

Anterior Cut First
Femoral Preparation
Primary Total Knee Arthroplasty



LEGION[◇] 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.

ACF femoral highlights

Use the 9.5mm drill to open up the femoral canal and slide the valgus alignment assembly up the IM rod until it contacts the distal femur.



Place the anterior stylus tip on the lateral ridge of the anterior cortex to determine resection level.



Resect the anterior cortex.



Attach distal cutting block and distal stylus to valgus alignment assembly.



Remove valgus alignment assembly and resect the distal femur.



Place the stylus tip of the femoral sizing guide on the provisional anterior cut surface. Read the size indicated by the line across the stylus shaft. If in-between sizes, choose the smaller size.



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 until the depth stop contacts the collet and then move the reamer anterior and posterior until it contacts the depth stop.



Impact the housing box chisel anteriorly and 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.



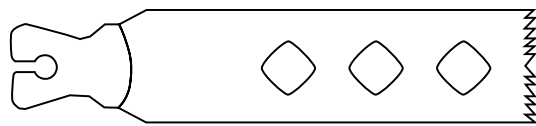
Preoperative planning

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.)

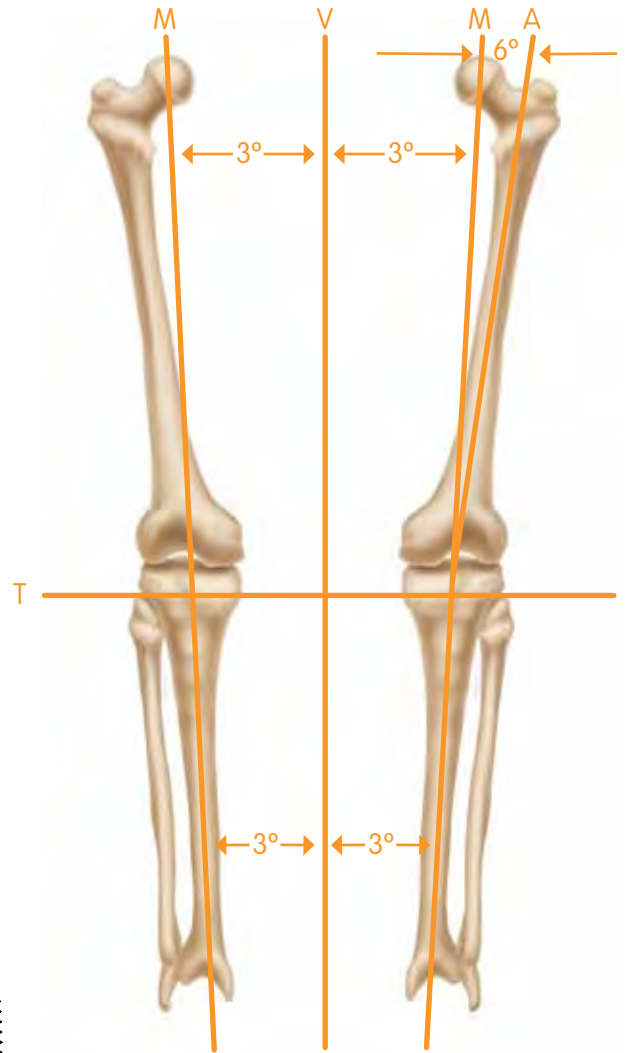
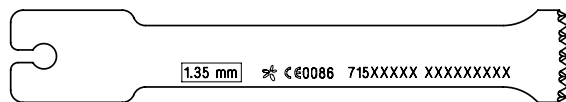
Tip: Many surgeons prefer to simply select a standard angle for the distal femoral cut (ie, 5°, 6° or 7°) based on the patient and surgical experience.

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 modular T-handle to the intramedullary rod.
- 2 Select the appropriate valgus angle bushing based on preoperative measurements.
- 3 Slide the bushing into the valgus alignment guide (left or right). Make sure the bushing is positioned so that 'left' is facing anteriorly when operating on a left knee and 'right' is facing anteriorly when operating on a right knee.
- 4 Attach a quick-connect handle to the valgus alignment guide.
- 5 Slide the rod through the bushing (Figure 1).

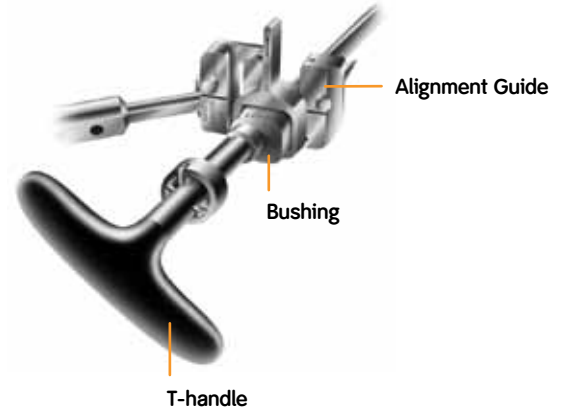


Figure 1

Anterior resection guide assembly:

Place the anterior resection guide into the valgus alignment guide (Figure 2) and attach the anterior stylus to the anterior resection guide by sliding the foot into the cutting slot (Figure 3).



Figure 2

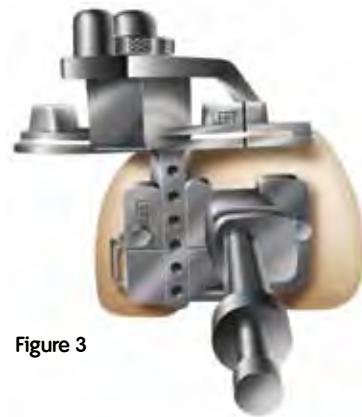


Figure 3

Valgus Bushing	T-handle	IM Rod	Quick-connect Handle
5° 7144-0014	7111-0080	Long 7144-0004	7144-0044
6° 7144-0016		Short 7144-0006	
7° 7144-0018			
Anterior Resection Guide	Valgus Alignment Guide	Anterior Resection Stylus	Distal Femoral Cutting Block
Left 7144-1116	Left 7144-1256	7144-1115	7144-1118
Right 7144-1117	Right 7144-1257		

Distal femoral resection assembly:

- 1 Assemble the distal femoral cutting block with the distal resection stylus by pressing the gold button and sliding the stylus until it hits a stop (Figure 4).
- 2 The word 'primary' should show through the cutting slot. This will resect the standard 9.5mm from the distal femur. For a large femur or in the case of flexion contracture, up to 7mm additional resection can be taken by sliding the cutting block proximally so that the desired resection level shows through the cutting slot.

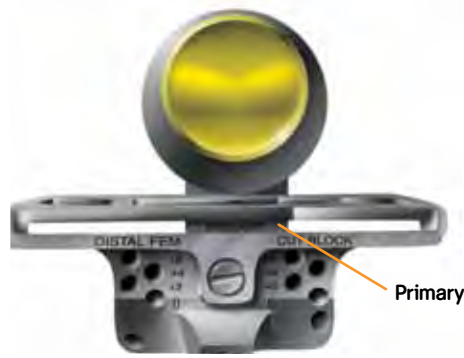


Figure 4

Distal Cutting
Block
7144-1118

Distal Resection
Stylus
7144-1161

Intramedullary alignment

- 1 Identify the rotational reference landmarks:
 - A/P axis (as described by Whiteside)
 - Medial/lateral posterior femoral condyles
 - Epicondylar axis
- 2 Open the femoral canal (generally just anterior to the PCL insertion) with the 9.5mm drill (Figure 5).
- 3 Insert the IM assembly into the canal. Position the valgus alignment guide until it contacts the distal femur (Figure 6).

Note: Do not engage the floating pins until rotation is set.



Figure 5



Quick-connect Handle

Figure 6

Valgus Bushing	Quick-connect	T-handle	IM Rod	IM Drill
5° 7144-0014	Handle	7111-0080	Long 7144-0004	7144-0002
6° 7144-0016	7144-0044		Short 7144-0006	
7° 7144-0018				

Femoral alignment

Rotation of the valgus alignment guide is set external to the posterior femoral condyles by using one of the following landmarks:

- A/P axis (Whiteside's line)
- Posterior condyles
- Epicondylar axis

This can be done with or without the rotational alignment paddles (left and right).

Without paddles

- 1 Use a bovie or pen to mark the A/P axis line (deepest part of the trochlear groove).

The femoral alignment template (Figure 7) is designed such that setting it parallel to the A/P axis aligns the valgus alignment guide in external rotation.

- 2 Place the femoral alignment template over the valgus angle bushing to guide rotational alignment (Figure 8). The valgus alignment guide is placed in external rotation by aligning the template with the A/P line (Figure 9).

The line on the valgus alignment guide is drawn such that placing it parallel to the epicondylar axis aligns the guide in external rotation.

- 3 Secure the valgus alignment assembly on the distal femur by impacting the floating spikes.



Figure 7



Figure 8



Figure 9

Rotation Alignment Paddles	Valgus Alignment Guide	Femoral Alignment Template	Valgus Bushing	IM Rod
Left 7144-1253	Left 7144-1256	7144-1254	5° 7144-0014	Long 7144-0004
Right 7144-1252	Right 7144-1257		6° 7144-0016	Short 7144-0006
			7° 7144-0018	

Femoral alignment with paddles

- 1 Choose the appropriate paddles – left or right – for the knee to be replaced. The left and right specific paddles allow for 3° of external rotation.
- 2 Unlock the capture mechanism on the modular paddles. The arm on the paddles distracts posteriorly and rotates to either side to unlock so the anterior lip can engage the slot in the posterior aspect of the valgus alignment guide. (Figure 10).
- 3 Insert the anterior lip of the paddles into the slot in the valgus alignment guide. Rotating the arm back centrally into the recess will lock the paddles onto the valgus alignment guide. Flex the knee and position the paddles under the posterior condyles (Figure 11). This will set rotation at 3°.

Tip: It may be helpful to flex the knee greater than 90°, as this will help fit the paddles under the femoral condyles.

Tip: Posterior condylar referencing may be less reliable in knees with deficient posterior condyles (eg severe valgus deformity). If the posterior condyles are deficient, the A/P or epicondylar axis should be used to determine alignment.

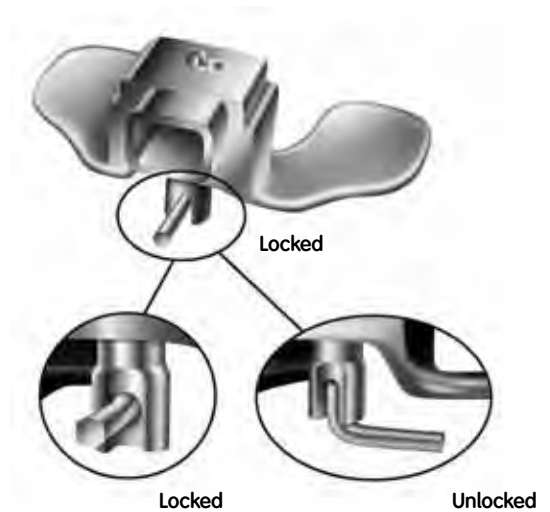


Figure 10



Figure 11

Rotation Alignment Paddles	Valgus Alignment Guide	Femoral Alignment Template	Valgus Bushing	IM Rod
Left 7144-1253	Left 7144-1256	7144-1254	5° 7144-0014	Long 7144-0004
Right 7144-1252	Right 7144-1257		6° 7144-0016	Short 7144-0006
			7° 7144-0018	

Femoral resection

Preliminary anterior resection

- 1 Release and remove the modular paddles, if applicable.
- 2 Place the anterior stylus tip on the lateral ridge of the anterior femoral cortex. Pin the anterior resection guide with a 1/8" trocar pin in any available hole and remove the anterior stylus (Figure 12).
- 3 Resect the anterior cortex (Figure 13).

Tip: Removing a small area of soft tissue down the bone over the distal and lateral anterior femur allows the stylus to fully seat. This will help prevent overestimating femoral sizing, which could lead to 'over-stuffing' of the patellofemoral joint.



Figure 12

Distal resection

- 1 Secure the distal femoral cutting block assembly to the anterior cortex by impacting or drilling unheaded or headed pins through the holes marked 'O'. Use of a third oblique pin is recommended for additional stability (Figure 14).



Figure 13

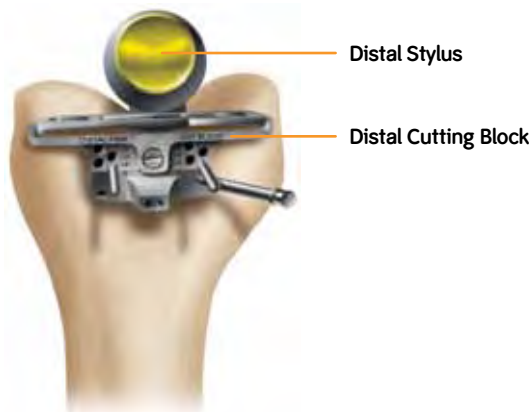


Figure 14

Anterior Resection Guide	Valgus Alignment Guide	Anterior Resection Stylus	Distal Femoral Cutting Block	Distal Resection Stylus	IM Rod
7144-1116	Left 7144-1256	7144-1115	7144-1118	7144-1161	Long 7144-0004
7144-1117	Right 7144-1257				Short 7144-0006

- 2 Remove IM rod.
- 3 Attach the slap hammer to the valgus bushing and remove the distal resection stylus and valgus alignment assembly (Figure 15).
- 4 Only the distal femoral cutting block should remain on the femur (Figure 16).
- 5 Resect the distal femur (Figure 17), then remove the distal femoral cutting block.

Tip: To take an additional distal resection after resection, simply reposition the block through the pin holes marked +2 or +4mm for the desired level of resection after removing the oblique pin.



Figure 15



Figure 16



Figure 17

Sizing guide procedure

- 1 Attach a quick-connect handle to the femoral sizing guide. Place the femoral sizing guide on the distal femur, and place the stylus tip on the lateral side of the provisional anterior cut (Figure 18).
- 2 Read the size indicated by the line across the stylus shaft and choose the smaller size if in-between two sizes (Figure 19).

Tip: Traditionally, surgeons using an anterior cut first/anterior referencing approach have always chosen the smaller size component between sizes. However, some surgeons choose to use the larger size, particularly when using a PS component, as sacrificing the PCL can increase the flexion space from 4-6mm and could leave the knee loose in flexion if the smaller component is used.



Figure 18

Sizing Guide



Figure 19

Quick-connect
Handle
7144-0044

Femoral Sizing
Guide
7144-1113

A/P resection

- 1 Choose the correct size A/P cutting block and place it on the distal femur in a medialized position. M/L positioning of this block is not critical.
- 2 Secure the A/P cutting block first with a straight pin through either the medial, lateral or central pin hole on the distal block surface. Pin through the angled holes in the ears on the medial and lateral sides of the block as bone quality dictates to achieve stability (Figure 20). Remove the pin(s) from the distal face before making chamfer cuts.

Tip: The A/P cutting block should seat flush with the cut anterior and distal surfaces.

- 3 Complete the anterior, posterior and chamfer cuts (Figures 21-24).



Figure 20



Figure 21



Figure 22



Figure 23



Figure 24

A/P Cutting Block

sz 2	7144-1120
sz 3	7144-1121
sz 4	7144-1122
sz 5	7144-1123
sz 6	7144-1124
sz 7	7144-1125
sz 8	7144-1126

Component trialing

- 1 Flex the knee to 90° and insert the femoral trial using the femoral trial impactor (Figure 25).
- 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 26).
- 3 For cruciate-retaining femorals, prepare the femoral lug holes through the femoral trial with the femoral lug punch (Figure 27).
- 4 Attach the end of the universal extractor to the femoral trial (Figure 28). Remove the femoral trial.

Precaution: Implants are not designed to be used as trial components. Their use as trial components may expose the implant's cementing surface to body fluid and/or fat. This exposure would contaminate the implant/cement interface and potentially compromise implant fixation by reducing cement bonding strength. This may cause premature implant loosening, leading to implant revision.



Figure 25

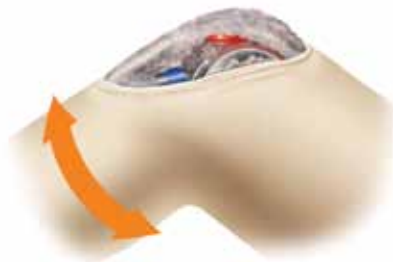


Figure 26

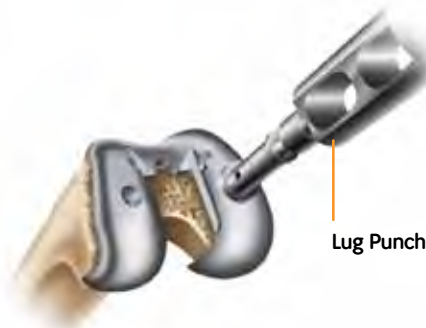


Figure 27



Figure 28

Lug Punch	Universal Extractor	Femoral Trial	Femoral Trial	Femoral Trial
7144-0183	7144-0366	Left	Right	Impactor
		sz 2 7143-3342	sz 2 7143-3352	7144-0009
		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 femoral resection

Femoral housing box resection

- 1 Pin the femoral trial through the anterior flange (Figure 29).
- 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 30).



Figure 29

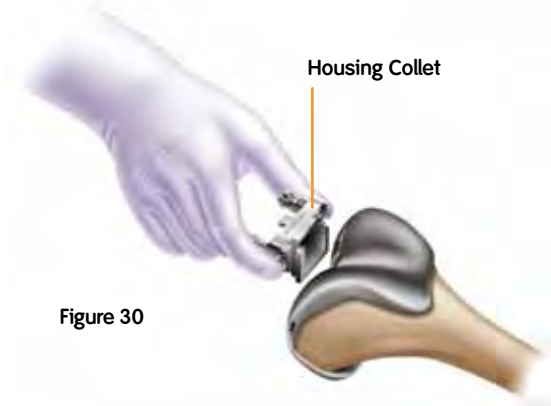


Figure 30

Femoral Trial		Right		Housing Collet		Free	
Left				Lockable			
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 31).

4 Ream through the housing resection collet in both the anterior and posterior positions until the depth stop contacts the collet (Figure 32).

5 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 33).

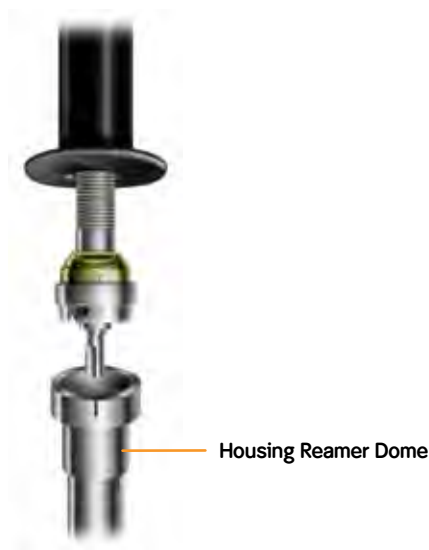


Figure 31



Figure 32



Figure 33

Housing Reamer Dome 7144-0145	Housing Box Chisel 7144-0373	Patellar Reamer Shaft 7144-0324	Reamer Sleeve 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 34 and 35).



Figure 34



Figure 35

Cam Modules		Femoral Trial			
		Left		Right	
sz 2	7143-3362	sz 2	7142-3342	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 36).
- 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 36

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.

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

Smith & Nephew, Inc.
1450 Brooks Road
Memphis, TN 38116
USA

www.smith-nephew.com
www.legionpower.com

Telephone: 1-901-396-2121
Information: 1-800-821-5700
Orders and Inquiries: 1-800-238-7538