

# Distal Cut First Femoral Preparation

Primary Total Knee Arthroplasty





# LEGION<sup>◇</sup> Total Knee System

## Femoral preparation

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### Nota Bene

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

Additional LEGION Total Knee System surgical technique brochures are available for the other LEGION Components.



# Introduction

The LEGION® Total Knee System has been designed to offer the orthopaedic surgeon solutions to address intraoperative situations. Implant function is directly related to accurate surgical technique. LEGION instrumentation has been developed to be an easy-to-use system that will assist the surgeon in obtaining accurate and reproducible knee alignment. The instrumentation can be used in minimally invasive or standard exposures.

While it has been the designers' objective to develop accurate, easy-to-use instrumentation, each surgeon must evaluate the appropriateness of the following technique based on his or her medical training, experience and patient evaluation.

# DCF femoral highlights

Use the 9.5mm drill to open up the femoral canal and slide the valgus alignment assembly until at least one side contacts the distal femur.



After the assembly is placed in neutral rotation, impact the floating spikes into the distal femur and secure the distal block with pins.



Remove the IM rod, unlock the lever on the valgus alignment guide and remove the valgus alignment assembly using the universal extractor.



Resect the distal femur.



Position the sizing guide flush against the distal femur, while ensuring that the posterior paddles are contacting the underside of both posterior condyles.



**To set rotation:** Pin through lateral pivot pinhole, located on the lower lateral corner of the sizing guide. Adjust external rotation of the sizing guide by turning the rotational adjustment knob clockwise (0-6°).



**Fixed posterior referencing:** Ensure the sizing guide is set in the '0' position. Drill and insert two pins through the locator holes of the sizing guide. Determine the size of the component by the graduations on the stylus. If the femur is in-between two sizes, choose the larger size.



**Adjustable anterior referencing:** Position the sizing guide stylus so that it contacts the lateral ridge of the anterior cortex and determine the size from the graduations on the shaft of the stylus.



If the indicated size is in-between two sizes, turn the upper hex screw clockwise to the next lower size for anterior referencing or turn the upper hex screw counterclockwise to the next larger size. To lock in position, tighten the locking hex screw. Drill to mark the locator holes for the A/P cutting block.



Place the correctly sized A/P cutting block on the distal femur and make anterior, posterior and chamfer cuts.



### Posterior stabilized

Pin trial through anterior flange. Select the housing resection collet matching the femoral trial size (either 1-2 or 3-8).



Ream through the collet in the anterior position until the depth stop makes contact. Remove the reamer and move the collet to the posterior position. Ream through the collet once more until contact is made.



Impact the housing box chisel anteriorly and then posteriorly through the housing resection collet to square the corners of the PS box resection.



Select the appropriate size femoral trial cam module, insert the arms of the cam module into the anterior aspect of the femoral trial box and rotate posteriorly.



### Final femoral preparation

Place the femoral implant on the femur and use the femoral impactor to fully seat the implant.



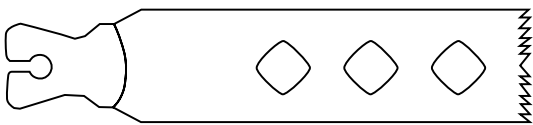
# Preoperative planning

Determine the angle between the anatomical and the mechanical axes. This measurement will be used intraoperatively to select the appropriate valgus angle so that correct limb alignment is restored. (Beware of misleading angles in knees with a flexion contracture or rotated lower extremities.)

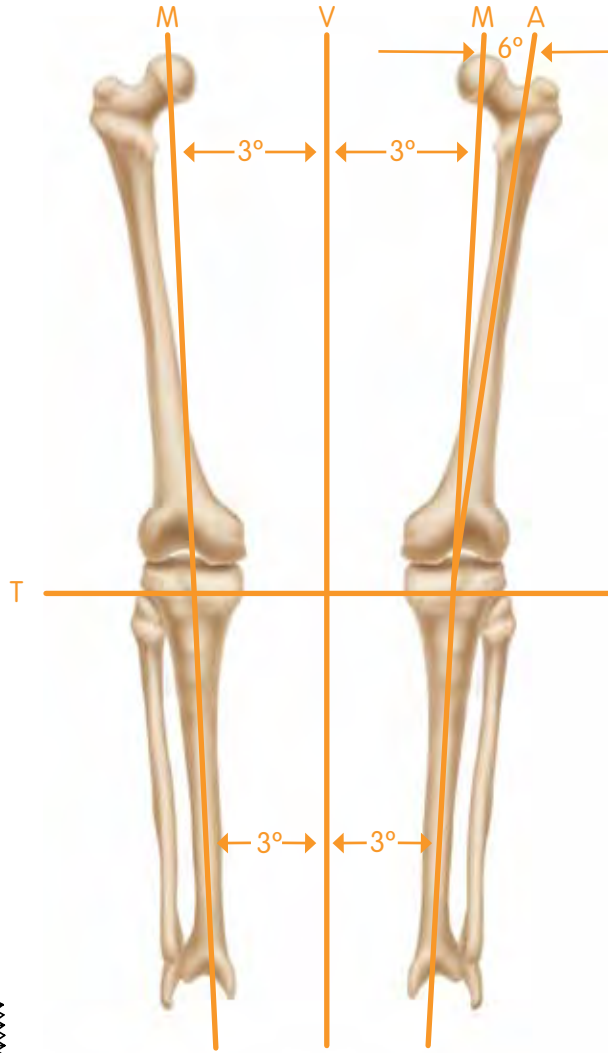
Tip: Many surgeons prefer to simply select a standard angle for the distal femoral cut (ie, 5°, 6° or 7°) based on the patient and surgical experience.

## Recommended sawblades

1.27 Sawblade (for standard blocks)  
Cutting thickness and blade thickness should be 0.050" or 1.27mm.



1.35 Sawblade (for MIS blocks)  
Cutting thickness and blade thickness should be 0.053" or 1.35mm.



M = Mechanical Axis

A = Anatomical Axis

T = Transverse Axis

V = Vertical Axis



# Instrument assembly

## IM assembly

- 1 Attach the selected valgus angle bushing (5°, 6° or 7°) to the valgus alignment guide. Check the bushing position to make sure that 'left' is facing anteriorly when operating on a left knee and 'right' is facing anteriorly when operating on a right knee.
- 2 Attach a modular T-handle to the IM rod and insert through the alignment assembly (Figure 1).
- 3 Assemble the distal femoral cutting block onto the valgus alignment guide. Positioning the block at the 'primary' resection level will ensure the cut will equal the distal thickness of the femoral prosthesis. Lock by pressing the lever in a horizontal position toward the medial side.



Figure 1

---

Valgus Bushing	Align Guide	T-handle	IM Rod	Distal Cutting Block
5° 7144-0014	7144-1144	7111-0080	Long 7144-0004	7144-1147
6° 7144-0016			Short 7144-0006	
7° 7144-0018				

# Intramedullary alignment

- 1 Open the femoral canal with a 9.5mm intramedullary drill (Figure 2).

Tip: If desired, the distal femoral cutting block may be set to resect an additional +2, +5 or +7mm of bone.

- 2 Slide the intramedullary rod of the assembly into the femoral canal until the alignment guide contacts the distal femur (Figure 3).

Tip: There may be times when only one side of the guide will touch bone.

- 3 Orient rotation of the assembly neutral to the posterior condyles (Figure 4) and impact one or both of the floating spikes into the distal femur.



Figure 2



Figure 3



Figure 4

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Valgus Bushing	Align Guide	T-handle	IM Rod	Distal Cutting Block	IM Drill
5° 7144-0014	7144-1144	7111-0080	Long 7144-0004	7144-1147	7144-0002
6° 7144-0016			Short 7144-0006		
7° 7144-0018					

# Distal resection

- 1 Using non-headed pins, pin the distal femoral cutting block to the anterior femur using the holes marked '0'. Once adequate distal femoral resection is noted, an additional headed or non-headed pin should be placed obliquely to provide additional stability (Figure 5).
- 2 Unlock the lever on the valgus alignment guide, remove the intramedullary rod and the valgus alignment assembly using the universal extractor (Figure 6). Only the distal femoral cutting block should remain on the femur.
- 3 Resect the distal femur (Figure 7) then remove the distal femoral cutting block.

**Tip:** If the distal femoral resection is not adequate, remove the oblique headed pin, and reposition the block through the pin holes marked +2 or +4mm for the desired level of resection and re-insert the oblique pin.



Figure 5

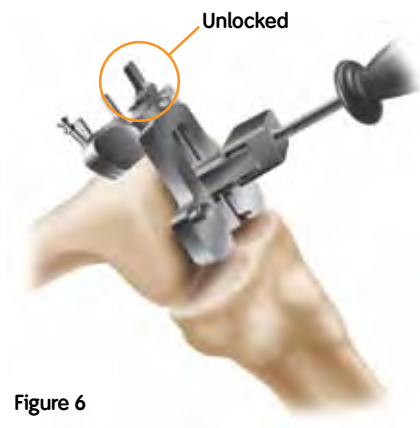


Figure 6



Figure 7

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Valgus Bushing	Align Guide	Universal Extractor	IM Rod	Distal Cutting Block
5° 7144-0014	7144-1144	7144-0366	Long 7144-0004	7144-1147
6° 7144-0016			Short 7144-0006	
7° 7144-0018				

# Sizing guide procedure

The sizing guide allows for external rotation to be set from 0-6° based on surgeon preference and patient anatomy. Rotational alignment may be checked by aligning the A/P axis with the pointer on the sizing guide or by ensuring that the laser marked lines on the face of the guide are parallel with the epicondylar axis. The rotational adjustment knob on the lower portion of the guide is turned to dial in rotation (Figure 8).

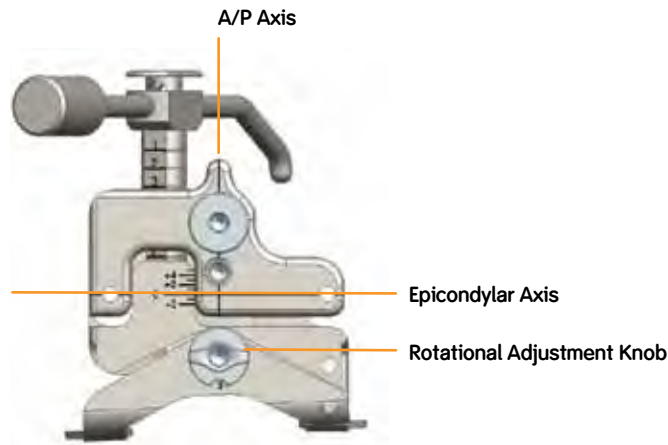


Figure 8

The guide can be used for fixed posterior referencing or can be adjusted anteriorly or posteriorly for fine tuning. When in-between sizes, the surgeon can choose to adjust sizing up to 4mm anteriorly, thereby taking up to an additional 4mm off the posterior condyles, or up to 2mm posteriorly, taking up to an additional 2mm off of the anterior cortex.

If the anterior surface of the guide is in-between two sizes when it is at the zero position, the upper hex screw can be rotated to shift the anterior face of the sizing guide up to the next smaller size or down to the next larger size on the stylus. As a result, the locator holes for the A/P cutting block are shifted either anteriorly or posteriorly to align with the next implant size (Figure 9).

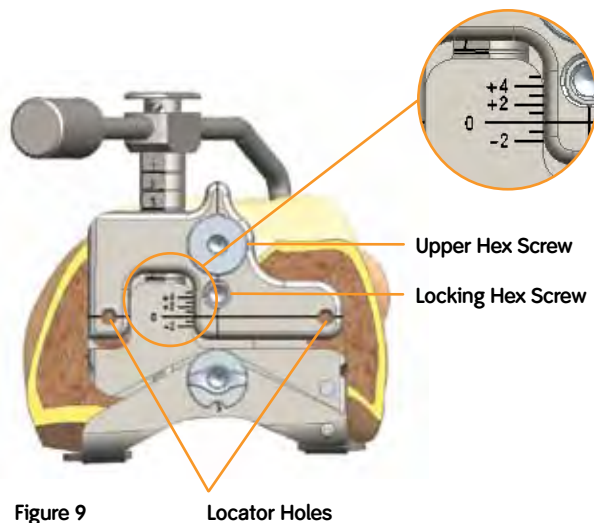


Figure 9

**Tip:** The gap between the top of the sizing guide and the stylus graduation line indicates how much bone will be removed from either the anterior cortex or posterior condyles by choosing the next larger size (Figure 10).



Figure 10

Sizing Guide	Sizing Stylus	Hex Screwdriver
Left 7144-0007	7144-1140	11-5035
Right 7144-0008		

### Sizing guide procedure: rotation

- 1 Flex the knee, approximately 90° so the posterior condyles are accessible.
- 2 Choose appropriate sizing guide, **'Left'** for a left knee and **'Right'** for a right knee.
- 3 Position the femoral sizing guide flush against the distal femur, while ensuring the posterior paddles are contacting the underside of both posterior condyles. Once correct position of sizing guide is established, place a pin through lateral pivot pinhole located in the posterior/lateral corner on the face of the sizing guide (Figure 11).
- 4 Adjust the external rotation of the sizing guide to be aligned anatomically with the epicondylar and/or A/P axis. This can be achieved by turning the rotational adjustment knob (0-6°) using a hex screwdriver (Figure 12).
- 5 Once rotation is set, sizing can be established either by fixed posterior referencing or adjustable referencing.

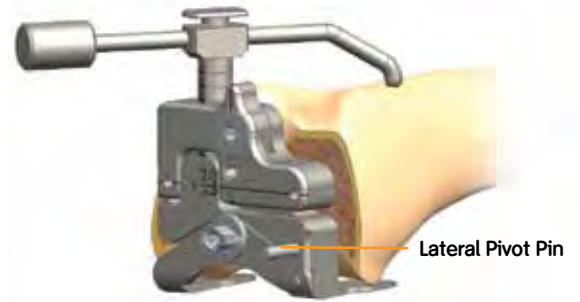


Figure 11

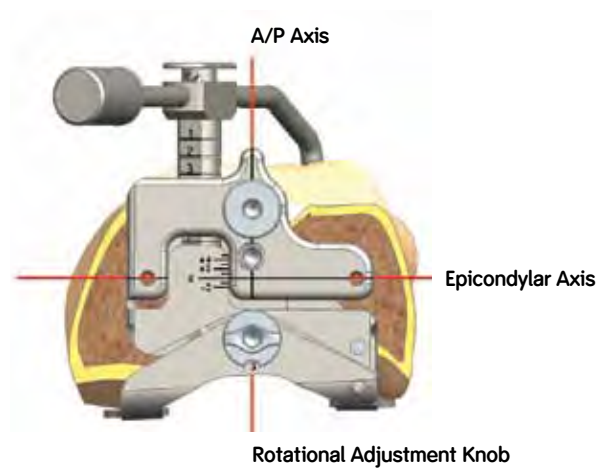


Figure 12

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Sizing Guide	Sizing Stylus	Hex Screwdriver
Left 7144-0007	7144-1140	11-5035
Right 7144-0008		

### Sizing guide procedure: fixed posterior referencing

- 1 Ensure that the anterior surface of the sizing guide is set in the '0' position.
- 2 Drill and insert two pins through the locator holes of the sizing guide to secure the guide.
- 3 Position the sizing guide stylus so that it contacts the lateral ridge of the anterior femoral cortex (highest point on the anterior cortex of the femur) (Figure 13).
- 4 Determine the size of the component from the graduations on the shaft of the stylus.
- 5 If the femur is between sizes, choose the larger size.
- 6 Remove the pins and the sizing guide.



Figure 13

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Sizing Guide	Sizing Stylus	Hex Screwdriver
Left 7144-0007	7144-1140	115035
Right 7144-0008		

**Sizing guide procedure: adjustable anterior referencing**

- 1 Ensure that the anterior surface of the sizing guide is set in the '0' position.
- 2 Drill and insert two pins through the oblique holes of the sizing guide to secure the guide.
- 3 Position the sizing guide stylus so that it contacts the lateral ridge of the anterior femoral cortex (highest point on the anterior cortex of the femur) (Figure 14).
- 4 Determine the size of the component from the graduations on the shaft of the stylus.
- 5 If the indicated size is in-between sizes, you can turn the upper hex screw to shift the anterior surface up to an additional 4mm to the next smaller size or down an additional 2mm to the next larger size (Figures 15a and b). Once the appropriate size is selected, turn the locking hex screw to lock the anterior surface and locator holes into position (Figure 14).
- 6 Drill the locator holes to set the position for the cutting block.
- 7 Remove the pins and sizing guide.

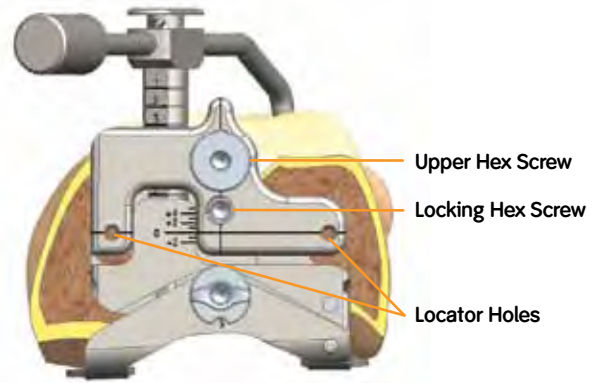


Figure 14



Anterior Reference Shift of 4mm

Figure 15a



Posterior Reference Shift of 2mm

Figure 15b

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Sizing Guide	Sizing Stylus	Hex Screwdriver
Left 7144-0007	7144-1140	11-5035
Right 7144-0008		

# A/P resection

- 1 Position the fixed spikes on the A/P cutting block into the predrilled holes.

**Tip:** It is not necessary that the block be centered M/L on the distal femur.

- 2 Ensure that the cutting block is flush with the resected distal femur. Several holes in the A/P block allow fixation of the block. Place one pin centrally through one of the middle holes just medial or lateral to the quick-connect attachment. For additional stability, a headed pin may be placed through the holes on the medial or lateral side of the block (Figure 16).

- 3 Complete the anterior, posterior and chamfer cuts (Figures 17-20). The block is designed to allow for angling of the sawblade during the cuts.

**Tip:** To maintain block stability, the anterior chamfer cut should be completed last.



Figure 16



Figure 17



Figure 18



Figure 19



Figure 20

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## A/P Cutting Block

sz 2	7144-1150
sz 3	7144-1151
sz 4	7144-1152
sz 5	7144-1153
sz 6	7144-1154
sz 7	7144-1155
sz 8	7144-1156



## Downsizing the femoral component

- 1 Attach the downsizing drill guide to the cut femur, placing the spikes on the back of the plate into the same location holes used for the A/P cutting block (Figure 21).
- 2 Drill new location holes through the downsizing drill guide (shifted 2mm anterior).
- 3 Place the smaller A/P cutting block into the new location holes. Redo the posterior, anterior and chamfer cuts.

**Tip:** It is useful to mark the original pin track holes with a marking pen in order to properly identify the new holes.



Figure 21

# Component trialing

1 Flex the knee to 90° and insert the femoral trial using the femoral trial impactor (Figure 22).



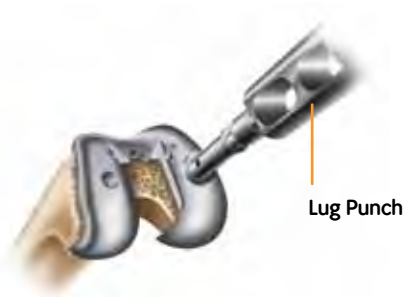
Figure 22

2 Perform a trial range of motion to assess patellar tracking. With cruciate-retaining knees, medial/lateral placement of the femoral trial can be adjusted to optimize patellar tracking (Figure 23).



Figure 23

3 For cruciate-retaining femorals, prepare the femoral lug holes through the femoral trial with the femoral lug punch (Figure 24).



Lug Punch

Figure 24

4 Attach the end of the universal extractor to the femoral trial (Figure 25). Remove the femoral trial.



Extractor

Figure 25

Femoral Trial		Femoral Trial	Lug Punch	Universal Extractor
Left	Right	Impactor		
sz 2 7143-3342	sz 2 7143-3352	7144-0009	7144-0183	7144-0366
sz 3 7143-3343	sz 3 7143-3353			
sz 4 7143-3344	sz 4 7143-3354			
sz 5 7143-3345	sz 5 7143-3355			
sz 6 7143-3346	sz 6 7143-3356			
sz 7 7143-3347	sz 7 7143-3357			
sz 8 7143-3348	sz 8 7143-3358			

# Posterior stabilized resection

## Femoral housing box resection

- 1 Pin the femoral trial through the anterior flange (Figure 26).
- 2 Choose the housing resection collet matching the femoral trial size (either 1-2 or 3-8). Attach the collet to the femoral trial by sliding the housing collet (anterior to posterior) into the slots on the distal face of the femoral trial and threading the two posts into the femoral trial. The housing collet should be secured in the anterior position first and then shifted to the posterior position and screwed (Figure 27).



Figure 26

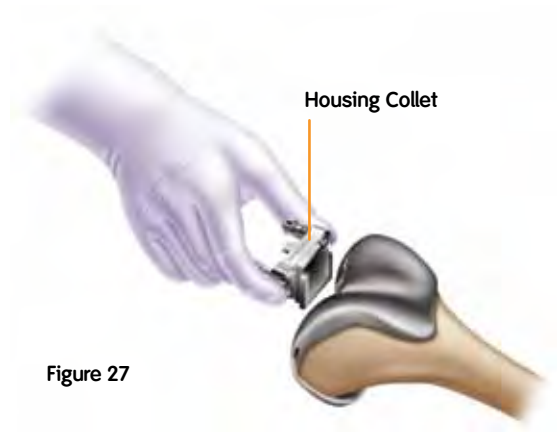


Figure 27

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Femoral Trial		Housing Collet	
Left	Right	Lockable	Free
sz 2 7143-3342	sz 2 7143-3352	sz 1-2 7144-0003	sz 1-2 7143-4423
sz 3 7143-3343	sz 3 7143-3353	sz 3-8 7144-0001	sz 3-8 7143-4424
sz 4 7143-3344	sz 4 7143-3354		
sz 5 7143-3345	sz 5 7143-3355		
sz 6 7143-3346	sz 6 7143-3356		
sz 7 7143-3347	sz 7 7143-3357		
sz 8 7143-3348	sz 8 7143-3358		

3 Attach the housing reamer dome and the PS reamer sleeve to the patellar reamer shaft (Figure 28).

Ream through the housing resection collet in both the anterior and posterior positions until the depth stop contacts the collet (Figure 29).

4 Impact the housing box chisel through the housing resection collet to square the corners of the housing. The housing box chisel should be used anteriorly and then posteriorly to ensure that the full length of the box is prepared (Figure 30).

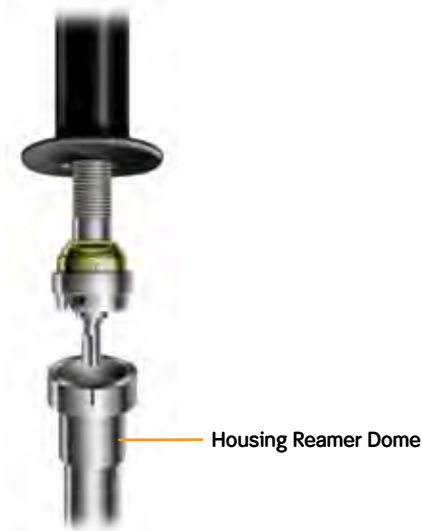


Figure 28



Figure 29



Figure 30

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<b>Housing Reamer Dome</b> 7144-0145	<b>Housing Box Chisel</b> 7144-0373	<b>Patellar Reamer Shaft</b> 7144-0324	<b>Reamer Sleeve</b> 7144-0464
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## Femoral trial cam module assembly

- 1 Select the appropriate sized femoral trial cam module (matching the femoral trial size selected).
- 2 Insert the arms of the femoral cam module into the anterior aspect of the femoral trial box and rotate posteriorly until seated (Figures 31 and 32).



Figure 31



Figure 32

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Cam Modules		Femoral Trial			
		Left		Right	
sz 2	7143-3362	sz 2	7143-3342	sz 2	7143-3352
sz 3	7143-3363	sz 3	7143-3343	sz 3	7143-3353
sz 4	7143-3364	sz 4	7143-3344	sz 4	7143-3354
sz 5	7143-3365	sz 5	7143-3345	sz 5	7143-3355
sz 6	7143-3366	sz 6	7143-3346	sz 6	7143-3356
sz 7	7143-3367	sz 7	7143-3347	sz 7	7143-3357
sz 8	7143-3368	sz 8	7143-3348	sz 8	7143-3358

# Component implantation

## Cemented

- 1 Mix and prepare bone cement for femoral component and distal femur. Apply to the femoral component or prepared bone, based on the surgeon's preference.

*Tip: Many surgeons put cement on the bone rather than, or supplemental to, cement on the underside of the implant.*

- 2 Place the femoral implant onto the femur and use the femoral impactor to fully seat the implant (Figure 33).
- 3 Remove excess cement. Extend the knee to remove cement anteriorly without retracting the proximal soft tissue.
- 4 Place the tibial insert trial onto the tibial implant and extend the leg to pressurize the cement.

*Tip: Place the CR tibial trial in the tibial implant tray to assist with aligning the femoral component during implantation.*



Figure 33

## Porous

- 1 Ensure that flat, clean cuts are made to all of the femoral resection cuts. This will help to achieve an optimal press-fit.

*Tip: Lavaging during resection helps ensure flat, clean cuts.*

- 2 Place the femoral implant onto the femur and use the femoral impactor to fully seat the implant.

*Tip: If extraction of the femoral component is needed, attach the locking impactor and move in side-to-side motions to leverage off, then adjust and reimpact.*

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OXINIUM® CR Impactor (Universal Impactor) 7144-0890	Femoral Impactor 7144-0190	PS Femoral Impactor 7144-0005
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