into the base of the femoral component.

If using an offset stem extension, line up the stem location number referenced earlier with the etched line on the posterior stem base housing (see arrow Figure 56b).



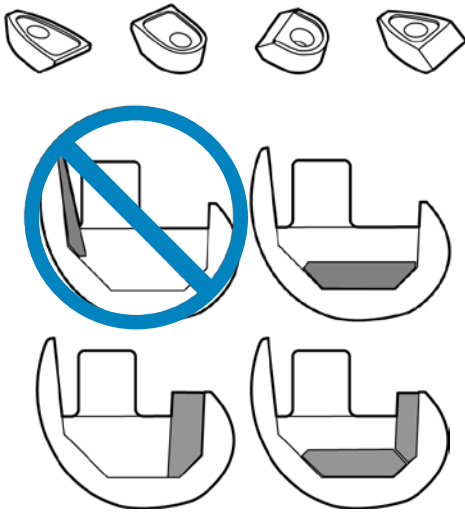


Figure 57



Figure 58a

Step 12: Implant Components (cont.)

12.2 Prepare Femoral Component (cont.)

Ensure that the stem extension is snug in the femoral component base. If toggle exists, back out one or both of the set screws one half turn and ensure snug fit.

Wrap the femoral component in a cloth and place it on a surgical cart.

While protecting the stem extension, seat it by striking it solidly one time with a two-pound mallet.

⚠ **Caution:** Hitting the stem more than once may loosen the taper connection.

Using the femoral set screw hex driver, apply moderate torque to tighten each of the two set screws located in the base of the femoral component (Figure 56b).

⚠ **Caution:** The femoral set screw hex Driver is designed to limit the amount of torque that can be applied to the set screws. Torque by hand only. It is not necessary to break the femoral set screw hex driver.

⚠ **Note:** The stem extension screw is not used with the stemmed femoral component.

ATTACH FEMORAL AUGMENTS

Femoral augments can be secured to the femoral implant using either a single fixation screw, which is packaged with the augment, or cement (Figs. 57 and 58a).

Attach the femoral augments according to the following criteria:

For fixation-screw attachment of the distal augments and the posterior medial augment, use either the femoral augment screwdriver or the standard hex-head screwdriver.

For fixation-screw attachment of the posterior lateral augment, initially use the femoral augment starter screwdriver (Figure 58a). After the augment is secure, final tightening of the augment screw is done with the 3.5mm hex head screwdriver.

⚠ **Technique Tip:** To address the limited clearance, use the Posterior Augment Starter Screwdriver for initial tightening of the locking screw for the posterior augments. A final tightening of the augment screw must be done with the 3.5mm hex head screwdriver.

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

Mallet
00-0155-002-00

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

Femoral Augment
Starter Screwdriver
00-5987-092-03



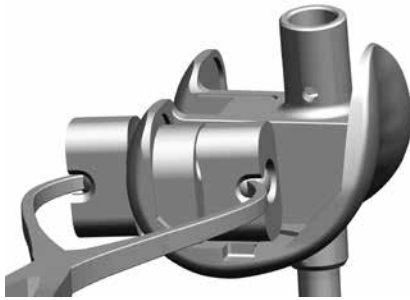


Figure 58b

Tabs on both sides

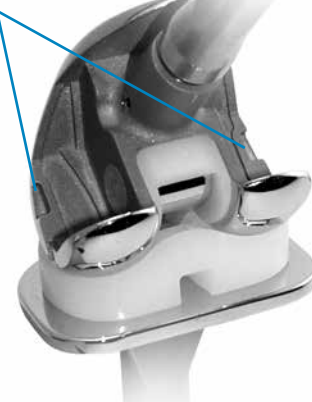


Figure 59

Step 12: Implant Components (cont.)

12.2 Prepare Femoral Component (cont.)

For cement fixation of the augments, apply cement between the augment and femoral component, as well as to the rails of the femoral component (Figure 58b).

- Use the femoral augment holding clamp head with the augment assembly clamp to achieve intimate contact between the augment and the femoral component while the cement cures.

⊖ Technique Tip: Use of 10mm, 15mm, and 20mm NexGen Distal Femoral Augments and 10mm Posterior Augments will block access to the NexGen RH Knee hinge pin when placed on the medial side. Consider the use of cement only (no locking screw) to affix a medial augment of these sizes to expedite removal in the rare event a revision is required. When implanting a size B femur, all augments on the medial side should be cemented. A 5mm augment will block access to the NexGen RH Knee hinge pin on a size B femur.

⊖ Notes:

- When using multiple femoral augments, the distal augments must be attached before the posterior augments.
- Do not use posterior-only and distal-only augments in combination with other distal or posterior augments.
- NexGen Anterior Augments are not compatible with the RH Knee Femoral.

While implanting the femoral component, rotate the hinge post anteriorly to gain better visualization of the hinge area.

12.3 Implant/Assemble Components

IMPLANT TIBIAL & FEMORAL COMPONENTS

Apply cement. Implant the tibial base plate, and remove excess cement.

Implant the femoral component, and remove excess cement.

Ensure that all cement is removed from the tabs on the femoral component where the Spanner Wrench will be attached (Figure 59).

Use a curette to remove all cement from the hinge area.

Femoral Augment
Holding Clamp
00-5987-086-00



Augment
Assembly Clamp
00-5977-030-00





Figure 60



Figure 61



Figure 62

Step 12: Implant Components (cont.)

ATTACH TIBIAL ARTICULAR SURFACE (RH KNEE ARTICULAR SURFACE)

Cement must be completely cured before inserting articular surface. (See Appendix E & F for assembly of a Segmental Articular Surface).

Perform a final check of the articular surface thickness by using the articular surface provisional to evaluate the flexion and extension gaps. Remove articular surface provisional once the final thickness is selected.

With the knee flexed, distract the joint so the femoral component will not contact the tibial base plate.

Rotate the hinge post anteriorly until it contacts the stop on the polyethylene box insert (Figure 60).

Insert the tibial articular surface using one of the following two methods:

FEMORAL CONDYLE SLIDE METHOD

Place the tibial articular surface over the hinge post until it contacts the condyles of the femoral component (Figure 61).

While maintaining contact with the femoral condyles, slide the articular surface posteriorly until it rests on the tibial base plate (Figure 62).

Slide the articular surface anteriorly until the tabs on the tibial plate are engaged.





Figure 63

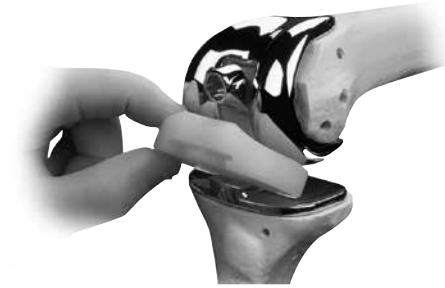


Figure 64



Figure 65

Step 12: Implant Components (cont.)

12.3 Implant/Assemble Components (cont.)

DISTRACTION METHOD

Rotate the hinge post anteriorly until it contacts the stop on the polyethylene box insert (Figure 63).

Place the tibial articular surface onto the tibial base plate and slide it anteriorly until it engages the tabs (Figure 64).

While distracting the joint, rotate the Hinge Post posteriorly until it drops into the hole in the middle of the articular surface (Figure 65).

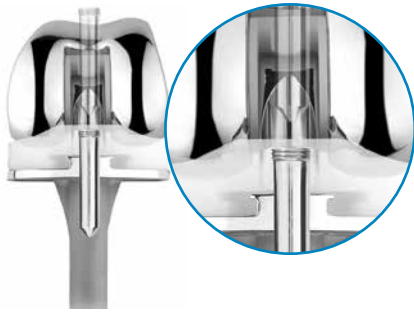


Figure 66



Figure 67

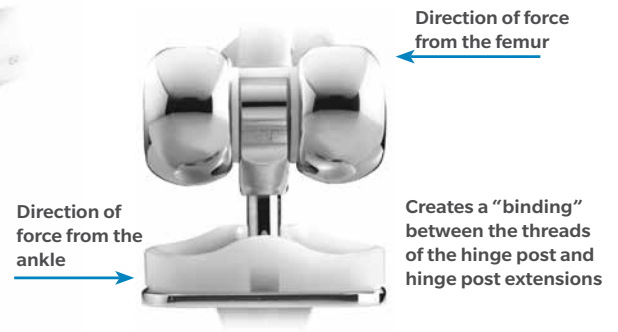


Figure 68

Step 12: Implant Components (cont.)

12.3 Implant/Assemble Components (cont.)

INSERT RH KNEE HINGE POST EXTENSION

The modular hinge post extension is designed with a 4° Morse-type taper below the threads (Figure 66). This taper mates with a taper in the hinge post to provide a secure lock between the components.

⚠ Warning: Tightening of the taper to the level indicated on the torque wrench is critical to securing the locking mechanism because it locks the hinge post extension into position. If the hinge post assembly is not properly tightened, postoperative disassembly could potentially occur.

Ensure that the hinge post and hinge post extension tapers are clean and dry.

Align the hinge post with the hole in the top of the tibial base plate, and insert the hinge post extension into the hinge post, through the articular surface, and into the hole on the tibial base plate (Figure 67).

Ensure that the hinge post extension can freely rotate within the hinge post.

ⓘ Technique Tip: If difficulty is encountered in assembling the hinge post components, reposition the tibia under the femur until the hinge post extension slips easily into place (Figure 66).

ⓘ Notes:

- The appropriate length hinge post extension is packaged with each articular surface.
- Freedom of the hinge post extension to rotate within the modular hinge post may be compromised by binding between the threads of the hinge post and hinge post extension. This may occur when the tibial component is not aligned directly under the femoral component (Figure 68), creating friction between the threads of the hinge post and hinge post extension as the extension is inserted and turned. If the malalignment is significant, bending forces may increase to the point where, even though the torque wrench reads to the proper level, only a fraction of tightening force is being exerted to the screw threads and taper. In this case, the 4° taper may not be fully locked. Adequate taper locking is critical to preventing disassembly.



Figure 69

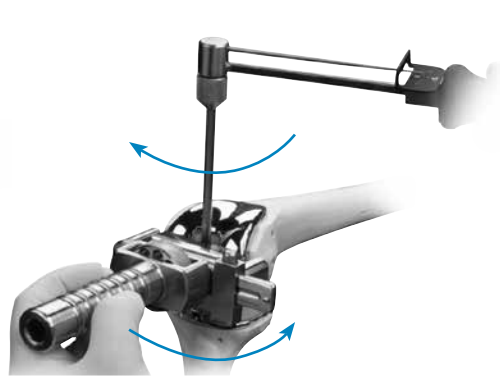


Figure 70



Figure 71

Step 12: Implant Components (cont.)

12.3 Implant/Assemble Components (cont.)

Thread the hinge post extension into the hinge post, by hand, using the 4.5mm hex head screwdriver (Figure 69). Then leave the driver in the hinge post extension.

Attach the spanner wrench to the tabs on each side of the femoral component, and thumb tighten the knurled wheel until the wrench is snug to the distal femoral condyles.

Confirm that the femur and tibia are in alignment by using the 4.5mm hex head screwdriver to finger tighten and loosen the hinge post extension a half turn.

Attach the RH Knee Deflection Beam Torque Wrench (blue handle) to the driver.

While using the spanner wrench to apply a counter rotation force, use the torque wrench to apply 130 in-lbs of torque until the needle reaches the appropriate mark (Figs. 70 and 71).

ⓘ Notes:

- Proper alignment must be maintained during the entire assembly process. The hinge post extension should be easy to thread until it is flush with the top of the hinge post using only two fingers on the 4.5mm hex head screwdriver.
- Using the spanner wrench to counteract the opposing forces of the torque wrench ensures that minimal forces are transmitted to the fixation surfaces, and reduces the potential for binding.

- ⓘ **Warning:** Do not over- or under-torque. Undertightening of the hinge post extension may allow it to loosen over time. Overtightening is not necessary.

4.5mm Hex Head
Screwdriver
00-5881-026-00



Spanner Wrench
00-5881-028-00
00-5881-028-01 (Size B)



RH Knee Deflection
Beam Torque Wrench
00-5881-027-00



Appendix A: Troubleshooting Flexion/Extension Gaps

Nine Scenarios

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

Table 9

Troubleshooting Flexion/Extension Gaps

Note: Adjustments to the femoral side of the arthroplasty can affect the knee in either flexion or extension, while adjustments to the tibial side affect both flexion and extension.

During a trial reduction, nine scenarios are possible (Table 9).

- If the knee is too tight in both flexion and extension, two options exist:
 - Use a thinner articular surface.
 - Resect more tibia.
- If the knee is tight in flexion but acceptable in extension, 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.
- If the joint is loose in extension and tight in flexion, 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 a smaller femoral component.
 - Use an offset stem extension to move the femoral component anteriorly and use a thicker articular surface.
- If the joint is acceptable in flexion but tight in extension, two options exist:
 - Release the posterior capsule from the femur.
 - Resect additional distal femoral bone and move the femoral component proximally.
- If both components are acceptable, no further modification is necessary.
- If the joint is acceptable in flexion and loose in extension, two options exist:
 - Use a distal femoral augment with the same articular surface to drop the joint line and tighten the extension gap.
 - Downsize the femoral component and use a thicker articular surface to raise the joint line.

Troubleshooting Flexion/Extension Gaps (cont.)

7. If the joint is loose in flexion and tight in extension, 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 posterior femoral augments and an offset stem extension to move the femoral component posteriorly.
8. If the joint is loose in flexion and acceptable in extension, four options exist:
 - Use a larger femoral component with posterior femoral augments to equalize gaps.
 - Resect additional distal femoral bone and use a thicker articular surface with a more proximal femoral position.
 - Use posterior femoral augments and an offset stem extension to move the femoral component posteriorly.
 - Choose to accept the current balance if it is only of a mild degree, particularly in a highly constrained component.
9. If the joint is symmetrically loose in both flexion and extension, use a thicker articular surface.

Note:

- Always consider the position of the patella and joint line in the final soft tissue balancing.
- After implementing any of these solutions, perform another trial reduction to verify that the solution was successful, or to identify any new problems and/or variation of the initial problem that may still exist.

Appendix B: Primary Arthroplasty Using RH Knee Instrumentation

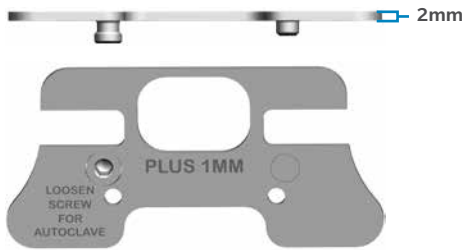


Figure 72



Figure 73



Figure 74

Step 1: Prepare Tibia

To prepare the tibia, go to Steps 1 and 2 for revision arthroplasty in the main body of this technique.

Step 2: Prepare Femoral Canal

To prepare the femoral canal, go to Step 3 for revision arthroplasty in the main body of this technique.

Step 3: Resect Distal Femur

- Attach the Plus 1mm Cut Block to the appropriate 6° distal femoral guide (Figure 72).
- Set the revision IM guide to the correct “R” or “L” designation.
- Attach the straight stem extension provisional to the guide.

Notes:

- The plus 1mm cut block is approximately 2mm in thickness and provides approximately 10mm of bone removal.
- Be sure that the correct cutting block is attached before inserting the guide assembly. Using the wrong cutting block may result in excessive bone removal.

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 (Figure 73).

Insert the guide assembly into the femoral canal, and impact it onto the distal femur (Figure 74).

RH Knee Tibial Provisional (See Profiler)
00-5881-00X-00



Mini Handle
00-5967-046-00



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



Plus 1mm Cut Block
00-5964-004-01



Revision IM Guide
00-5987-060-00



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



Extramedullary Alignment Arch
00-5125-081-00



Alignment Rod with Coupler
00-5785-080-00





Figure 75a



Figure 75b



Figure 76

Step 3: Resect Distal Femur (cont.)

Confirm that the guide has remained on the correct “R” or “L” designation.

Attach the distal femoral cutting guide to the 0° distal placement guide (Figure 75a).

Attach the cutting guide assembly onto the revision IM guide, and turn the thumb screw on the cutting guide until it contacts the anterior femoral cortex (Figure 75b).

Insert two screws through the holes marked “0” on the top of the distal femoral cutting guide.

Fully loosen the thumb screw of the 0° distal placement guide, and use the Slaphammer Extractor to remove the revision IM guide and the stem extension provisional, leaving the cutting guide in place.

Use a 0.050 in. (1.27mm) oscillating saw blade to make a minimal resection of the distal femur through the slot on the cutting guide (Figure 76).

Remove the distal femoral cutting guide.

Notes:

- Because the stem location of the RH Knee Femoral Component is oriented in 6° of valgus, the IM guide is designed to yield a 6° valgus cut.
- The thumb screw on the distal femoral cutting Guide is designed to stabilize the guide. After contacting bone, do not turn the screw further.
- Additional 2mm adjustments may be made to the resection by using the sets of holes marked -4, -2, +2, and +4 on the cutting guide.

<p>RH Knee Tibial Provisional (See Profiler) 00-5881-00X-00</p>	<p>Mini Handle 00-5967-046-00</p>	<p>LCCK 6° Distal Femoral Guide 00-5987-061-01, Lt.00-5987-061-02, Rt</p>	<p>Plus 1mm Cut Block 00-5967-045-00</p>	<p>Revision IM Guide 00-5987-060-00</p>	<p>Straight Stem Extension Provisional (See Profiler) 00-5989-010-10</p>
<p>Mini Distal Femoral Cutting Guide 00-5967-036-00</p>	<p>0° Distal Placement Guide 00-5967-031-00</p>	<p>Slaphammer Extractor 00-5785-097-00</p>	<p>Hex-headed Screws 00-5983-040-27, 27mm 00-5983-040-33, 33mm 00-5983-040-48, 48mm</p>	<p>MIS Screw Inserter/ Extractor 00-5983-049-00</p>	



Figure 77

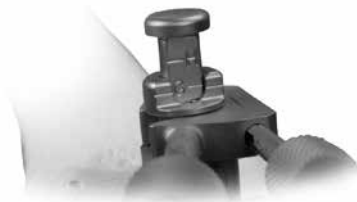


Figure 78

RH Knee

Size	M/L	A/P	Distal Thickness
B	58	50	9
C	64	54.5	10.5
D	68	58	10.5
E	72	62	10.5
F	76	66	10.5

Table 10

Step 4: Determine Femoral Size

Use one of the following methods to determine the femoral size.

Sizing Guide Method

Remove the last reamer used, if still in the IM canal.

Place the mini A/P sizing guide flat on the resected distal femur with the feet flush against the posterior condyles.

Check the position by looking through both windows of the mini A/P sizing guide, ensuring that the medullary canal is not visible through either.

Insert hex-head screws to fix the mini A/P sizing guide to the distal femur.

Attach the MIS locking boom to the Mini A/P sizing guide.

Position the boom and lock it by turning the thumb screw (Figure 77).

Read the femoral size between the engraved lines on the sizing tower (Figure 78).

ⓘ Notes:

- Do not overtighten the hex-head screws or the anterior portion of the mini A/P sizing guide will not slide on the distal femur.
- If the indicator on the sizing guide is between two sizes, the smaller size is typically chosen to help prevent excessive ligament tightness in flexion.
- Although the mini A/P sizing guide has eight engraved sizes, the RH Knee is available only in sizes B-F.

Epicondylar Width Method

Measure the width of the epicondyles and use the table to help determine the appropriate size (Table 10).

ⓘ **Note:** By measuring the epicondyles, the maximum size has been determined.

RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00

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

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

MIS Locking Boom
00-5983-028-00



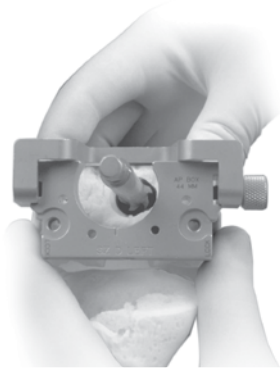


Figure 79



Figure 80



Figure 81

Step 5: Confirm Femoral Position & Establish Rotation

Reinsert the last reamer used or the corresponding size straight stem extension provisional with the stem provisional adapter attached.

If re-establishing femoral rotation and refreshing anterior cuts during a revision, attach the femoral base guide flange to the femoral stem base/cutting block that corresponds to the femoral component size chosen.

Note: In a primary knee procedure, the flange cannot be used since the anterior femoral condyles have not been resected.

Insert the femoral stem base/cutting block over the reamer or stem provisional adapter so the cutting block is flush against the distal femur (Figure 79). Be sure that the proper “Right” or “Left” indication is facing toward you on the cutting block.

Slide the 9-10mm femoral guide bushing over the reamer shaft or stem provisional adapter until it seats into the circular step of the femoral stem base/cutting block (Figure 80).

Insert the tabs of the revision rotational alignment guide into the posterior holes on the face of the femoral stem base/cutting block.

Rotate the assembly until the handles of the alignment guide are in line with the epicondylar axis (Figure 81).

Lay the resection guide on the distal most surface of the anterior face of the femoral stem base/cutting block, and check the medial and lateral sides to be sure the cut will not notch the anterior cortex.

If the femoral stem base/cutting block is in proper alignment and rotation, insert two headless holding pins into the upper two holes (Fig 82). Then proceed to “Step 6: Finish Femur.”

If the femoral stem base/cutting block indicates a less than optimal position for the femoral component, continue with “Offset Stem Technique.”

NexGen Reamer
(See Profiler)
00-5125-010-XX

Straight Stem Extension
Provisional (See Profiler)
00-5989-010-XX

Stem Provisional
Adapter
00-5987-016-00

Femoral Base
Guide Flange
00-5987-012-00

Femoral Stem Base/Cutting
Block (See Profiler)
00-5987-011-0X

9-10mm Femoral
Guide Bushing
00-5987-013-01

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



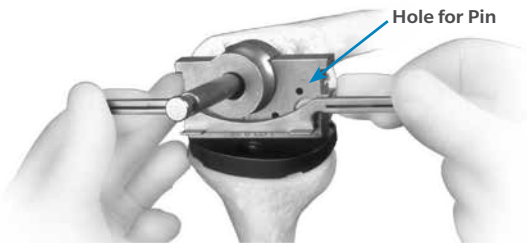


Figure 82



Figure 83

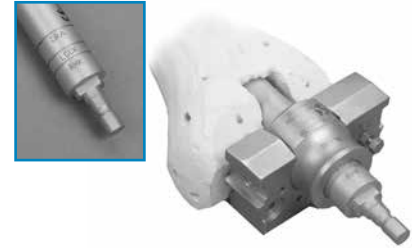


Figure 84

Step 5: Confirm Femoral Position & Establish Rotation (cont.)

Offset Stem Technique

Remove headless holding pins, if used.

Remove the 9-10mm femoral guide bushing and insert the femoral offset bushing with the numbers facing outward.

Rotate the bushing within the block until an optimal position is determined.

Place the resection guide on the anterior surface of the femoral stem base/cutting block to check the anterior cut location to prevent notching of the anterior cortex.

Note: the reading on the femoral offset bushing that lines up with the engraved line on the posterior face of the femoral stem base/cutting block.

Confirm appropriate external rotation, and insert two headless holding pins in the upper two holes of the block (Figure 82).

Note: This reading will be used to set the provisional and the offset stem rotations (Figure 83).

Step 6: Finish Femur

6.1 Drill for Femoral Stem Base

Remove the femoral bushing, and the reamer or provisional assembly.

Attach any augments to the posterior surface of the femoral stem base/cutting block.

Insert the 16mm-18mm femoral guide bushing into the cutting block.

Attach the femoral stem drill to a drill/driver and drill through the bushing to the third engraved line marked "RH Knee" on the drill bit (Figure 84).

Caution: In patients with a small medullary canal, do not use the femoral stem drill, as it is an end-cutting instrument. Instead, use the 18mm intramedullary reamer, which is a less aggressive side-cutting instrument, to ream to a depth of 7cm to allow the femoral provisional/cutting guide and stem extension provisional to be inserted.

NexGen Reamer
(See Profiler)
00-5125-010-XX



Straight Stem Extension
Provisional (See Profiler)
00-5989-010-XX



Stem Provisional
Adapter
00-5987-016-00



Femoral Base
Guide Flange
00-5987-012-00



Femoral Stem Base/
Cutting Block (See
Profiler)
00-5987-011-0X



9-10mm Femoral
Guide Bushing
00-5987-013-01



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



Distal Femoral Augment
Provisional (See Profiler)
00-5987-0XX-XX



Posterior Femoral
Augment Provisional
(See Profiler)
00-5987-0XX-XX



16-18mm Femoral
Guide Bushing
00-5987-013-04



Femoral Stem
Base Drill
00-5881-010-01





Figure 85



Figure 86b



Figure 86a

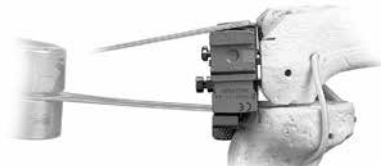


Figure 86c

Step 6: Finish Femur (cont.)

6.2 Cut Anterior & Posterior Condyles

Attach the posterior saw guide attachment to the posterior surface of the femoral stem base/cutting block, ensuring that it is flush with the distal surface of the block, and fully tighten the thumb screw (Figure 85).

Use an oscillating saw to cut the anterior and posterior condyles (Figures 86a, 86b and 86c). Cut off the most distal top surface when making the anterior cut.

Remove the femoral stem base/cutting block, leaving the headless pins in place.

Notes:

- The posterior saw guide attachment is marked to indicate the side that must face the bone.
- The headless pins will serve to provide rotational alignment for the RH Knee Notch/Chamfer Guide.
- One headless pin will also provide sufficient rotational alignment.
- The chamfer cuts will be made in the next step using the RH Knee Notch/Chamfer Guide.

6.3 Make Femoral Augment Cuts

If femoral augmentation is necessary, remove the headless pins and refer to Step 8 for revision arthroplasty in the main body of this technique.

Final Steps

To complete the procedure, refer to Steps 9, 10, 11, and 12 for revision arthroplasty in the main body of this technique.

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

Posterior Saw Guide Attachment
00-5987-019-00



Appendix C: Primary Arthroplasty for RH Knee Using NexGen LCCK 4-in-1 Instrumentation

Primary Arthroplasty for RH Knee Using NexGen LCCK 4-in-1 Instrumentation

On a size-for-size basis, the anterior, posterior, and chamfer cuts are identical for all implants in the NexGen Complete Knee Solution family, this section describes using the LCCK 4-in-1 Femoral Cutting Blocks to prepare these cuts, followed by an additional step to cut the notch using the RH Knee Femoral Provisional/Cutting Guide assembly.

Note: The LCCK 4-in-1 Cutting blocks are not available in size B. When implanting a size B RH Knee, use the steps described in Appendix B.

Step 1: Prepare the Tibia

To prepare the tibia, go to Steps 1 and 2 for revision arthroplasty in the main body of this technique.

Step 2: Prepare Femoral Canal

To prepare the femoral canal, go to Step 3 for revision arthroplasty in the main body of this technique.

Note: After preparing the canal, leave the last reamer in place, or remove the reamer and insert the corresponding size straight stem extension Provisional with the stem provisional adapter attached.

RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00



NexGen Reamer
(See Profiler)
00-5125-010-XX



Straight Stem Extension
Provisional (See Profiler)
00-5989-010-XX



Stem Provisional
Adapter
00-5987-016-00



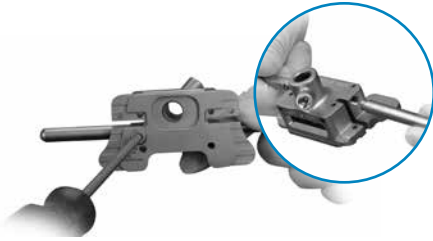


Figure 87



Figure 88



Figure 89

Step 3: Resect Distal Femur

Screw the mini handles into the side of the appropriate (left or right) LCCK 6° Distal Femoral Guide (Figure 87).

Attach the plus 1mm cut block to the femoral guide (Figs. 87 and 88).

Ensure that the locking screw is backed out to allow insertion over the reamer or stem extension provisional.

Slide the femoral guide assembly over the reamer or stem extension provisional assembly and rotate the guide until the mini handles are aligned with the epicondylar axis (Figure 89).

Note:

- The plus 1mm cut block is approximately 2mm in thickness and provides approximately 10mm of bone removal.
- Be sure that the correct cutting block is attached before inserting the guide assembly. Using the wrong cutting block may result in excessive bone removal.
- Because the stem location of the RH Knee Femoral Component is oriented in 6° of valgus, the IM guide is designed to yield a 6° valgus cut.

RH Knee Tibial Provisional (See Profiler)
00-5881-00X-00



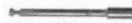
NexGen Reamer (See Profiler)
00-5125-010-XX



Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX



Stem Provisional Adapter
00-5987-016-00



Plus 1mm Cut Block
00-5964-004-01



Mini Handle
00-5967-046-00



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





Figure 90



Figure 91



Figure 92

Step 3: Resect Distal Femur (cont.)

Check to ensure the proper “Left” or “Right” LCCK 6° Distal Femoral Guide is contacting the distal femur, and use the 3.5mm hex-head screwdriver to secure the femoral guide to the reamer or provisional assembly (Figure 90).

ⓘ Technique Tip: For additional stability, insert 27mm hex-head screws through the femoral guide (Figure 90).

Insert the extramedullary alignment arch into the femoral guide.

Insert the alignment rod with coupler through the arch, passing it proximally toward the femoral head to check varus/valgus alignment (Figure 91).

Attach the mini distal femoral cutting guide to the 0° distal placement guide (Figure 92), and slide the assembly onto the femoral guide.

RH Knee Tibial Provisional (See Profiler)
00-5881-00X-00



NexGen Reamer (See Profiler)
00-5125-010-XX



Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX



Stem Provisional Adapter
00-5987-016-00



Plus 1mm Cut Block
00-5964-004-01



Mini Handle
00-5967-046-00



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



Extramedullary Alignment Arch
00-5125-081-00



Alignment Rod with Coupler
00-5785-080-00



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



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



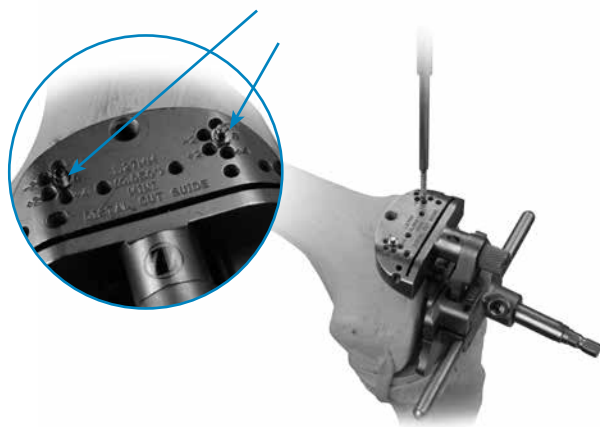


Figure 93

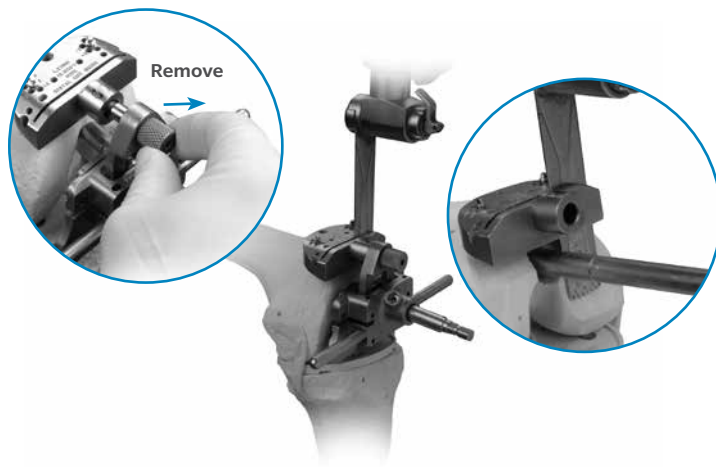


Figure 94

Step 3: Resect Distal Femur (cont.)

Ensure the guides contacting the distal femur and insert two 33mm hex-head screws through the holes marked “0” on the top of the cutting guide (Figure 93).

ⓘ Technique Tip: For increased stability, use additional hex-head screws or headless holding pins.

ⓘ Technique Tip: To improve fixation, leave the instrumentation in place during most of the distal resection.

Use a 0.050 in. (1.27mm) oscillating saw blade to start the resection of the distal femur through the slot on the cutting guide (Figure 94).

Loosen the thumb screw on the 0° distal placement guide, and remove the 6° distal femoral guide and 0° distal placement guide, leaving the cutting guide in place.

Finish the resection (Figure 94). If necessary, remove the reamer to complete the cut.

Remove the mini distal femoral cutting guide, leaving the reamer or stem extension provisional assembly in place.

RH Knee Tibial Provisional (See Profiler)
00-5881-00X-00



NexGen Reamer (See Profiler)
00-5125-010-XX



Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX



Stem Provisional Adapter
00-5987-016-00



Plus 1mm Cut Block
00-5964-004-01



Mini Handle
00-5967-046-00



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



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



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



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



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



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





Figure 95

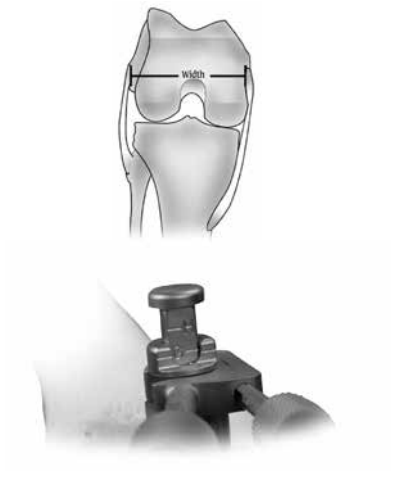


Figure 96

RH Knee

Size	M/L	A/P	Distal Thickness
B	58	50	9
C	64	54.5	10.5
D	68	58	10.5
E	72	62	10.5
F	76	66	10.5

Table 11

Step 4: Determine Femoral Size

Use one of the following methods to determine the femoral size.

Note: There are no LCCK 4-in-1 instruments for a size B. When using a size B RH Knee, use steps in Appendix B.

Sizing Guide Method

Remove the last reamer used, if still in the IM canal.

Place the mini A/P sizing guide flat on the resected distal femur with the feet flush against the posterior condyles.

Check the position by looking through both windows of the mini A/P sizing guide, ensuring that the medullary canal is not visible through either.

Insert hex-head screws to fix the mini A/P sizing guide to the distal femur.

Attach the MIS Locking Boom to the mini A/P sizing guide.

Position the boom and lock it by turning the thumb screw (Figure 95).

Read the femoral size between the engraved lines on the sizing tower (Figure 96).

Notes:

- Do not overtighten the hex-head screws or the anterior portion of the mini A/P sizing guide will not slide on the distal femur.
- If the indicator on the sizing guide is between two sizes, the smaller size is typically chosen to help prevent excessive ligament tightness in flexion.
- Although the mini A/P sizing guide has eight engraved sizes, the RH Knee is available only in sizes B-F.

Epicondylar Width Method

Measure the width of the epicondyles and use the table to help determine the appropriate size (Table 11).

Note: By measuring the epicondyles, the maximum size has been determined.

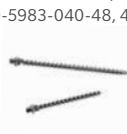
RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00



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



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



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



MIS Locking Boom
00-5983-028-00





Figure 97



Figure 98



Figure 99

Step 5: Confirm Femoral Position & Establish Rotation

Reinsert the reamer or stem provisional assembly if not already present

ⓘ Technique Tip: The reamer or stem provisional Adapter should have minimal distal protrusion.

Insert the 4-in-1 9-10mm bushing into the 4-in-1 femoral cutting block.

Ensure that the proper “Right” or “Left” designation is showing anteriorly.

Use the engraved mark on the bushing to ensure proper alignment relative to the medullary canal.

ⓘ Technique Tip: If the cutting block does not sit flush due to missing or poor quality bone on the condyles, consider using a distal femoral augment. The 15mm and 20mm distal femoral augment provisionals will block access through the screw fixation holes in the 4-in-1 femoral cutting block; use other available holes if necessary.

Slide the cutting block/bushing assembly over the reamer shaft or stem extension provisional assembly until the cutting block is flush against the distal femur (Figure 97).

Insert the tabs of the revision rotational alignment guide into the posterior cutting slot, and rotate the guide until the handles are aligned with the transepicondylar axis (Figure 98).

Ensure the construct is contacting the distal femur, and the 3.5mm hex-head screwdriver to tighten the bushing to the reamer or stem extension provisional assembly (Figure 99).

RH Knee Tibial Provisional (See Profiler)
00-5881-00X-00



NexGen Reamer (See Profiler)
00-5125-010-XX



Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX



Stem Provisional Adapter
00-5987-016-00



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



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



Revision Rotational Alignment Guide
00-5987-051-01



Distal Femoral Augment Provisional (See Profiler)
00-5987-0XX-XX



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





Figure 100

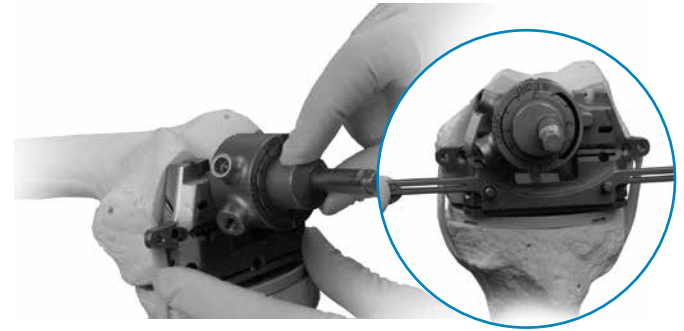


Figure 101

Step 5: Confirm Femoral Position & Establish Rotation (cont.)

If the position is satisfactory, insert two hex-head screws to secure the 4-in-1 femoral cutting block to the distal femur (Figure 100). Then proceed to “Step 6: Finish Femur.”

If the cutting block indicates a less than optimal position for the femoral component, continue with “Offset Stem Technique.”

Offset Stem Technique

Remove the 4-in-1 9mm-10mm bushing, and insert the femoral offset bushing into the LCCK Straight/Offset Bushing Adapter.

Remove the headless holding pins, if used.

Insert the adapter and bushing into the appropriate size 4-in-1 femoral cutting block.

Ensure that the proper “Right” or “Left” designation is showing anteriorly.

Use the engraved mark on the bushing to ensure proper alignment relative to the IM canal.

Slide the adapter/cutting block assembly over the reamer or stem extension provisional assembly.

Rotate the bushing within the adapter until an optimal position is determined (Figure 101).

Insert the tabs of the revision rotational alignment guide into the posterior cutting slot, and rotate the guide until the handles are aligned with the transepicondylar axis (Figure 101).

<p>RH Knee Tibial Provisional (See Profiler) 00-5881-00X-00</p> 	<p>NexGen Reamer (See Profiler) 00-5125-010-XX</p> 	<p>Straight Stem Extension Provisional (See Profiler) 00-5989-010-XX</p> 	<p>Stem Provisional Adapter 00-5987-016-00</p> 	<p>LCCK 4-in-1 9-10mm Bushing 00-5987-026-00</p> 	<p>LCCK 4-in-1 Femoral Cut Block (See Profiler) 00-5987-021-03</p> 	<p>Distal Femoral Augment Provisional (See Profiler) 00-5987-0XX-XX</p> 
<p>3.5mm Hex Head Screwdriver 00-5987-089-00</p> 	<p>Hex-headed Screws 00-5983-040-27, 27mm 00-5983-040-33, 33mm 00-5983-040-48, 48mm</p> 	<p>MIS Screw Inserter/Extractor 00-5983-049-00</p> 	<p>Femoral Offset Bushing 00-5987-014-00</p> 	<p>Straight/Offset Bushing Adapter 00-5987-025-00</p> 	<p>Revision Rotational Alignment Guide 00-5987-051-01</p> 	



Figure 102

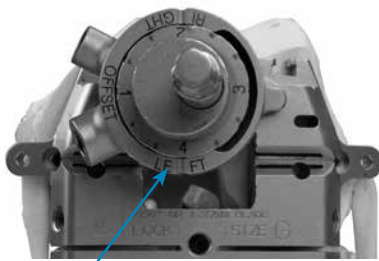


Figure 103

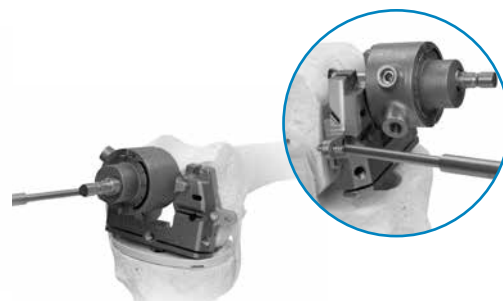


Figure 104

Step 5: Confirm Femoral Position & Establish Rotation (cont.)

Use the 3.5mm hex-head screwdriver to tighten the adapter to the bushing (Figure 102). This locks in the offset setting for future reference.

Note the orientation of the bushing by observing the numbers and marks on the bushing relative to the etched line on the posterior face of the adapter (Figure 103).

Note: This reading will be used to set the provisional and the offset stem rotations (Figure 103).

Secure the cutting block to the femur with two Hex-head Screws (Figure 104).

Note: Use the inside screw holes for all primary cases that do not require distal femoral augments. Use the outside screw holes if 5mm or 10mm distal femoral augment provisionals are used (Figure 104).

<p>RH Knee Tibial Provisional (See Profiler) 00-5881-00X-00</p> 	<p>NexGen Reamer (See Profiler) 00-5125-010-XX</p> 	<p>Straight Stem Extension Provisional (See Profiler) 00-5989-010-XX</p> 	<p>Stem Provisional Adapter 00-5987-016-00</p> 	<p>LCCK 4-in-1 9-10mm Bushing 00-5987-026-00</p> 	<p>LCCK 4-in-1 Femoral Cut Block (See Profiler) 00-5987-021-03</p> 	<p>Distal Femoral Augment Provisional (See Profiler) 00-5987-0XX-XX</p> 
<p>3.5mm Hex Head Screwdriver 00-5987-089-00</p> 	<p>Hex-headed Screws 00-5983-040-27, 27mm 00-5983-040-33, 33mm 00-5983-040-48, 48mm</p> 	<p>MIS Screw Inserter/Extractor 00-5983-049-00</p> 	<p>Femoral Offset Bushing 00-5987-014-00</p> 	<p>Straight/Offset Bushing Adapter 00-5987-025-00</p> 		

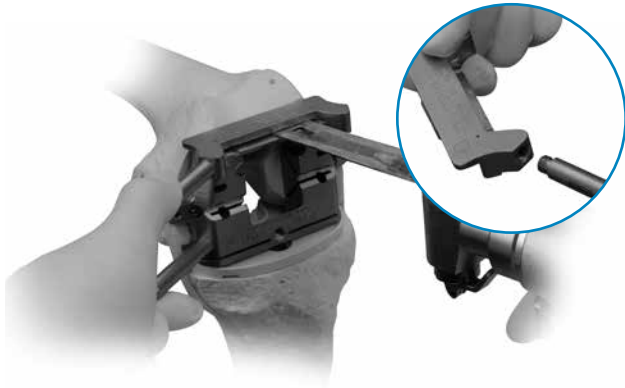


Figure 105



Figure 106

Step 6: Finish Femur

6.1 Make 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.

Place the resection guide on the anterior surface of the 4-in-1 femoral cutting block, and check the medial and lateral sides to be sure the cut will not notch the anterior cortex (Figure 105).

Attach the mini handles to the LCCK Anterior Cutting Guide (Figure 106).

Slide the LCCK Anterior Cutting Guide into the keyed slots in the 4-in-1 femoral cutting block (Figure 106).

Use a 0.050 in. (1.27mm) oscillating saw blade to make the anterior bone cut (Figure 106).

ⓘ Technique Tip: For added stability while cutting, hold the mini handles on the anterior cutting guide and the 4-in-1 femoral cutting block.

RH Knee Tibial Provisional (See Profiler)
00-5881-00X-00



Resection Guide
00-5977-084-00



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



Distal Femoral Augment Provisional (See Profiler)
00-5987-0XX-XX



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



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



Mini Handle
00-5967-046-00



LCCK Anterior Cutting Guide
00-5987-023-00



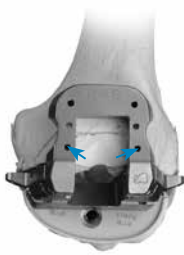


Figure 107a



Figure 108a



Figure 109a



Figure 107b



Figure 108b



Figure 109b

Step 6: Finish Femur (cont.)

6.2 Make Posterior & Chamfer Cuts

POSTERIOR CUT

Remove the LCCK Anterior Cutting Guide.

Insert the appropriate size LCCK Notch Cut Guide until fully seated in the 4-in-1 femoral cutting block.

Insert two 33mm hex-head screws through the top of the notch guide (Figure 107a and 107b).

Use the oscillating saw to cut the posterior condyles (Figure 108a).

CHAMFER CUTS

If screws were used in the first two sets of holes on the LCCK Notch Cut Guide, remove them before making the anterior chamfer cut (Figure 108b).

Use a reciprocating saw or an oscillating saw to cut the anterior and posterior chamfers (Figure 109).

⊖ Notes:

- There are no LCCK 4-in-1 instruments for a size B. If implanting a size B RH Knee, use steps in Appendix B.
- 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.
- The first set of holes on the notch guide should not be used if any augmentation is used on the 4-in-1 femoral cutting block (Figure 107a).
- If snap-in distal augments have been used for sizes B, C, and D, be careful to avoid the peg if it enters the slot with the saw blade (Figure 109).

RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00



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



Distal Femoral Augment
Provisional (See Profiler)
00-5987-0XX-XX



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



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



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



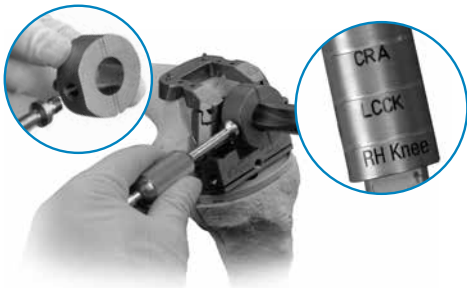


Figure 110



Figure 111



Figure 112

Step 6: Finish Femur (cont.)

6.3 Drill for Femoral Stem Base

Attach the MIS Threaded Handle to the LCKK 18mm Femoral Drill Bushing (Figure 110). Ensure that the proper “Right” or “Left” designation is showing anteriorly.

Use the engraved mark on the bushing to ensure proper alignment relative to the IM canal.

Insert the RH Knee 18mm Femoral Drill Bushing into the 4-in-1 femoral cutting block.

Drill the canal to the second engraved line, marked “RH Knee” (Figure 110).

⚠ Caution: In patients with a small medullary canal, do not use the femoral stem drill. Instead, use the 18mm intramedullary reamer to ream to a depth of 7cm to allow the femoral provisional/cutting guide and stem extension provisional to be inserted.

6.4 Make Femoral Augment Cuts

If femoral augmentation is necessary, remove the headless pins and refer to Step 8 for revision arthroplasty in the main body of this technique.

Step 7: Prepare for RH Knee Box

7.1 Attach Notch/Chamfer Guide

Insert one or two headless holding pins into the face of the LCKK 4-in-1 Femoral Cutting Block (Figure 111)

Remove the hex-head screws and the cutting block.

If distal femoral augment provisionals were used on the cutting block, remove and install them on the RH Knee Notch/Chamfer Guide (Figure 112).

RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00



LCKK 4-in-1 Femoral Cut Block
(See Profiler)
00-5987-021-03



Distal Femoral Augment Provisional
(See Profiler)
00-5987-0XX-XX



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



LCKK Anterior Cutting Guide
00-5987-023-00



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



MIS Threaded Handle
00-5983-002-01



LCKK 18mm Femoral Drill Bushing
00-5987-04-00



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



RH Knee Notch/Chamfer Guide
(See Profiler)
00-5881-01X-10



Condylar Trephine Guide
00-5853-028-00



Femoral Stem Base Drill
00-5881-010-01



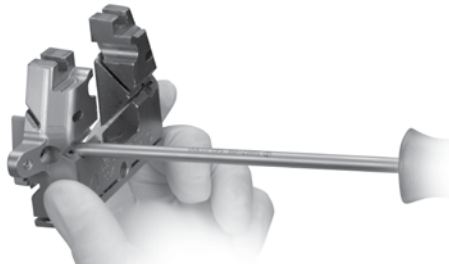


Figure 113

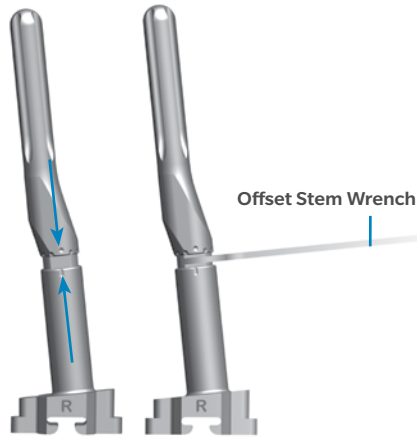


Figure 114

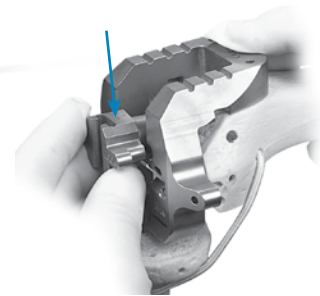


Figure 115

Step 7: Prepare for RH Knee Box (cont.)

ⓘ Technique Tip: 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 (Figure 113).

For a straight stem extension, thread the straight stem extension provisional into the stem extension bushing (Figure 114).

For an offset stem extension, fully thread the offset stem locknut onto the offset stem extension provisional.

Thread the offset stem extension provisional onto the stem extension bushing.

Rotate the offset stem extension provisional so the appropriate number is lined up to the position noted earlier on the bushing adapter (Figure 114).

Back thread the locknut against the stem extension bushing and use the offset stem wrench to tighten the locknut against the stem extension bushing.

Insert the stem/bushing assembly into the RH Knee Notch/Chamfer Guide, ensuring that the proper “R” or “L” (right or left) designation is showing anteriorly (Figure 115).

RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00



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



Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX



Stem Extension Bushing
00-5987-070-00
00-5987-070-01 (Size B)



Offset Stem Extension Provisional (See Profiler)
00-5987-020-XX



Offset Stem locknut
00-5987-080-00



Offset Stem Wrench
00-5987-079-00



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



RH Knee Notch/Chamfer Guide (See Profiler)
00-5881-01X-10





Figure 116



Figure 117



Figure 118

Step 7: Prepare for RH Knee Box (cont.)

Insert the entire assembly into the femoral canal over the headless pins (Figure 116).

ⓘ Technique Tip: Be sure that the headless holding pins protrude beyond the face of the guide so they can be grasped with a pin puller for extraction.

Insert hexhead holding pins through the anterior or distal tab holes in the guide. Use the Slaphammer Extractor to pull the Stem Extension Bushing and the Stem Extension Provisional out of the guide.

ⓘ Technique Tip: If a straight stem extension provisional larger than 22mm in diameter or an offset stem extension provisional larger than 17mm in diameter is used, remove the entire assembly as a unit.

ⓘ Notes:

- The headless holding pins will serve to provide rotational alignment for the RH Knee Notch/Chamfer Guide.



- The 15mm and 20mm distal femoral augment provisionals will block access through the screw fixation holes in the RH Knee Notch/Chamfer Guide; use other available pin holes.
- The Size B has two sets of pin holes on the distal tabs to help secure the notch/chamfer guide when used with small femurs.
- This notch/chamfer guide is designed to key from the medullary canal. There is typically a space between the anterior bone and the bottom of the guide (see Figure 117).

7.2 Make the RH Knee Box Cut

Use a reciprocating or narrow oscillating saw blade to cut the sides and base of the RH Knee box (Figure 118). Remove the holding pins and the notch/chamfer guide.

Final Steps

To complete the procedure, refer to Steps 10, 11, and 12 for revision arthroplasty in the main body of this technique.

<p>RH Knee Tibial Provisional (See Profiler) 00-5881-00X-00</p> 	<p>3.5mm Hex Head Screwdriver 00-5987-089-00</p> 	<p>Straight Stem Extension Provisional (See Profiler) 00-5989-010-XX</p> 	<p>Stem Extension Bushing 00-5987-070-00 00-5987-070-01 (Size B)</p> 	<p>Offset Stem Extension Provisional (See Profiler) 00-5987-020-XX</p> 	<p>Offset Stem locknut 00-5987-080-00</p> 
<p>Offset Stem Wrench 00-5987-079-00</p> 	<p>Headless Holding Pins 00-5222-039-00, 48mm 00-5997-084-00, 75mm</p> 	<p>RH Knee Notch/Chamfer Guide (See Profiler) 00-5881-01X-10</p> 	<p>Hex-head Holding Pins 00-5061-063-00</p> 	<p>Slaphammer Extractor 00-5785-097-00</p> 	

Appendix D: Using the RH Knee Femoral Component with the Segmental Proximal Tibial Component



Figure 119

Segmental Knee System Compatibility Chart (using RH Knee Femoral and Tibial Components)

		NexGen RH Knee Femoral Size				
		B	C	D	E	F
Segmental Proximal Tibial Size	1	B/123	C/123	D/123		
	2	B/123	C/123	D/123	E/23	
	3	B/123	C/123	D/123	E/23	F/3

Table 12

This section is used when implanting a Trabecular Metal Proximal Tibial Component. The tibial instructions are provided in the Zimmer Segmental System Trabecular Metal Proximal Tibial Component Surgical Technique (97-5850-006-00).

Step 1: Tibial Preparation

Refer to the Zimmer Segmental System Trabecular Metal Proximal Tibial Component Surgical Technique (97-5850-006-00) for tibial preparation.

Step 2: Initial Femoral Preparation

If using the RH Knee in a primary arthroplasty refer to Appendix B for the femoral preparation.

If using the RH Knee in a revision arthroplasty refer to the main NexGen RH Knee technique:

Step 3: Prepare Femoral Canal (p.14)

Step 4: Determine Femoral Size (p. 15)

Step 5: Confirm Femoral Position & Establish Rotation (p. 16)

Caution: The Segmental one-piece hinge post must be used with the Segmental Proximal Tibial Component (The NexGen RH Knee modular hinge post and hinge post extension are not compatible with the Trabecular Metal Proximal Tibial Component).

Step 3: Provisional Preparation

3.1 Prepare the Stem Provisional

3.2 Prepare the Proximal Tibial Provisional

Refer to the Zimmer Segmental System Trabecular Metal Proximal Tibial Component Surgical Technique (97-5850-006-00) for preparation of the Segmental Stem Provisional and Tibial Provisional.

3.3 Prepare the Distal Femoral Provisional

- Insert the thinnest articular surface provisional that matches the femoral provisional size and is compatible with the tibial plate size. (Figure 119 & Table 12).

NexGen Reamer (See Profiler)
00-5125-010-XX

Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX

Stem Provisional Adapter
00-5987-016-00

RH Knee Articular Surface Provisional (See Profiler)
00-5881-0XX-XX

RH Knee Femoral Provisional/Cutting Guide (See Profiler)
00-5881-01X-XX



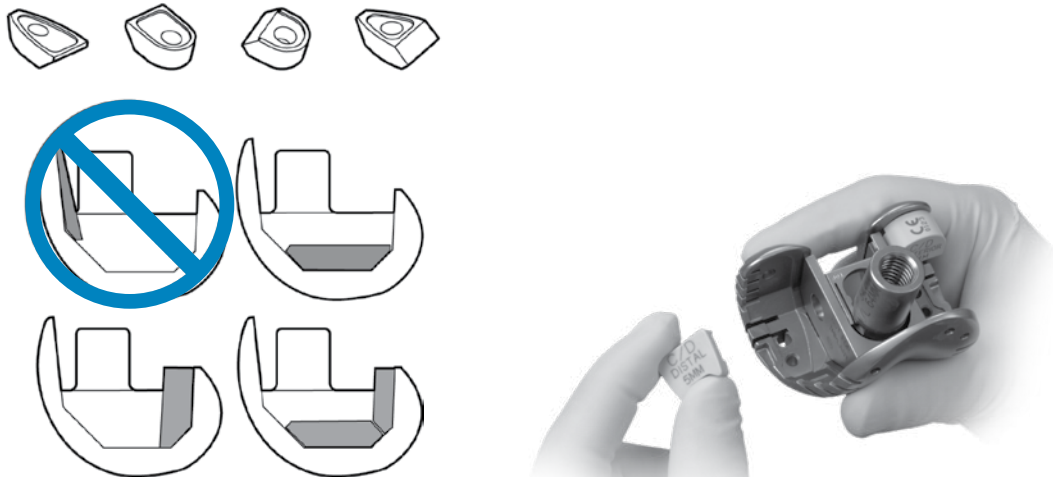


Figure 120

Step 3: Provisional Preparation (cont.)

3.4 Establish Flexion/Extension Gap & Stability

Refer to Appendix A for more detail regarding flexion/extension balancing. If the thinnest articular surface provisional cannot be inserted or the joint is too tight, consider the following:

- Downsize the femoral component (each size is 4mm different in the A/P dimension).
- Lower the tibial plateau/joint line by resection additional bone from the tibia (Refer to the Zimmer Segmental System Trabecular Metal Proximal Tibial Component Surgical Technique (97-5850-006-00) Step 1 Tibial Preparation).

If the thinnest articular surface provisional does not provide adequate tension, insert progressively thicker provisionals until adequate stability is obtained.

If the thickest articular surface provisional does not provide adequate tension, consider the following:

- Select the next larger femoral provisional/cutting guide. Re-evaluate the tibial resection and use of Segmental Segments (Refer to the Zimmer Segmental System Trabecular Metal Proximal Tibial Component Surgical Technique (97-5850-006-00) Step 1 Tibial Preparation).

With the final articular surface provisional in place, fully extend the knee and check for a symmetrical extension gap and adequate stability.

ⓘ Technique Tip: Use the Distal and Posterior Augment Provisionals as spacers to create added stability in flexion and extension (Fig. 120).

If hyperextension exists, move the femoral provisional more distally and evaluate the resulting space between the femoral provisional and the distal femur.

If the gap exceeds 20mm, which is the maximum augment size available, evaluate the next smaller femoral component size, which will allow the use of a thicker articular surface. Then repeat Steps 2 “Femoral Preparation” and 3 “Trial Reduction” above as necessary.

NexGen Reamer
(See Profiler)
00-5125-010-XX

Straight Stem Extension
Provisional (See Profiler)
00-5989-010-XX

Stem Provisional
Adapter
00-5987-016-00

RH Knee Articular
Surface Provisional
(See Profiler)
00-5881-0XX-XX

RH Knee Femoral
Provisional/Cutting
Guide (See Profiler)
00-5881-01X-XX

Distal Femoral
Augment Provisional
(See Profiler)
00-5987-0XX-XX

Posterior Femoral
Augment Provisional
(See Profiler)
00-5987-0XX-XX



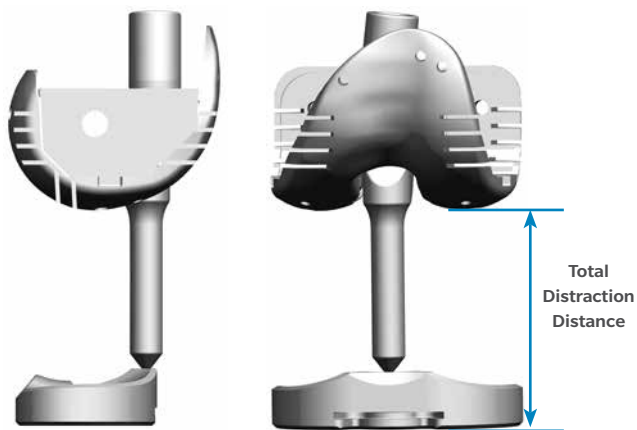


Figure 121

Provisional Articular Surface	Total Distraction Distance Required
00-5881-0XX-12	67mm
00-5881-0XX-14	71mm
00-5881-0XX-17	77mm
00-5881-0XX-20	83mm
00-5881-0XX-23	89mm
00-5881-0XX-26	95mm

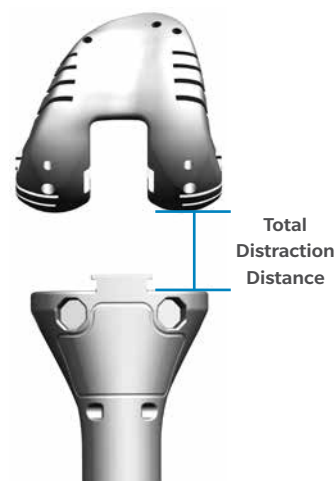


Table 13

Step 3: Provisional Preparation (cont.)

3.5 Reestablish the Joint Line

Refer to Step 7.3 in the main NexGen RH Knee technique above “Reestablish the Joint Line” (p.20).

- After selecting the final articular surface, use the mark made earlier on the tibia to verify the rotation of the proximal tibial provisional.
- If the desired position is different than the initial mark made on the tibia, make a new mark.
- Measure soft tissue distraction available for back-table assembly with the femoral caliper by simulating the total height required to assemble the Segmental One-Piece Hinge Pin over and into the Segmental Articular Surface (Figure 121 & Table 13).

Caution: The hinge post provisional used for trial reduction is available only in the shortest length (corresponding to a 12 mm Segmental Articular Surface), which may be shorter than the final hinge post being implanted. Thus, more distraction may be necessary to assemble the final implant.

If there may not be enough distraction consider in vivo assembly as described in Appendix F.

Step 4: Tissue Attachment Assessment

4.1 Assess Tissue Attachment

4.2 Perform Trialing

Refer to the Zimmer Segmental System Trabecular Metal Proximal Tibial Component Surgical Technique (97-5850-006-00) for the steps listed above.

Step 5: Final Distal Femoral Preparation & Final Trialing

5.1 Final Femoral Preparation

Step 8: Make Femoral Augment Cuts (p.21)

Step 9: Prepare for RH Knee Box (p.22)

Step 10: Prepare Patella (p.25)



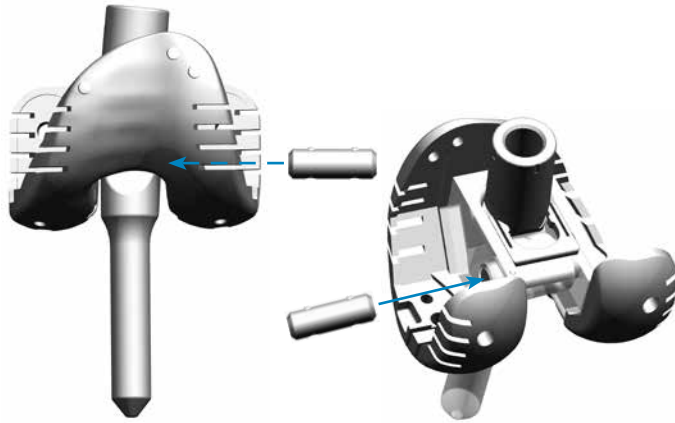


Figure 122



Figure 123

Step 5: Final Distal Femoral Preparation & Final Trialing (cont.)

5.2 Assemble & Insert Femoral Provisional Components

Refer to the femoral provisional assembly instructions in the main NexGen RH Knee technique above:

- Step 11.1: Assemble & Insert Provisional Components (p.22).
- To secure the Segmental/RH Knee Hinge Post Provisional to the NexGen RH Knee Femoral Provisional/Cutting Guide, cross-pin with the Segmental RH Knee Hinge Pin Provisional (Figure 122).

Note: Do not use the Segmental Hinge Post (gold color on its superior end) on the RH Knee Femoral Provisional/Cutting Guide. It will not provide an accurate assessment of hyperextension during trial reduction.

5.3 Insert Hinge Post Provisional

Place the articular surface provisional onto the tibia provisional assembly.

Hyperflex the knee and slide the Segmental/RH Knee Segmental Hinge Post Provisional through the articular surface provisional into the tibial provisional assembly (Figure 123).

Caution: The Segmental One-piece Hinge Post must be used with the Segmental Proximal Tibial Component (not compatible with the NexGen RH Knee modular hinge post and hinge post extension with the Segmental Trabecular Metal Proximal Tibia).

Note: Use of leg holders during the assembly process is not recommended.

5.4 Evaluate Patellar Tracking

Refer to the patellar tracking evaluation in the main NexGen RH Knee technique above:

- Step 11.4: Evaluate Patellar Tracking (p.27)

NexGen Reamer
(See Profiler)
00-5125-010-XX



Straight Stem Extension
Provisional (See Profiler)
00-5989-010-XX



Stem Provisional
Adapter
00-5987-016-00



RH Knee Articular
Surface Provisional
(See Profiler)
00-5881-0XX-XX



RH Knee Femoral
Provisional/Cutting
Guide (See Profiler)
00-5881-01X-XX



Distal Femoral Augment
Provisional (See Profiler)
00-5987-0XX-XX



Posterior Femoral
Augment Provisional
(See Profiler)
00-5987-0XX-XX



Segmental/RH Knee Hinge
Post Provisional (See Profiler)
00-5851-01X-04



Segmental RH Knee
Hinge Pin Provisional
00-5851-085-05





Figure 124

Step 6: Provisional Disassembly

Consider initiating disassembly at the proximal tibia/stem or segment interface. Use the taper separator if necessary.

If necessary, place the femoral extractor into the extraction slots on the distal femoral provisional to remove the component and/or hinge post assembly.

Refer to the Zimmer Segmental System Trabecular Metal Proximal Tibial Component Surgical Technique (97-5850-006-00) for disassembly of the tibial construct.

Step 7: Gastrocnemius Transfer Preparation

Refer to the Zimmer Segmental System Trabecular Metal Proximal Tibial Component Surgical Technique (97-5850-006-00) to prepare the gastrocnemius transfer.

RH Knee Compatibility Chart.
Interchangeability Chart 2-Segmental Knee System
(using RH Knee Distal Femoral and Segmental
Tibial Components)

		NexGen RH Knee Femoral Size				
		B	C	D	E	F
Segmental Proximal Tibial Size	1	B/123	C/123	D/123		
	2	B/123	C/123	D/123	E/23	
	3	B/123	C/123	D/123	E/23	F/3

Table 14

Step 8: Final Assembly & Implantation

It is important to implant the tibial construct before the distal femoral construct to provide a platform for the articular surface and subsequent pressure for the distal femoral component while the cement is curing.

8.1 Assemble the Tibial Construct

Refer to the Zimmer Segmental System Trabecular Metal Proximal Tibial Component Surgical Technique (97-5850-006-00) for the tibial construct assembly.

8.2 Assemble Distal Femoral Construct

Make a final check to ensure that the femoral, tibial, and articular surface components match (Figure 124 and Table 14).

Assemble the stem extension and augment(s) per the main NexGen RH Knee technique above:

- Step 12: “Implant Components” 12.2 “Prepare Femoral Component” (p.29).

Segmental Taper
Separator
00-5851-020-00



Femoral
Extractor
00-5978-020-00



Step 8: Final Assembly & Implantation (cont.)

8.3 Implant Distal Femoral Construct & Articular Surface

See Appendix E: Using the One-piece Segmental Hinge Post with the RH Knee Femoral Component (Back Table Assembly).

- ⓘ **Caution:** If there is concern regarding insufficient tissue distraction, assemble the components via the in vivo Assembly Technique (Appendix F).
- ⓘ **Warning:** Do not use the Segmental Polyethylene Insert with the NexGen RH Knee Distal Femoral Component. Only use the items included in the appropriate size Segmental Articular Surface and NexGen RH Knee Cement Shield Service Kit (Appendix H).

Step 9: Tissue Attachment

Step 10: Final Gastrocnemius Transfer & Closure

Refer to the Zimmer Segmental System Trabecular Metal Proximal Tibial Component Surgical Technique (97-5850-006-00) for final gastrocnemius transfer and closure.

Appendix E: Using the One-piece Segmental Hinge Post with the RH Knee Femoral Component (Back Table Assembly)

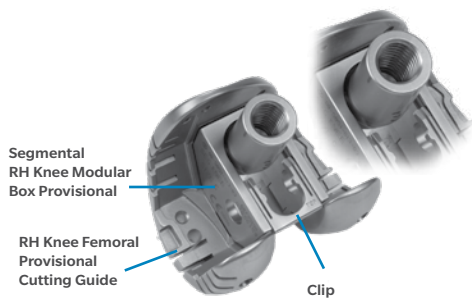


Figure 125



Figure 126



Figure 127

This is the recommended method for the One-piece Segmental Hinge Post with the RH Knee Femoral Component Assembly. If there is concern over sufficient distraction distance, proceed to Appendix F (in vivo Assembly).

In back-table assembly, the hinge post is attached to the femoral component on the back table before the femoral component is implanted. The distal femoral implant assembly (with one-piece hinge post) is inserted into the femoral canal as a complete construct. Then, after sufficient distraction has been achieved across the joint space, the cylindrical portion of the hinge post is inserted through the articular surface and into the tibia.

- Complete Steps 1-10 in the main body of this technique.

Step 1: Assemble and Insert Provisionals

1.1 Prepare the Tibial Provisional Assembly

Insert the tibial provisional assembly onto the tibia if not already present.

1.2 Prepare the Femoral Provisional Assembly

Slide the Segmental/RH Knee Modular Box Provisional onto the femoral provisional/cutting guide and push the clip until it snaps into place (Figure 125).

Snap the appropriate posterior and distal femoral augment provisionals onto the lateral side of the femoral provisional/cutting guide (Figure 126).

Attach the stem extension provisional to the femoral provisional/cutting guide (Figure 127).

For an offset stem extension, set the rotational alignment mark to the setting noted earlier, fully thread the offset stem locknut onto the offset stem extension Provisional and tighten the locknut against the stem extension bushing to lock the orientation.

RH Knee Tibial Provisional (See Profiler)
00-5881-00X-00



Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX



Offset Stem Extension Provisional (See Profiler)
00-5987-020-XX



Segmental RH/ Knee Modular Box Provisional (See Profiler)
00-5851-01X-03



RH Knee Femoral Provisional/ Cutting Guide (See Profiler)
00-5881-013-01



Distal Femoral Augment Provisional (See Profiler)
00-5987-0XX-XX



Posterior Femoral Augment Provisional (See Profiler)
00-5987-0XX-XX



Offset Stem locknut
00-5987-080-00



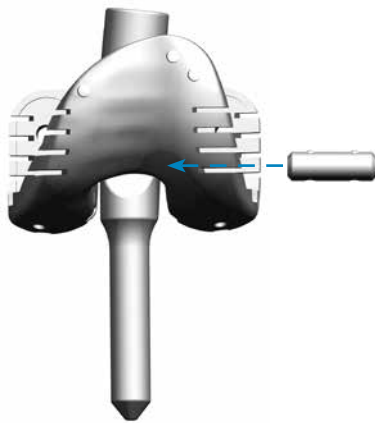


Figure 128

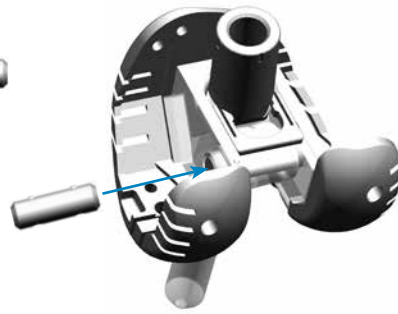


Figure 129

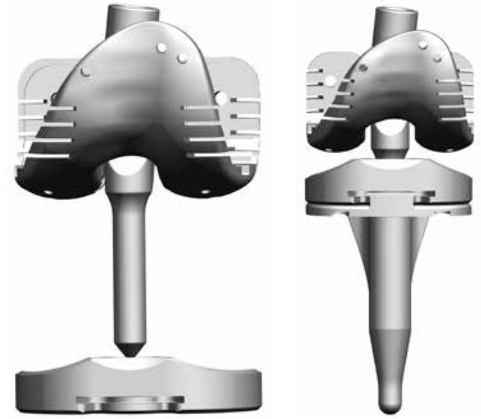


Figure 130

Step 1: Assemble and Insert Provisionals (cont.)

To secure the Segmental/RH Knee Hinge Post Provisional to the NexGen RH Knee Femoral Provisional/Cutting Guide, cross-pin with the Segmental RH Knee Hinge Pin Provisional (Figs. 128 and 129).

Place the articular surface provisional onto the tibial provisional assembly (refer to page 61 for compatibility chart).

1.3 Insert Femoral Provisional Assembly

Insert the provisional stem extension into the canal and begin to advance the femoral component.

As the hinge post approaches the tibial component, distract the joint and simultaneously engage the cylindrical portion of the hinge post through the articular surface and into the tibial component (Figure 130).

Continue to advance the femoral construct until it is flush against the bone surface.

Note: Do not use the Segmental Hinge Post (gold color on its superior end) on the RH Knee Femoral Provisional/Cutting Guide. It will not provide an accurate assessment of hyperextension during trial reduction.

Caution: The hinge post provisional used for trial reduction is available only in the shortest length (corresponding to a 12 mm Segmental Articular Surface), which may be shorter than the final Hinge Post being implanted. Thus, more distraction may be necessary to assemble the final implant. If there is concern over sufficient distraction distance, proceed to Appendix F.






Step 2: Perform Trial Reduction

Place the knee through a full range of motion to evaluate soft tissue tension and knee stability.

If necessary, use a thicker articular surface provisional to balance the knee. For additional information about balancing flexion and extension gaps, refer to Appendix A.

Refer to the patellar tracking evaluation in the main RH Knee technique above (pg. 23).

Once satisfied with the balance of the knee, remove all provisional components.

<p>RH Knee Tibial Provisional (See Profiler) 00-5881-00X-00</p> 	<p>Straight Stem Extension Provisional (See Profiler) 00-5989-010-XX</p> 	<p>Segmental RH/Knee Modular Box Provisional (See Profiler) 00-5851-01X-03</p> 	<p>RH Knee Femoral Provisional/Cutting Guide (See Profiler) 00-5881-013-01</p> 	<p>Distal Femoral Augment Provisional (See Profiler) 00-5987-0XX-XX</p> 	<p>Posterior Femoral Augment Provisional (See Profiler) 00-5987-0XX-XX</p> 	<p>Segmental RH Knee Hinge Pin Provisional 00-5851-085-05</p> 	<p>RH Knee Articular Surface Provisional (See Profiler) 00-5881-0XX-XX</p> 
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Segmental Knee System Compatibility Chart
(using RH Knee Femoral and Tibial Components)

		RH Knee Femoral Size				
		B	C	D	E	F
RH Knee Tibial Size	1	B/123456	C/123456	D/123456		
	2	B/123456	C/123456	D/123456	E/23456	
	3	B/123456	C/123456	D/123456	E/23456	F/3456
	4	B/123456	C/123456	D/123456	E/23456	F/3456
	5	B/123456	C/123456	D/123456	E/23456	F/3456
	6	B/123456	C/123456	D/123456	E/23456	F/3456

Table 15

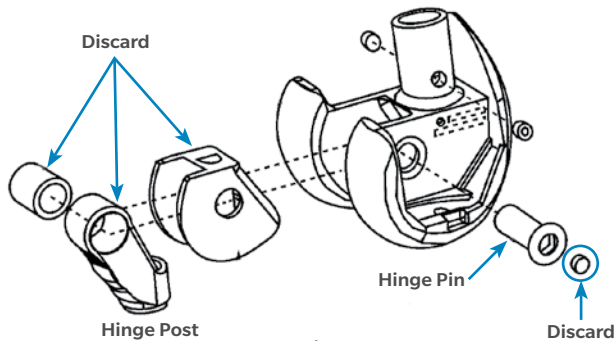


Figure 131

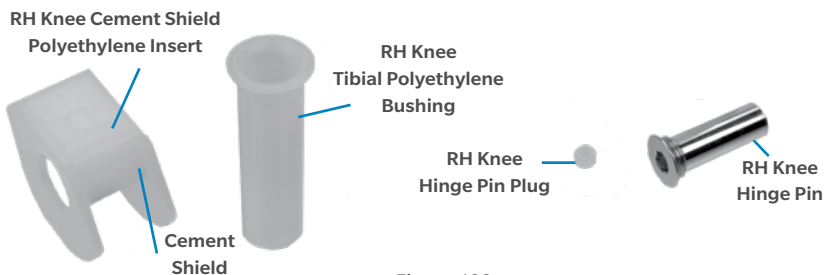


Figure 132

Step 3: Prepare Implants

3.1 Prepare Tibial Component

Refer to the Tibial Component Preparation instructions in the main NexGen RH Knee technique above (p. 28).

3.2 Prepare Femoral Component

Check all component sizes to ensure that the distal femoral component, tibial articular surface, tibial component, and hinge post match (Table 15).

Remove the modular hinge post assembly that is pre-attached to and packaged with the RH Knee Femoral Component.

- Use the hinge pin polyethylene plug removal tool to remove the hinge pin plug.
- Use the 4.5 mm hex driver and LCCK Torque Wrench (black handle) to remove the hinge pin.
- Remove and discard the hinge post and polyethylene box insert (Figure 131).

3.3 Assemble One-Piece Segmental Hinge Post

Verify that the appropriate size Segmental Articular Surface and NexGen RH Knee Cement Shield Service Kit (Figure 132) is used (Appendix H).

Attach the proper size RH Knee Polyethylene Box Insert with Shield to the Segmental Hinge Post by spreading out the sides of the insert slightly and pressing it over the hinge post so the holes in the insert engage the bosses of the Segmental Hinge Pin Bushing.

Warning: When implanting an RH Knee Femoral Component with the Segmental One-piece Hinge Post, use only the RH Knee Cement Shield Polyethylene Insert (Figure 132). Do not use the Segmental Polyethylene Insert as this is only used on the Segmental System Distal Femoral Component (refer to Appendix H).

If the post/insert assembly does not fit easily within the intercondylar notch, pull the assembly out, spread the sides of the insert to remove it from the hinge post, reverse the polyethylene insert orientation, and re-attach it.

Hex Cap Removal Tool 00-5881-053-00 4.5mm Hex Head Screwdriver 00-5881-026-00 LCCK Deflection Beam Torque Wrench 00-5987-035-00



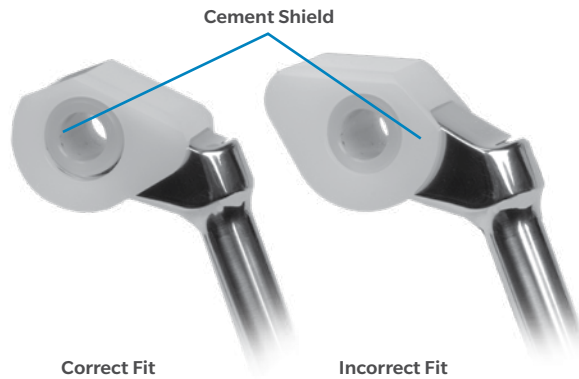


Figure 133

Step 3: Prepare Implants (cont.)

Notes:

- At least two NexGen RH Knee Cement Shield Hinge Servicing Kits must be available in the operating room in case a component is dropped or otherwise rendered nonsterile.
- The RH Knee Cement Shield Hinge Servicing Kit is not the same as the NexGen RH Knee Hinge Servicing Kit or the Segmental Knee Hinge Servicing Kit (Appendix H).
- Use only the Segmental Hinge Post packaged with the Segmental Articular Surface. Its length accounts for the thickness of the Segmental Articular Surface and includes an additional 40mm of jump height to resist subluxation.
- The hinge pin bushing that is pre-assembled to the hinge post prevents the polyethylene insert from being assembled backwards. This bushing should never be replaced with a modular NexGen RH Knee Hinge Post Bushing.
- The holes in the polyethylene insert must match the bosses on the hinge pin bushing to ensure proper orientation (Figure 133). If assembled backwards, the insert will not sit flush against the lateral side of the hinge post due to a “no-fit” condition with the hinge pin bushing. This will cause the post/insert assembly to not properly fit within the intercondylar notch of the NexGen RH Knee Distal Femoral Component upon assembly.

Place the distal femoral component on a padded surgical table.

Insert the Segmental post/insert assembly into the distal femoral component.

Insert the Segmental/RH Knee Hinge Pin Aligner through the medial hole of the femoral component and through the hole in the post/insert assembly to align the components.

Remove the aligner and insert the hinge pin.

Confirm that the hinge pin has engaged the hole on the hinge post bushing and on the opposite side of the intercondylar notch visually or by pulling distally on the hinge post by hand.

Use the LCCK Torque Wrench (black handle) and 4.5mm hex driver to torque the hinge pin to 95 in-lbs.

Cover the hex of the hinge pin with bone wax or press the hinge pin plug from the NexGen RH Knee Cement Shield Hinge Servicing Kit into place with a fingertip or blunt tool to protect the hex of the hinge pin during cementing.

3.4 Stem Extension Assembly

Refer to the Stem Extension Assembly in the main NexGen RH Knee technique above (p. 28).

Hex Cap Removal Tool 00-5881-053-00	4.5mm Hex Head Screwdriver 00-5881-026-00	LCCK Deflection Beam Torque Wrench 00-5987-035-00
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Figure 134

Step 4: Implant Components

Implant the tibial component.

- If using a RH Knee Tibial Component, refer to the main NexGen RH Knee technique above (p. 28).
- If using a Segmental Proximal Tibial Component, refer to Appendix D.

Insert the Segmental Articular Surface (packaged with the Segmental One-piece Hinge Post) onto the implanted tibial component.

Apply augments per the main NexGen RH Knee technique above (p. 29). If using medial augments, apply with cement in order to facilitate its removal if future hinge servicing needed.

Apply cement to the fixation surfaces of the distal femoral component, and to the stem extension.

Insert the stem extension into the canal and begin to advance the femoral component.

As the hinge post approaches the tibial component, distract the joint and simultaneously engage the cylindrical portion of the hinge post through the articular surface and into the tibial component (Figure 134).

Continue to advance the femoral construct until it is flush against the bone surface.

Note: Be careful to protect the articular surface from cement when implanting the femoral/hinge post assembly.

Appendix F: Using the One-piece Segmental Hinge Post with the RH Knee Femoral Component (in vivo Assembly)

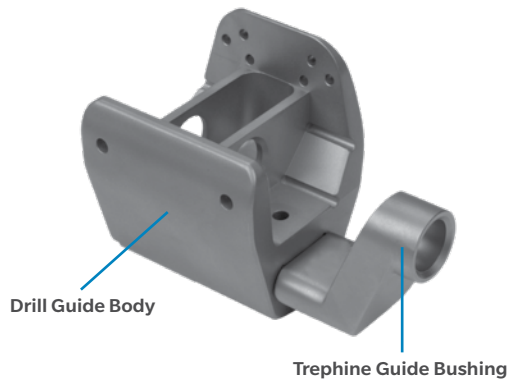


Figure 135



Figure 136

In vivo assembly is recommended when there is concern over sufficient distraction distance.

For in vivo assembly, the hinge post is attached to the femoral component after all other components (the femoral component, Segmental Articular Surface, and tibial component) have been implanted and a medial trephine hole is drilled. The cylindrical portion of the hinge post is first inserted through the Segmental Articular Surface and into the implanted tibial component. Then the proximal portion of the hinge post is attached to the implanted femoral component.

- Complete Steps 1-10 in the main body of this technique.

Step 1: Assemble Provisionals

1.1 Prepare the Tibial Provisional Assembly

Insert the tibial provisional assembly onto the tibia if not already present.

1.2 Prepare the Femoral Provisional Assembly

Slide the Segmental Trepine Guide Bushing into the slot of the Segmental/RH Knee Drill Guide Body (Figure 135).

Thread the universal impactor handle into the hole on the distal face of the drill guide body and tighten it to secure the guide bushing to the drill guide body.

If using a distal femoral augment on the lateral side, attach the distal augment provisional to the underside of the drill guide body.

Confirm that the drill guide body is flush against the distal and anterior chamfer cuts on the lateral side (Figure 136).

RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00



Straight Stem Extension
Provisional (See Profiler)
00-5989-010-XX



Segmental Trepine
Guide Bushing
00-5851-012-06



Segmental/ RH Knee Drill
Guide Body (See Profiler)
00-5851-01X-05



Universal
Impactor Handle
6216-01-125



Distal Femoral Augment
Provisional (See Profiler)
00-5987-0XX-XX



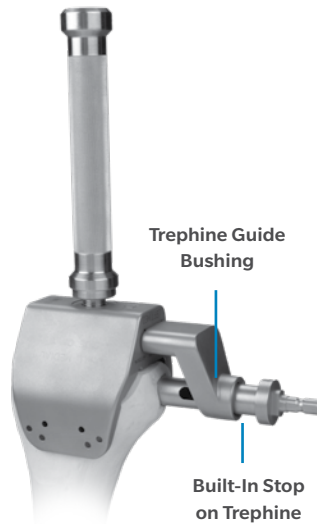


Figure 137

Step 1: Assemble Provisionals (cont.)

Insert the drill guide assembly onto the distal femur, and impact it lightly with a mallet until it is flush with the resected distal surface.

Attach the trephine to a drill/driver, and drill an access hole through the guide bushing and into the medial side of the femur (Figure 137).

RH Knee Tibial Provisional
(See Profiler)
00-5881-00X-00



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



Segmental Trephine Guide Bushing
00-5851-012-06



Segmental/ RH Knee Drill Guide Body
(See Profiler)
00-5851-01X-05



Universal Impactor Handle
6216-01-125



Distal Femoral Augment Provisional
(See Profiler)
00-5987-0XX-XX



Trephine
00-5881-050-00



Segmental RH/Knee Modular Box Provisional
(See Profiler)
00-5851-01X-03



RH Knee Femoral Provisional/Cutting Guide
(See Profiler)
00-5881-013-01



☰ Notes:

- The Segmental/RH Knee Drill Guide Body is intended to be used when implanting an RH Knee either during a revision or primary procedure. To service the hinge on a well fixed, implanted RH Knee, see Appendix G.
- Use the Segmental/RH Knee Drill Guide Body that is the same size as the femoral component being implanted.
- Do not attach distal femoral augment provisionals to the medial side of the drill guide body as this could block the trephine when drilling the access hole.
- The trephine has a built-in stop to limit the depth of drilling.

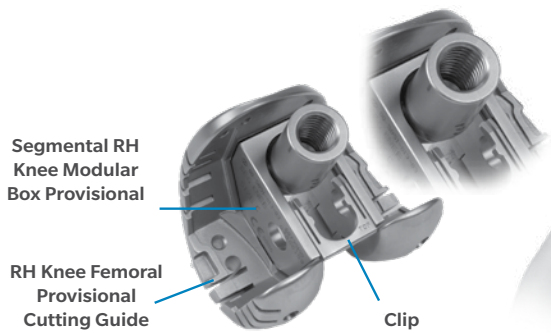


Figure 138



Figure 139



Figure 140

Step 2: Perform Trial Reduction

Slide the Segmental/RH Knee Modular Box Provisional onto the femoral provisional/cutting guide and push the clip until it snaps into place (Figure 138).

Snap the appropriate Posterior and distal femoral augment provisionals onto the lateral side of the femoral provisional/cutting guide (Figure 139).

Attach the stem extension provisional to the femoral provisional/cutting guide (Figure 140).

For an offset stem extension, set the rotational alignment mark to the setting noted earlier, fully thread the offset stem locknut onto the offset stem extension provisional and tighten the locknut against the stem extension bushing to lock the orientation

Insert the provisional assembly onto the bone.













Ensure that the hole in the medial side of the box provisional lines up with the access hole drilled into the medial side of the femur.

If the hole is not aligned, re-drill the access hole or use a burr to remove additional bone.

Assemble and insert the tibial provisional construct.

Insert the articular surface provisional.

Look through the drilled medial hole and ensure it is aligned to the hole in the provisional assembly.

<p>RH Knee Tibial Provisional (See Profiler) 00-5881-00X-00</p> 	<p>Straight Stem Extension Provisional (See Profiler) 00-5989-010-XX</p> 	<p>Offset Stem Extension Provisional (See Profiler) 00-5987-020-XX</p> 	<p>Segmental RH/Knee Modular Box Provisional (See Profiler) 00-5851-01X-03</p> 	<p>RH Knee Femoral Provisional/Cutting Guide (See Profiler) 00-5881-013-01</p> 	<p>Distal Femoral Augment Provisional (See Profiler) 00-5987-0XX-XX</p> 
<p>Offset Stem locknut 00-5987-080-00</p> 	<p>Offset Stem Wrench 00-5987-079-00</p> 	<p>Segmental/RH Knee Hinge Post Provisional (See Profiler) 00-5851-01X-04</p> 	<p>Segmental/ RH Knee Hinge Pin Aligner 00-5851-085-00</p> 	<p>Posterior Femoral Augment Provisional (See Profiler) 00-5987-0XX-XX</p> 	<p>RH Knee Articular Surface Provisional (See Profiler) 00-5881-0XX-XX</p> 

Step 2: Perform Trial Reduction (cont.)

Insert the Segmental/RH Knee Hinge Pin Aligner through the access hole drilled on the medial side of the femur, and through the holes in the insert provisional and hinge post provisional.

🔊 **Technique Tip:** To facilitate assembly, flex the knee to approximately 90° and ensure that the tibia is free to move medially and laterally so it can be centered under the femur. Movement of the knee from 90° of flexion to full extension may also facilitate assembly.

Insert the Segmental/RH Knee Hinge Post Provisional into the post hole in the tibial provisional assembly.

Place the knee through a full range of motion to evaluate soft tissue tension and knee stability.

If necessary, use a thicker articular surface provisional to balance the knee.

Step 2: Perform Trial Reduction (cont.)

If the hinge post provisional does not line up with the box provisional, reposition the tibia under the femur.

Perform any necessary soft tissue releases.

Assess the patellar tracking per the patellar tracking evaluation section in the main RH Knee technique above (p. 27).

Once satisfied with the balance of the knee, remove all provisional components.

Notes:

- Do not attach distal femoral augment provisionals thicker than 5mm to the medial side of the femoral provisional/cutting guide as this could block access for cross-pinning with the Segmental/RH Knee Hinge Pin Aligner.
- Use the NexGen RH Knee Articular Surface Provisionals from the NexGen RH Knee Articular Surface Provisional Instrument Set.
- The size of the articular surface provisional must match the size of the femoral provisional, and the size of the tibial provisional must be compatible with the size on the femoral provisional. Refer to the sizing chart (refer to pg. 71 Table 16).
- Do not use the Segmental Hinge Post (gold color on its superior end) on the RH Knee Femoral Provisional/Cutting Guide. It will not provide an accurate assessment of hyperextension during trial reduction.
- The provisional hinge post used for trial reduction is available in only one length, which may be shorter than the final hinge post implanted. The main purpose of the provisional hinge post is to bring the tibia into alignment with the mechanical axis directly under the femur. The Segmental/RH Knee Hinge Post Implant plays a similar role; however, its length also accounts for the thickness of the Segmental Articular Surface and provides 40mm of jump height to resist subluxation.

RH Knee Tibial Provisional (See Profiler)
00-5881-00X-00



Straight Stem Extension Provisional (See Profiler)
00-5989-010-XX



Offset Stem Extension Provisional (See Profiler)
00-5987-020-XX



Segmental RH/Knee Modular Box Provisional (See Profiler)
00-5851-01X-03



RH Knee Femoral Provisional/Cutting Guide (See Profiler)
00-5881-01X-XX



Distal Femoral Augment Provisional (See Profiler)
00-5987-0XX-XX



Offset Stem locknut
00-5987-080-00



Segmental/RH Knee Hinge Post Provisional (See Profiler)
00-5851-01X-04



Segmental Knee System Compatibility Chart
(using RH Knee Femoral and Tibial Components)

		RH Knee Femoral Size				
		B	C	D	E	F
RH Knee Tibial Size	1	B/123456	C/123456	D/123456		
	2	B/123456	C/123456	D/123456	E/23456	
	3	B/123456	C/123456	D/123456	E/23456	F/3456
	4	B/123456	C/123456	D/123456	E/23456	F/3456
	5	B/123456	C/123456	D/123456	E/23456	F/3456
	6	B/123456	C/123456	D/123456	E/23456	F/3456

Table 16

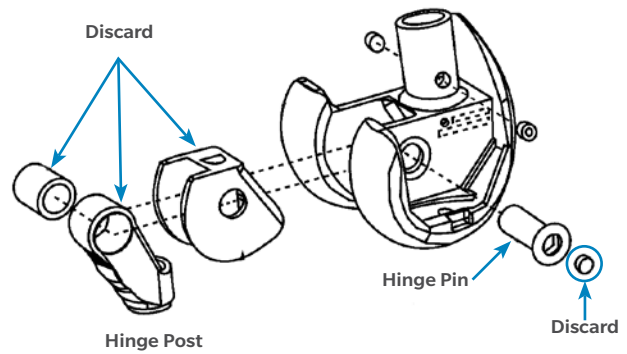


Figure 141

Step 3: Assemble and Insert Implants

3.1 Prepare Tibial Component

Refer to the tibial component preparation instructions in the main NexGen RH Knee technique above (p. 28)

3.2 Prepare Femoral Component

Check all component sizes to ensure that the distal femoral component, tibial articular surface, tibial component, and hinge post match (Table 16).

Remove the modular hinge post assembly that is pre-attached to and packaged with the RH Knee Femoral Component.

- Use the hex cap removal tool to remove the Hinge Pin Plug.
- Use the 4.5 mm hex driver and LCCK Torque Wrench (black handle) to remove the hinge pin.
- Remove and discard the hinge post and polyethylene box insert (Figure 141).
- Re-insert and manually tighten the hinge pin to protect the thread in the femoral component during the cementing process.

Assemble the femoral and tibial components as indicated in the main body of this technique; however, do not attach femoral augments on the medial side greater than 5 mm.

ⓘ **Technique Tip:** Use of 10 mm, 15 mm, and 20 mm NexGen Distal Femoral Augments and 10 mm posterior augments will block access to the RH Knee hinge pin when placed on the medial side. Consider the use of cement only (no locking screw) to affix a medial augment of these sizes to expedite removal in the rare event a revision is required.

Hex Cap Removal Tool
00-5881-053-00

4.5mm Hex Head Screwdriver
00-5881-026-00

LCCK Deflection Beam Torque Wrench
00-5987-035-00



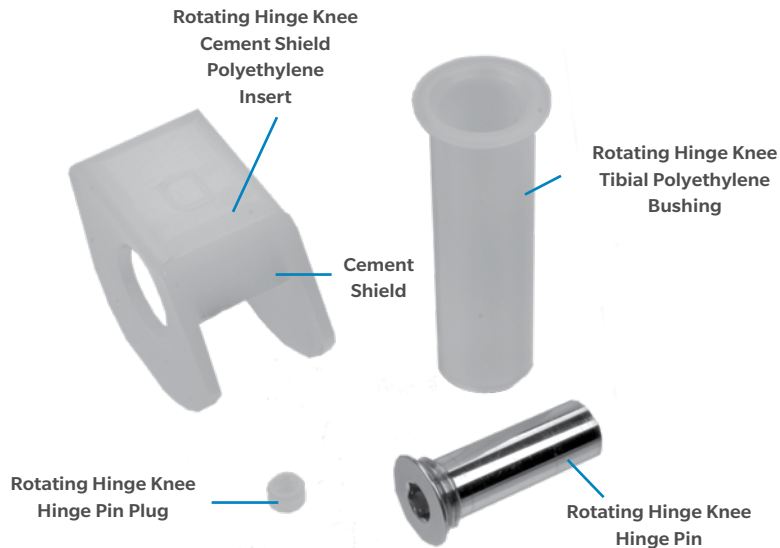


Figure 142

Step 3: Assemble and Insert Implants (cont.)

3.3 Cement Implants

Insert the tibial base plate component.

Insert the femoral component, clearing any excess cement from the medial access hole prior to cement cure.

Insert the articular surface provisional and place the knee in extension until the cement cures.

Use the 4.5 mm hex driver or expandable hinge pin driver through the medial access hole to remove the hinge pin.

Discard the hinge pin.

Step 4: Assemble Segmental Hinge Post

Verify that the appropriate size Segmental Articular Surface and NexGen RH Knee Cement Shield Service Kit (Figure 142) is used (Appendix H).

Attach the proper size RH Knee Polyethylene Box Insert with Shield to the Segmental Hinge Post by spreading out the sides of the insert slightly and pressing it over the hinge post so the holes in the insert engage the bosses of the Segmental Hinge Pin Bushing.

If the post/insert assembly does not fit easily within the intercondylar notch, pull the assembly out, spread the sides of the insert to remove it from the hinge post, reverse the polyethylene insert orientation, and re-attach it.

Warning: Do not use the Segmental Polyethylene Insert with the NexGen RH Knee Distal Femoral Component. Only the items shown in Figure 142 are to be used with the Segmental Hinge Post when it is being implanted with a NexGen RH Knee Distal Femoral Component (refer to Appendix H).

4.5mm Hex Head
Screwdriver
00-5881-026-00



RH Knee Articular
Surface Provisional
(See Profiler)
00-5881-0XX-XX



Expandable Hinge
Pin Driver
00-5881-052-00



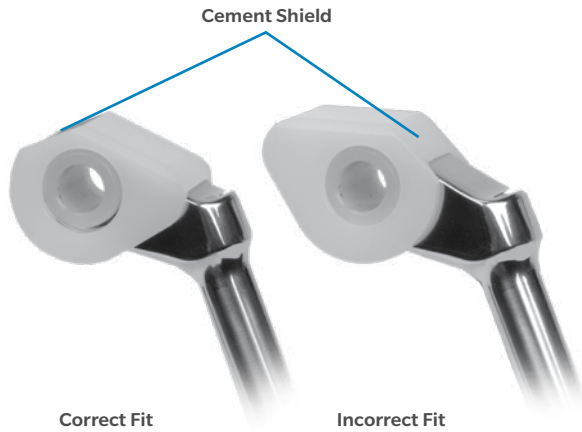


Figure 143



Figure 144

Step 4: Assemble Segmental Hinge Post (cont.)

Notes:

- At least two NexGen RH Knee Cement Shield Hinge Servicing Kits must be available in the operating room in case a component is dropped or otherwise rendered non-sterile.
- The RH Knee Cement Shield Hinge Servicing Kit is not the same as the NexGen RH Knee Hinge Servicing Kit or the Segmental Knee Hinge Servicing Kit (Appendix H).
- Use only the Segmental Hinge Post packaged with the Segmental Articular Surface. Its length accounts for the thickness of the Segmental Articular Surface and includes an additional 40mm of jump height to resist subluxation.
- The hinge pin bushing that is pre-assembled to the hinge post prevents the polyethylene insert from being assembled backwards. This bushing should never be replaced with a modular NexGen RH Knee Hinge Post Bushing.
- The holes in the polyethylene insert must match the bosses on the hinge pin bushing to ensure proper orientation (Figure 143).

- If the polyethylene insert with shield is assembled backwards onto the hinge post, the insert will not sit flush against the lateral side of the hinge post due to a “no-fit” condition with the hinge pin bushing. This will cause the post/insert assembly to not fit without interference within the intercondylar notch of the NexGen RH Knee Distal Femoral Component upon assembly.

Step 5: Assemble and Insert Implants

Implant Assembly

Attach the new hinge pin from the NexGen RH Knee Cement Shield Servicing Kit to the expandable hinge pin driver (Figure 144).

Insert the proximal end of the post/insert assembly into the intercondylar notch of the distal femur.

- **Technique Tip:** To facilitate seating of the assembly into the intercondylar notch, rotate the post/insert assembly anteroposteriorly and move the knee from 90° of flexion into extension.

4.5mm Hex Head
Screwdriver
00-5881-026-00

Expandable Hinge
Pin Driver
00-5881-052-00





Figure 145

Step 5: Assemble and Insert Implants (cont.)

Visually confirm that the holes are aligned by looking through the medial access hole.

Insert the Segmental/RH Knee Hinge Pin Aligner through the holes.

Confirm that the aligner has engaged the hole on the opposite side of the intercondylar notch by pulling distally on the hinge post by hand.

While holding the knee steady, remove the Segmental/RH Knee Hinge Pin Aligner.

Insert and thread the new hinge pin through the medial access hole and into the aligned holes of the femoral component and hinge post, ensuring that the hinge pin passes through the hinge pin bushing of the hinge post.

Confirm that the hinge pin has engaged the hole in the hinge post bushing and on the opposite side of the intercondylar notch by pulling distally on the hinge post by hand.

Use the LCCX Torque Wrench (black handle) and 4.5mm Hex Driver to torque the hinge pin to 95 in-lbs (Figure 145).

Cover the hex with bone wax through the medial access hole.

If using medial augments, pack cement into the medial pockets of the distal femoral component, and onto the resected distal and posterior medial femoral condyle.

Insert the medial augments from the side, and fill any gaps with additional cement.

ⓘ Notes:

- Do not use the hinge pin that was in place during the cementing process.
- The expandable hinge pin driver can be used to hold the hinge pin during insertion. Do not use this instrument to torque the hinge pin after it is fully inserted.
- If femoral augments are being used on the medial side of the NexGen RH Knee Distal Femoral Component, the augments will need to be removed to remove the hinge pin in a future revision. Consider cementing these augments to facilitate further removal if necessary.

Segmental/ RH
Knee Hinge Pin
Aligner
00-5851-085-00



LCCX Deflection
Beam Torque
Wrench
00-5987-035-00



Expandable Hinge
Pin Driver
00-5881-052-00



Appendix G: Servicing the Hinge of a Well Fixed RH Knee

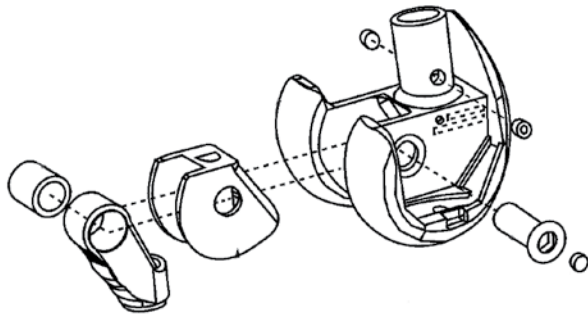


Figure 146

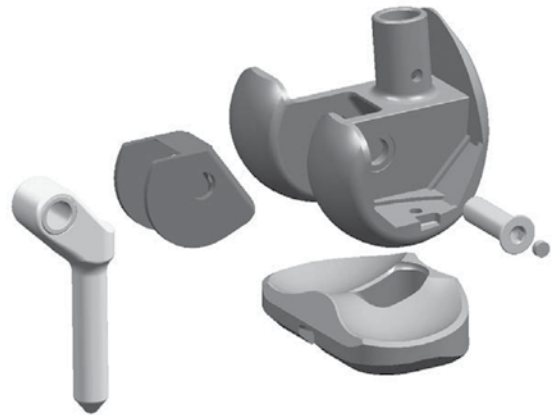


Figure 147

This is typically used when there is an existing well fixed RH Knee Femoral and tibial component.

The hinge mechanism of the RH Knee implant can be replaced or serviced without disrupting the fixation of the femoral and tibial components. A sterile kit (RH Knee Cement Shield Hinge Servicing Kit for replacement with the Segmental Articular Surface and the One-Piece Hinge Post, or the RH Knee Hinge Servicing Kit for replacement with the RH Knee Articular Surface or Segmental Articular Surface and the modular hinge post) is available for each femur size that contains the hinge components required to facilitate the exchange (Figures 146 and 147).

Note: If the RH Knee Hinge Servicing Kit (Table 17 top) is used to service the RH Knee implant, the RH Knee Modular Hinge Post can be used with either the RH Knee Articular Surface or the Segmental Articular Surface. If the RH Knee Cement Shield Hinge Servicing Kit (Table 17, bottom) is used to service the RH Knee implant, the Segmental One-Piece Hinge Post must be used with the Segmental Articular Surface. See Table 17 for an illustration of the compatibility of the servicing kits.

Servicing Kit Compatibility Chart (using RH Knee Femoral and Tibial Components)

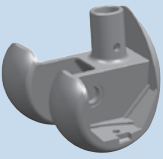


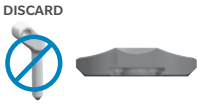
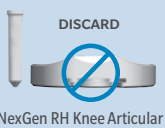
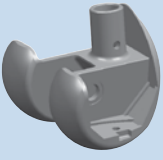


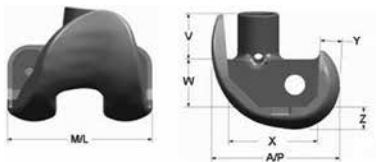
RH Knee	Hinge Servicing Kit Used	Compatible Articular Surfaces and Hinge Components		
			Segmental Articular Surface (with the Hinge Post)	
 <p>Base Component System</p>	 <p>NexGen RH Knee Hinge Servicing Kit</p>	 <p>NexGen RH Knee Articular Surface (with the Hinge Post Extension)</p>	<p>OR</p>  <p>Segmental Articular Surface with the Segmental One-Piece Hinge Post</p>	<p>DISCARD</p>  <p>NexGen RH Knee Articular Surface (with the Hinge Post Extension)</p>
 <p>Base Component System</p>	 <p>NexGen RH Knee Cement Shield Servicing Kit</p>	 <p>Segmental Articular Surface with the Segmental One-Piece Hinge Post</p>		

Table 17



RH Knee Distal Femoral Implant Dimensions

	RH Knee Key Dimensions						
	M/L	A/P	V	W	X	Y	Z
Size B	58mm	50mm	18mm	19mm	35mm	8.4mm	9mm
Size C	64mm	54.4mm	23.4mm	22.4mm	37mm	10mm	10.5mm
Size D	68mm	58mm	23.4mm	24mm	41mm	10mm	10.5mm
Size E	72mm	62mm	23.4mm	25.4mm	45mm	10mm	10.5mm
Size F	76mm	66mm	23.4mm	27.4mm	48.6mm	10mm	10.5mm

Table 18

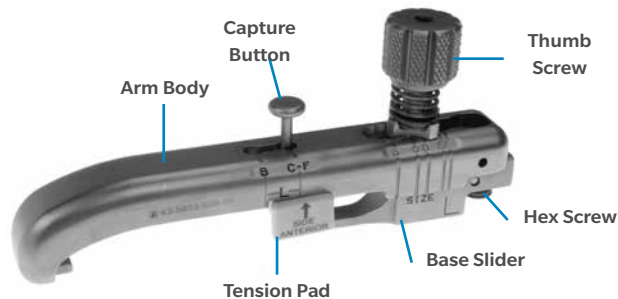


Figure 148

Servicing the Hinge of a Well Fixed RH Knee (cont.)

Determine the femur size that has been implanted into the patient. Markings on the articular surface, top of the polyethylene box insert and on the back of the hinge post can assist in this identification.

Notes:

- The Segmental Articular Surface may be used to increase the tibial/femoral compatibility options (refer to Table 17, p. 75). If used with the RH Knee Hinge Servicing Kit, discard the Segmental One-piece Hinge Post from the Segmental Articular Surface package. An RH Knee Articular Surface package must also be opened to retrieve the hinge-post extension to be used with the RH Knee Hinge Servicing Kit and the Segmental Articular Surface.
- If a distal and/or posterior augment larger than 5mm has been used on the medial side, the augment will need to be removed to provide access to the hinge pin.

- Make sure the femur size is identified correctly (by reading markings or measuring M/L and/or A/P dimension of femoral implant) and that the correct trephine guide bushing is chosen. Otherwise, the hinge pin may not be accessed and additional bone loss could occur. See Table 18 and Table 19 for M/L, A/P, and other important dimensions of the RH Knee Distal Femoral Implant.

If there is not sufficient clearance on the distal end of the RH Knee Femoral Component for the condylar trephine guide instrumentation (Figure 148) to be used properly due to biological obstructions, an alternate freehand technique may be used to locate the hinge pin as follows.



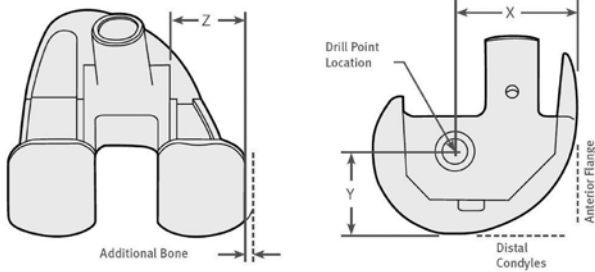


Figure 149

RH Knee Hinge Pin Location Dimensions			
Femoral Size	X	Y	Z
B	32.5mm	17.5mm	16mm
C	32.5mm	22mm	19mm
D	35mm	23.5mm	21mm
E	37mm	25mm	23mm
F	38.5mm	27mm	25mm

Table 19

Freehand Drilling using Trepine or 18mm Femoral Stem Drill:

Locate and mark the drilling center point on the medial side of the bone at a distance of 'X' from the anterior flange and a distance of 'Y' from the distal condyle surface (Figure 149).

Measure the additional bone on the medial side (not covered by the implant) and add to 'Z' depth (Table 19). This is the 'total depth' to be drilled.

Mark the total depth on trephine or 18mm femoral stem drill with a marking pen and drill through the bone to the required depth (taking care not to drill into the actual component) to access the hinge pin.

Follow the steps as shown for servicing the hinge mechanism for a RH Knee Distal Femur with a Segmental One-Piece Hinge Post or servicing the hinge mechanism for a RH Knee Distal Femur with a RH Knee Modular Hinge Post, whichever applies.

Note: For size B RH Knee Femurs, if a distal and/or posterior augment has been used on the medial side, the augment will need to be removed to provide access to the hinge pin.

For size C-F RH Knee Femurs, if a distal and/or posterior augment larger than 5mm has been used on the medial side, the augment will need to be removed to provide access to the hinge pin.

Trepine
00-5881-050-00

Femoral Stem
Base Drill
00-5881-010-01



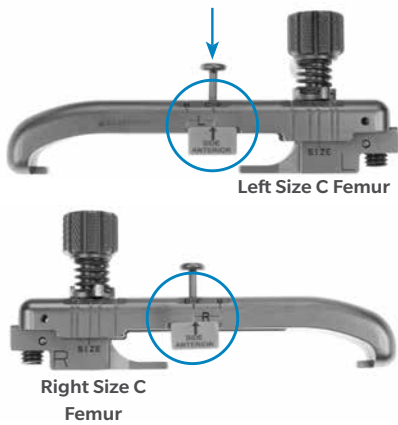


Figure 150



Figure 151

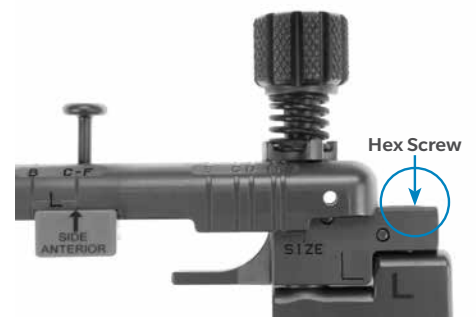


Figure 152

Step 1: Preparing the Condylar Trephine Guide

Adjust the orientation of the tension pad on the condylar trephine guide by pressing the capture button so that the tension pad is disengaged and slide the capture button so that it is in the hole that corresponds to the size of the femoral component (Figure 150).

The etching on the tension pad must match up with the etching on the arm body indicating which side femoral component ('L' for left or 'R' for right) is being serviced (Figure 151).

Adjust the base slider by loosening the thumb screw of the condylar trephine guide so that the recessed hex screw is accessible for attachment of the trephine guide bushing (Figure 152).

Condylar
Trephine Guide
00-5853-028-00



Trephine Guide Bushing
See ZSS Profiler
00-5853-01X-51



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





Figure 153

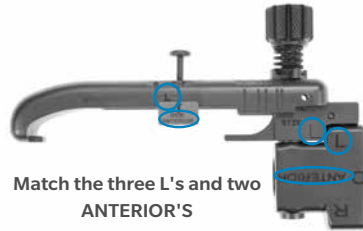


Figure 154

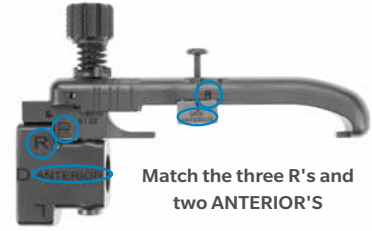


Figure 155

Step 1: Preparing the Condylar Trephine Guide (cont.)

Secure the appropriate size trephine guide bushing, corresponding to the size femoral component implanted in the patient, to the condylar trephine guide by tightening the recessed hex screw with the 3.5 mm hex head screwdriver (Figure 153).

Note: For a left femur, the 'L' on the trephine guide bushing should be oriented the same as both 'L's on the condylar trephine guide (Figure 154). For a right femur, the 'R' on the trephine guide bushing should be oriented the same as the 'R' on the condylar trephine guide (Figure 155). In both cases the bushing and guide should read 'ANTERIOR'.

Condylar
Trephine Guide
00-5853-028-00



Trephine Guide Bushing
See ZSS Profiler
00-5853-01X-51



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



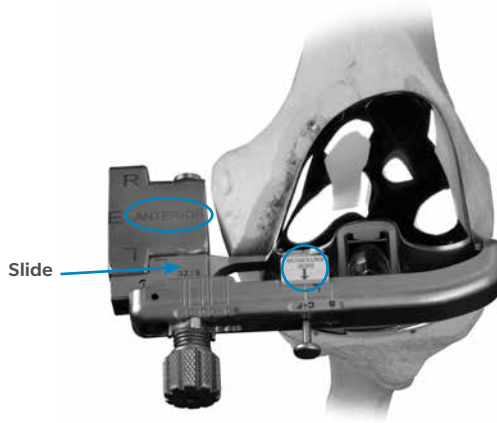


Figure 156



Figure 157



Figure 158

Step 1: Preparing the Condylar Trephine Guide (cont.)

Attach the condylar trephine guide to the notches on each side of the femoral component by sliding the base slider towards the femoral component (Figures 156 and 157).

Note: The etching on the trephine guide bushing 'ANTERIOR' as well as the etching on the tension pad 'ANTERIOR' should be facing the ANTERIOR side of the femoral component.

Tighten the thumb screw in the location on the arm body such that the appropriate size femur matches the size indicated by the condylar trephine guide (Figure 158). This will secure the condylar trephine guide to the notches of the femoral component.

Note: Make sure the femur size implanted in the patient matches the femoral size marking on the condylar trephine guide. Otherwise, the hinge pin may not be accessed and additional bone loss could occur.

Condylar
Trephine Guide
00-5853-028-00



Trephine Guide Bushing
See ZSS Profiler
00-5853-01X-51





Figure 159



Figure 160



Figure 161

Step 2: Accessing the Currently Implanted Hinge Pin

Use the trephine to drill an access hole into the medial side of the femur (Figure 159). The trephine has a built in stop to limit the depth of drilling. Use the hand rasp to remove any remaining bone or cement obstructing access to the hinge pin (Figure 160).

Remove the condylar trephine guide from the femoral component by loosening the thumb screw. Use the hex cap removal Tool to remove the polyethylene plug from the hex in the hinge pin by pressing the tip into the center of the hinge pin plug and turning (Figure 161).

**Condylar
Trepine Guide**
00-5853-028-00



Trepine Guide Bushing
See ZSS Profiler
00-5853-01X-51



Trepine
00-5881-050-00



Hand Rasp
00-5881-051-00



**Hex Cap Removal
Tool**
00-5881-053-00



**Tibial Bushing
Remover**
00-5881-055-00





Figure 162



Figure 163



Figure 164

Step 3: Removing the Currently Implanted Hinge Pin & Components

ⓘ **Note:** This document assumes that there is a well-fixed distal femoral component and a well-fixed proximal tibia component.

Removing the Hinge Pin and Components

Remove the hinge pin using the 4.5mm hex head screwdriver and RH Knee Removal Wrench. Once the hinge pin has been removed, the remaining internal hinge components are also removed (Figures 162 and 163).

Remove the articular surface. Remove tibial bushing from the tibial plate stem with the tibial bushing remover (Figure 164). Be careful to avoid scratching the tibial plate surface.

4.5mm Hex Head Screwdriver
00-5881-026-00

RH Knee Removal Wrench
00-5881-054-00





Figure 165



Figure 166



Figure 167



Figure 168

Step 4: Implanting the New Hinge Mechanism and Articular Surface

Implanting the Hinge Mechanism using the RH Knee Hinge Servicing Kit with an RH Knee Modular Hinge Post

Insert the new tibial bushing from the RH Knee Hinge Servicing Kit for using a RH Knee Modular Hinge Post into the tibial plate stem and press into place (Figure 165) (Appendix H). If using a Segmental One-piece Hinge Post, proceed to page 87.

Insert the polyethylene box insert from the RH Knee Hinge Servicing Kit into the femur and slide the RH Knee Hinge Post with bushing into place (Figure 166).

Attach the new hinge pin from the RH Knee Hinge Servicing Kit to the expandable hinge pin driver (Figure 167). The expandable hinge pin driver can be used to hold the hinge pin during insertion.

Note: Do not use this instrument to torque the hinge pin after it is fully inserted.

Align the holes of the femoral component and of the RH Knee Modular Hinge Post/RH Knee Polyethylene Box Insert assembly to accept the hinge pin by first confirming alignment visually through the medial access hole, then insert the Segmental/RH Knee Hinge Pin Aligner through the medial access hole.

Hold the knee steady, and remove the Segmental/RH Knee Hinge Pin Aligner. Then insert and thread the new hinge pin (attached to the expandable hinge pin driver). Remove the expandable hinge pin driver.

Torque the hinge pin to 95 in.-lb. using the LCCCK Torque Wrench (black handle) and the 4.5mm hex driver (Figure 168). Press the new hinge pin plug from the RH Knee Hinge Servicing Kit into the hex of the hinge pin or cover the hex with bone wax. Replace the bone removed during drilling if desired.

Segmental RH/Knee
Modular Box Provisional
(See Profiler)
00-5851-01X-03



Segmental/ RH Knee
Hinge Pin Aligner
00-5851-085-00



Expandable Hinge
Pin Driver
00-5881-052-00



LCCCK Deflection Beam
Torque Wrench
00-5987-035-00





Figure 169



Figure 170

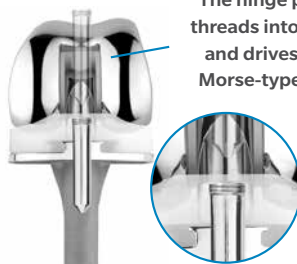


Figure 171

The hinge post extension threads into the hinge post and drives the 4-degree Morse-type taper to lock.

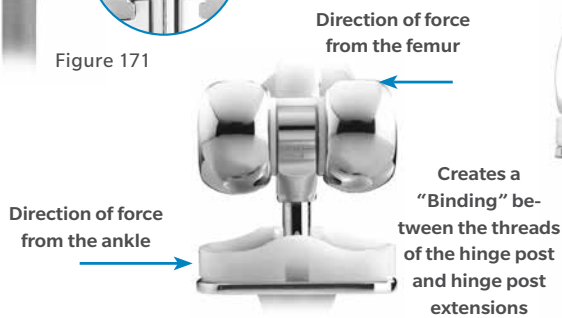


Figure 172

Hinge Post Extension will require the tibia to be located directly under the femur. If they are not, it will be difficult to insert the hinge post extension. To solve - reposition the lower leg under the femur.

Step 4: Implanting the New Hinge Mechanism and Articular Surface (cont.)

Distraction Method

Select the appropriate size articular surface (refer to page 5).

Place the tibial articular surface onto the tibial base plate and slide it forward until it engages the tab (Figure 169). While distracting the joint, rotate the hinge post posteriorly until it drops into the hole in the middle of the articular surface (Figure 170).

The Locking Mechanism of the RH Knee

Tightening of the taper on the hinge post extension is critical to achieving security of the locking mechanism of the implant. Use of the spanner wrench to counteract the opposing forces of the RH Knee Torque Wrench ensures minimal forces are transmitted to the fixation surfaces, and reduces the potential of binding. Tightening to the level indicated on the torque wrench is the most important step in the surgical technique because it “locks” the hinge post extension into position. The hinge post extension is designed with a 4 degree Morse-type taper below the threads (Figure 171). This 4 degree taper mates with a taper in the hinge post to provide the “lock” between the components. If the hinge post assembly is not properly tightened, postoperative disassembly could potentially occur.

Freedom of the hinge post extension to rotate within the hinge may be compromised (reduced) by binding between the threads of the hinge post and hinge post extension. This binding is created when the tibia is not aligned directly under the femoral component (Figure 172).

This malalignment creates friction between the threads of the hinge post and hinge post extension as the extension is inserted and turned. The friction in the hinge post extension can lead to a reduction in the tightening torque being applied to threads just above the 4 degree Morse Taper. As bending forces (binding) increase, the rotational torque that is applied to the hinge post extension decreases. This could directly affect locking of the 4 degree locking taper. In cases where this malalignment is significant, it is possible for bending forces to increase to the point where even though the torque wrench reads to the proper level, only a fraction of tightening force is being exerted to the screw threads and Morse Taper. In this case, the 4-degree Morse Taper may not be fully locked. As earlier discussed, adequate taper locking is critical to maintaining assembly.

Spanner Wrench
00-5881-028-00
00-5881-028-01 (Size B)



RH Knee Deflection
Beam Torque Wrench
00-5881-027-00





Figure 173



Figure 174

Step 4: Implanting the New Hinge Mechanism and Articular Surface (cont.)

It is possible to address this concern at the time of implant assembly by following these recommendations. If difficulty is encountered in assembling or disassembling the provisional hinge post components, it is necessary to reposition the lower leg (tibia) under the femur until the hinge post extension pin slips easily into place. The same is true for the implant assembly. The hinge post extension should easily slide through the hole in the top of the hinge post and into the tibial base plate (Figure 173).

The surgeon should be able to easily turn (thread) the hinge post extension until it is flush with the top of the hinge using only two fingers on the hex head screwdriver. If significant resistance to turning is encountered, the tibial/femoral alignment must be altered to remove the binding force.

Proper alignment must be maintained during the entire assembly process. It is critical to continue to maintain this orientation during the time that the spanner wrench is assembled, and the torque wrench is tightened. Remember, if resistance to turning is encountered, a malalignment is creating a bending force (binding) and reducing the locking torque on the 4-degree Morse Taper.

To confirm that the femur and tibia are in alignment during the tightening process, use the 4.5mm hex head screwdriver to finger tighten and loosen the hinge post extension a half turn immediately prior to use of the torque wrench. The proper upper/ lower leg alignment position must then be maintained throughout the tightening process.

Hinge Post Extension Insertion

Make sure that the hinge post and hinge post extension tapers are clean and dry prior to assembly of the components. The appropriate length hinge post extension is packaged with each articular surface. Align the hinge post with the hole in the top of the tibial base plate, and insert the hinge post extension in the hinge post through the articular surface and into the hole on the tibial base plate (Figure 174). Thread the hinge post extension into the hinge post, by hand, using the driver (Figure 175).

Spanner Wrench
00-5881-028-00
00-5881-028-01 (Size B)



RH Knee Deflection Beam Torque Wrench
00-5881-027-00



4.5mm Hex Head Screwdriver
00-5881-026-00



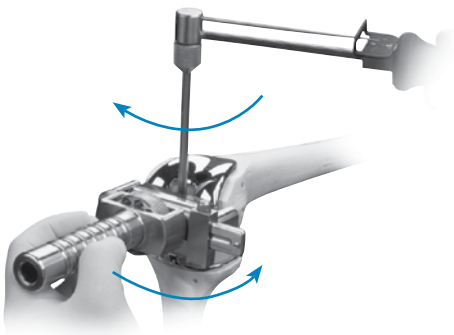


Figure 175



Figure 176

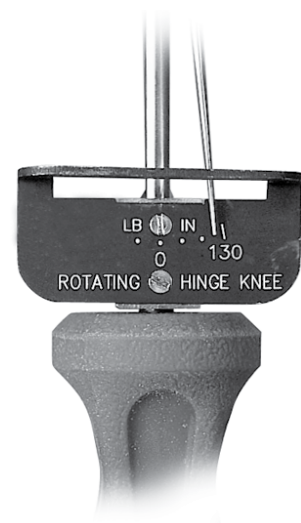


Figure 177

Step 4: Implanting the New Hinge Mechanism & Articular Surface (cont.)

Leave the driver in the hinge post extension. Attach the spanner wrench to the two tabs on the outside of the medial and lateral femoral component. Thumb tighten the knurled wheel to snug the wrench to the distal femoral condyles. Attach the RH Knee Deflection Beam Torque Wrench to the driver, and apply 130 in.-lbs. (15N-m) of torque until the needle on the wrench reaches the appropriate mark on the torque wrench (Figures 175-177). While torque is being applied, counter rotation is applied using the spanner wrench.

Note: Do not over- or under-torque. Undertightening of the hinge post extension may allow it to loosen over time. Overtightening is not necessary.

Spanner Wrench
00-5881-028-00
00-5881-028-01 (Size B)



RH Knee Deflection Beam Torque Wrench
00-5881-027-00



4.5mm Hex Head Screwdriver
00-5881-026-00





Figure 178

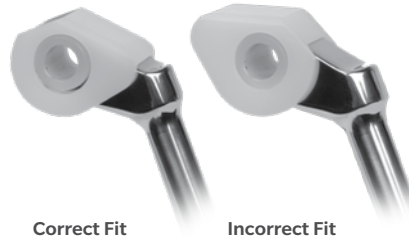


Figure 179

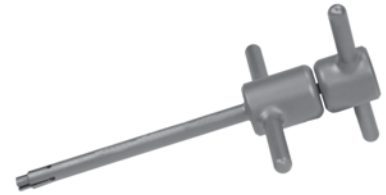


Figure 180

Step 4: Implanting the New Hinge Mechanism & Articular Surface (cont.)

Implanting the Hinge Mechanism using the RH Knee Cement Shield Servicing Kit with a Segmental One-Piece Hinge Post

Insert the new tibial bushing from the RH Knee Cement Shield Hinge Servicing Kit for using a Segmental One-Piece Hinge Post into the tibial plate stem and press into place (Figure 178).

Attach the proper size RH Knee Cement Shield Polyethylene Insert to the Segmental Hinge Post by spreading out the sides of the insert slightly and pressing it over the hinge post so the holes in the insert engage the bosses of the Segmental Hinge Pin Bushing. The holes in the polyethylene insert must match the bosses on the hinge pin bushing to assure proper orientation (Figure 179).

- ⓘ **Note:** If attached backwards, the insert will not sit flush against the lateral side of the hinge post due to a “no-fit” condition with the hinge pin bushing. This will cause the hinge post/polyethylene insert assembly to not fit without interference within the intercondylar notch of the femoral component upon assembly. Therefore, if the hinge post/polyethylene insert assembly does not fit easily within the intercondylar notch, pull the assembly out, spread the sides of the polyethylene insert to remove it from the hinge post, reverse the polyethylene insert orientation, and reattach it. The polyethylene insert should then be flush against the lateral sides of the hinge post.

Place the Segmental Articular Surface onto the tibial base plate and slide it forward until it engages the tab.

Insert the cylindrical portion of the Segmental One-Piece Hinge Post through the Segmental Articular Surface and into the implanted tibial component.

Attach the new hinge pin from the RH Knee Cement Shield Hinge Servicing Kit to the expandable hinge pin Driver (Figure 180). The expandable hinge pin driver can be used to hold the hinge pin during insertion.

- ⓘ **Note:** Do not use this instrument to torque the hinge pin after it is fully inserted.

Expandable Hinge
Pin Driver
00-5881-052-00





Figure 181

Step 4: Implanting the New Hinge Mechanism & Articular Surface (cont.)

Insert the proximal end of the Segmental One-Piece Hinge Post/RH Knee Cement Shield Polyethylene Insert assembly into the intercondylar notch of the distal femur. Anteroposterior rotation of the Segmental One-Piece Hinge Post/RH Knee Cement Shield Polyethylene Insert assembly, from flexion into extension, may facilitate seating of the assembly into the intercondylar notch.

Align the holes of the femoral component and the Segmental One-Piece Hinge Post/RH Knee Cement Shield Polyethylene Insert assembly to accept the hinge pin by first confirming alignment visually through the medial access hole, then insert the Segmental/ RH Knee Hinge Pin Aligner through the medial access hole.

Hold the knee steady, and remove the Segmental/ RH Knee Hinge Pin Aligner then insert and thread the new hinge pin (attached to the expandable hinge pin driver). Remove the expandable hinge pin driver.

Torque the hinge pin to 95 in.-lb. using the LCCK Torque Wrench (black handle) and the hex head screwdriver (Figure 181). Press the new hinge pin plug from the RH Knee Hinge Servicing Kit into the hex of the hinge pin or cover the hex with bone wax. Replace the bone removed during drilling if desired.


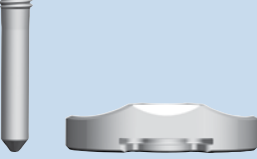



Segmental/RH Knee
Hinge Pin Aligner
00-5851-085-00

LCCK Deflection Beam
Torque Wrench
00-5987-035-00

4.5mm Hex Head
Screwdriver
00-5881-026-00



Appendix H: NexGen RH Knee & Segmental Articular Surface/Hinge Kit Compatibilities

	Item Description	Picture/Item Number	Use On/With	Do Not Use With/Why
1	<p>Segmental Articular Surface</p> <ul style="list-style-type: none"> Segmental One-piece Hinge Post Segmental Articular Surface Piece 	 <p>00-5850-020_060-12_26</p>	<p>Segmental Distal Femoral XT (00-5850-042_043-02)</p> <p>Segmental Trabecular Metal Proximal Tibial (00-5850-001_003-10)</p> <p>NexGen RH Knee Distal Femoral (00-5880-012_016-02)</p> <p>NexGen RH Knee Tibial Plate (00-5880-001_006-02)</p> <p>Segmental Articular Surface can be used with the NexGen RH Knee Hinge Post Extension (from Item 2 below) EXCEPT with the Trabecular Metal Proximal Tibial (see page 75 for the Servicing Kit Compatibility Chart)</p>	<p>Segmental One-piece Hinge Post with NexGen RH Knee Articular Surface Piece</p> <ul style="list-style-type: none"> Mating components are not compatible <p>RH Knee Modular Hinge Post Extension + Segmental Articular Surface + Segmental Trabecular Metal Proximal Tibial</p> <ul style="list-style-type: none"> Only Segmental One-piece Hinge Post is indicated with the Segmental Trabecular Metal Proximal Tibial
2	<p>NexGen RH Knee Articular Surfaces</p> <ul style="list-style-type: none"> NexGen RH Knee Hinge Post Extension NexGen RH Knee Articular Surface Piece 	 <p>00-5880-020_060-12_26</p>	<p>NexGen RH Knee Distal Femoral</p> <p>NexGen RH Knee Tibial Plate</p>	<p>Segmental Distal Femoral XT</p> <p>Segmental Trabecular Metal Proximal Tibial</p> <p>Segmental One-piece Hinge Post</p> <ul style="list-style-type: none"> Mating components are not compatible
3	<p>NexGen RH Knee Cement Shield Hinge Service Kit</p> <ul style="list-style-type: none"> Poly Insert with Shield Shoulder Bolt Hinge Pin Hinge Pin Plug Tibial Bushing 	 <p>00-5850-075-12_16</p>	<p>NexGen RH Knee Distal Femoral with Segmental Articular Surface & Segmental One-Piece Hinge Post (Item 1 above)</p>	<p>NexGen RH Knee Distal Femoral with NexGen RH Knee Hinge Post Extension</p> <ul style="list-style-type: none"> Mating components are not compatible
4	<p>Segmental Hinge Service Kit</p> <ul style="list-style-type: none"> Segmental Poly Insert Segmental Hinge Pin Segmental Hinge Pin Set Screw Tibial Bushing 	 <p>00-5850-071-12_13</p>	<p>Segmental Distal Femoral XT</p> <p>Segmental Articular Surface with Segmental One-piece Hinge Post (Item 1 above)</p>	<p>NexGen RH Knee Distal Femoral</p> <ul style="list-style-type: none"> Mating components are not compatible
5	<p>NexGen RH Knee Hinge Service Kit</p> <ul style="list-style-type: none"> Poly Box Insert Hinge Post Shoulder Bolt Hinge Pin Hinge Pin Plug Tibial Bushing 	 <p>00-5880-090-12_16</p>	<p>NexGen RH Knee Distal Femoral</p> <p>NexGen RH Knee Articular Surface and RH Knee Hinge Post Extension (Item 2 above)</p>	<p>Segmental Distal Femoral XT</p> <p>NexGen RH Knee Distal Femoral with Segmental One-piece Hinge Post</p> <ul style="list-style-type: none"> Mating components are not compatible

NexGen RH Knee Precoat Femoral Augments

		Posterior (5mm)					Posterior (10mm)					Distal (5mm)					Distal (10mm)					Distal Only (10mm)					Distal Only (15mm)					Distal Only (20mm)					Posterior Only				
Size		B	C	D	E	F	C	D	E	F	B	C	D	E	F	C	D	E	F	B	C	D	E	F	B	C	D	E	F	C	D	E	F	C	D	E	F	E	F		
NexGen RH Knee Femorals	B Left	CS									CS										CS					CS															
	B Right	CS									CS										CS					CS															
	C Left		CS					CS				CS					CS					CS					CS					CS				CS					
	C Right		CS					CS				CS					CS					CS					CS					CS				CS					
	D Left			CS					CS				CS					CS					CS					CS					CS				CS				
	D Right			CS					CS				CS					CS					CS					CS					CS				CS				
	E Left				CS					CS				CS					CS					CS					CS					CS		CS		CS			
	E Right				CS					CS				CS					CS					CS					CS					CS		CS		CS			
	F Left					CS									CS					CS					CS					CS					CS		CS		CS		
	F Right						CS									CS										CS									CS		CS		CS		

CS: Cement or Screw Attachment

References

1. Insall JN. Surgery of the Knee. 3rd ed. New York, NY: Churchill Livingstone; 2001:1556.
2. Berger RA, Crossett LS, Jacobs JJ, Rubash HE. Malrotation causing patellofemoral complications after total knee arthroplasty. Clin Orthop. November 1998;(356):144-153.

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