Surgical Technique
Revision Knee Arthroplasty
Surgical Technique
LEGION® 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.
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 technetium 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 preoperatively in order to help maximize the likelihood of postoperative success. If bone defects secondary to osteolysis exist preoperatively then the surgeon performing the procedure must understand the implications of this bone loss as well as techniques required to manage them.

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 that of 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. An extensile exposure proximally such as a quadriceps snip, or distally such as a tibial tubercle osteotomy, may be required to achieve adequate exposure.

Component removal

After adequate exposure of all components has been achieved, attention is turned to component removal. This is typically achieved through dissection of the interface between the prosthesis and the cement or at the prosthetic/bone interface. Many surgeons prefer to remove the femoral component first in order to improve visualization of the posterior tibial component. A thin, flexible osteotome or a thin oscillating saw may be used to disrupt the prosthetic interface in order to allow removal with minimal bone loss. Alternative techniques include the use of a Midas-Rex burr or a Gigli saw to free this interface. Angled osteotomes may be helpful in freeing the condylar portions of the femoral components. If the interfaces have been adequately freed, minimal force is typically required to remove the femoral component. Excessive force to remove the component may lead to femoral fracture. Removal of the tibial component is then carried out in a similar manner. Occasionally, exposure of the lateral side may be more difficult, and the use of a small capsular incision about the lateral aspect of the joint may be required to gain access to the posterolateral aspect of the tibial component. If disruption of the interface at the level of the plateau does not allow for easy implant removal, a cortical window may be made in the metaphysis of the tibia to allow a bone tamp access to the keel of the prosthesis. As bone cement fails most easily in tension, a controlled, well-placed blow will often dislodge the tibial component. If the patellar button is securely fixed, well-positioned and does not show excessive wear then it may be left and protected for the remainder of the case. If the patellar button must be revised, removal is most easily performed with a sagittal saw at the cement interface. Remaining cement and polyethylene plugs from the component may then be removed with a small, high-speed burr.

Great care must be taken during this stage of the procedure in order to ensure adequate patellar bone stock remains for revision component placement so that fracture is prevented. Once components have been removed, the remaining cement can then be removed with curettes, rongeurs or cement osteotomes. The wounds can be irrigated with a water pick to remove loose debris and attention can then be turned to the reconstructive portion of the procedure.
Contents
Preoperative evaluation .................................................. 2
Exposure ........................................................................ 4
Tibial preparation .......................................................... 5
Non-offset tibial sizing and preparation ........................... 9
Non-offset tibial trial assembly ...................................... 12
Offset tibial sizing and preparation ................................ 13
Offset tibial trial assembly ............................................. 17
Femoral canal and distal resection .................................. 20
Non-offset A/P resections and preparation ................. 24
Non-offset femoral trial ................................................. 30
Offset A/P resections and preparation ......................... 31
Offset femoral trial ....................................................... 38
Femoral box resection .................................................. 41
Trial hinge assembly and trial range of motion .......... 44
Tibial wedge resection .................................................. 47
Tibial fin punch ............................................................. 49
Patellar preparation ...................................................... 50
Implant assembly ......................................................... 51
Implantation ................................................................. 55
Component assembly ................................................... 57

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 preoperatively 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.

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**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. 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.

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*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 neurovascular 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.
Ream
1. Drill a pilot hole with the 9.5mm Intramedullary Drill, if necessary.

2. Ream the canal until cortical contact is achieved using progressively larger diameter reamers (Figure 1).

3. Choose between the two methods of instrument stabilization:
   a. Last reamer:
      – Leave the last reamer in the tibial canal.

   b. Trial Stem Connection Rod Assembly:
      – Remove the last reamer, making note of the depth and diameter (Figure 2).
      – Attach the Trial Stem Connection Rod to the appropriate diameter Trial Stem and insert the Trial Stem Connection Rod Assembly into the tibial canal.

Note: Long Stems are offered in 120mm, 160mm, and 220mm straight; 220mm and 280mm bowed. Markings of depth length are laser marked on the reamers.

Note: The Cutting Flutes on the press-fit stems are 1mm larger in diameter than the reamers.
**Tibial IM Alignment Guide**

Ensure the horizontal alignment bar knob (Figure 3b) is in the locked position. Slide the Cutting Block onto the vertical alignment bar (Figure 3c), position at the 0mm mark (Figure 3e) and tighten the Tibial Cutting Block Thumbscrew (Figure 3d).

**Note:** "0mm" line will be fully visible.

1. Attach the 1mm stylus to the slot capture of the Tibial Cutting Block by inserting the stylus foot into the cutting slot.

2. Slide the Tibial IM Assembly onto the reamer (or Trial Stem Connection Rod Assembly) (Figure 4).
3. Adjust the vertical alignment bar towards the anterior tibia and lock in position (Figure 5c).

Lower the IM Assembly so that the 1mm Stylus touches the least affected side of the tibial plateau (Figure 5e) and tighten the IM collet in position (Figure 5f).

4. With the IM Alignment Guide secured to the Reamer Shaft (or Trial Stem Connection Rod) by the tightened collet, the Tibial Cutting Block can be rotated around the anterior tibia for optimum access by loosening the thumbscrew (Figure 5b).
**Tibial resection**

Note: Ensure that the IM Assembly is in the locked position by inserting a 3.5mm Hex Screwdriver into the female end of the thumbscrews (Figure 6a, b and d), turning clockwise until tight.

1. Pin the Tibial Cutting Block to the tibia by inserting pins first through the central holes in the 0mm position, then the oblique hole (Figure 6).

   Note: Using headless pins through the central holes marked 0mm will allow the block to be shifted to +2mm, +5mm or +7mm should additional resection be needed.

2. Remove the stylus.

3. Using a 1.35mm Oscillating sawblade, resect the proximal tibia (Figure 7).

   Note: The LEGION® Revision tibial tray has a 0° posterior slope. Rotational alignment is not a factor when making the tibial resection.

4. Remove the pins and loosen the IM collet. Remove the IM assembly, leaving the reamer (or trial stem connection rod assembly) in the tibial canal.
Non-offset tibial sizing and preparation*

Sizing and placement
1. Assess the A/P and M/L size of the resected proximal tibia with the Tibial Drill Guides and select the proper size.

_Tibial Drill Guide/Neutral Bushing Instrument Assembly:

Insert the Tibial Neutral Bushing into the appropriate sized Tibial Drill Guide. Push in until fully seated.

2. Place the Tibial Drill Guide/Neutral Bushing Assembly over the reamer (or Trial Stem Connection Rod Assembly) and assess the A/P and M/L position and rotation to ensure adequate tibial coverage. (If adequate coverage is not achieved, proceed to “Offset Tibial Sizing and Preparation” section).

3. Using headless pins, pin the Tibial Drill Guide to the proximal tibia (Figure 8).

*Note: Only tibial sizes 2, 3, 4, 5 and 7 are available for HK.
Preparation of the female taper counterbore

4. Remove the Neutral Bushing and Reamer (or Trial Stem Connection Rod Assembly).

Note: If needed, the Revision T-handle can be used to remove fixed Reamers or in case the Trial Stem becomes well-fixed within the canal, the Universal Extractor can be attached to the end of the Trial Stem Connection Rod to aid in removal.

5. Insert the Tibial Counterbore Guide Bushing into the Tibial Drill Guide (Figure 9).

Counterbore Reamer Instrument Assembly:

Depress the button on the counterbore depth stop and slide the depth stop over the Reamer with the “IM CANAL FLUTE” marking towards the cutting end of the Reamer. Then attach to the Power drill. Position the depth guide to the “FEMUR” marking (Figure 10).

Note: The Tibial Post of the Hinged Tibia is 15mm deeper than a LEGION® Revision Tibial Base. Therefore, the “FEMUR” depth marking is used instead of the “TIBIAL” marking.

Caution should be used in smaller tibias.
6. Insert the Counterbore Reamer Assembly into the Guide Bushing and ream until the depth stop makes contact with the Guide Bushing (Figure 11).

Remove pins and Drill Guide.
Non-offset tibial trial assembly

Component assembly

Tibial Trial preparation

Tibial Trial/Trial Stem Instrument Assembly:

7. Align the laser mark on the J-hook of the Trial Stem to the laser mark on the posterior side of the distal face of the female tibial trial taper (Figure 12). Push in the trial stem and make a quarter-turn clockwise to engage the J-hooks.

8. Insert the Tibial Trial/Trial Stem Assembly into the tibial canal (Figure 13).
Offset tibial sizing and preparation*

**Sizing and placement**

1. If adequate tibial coverage is not achieved with the Neutral Tibial Bushing Assembly (Figure 14), remove the assembly from the tibial plateau.

2. Estimate the amount of offset required (Figure 14a) and insert the 2mm, 4mm or 6mm Tibial Offset Bushing Instrument Assembly into the appropriate sized Tibial Drill Guide. In this surgical technique a 4mm offset is used.

3. Replace the Tibial Offset Bushing Assembly over the Reamer (Figure 15).

*Note: Only tibial sizes 2, 3, 4, 5 and 7 are available for HK.
4. Rotate the Tibial Offset Bushing about the tibia until proper tibial coverage is achieved (Figures 16 and 17).

5. Using Headless Pins, pin the Tibial Drill Guide to the proximal tibia (Figure 17).

6. Make note of the location of the arrow marking on the offset bushing to the number on the Tibial Drill Guide (Figure 17a). This number references the position (location) of the Offset Coupler Trial/Implant when connected to the Trial Stem/implant and will be used during the assembly of the trials.
Preparation of the female taper counterbore

7. Leaving the pins in place, remove the Offset Bushing Assembly from the tibial plateau, then remove the Reamer (or Trial Stem Connection Rod Assembly).

8. Insert the Tibial Counterbore Guide Bushing into the appropriate sized Tibial Drill Guide.

9. If removed, replace the Tibial Counterbore Guide Bushing Assembly over the pins (Figure 18).

**Counterbore Reamer Instrument Assembly:**

Depress the button on the counterbore depth stop and slide the depth stop over the Reamer with the “IM CANAL FLUTE” marking towards the cutting end of the Reamer. Then attach to the power drill. Position the Depth Guide to the “FEMUR” marking (Figure 19).

Note: The Tibial Post of the Hinged Tibia is 15mm deeper than a LEGION® Revision Tibial Base. Therefore, the “FEMUR” depth marking is used instead of the “TIBIAL” marking.

Caution should be used in smaller tibias, especially if the use of an Offset Coupler is intended.

10. Insert the Counterbore Reamer Assembly into the Guide Bushing and ream until the depth stop makes contact with the Guide Bushing (Figure 19). Remove the Counterbore Reamer Assembly.

11. Remove the Tibial Counterbore Guide Bushing Assembly and pins from the tibial plateau.
Preparation of the Offset Coupler Counterbore
Trial Stem Guide Assembly:

Attach the 120mm length Trial Stem, using the diameter of the last reamer used, to the Trial Stem Connection Rod.

12. Insert the Trial Stem Guide Assembly into the tibial canal (Figure 20).

13. Place the Counterbore Reamer Assembly, still positioned at the “FEMUR” marking, over the Trial Stem Guide Assembly and ream until the depth stop contacts the tibial plateau (Figure 21).

Caution should be used in smaller tibias.
Offset tibial trial assembly

Tibial Trial preparation
Note: Ensure the Offset Coupler Trial is in the locked position. If not, insert a 3.5mm Hex Screwdriver in the male end of the Coupler turning clockwise until tight.

Tibial Trial/Coupler/Stem Instrument Assembly:
Align the laser mark on the male end of the offset Coupler J-hook with the line mark on the posterior side of the distal face of the female tibial trial taper (Figure 22a).

Push in the Offset Coupler trial and turn Coupler a quarter-turn clockwise to engage J-hook. Align the male end of the Trial Stem J-hook to the female end of the Offset Coupler (Figure 22b). Push in the Trial Stem and make a quarter-turn clockwise to engage the J-hook (Figure 22).

Tip: If difficulty is experienced with J-hook assembly, rotate stem or coupler 180° and retry. If laser mark lines are not aligned, the connection cannot be inserted fully.

Component assembly
Tibial Trial preparation
Tibial Trial/Trial Stem Instrument Assembly:
7. Align the laser mark on the J-hook of the Trial Stem to the laser mark on the posterior side of the distal face of the female tibial trial taper (Figure 12). Push in the trial stem and make a quarter-turn clockwise to engage the J-hooks.
8. Insert the Tibial Trial/Trial Stem Assembly into the tibial canal (Figure 13).
1. Insert the 3.5mm Hex Screwdriver into the proximal end of the Tibial Trial until the screwdriver is engaged with the hex connection of the Coupler Trial (Figure 23). Unlock the Coupler Trial by turning the Hex Screwdriver counterclockwise.

2. Adjust the Coupler to the predetermined position (obtained previously in the Sizing and Placement section, Figure 17a) by aligning the correct clock position on the Offset Coupler Trial to the line marking on the Tibial Trial (Figure 24). (In this case, a 1 o’clock position was used.)
3. Once positioned, turn the Hex Screwdriver clockwise to lock the predetermined offset into position.

4. Insert the Tibial Trial/Offset Coupler Trial/Stem Trial Assembly into the tibial canal (Figure 25).
   
   If required, impact with the Tibial Tray insertion tool in order to broach the posterior edge of the IM Canal for the Tibial Base Post (Figure 26a).

5. Assess the preliminary A/P and M/L position of the Tibial Trial Tray.

   Tip: If minor changes to Tibial Trial Tray orientation are desired, loosen the Hex Screw of the Offset Coupler Trial (Figure 23) and move the tray where desired. Lock the Hex Screw and note the final clock position after removing the Trial Assembly.
Femoral canal and distal resection

Femoral preparation

Ream

1. Drill a pilot hole with the 9.5mm Intramedullary Drill, if necessary.

2. Ream the canal until cortical contact is achieved using progressively larger diameter Reamers (Figure 27).

3. Choose between the two methods of instrument stabilization:
   a. Last reamer:
      – Leave the last reamer used in the femoral canal
   b. Trial Stem Connection Rod Assembly:
      – Remove the last reamer, making note of the depth and diameter (Figure 27b).
      – Attach the Trial Stem Connection Rod to the appropriate diameter Trial Stem and insert the Trial Stem Connection Rod Assembly into the femoral canal.

Note: Long stems are offered in 120mm, 160mm, and 220mm straight; and 220mm and 280mm bowed. Markings of depth lengths are laser marked on the reamers. The Offset Coupler adds 30mm to the stem length; therefore an additional 30mm depth is needed when using an Offset Coupler.

Note: The Cutting Flutes on the press-fit stems are 1mm larger in diameter than the reamers.
Distal femoral resection(s)

Valgus Guide Instrument Assembly:

Attach the size 3-8 Neutral 6° Valgus Collet to the Valgus Alignment Guide and ensure that the "LATERAL" notation (Figure 29a) on the Collet is correctly positioned for a left or right knee. Slide the Distal Cutting Block on the post of the Valgus Guide (Figure 28).

1. Slide the Valgus Guide Assembly over the shaft of the Reamer (or Trial Stem Connection Rod Assembly) and flush with the distal femur.

2. Tighten the Valgus Collet clockwise to the Reamer (Figure 29b).

Note: The Distal Cutting Block is designed for a 1.5mm "clean-up" cut, 5mm, 10mm, or 15mm wedge cut.

Option: Attach the 1mm Stylus to the Distal Cutting Block by inserting the stylus foot into the distal slot and position the stylus tip on the least affected side (Figure 30).
3. Pin the Distal Cutting Block, using at least one Oblique Pin, and resect the distal femur (Figure 31a).

**Distal femoral wedge resection(s):**

Note: Joint line/patella height corrections noted preoperatively should be assessed for any proximal/distal (augment/resection) adjustments.

Note any augment variations for use on the femoral A/P Cutting Block and Femoral Trial.

1. If needed, resect the appropriate Distal Femoral Wedges through the Distal Cutting Block (Figure 31b).

2. Remove the pin(s), loosen the Valgus Guide Collet, and remove the Guide Assembly from the Reamer.
Option: M/L femoral sizing with Valgus Guide Sizing Plate*

Valgus Guide Instrument Assembly:

Attach the size 3 – 8 Neutral 6° Valgus Collet to the Valgus Alignment Guide and ensure that the “LATERAL” notation on the collet (Figures 32-33) is correctly positioned for a left or right knee. Slide the Distal Cutting Block on the post of the Valgus Guide.

1. Attach the Valgus Guide Sizing Plate to the Valgus Guide Assembly by sliding over the distal surface of the Valgus Guide.

2. Assess the M/L femoral size with the size correlating steps of the Valgus Guide Sizing Plate in relation to the femur (Figure 33)*.

*Note: Only femoral sizes 3, 4, 5 and 7 are available for HK.

Tip: When placing the Valgus Guide Assembly onto the distal surface of the femur, occasionally there will not be adequate cancellous bone stock for the assembly to sit flush on the “best” distal surface. If this occurs, the Valgus Guide Sizing Plate can be used as an outrigger to allow the optimal distal placement of the Valgus Guide Assembly.
Non-offset A/P resections and preparation*

A/P femoral resections

Note: Joint line/patella height corrections noted preoperatively and at the Distal femoral resection step should be accounted for in the A/P Hemi Distal Shim(s) selection (augment variations).

1. Attach the appropriate A/P Hemi Distal Shims, matching the size of the Distal Wedge resections, to the posterior aspect of the A/P Cutting Block (Figure 34).

* Note: Only femoral sizes 3, 4, 5 and 7 are available for HK.

Neutral femoral resection instrument assembly

Attach the Neutral 6° Valgus Collet to the selected A/P Femoral Cutting Block ensuring that the “LATERAL” notation on the collet is correctly positioned for a left or right knee (Figure 35).
2. Slide the Neutral Femoral Resection Assembly over the shaft of the Reamer (or Trial Stem Connection Rod Assembly) until flush with the distal femur (Figure 36).

   Note: Quick-connect Handles may be used to assist in stabilization and/or setting rotation.

3. Assess the A/P and M/L position ensuring the rotation of the A/P Cutting Block is aligned with the epicondylar axis. (If appropriate position is not achieved, proceed to Offset A/P Resections and Preparation section.)
Non-offset A/P resections and preparation

**Non offset femoral sizing and placement**

Note: Quick-connect Handles may be left in the A/P Cutting Block while resections are made. This page shows the handles removed for visual clarity.

4. Tighten the Neutral 6° Valgus Collet to the Reamer Shaft (or Trial Stem Connection Rod Assembly). Pin the A/P cutting block to the distal femur through the central hole and secure with Oblique Pin(s) through the side of the A/P Cutting Block and Distal Shims (Figure 37).

   Note: To secure Distal Shims, Oblique Pins must be used.

5. Resect the anterior femur above the anterior surface of the A/P Cutting Block (Figure 38).
6. Resect the posterior condyles through the 10mm posterior wedge slot (Figure 39a). This resection is required to make room for the hinge axle. Posterior Wedges are not available for the hinge knee.

Note: Posterior chamfer cuts are not needed for the LEGION® HK Hinge Knee System.

7. Resect the anterior chamfer (Figure 40).
Non-offset A/P resections and preparation

**Preparation of the female taper counterbore**

8. With the A/P Cutting Block pinned in place, remove the Neutral 6° Valgus Collet and Reamer (or Trial Stem Connection Rod Assembly).

Note: If needed, the Revision T-handle can be used to remove fixed reamers or in case the Trial Stem becomes well-fixed within the canal, the universal extractor can be attached to the end of the Trial Stem Connection Rod to aid in removal.

9. Insert the Femoral Counterbore Guide Bushing into the A/P Femoral Cutting Block, ensuring that the “LATERAL” notation on the bushing is correctly positioned for a left or right knee (Figure 41).
Counterbore Reamer Instrument Assembly:
Depress the button on the Counterbore Depth Stop and slide the Depth Stop over the Reamer with the “IM CANAL FLUTE” marking towards the cutting end of the Reamer. Then attach to the power drill. Position the Depth Guide to the “FEMUR” marking (Figure 42).

10. Insert the Counterbore Reamer Assembly into the Guide Bushing and Ream until the depth stop contacts with the Guide Bushing (Figure 43).

11. Remove the pins and A/P Cutting Block from the distal femur.
Non-offset Femoral Trial

Femoral Trial preparation

**Femoral Trial/Trial Stem Instrument Assembly:**

1. Using a 3.5mm Hex Screwdriver, screw on the appropriate Distal Wedge Trial(s) to the Femoral Trial (Figure 44).

   *Note: Magnetic connections are used on smaller distal wedge trial sizes.*

   *Note: Joint line/patella height corrections noted preoperatively and at the Distal femoral resection step should be accounted for in the Distal Wedge Trial(s) selection.*

2. Align the laser mark on the J-hook of the Trial Stem to the laser mark on the side of the femoral trial taper. Push in the Trial Stem and make a quarter-turn clockwise to engage the J-hooks (Figure 45).

3. Insert the Femoral Trial/Trial Stem Assembly into the femoral canal. Proceed to "Femoral Box Resection" section.
Offset A/P resections and preparation*

Offset femoral sizing and preparation
A/P femoral resections

1. If appropriate femoral position is not achieved with the Neutral 6° Valgus Collet, remove the Neutral 6° Valgus Collet and A/P Cutting Block from the distal femur.

2. Ensure that the A/P Hemi Distal Shims, matching the size of the distal wedge resections, are attached to the posterior aspect of the A/P Cutting Block.

* Note: Only femoral sizes 3, 4, 5 and 7 are available for HK.

Note: Joint line/patella height corrections noted preoperatively and at the Distal femoral resection step should be accounted for in the A/P Hemi Distal Shim(s) selection (augment variations).

Offset Femoral Collet Instrument Assembly:

Insert the 2mm, 4mm or 6mm Offset Femoral Collet to the appropriate sized A/P Cutting Block, ensuring that the “LATERAL” notation on the collet is correctly positioned for a left or right knee (Figure 46). In this surgical technique a 4mm offset is used.

3. Slide the Offset Femoral Collet Assembly over the Reamer (Figure 47).
4. Rotate the arm of the Offset Collet until the A/P Cutting Block is positioned appropriately. The clock position of the arm references the positioning of the Femoral Collet relative to the canal (Figures 48 – 50). (In this surgical technique a five o'clock position is referenced.)

5. Assess the A/P and M/L position ensuring the rotation of the A/P cutting block is aligned with the epicondylar axis.

Note: Quick-connect Handles may be used to assist in setting rotation.
Note: Quick-connect Handles may be left in the A/P Cutting Block while resections are made. This page shows the handles removed for visual clarity.

6. Tighten the Offset Valgus Collet to the Reamer Shaft (or Trial Stem Connection Rod Assembly). Pin the A/P Cutting Block to the distal femur through the central hole and secure with oblique pin(s) through the sides of the A/P Cutting Block and Distal Shims (Figure 51a).

Note: To secure Distal Shims in place, oblique pins should be used (Figure 51a).

7. Resect the anterior femur above the anterior surface of the A/P Cutting Block (Figure 52).
8. Resect the posterior condyles through the 10mm posterior wedge slot (Figure 53a). This resection is required to make room for the hinge axle. Posterior wedges are not available for the hinge knee.

Note: Posterior chamfer cuts are not needed for the LEGION® HK Hinge Knee System.

9. Resect the anterior chamfer (Figure 54).
Preparation of the female taper counterbore

10. Remove the Offset Valgus Collet and Reamer, leaving the pinned A/P Block on the distal femur.

Note: If using a 4mm Offset (16mm or larger diameter reamer) or 6mm Offset, the oblique pins and A/P Cutting Block will need to be removed so that the Reamer can be extracted from the femoral canal.

11. Insert the Femoral Counterbore Guide Bushing into the A/P Cutting Block, ensuring that the “LATERAL” notation on the collet is correctly positioned for a left or right knee (Figure 55).

Counterbore Reamer Instrument Assembly:
Depress the button on the Counterbore Depth Stop and slide the depth stop over the Reamer with the “IM CANAL FLUTE” marking towards the cutting end of the Reamer. Then attach to the power drill. Position the depth guide to the “FEMUR” marking (Figure 56).
12. Insert the Counterbore Reamer Assembly into the Guide Bushing and ream until the depth stop makes contact with the Guide Bushing (Figure 57).

13. Remove the pins, Femoral Counterbore Guide Bushing and A/P Cutting Block from the distal femur.
Preparation of the Offset Coupler Taper
Counterbore

Trial Stem Guide Assembly:
Attach the 120mm length Trial Stem, using the
diameter of the last reamer used, to the Trial
Stem Connection Rod.

14. Place the Trial Stem Guide Assembly into the
femoral canal (Figure 58).

15. Insert the Counterbore Reamer Assembly, still
positioned at the "FEMUR" mark, over the Trial
Stem Guide and ream until the depth stop
contacts the distal femur (Figure 59).

16. Remove the Counterbore Reamer Assembly
and Trial Stem Guide Assembly.
Offset Femoral Trial

**Femoral Trial preparation**

1. Using a 3.5mm Hex Screwdriver, screw on the appropriate Distal Wedge Trial(s) to the Femoral Trial (Figure 60).

   Note: magnetic connections are used on smaller distal wedge trial sizes.

   Note: Joint line/patella height corrections noted preoperatively and at the Distal femoral resection step should be accounted for in the Distal Wedge Trial(s) selection.

**Femoral Trial assembly:**

2. Align the laser mark on the male end of the offset coupler J-hook with the laser mark on the taper of the Femoral Trial (Figure 61a). Push in the Offset Coupler Trial and turn the Coupler a quarter-turn clockwise to engage J-hook.

   Note: Ensure the Offset Coupler Trial is in the locked position by inserting a 3.5mm Hex Screwdriver in the male end of the Coupler, turning clockwise until tight.
3. Align the laser mark on the male end of the Trial Stem J-hook with the laser mark on the taper of the female end of the Offset Coupler (Figure 62b). Push in the Trial Stem and make a quarter-turn clockwise to engage the J-hook.

4. Insert the 3.5mm Hex Screwdriver into the distal end of the Femoral Trial until the screwdriver is engaged with the hex connection of the Coupler Trial. Unlock the Coupler Trial by turning the Hex Screwdriver counterclockwise (Figure 63).
**Offset Femoral Trial**

1. Adjust the Coupler to the predetermined position (obtained previously in the Offset Sizing and Placement section) by aligning the correct clock position on the Offset Coupler Trial to the line marking on the Femoral Trial. In this surgical technique a five o’clock position was used.

2. Once positioned, turn the Hex Screwdriver clockwise to lock the predetermined offset into position.

3. Insert the Femoral Trial Assembly into the femoral canal (Figure 64).
Femoral box resection

1. Pin the Hinge Femoral Trial through the anterior flange (Figure 65).

2. Attach the Hinge Housing Resection Collet to the Femoral Trial by pulling forward on the gold tabs of the collet (Figure 66) and sliding the Housing Collet (anterior to posterior) into the slots on the distal face of the Femoral Trial.
3. Attach the LEGION™ HK Box Reamer and
the P/S Reamer Shaft Handle to the Patellar
Reamer Shaft. Ream through the Housing
Resection Collet until the depth stop contacts
the collet (Figure 67).

4. Impact the Hinge Housing Box Chisel through
the Housing Resection Collet to square the
corners of the housing (Figure 68).
Femoral Trial Box Module Assembly

1. Insert the arms of the appropriate Femoral Trial Box Module (either Size 2 – 5 or Size 6* – 7) into the anterior aspect of the Femoral Trial Box (Figure 69a) and rotate downward until seated (Figure 70).

*Note: Size 6 is not available.
Trial Hinge Assembly and trial range of motion

1. With the Tibial Trial/Trial Stem in the tibia and the Femoral Trial/Trial Stem in the femur, insert a Guided Motion (Orange as shown for Left Knee – Black for Right Knee) Articular Insert Trial into the Tibial Trial Tray (Figure 71).

2. Select the blue colored (size 2 – 5) or Tan colored (size 6* – 7) Trial Link and insert in through the Trial Box Module (Figure 72).

*Note: Size 6 is not available.
3. Use the 4.75mm Hex Screwdriver to assemble the appropriate length Trial Post to the Tibial Trial Tray (Figure 73).

   Tip: The Trial Post length is the same as the Insert height.

4. Insert the Trial Axle through the Femoral Trial and Trial Link (Figure 74).

   Note: The Trial Axle can be inserted from either side.
Trial Hinge Assembly and trial range of motion

5. Perform a trial range of motion (Figure 77) to assess joint stability, joint line, patellar tracking and patella height (Figure 75). The 10mm distal wedge resection slots in Femoral Trial provide a reference of 20mm from the joint line to help assess the height of the inferior imminence of the patella (Figure 76).

6. Pin using anterior oblique hole and mark the rotation on the tibia utilizing the anterior mark on the Tibial Trial Tray (Figure 78, 79a). Remove the Trial Post Bolt with the 4.75mm Hex Driver, Trial Link, Trial Axle and Articular Insert Trial.
1. Remove any spikes intersecting a compartment needing a Hemi Wedge and pin the opposite compartment if necessary to lock the rotational orientation of the Tibial Trial.

2. Select the appropriate Wedge Resection Guide (Figure 80a) and orient to the correct M/L direction.

3. Insert the locking Quick-connect Handle through the Wedge Resection Guide by depressing the ball tip of the handle and inserting the handle through the guide into the anterior Quick-connect Pocket of the Tibial Trial Tray (Figure 81a). Lock the Wedge Resection Guide by tightening the knob clockwise on the Quick-connect Handle (Figure 81b). Then tighten the thumbscrew clockwise on the Wedge Resection Guide (Figure 81c).

4. Using Headless Pins, pin the Wedge Resection Block to the anterior tibia in the most distal holes.
Tibial Wedge resection

5. Resect for Tibial Wedges (Figure 82).

6. Loosen the Quick-connect Knob to release the handle and attached Resection Guide from the Tibial Tray.

7. Remove the Tibial Trial Assembly from the canal.

Note: For Hemi Wedges, Insert an additional pin at the level of Tibial Wedge resection (5mm, 10mm, or 15mm). This will be used as a guide for the sagittal clean-up cut for Hemi-stepped Wedges (Figure 83).
Tibial fin punch

**Tibial Wedge Assembly and fin punch**

1. Using a 3.5mm Hex Screwdriver, screw the appropriate Tibial Wedge Trial(s) into the distal aspect of the Tibial Trial Tray (Figure 84) and replace the tray assembly onto the proximal tibia.

2. Verify rotational orientation and replace any pins needed for stability, then pick the appropriate sized Fin Punch, insert the punch into the Proximal Tibial Trial Tray and impact until fully seated (Figures 85).
Patellar preparation

The surgeon can choose from a free-hand cutting technique with towel clips or, if desired, the surgeon can choose one of the following instrumented techniques.

Please refer to:
71281678 – LEGION® Resurfacing Patella Surgical Technique
or
71281677 – LEGION Biconvex Patella Surgical Technique.
Implant assembly

1. Select the appropriate sized Femoral/Tibial Components and the matching sized Femoral/Tibial Wedges.

2. Using the Tibial and Femoral Trials as a guide, assemble the Femoral and/or Tibial Wedges with the 3.5mm Hex Screwdriver (Figure 86). Secure the wedges with the torque wrench by turning clockwise until a click is felt (Figure 87).

   Note: Only LEGION™ RK/HK Tibia Wedges are compatible with the LEGION Hinge tibial base. Standard LEGION Revision Tibial Wedges are not compatible with the LEGION Hinge Baseplate.

   Note: Screws are packaged sterile with the implant wedge.

   Note: Torque wrench should be calibrated every 6 months.
3. If an Offset Coupler is needed, select the appropriate sized Offset Coupler for the Tibial or Femoral Component. Insert the male end of the Offset Coupler into the Femoral and/or Tibial Implant taper. Referencing the Trial Assembly, align the clock orientation lines to the appropriate setting (Figure 88a). To protect the Offset Coupler upon impaction, place the plastic LEGION™ Stem/Coupler Impactor over the female end of the Offset Coupler Implant (Figure 89).

Note: Impact the Coupler at least three times to ensure the taper lock is properly engaged.

An Angled Coupler could be used on the femur instead of an offset coupler.

4. Select the appropriate length and diameter Stem that was used for the Tibial and Femoral Trials.

5a. Cemented Stems: To protect the stem tip upon impaction, place the appropriate sized plastic LEGION Stem Impactor over the tip of the Cemented Stem. Insert the male end of the Stem into the Offset Coupler or femoral and/or tibial taper. Using a stable surface, impact the stem at least three times to ensure the taper lock has been properly engaged.
5b. Press-fit stems: Insert the male end of the Stem into the Offset Coupler or Femoral and/or Tibial Taper.

Note: For the press-fit slotted stems, ensure that the rotational mark on the stem lines up with the rotational mark on the post of the Femoral Component (slot orientated in the coronal plane – Figure 90) and/or Tibial Implant (slot orientated in a sagittal plane–Figure 91).

To protect the tip upon impaction, wrap or cover the tip of the press-fit stem. Using a stable surface, impact the stem at least three times to ensure the taper lock has been properly engaged.
6. Attach the Stem Set Screws included in the stem packaging and Offset Coupler Set Screws included in the Offset Coupler packaging, by securing with a 2.5mm Hex Screwdriver on both sides of the Femoral and/or Tibial Post and Offset Coupler Post (Figures 92 and 93).
1. Sublux the tibia anteriorly using a Hohmann or similar retractor. Place cement on the proximal tibia and seat the Tibial Implant with the Tibial Impactor (Figure 94). Remove excess cement and remove the cement restrictor screw using the 3.5mm Hex Driver.

Note: Remove the cement restrictor screw only after implantation.

2. Flex the knee. Place cement onto the distal surface of the femur. Insert the Femoral Implant into position (Figure 95). When using the Femoral Impactor, rotate the link down, posteriorly and orient the Femoral Impactor with the “C/R ANTERIOR” to the anterior side of the Femoral Component.

Remove any excess cement. Pay close attention to the hinge box/link area.
3. Place the correct size Guided Motion Tibial Insert Trial into the Tibial Baseplate and extend the leg to pressurize the cement (Figure 96).

4. Assemble the Patellar Cement Clamp to the Patellar Reamer Guide.

5. Apply bone cement to the patella.

6. Place the Patellar Implant onto the patella and clamp into the bone. Remove excess cement.

7. Remove all excess cement and verify the joint is clean, especially around the link assembly.
Tibial insert assembly

8. 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 97). Place the Insert onto Tibial Base making sure to engage anterior slot on distal side of Insert with tab on Tibial Base (Figures 98a – 99).
9. Use the 3.5mm Hex Driver to secure the lock screw into the Tibial Base (Figure 100) and then torque with appropriate 75 in-lb Torque Wrench (Figure 101).

Sublux the tibia slightly anterior and rotate the Link down into the Insert (Figure 102).

10. Attach the appropriate Height Sleeve for the chosen insert thickness to the Sleeve Insertion Tool. The Sleeve Insertion Tool lever (Figure 103a) must be depressed to retain the sleeve. The alignment tab on the sleeve (Figure 103b) and the downward slope proximally (Figure 103c) will be aligned to the anterior of the tibia.

Note: Torque wrench should be calibrated every 6 months.
11. Insert the Sleeve through the Link Assembly and into the Tibial Base (Figure 104). 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 105a).

12. 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.

13. 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 106).
Preliminary torque

14. Attach the 4.75mm Hex Bit (Figure 107b) to the 150 in-lb minimum* Torque Wrench (Figure 107a). Insert the Tibial Stabilizing Tool (Figure 107c) to the anterior hole of the Tibial Implant. Torque the Post Bolt to 150 in-lb (Figure 108) 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 108).

Note: Torque wrench should be calibrated every 6 months.

Note: This next 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 108).

15. 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 109).
16. In a vertical position, use the entire range of the slide allowing it to free-fall three times. (Figures 110 and 111).

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**

17. Reattach the Tibial Stabilizing Tool and Hinge Bolt Torque Wrench and re-torque to 150 in-lb minimum* (Figure 112).

Note: *Torque is at a minimum of 150 in-lb by positioning the indicator outside of the edge of the line (Figure 108).

Note: Torque wrench should be calibrated every 6 months.

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