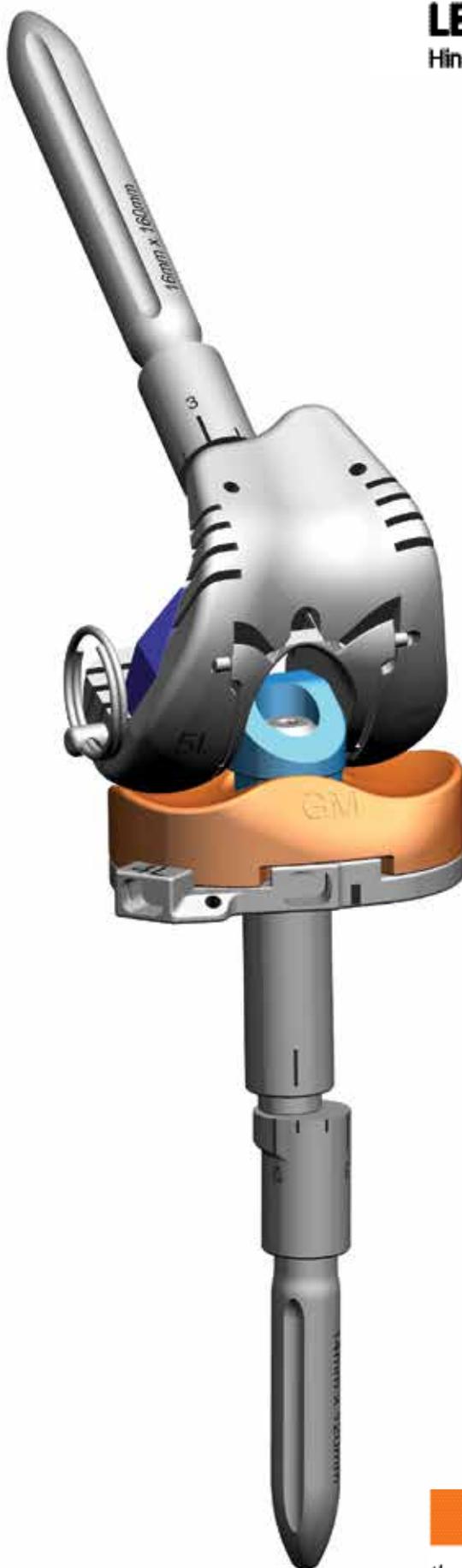


Surgical Technique

Hinge Disassembly and  
Rebuild Technique

 **smith&nephew**  
**LEGION<sup>®</sup> HK**  
Hinge Knee System



 **LEGION<sup>®</sup>**  
Total Knee System  
*the power of simplicity*

# Revision Knee Arthroplasty Surgical Technique

## LEGION<sup>◇</sup> HK Hinge Knee System

### Introduction

The LEGION HK Hinge Knee System has been designed as an extension of the LEGION Revision Knee System. The goal was to develop a hinged knee which transitioned seamlessly from a condylar constrained component to a hinged assembly while minimizing the number of new instruments and implants required. This surgical technique follows the same intuitive flow as the LEGION Revision technique and utilizes the same cutting instruments. From an implant side, the system uses the same stems and offset couplers as the revision system while having the same tibial footprint and femoral positioning.



# LEGION<sup>◇</sup> HK

## Hinge Knee System

### Contents

Preoperative evaluation .....	2
Exposure.....	4
Replacing the LEGION HK linkage, femoral assembly or tibial assembly.....	5
Implant linkage assembly.....	9
Component assembly .....	13

### Contact numbers

Knee hotline: 1-800-238-7538

### 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.

# Preoperative evaluation

The preoperative evaluation of a failed total knee arthroplasty begins with a complete history and physical examination. Determination of the etiology or failure will also require radiographic evaluation, occasionally the use of nuclear bone scans, the use of laboratory studies and/or aspiration to rule out the possibility of indolent infection. It is imperative that the cause of failure be determined pre-operatively in order to help maximize the likelihood of post-operative success.

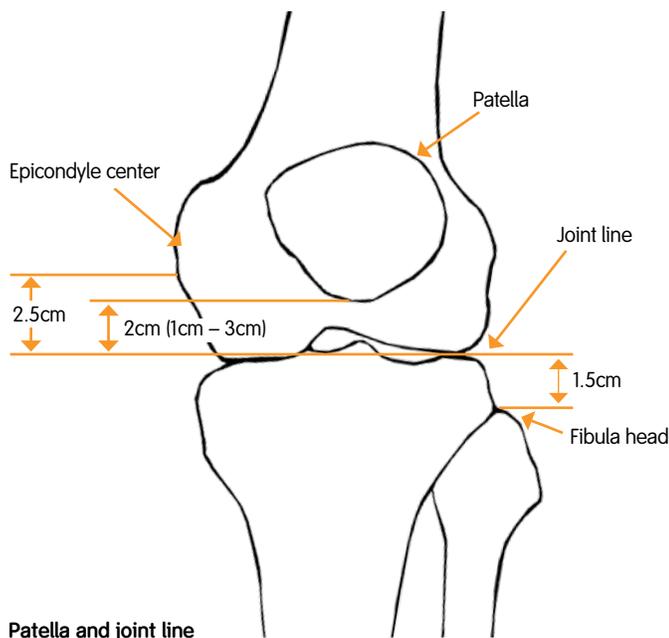
If bone defects secondary to osteolysis exist pre-operatively then the surgeon performing the procedure must understand the implications of this bone loss as well as techniques required to manage them. CT scans can be a valuable tool in determining structural defects. Gross instability or bone loss in the area of the collateral ligaments may need a stabilized or constrained prosthesis.

Appropriate patella position should be assessed preoperatively and corrective strategies developed, if needed. A need to move the joint line distally can be a common occurrence in Revision TKA, and if known preoperatively, can save time over adjusting the joint line after the trial range of motion. An assessment of the joint line and patella height should be completed preoperatively and/or prior to the removal of any existing components with any necessary corrections noted. The noted corrections can then be performed within the initial steps of the surgical technique – distal resection, A/P block resections and Femoral Trial.

## System summary

The LEGION® HK Hinge Knee System is a primarily condylar-loading design, as opposed to an axial-loading hinged knee system. Unlike other hinged knee systems, the LEGION HK system is designed with femoral rollback as defined by articular contact. Together, the femoral rollback and condylar loading produces similar wear characteristics as seen in primary TKA designs in like conditions.

The LEGION HK Hinge Knee System utilizes the same footprint for the femoral and tibial components for their respective size offerings as the LEGION Revision System (sizes 3-4-5 and 7 for the femoral components and sizes 2-3-4-5 and 7 for the tibial components). However, the LEGION HK System has no restrictions on size matching; in other words, a size 7 fits a size 2 in either direction.



## **Femoral component**

The LEGION® HK femoral components are available in sizes 3-4-5 and 7 in asymmetrical configurations.

Bone preparation requires two variations from the LEGION Revision femoral technique. The posterior resection will be made through the 10mm posterior wedge resection slots which eliminate the need for posterior chamfer resections.

The second variation is a slight difference in the intracondylar box geometry. For this difference, the LEGION HK system includes its own box reamer and chisel. This preparation is the same as the LEGION Revision System but is produced through the LEGION HK femoral trial.

## **Tibial component**

The LEGION HK tibial components come in sizes 2-3-4-5 and 7 and are also asymmetrical. The primary difference in preparation from the LEGION Revision Tibial System is the reaming depth. The LEGION HK tibial tray is approximately 15mm longer; therefore additional reaming depth is required.

## **Tibial wedges**

The tibial wedge offerings match the LEGION Revision System in sizes, heights and geometries. Full wedges are in 10mm and 15mm heights and hemi-stepped wedges are in 5mm, 10mm, and 15mm heights. Do note however, the tibial wedges labeled “LEGION RK/HK” are the only ones that may be used with the LEGION HK tibial component.

## **Femoral wedges**

The femoral wedges come in hemi, symmetrical configurations in distal heights of 5mm, 10mm,

15mm and 20mm.

## **Tibial inserts**

In general, the insert height offerings 11mm, 13mm, 15mm, 18mm and 21mm and peripherally fit two size tibial trays – pairing are sizes 2-3, 4-5 and 6\*-7. The guided-motion inserts are asymmetrical (left and right).

The LEGION HK **guided-motion** insert is a ‘fixed-bearing’ design. The insert is locked to the tibial tray through a redundant locking configuration to help minimize motion between the tibial tray and distal insert surfaces. The primary distinction of the LEGION guided-motion design and other designs is the guided-rotation/‘screw-home’ kinematics. One of the central points of this design was to potentially reduce the complication rates of patellar dislocation/subluxation. The guided-motion insert is designed to help induce normal kinematic rotation to ‘zero’ the Q-angle of the patellar/quad mechanism through the range of motion. When the Q-angle is reduced, the medial/lateral shear forces are reduced from the patella, which in turn reduces the forces for dislocation/subluxation. However, other conditions may still exist.

## **Stems**

All LEGION stems (straight and bowed in cemented and press-fit configurations) can be used with the LEGION HK Hinge Knee System. The only variation between the LEGION Revision System and the LEGION HK system is the length of the tibial tray stem connection. The LEGION HK tibial tray is approximately 15mm longer; therefore additional reaming depth is required on the tibial preparation.

All LEGION Revision Offset Couplers function with the LEGION HK system.

\*Size 6 is not available

# Exposure

Exposure of the revision total knee can be complicated by previous incisions, stiffness or a fibrotic soft tissue envelope. In general, greater exposure is required for a revision total knee arthroplasty as compared with a primary procedure. Proper tissue planes medially and laterally must be elevated and fasciocutaneous flaps must be maintained in order to minimize wound healing complications. In general, a standard medial parapatellar arthrotomy is used when feasible.

Excision of scar or dysvascular tissue can facilitate the exposure. Posterior capsular release with posterior mobilization of the neuron-vascular bundle is sometimes necessary to facilitate exposure of the prosthesis.

If infection is encountered, complete excision of reactive tissue, capsule, ligaments and removal of prosthetic components may be necessary to assure adequate rates of local control.

# Replacing the LEGION<sup>◇</sup> HK linkage, femoral assembly or tibial assembly

The LEGION HK is designed to accommodate Trial Components interfaces for accessing partial component replacements.

**Note:** In the event of replacing components, care should be taken to prevent damage to remaining articular surfaces.

For femoral replacements (Figure 1), follow the steps necessary in the standard Femoral Preparation technique as described in the LEGION Hinge surgical technique, 71281506.

For tibial replacements (Figure 2), follow the steps necessary in the standard Tibial Preparation technique as described in the LEGION Hinge surgical technique, 71281506.

For Linkage removal and replacement, the following pages are provided.

Figure 1

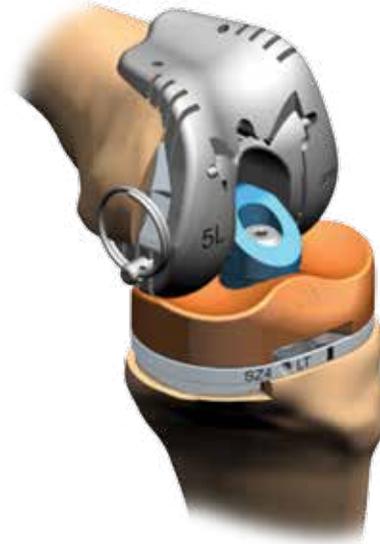
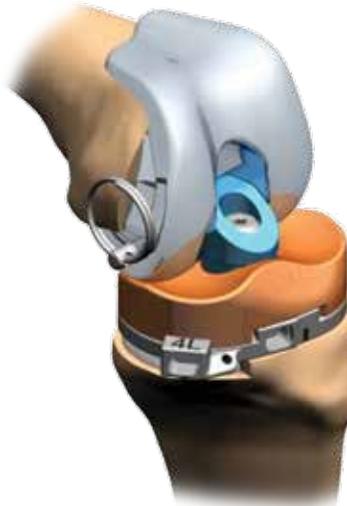


Figure 2



1. Attach the 4.75mm Hex Bit (Figure 3b) to the 150in-lb Torque Wrench (Figure 3a). Insert the Tibial Stabilizing Tool (Figure 3c) to the anterior hole of the Tibial Implant. Remove the Post Bolt turning counterclockwise (Figure 3) while applying a counter torque with the Tibial Stabilizing Tool. Remove the Post Bolt.
2. The Post Sleeve will require impact to the side of the Link (Figure 4) to disengage the taper junction.

Note: Reminder the Legion Hinge Torque Wrench Should be calibrated every six months.

Figure 3

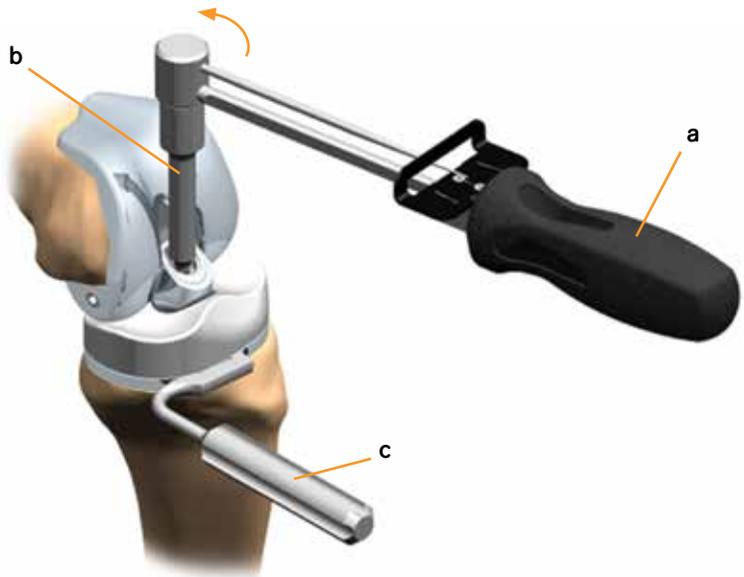
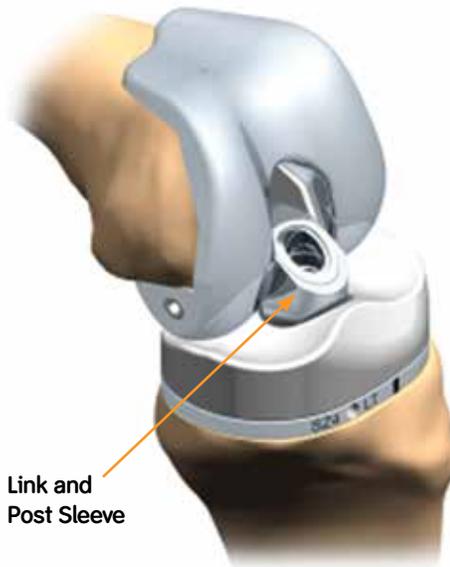


Figure 4

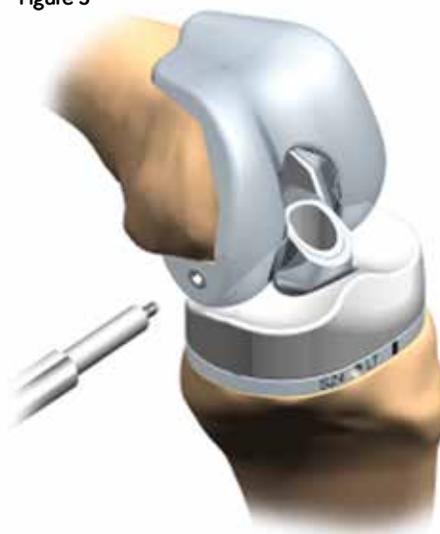


- 3 Thread (clockwise) the Axle Plug Removal Tool (Figure 5) into the exposed Axle Plug dimple until flush. Pull the Axle Plug out of the Femoral axle hole.

Note: There are two options for removal of the axle assembly. The first method involves removal from one side of the femoral due to limited accessibility to the opposite side.



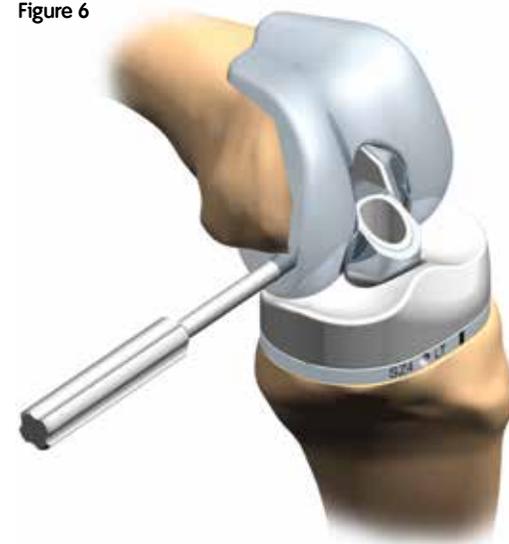
Figure 5



Insert the Axle Inserter Tool into axle hole of the Femoral until it makes contact with the Axle within the hole (Figure 6). Thread (clockwise) Axle Inserter Tool into the Axle a minimum of five turns. Remove the Axle from the Femoral axle hole.

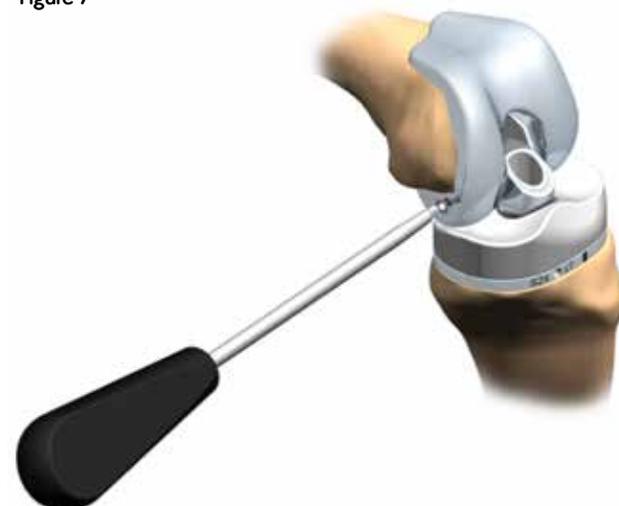


Figure 6



If both medial and lateral aspects of the posterior femoral component have good exposure, The Axle Plugs (2) and the Axle can be driven out from one side to the other with the 3.5mm Hex Driver (Figure 7). If this method is chosen, ensure that both Axle Plugs and the Axle are removed.

Figure 7



4. Remove the remaining linkage components (Post Sleeve, Hyperextension Stop, and Link Assembly) within the intercondylar box (Figure 8).
5. To remove a Guided-Motion Insert, use the 3.5mm Hex Driver to remove the Insert Locking Screw (Figure 9).

Figure 8

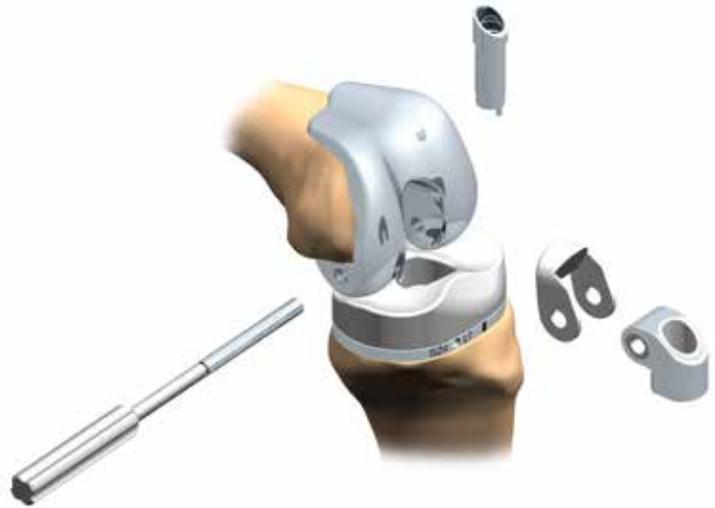
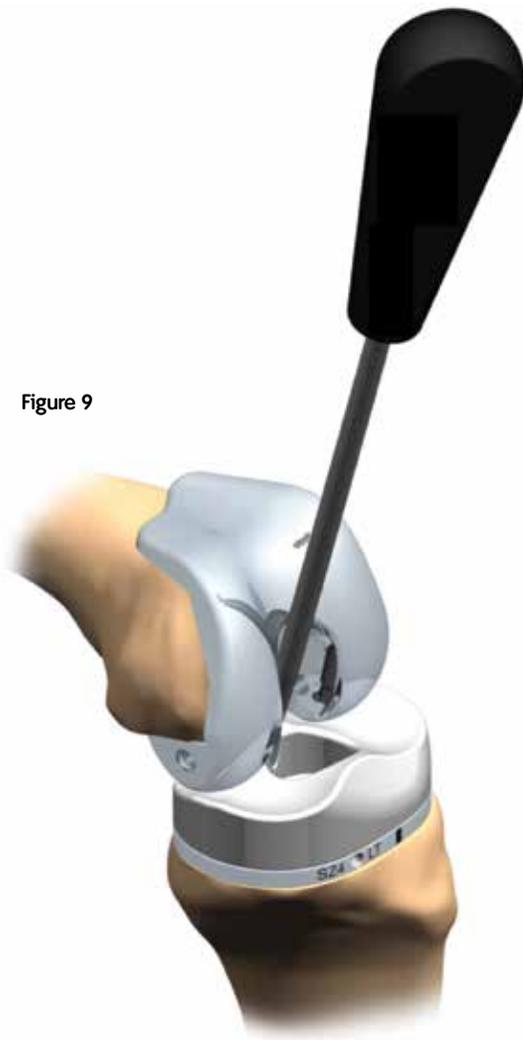


Figure 9

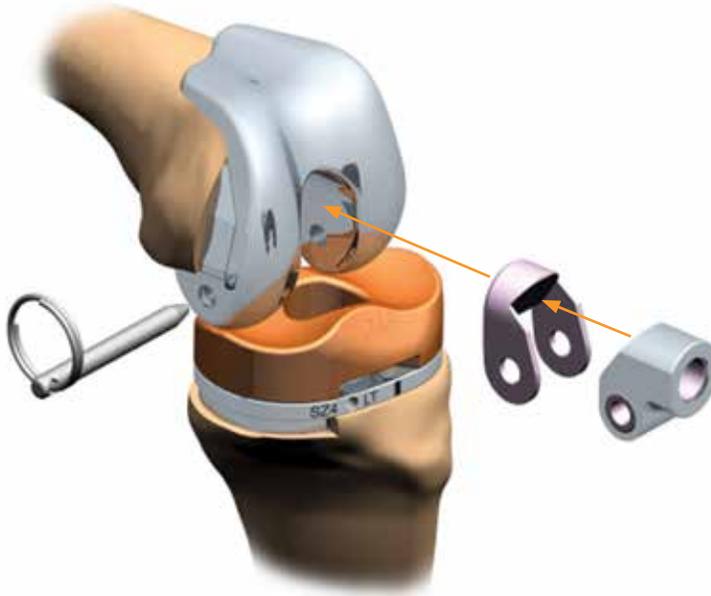


## Implant linkage assembly

1. Install the Hyperextension stop and the Link together in the direction and orientation shown in Figure 10.

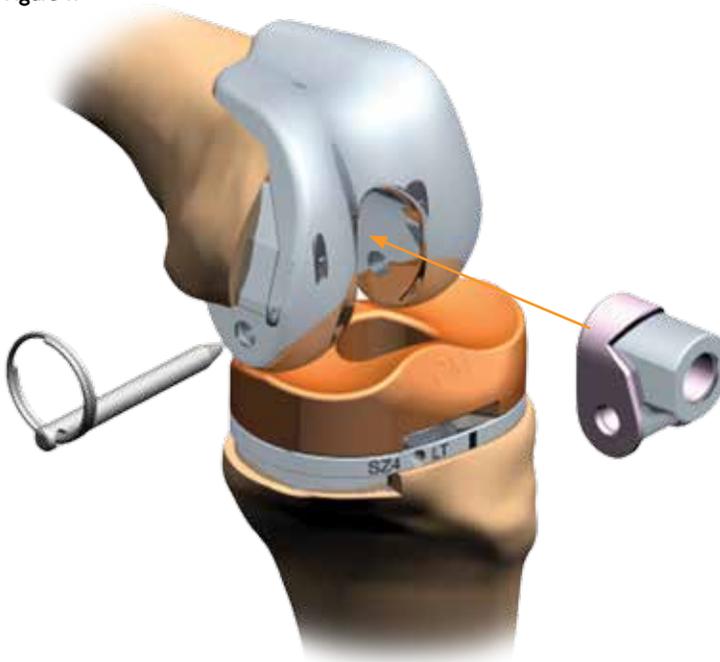
Note: the trial axle can be inserted from either side.

Figure 10



2. Install the Hyperextension stop and Link assembly in the cruciate gap of the femoral component noting the direction and rotation of the assembly as shown in Figure 11.

Figure 11



3. Install the Trial Axle through the axle hole to hold this assembly in place for the installation of the implant axle. See Figures 12 and 13.
4. Ensure Link assembly is located correctly in femoral per Figure 13 and ensure it will freely rotate around the trial axle.

Figure 12

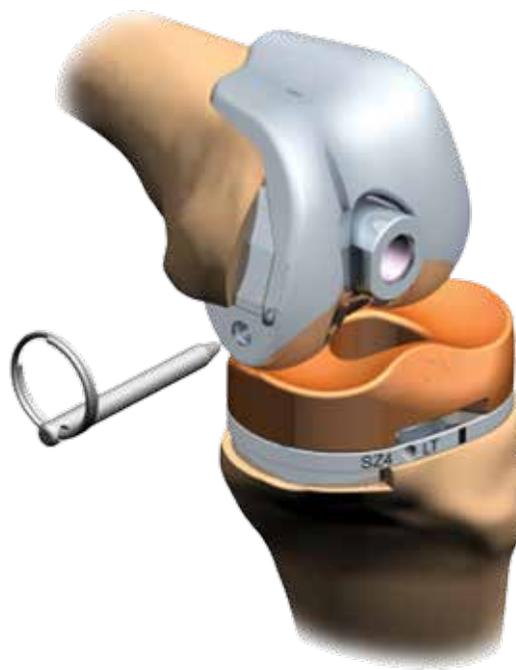
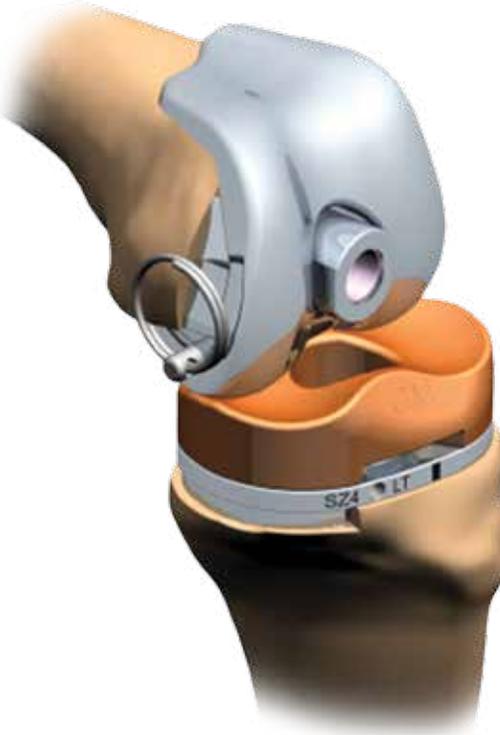


Figure 13



5. If the opposite side is accessible, install the implant axle from the opposite side that the trial axle was installed. While installing the implant axle remove the trial axle in the opposite direction to keep the Hyperextension and Link assembly in place as shown in Figures 14 and 15.

If the opposite side is not accessible, hold the link assembly in place while replacing the Trial Axle with the Implant Axle.

Figure 14

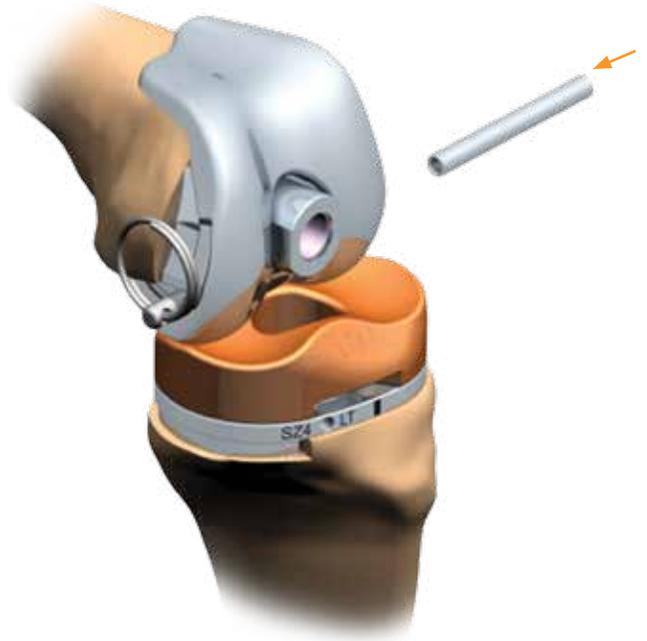
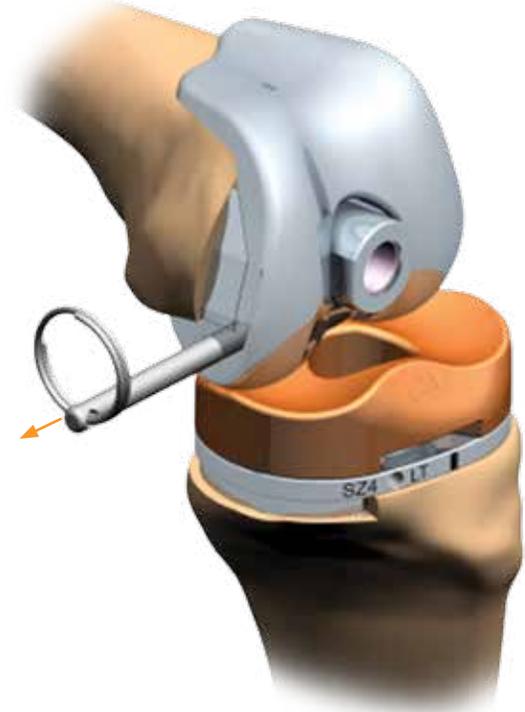


Figure 15



6. Install the axle plugs one at a time (Figure 16). Use caution as they are very small and easy to drop. Ensure the axle plugs are turned in the correct direction to properly engage the inner lock groove – the hole should be facing outward as shown in Figure 17. Using a standard mallet, tap the axle plugs into the axle hole until they are flush with the outer face of the femur. Ensure the axle does not disengage from the Link assembly.

Repeat this procedure for the opposite of the axle hole (if required), again, ensuring that the axle plugs are flush with the outside of the femoral component. (Inspect the outer edge of the tapped axle plugs for possible polyethylene rings – as some of the lock tab can shear when installing. This is to be expected and is not a failure of the axle plugs).

Figure 16

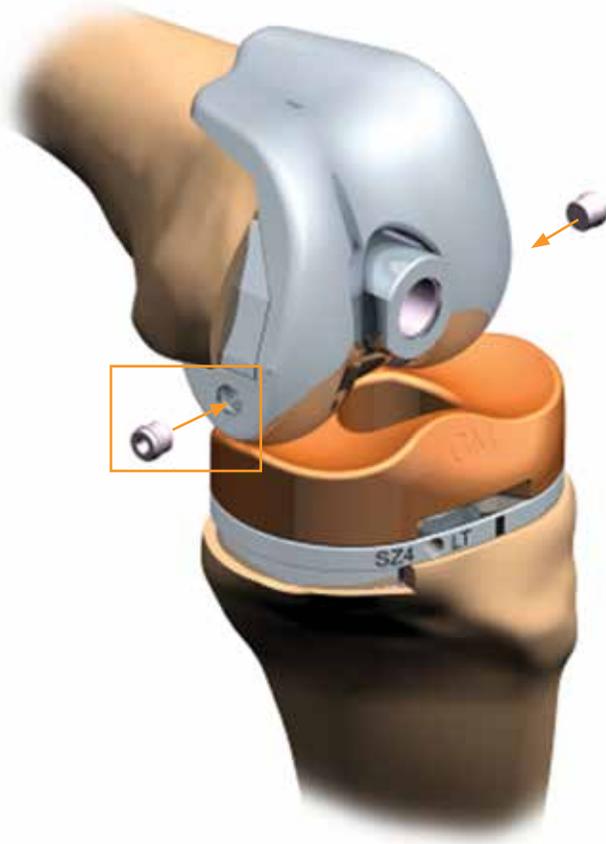
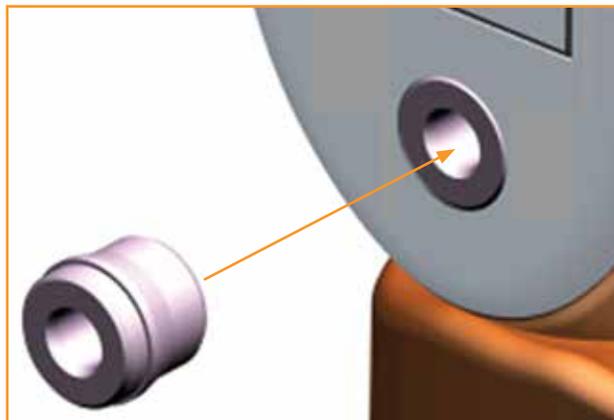


Figure 17



# Component assembly

## 7. Tibial insert assembly

Select the appropriate size/hand and thickness Guided-Motion Insert. Pre-install the Guided-Motion Insert lock screw into the posterior aspect of the insert with 2 – 3 turns using the 3.5mm Hex Screwdriver (Figure 18). Place the Insert onto Tibial Base making sure to engage anterior slot on distal side of Insert with tab on Tibial Base (Figure 19a).

Figure 18



Figure 19

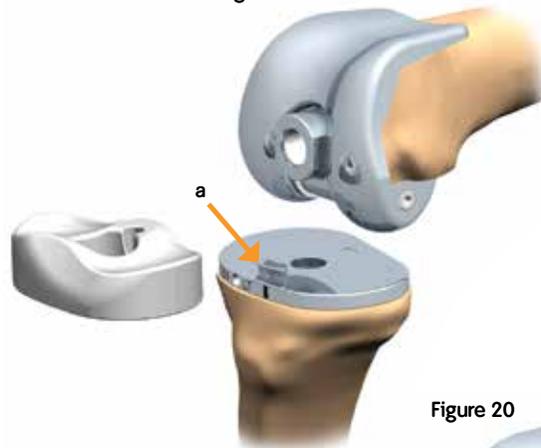
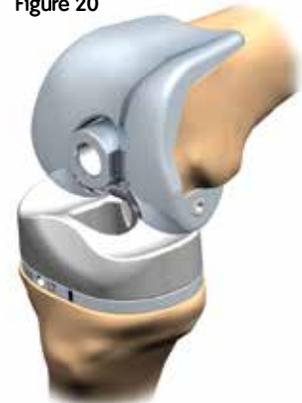


Figure 20



- Use the 3.5mm Hex Driver to secure the lock screw into the Tibial Base (Figure 21) and then torque with appropriate 75 in-lb Torque Wrench (Figure 22).

Sublux the tibia slightly anterior and rotate the Link down into the Insert (Figure 23).

- Attach the appropriate Height Sleeve for the chosen insert thickness to the Sleeve Insertion Tool. The Sleeve Insertion Tool lever (Figure 24a) must be depressed to retain the sleeve. The alignment tab on the sleeve (Figure 24b) and the downward slope proximally (Figure 24c) will be aligned to the anterior of the tibia.

*Note: Reminder the LEGION® Hinge Torque Wrench Should be calibrated every six months.*

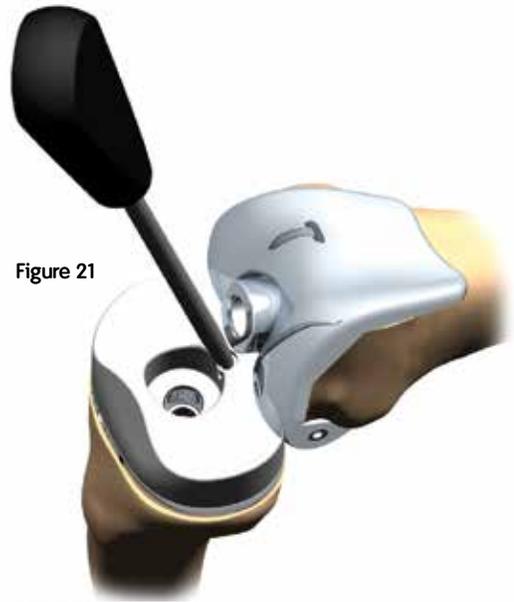


Figure 21

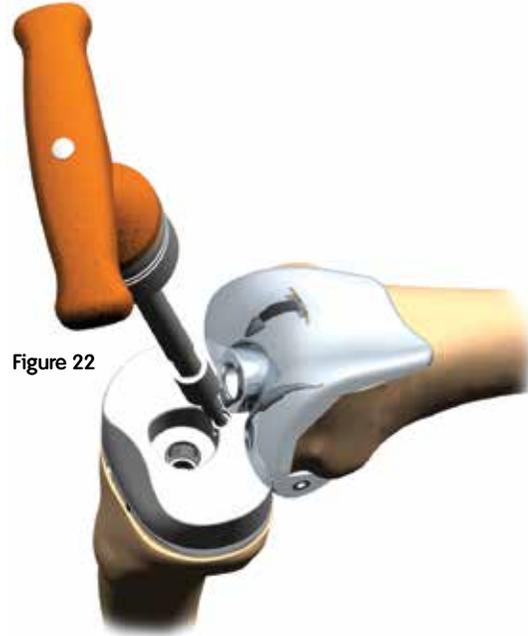


Figure 22

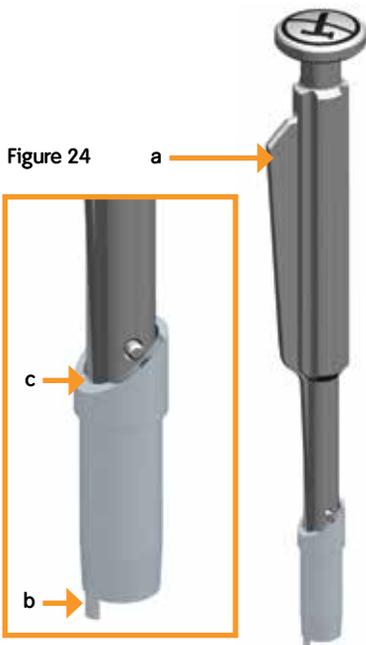


Figure 24

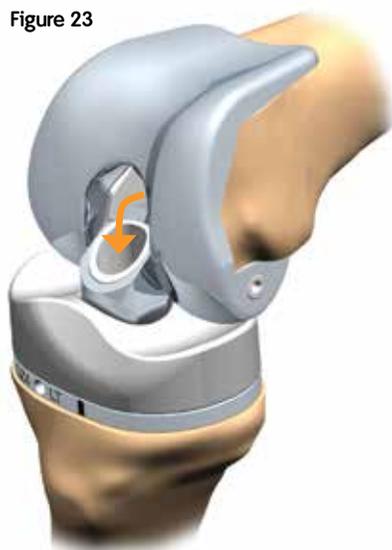


Figure 23

10. Insert the Sleeve through the Link Assembly and into the Tibial Base (Figure 25). Rotate the Sleeve until the alignment tab aligns and taper engages. With femoral tibial contact, the Sleeve should be flush or below the surface of the link (Figure 26a).
11. A slight bump with the palm of the hand will hold the Sleeve in place until the Post Bolt is installed. Do not impact the Sleeve Insertion Tool with a hammer.
12. Place the appropriate height bolt for the Insert selected (i.e. 11mm, 13mm, 15mm, 18mm, or 21mm) through the Link Assembly and Sleeve. Use the 4.75mm Hex Screwdriver to tighten the bolt (Figure 27).

Figure 25



Figure 27

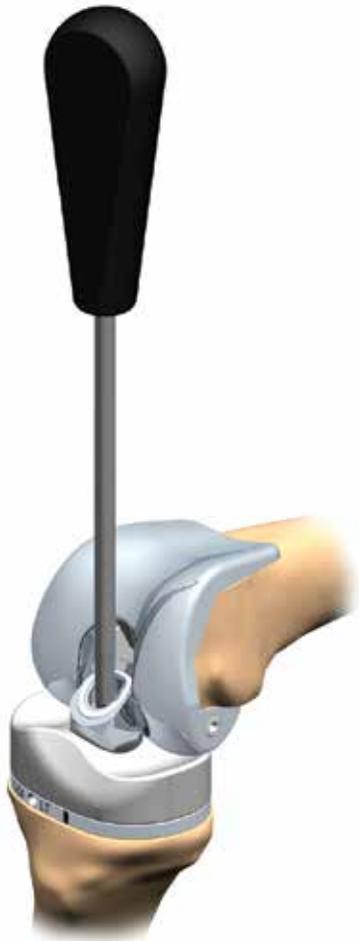
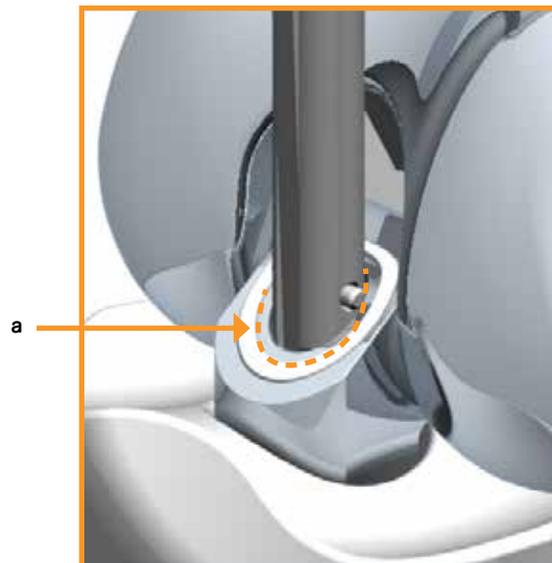


Figure 26



### Preliminary torque

13. Attach the 4.75mm Hex Bit (Figure 28b) to the 150 in-lb minimum\* Torque Wrench (Figure 28a). Insert the Tibial Stabilizing Tool (Figure 28c) to the anterior hole of the Tibial Implant. Torque the Post Bolt to 150 in-lb (Figure 30) while applying a Counter Torque with the Tibial Stabilizing Tool.

Note: \*Torque is at a minimum of 150 in-lb by positioning the indicator outside of the edge of the line (Figure 29).

Note: Reminder the LEGION® Hinge Torque Wrench Should be calibrated every six months.

14. To ensure adequate impaction of the sleeve taper junction, attach the Universal Extractor (slide hammer) to the Hinge Sleeve Impactor and insert into the opening of the Sleeve above the head of the Post Bolt (Figure 30).

Note: This step is required to make sure the bolt is seated correctly into the sleeve. Impaction of the sleeve will result in a slight settling which requires the bolt to be re-torqued.

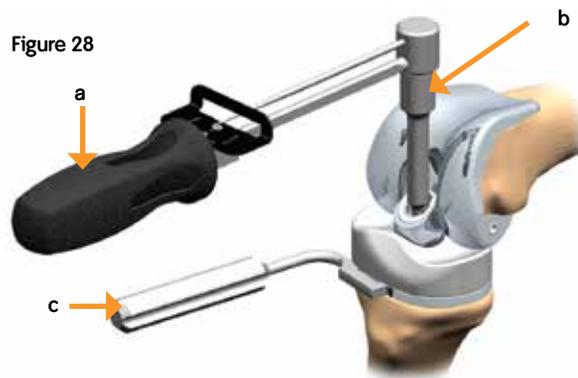
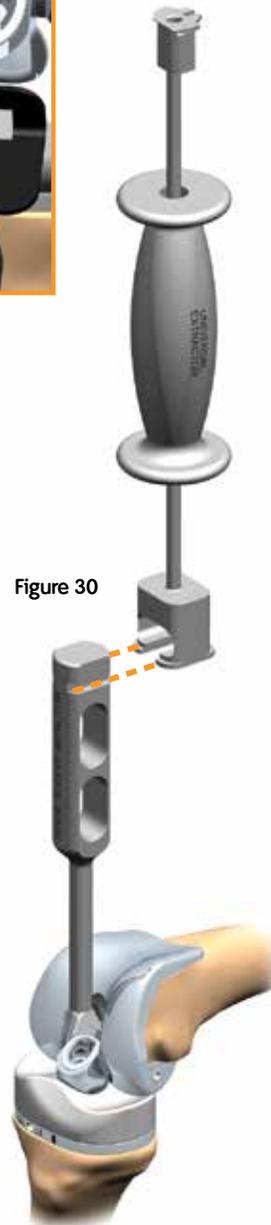


Figure 29



Figure 30



15. In a vertical position, use the entire range of the slide allowing it to free-fall three times. (Figures 31 and 32).

Note: If a Hammer is preferred, impact the Hinge Sleeve Impactor at least three times to ensure the sleeve taper has been properly engaged.

### Final torque

16. Reattach the Tibial Stabilizing Tool and Hinge Bolt Torque Wrench and re-torque to 150 in-lb minimum\* (Figure 33).

Note: \*Torque is at a minimum of 150 in-lb by positioning the indicator outside of the edge of the line (Figure 29).

Note: Reminder the LEGION® Hinge Torque Wrench Should be calibrated every six months.

Note: Visually inspect the Hex Driver Bit for wear after each surgery. The hex may wear after repeated use.

Figure 31



Figure 32

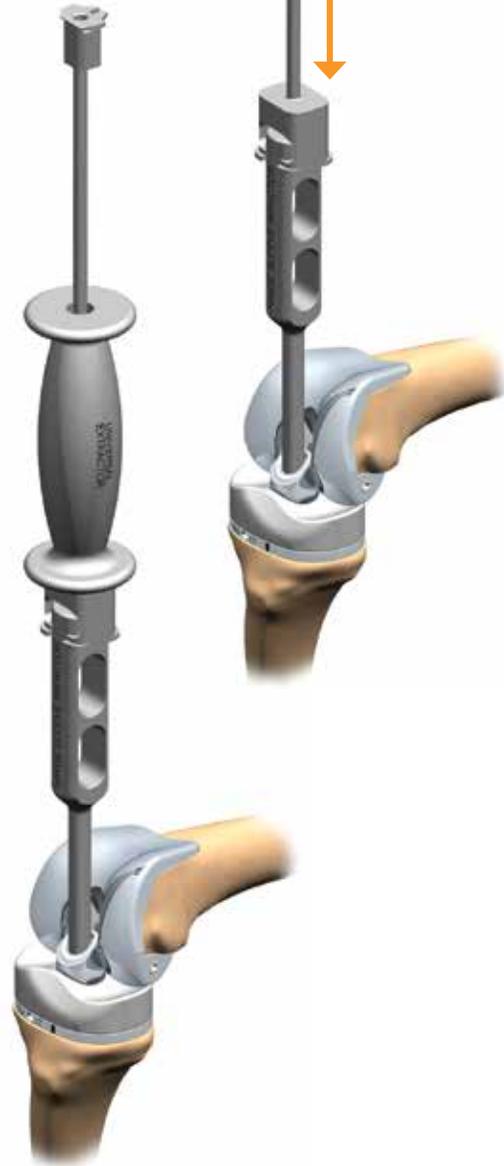
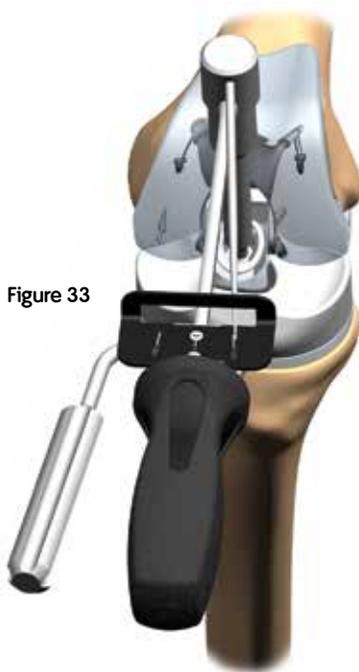


Figure 33



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