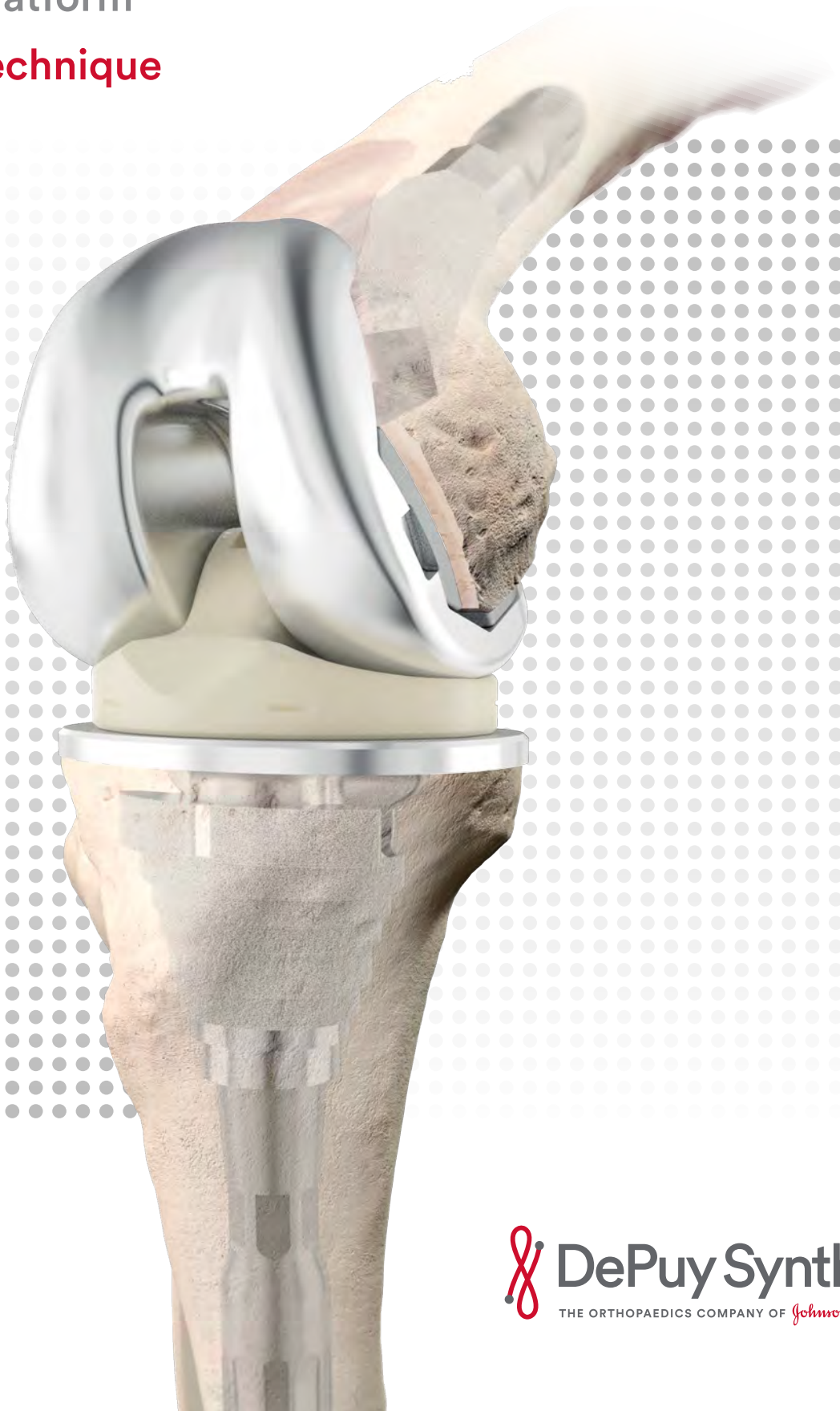
ATTUNE™ Revision Knee System

Rotating Platform

Surgical Technique



DePuy Synthes
THE ORTHOPAEDICS COMPANY OF Johnson & Johnson

Introduction

This surgical technique provides guidelines for the implantation of the ATTUNE™ Revision Knee System.

ATTUNE Revision Knee System Rotating Platform (RP) Implants include the following components:

- ATTUNE Revision Femoral Component
- ATTUNE Revision Rotating Platform Insert
- ATTUNE Revision Rotating Platform Tibial Base
- ATTUNE Revision Press-Fit and Cemented Stems
- ATTUNE Revision Femoral Augments
- ATTUNE Revision Tibial Augments
- ATTUNE Revision Offset Adaptors (For Femoral Stems only)
- ATTUNE Revision Femoral Sleeves
- ATTUNE Revision Tibial Sleeves

■ Notes:

When using Tibial Augments or the ATTUNE Revision CRS RP Tibial Insert with the ATTUNE Revision RP Tibial Base, surgeon consideration should be given to the use of supplemental fixation (Stems and/or Sleeves) based on the patient's clinical condition, which may include but is not limited to patient anatomy, BMI, bone quality, and activity level.

The ATTUNE Revision Femoral Component is compatible with the ATTUNE PS Rotating Platform Tibial Insert and the ATTUNE Revision Rotating Platform Tibial Insert. The ATTUNE PS RP Insert can be used with the ATTUNE Revision Femoral Component when less constraint is desired.

■ Addendum A
Image Intensifier Control
■ Notes
▲ Warnings

Table of Contents

Table of Contents

Abbreviations

Abbreviations used in the surgical technique:

RP - Rotating Platform

TKA - Total Knee Arthroplasty

MRI - Magnetic Resonance Imaging

CT - Computerized Tomography

M/L - Medial/Lateral

V/V - Varus/Valgus

A/P - Anterior/Posterior

F/E - Flexion/Extension

EM - Extramedullary

IM - Intramedullary

CR - Cruciate Retaining

CS - Cruciate Sacrificing

PS - Posterior Stabilized

PCL - Posterior Cruciate Ligament

Icons

The below icons are utilized within the different preparation solutions to indicate the type of preparation that is being described on the specific page. These are an aid to navigate through a given workflow solution.


Straight Stem

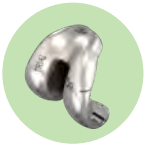

Femoral Sleeve and Stem

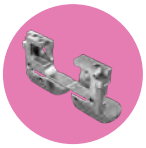

Offset Stem (Femoral Component)


Tibial Sleeve and Stem


Conventional Cut Guide

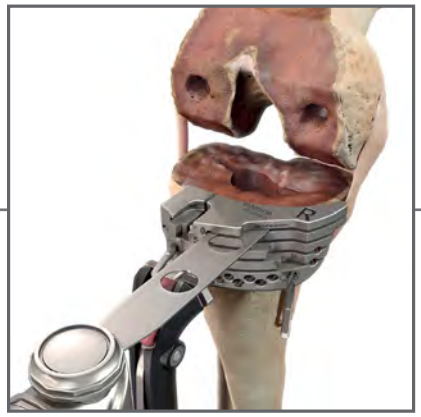

Cut Through Trial


Solid Femoral Trial


FE Guide

Key Surgical Steps Summary

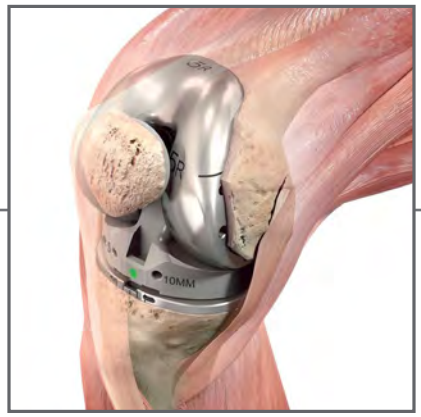
General Revision
Instrumentation Information



Tibial Preparation

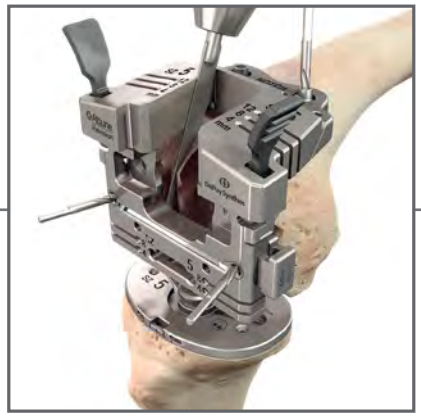
Two Solutions:

- Revision Rotating Platform (RP) Tibial Base Alone or with 30 mm Cemented Stem Preparation (Extramedullary Preparation)
- Revision RP Tibial Base with Straight Stem or Sleeve and Stem Preparation (Intramedullary Preparation)

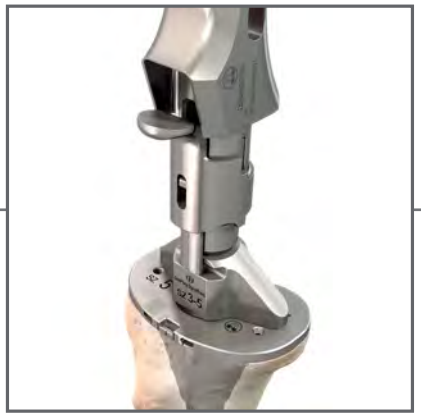


Final Trial Assessment

Implant Assembly



Revision Femoral Preparation

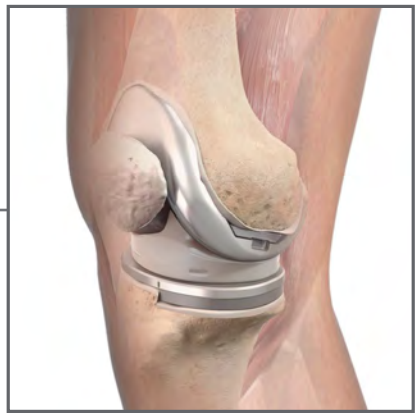


Trialing and Final Preparation

Four Solutions:

- Revision Femoral Component with Short Cemented Stem (With Cut Through Trials)
- Revision Femoral Component with Short Cemented Stem (With Solid Femoral Trials)
- Revision Femoral Component with Intramedullary Preparation (With Conventional Cut Guide)
- Revision Femoral Component with Intramedullary Preparation (With FE Guide)
- Revision Femoral Component with Intramedullary Preparation (With Cut Through Trials)

Cementing Technique



Final Implantation

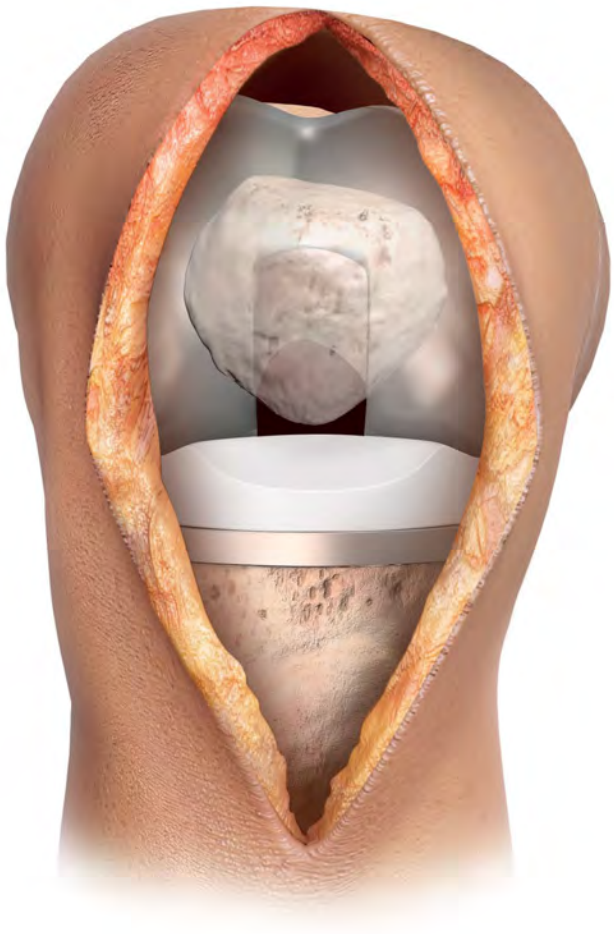
Pre-operative Planning

Revision Total Knee Arthroplasty begins with thorough clinical and X-ray evaluation. Templates are employed to establish replacement implant size and the alignment of bone resections, to indicate augmentation of skeletal deficits, and to confirm the joint line.

Pre-operative X-ray evaluation for the long-axis of tibial and femoral curvature is recommended prior to determining the surgical path for appropriately addressing the needs of the patient. Anatomical curvature should be taken into consideration when determining the Stem length with or without augmentation. The construct length and/or offset should be selected to avoid the area where extreme curvature occurs.

Initial Incision, Capsular Incision and Implant Extraction from the Primary Procedure

Incision and exposure should be performed using the surgeon's preferred surgical technique. When removing/ extracting an implant from previous procedure, take care to preserve as much bone as possible.



Pinning

The ATTUNE Revision Instrument System Revision Instruments are designed to be used with the ATTUNE Knee Pinning System that contains Universal Pins and Threaded Headed Pins. Threaded Non-Headed Pins are also shown but are not available in the Pin Pack.

The Universal Pin can be drilled in or hammered in, and drilled out or pulled out using the Pin Jack.

Universal Pin

The Threaded Headed Pin is designed to be inserted and removed with a Power Driver. These Pins are best used to secure blocks against a flat surface such as resected bone. ▲

Threaded Headed Pin

The Threaded Non-Headed Pin is also available and is designed to be inserted and removed with a Power Driver.

Threaded Non-Headed Pin

▲ Warning:

Care should be taken to not over tighten these Pins with the ATTUNE Revision Knee System Instrumentation as it may change the angle of the Cut Block. Additionally, care should be taken to be aware of the position of the Pin with respect to cortical bone, as cortical perforation with a Pin can be the source of a stress riser.

Pin Jack

Power Driver

■ Notes:

Steinmann Pins are compatible with all Pin holes throughout the ATTUNE Revision Instrumentation.

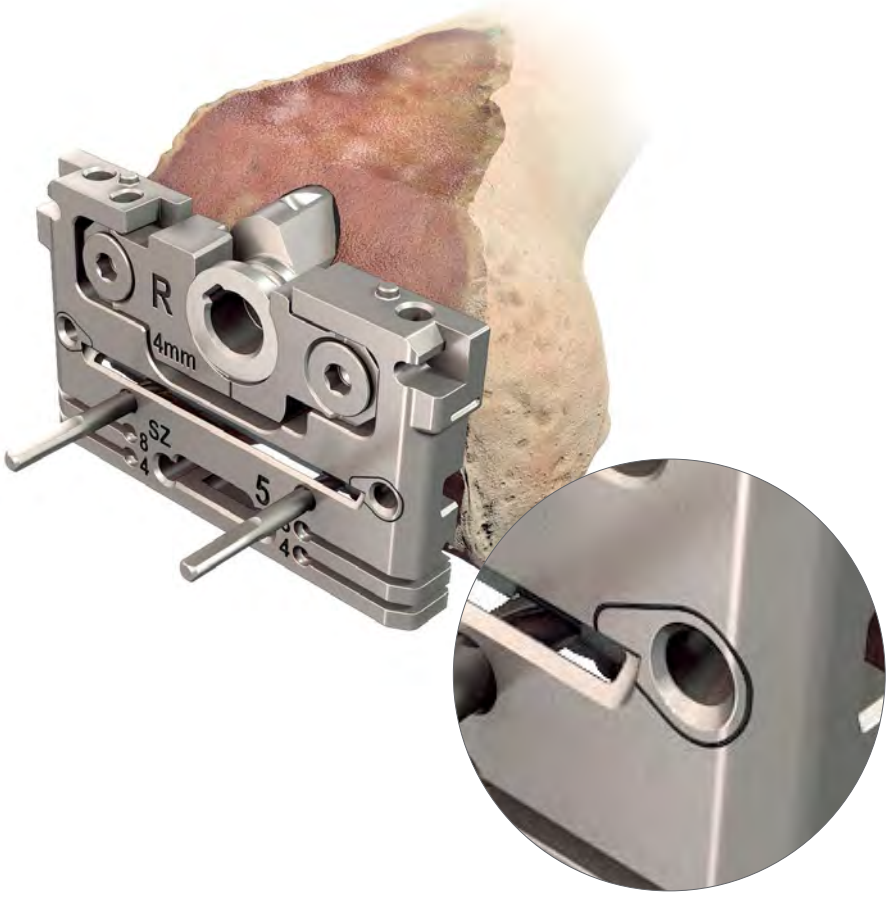
Touch-points

The Revision Instrumentation System has identified touch-points through a number of methods: Instruments may have the touch-points highlighted red or black.

In some instances a marking pattern has been applied to metal components to indicate the touch-points.

Angled Pin Holes

The following symbol ⬭ has been applied over holes to indicate the angled orientation of the Pin hole.



Reamer Reference Tools

Reamer Reference Tools come in three lengths in order to differentiate the various construct configurations for:

- Tibia (shortest Reference Tool)
- Femur (medium length Reference Tool)
- Offset (longest Reference Tool)

The Reference Tools are dual sided:

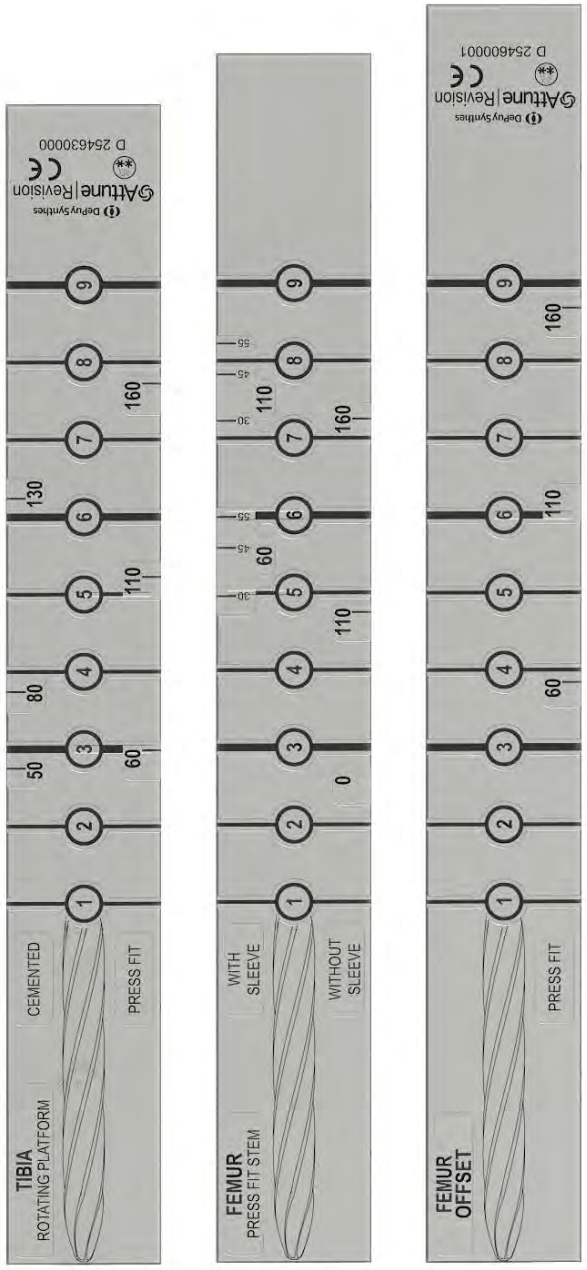
- Tibia: 1) Fixed Bearing
  2) Rotating Platform
- Femur: 1) Cemented Stem with and without Sleeves
  2) Press-Fit Stem with and without Sleeve
- Offset: 1) Tibia (Fixed Bearing only)
  2) Femur (with Press-Fit Stem only)

  - The Offset Adaptor adds an additional 25 mm to the overall construct length

The Reference Tools have general depth indication lines sequentially numbered and spaced 20 mm apart.

- The Canal Reamers have grooves that correspond with the depth indication lines

The 3rd, 6th, and 9th depth lines are wider in both the Canal Reamers and the Reference Tools to aid in visual identification while reaming.



▲ Warning:

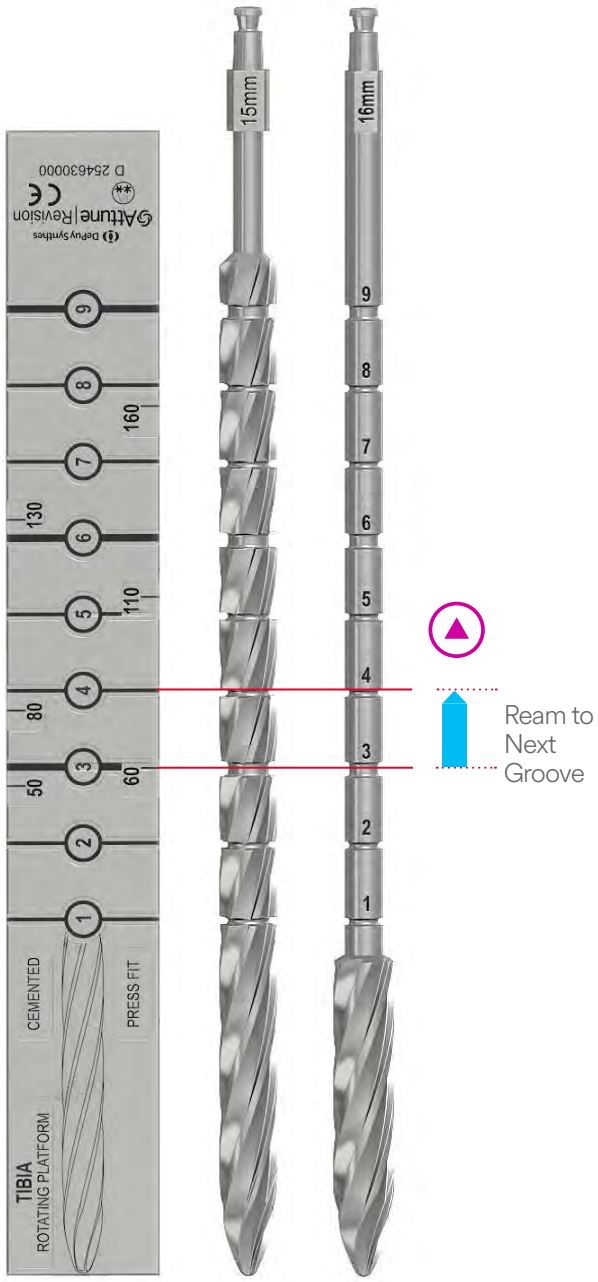
It should be noted that depth lines do not represent the exact construct lengths but rather the ream depth to prevent under-preparation.

Reamer Reference Tools

Select the appropriate side of the desired Reamer Reference Tool to prepare the canal.

Align the Canal Reamer with the scribed image on the Reference Tool. Using the scale, identify the appropriate engraved mark and corresponding number on the Reamer as reference for reaming the canal. If the construct is between Reamer markings, **ream to the next deeper groove.** Note that the addition of a Tibial Sleeve to the RP Tibial Base construct does not affect the overall length of the construct.

If it is determined that Femoral Sleeve Preparation is appropriate to manage the defect, utilize the indicated depth from the Sleeve and Stem markings on the Femur Reference Tool. An example of the Femoral Sleeve and Stem markings are on the following page.



■ Notes:

For the Femur Preparation, the Femoral Box is variable in depth and therefore the depth of reaming is dependent on the size of the femur used. To avoid under-reaming, the Femur Reamer Reference Tools indicate a reaming depth that corresponds to the largest Femoral Box size, and thus for smaller femurs, this could result in slight over-preparation of approximately 9 mm.

▲ Warning:

Always ream to the next largest groove. If a stem length is very close to or just past or just before a groove, ream to the next groove; as in the example above, which reams to Groove 4 when anticipating a 60 mm Tibial Stem.

Reamer Reference Tools

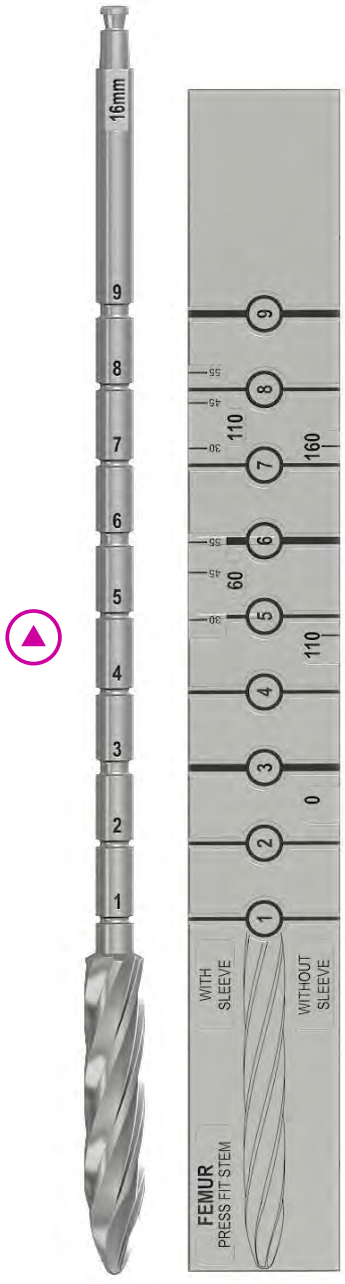
Example of Reamer Reference Tool use for Press-Fit Stem and Femoral Sleeve:

Either

1. Pre-operative Planning suggested use of 55 mm Sleeve with 60 mm Stem. Ream to Groove 6.

or

2. The Cut Through Trial assessment was performed with a 110 mm Stem Trial and Pre-operative Planning suggested use of a 55 mm Sleeve. To accommodate the Sleeve within the overall construct length, a 60 mm Stem should now be used instead of the 110 mm Stem. Ream to Groove 6. The resultant implant construct (Femoral Component, 60 mm Stem, 55 mm Femoral Sleeve) will align with the Femoral Sleeve Trial construct but will be slightly longer than the 110 mm Stem Trial *without Sleeve* as can be seen by comparing the position of the 55 mm Sleeve and 60 mm Stem versus the 110 mm Stem without Sleeve on the Reamer Reference Tool. Refer to **page 139** for more information on the Cut Through Trial to Femoral Sleeve workflow.



Reference Tool on Press-Fit Side

▲ Warning:

Ensure that the Sleeve scale is being referenced. The appropriate ream depth is dependent on the final Sleeve size. If it is not apparent what the final Sleeve size is, ream to the depth corresponding to the largest Sleeve to avoid not having the canal fully prepared.

Canal Reamers

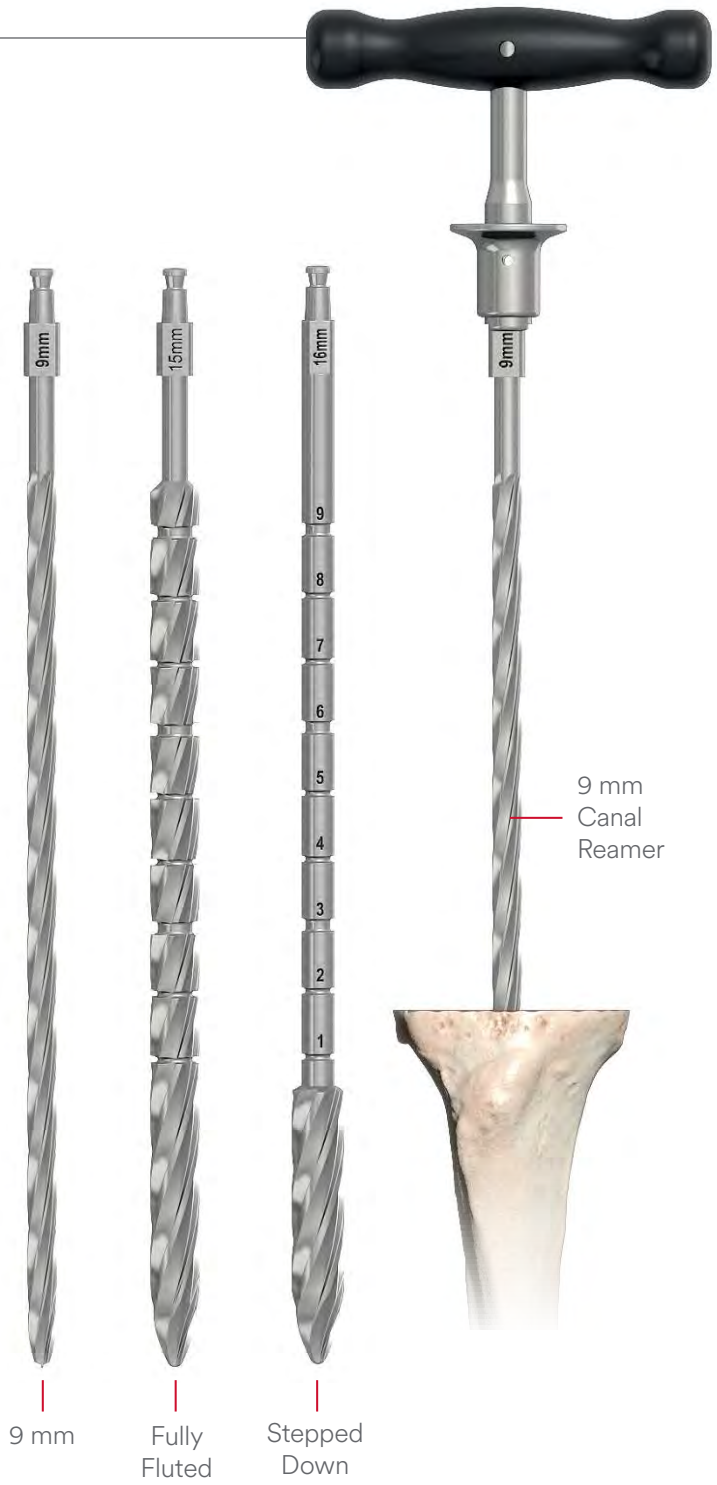
The Canal Reamers come in alternating designs: the odd diameters are fully fluted and the even diameters are stepped down. The even diameter Reamers correspond with definitive Stem Implants (10, 12, 14, 16, 18, 20, 22, 24 mm) and allow the Tibial Cutting Block instruments to be adjusted along the length to set the desired resection height.

The canal may be opened with the fully fluted, end cutting, 9 mm Canal Reamer. ▲

Canal Preparation

The Canal Reamers have a standard Hudson connection and can attach to the Reamer T-Handle for Hand Reaming or can be used with standard power equipment.

Introduce the Canal Reamer into the canal to the appropriate depth.



▲ Warning:

The 9 and 10 mm Canal Reamers in the system are end cutting. Be cautious to avoid eccentric reaming or extensive engagement of the cortex.

■ Notes:

Reaming should be done based on bone anatomy and size.

Hand reaming is recommended, however, power reaming is available. If power reaming, some tactile feel may be hindered.

Canal Reamers

For Cemented Stem Preparation

Cemented Stems are available in the following sizes:

- 14 mm diameter x 30, 50, 80, 130 mm length
- 16 mm diameter x 80 and 130 mm length

Sequentially open the canal to the same depth with progressively larger Reamers until reaching the 14 mm or 16 mm diameter Reamer for the 14 or 16 mm Cemented Stem respectively to prepare for a line-to-line cement mantle for the shorter stem lengths.

Avoid cortical contact.

The 80 mm and 130 mm long Cemented Stems are tapered 4 mm diametrically, with the 14 mm diameter Stems tapering to 10 mm and the 16 mm diameter Stems tapering to 12 mm. The line-to-line cement mantle occurs on the parallel section of the stem prior to the taper.

14 x 80 mm
Cemented Stem

16 x 80 mm
Cemented Stem

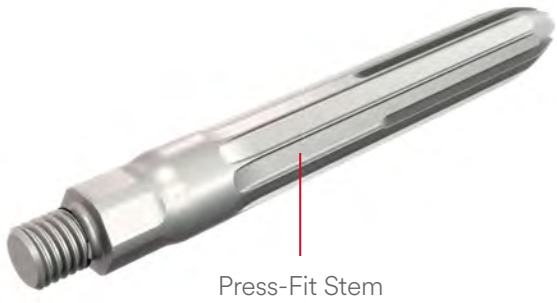
Canal Reamers

For Press-Fit Stem Preparation

Press-Fit Stems are available in the following sizes:

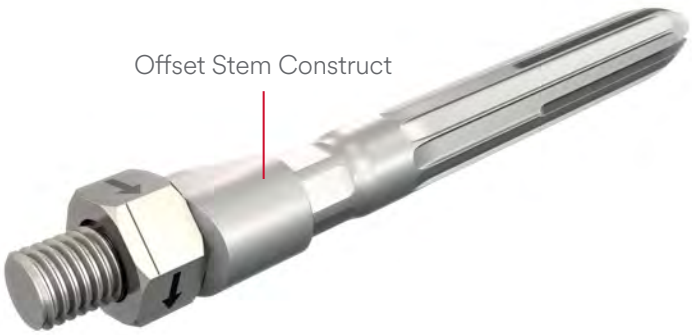
- 10 - 24 mm diameter (2 mm increments) x 60, 110, 160 mm length

Sequentially open the canal to the same depth with progressively larger Reamers until firm endosteal engagement is established. Remove any native/sclerotic bone at the joint surface that could influence the orientation of the reaming in to the isthmus of the femur or tibia. Canal reaming should end on an even diameter to correspond with the Stem Implant offering.
The same diameter final Press-Fit Stem Implant is designed to have a 1.25 mm diametric press-fit with respect to the Reamer.



For Femoral Offset Stem Preparation

Sequentially open the canal with progressively larger Reamers to the indicated depth from the **Femur side** of the Offset Reamer Reference Tool. For a Press-Fit Stem, ream until firm cortical engagement is established. Remove any native/sclerotic bone at the joint surface that could influence the orientation of the reaming in to the isthmus of the femur. Canal reaming should end on an even diameter Reamer to correspond with the Stem Implant offering.



■ Notes:

Simple cortical contact should not be construed as engagement.

Torque Limiting Screwdriver and System Hex Attachment

The Torque Limiting Screwdriver attaches to the System Hex Attachment *via* an AO connection.

The Torque Limiting Screwdriver Assembly applies a 2 Nm torque to aid in assembly of various instruments throughout the ATTUNE Revision Instrumentation set.

Tighten to “click” when assembling instruments with the Torque Limiting Screwdriver Assembly to ensure solid assembly throughout preparation and trialing. ▲

▲ Warning:

Not torquing to the “click” may result in trial components loosening during use or extraction.

Modular Stop

The Modular Stop attaches to the Reamers of the Revision System (excluding Canal Reamers) to aid in controlling depth when reaming through a Tower or Bushing.

Slide the Stop over the Hudson end of the Reamer.

Depress the button on the Modular Stop and place the Stop at the desired preparation indication on the Reamer, where it “clicks” into place. Ensure Modular Stop engages the appropriate groove on the Reamer before use.

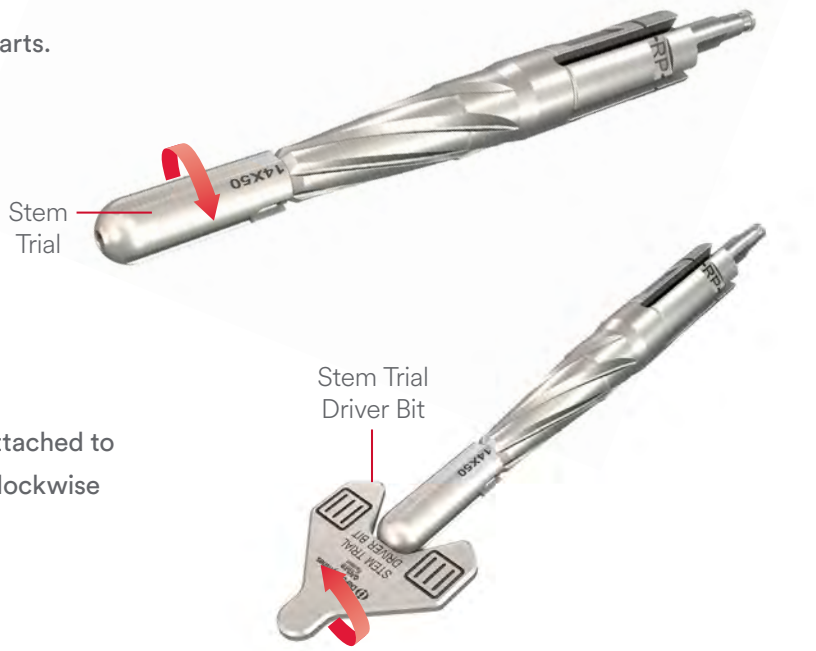
Optionally, the Reamers may be utilized through the Towers or Bushings without the Modular Stop. In that application progress the Reamer until the center of the desired depth line is flush with the proximal feature of either the Tower or Bushing.

■ Notes:

Avoid contacting the sharp edges of the Reamer flutes when attaching the Modular Stop.

Stem Trial Assembly

The Stem Trials thread on to their connecting parts.



To Aid in Disassembly

If necessary, the Stem Trial Driver Bit may be attached to the end of the Stem Trial and rotated counter clockwise by hand.

Care should be taken not to reverse ream as the Stem Trial may become disengaged from the Reamer.

▲ Warning:

Do not reverse ream.

Stem Trial Extraction

If the Stem Trial disengages from the Reamer, use the female end of the Stem Trial and Stabilizer Extractor Tool to engage the threads of the Stem Trial and extract it from the canal.

Stem Trial Retrieval

The threaded female (hole) end of the Stem Trial and Stabilizer Extractor Tool connects with the threaded male (post) feature on the Stem Trial.

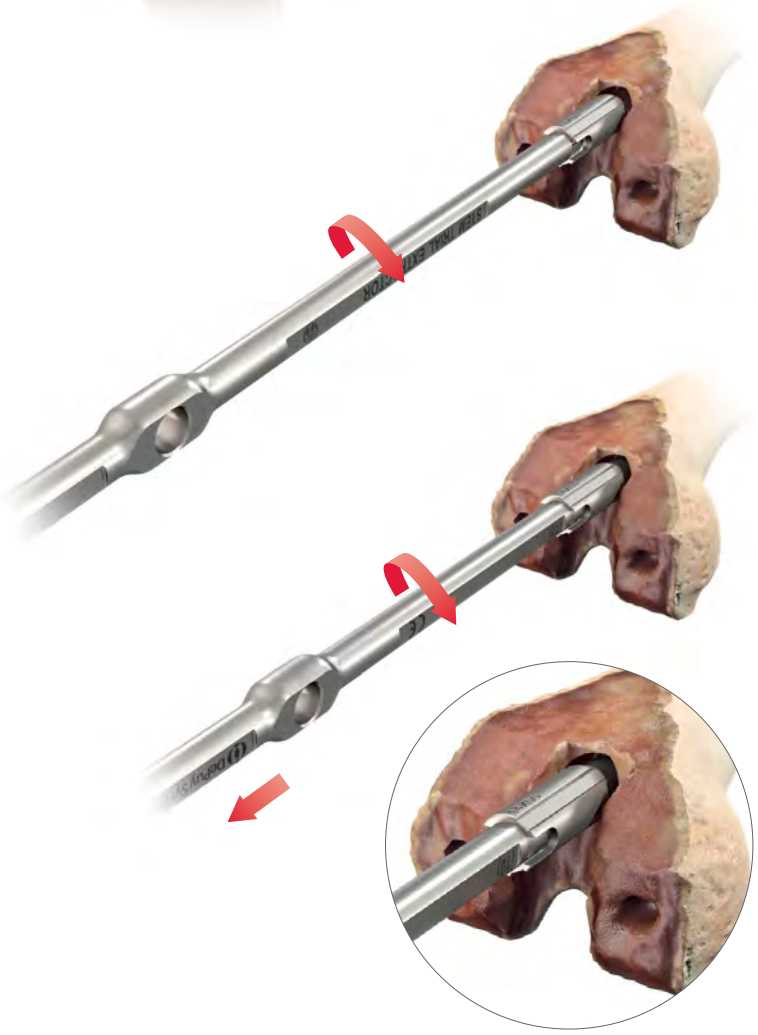
Stem Stabilizer Retrieval

The threaded male (post) end of the Stem Trial and Stabilizer Extractor Tool connects with the threaded female (hole) feature on the Stem Stabilizer.

Drop the appropriate end of the Stem Trial and Stabilizer Extractor Tool into the medullary canal, turn the handle clockwise until a secure engagement is acquired to the Stem Trial or Stem Stabilizer, and pull to extract.

To aid in extraction, there is a through hole in the Stem Trial and Stabilizer Extractor Tool to allow a general surgical instrument, such as forceps, to pass through and create a “T-Handle”.

If a stem trial cannot be retrieved utilizing the Stem Trial and Stabilizer Extractor Tool, a designed extraction feature can assist along with a general instrument such as a pituitary rongeur.



General Tibial Instrumentation

Tibial Trial Assembly

The Revision RP Tibial Base Trial attaches to the RP Stem Adaptor Trial, Tibial Broaches, and Tibial Sleeve Trials *via* a threaded connection in the RP Base Trial.

The RP Stem Adaptor Trial is utilized when the Revision RP Tibial Base will be implanted with the pre-assembled polyethylene End Cap or with

a Straight Stem Extension.

The Tibial Broach or Tibial Sleeve Trial are utilized when the Revision RP Tibial Base will be implanted with a Tibial Sleeve. The Tibial Sleeve Trial is utilized in combinations where Tibial Keels extend beyond the Broach/Sleeve.

Revision RP Base Trial

RP Stem Adaptor Trial

Tibial Broach

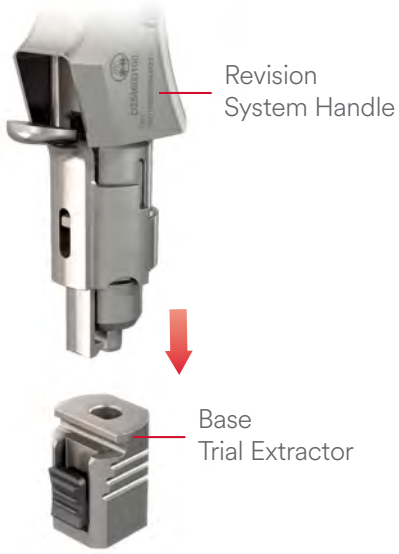
Tibial Sleeve Trial

The Trial Assembly must be tightened with the Torque Limiting Screwdriver Assembly until it “clicks” prior to handing off the Instrument Assembly or moving on to the next surgical step.

Revision Tibial Base Trial Extractor

The RP Tibial Base Trial construct may be seated and extracted from the prepared bone using the Revision Tibial Base Trial Extractor.

1. Attach the Revision Tibial Base Trial Extractor to the Revision System Handle.



2. Slide the Revision Tibial Base Trial Extractor Assembly over the central feature of the RP Base Trial.

3. Impact or Extract the RP Base Trial construct.

RP Base Trial Extraction Depicted

Tibial Preparation - Solutions

Solution 1: Revision Rotating Platform (RP) Tibial Base Alone or with 30 mm Cemented Stem Preparation (Extramedullary Preparation) go to **page 28**

Solution 2: Revision RP Tibial Base with Straight Stem or Sleeve and Stem Preparation (Intramedullary Preparation) go to **page 40**

Straight Stem

Tibial Sleeve and Stem

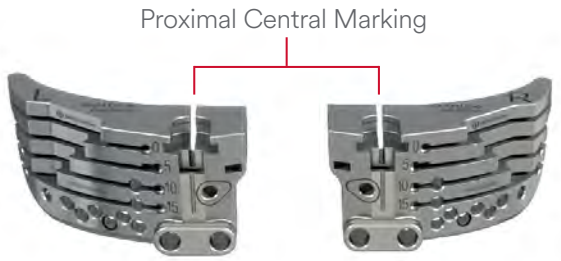
Tibial Preparation

Tibial Alignment and Resection - Instrument Assembly

This is the Extramedullary Tibial Preparation of the Revision Rotating Platform (RP) Tibial Base, alone or with a 30 mm Cemented Stem.

With the Height Adjustment Knob fully unscrewed on the Tibial Proximal Uprod, attach the Tibial Distal Uprod to the Proximal Uprod. Then attach the Tibial Ankle Clamp to the Distal Uprod. Assemble the appropriate Cutting Block to the Tibial Proximal Uprod.

Revision Tibial Cutting Block Options



Tibial Jig Assembly

Complete Assembly

Tibial Preparation

Tibial Alignment and Resection

Pinch Lever

Correct Placement of Tibial Jig

Set the tibial posterior slope as depicted on the Proximal Uprod of the Tibial Jig, according to the recommendations depending on the appropriate implant configuration.

Place the knee in 90 degrees of flexion. Place the Ankle Clamp around the malleoli. Set Varus/Valgus (V/V) rotation by aligning the proximal central marking on the Tibial Cutting Block with the medial one third of the tibial tubercle.

The axis of the Proximal Uprod should be positioned with reference to the tibial axis.

Note that the figures on the Jig will only deliver that angle if the rest of the Jig is set up correctly. If the slope adjustment is changed after the Cutting Block is resting against bone, the surgeon should re-align the Uprod to be parallel to the tibial axis by moving the A/P adjustment mechanism.

■ Notes:

Tibia Slope Recommendations: Revision Tibial Base constructs will follow the Posterior Stabilized (PS) Slope recommendation. The Revision Tibial Bases have a 2 degree posterior slope of the Stem with respect to the tibial plateau. For a PS configuration it is recommended to set the tibial posterior slope at 3 degrees.

When using Cruciate Retaining or Cruciate Sacrificing (CR/CS) configuration, with the ATTUNE CR Tibial Insert and the ATTUNE CR Femoral Component, it is recommended to use 5 - 7 degrees of tibial posterior slope. Surgeons should pre-operatively template a stemmed tibial construct when using a CR/CS configuration to assess the impact of slope upon Stem orientation and fit within the canal.

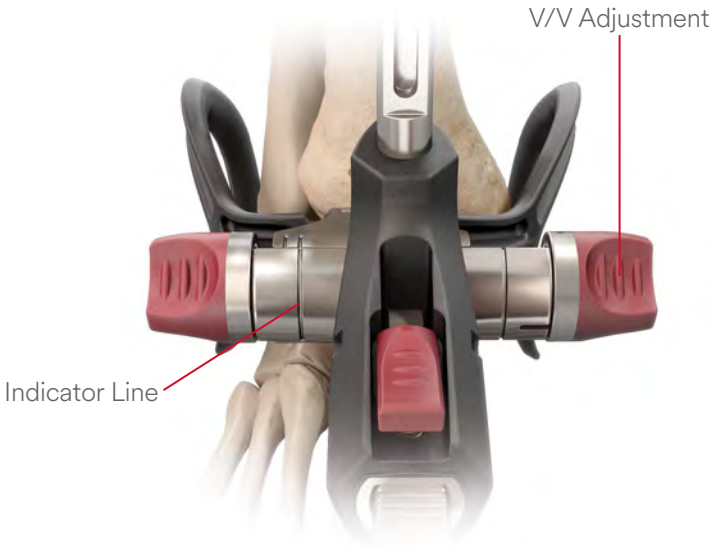
■ Notes:

The Revision Tibial Cutting Blocks slot are set at 0 degrees similar to the ATTUNE Primary Knee INTUITION™ Instruments Tibial Cutting Block, the slope is adjusted through the Extramedullary Tibial Proximal Uprod.

Tibial Preparation

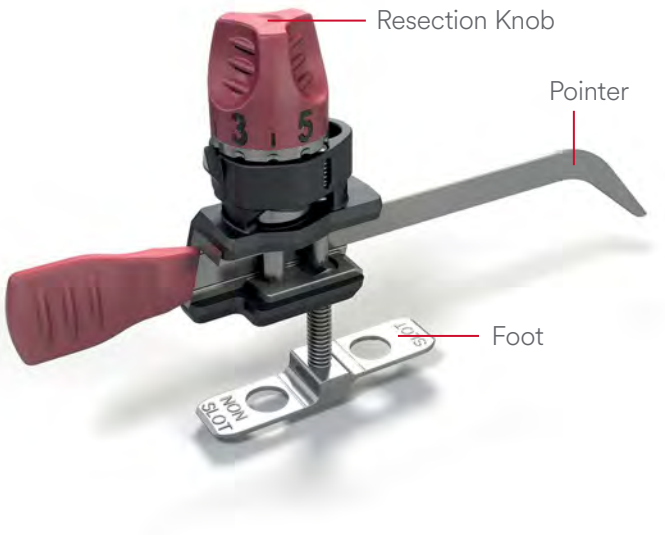
When checking and setting the sagittal alignment, be careful to prevent anterior slope. This could happen if the A/P Boss on the Distal Uprod is translated too far towards the ankle, exposing the Through-Slot. Posterior slope adjustment is the equivalent to using Cutting Blocks with slope built into them.

Use the V/V Adjustment Mechanism to align the Tibial Proximal Uprod parallel to the long axis of the tibia. For many patients, this involves translating the V/V Adjustment Mechanism until the second line from the lateral side of the ankle clamp lines up with the indicator line.



Stylus Attachment

Attach the Adjustable Tibial Stylus to the Cutting Block through the slot feature.



▲ Warning:

Adjustment of the A/P Boss such that the Through-Slot is visible (as shown) could result in anterior slope.

Tibial Preparation

Resection through the Slot

When utilizing the Revision Tibial Cutting Block, **resection through the slot is recommended.** Position the foot of the Stylus marked "SLOT" into the "0" slot of the Cutting Block.

Rotate the Resection Knob to set the resection level on the Stylus (0 to 10). Each number corresponds to resection amount in millimeters.

For resection off the top of the block, see the CAUTION box below for the Stylus. ▲

Rest the pointer of the Adjustable Tibial Stylus on the bone according to the presented tibial plateau.

Considerations for tibial plateau resections:

- If a defect is present, the Adjustable Tibial Stylus may be used to reference the defect and provide a minimal resection to clean-up a revision tibial plateau, with the option of augmenting where required
- For a **Revision Tibial Plateau,** use the Revision Tibial Cutting Blocks with a minimal resection, with the option of resecting for augments where required

Then lock the Height Adjustment Knob on the Proximal Uprod.

▲ Warning:

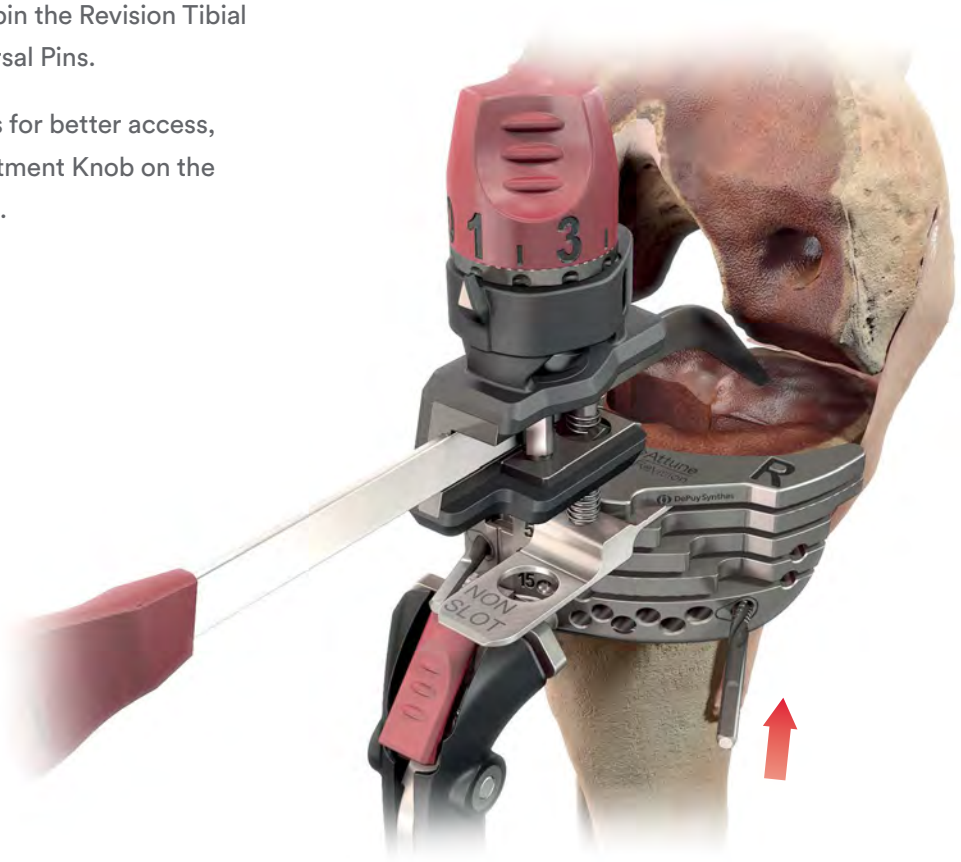
If resection off the top of the Revision Tibial Cutting Block is desired, and the "NON SLOT" setting on the Stylus is used, the resection will be 1 mm less than indicated with the Stylus due to the saw capture of the Revision Tibial Cutting Block being 5 mm vs 4 mm in the Intuition Instrument Set. The subsequent Augment Slots will be 5 mm deeper than indicated by the marking on the Block.

Tibial Preparation

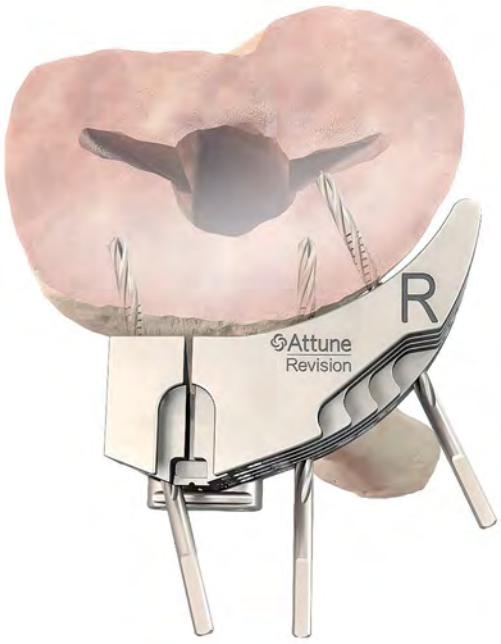
Proximal Tibial Resection

After the height has been set, pin the Revision Tibial Cutting Block using two Universal Pins.

If necessary, remove the Stylus for better access, ensuring that the Height Adjustment Knob on the Tibial Proximal Uprod is locked.



There are multiple Pin hole options in the Revision Tibial Cutting Block to ensure fixation of the Block.



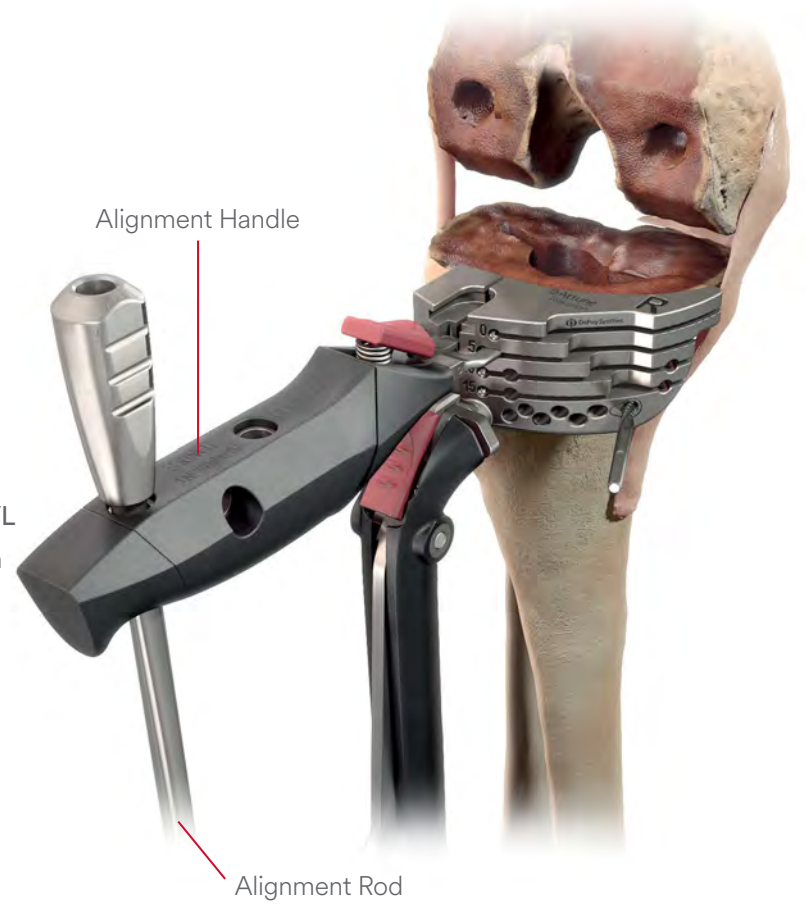
Tibial Preparation

Optional: To assess tibial slope prior to performing the tibial resection, place the Alignment Handle into the slot feature of the Revision Tibial Cutting Block, and insert the Alignment Rod. Alignment can be checked by ensuring that the Alignment Rod remains parallel with the tibial axis.

Additionally, the two Alignment Rods may be assembled with the Alignment Handle to assess long leg alignment from hip center to ankle.

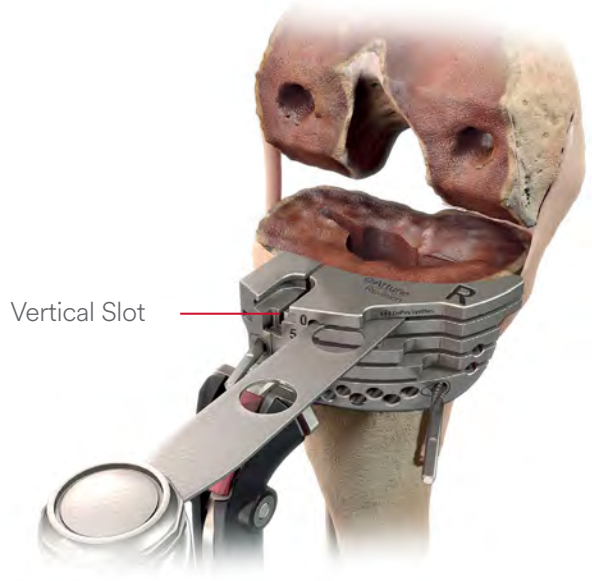
In addition, a second Alignment Rod may be inserted through the Alignment Handle in the M/L direction to help ensure that the tibia is not cut in Varus or Valgus.

Resect the tibia.



If desired, Medial Augments may be prepared at this point.

Should Lateral Augments be required, if exposure permits, utilize the Tibial Cutting Block for the opposite leg.



■ Notes:

The vertical slot in the central aspect of the Tibial Cutting Block may aid in initiating the center line of the Tibial Augment resection.

Tibial Preparation

Tibial Sizing

Attach the Alignment Handle to the appropriate size Revision Tibial Prep Plate based on pre-operative templating and place onto the resected tibial surface.

Rotation should be set per surgeon preference. One suggested technique follows:

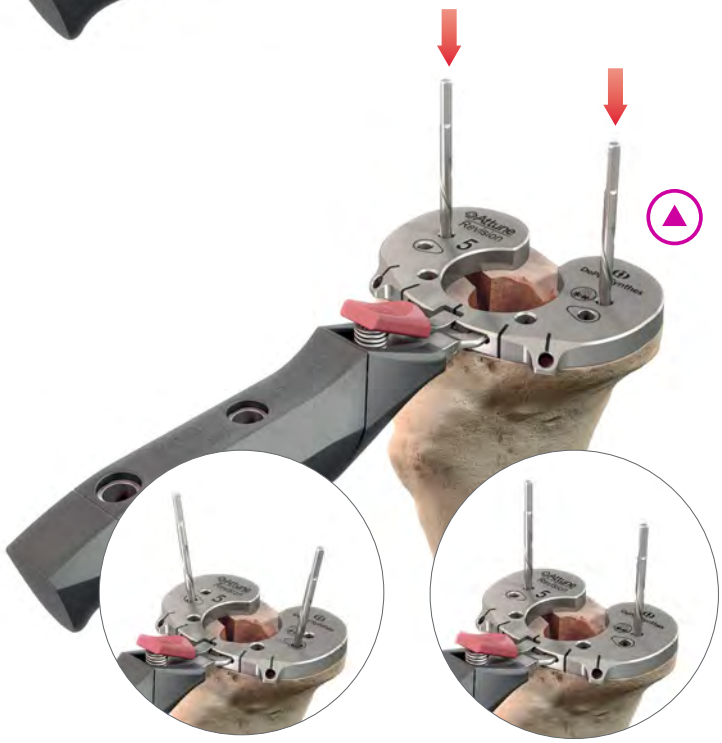
The rotation of the Tibial Base Trial is typically centered on the junction between the medial and central third of the tibial tubercle. Assess the position of the Base at the proper rotation to maximize tibial coverage while avoiding overhang. Optionally, a mark may be made on the anterior cortex of the tibia for future reference to tibial rotation.

When using Pins, be careful not to deflect the Base position. ▲

Only utilize Non-Headed Pins through the parallel or angled Pin Hole options on the Prep Plate.

Additionally, the Anterior Pin Holes may be utilized with the Low Profile Anterior Pins inserted with the Low Profile Tibial Pin Puller to aid in fixating the Prep Plate.

Tibial Prep Plates for Sizes 2 - 3 have an anterior protrusion with an indicated line for the anterior profile of the definitive implant.



Angled Pinning **Parallel Pinning**

Example of anterior protrusion for Sizes 2 - 3

▲ Warning:

Care should be taken when seating the Pins so as to not perforate the Tibial Cortex.

■ Notes:

The Revision Tibial Prep Plates are 6 mm thick and are not reflective of the actual Tibial Base Implant or Tibial Base Trial thicknesses. The Prep Plates should not be utilized to determine definitive Insert thickness.

Tibial Preparation

With the Revision Tibial Prep Plate in place, attach the Revision Tibial Prep Tower by inserting the spikes of the Tower through the two inside holes on the anterior aspect of the Plate.

Insert the Revision Cemented Reamer Bushing into the Tower.

The Revision Tibial Cemented Stem Reamer includes markings for the preparation of the 30 mm Stem.

To differentiate between the FB and RP markings on this Reamer, the RP markings have been laser marked as well as engraved.

■ Notes:

The Tibial Cemented Stem Reamer prepares for a line-to-line fit with the 30 mm Cemented Stem Implant.

Tibial Preparation

Assemble the Modular Stop to align with the desired RP construct depth on the Revision Tibial Cemented Stem Reamer and advance the Reamer until the Stop is flush with the top of the Reamer Bushing.

Modular Stop assembled to the Cemented Stem Reamer at the RP-30 mark

The Cemented Stem Reamer may be utilized through the Reamer Bushing without the Modular Stop. In that application, progress the Reamer until the desired depth line is flush with the proximal feature of the Reamer Bushing.

Remove the Cemented Stem Reamer and Cemented Reamer Bushing.

■ Notes:

If preparing for a Revision RP Tibial Base without a Stem Extension, ream to the “RP-0” mark on the Cemented Stem Reamer to prepare for the End Cap on the Tibial Implant.

Tibial Preparation

Assemble the corresponding Stem Trial to the end of the Revision Cemented Conical Reamer. If preparing for a Revision Base without a Stem Extension utilize the Conical Reamer without any Stem Trials.

Assemble the Modular Stop to align with the “RP” line on the Revision Cemented Conical Reamer.

To prepare for the conical section of the Tibial Base, advance the Conical Reamer through the Tower and seat to the Stop.

The Conical Reamer can be used without the Modular Stop. In that application, progress the reamer until the “RP” line on the Reamer is flush with the proximal surface of the Revision Prep Tower.

With the tibial canal prepared, remove the Tibial Preparation Instruments.

▲ Warning:

Avoid contacting the sharp edges of the Reamer flutes when attaching the Modular Stop.

Do not reverse ream.

■ Notes:

Do not apply excessive force to the Conical Reamer. If approaching the cortex, stop reaming and consider a slightly different position on the tibial plateau, readjustment of tibial slope and the use of cement to fill any resulting bone voids.

Tibial Preparation

Tibial Trial Assembly

Choose the appropriate size of RP Base Trial that corresponds to the Tibial Preparation Plate and assemble the RP Stem Adaptor Trial.

Assemble the Cemented Stem Trial to the end of the RP Stem Adaptor Trial.

RP Base Trial Construct with a 14 × 30 mm Cemented Stem Trial

■ Notes:

The RP Stem Adaptor Trial is utilized without a Stem Trial when the Revision RP Tibial Base has been prepared to the RP-0 line and will be implanted without the addition of a Stem Extension.

Tibial Preparation

Seat the RP Tibial Base Trial construct into the prepared bone using the Revision Tibial Base Trial Extractor attached to the Revision System Handle and over the central feature of the RP Base Trial as described on **page 26**.

Keel preparation can be performed with the RP Trial Assembly from this point forward in the procedure.

Proceed to **Revision Femoral Preparation on page 53.**

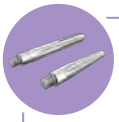
Tibial Preparation

Canal Preparation

This is the Intramedullary Tibial Preparation of the Revision RP Tibial Base, with the following:

- Cemented Stem: 50, 80 or 130 mm lengths,
- Press-Fit Stems: 60, 110, 160 mm lengths,
- or the Tibial Sleeve with a Stem

When pre-operative evaluation indicates that Press-Fit or Long (>30 mm) Cemented Tibial Stem Extensions are required, it is recommended to prepare the proximal tibia with reference to the position of the IM canal.



Straight Stem

Utilize the Tibial Reamer Reference Tool. Refer to **page 15**.

Tibial Sleeve and Stem

Utilize the Tibial Reamer Reference Tool. Refer to **page 15**. *Note that the addition of a Tibial Sleeve to the RP Tibial Base construct does not affect the overall length of the construct.*

▲ Warning:

When Tibial Augments are used with the ATTUNE Revision RP Tibial Base, only the 29 mm ATTUNE Tibial Sleeves may be used. For the ATTUNE Revision RP Tibial Base Size 2, Tibial Augments or a Tibial Sleeve may be used individually, but not in combination.

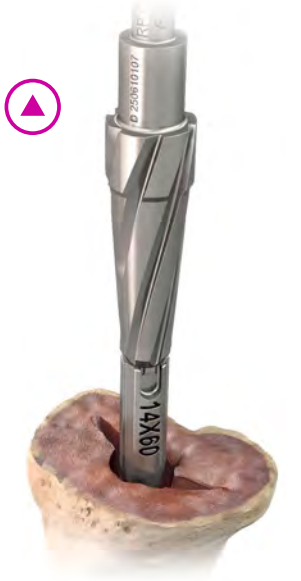
Tibial Preparation

Canal Preparation

Assemble the Canal Reamer to either the Reamer T-Handle or standard power. Sequentially straight canal ream to the appropriate depth and diameter, remembering to finish on an even diameter Reamer (Refer to **pages 18, 19 and 20**).

Remove the Canal Reamer from the prepared tibia.

Attach the appropriately sized Stem Trial to the RP Conical Reamer.



Seat the top surface of the Reamer to the planned level of tibial resection.

For Straight Stem Preparation, proceed to **page 42**.

For Tibial Sleeve and Stem Preparation, proceed to **page 46.**

▲ Warning:

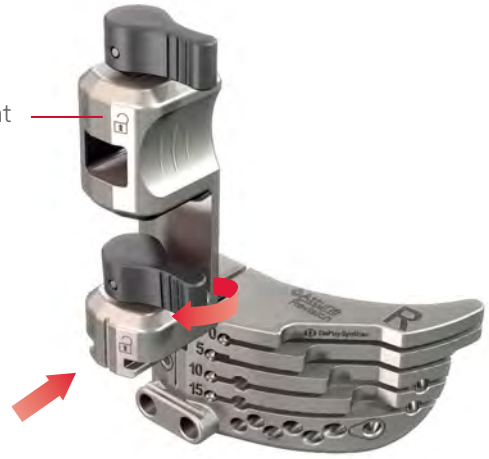
Do not reverse ream.

Tibial Preparation

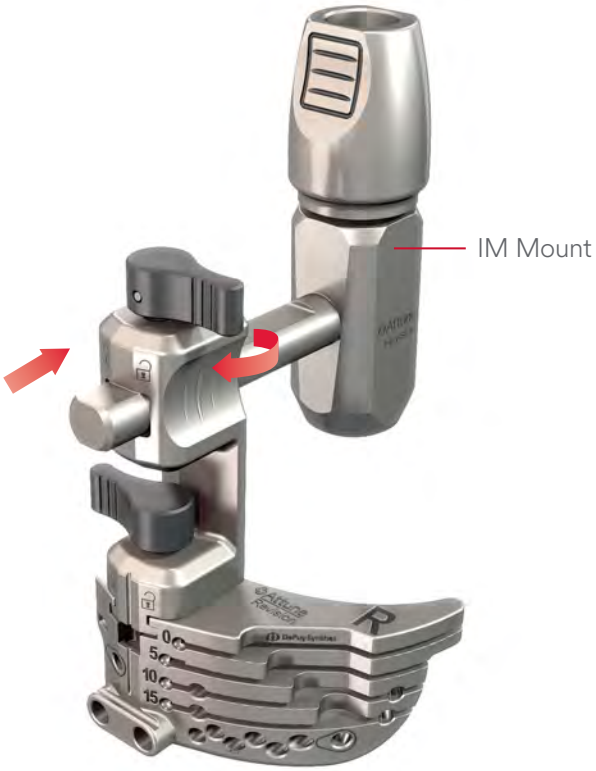
Tibial Resection

Straight Stem

Select the appropriate sided Block, and assemble the Cutting Block Mount to the Revision Tibial Cutting Block.



Assemble to the IM Mount.



Tibial Preparation

Straight Stem

Assemble the Revision IM Mount to the RP Conical Reamer.

Allow the IM Mount to rest against the top of the RP Conical Reamer, this will set the Tibial Cutting Block depth at the desired location to allow for the “0” slot to provide a clean-up resection at the top of the Conical Reamer.

Lock the Jig in place by tightening the Lock Knob over the IM Mount.

■ Notes:

The Revision Tibial Bases have a 2 degree posterior slope of the Stem with respect to the tibial plateau. The 2 degree posterior resection is built into the IM Mount and will provide a fixed angle of resection when based off of the Intramedullary based Reamers.

Optional: If Resection off the Canal Reamer is desired, prior to conical reaming, assemble the IM Mount to the Canal Reamer.

Adjust the Tibial Cutting Block Assembly to the desired level of proximal tibial resection. ▲

Pin the Cutting Block. Make the resection, and then assemble the Stem Trial to the RP Conical Reamer and seat the Reamer in the tibia until the top of the flutes are level with the proximal resection.

▲ Warning:

If resection off the top of the Revision Tibial Cutting Block is desired, and the “NON SLOT” setting on the Stylus is used, the resection will be 1 mm less than indicated with the Stylus due to the saw capture of the Revision Tibial Cutting Block being 5 mm vs 4 mm in Primary Tibial Cutting Block. The subsequent Augment Slots will be 5 mm deeper than indicated by the marking on the Block.

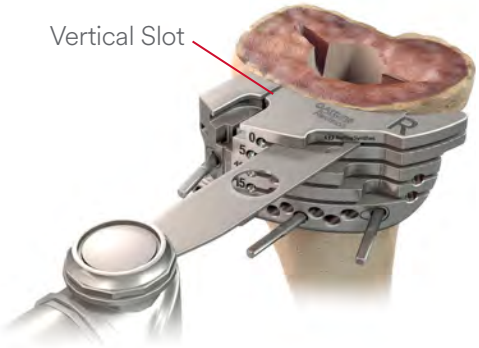
Tibial Preparation

Straight Stem

Pin the Tibial Cutting Block.

Make tibial resection.

If desired, Medial Augments may be prepared at this point.



Should Lateral Augments be required, if exposure permits, utilize the Tibial Cutting Block for the opposite leg.

Remove Tibial Cutting Block and Pins (and other tibial instruments).

With the tibial canal prepared, proceed to Tibial Trial Assembly on **the next page**.

■ Notes:

The Conical Reamer and Tibial Jig Assembly may be removed from the canal in order to complete the tibial resection. To do so, move both levers on the Cutting Block Mount to the unlock position, slide the Cutting Block Mount anteriorly and then remove the assembly proximally while leaving the Cutting Block pinned in place.

■ Notes:

The vertical slot in the central aspect of the Tibial Cutting Block may aid in initiating the center line of the Tibial Augment resection.

Tibial Preparation

Straight Stem Tibial Trial Assembly

Straight Stem

Choose the appropriate size RP Base Trial that allows the Tibial component to be set at the proper tibial rotation and maximizes tibial coverage while avoiding overhang.

Assemble the RP Base Trial by tightening the bolt of the Base Trial with the Torque Limiting Screwdriver Assembly.

Assemble the appropriate Stem Trial to the end of the RP Stem Adaptor Trial.

Seat the Tibial Base Trial construct into the bone.

The Tibial Base Trial Extractor connected to the Revision System Handle may be utilized to aid in seating the Trial construct.

Keel preparation can be performed with the RP Trial Assembly from this point forward in the procedure.

Proceed to Revision Femoral Preparation on **page 53**.

Tibial Preparation

Tibial Broaching

Tibial Sleeve and Stem

With the RP Conical Reamer removed from the tibia, attach the appropriately sized Stem Trial to the 29 mm Tibial Broach.

If utilizing the KINCISE™ Surgical Automated System for Tibial broaching proceed to Appendix A on Page 216.

Attach the 29 mm Tibial Broach to the Broach Handle.

Tibial Preparation

Tibial Sleeve and Stem

The Broaches are asymmetrical. Position the “ANT” engraving on the Broach anteriorly.

Impact the Broach into the tibia until the top surface of the Broach is at the planned proximal tibial resection level.

Check for rotational stability of the Broach. If the Broach moves in the canal, it is not rotationally stable.

■ Notes:

The Stem Trial helps guide the Broach along the axis previously reamed.

Tibial Preparation

Tibial Sleeve and Stem

If the Broach is unstable or does not fill the bone defect, repeat with consecutively larger Broaches until the desired fit and fill is achieved.

Remove the Broach Handle leaving the last Broach in place.

Resect the proximal tibia off the top of the Broach. The top of the Broach has a 2 degree slope built in to match the Implant. The proximal tibial resection should be parallel to the top of the Broach.

Alternatively, the tibial resection may be made using the Broach Mount and Revision Cutting Block as described on **page 49**.

Proceed to Tibial Sleeve Trial Assembly on **page 50**.

Alternatively, in cases where the Broach size or bone quality is such that Keel Preparation is not required proceed to Tibial Broach Trial Assembly on **page 52**.

■ Notes:

The Broach Stop and the “1 - 3, 4 - 7, 8 - 10” markings on the Broach Handle are only utilized for Femoral Broaching.

■ Notes:

The corresponding Tibial Sleeve implant allows up to +/- 20 degrees of rotation from the centerline of the ATTUNE Revision RP Tibial Base. If the Tibial Broach is rotated at a different orientation there will be a slight difference in slope between the proximal tibial resection and the Tibial Base Trial and Implant.

Tibial Preparation

Tibial Sleeve and Stem

Assemble the Cutting Block Mount to the Revision Tibial Cutting Block.

Assemble to the Broach Mount.

Assemble the Broach Mount Assembly to the Tibial Broach that remains in the bone.

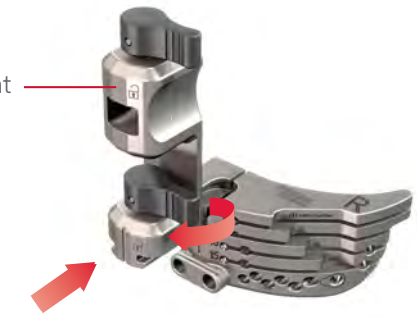
Pin the Cutting Block to the bone, taking care to avoid pinning into the Broach.

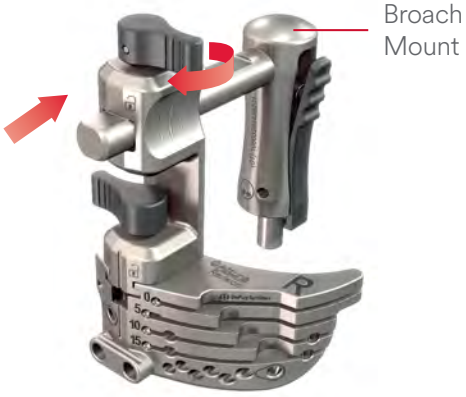
Make the tibial resection through **the top slot** of the Cutting Block. ▲

If required, the Broach Mount can be removed to allow access to the lateral tibia to complete the resection.

Proceed to Tibial Sleeve Trial Assembly on **page 50**.

Alternatively, in cases where the Broach size or bone quality is such that Keel Preparation is not required proceed to Tibial Broach Trial Assembly on **page 52**.





▲ Warning:

When Tibial Augments are used with the ATTUNE Revision RP Tibial Base, only the 29 mm ATTUNE Tibial Sleeves may be used. For the ATTUNE Revision RP Tibial Base Size 2, Tibial Augments or a Tibial Sleeve may be used individually, but not in combination.

Tibial Preparation

Tibial Sleeve and Stem

Use the Revision Broach Handle to remove the Tibial Broach Assembly from the prepared tibia.

Choose the appropriate size RP Base Trial that allows the Tibial component to be set at the proper tibial rotation and maximizes tibial coverage while avoiding overhang.

Assemble to the Tibial Sleeve Trial corresponding to the last Broach size utilized and tighten using the Torque Limiting Screwdriver Assembly.

Assemble the appropriate sized Stem Trial to the Tibial Sleeve Trial.

■ Notes:

The RP Base Trial size may be changed in situ by loosening the central bolt and changing Base Trials.

Tibial Preparation

Tibial Sleeve and Stem

Introduce the RP Tibial Base Trial Assembly to the prepared tibia.

Seat the Trial construct using the Tibial Base Trial Extractor connected to the Revision System Handle.

To set the desired Tibial Base position to optimize tibial plateau coverage, the RP Tibial Base Trial may be loosened from the Tibial Sleeve Trial, repositioned and then retightened with the Torque Limiting Screwdriver Assembly.

Keel preparation can be performed with the RP Sleeve Trial Assembly from this point forward in the procedure.

Proceed to Femoral Preparation on **page 53**.

Tibial Preparation

Tibial Sleeve and Stem

Depending on bone quality and/or size of Broach/RP Tibial Base Trial, the Broach may be utilized in the place of the Tibial Sleeve Trial. In those instances, the RP Base Trial may assemble to the Tibial Broach. **Although, please note Keel preparation cannot be performed in a Broach/Tibial Base Trial construct.**

Choose the appropriate size RP Base Trial that maximizes tibial coverage while avoiding overhang, introduce to the Broach that is retained in the prepared tibia.

Assemble the RP Tibial Base Trial to the Tibial Broach retained in the tibia using the Torque Limiting Screwdriver Assembly.

Proceed to Femoral Preparation on **page 53**.

■ Notes:

The RP Base Trial size may be changed in situ by loosening the central bolt and changing Base Trials. If the Broach is not used to form the trial, it is necessary to remove the Broach and return to page 51 to complete the Keel preparation using the Tibial Sleeve Trial and Keel Punch.

General Femoral Instrumentation

Torque Driver and 6 mm Hex Driver

The Torque Driver Assembly is utilized when tightening instruments to Femoral Broaches, Boss Trials, and Femoral Offset Adaptor Trials. The Assembly applies a torque to the constructs to aid in maintaining a tight connection throughout the surgical process and to aid in setting final implant rotation based off of the Femoral Trial construct.

Tighten to “click” when assembling Femoral Instruments and associated constructs with the Torque Driver Assembly to ensure solid assembly throughout preparation and trialing.

▲ Warning:

Not torquing to the “click” may result in Trial components loosening during use or extraction.

General Femoral Instrumentation

Femoral Trial Assembly - Boss Trial

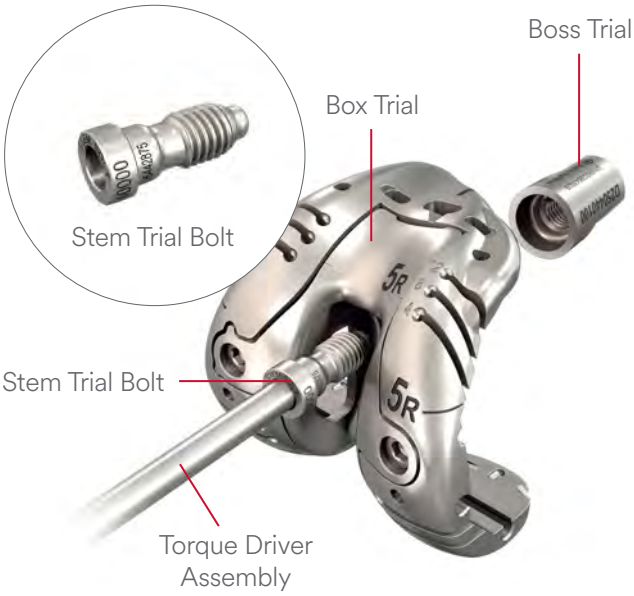
Cut Through Trial

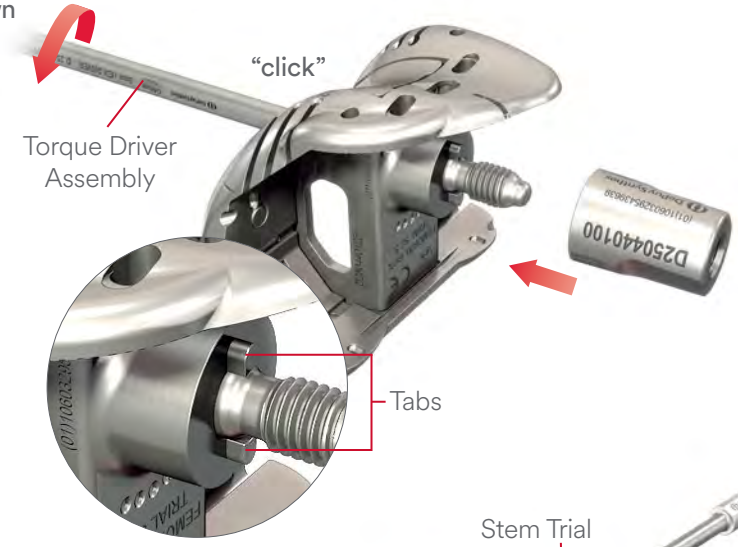
Straight Stem

The Boss Trial attaches to the proximal side of the Femoral Trial utilizing the Stem Trial Bolt passed through the Box region of the Femoral Trial. The Stem Trial then threads on to the Boss Trial.

The Cut Through Trial can be assembled with the IM Connector for the Cut Through Trial workflows in cases where there is significant bone loss and it is desired to use the Cut Through Trial prior to final box preparation. Otherwise it should be assembled to the Box Trial (shown below).

Box Trial and Boss Trial





■ Notes:

The distal surface of the Boss Trial has a recess to interface with the tabs on the box of the Femoral Trial components.

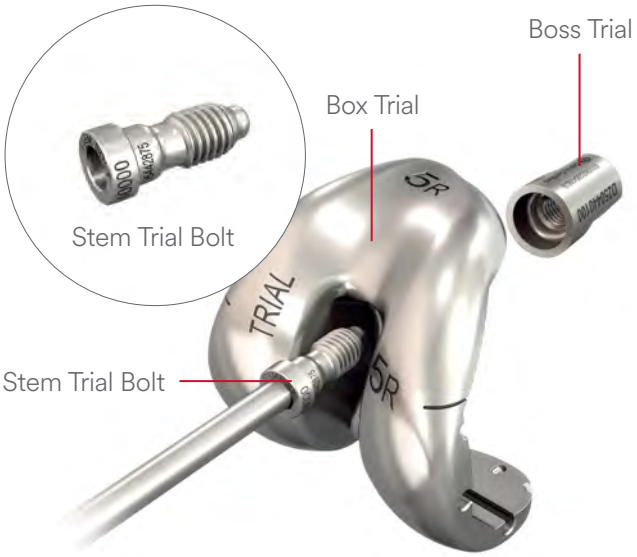
General Femoral Instrumentation

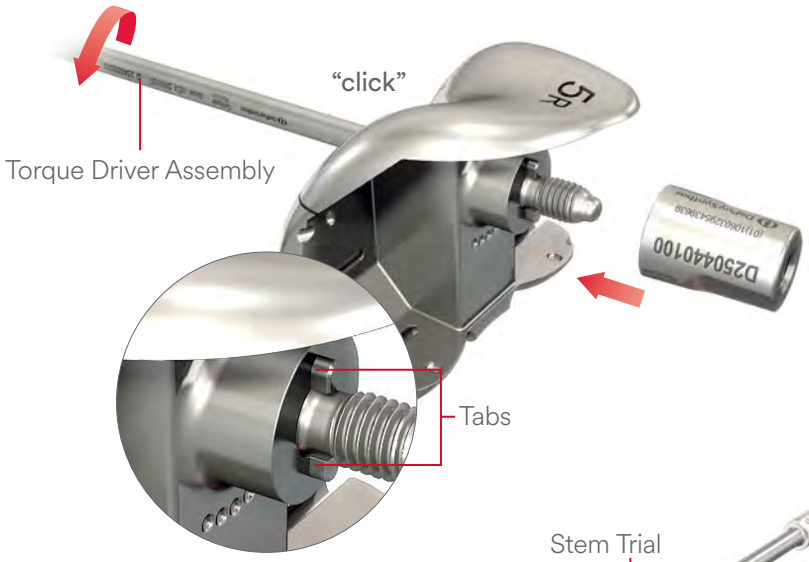
Femoral Trial Assembly - Boss Trial

Solid Femoral Trial

Straight Stem

The Boss Trial attaches to the proximal side of the Femoral Trial utilizing the Stem Trial Bolt passed through the Box region of the Femoral Trial. The Stem Trial then threads on to the Boss Trial.





■ Notes:

The distal surface of the Boss Trial has a recess to interface with the tabs on the box of the Femoral Trial components.

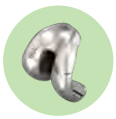
General Femoral Instrumentation

Femoral Trial Assembly - Offset Adaptor Trial for Offset Stem

Offset Stem

The Femoral Offset Adaptor Trial attaches to the proximal side of the Femoral Trial utilizing the Stem Trial Bolt passed through the Box region of the Femoral Trial. The Stem Trial threads on to the Femoral Offset Adaptor Trial.

Cut Through Trial



Solid Femoral Trial

Orientation Feature

General Femoral Instrumentation

Femoral Trial Assembly - Broach Trial for Femoral Sleeve

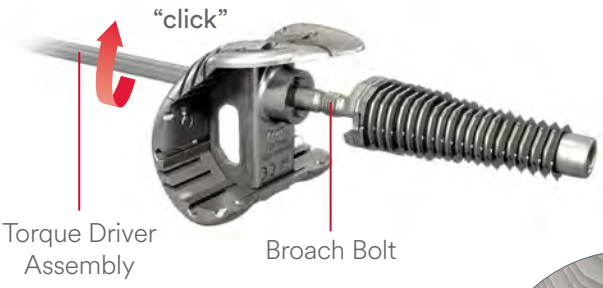
Femoral Sleeve and Stem

The Femoral Broach attaches directly to the Box of the Femoral Trial *via* the Broach Bolt.

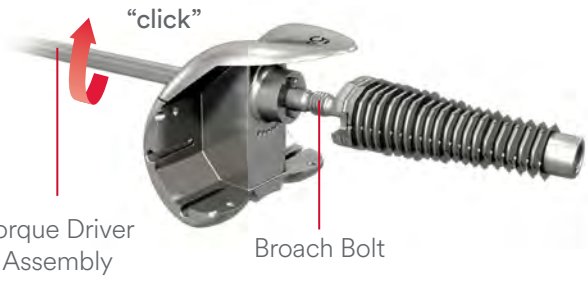
The Femoral Trial will generally be assembled to the Broach when it is in situ on the bone.

Broach Bolt

Cut Through Trial



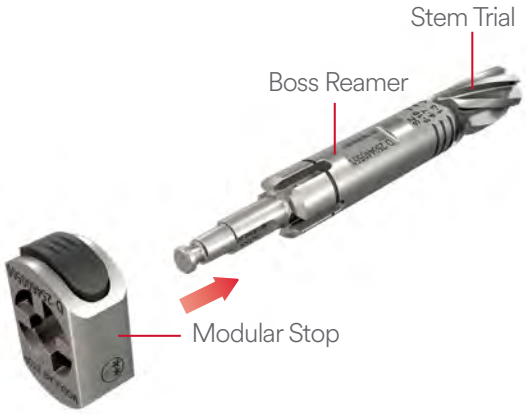
Solid Femoral Trial



Orientation Feature

General Femoral Instrumentation

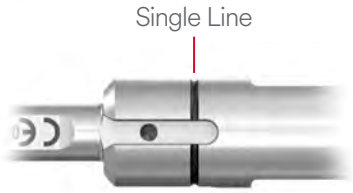
Femoral Boss Reamer

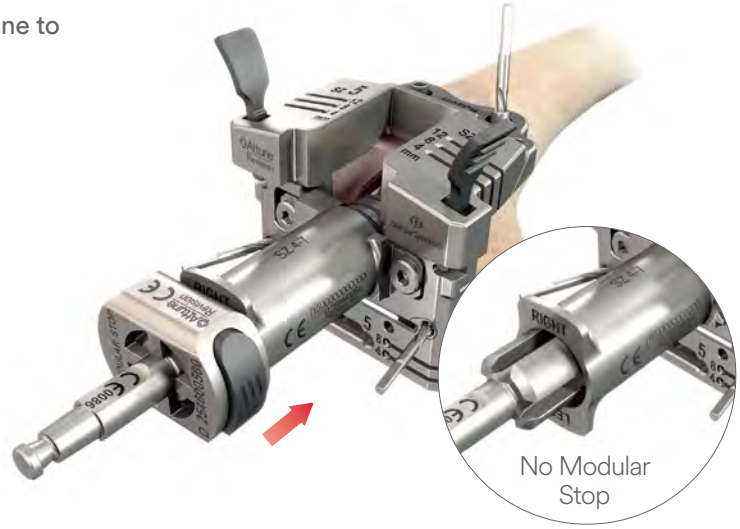


When reaming with the Femoral Boss Reamer, the appropriate Stem Trial should always be assembled to the end of the Boss Reamer.

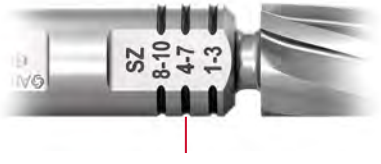
There are different depth indications on the Femoral Boss Reamer:

1) **The single engraved line closest to the Hudson Connection:**
Ream to this line any time the Boss Reamer is going through a Reamer Guide.
Additionally, the Modular Stop may be assembled to this line to aid in controlling the depth of the Reamer and should be seated flush against the Reamer Guide.





2) **The grouping of three lines closest to the cutting flutes of the Boss Reamer:**
In preparations where the Boss Reamer is being Guided by a Stem Trial (not passing through a Reamer Guide), seat the Boss Reamer until the appropriate femoral size marking group is aligned with the distal surface of the femur (or distal surface of any prepared Augments).



The modular size groupings on the Boss Reamer represent the distal bone surface and not the anticipated joint line.

The Modular Stop will NOT connect to these positions.

General Femoral Instrumentation

Femoral Augment Trial Assembly ▲

The Femoral Augment Trials slide in from the side of the Femoral Trials and have a magnet for retention.

When assembling the Augment Trials to the Femoral Trial while on the bone, it may be necessary to slightly distract the Femoral Trial to allow clearance for assembly.

To remove the Femoral Augment Trial:

1. Gently press on the posterior aspect of the Distal Augment Trial.
2. Slide to the exterior of the Femoral Component.

For the Posterior Augment Trial:

1. Gently press on the distal aspect.
2. Slide exteriorly.

▲ Warning:

The ATTUNE Revision Femoral Augment Trials contain magnets. These devices should be kept at a safe distance from a patient's active implantable medical device(s) (i.e. pacemaker) in order to avoid adversely affecting the device. The Femoral Augment Trials should be kept at an appropriate location when not in use in the surgical site.

■ Notes:

Femoral Augment Trials are shared across 2 sizes: 1 - 2, 3 - 4, 5 - 6, 7 - 8, and 9 - 10 and may be utilized on the "Left or Right" medial or lateral for the corresponding Distal or Posterior Augment Trials; the Femoral Augment Implant sizes correspond to the Femoral Implant size and are not shared across sizes.

Additionally, each Augment Trial is marked with two colored dots which correspond to the size and color markings for the compatible femoral component. The compatiblity chart on page 222 shows the implant size and corresponding color assignment/association.

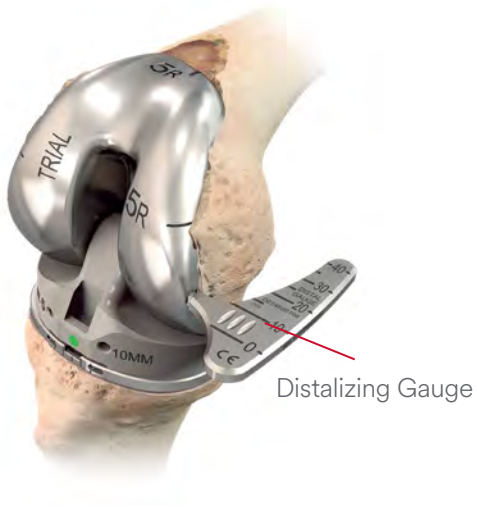
■ Notes:

Where appropriate, Femoral Augment resections may be made through the Conventional Cut Guide, Notch Guide, FE Guide, or Cut Through Trial.

General Femoral Instrumentation

Distalizing Gauge

The Distalizing Gauge may be utilized to provide an additional reference to the epicondyles and ultimately joint line placement. There are reference marks on the Distalizing Gauge in 5 mm increments to allow for assessment of the distance of the joint line from the medial or lateral epicondyle, as desired.



The "0" line indicates the joint line of the Femoral Component and is level with:

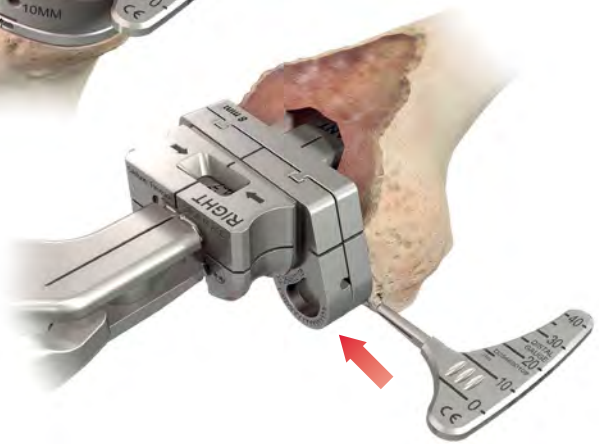
- The articular surface of the Revision Femoral Trials
- The distal surface of the Conventional Cut Guide

The Distalizing Gauge slides into:

- The channels for the Distal Spacers in the Conventional Cut Guide or FE Guide

- The channels for the Femoral Augment Trials in the Femoral Trials

- Or the channels in the Medial and Lateral sides of the Broach Stop



Revision Femoral Preparation - Solutions

Solution 1: Revision Femoral Component with Short Cemented Stem With Cut Through Trials (go to **page 62**)

Cut Through Trial

This workflow positions the Femoral Component with a Short Cemented Stem relative to the femoral bone resections as determined using the INTUITION A/P Chamfer Block from the INTUITION Instruments Surgical Technique.

Solution 2: Revision Femoral Component with Short Cemented Stem With Solid Femoral Trials (go to **page 67**)

Conventional Cut Guide

This workflow positions the Femoral Component with a Short Cemented Stem relative to the femoral bone resections as determined using the INTUITION A/P Chamfer Block from the INTUITION Instruments Surgical Technique.

Revision Femoral Component with Intramedullary (IM) Preparation (go to **page 73**)

Solutions 3 , 4 and 5 position the Femoral Component relative to the IM Canal with the positioning being driven by the fixation achieved through long Stems or Femoral Sleeves.

Straight Stem

Offset Stem

Femoral Sleeve and Stem

Solution 3: Revision Femoral Component with Intramedullary (IM) Preparation with Conventional Cut Guide (go to **page 73**)

Conventional Cut Guide

Revision Femoral Component with Intramedullary (IM) Preparation with FE Guide (go to **page 73**)

FE Guide

Solution 4: Revision Femoral Component with Intramedullary (IM) Preparation with Cut Through Trials (go to **page 73**)

Cut Through Trial

Femoral Preparation

Cut Through Trial

This is the Extramedullary Preparation of the Revision Femoral component with a 30, 50, or 80 mm Cemented Stem.

When using an 80 mm long Cemented Stem (14 mm or 16 mm in diameter) and based on pre-operative templating, the size of the Femoral Stem and bow of the femoral canal should be taken into consideration when determining if the longer Stem is suitable for the patient.

This technique positions the Stem based on the femoral bone cuts rather than the patient's intramedullary canal.

Follow the femur preparation stages described in the ATTUNE Knee System INTUITION Instruments Surgical Technique. Once the chamfer resections are made, remove the ATTUNE Primary INTUITION A/P Chamfer Block.

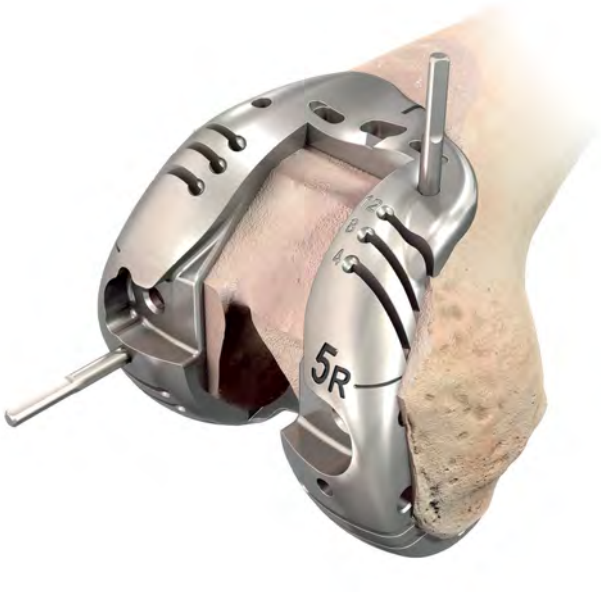
Delay resecting the Femoral Box as the Revision Box will be prepared using the Cut Through Trial to set the M/L position.

■ Notes:

Reference the ATTUNE Knee System ATTUNE Primary INTUITION Instruments Surgical Technique for femur preparation.

▲ Warning:

The ATTUNE Revision Femoral Augment Trials contain magnets. These devices should be kept at a safe distance from a patient's active implantable medical device(s) (i.e. pacemaker) in order to avoid adversely affecting the device. The Femoral Augment Trials should be kept at an appropriate location when not in use in the surgical site.



Femoral Finishing - Cut Through Trial

Take the corresponding size Revision Cut Through Femoral Trial (without any attachments assembled) and place on the prepared distal femur. Locate the Cut Through Trial in the desired M/L position on the prepared distal femur.

Pin the Cut Through Trial in place.

If Augments are required, make the appropriate resections through the Distal and/or Posterior Augment slots ensuring that Pins are not in the way. Femoral Augment Trials may be loaded from the side. ▲

Pins can pass through the Augment Trials after they are in place, however, the Pins must be removed to perform the resection and to allow for the trials to slide into position.

■ Notes:

The Cut Through Trials are available in Sizes 3 - 10. The Conventional Cut Guide must be utilize to prepare femurs of Sizes 1 or 2.

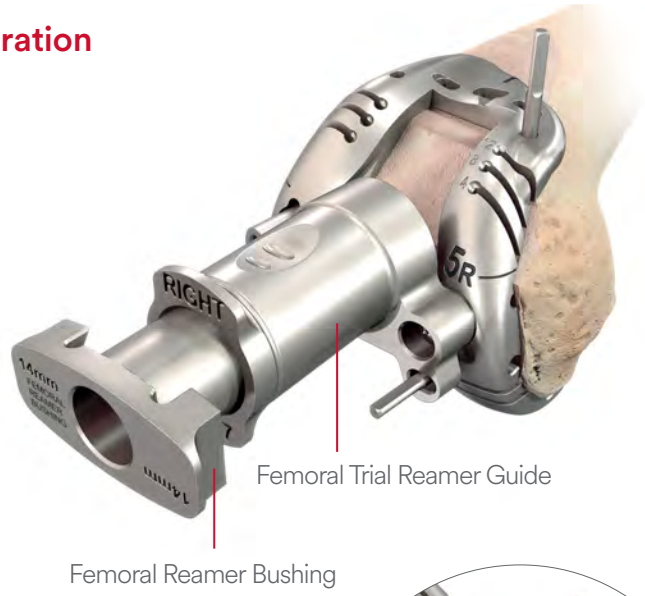
Femoral Preparation

Femoral Finishing - Cemented Stem Preparation

Cut Through Trial

Introduce the correct side “Left or Right” and size (3, 4 - 7, or 8 - 10) Femoral Trial Reamer Guide and attach to the Cut Through Trial by **tightening the Hexes** using the Torque Limiting Screwdriver Assembly.

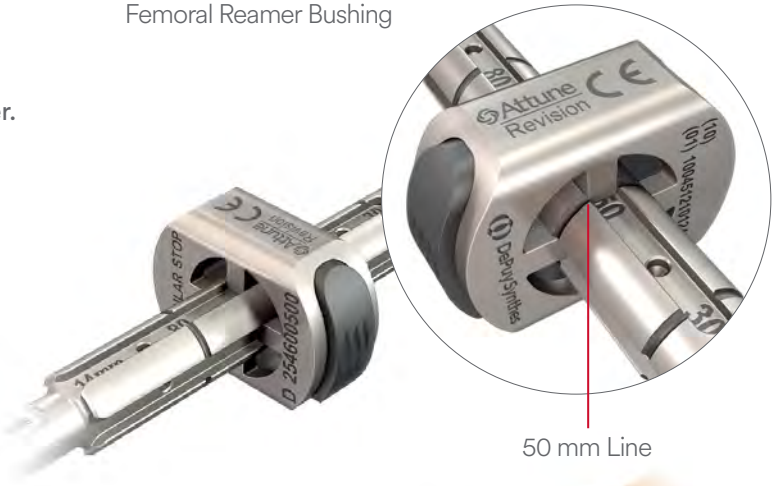
Introduce the 14 mm Femoral Reamer Bushing to the Reamer Guide.



Attach the Modular Stop to the desired 30, 50, or 80 mm line of the 14 mm Cemented Femoral Reamer.

Seat the Reamer to the Stop. ▲

Proceed to Boss Preparation on **page 64**.



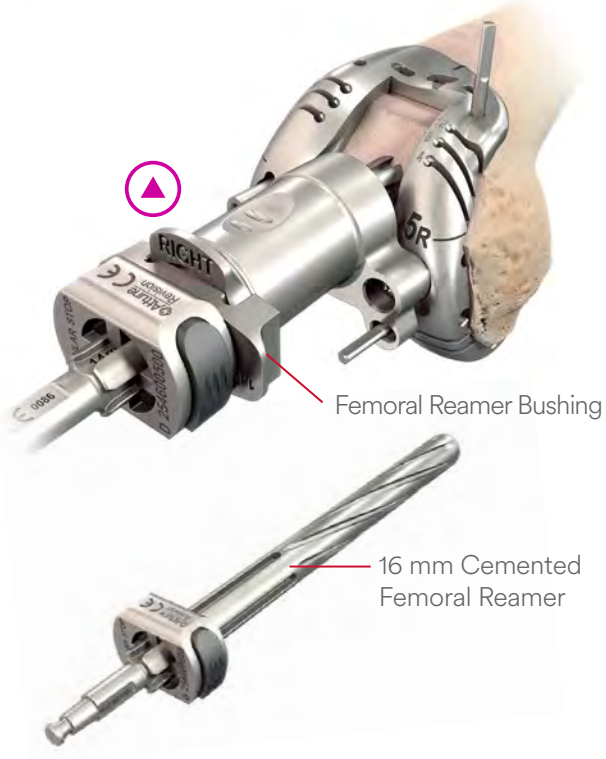
If a 16 mm x 80 mm Cemented Stem is desired, introduce the 16 mm Femoral Reamer Bushing to the Reamer Guide.

Ensure the 80 mm long Stem is appropriate for the patient's anatomy as previously described on **page 62.**

Attach the Modular Stop to the 80 mm line of the 16 mm Cemented Femoral Reamer.

Seat the Reamer to the Stop. ▲

Proceed to Boss Preparation on **page 64**.



▲ Warning:

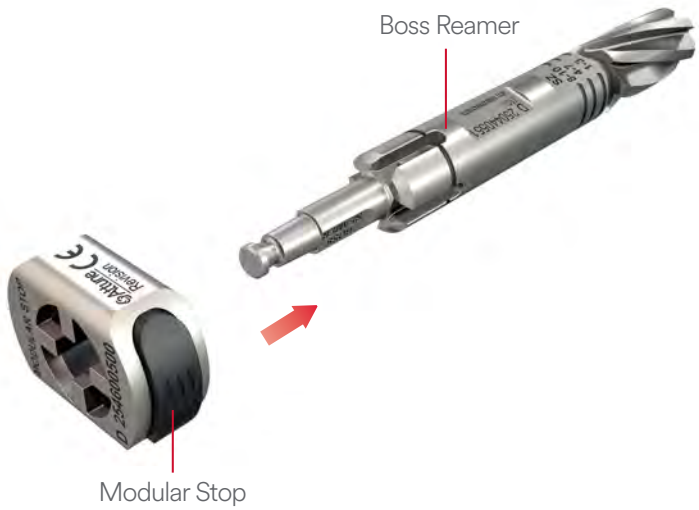
Avoid cortical contact.

Femoral Preparation

Femoral Finishing - Boss Preparation

Cut Through Trial

To prepare for the Femoral Boss, remove the Femoral Reamer Bushing and prepare the femoral canal with the Femoral Boss Reamer.



Assemble the appropriate Cemented Stem Trial to the Femoral Boss Reamer and attach the Modular Stop to the most proximal line on the Femoral Boss Reamer.

Seat the Reamer to the Stop.

Remove all instruments except the Cut Through Trial and Pins.

▲ Warning:

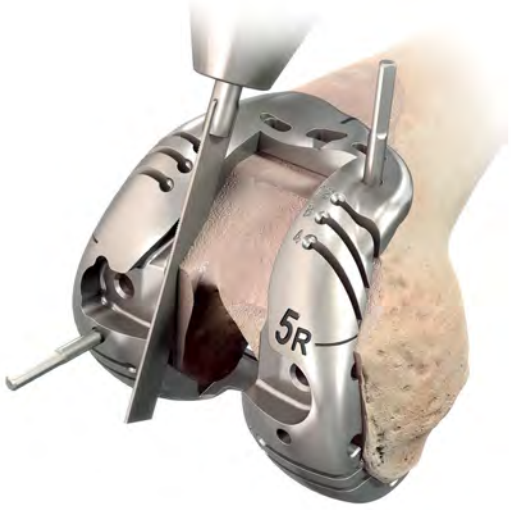
Do not reverse ream.

Femoral Preparation

Femoral Finishing - Box Resection

Cut Through Trial

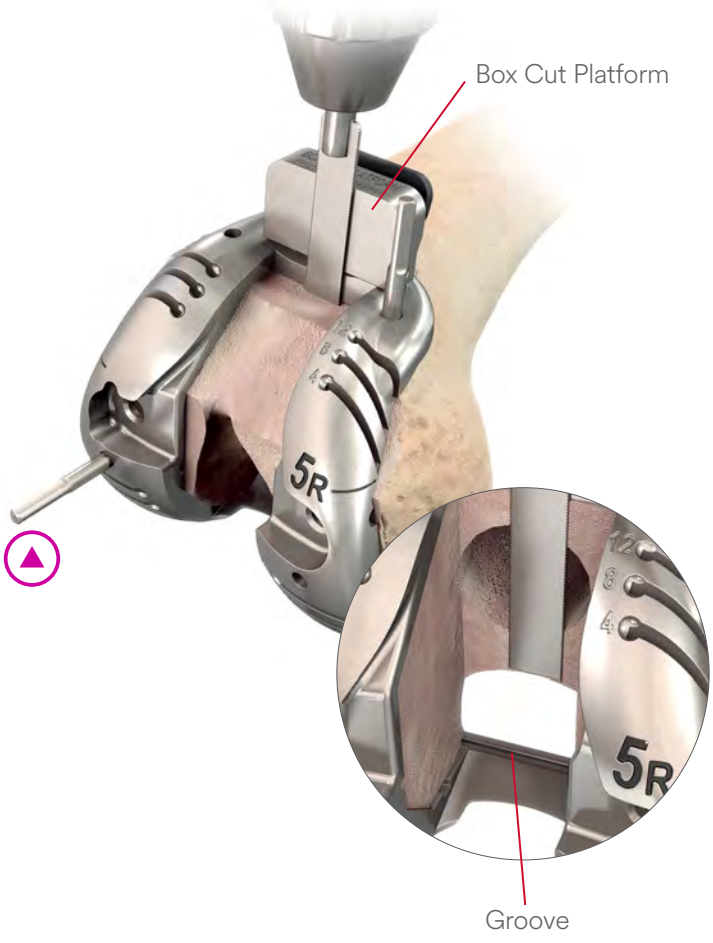
A Reciprocating Saw is recommended for resecting the sides of the Femoral Box. Use the side walls of the box opening on the Cut Through Trial as a guide.



Attach the Box Cut Platform to the anterior flange of the Cut Through Trial and proceed to resect the top of the box with the Reciprocating Saw or Narrow Saw Blade. A groove is machined into the bridge between the posterior condyles, once the top of the box resection has been completed this groove is fully visible.

Check completeness of the box resection with the Angel Wing against the Box Cut Platform and along the sides of the box opening in the Cut Through Trial.

Remove the Box Cut Platform.



▲ Warning:

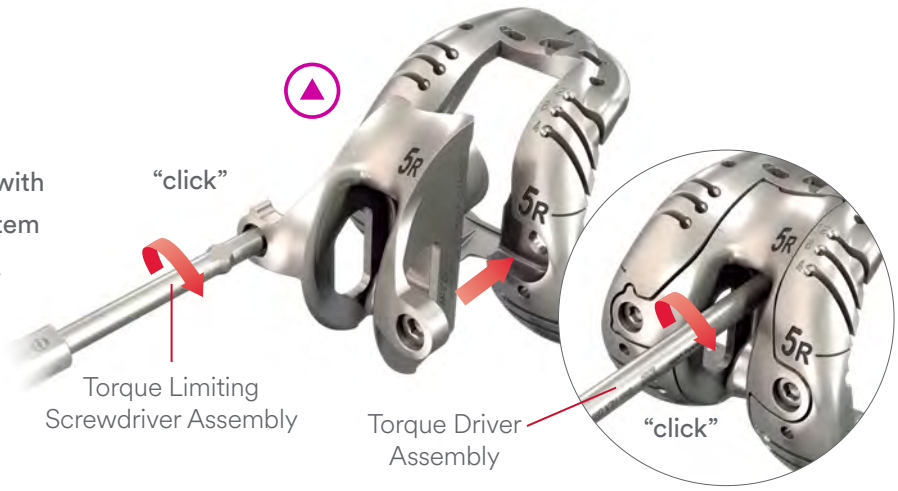
If the box resection is not complete, the connecting components of the Cut Through Trial may not seat.

Femoral Preparation

Femoral Trial Assembly

Cut Through Trial

Assemble the Cut Through Femoral Trial with the Box Trial, Boss Trial, Stem Trial Bolt, Stem Trial, and any appropriate Augment Trials.



Introduce the Femoral Trial Assembly to the prepared femur. Utilize the ATTUNE System Impactor to seat the Femoral Trial Assembly.

Introduce the Revision Tibial Insert Trial and proceed to setting Tibial Base Rotation on **page 150.**

▲ Warning:

The Box Trial is size and side specific.

▲ Warning:

The ATTUNE Revision Femoral Augment Trials contain magnets. These devices should be kept at a safe distance from a patient's active implantable medical device(s) (i.e. pacemaker) in order to avoid adversely affecting the device. The Femoral Augment Trials should be kept at an appropriate location when not in use in the surgical site.

▲ Warning:

If Femoral Trial Assembly does not seat to the intended depth, verify that the depth of the box resection was correct.

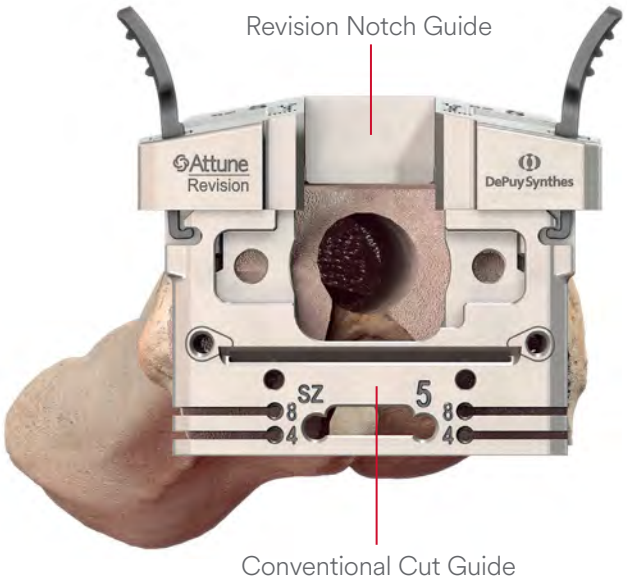
Femoral Preparation

Conventional Cut Guide

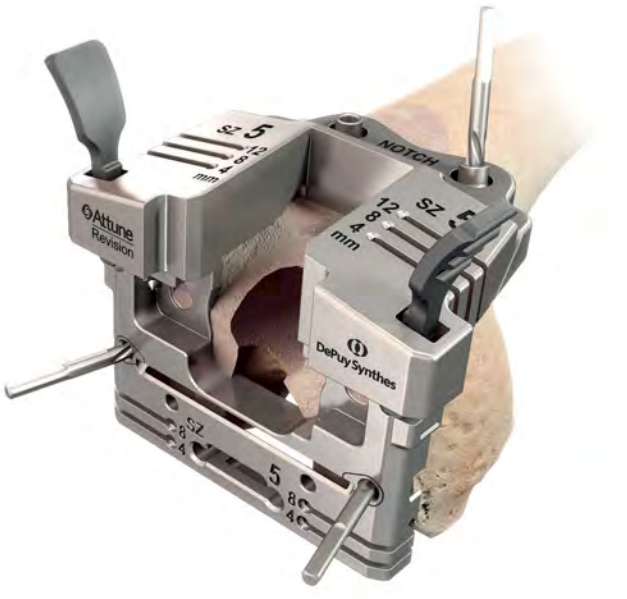
This is the Extramedullary Preparation of the Revision Femoral Component with a 30, 50, or 80 mm Cemented Stem.

When using an 80 mm long Cemented Stem (14 mm or 16 mm in diameter) and based on pre-operative templating, the size of the Femoral Stem and bow of the femoral canal should be taken into consideration when determining if the longer Stem is suitable for the patient.

This technique positions the Stem based on the femoral bone cuts rather than the patient's intramedullary canal.



Follow the femur preparation stages as described in the ATTUNE Knee System ATTUNE Primary INTUITION Instruments Surgical Technique. Once the chamfer resections are made remove the ATTUNE Primary INTUITION A/P Chamfer Block. **Delay resecting the Femoral Box as the Revision Box will be prepared with the Conventional Cut Guide and Revision Notch Guide.**



Take the corresponding Conventional Cut Guide and Revision Notch Guide and place on the prepared distal femur. Locate the Assembly in the desired M/L position on the prepared distal femur.

Pin the Conventional Cut Guide and Revision Notch Guide in place.

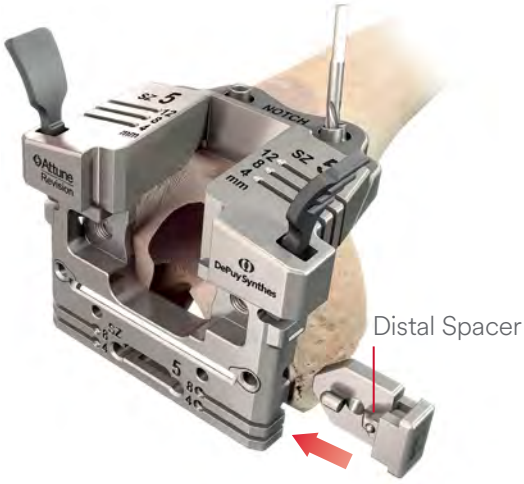
Femoral Preparation

Augment and Cemented Stem Preparation

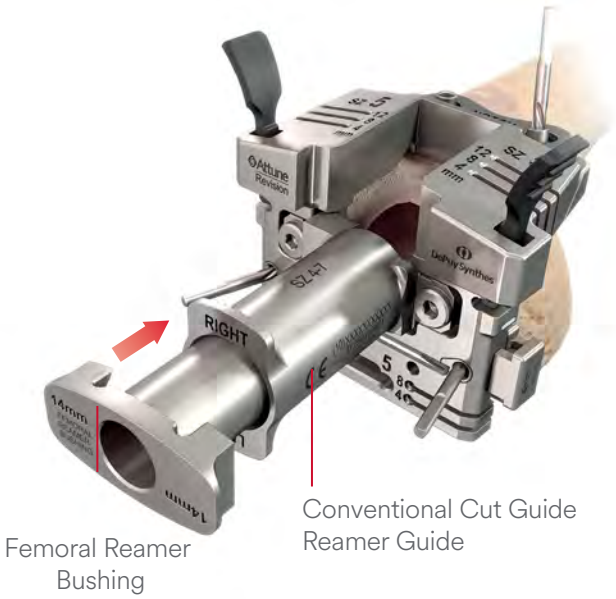
Conventional Cut Guide

If Augments are required, make the appropriate resections through the Distal and/or Posterior Augment slots ensuring that the Pins are not in the way.

Insert the appropriate Distal Spacers by loading from the side of the Conventional Cut Guide.



Introduce the Conventional Cut Guide Reamer Guide so that the correct text “LEFT” or “RIGHT” is legible when assembled to the Conventional Cut Guide and the 14 mm Femoral Reamer Bushing.

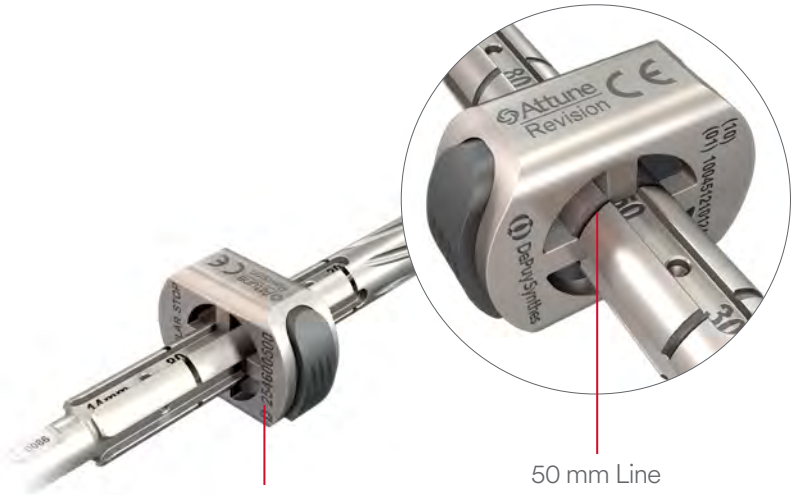


Femoral Preparation

Cemented Stem Preparation

Conventional Cut Guide

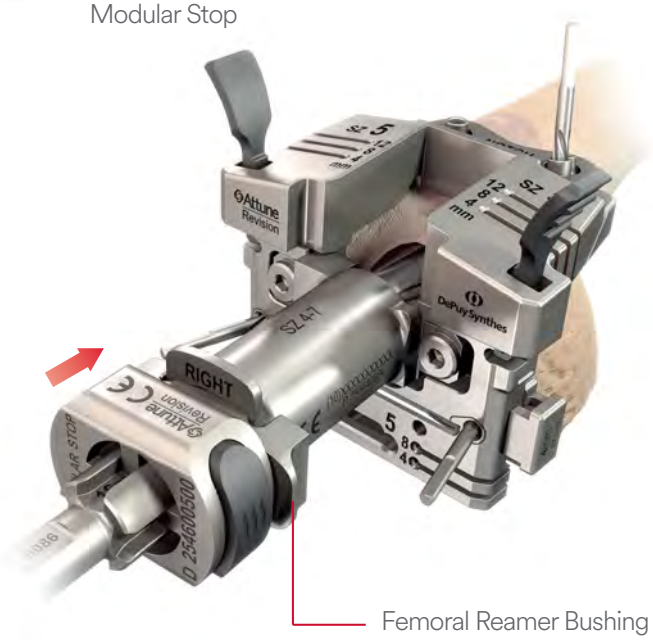
Attach the Modular Stop to the desired 30, 50, or 80 mm line of the 14 mm Cemented Femoral Reamer.



Seat the Reamer to the Stop.

Proceed to **Boss Preparation on page 70.**

If a 16 mm x 80 mm Cemented Stem is desired, introduce the 16 mm Femoral Reamer Bushing to the Reamer Guide. **Ensure the 80 mm long Stem is appropriate for the patient's anatomy as previously described on page 62.** ▲



Attach the Reamer Stop to the 80 mm line of the 16 mm Cemented Femoral Reamer.

Seat the Reamer to the Stop.

Proceed to **Boss Preparation on page 70.**

▲ Warning:

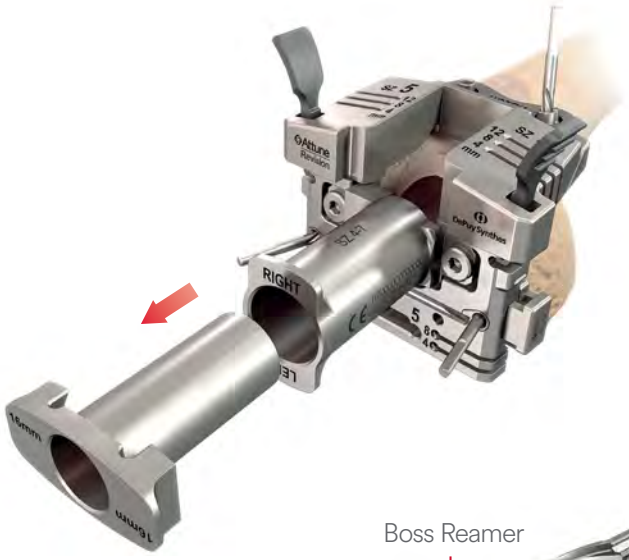
Avoid cortical contact.

Femoral Preparation

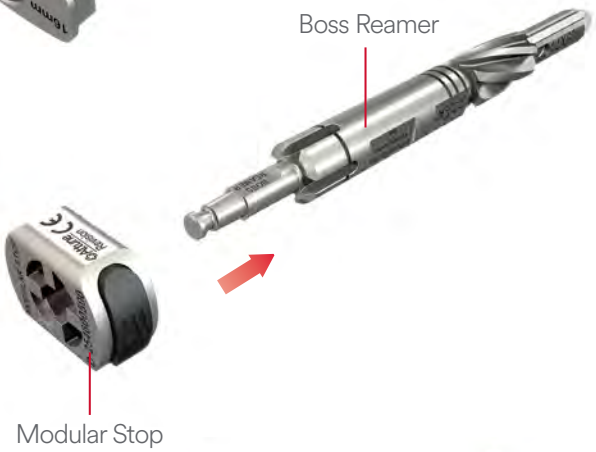
Boss Preparation

Conventional Cut Guide

To prepare for the Femoral Boss, remove the Femoral Reamer Bushing.

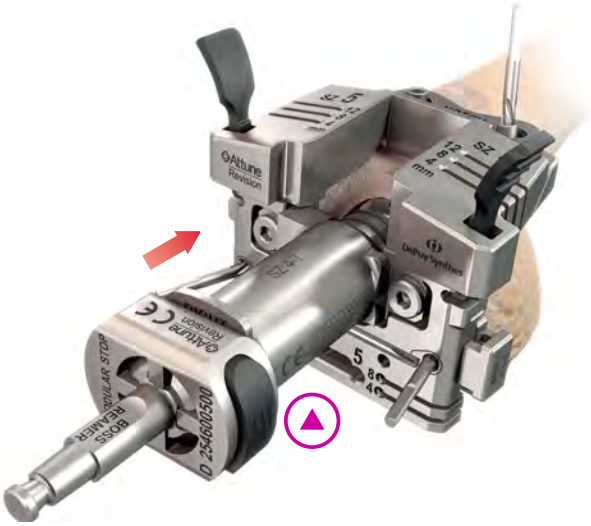


Assemble the Stem Trial to the Femoral Boss Reamer and attach the Reamer Stop to the most proximal line on the Femoral Boss Reamer.



Seat the Reamer to the Stop.

With the Femoral Boss prepared, remove the Boss Reamer and the Conventional Cut Guide Reamer Guide Assembly.



▲ Warning:

Do not reverse ream.

Femoral Preparation

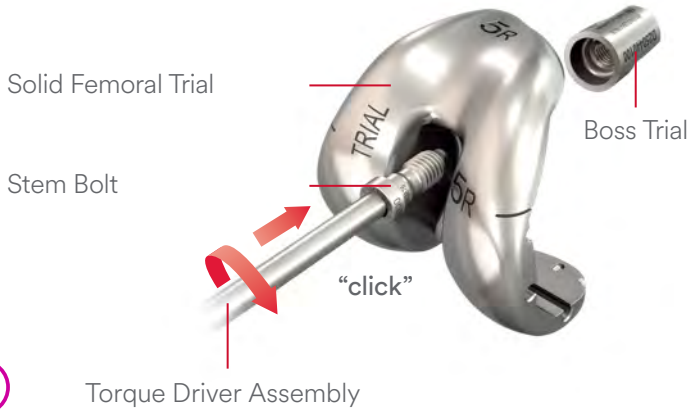
Box Resection and Femoral Trialing

Conventional Cut Guide

Resect the sides and top of the Femoral Box with a Reciprocating Saw. Use the side walls and top ledge of the box as a guide.

Optionally, the Notch Guide may be pinned through the Parallel Pin Holes to allow for removal of the Conventional Cut Guide to complete the Box resection, if desired.

With the femoral preparation complete, remove the Conventional Cut Guide Assembly.



Femoral Trialing

Assemble the Solid Femoral Trial with the Boss Trial, Stem Bolt, Stem Trial, and any appropriate Augment Trials. ▲

▲ Warning:

The ATTUNE Revision Femoral Augment Trials contain magnets. These devices should be kept at a safe distance from a patient's active implantable medical device(s) (i.e. pacemaker) in order to avoid adversely affecting the device. The Femoral Augment Trials should be kept at an appropriate location when not in use in the surgical site.

Femoral Preparation

Femoral Trialing

Conventional Cut Guide

Introduce the Solid Femoral Trial Assembly to the prepared femur. Utilize the ATTUNE System Impactor to seat the Femoral Trial Assembly.

System Impactor

Introduce the Revision Tibial Insert Trial and proceed to Setting Tibial Base Rotation on **page 150.**

▲ Warning:

If Femoral Trial Assembly does not seat to the intended depth, verify that the depth of the box resection was correct.

Femoral Preparation

According to user preference and amount of distal femoral bone loss, choose one of the following to perform the femoral bone preparation:

For any of the workflows, proceed to **pages 74 - 78** prior to progressing to Conventional Cut Guides or Cut Through Trials.

Solution 3

Conventional Cut Guide

Go to **pages 79 - 123**

Straight Stem | Femoral Sleeve and Stem | Offset Stem

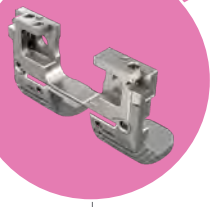
OR

Solution 3

FE Guide

In order to utilize the FE Guide workflow there must be sufficient posterior condylar bone loss to allow the FE Guide to seat on the distal femoral bone as well as adjust rotation. FE Guides are available in Sizes 3 - 10.

Go to **pages 79 - 123**



Straight Stem | Femoral Sleeve and Stem | Offset Stem

OR

Solution 4

Cut Through Trials

These should only be used when there is femoral bone loss that allows for a sliding fit of the Cut Through Trial before A/P and chamfer resections. Cut Through Trials are available in Sizes 3 - 10.

Go to **pages 124 - 149**

Straight Stem | Femoral Sleeve and Stem | Offset Stem

■ Notes:

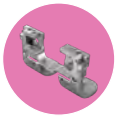
Regardless of the instruments used for these remaining femoral bone preparation steps, either the Cut Through Trial or Solid Femoral Trial can be used for trialing and range of motion evaluation.

Femoral Preparation

Canal Reaming


Cut Through Trial


Conventional Cut Guide


FE Guide

Straight Stem

Utilize the “With Stem” indications on the Femoral Reamer Reference Tool. Refer to **pages 15 - 17.**

Offset Stem

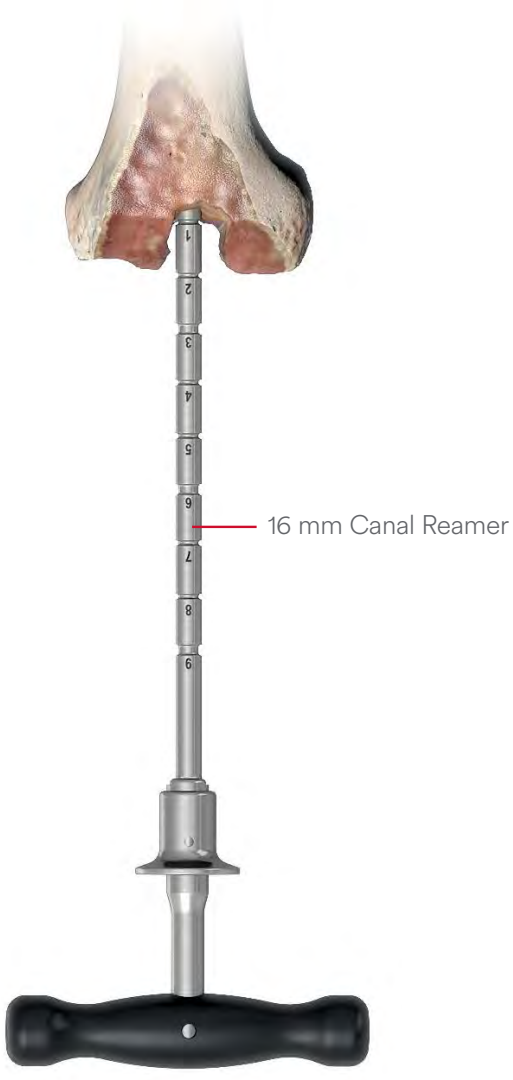
Utilize the Femoral side of the Offset Reamer Reference Tool.
Refer to **pages 15 - 17.**

Femoral Sleeve and Stem

Utilize the “With Sleeve and Stem” indications on the Femoral Reamer Reference Tool. Refer to **pages 15 - 17.**

Assemble the Canal Reamer to either the Reamer T-Handle or standard power. During canal preparation for Femoral Sleeves, care should be taken to posteriorize the Reamer in the distal femoral bone and not allow for the hard posterior bone to drive the femoral position anteriorly i.e. so that the Femoral Component is not extended.

Straight canal ream to appropriate depth and desired canal fit, remembering to finish on an even diameter Reamer. Refer to **pages 18 - 20.**



Femoral Preparation

Distal Resection


Cut Through Trial


Conventional Cut Guide

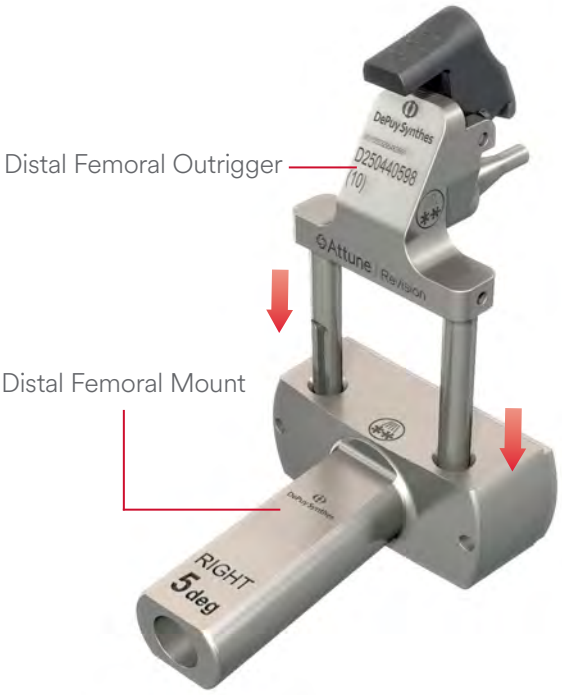

FE Guide


Straight Stem


Offset Stem


Femoral Sleeve and Stem

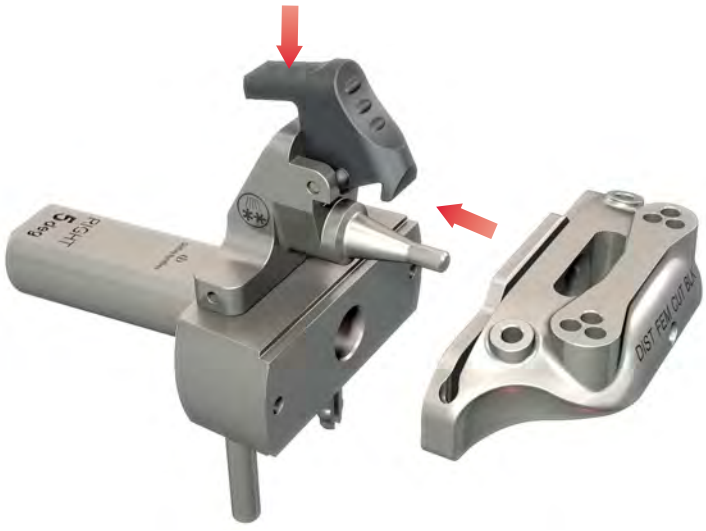
It is possible to use the INTUITION Distal Femoral Guide to perform a distal clean up cut.
Use the Jig prior to canal reaming and follow the instructions in the ATTUNE Knee System ATTUNE Primary INTUITION Instruments Surgical Technique, setting the instrument to 5 degrees valgus and set for a minimal amount of resection.



Alternatively, the distal femoral resection can be made off of the Canal Reamer as described. After progressively reaming, retain the even diameter Canal Reamer in the femoral canal.

Assemble the Revision Distal Femoral Mount to the Revision Distal Femoral Outrigger. Ensure the correct “R5” for Right, 5 degrees valgus or “L5” for Left, 5 degrees valgus is legible on the Distal Femoral Mount.

Assemble the INTUITION Distal Femoral Cutting Bloc to the Revision Distal Femoral Outrigger.



Femoral Preparation

Distal Resection


Cut Through Trial


Conventional Cut Guide


FE Guide

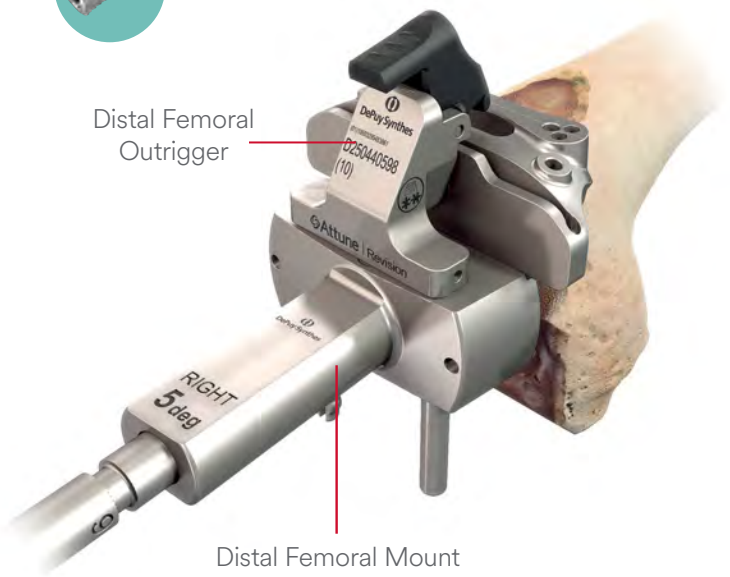

Straight Stem


Offset Stem

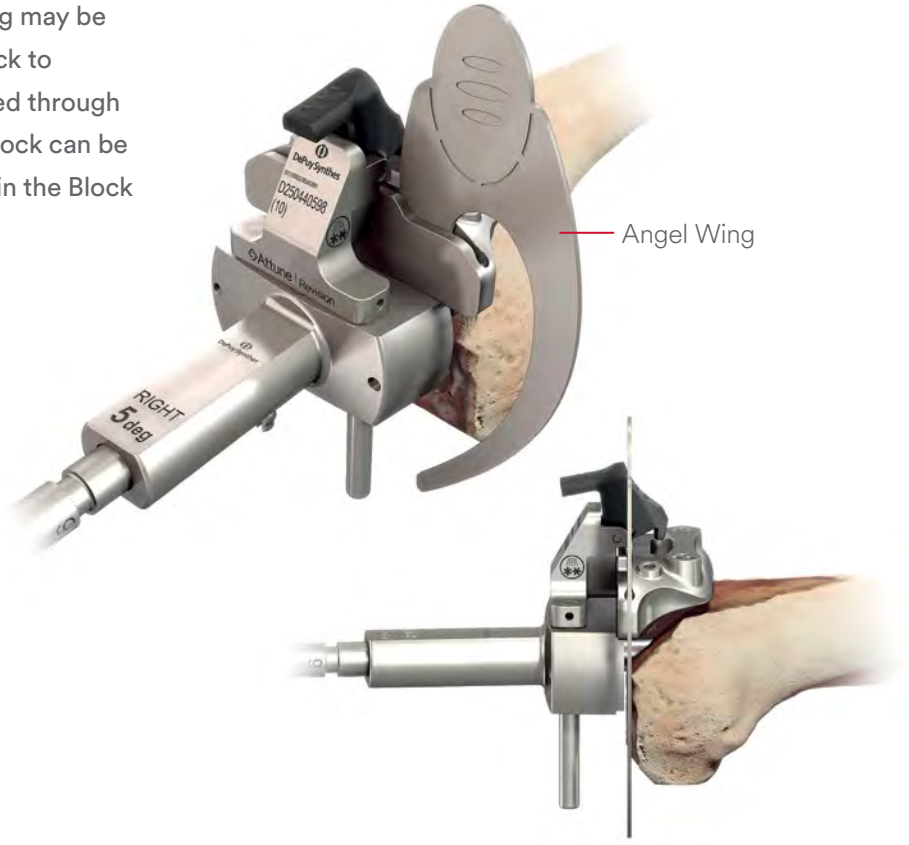

Femoral Sleeve and Stem

Slide the Distal Femoral Jig Assembly over the shaft of the Canal Reamer until the Distal Femoral Mount rests on the most prominent distal femoral bone.

The Cutting Block is positioned so that it takes a 2 mm clean up resection from the bone contacting surface of the Distal Femoral Mount.



If the Distal Femoral Jig Assembly does not rest on the most prominent distal bone, an Angel Wing may be utilized through the slot of the Cutting Block to reference the prominent bone. Once pinned through the holes with a central line, the Cutting Block can be repositioned by using the Distal Pin Holes in the Block to translate it proximally 2 mm.



Femoral Preparation

Distal Resection


Cut Through Trial


Conventional Cut Guide

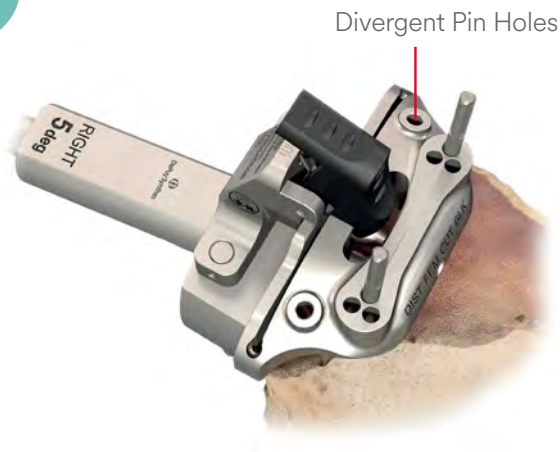

FE Guide


Straight Stem


Offset Stem


Femoral Sleeve and Stem

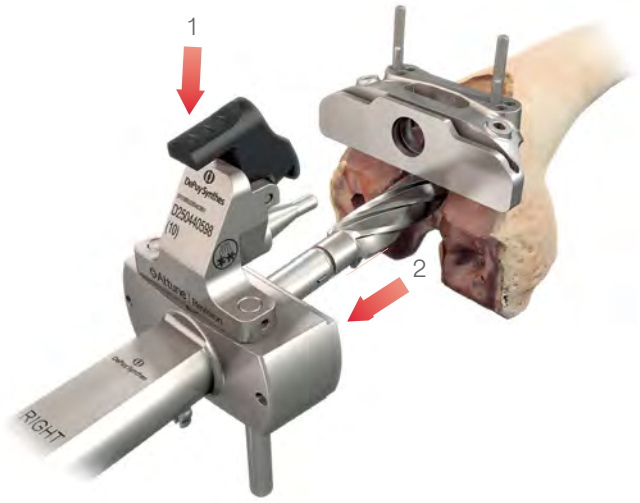
Secure the Cutting Block to the femur with two Universal or Non-Headed Pins through the holes marked with a center line. If necessary for additional stability, insert a Universal or Non-Headed Pin through one of the Divergent Pin Holes on the Cutting Block.



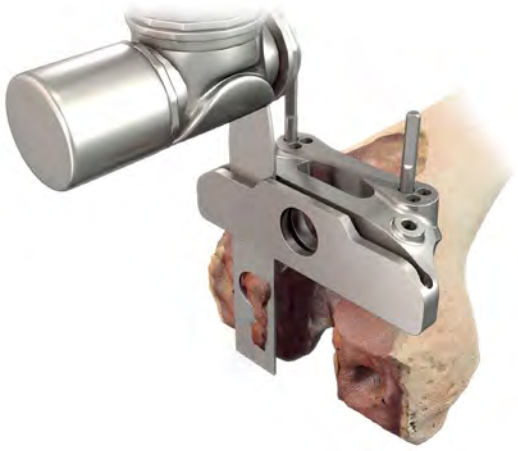
Disengage the Distal Femoral Cutting Block from the Outrigger Slide by pressing the lever on the Outrigger. Pull the entire Instrument distally.

Optionally, the distal femoral resection may be made with the Distal Femoral Jig Assembly in place by using a narrow, 1/2 inch, Saw Blade.

To further adjust the distal resection depth once the Distal Femoral Jig is removed, use the Distal or Proximal Pin Holes, that move the Block 2 mm in either direction.



If desired, the Canal Reamer can be removed from the femoral canal in order to complete the distal femoral resection.



Resect the distal femur.

Remove the Distal Femoral Cutting Block and Pins.

Femoral Preparation

Sizing the Femur


Cut Through Trial


Conventional Cut Guide


FE Guide


Straight Stem


Offset Stem

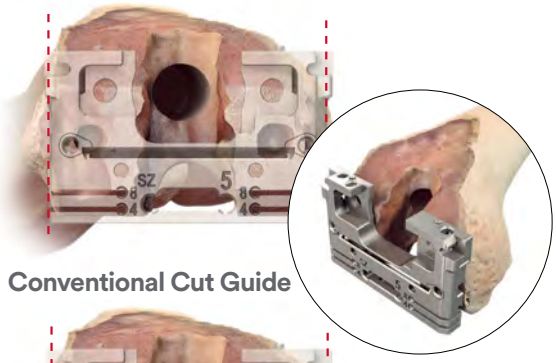

Femoral Sleeve and Stem

When sizing the femur, select the component that maximizes the femoral size while avoiding M/L overhang.

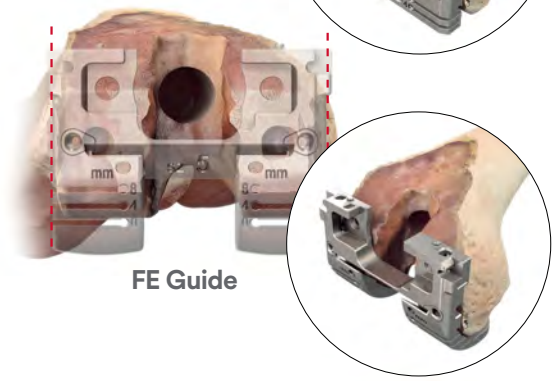
There are four suggested methods to assess the femoral size based on M/L dimension in addition to pre-operative templating:

- Place the Cut Through Trial Body over the distal femur
- Hold the Conventional Cut Guide against the distal femoral bone as the M/L width of the Conventional Cut Guide represents that of the Femoral Implant
- Hold the FE Guide against the distal femoral bone as the M/L width of the Cut Guide represents that of the Femoral Implant
- Place the Solid Femoral Trial backwards against the distal femur as the M/L width of the Femoral Trial represents that of the Femoral Implant

Cut Through Trial Body



Conventional Cut Guide



FE Guide

■ Notes:

The Cut Through Trials and FE Guides are available in Sizes 3 - 10. The Conventional Cut Guide must be utilized to prepare femurs of Sizes 1 or 2.

■ Notes:

If there is substantial bone loss, once the femoral size has been determined and the canal has been prepared, the Cut Through Trial may be assembled to the corresponding IM Connector, Boss Trial or Offset Adaptor Trial, Stem Trial Bolt and appropriate Stem Trial and inserted into the femoral bone.

The size 1 and 2 Conventional Cut Guide has a recessed portion which indicates the true M/L of the implant.

Proceed to Femoral Preparation through the Cut Through Trial on page 120.

Solid Femoral Trial

Femoral Preparation

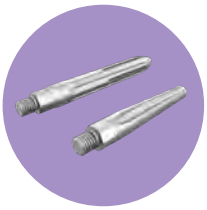
Setting Femoral Position


Conventional Cut Guide

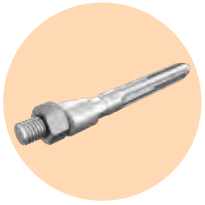

FE Guide

■ Notes:

In order to utilize the FE Guide workflow there must be sufficient posterior condylar bone loss to allow the FE Guide to seat on the distal femoral bone as well as adjust rotation. If there is posterior condylar bone present such that it prohibits the seating of the FE Guide, either perform a manual posterior resection or proceed to the Conventional Cut Guide workflow.


Straight Stem
Proceed to **page 80**


Femoral Sleeve and Stem
Proceed to **page 82**


Offset Stem
Proceed to **page 90**

Femoral Preparation

Setting Femoral Position


Conventional Cut Guide


FE Guide

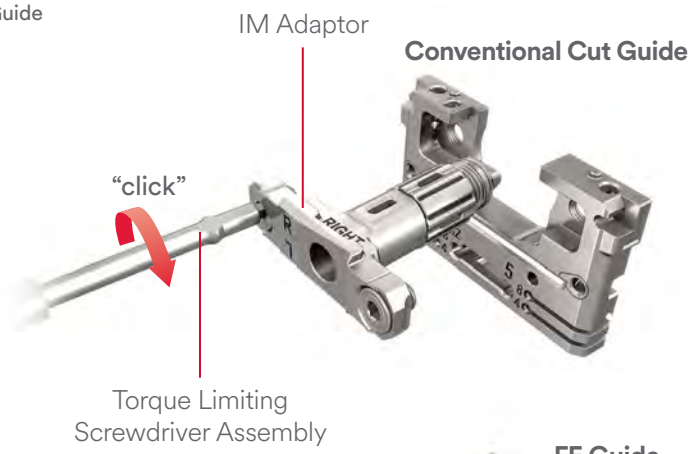

Straight Stem

This is the Intramedullary Preparation of the Revision Femoral component with a Press-Fit or long Cemented Stem.

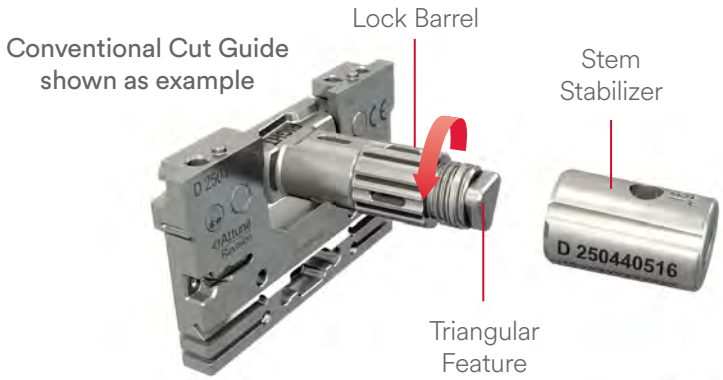
Once the definitive Reamer diameter has been determined, assemble the:

1. Conventional Cut Guide or FE Guide to IM Adaptor with the Hex Attachment.

   Ensure that the correct “Right or Left” marking is facing upward on the IM Adaptor when assembled to the Conventional Cut Guide or FE Guide.



2. Stem Stabilizer to the IM Adaptor by aligning the triangular feature on the Adaptor to the corresponding features on the Stem Stabilizer and turning the lock barrel of the IM Adaptor to tighten to the Stem Stabilizer.



3. Stem Trial to the Stem Stabilizer.
   Ensure that the correct “Right or Left” marking is facing upward on the IM Adaptor when assembled to the Conventional Cut Guide or FE Guide.

Conventional Cut Guide
shown as example

Femoral Preparation

Setting Femoral Position


Conventional Cut Guide


FE Guide


Straight Stem

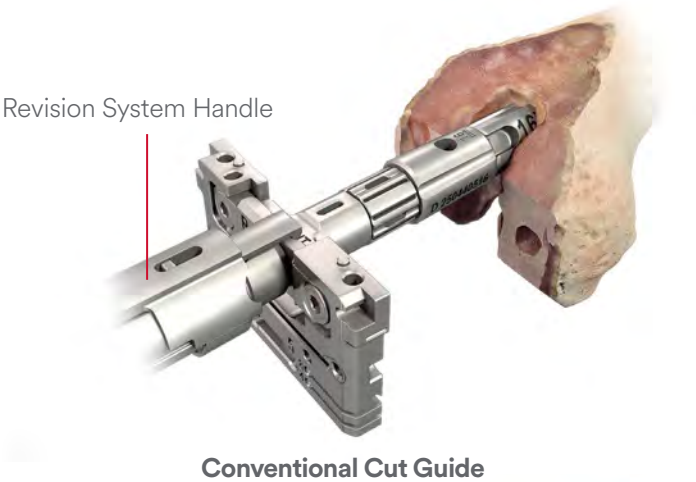
Introduce the Conventional Cut Guide or FE Guide Assembly into the femoral bone. If impaction is necessary, the Revision System Handle must be attached to the IM Adaptor and used to gently seat the assembly. The Conventional Cutting Guide or FE Guide should not be impacted directly.

Ensure that the construct is stable in the canal.

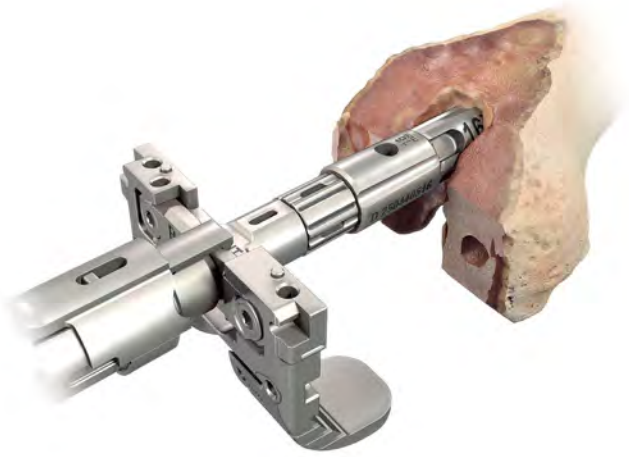
Please note that the Stem attached to the Conventional Cut Guide and FE Guide constructs are designed to provide support and therefore the Stem length will not be identical to all of the variable Final Trial constructs. The IM Adaptor length is designed to align with the middle of the femoral box groupings (Sizes 4 - 7) to reduce complexity within the system, and is 4 mm shorter than the largest grouping (Sizes 8 - 10).

The markings on the Reamer Reference Tools are positioned for the femoral canal to be prepared to the longest of the femoral box groupings (Sizes 8 - 10) to ensure the canal is prepared for the final Implant of all size groupings.

For Gap Balancing and Setting Rotation with a Straight Stem, proceed to **page 93.**



Conventional Cut Guide



FE Guide

■ Notes:

The Stem Stabilizers are tapered and measure 1 mm larger in diameter at the distal end and taper to be equivalent to the comparable Stem Trial at the proximal end. If necessary, to avoid potential femoral fracture, the distal femoral canal may be opened with the next larger Canal Reamer to allow for introduction of the Stem Stabilizer, but care should be taken not to sink in the Reamer too far in the canal.

Stem Stabilizers are available in 14, 16, 18, 20, 22, and 24 mm sizes and should be chosen to correspond with the Stem diameter used but may be adjusted in order to provide stability in the canal.

Femoral Preparation


Conventional Cut Guide

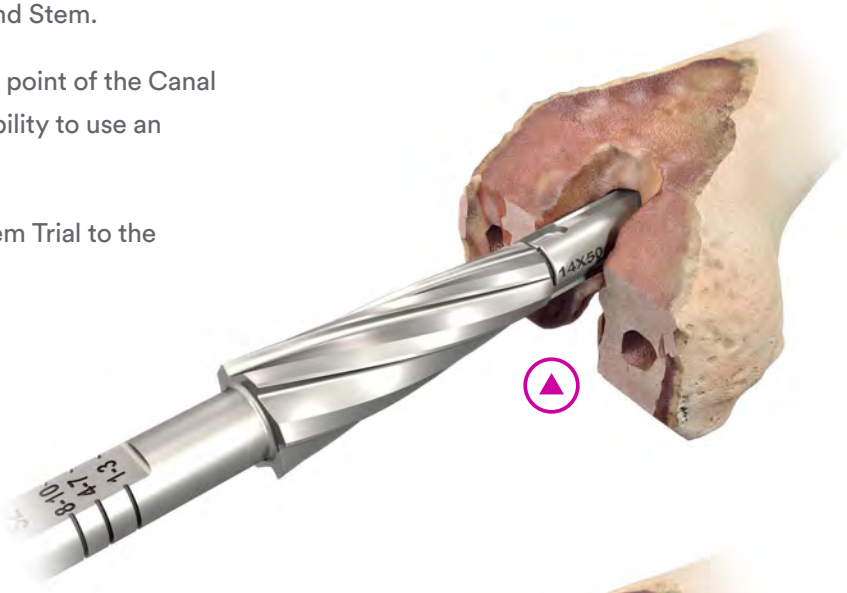

FE Guide


Femoral Sleeve and Stem

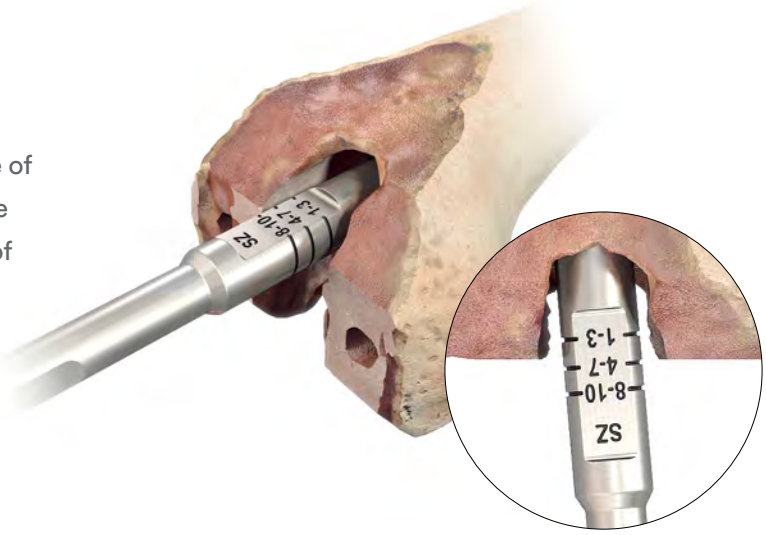
This is the Intramedullary Preparation of the Revision Femoral component with a Sleeve and Stem.

Attention should be paid to the entry point of the Canal Reamers and Broach as there is no ability to use an Offset Stem with a Femoral Sleeve.

Assemble the appropriately sized Stem Trial to the Femoral Broach Starter Reamer.



Seat the Femoral Broach Starter Reamer until the line of the appropriate femoral size grouping is level with the distal surface of the femur (or desired distal surface of the femur).



▲ Warning:

Do not reverse ream.

Femoral Preparation

Femoral Sleeve and Stem

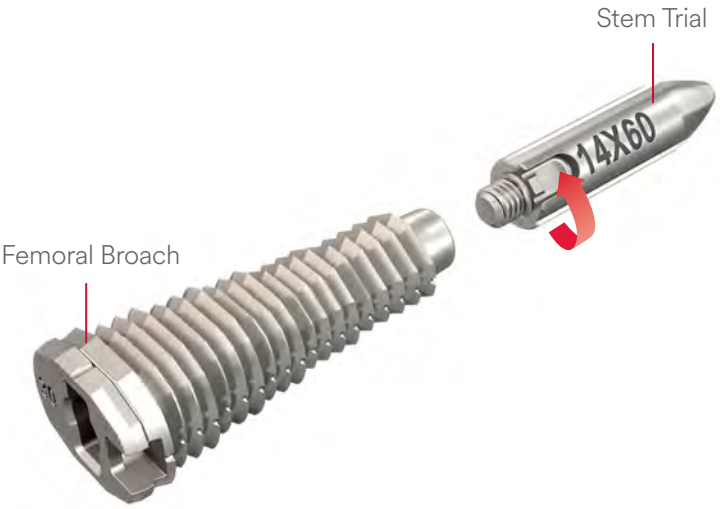

Conventional Cut Guide


FE Guide

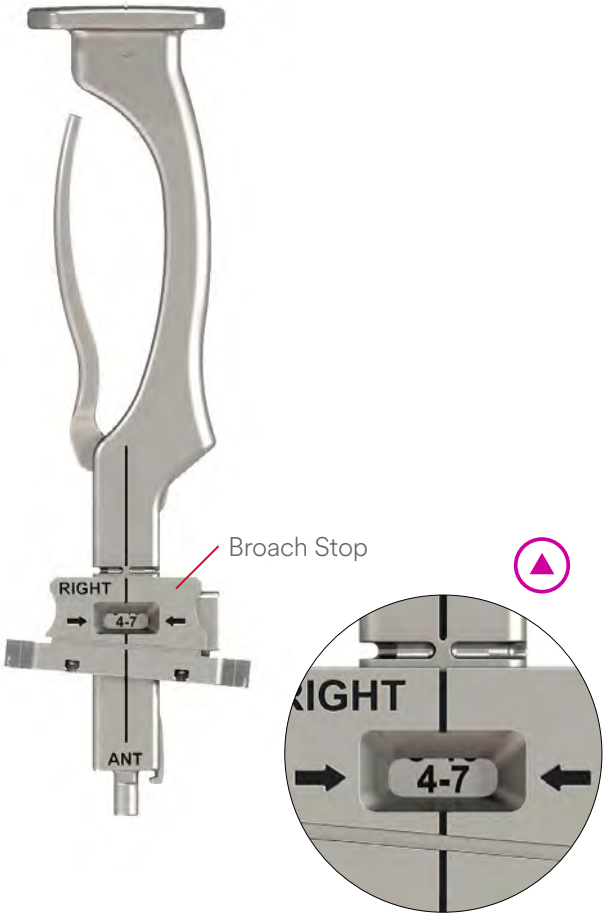

Femoral Sleeve and Stem

Assemble the corresponding Stem Trial to the smallest Femoral Broach.

If utilizing the KINCISE™ Surgical Automated System for Femoral Broaching, proceed to Appendix A on Page 216.



Connect the correct side, "Left or Right", Broach Stop of the appropriate size grouping, 1 - 3, 4 - 7, 8 - 10, to the Revision Broach Handle.



▲ Warning:

A Broach Stop must be utilized when broaching the femur.

Femoral Preparation

Femoral Sleeve and Stem


Conventional Cut Guide


FE Guide

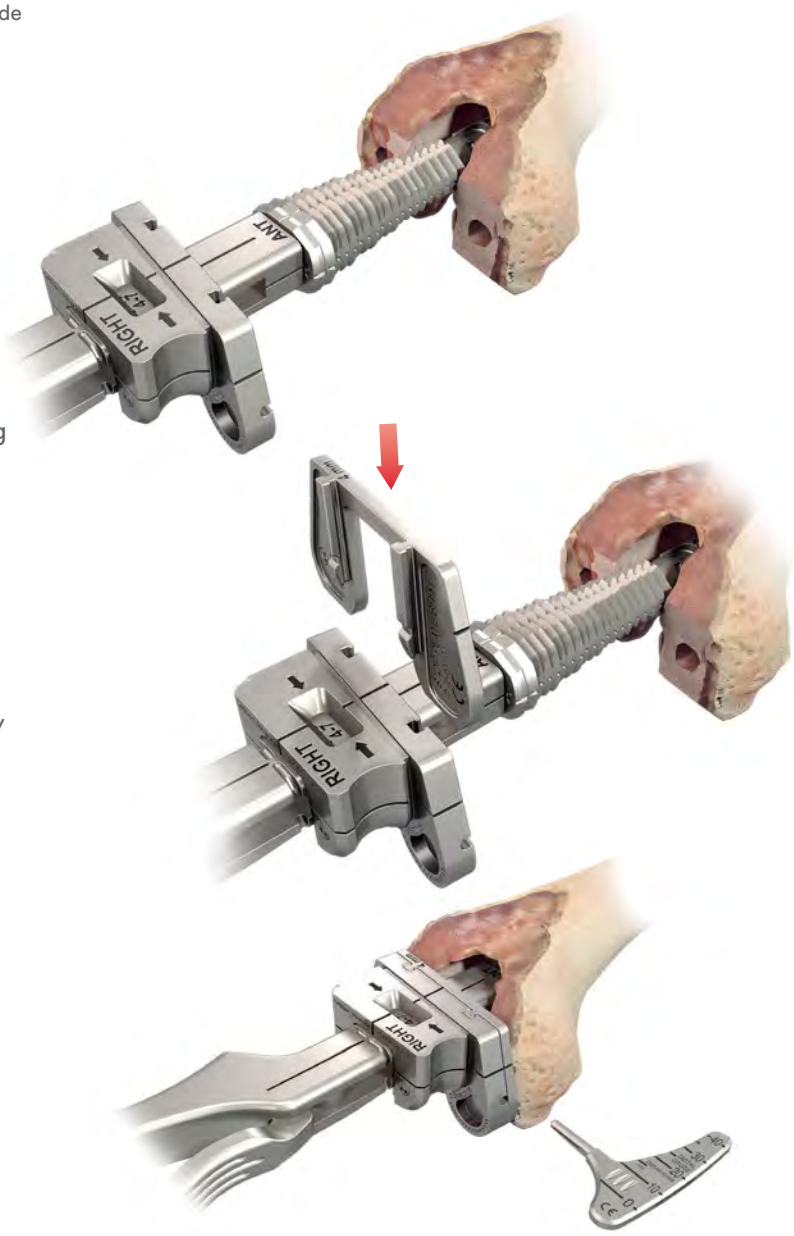

Femoral Sleeve and Stem

Connect the Broach Assembly to the Broach Handle Assembly and introduce to the reamed femoral canal.

Care should be taken to maintain a posterior positioning of the Broach to aid in posteriorizing the Femoral Component as a means for filling the flexion gap. Additionally the anterior flat surface of the Broach and Broach Stop should be rotated to the anticipated rotation of the Femoral Component to maximize Femoral to Sleeve compatibility. See chart on **Page 86** for rotational allowance between Broaches/ Sleeves and the Femoral Component.

Two additional tools to aid in placement of the Femoral Broach include:

- Broach Stop Shims available in 4, 8, 12, 16 mm, representative of the Distal Augment thicknesses in the system. If it is intended to have differing Augment thicknesses medial to lateral, then the Broach Stop Shim utilized will represent the thinner of the two intended Distal Augments. Additionally, Broach Stop Shims may be added to aid in leaving the Broach proud to allow for future adjustment when assessing extension gap
- Distalizing Gauge to aid in assessing the proximal - distal position relative to the level of the epicondyles



■ Notes:

If within a size 1, 2, or 3 femoral size, use the 30 mm Femoral Broach for canal fixation when preparing the distal femur. If a larger Femoral Sleeve is required, these femoral sizes (1, 2, or 3) are only compatible with up to a 35 mm Femoral Sleeve per the chart on page 86, however, no rotation is allowed.

Femoral Preparation

Femoral Sleeve and Stem

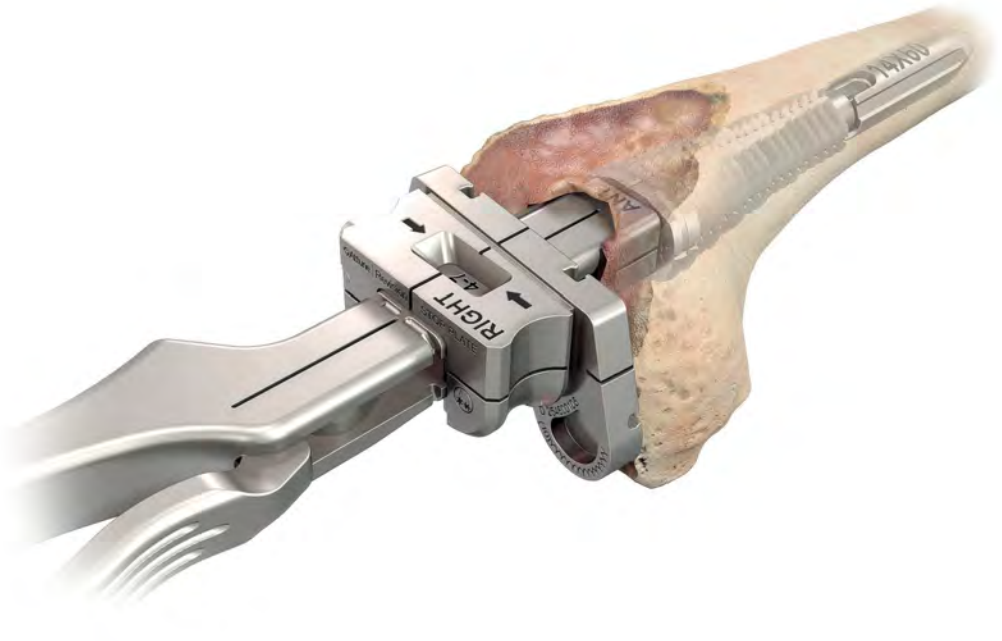
Conventional Cut Guide

FE Guide

Femoral Sleeve and Stem

Advance the Broach until the Broach Stop, or Broach Stop Shim, is contacting the most prominent aspect of the distal femur. If there is significant bone loss on the distal femur, consider putting Broach Stop Shims on the Broach Stop to aid in replicating the expected joint line while broaching.

Check that the Broach is rotationally stable. If not, progressively increase the Broach size until rotational stability is achieved.



Femoral Preparation

ATTUNE Revision Femoral Component to ATTUNE Revision Femoral Sleeve Compatibility Chart


Conventional Cut Guide


FE Guide


Femoral Sleeve and Stem

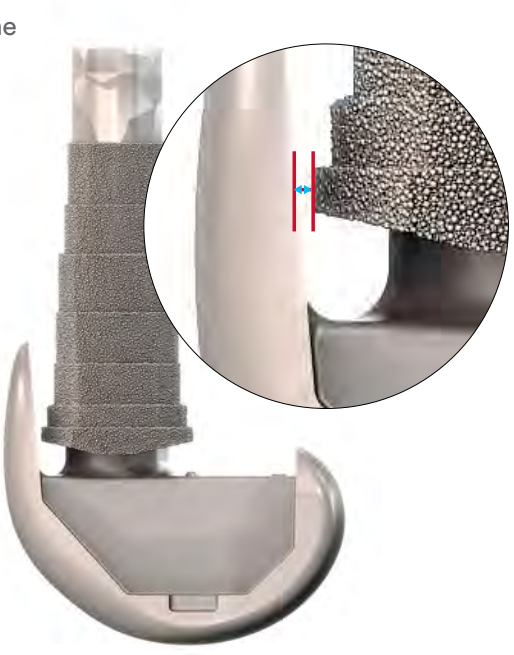
ATTUNE Revision Femoral Sleeve and ATTUNE Revision Femoral Component Compatibility*[1]

		ATTUNE Revision Femoral Sleeve Size (mm)					
		30	35	40	45	50	55
ATTUNE Revision Femoral Component Size	1	X	X				
	2	X	X				
	3	X	X				
	4	X	X	X	X		
	5	X	X	X	X	X	X
	6	X	X	X	X	X	X
	7	X	X	X	X	X	X
	8	X	X	X	X	X	X
	9	X	X	X	X	X	X
	10	X	X	X	X	X	X

▲

** Clearance between the ATTUNE Revision Femoral Component and ATTUNE Revision Femoral Sleeve was assessed at nominal conditions.*

The distance between the distal most anterior aspect of the Sleeve and the inside of the anterior flange limits the amount of rotation possible before impingement of the Sleeve on the implant. The "X"s in the table above indicate recommended compatibility.



▲ Warning:

For the seven highlighted scenarios in the Chart, there is less than 10 degrees of rotational freedom. Caution is recommended when broaching the femur with these component combinations.

Femoral Preparation

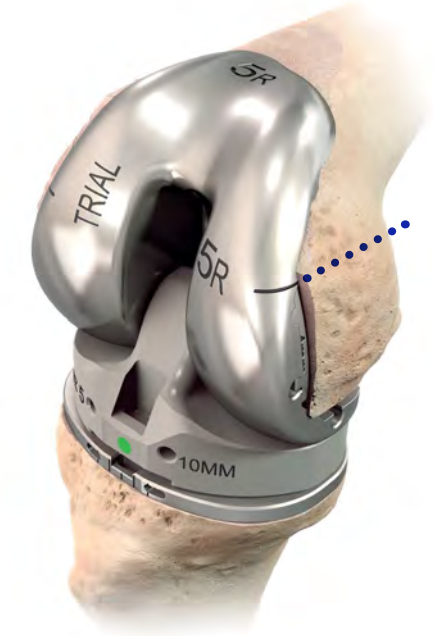
For Femoral Sizes 1 - 3

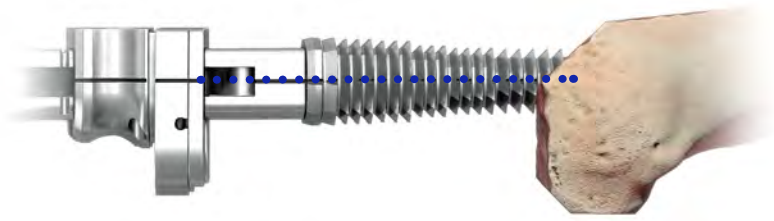

Conventional Cut Guide

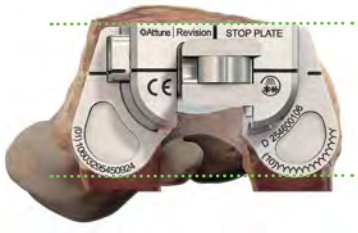

FE Guide

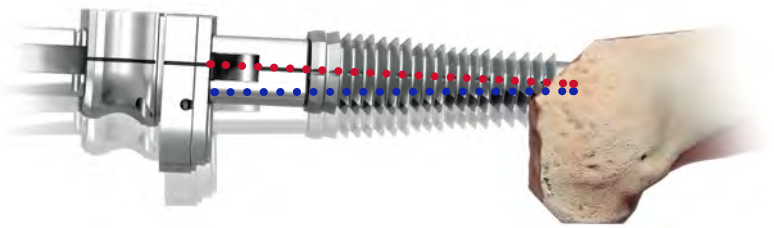

Femoral Sleeve and Stem

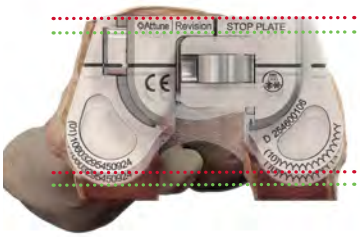
If after reviewing the chart, the patient anatomy requires a 35 mm Femoral Sleeve, use the 30 mm Femoral Broach for canal fixation when preparing the distal femur. After completing the bone preparation and assembling the Femoral Trial, transcribe the lines on the medial and lateral sides of the Femoral Trial
on to the distal femur and utilize the corresponding marks on the sides of the Broach Handle and Broach Stop to position the final, 35 mm Femoral Broach, thus ensuring that the rotation of the Broach closely matches the rotation of the trial.











Femoral Preparation

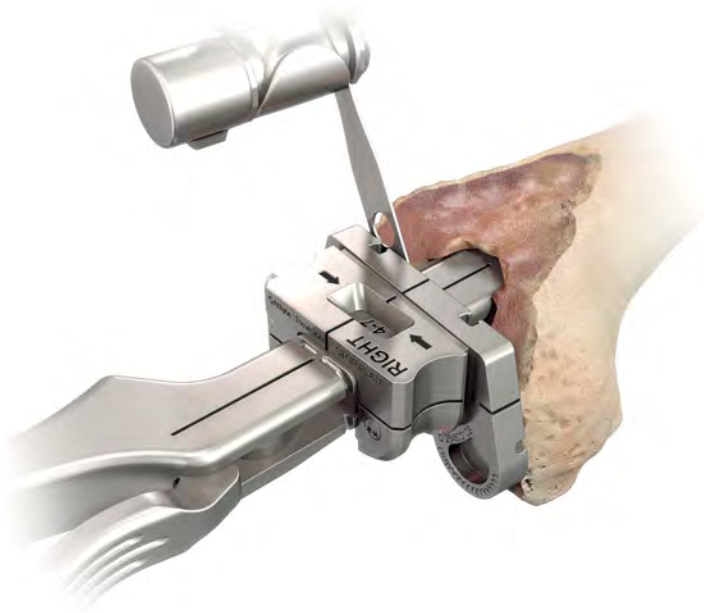
Distal Clean-up Resection

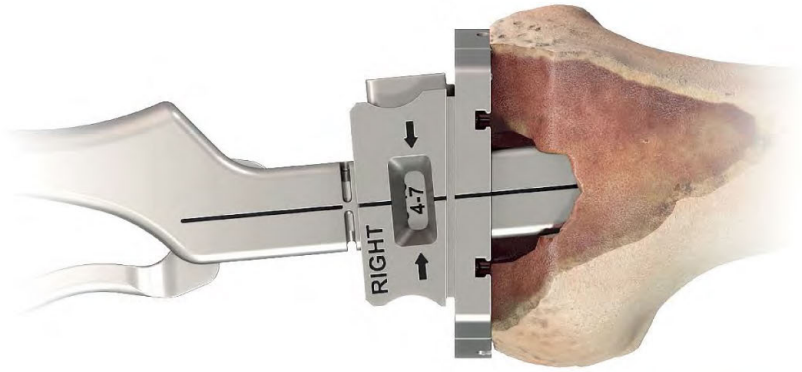

Conventional Cut Guide


FE Guide

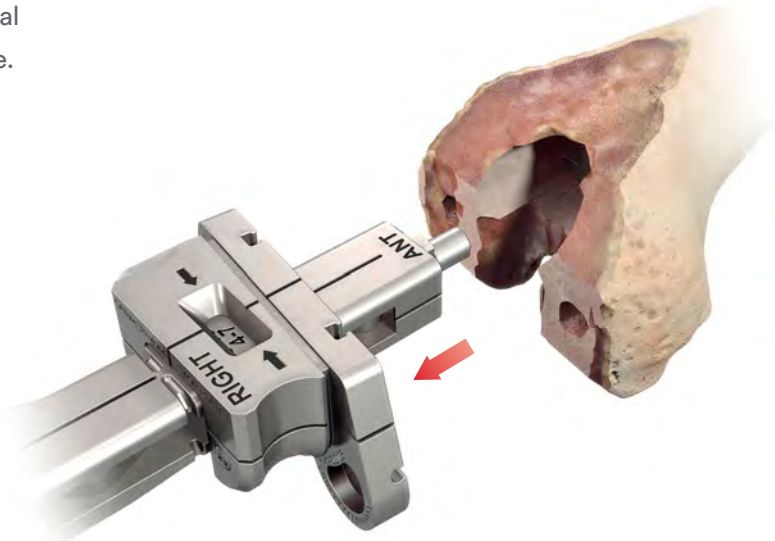

Femoral Sleeve and Stem

If desired, once rotational stability and the corresponding Broach size are achieved, a distal clean-up resection may be performed using the proximal surface of the Broach Stop or Broach Stop Shim, if used. If a resection is performed, reseat the Broach.





Disconnect the Broach Handle from the Femoral Broach, leaving the Femoral Broach in the bone.

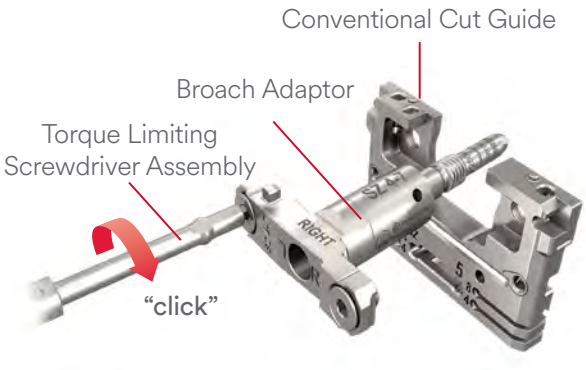


Femoral Preparation

Broach Adaptor Assembly

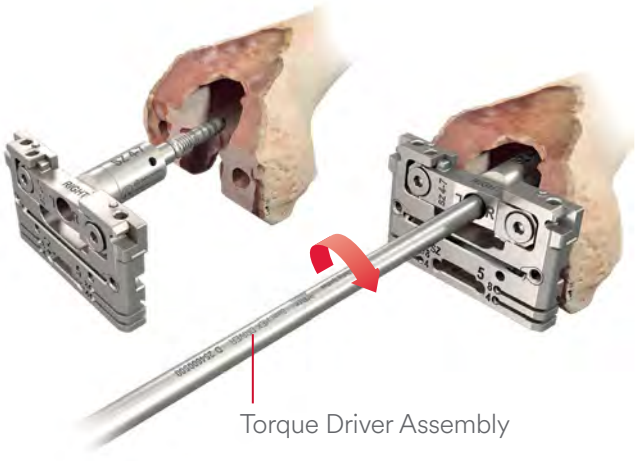
Conventional Cut Guide

Femoral Sleeve and Stem



Assemble the appropriate size (1 - 3, 4 - 7, or 8 - 10) Broach Adaptor to the appropriately sized Conventional Cut Guide ensuring that the correct orientation, Right or Left, are legible.

Tighten using the Torque Limiting Screwdriver Assembly.

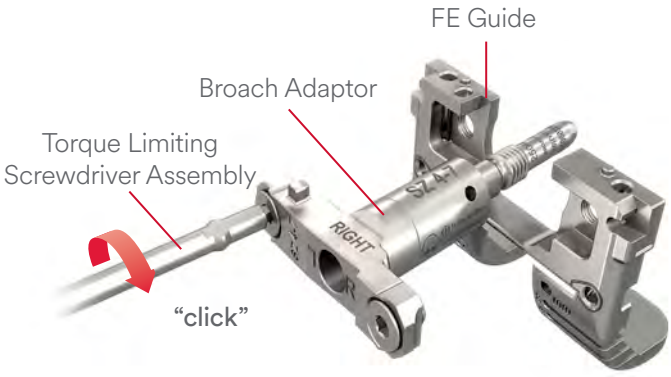


Using the Torque Driver and the 6 mm Hex Driver, assemble the Conventional Cut Guide Assembly to the Broach in the prepared femur.

For Gap Balancing and Setting Rotation with a Sleeve when utilizing the Conventional Cut Guide, proceed to **page 93.**

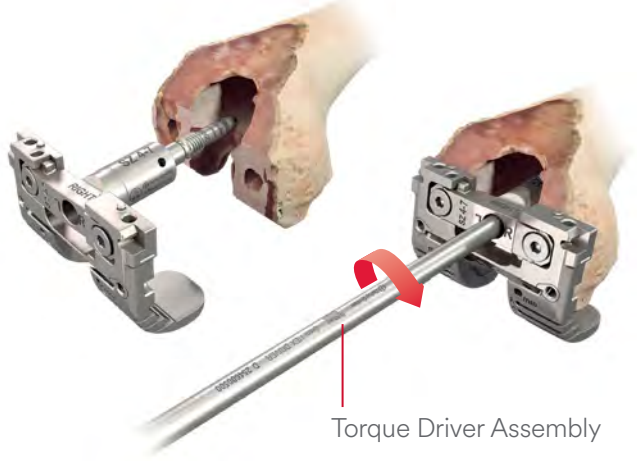
FE Guide

Femoral Sleeve and Stem



Assemble the appropriate size (1 - 3, 4 - 7, or 8 - 10) Broach Adaptor to the appropriately sized FE Guide ensuring that the correct orientation, Right or Left, are legible.

Tighten using the Torque Limiting Screwdriver Assembly.



Using the Torque Driver and the 6 mm Hex Driver, assemble the FE Guide Assembly to the Broach in the prepared femur.

For Gap Balancing and Setting Rotation with a Sleeve when utilizing the FE Guide, proceed to **page 97.**

Femoral Preparation

Femoral Offset Preparation


Conventional Cut Guide


FE Guide


Offset Stem

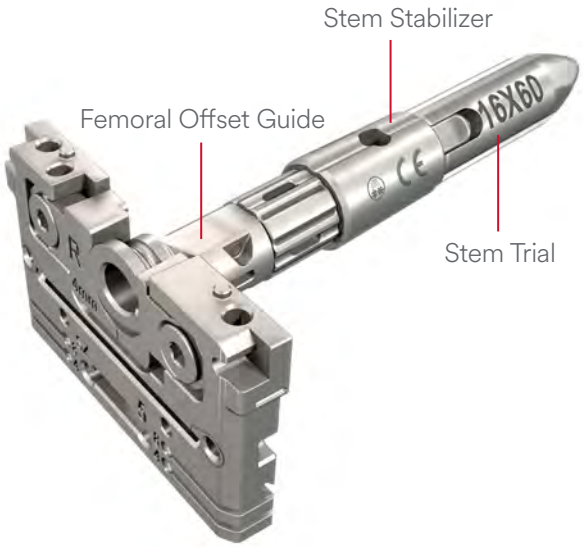
This is the Intramedullary Preparation of the Revision Femoral Component with an Offset Adaptor and Press-Fit Stem.

Once the definitive Reamer diameter has been determined, and either the femoral canal is determined to be offset from the distal femur or offset is desired to address the flexion gap, proceed with utilizing the Femoral Offset Instrumentation.

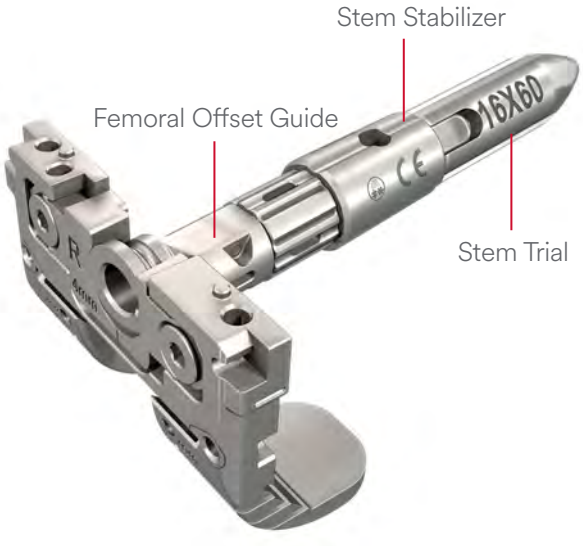
Please note, the Offset Adaptor adds an additional 25 mm to the overall implant construct length. However, the Conventional Cut Guide with the Offset Assembly has a construct length appropriate for a Straight Stem. This allows the evaluation of offset without having to increase the ream depth.

If the original ream depth was determined based on a Straight Stem assumption, once it is determined that an offset is required, then ensure that the ream depth is increased to be appropriate for an offset construct.

Approximate the magnitude of offset required (2 mm, 4 mm or 6 mm) based on M/L canal offset or desired flexion gap A/P compensation.



Conventional Cut Guide

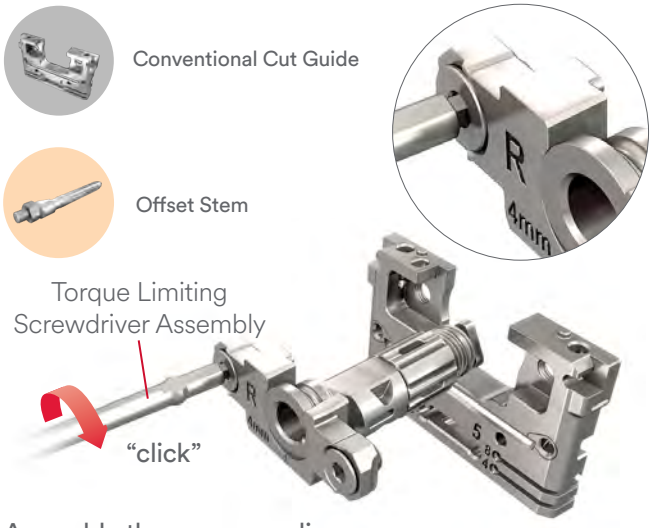


FE Guide

■ Notes:

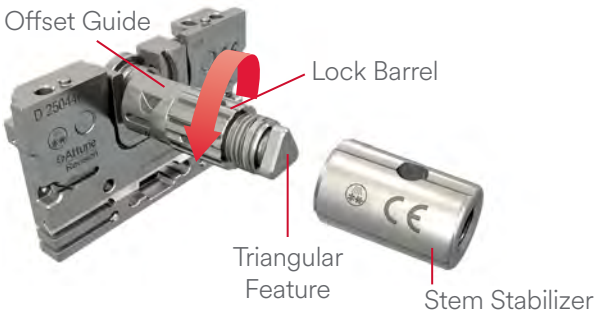
If intraoperatively transitioning from preparing for a straight Press-Fit Stem to an Offset Press-Fit Stem, it is recommended to revisit the distal femoral resection **(Page 75)** to ensure the Conventional Cut Guide or FE Guide will remain on axis with the femoral canal. Femoral Offset Guides are not compatible with the size 1 Conventional Cut Guide.

Femoral Preparation



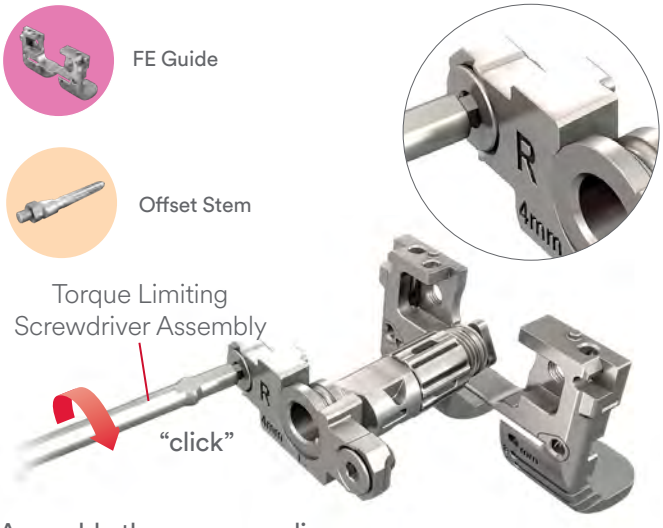
Assemble the corresponding:

1. Conventional Cut Guide to Femoral Offset Guide with the Hex Attachment. Ensure that the correct "Right or Left" marking is facing upward on the Femoral Offset Guide when assembled to the Conventional Cut Guide.



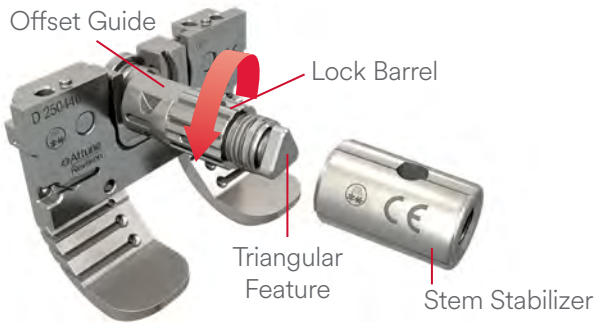
2. Stem Stabilizer to the Femoral Offset Guide by aligning the triangular feature on the Femoral Offset Guide to the corresponding features on the Stem Stabilizer and turning the Lock Barrel of the Femoral Offset Guide to tighten to the Stem Stabilizer.

3. Stem Trial to the Stem Stabilizer.



Assemble the corresponding:

1. FE Guide to Femoral Offset Guide with the Hex Attachment. Ensure that the correct "Right or Left" marking is facing upward on the Femoral Offset Guide when assembled to the FE Guide.

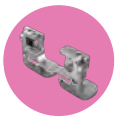


2. Stem Stabilizer to the Femoral Offset Guide by aligning the triangular feature on the Femoral Offset Guide to the corresponding features on the Stem Stabilizer and turning the Lock Barrel of the Femoral Offset Guide to tighten to the Stem Stabilizer.

3. Stem Trial to the Stem Stabilizer.

Femoral Preparation


Conventional Cut Guide

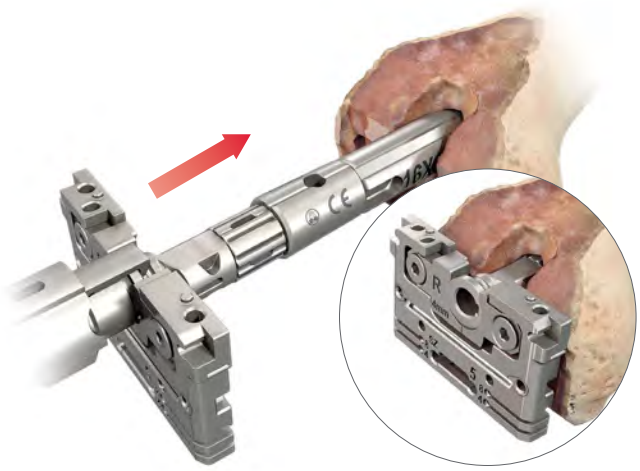

FE Guide


Offset Stem

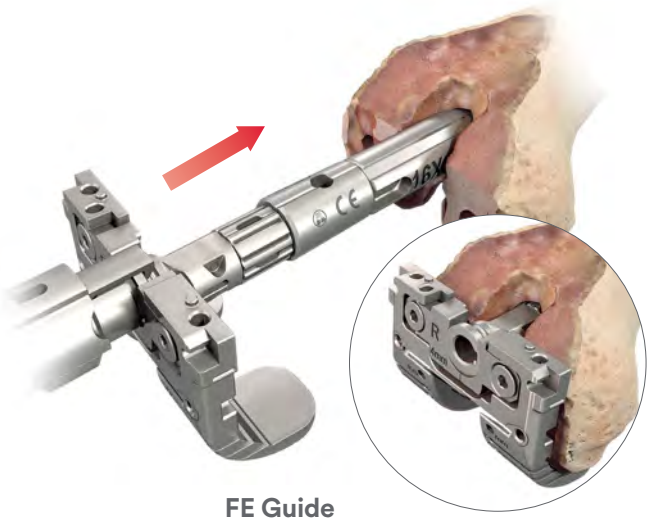
Introduce the Conventional Cut Guide or FE Guide Assembly into the femoral bone. If impaction is necessary, the Revision System Handle must be attached to the Femoral Offset Guide and used to gently seat the assembly. The Conventional Cut Guide or FE Guide should not be impacted directly.

For Gap Balancing and Setting Rotation with the Conventional Cut Guide and Offset Stem, proceed to **page 93.**

For Gap Balancing and Setting Rotation with the FE Guide and Offset Stem, proceed to **page 97**.



Conventional Cut Guide



FE Guide

■ Notes:

The Stem Stabilizers are tapered and measure 1 mm larger in diameter at the distal end and taper to be equivalent to the comparable Stem Trial at the proximal end. If necessary, to avoid potential femoral fracture, the distal femoral canal may be opened with the next larger Canal Reamer to allow for introduction of the Stem Stabilizer, but care should be taken not to sink in the Reamer too far in the canal.

Stem Stabilizers are available in 14, 16, 18, 20, 22, and 24 mm sizes and should be chosen to correspond with the Stem diameter used but may be adjusted in order to provide stability in the canal.

Femoral Preparation

Initial Flexion Gap Assessment


Conventional Cut Guide


Straight Stem


Offset Stem


Femoral Sleeve and Stem

The general approach in this surgical technique is to do an initial assessment of Flexion and Extension Gaps, adjust Extension Gap if required, and then establish the final Flexion Gap and Set Femoral Rotation.

The ATTUNE Revision Knee System provides two instrument options to balance the flexion gap with the Conventional Cut Guide: Spacer Block and Femoral Positioner, both of which are to be used with the Spacer Block Shims. ▲

Introduce the preferred balancing tool and set rotation and balance the flexion gap.

To gap balance with a Femoral Broach in place, slightly loosen the Central Bolt in the Broach Adaptor to allow rotation.


Revision Spacer Block

Revision Femoral Positioner

▲ Warning:

The ATTUNE Revision Spacer Block and Spacer Block Shims cannot be used interchangeably with the ATTUNE Primary INTUITION Spacer Block and Shims.

Femoral Preparation

Initial Flexion Gap Assessment

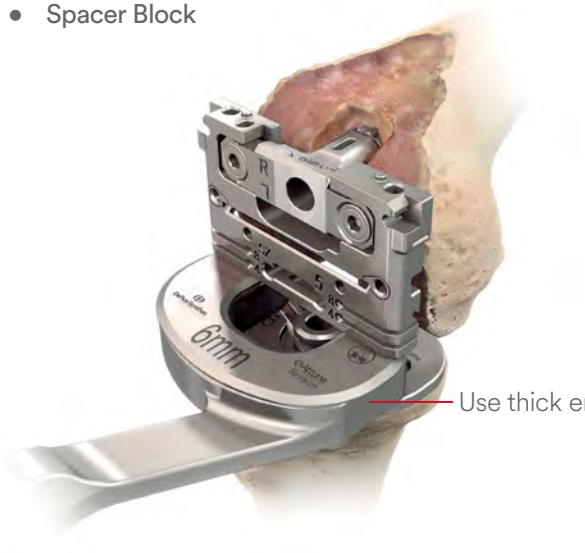
Conventional Cut Guide

Straight Stem

Offset Stem

Femoral Sleeve and Stem

- Spacer Block



IM Adaptor Depicted

- Femoral Positioner

IM Adaptor Depicted

The thick end of the Revision Spacer Block is only utilized in flexion, resting on the Tibial Trial and against the posterior aspect of the Conventional Cut Guide as this accounts for the thickness of the posterior condyles of the Femoral Implant. The thin end will be utilized to assess extension.

The Femoral Positioner connects to the Conventional Cut Guide for a secure rotational balance with respect to the tibial plateau, and may be especially helpful when preparing the femur for an Offset Stem. If the posterior femoral bone contacts the Femoral Positioner, it may limit rotation.

Revision Tibial Inserts are available in 2 mm increments (6 - 26 mm). The Revision Femoral Component is also designed to articulate with the PS Tibial Inserts available in 1 mm increments (5 - 8 mm) and 2 mm increments (10 - 20 mm). For Straight Stem or Sleeve workflows, proceed to **page 96,** for Offset Stem proceed to **page 95.**

■ Notes:

To assess for the 5 or 7 mm PS Tibial Inserts, the ATTUNE Primary INTUITION Spacer Block Handle and Shims must be utilized and the Revision Tibial Base Trial must be removed from the joint space.

Femoral Preparation

Initial Flexion Gap Assessment with Offset Stem

Conventional Cut Guide

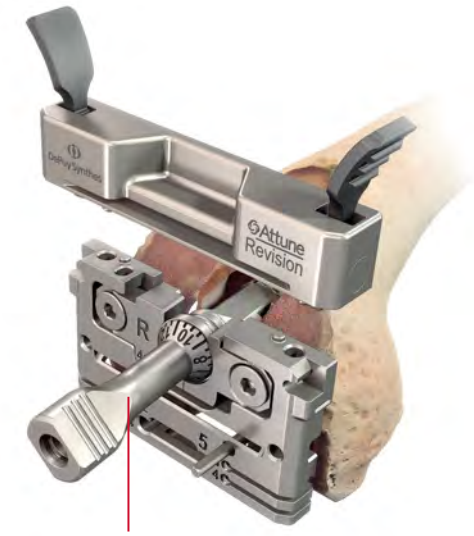
Offset Stem

Introduce the Femoral Offset Dial to the Femoral Offset Guide.

Attach the Anterior Cutting Guide to the Conventional Cut Guide and introduce the Angel Wing to assess the anterior resection. ▲

Use the Torque Limiting Screwdriver Assembly and Femoral Offset Dial to adjust the femoral offset while assessing ligament tension, anterior resection, and M/L fit.

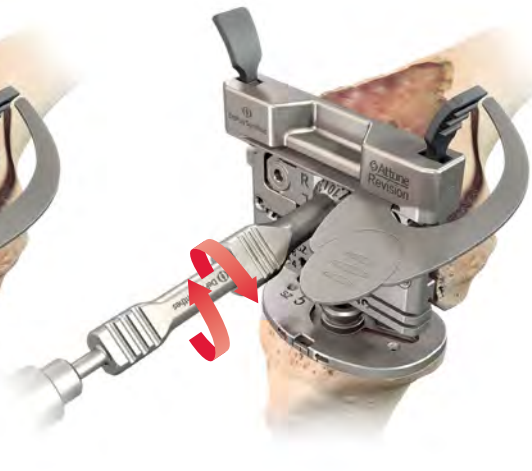
The surgeon should use their preferred method to assess the balance and flexion gap. Options available within the Revision Instrument System include using the Revision Spacer Block, the Femoral Positioner or visual landmarks.



Femoral Offset Dial

Revision Spacer Block

Revision Femoral Positioner



Visual Landmarks

▲ Warning:

The surgeon may want to support the thigh as the offset is being adjusted in order to allow for tensioning of the joint space not to be impacted by the weight of the leg.

Femoral Preparation

Initial Extension Gap Assessment


Conventional Cut Guide

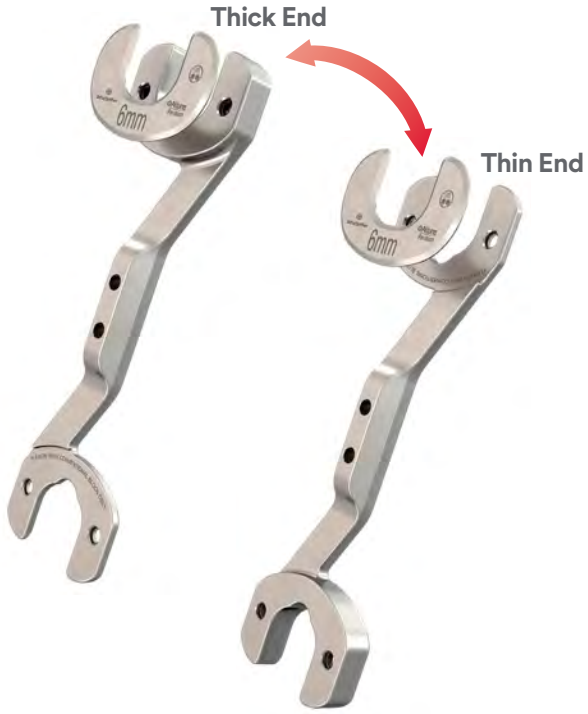

Straight Stem


Offset Stem


Femoral Sleeve and Stem

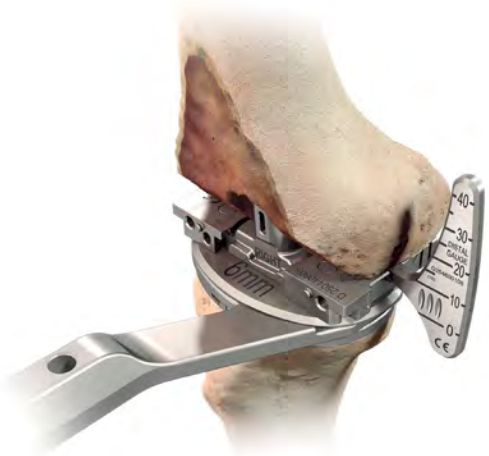
Remove the flexion gap assessment tools and place the knee into extension.

Move the final Spacer Block Shim utilized to assess flexion to the thin end of the Revision Spacer Block and introduce into the extension space.



Place the Spacer Block in the extension joint space between the distal surface of the Conventional Cut Guide and the top of the Tibial Base Trial. Optionally, if exposure permits, the Distalizing Gauge may be utilized to provide an additional reference to the epicondyles.

For Balancing the Flexion and Extension Gaps, go to **page 100.**



Conventional Cut Guide

■ Notes:

The Conventional Cut Guide is 9 mm thick to replicate the distal thickness of the definitive Femoral Implant.

Femoral Preparation

Initial Flexion Gap Assessment


FE Guide


Offset Stem


Straight Stem


Femoral Sleeve and Stem

The general approach in this surgical technique is to do an initial assessment of Flexion and Extension Gaps, adjust Extension Gap if required, and then establish the final Flexion Gap and Set Femoral Rotation.

With the knee in flexion, introduce the **thin end** of the Revision Spacer Block Handle with Shims. Utilize the Angel Wing to assess the projected anterior resection.

Note: Utilize the thin end of the Revision Spacer Block Handle to assess both extension and flexion with the FE Guide as the feet of the FE Guide represent the posterior condyles of the Femoral Implant and the distal thickness of the FE Guide represents the distal Femoral Implant thickness.

IM Adaptor Depicted

Revision Tibial Inserts are available in 2 mm increments (6 - 26 mm).

The Revision Femoral Component is also designed to articulate with the PS Tibial Inserts available in 1 mm increments (5 - 8 mm) and 2 mm increments (10 - 20 mm).

Attach the Anterior Cutting Guide to the FE Guide and introduce the Angel Wing to assess the anterior resection.

For Straight Stem or Sleeve workflows, proceed to **page 99**.

For Offset Stems proceed to **page 98.**

■ Notes:

To assess for the 5 or 7 mm PS Tibial Inserts, the ATTUNE Primary INTUITION Spacer Block Handle and Shims must be utilized and the Revision Tibial Base Trial must be removed from the joint space.

▲ Warning:

The Spacer Block Shims differ from the ATTUNE Primary INTUITION Shims used with the Primary Spacer Block. These cannot be used interchangeably.

The Spacer Block Shims have a different connection method and thickness than the ATTUNE Primary INTUITION Shims.

Femoral Preparation

Initial Flexion Gap Assessment with Offset Stem

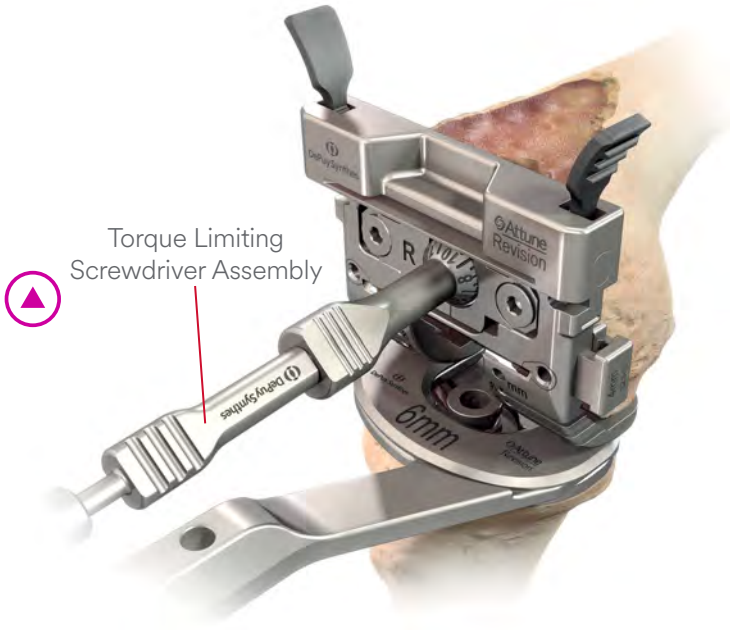
FE Guide

Offset Stem

Introduce the Femoral Offset Dial to the Femoral Offset Guide.

Use the Torque Limiting Screwdriver Assembly and Femoral Offset Dial to adjust the femoral offset while assessing ligament tension, anterior position, and M/L fit.

Note the preliminary offset position from alignment of the number on the Femoral Offset Guide and Dial with the etch line on the FE Guide. This will be used to set the initial offset position on the Trial.



For initial Extension Gap assessment, proceed to **page 99**.

▲ Warning:

The surgeon may want to support the thigh as the offset is being adjusted in order to allow for tensioning of the joint space to not be impacted by the weight of the leg.

■ Notes:

The 6 o'clock position of the Femoral Offset Guide places FE Guide in the most posterior position which will enable the initial position of the Offset Stem to avoid interference between the FE Guide Feet and any posterior condylar bone.

Femoral Preparation

Initial Extension Gap Assessment


FE Guide


Offset Stem

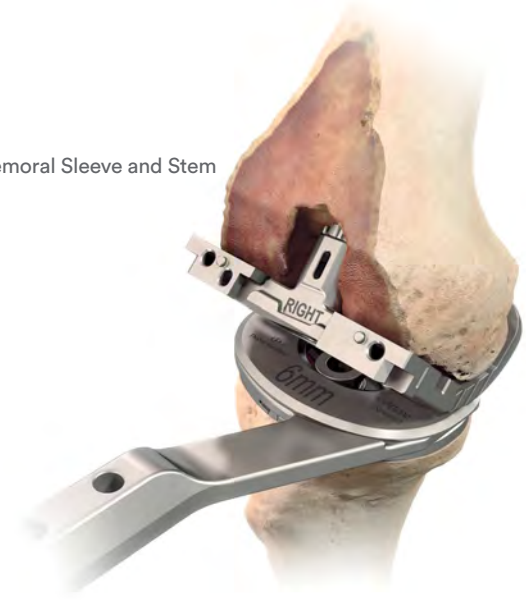

Straight Stem


Femoral Sleeve and Stem

Once the desired flexion gap has been achieved, with the Revision Spacer Block Assembly retained in the joint space, gently take the knee into extension and proceed to assess the extension gap.

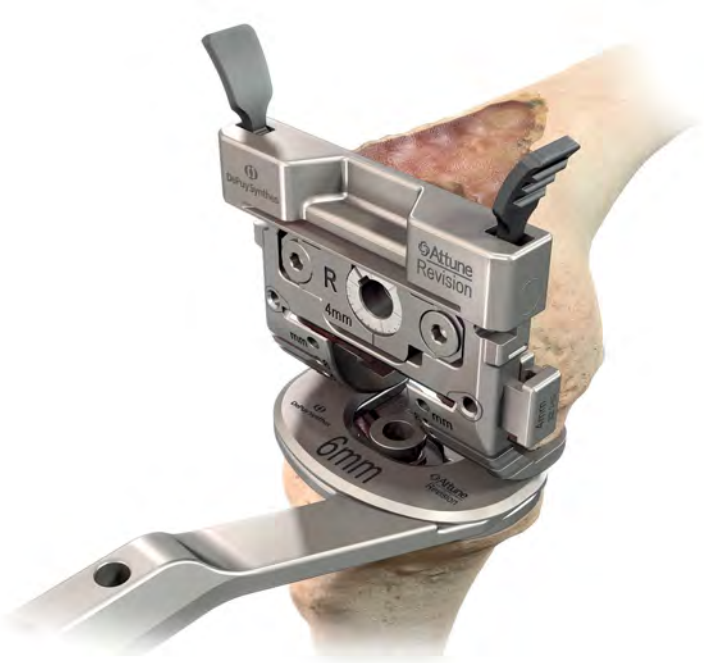
Distal Spacers may be added to the sides of the FE Guide to aid in maintaining desired femoral position during assessment of either flexion or extension.

Return the knee to flexion.



Femoral Offset Guide Depicted

For Balancing Flexion and Extension Gaps proceed to **page 100**.



Femoral Offset Guide Depicted

Femoral Preparation

Balance Flexion and Extension Gaps


Conventional Cut Guide


FE Guide


Straight Stem


Offset Stem


Femoral Sleeve and Stem

As the knee comes out to full extension, if the tension in the medial and lateral collateral ligaments is unequal, appropriate soft tissue releases should be performed in a manner to allow the tension to be equal on both the medial and lateral sides of the knee.

Should the selected joint line differ widely from the joint line anatomical markers, the surgeon has the ability to change the distal/proximal position of the Femoral Component but will have to mirror these changes with appropriate selection of the Tibial Insert and changes to the femoral sizing.

	Loose Extension	Stable Extension	Tight Extension
Loose Flexion	Cause 1. Flexion and extension gaps are too large. Possible Solution(s) • Increase Tibial Insert thickness • Distalize and upsize the Femoral Component and add any necessary Distal Augments • Assess if offset is appropriate to move the Femoral Component posteriorly to fill the flexion gap and add Distal Augments • If Sleeve preparation: increase femoral Broach size, add Distal Augments, and upsize the Femoral Component	Cause 1. Flexion gap is too large. Possible Solution(s) • Upsize Femoral Component • Assess if offset is appropriate to move the Femoral Component posteriorly to fill the flexion gap and add any necessary Distal Augments • Increase Tibial Insert thickness and resect more distal femur (re-evaluate A/P resections). ***Care should be taken to not raise the femoral position such that it results in patella baja***	Cause 1. Extension gap is too small and flexion gap is too large. Possible Solution(s) • Proximalize and upsize the Femoral Component by recutting the Distal Femur and adding any necessary Posterior Augments. ***Care should be taken to not raise the femoral position such that it results in patella baja*** • Assess if offset is appropriate to move the Femoral Component posteriorly to fill the flexion gap, and decrease Tibial Insert thickness
Stable Flexion	Cause 1. Extension gap is too large. Possible Solution(s) • Distalize the Femoral Component and add any necessary Distal Augments	**Desired ligament balance.**	Cause 1. Extension gap is too small. Possible Solution(s) • Proximalize the Femoral Component by recutting the distal femur (re-evaluate A/P resections). ***Care should be taken to not raise the femoral position such that it results in patella baja***
Tight Flexion	Cause 1. Flexion gap is too small and extension gap is too large. 2. Posterior osteophytes. Possible Solution(s) • Remove osteophytes if present • Downsize Femoral Component and distalize the Femoral Component adding any necessary Distal Augments • Assess if offset is appropriate to move the Femoral Component anteriorly to loosen the flexion gap. And reassess Insert thickness and Distal Femoral Augments	Cause 1. Flexion gap is too small. 2. Posterior osteophytes. Possible Solution(s) • Remove osteophytes if present • Ensure that there is no soft tissue impingement • Possibly downsize Femoral Component • Distalize the Femoral Component using Distal Augments and decrease the Insert thickness • Assess if offset is appropriate to move the Femoral Component anteriorly to loosen the flexion gap	Cause 1. Flexion and extension gaps are too small. Possible Solution(s) • Decrease Tibial Insert thickness • If the smallest Insert is still too tight, resect more tibia

For setting the Extension Gap with a Straight or Offset Stem proceed to **page 101.**
For setting the Extension Gap with a Sleeve and Stem proceed to **page 104.**

Femoral Preparation

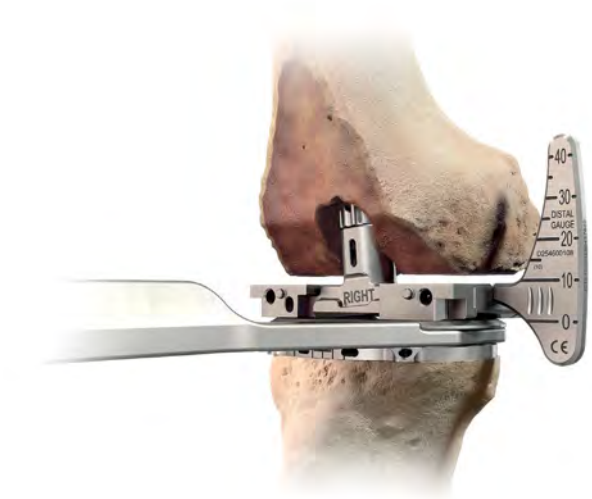
Adjusting Extension Gap


Conventional Cut Guide


Straight Stem


Offset Stem

Take the knee into extension and utilize the **thin end** of the Revision Spacer Block Handle and Shims to assess the extension space. Allow the Cutting Guide Assembly to translate proximally or be manipulated distally in the femoral canal through the addition of Distal Spacers and establish the extension space that will then match the flexion space.



Remove the Spacer Block and return the knee to flexion. Optionally, if exposure permits, the Distalizing Gauge may be utilized to provide an additional reference to the epicondyles.

For Establishing the Flexion Gap and Setting Rotation with a Straight Stem proceed to **page 102.**

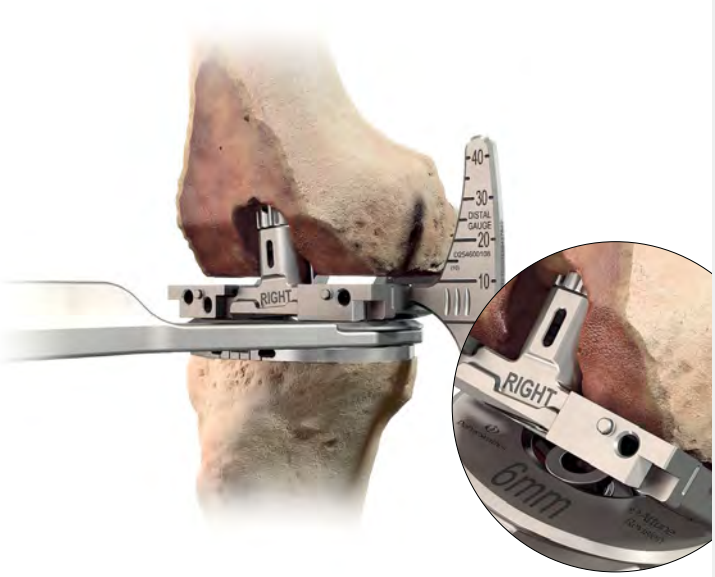
For Establishing the Flexion Gap and Setting Rotation with an Offset Stem, proceed to **page 103.**


FE Guide


Straight Stem


Offset Stem

Take the knee into extension and utilize the **thin end** of the Revision Spacer Block Handle and Shims to assess the extension space. Allow the FE Guide Assembly to translate proximally or be manipulated distally in the femoral canal through the addition of Distal Spacers and establish the extension space that will then match the flexion space.



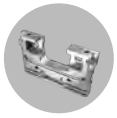
Leave the Spacer Block in the joint space and return the knee to flexion. Optionally, if exposure permits, the Distalizing Gauge may be utilized to provide an additional reference to the epicondyles.

For Establishing the Flexion Gap and Setting Rotation with a Straight Stem proceed to **page 102.**

For Establishing the Flexion Gap and Setting Rotation with an Offset Stem, proceed to **page 103.**

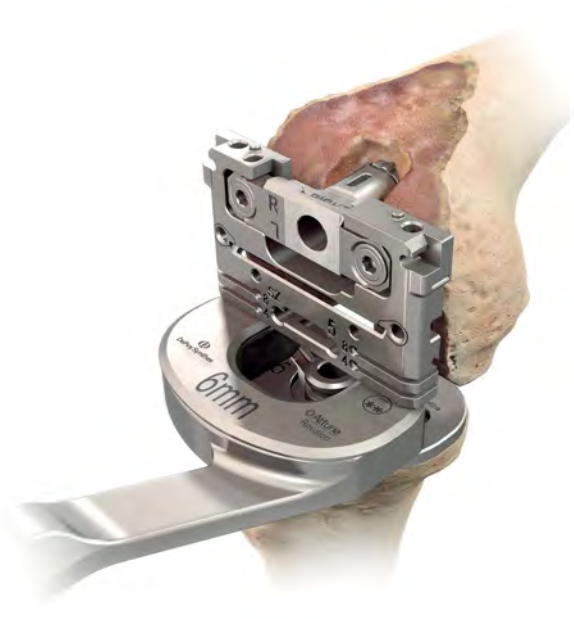
Femoral Preparation

Establishing the Flexion Gap and Setting Rotation



Conventional Cut Guide

Straight Stem



Balance the knee using the surgeon's preferred technique utilizing the **thick end** of the **Spacer Block** (per **page 96**).

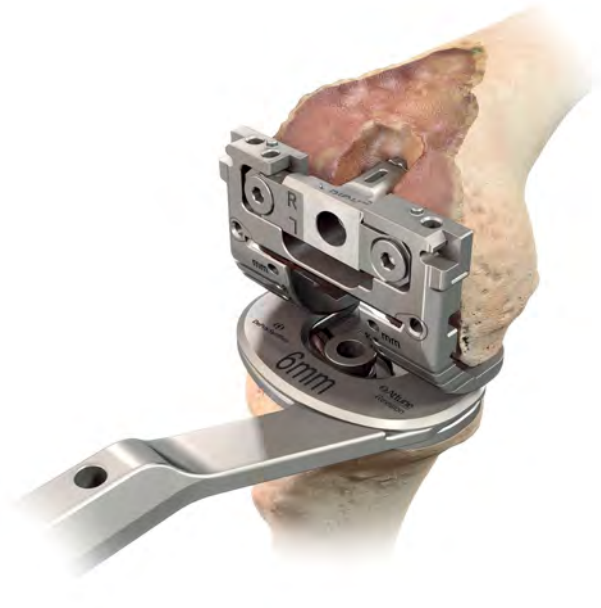
Set rotation and balance the flexion gap to match the extension gap.

Once the desired femoral position is achieved, pin the Conventional Cut Guide and proceed with Femoral Preparation.

For completing femoral resections with a Straight Stem, proceed to **page 108**.

FE Guide

Straight Stem



Balance the knee using the surgeon's preferred technique utilizing the **thin end** of the **Spacer Block** (per **page 97**).

Set rotation and balance the flexion gap to match the extension gap.

Once the desired femoral position is achieved, pin the FE Guide and proceed with Femoral Preparation.

For completing femoral resections with a Straight Stem, proceed to **page108**.

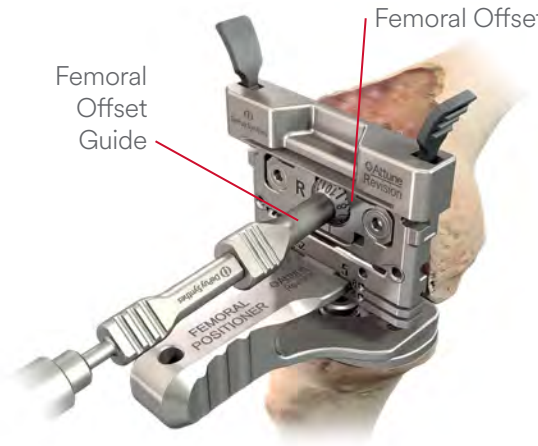
Femoral Preparation

Establishing the Flexion Gap and Setting Rotation

Conventional Cut Guide

Offset Stem

Balance the knee using the surgeon's preferred technique (per **page 95**). When the desired offset position has been achieved, pin the Conventional Cut Guide through the Parallel Pin Holes on the anterior face of the Guide.



Note the preliminary offset position from alignment of the etch line/number on the Femoral Offset Dial with the engraved line on the Femoral Offset Guide. This will be used to set the initial offset position on the Trial.

Once pinned in place and offset position noted, proceed with Femoral Preparation.

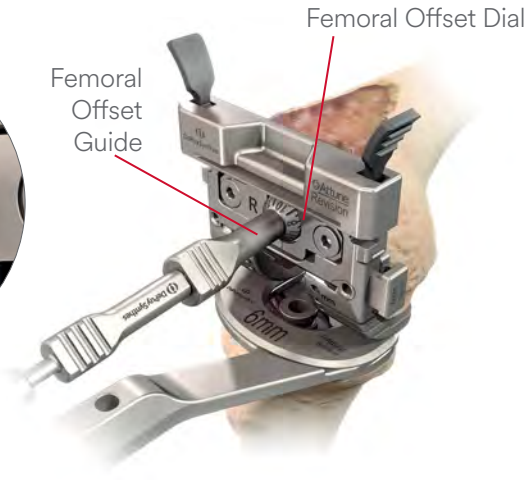
For completing femoral resections with an Offset Stem, proceed to **page 108**.

FE Guide

Offset Stem

Balance the knee using the **thin end** of the **Spacer Block** (per **page 98**). When the desired offset position has been achieved, pin the FE Guide through the Parallel Pin Holes on the anterior face of the Guide.

Dial shows an offset position between 4 and 5



Note the preliminary offset position from alignment of the etch line/number on the Femoral Offset Dial with the engraved line on the Femoral Offset Guide. This will be used to set the initial offset position on the Trial.

Once pinned in place and offset position noted, proceed with Femoral Preparation.

For completing femoral resections with an Offset Stem, proceed to **page 108**.

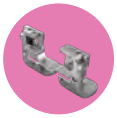
■ Notes:

Consider using Threaded Non-Headed Pins for the Parallel Pins. The Parallel Pins allow for the Conventional Cut Guide or FE Guide to be translated distally to remove the Femoral Offset Guide Assembly from the construct and then the Guide to be repositioned back over the Parallel Pins to allow for further femoral preparation.

Femoral Preparation

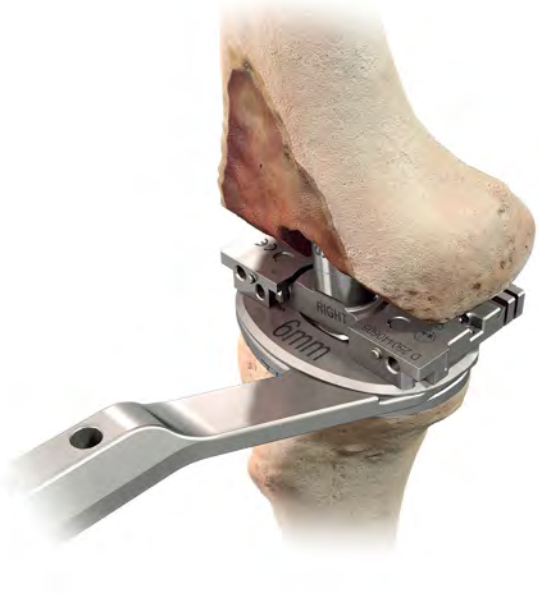
Adjusting Extension Gap - Proximalizing the Femoral Position when using a Broach


Conventional Cut Guide

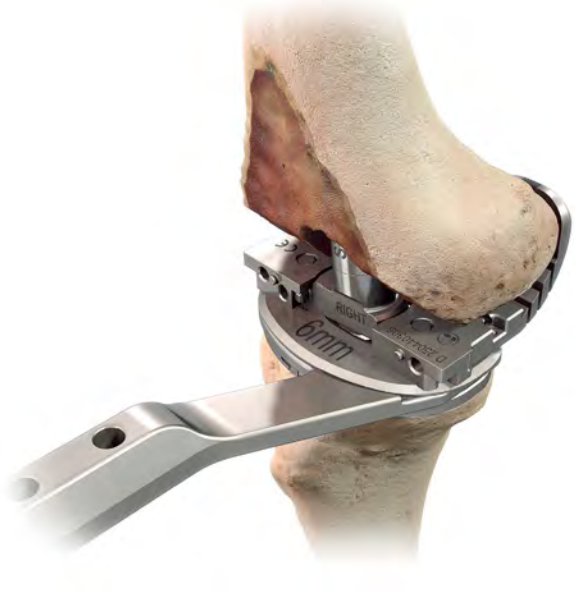

FE Guide


Femoral Sleeve and Stem

If the extension gap is tight, you may advance the Broach construct by assembling the System Handle to the Broach Adaptor and impacting the System Handle. ▲



Conventional Cut Guide Depicted



FE Guide Depicted

▲ Warning:

Do not advance the Broach by hitting the Cutting Block.

Femoral Preparation

Adjusting Extension Gap


Conventional Cut Guide


FE Guide


Femoral Sleeve and Stem

Distalizing the Femoral Position when utilizing a Broach (Optional)

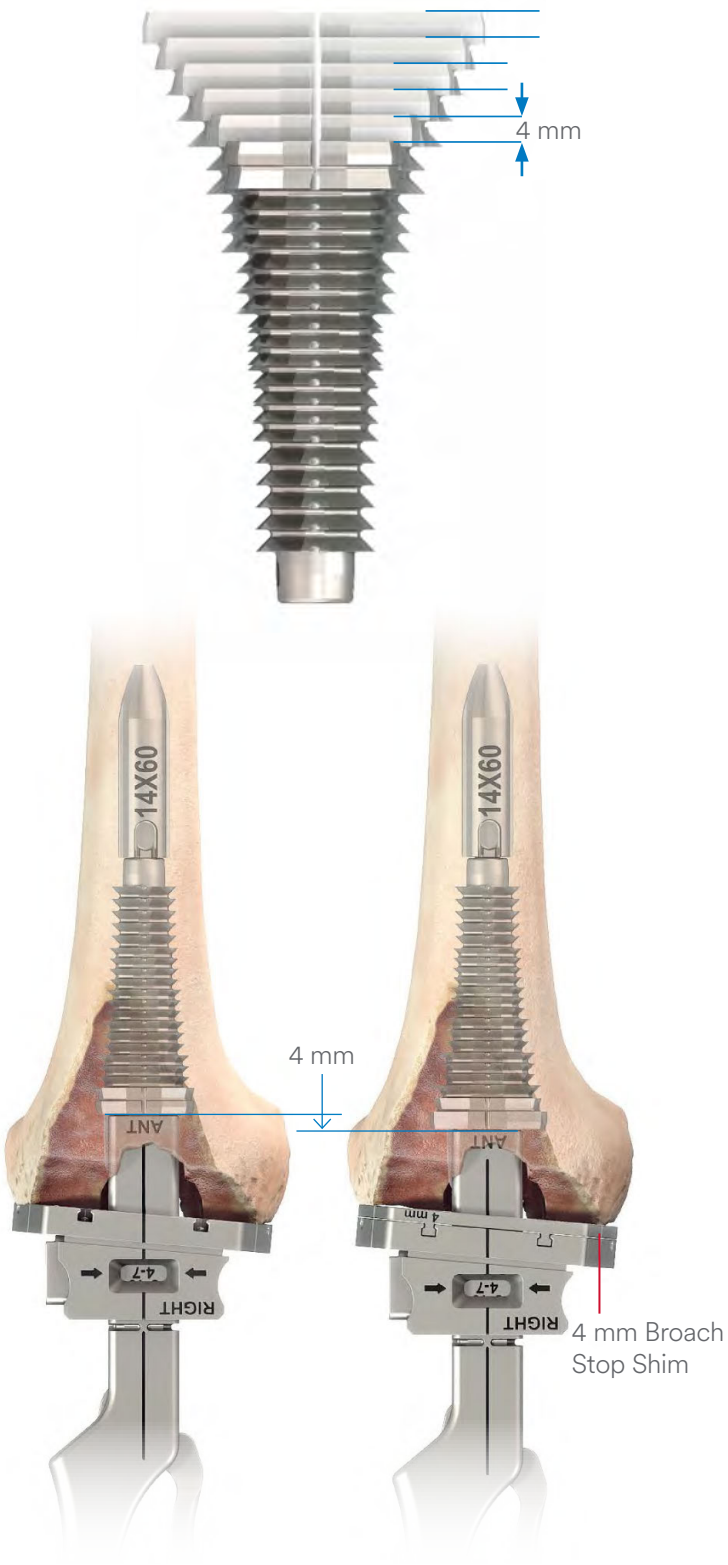
Femoral Sleeves are designed to not only fill bone voids, but also to aid in distalizing the Femoral Component in the case of a loose extension gap. This can be achieved through upsizing the Broach used, as each size has an identical proximal geometry to the previous size, but grows distally by 4 mm.

For example, if after broaching for a 30 mm Sleeve, it is determined that the extension gap is loose, the 4 mm Broach Stop Shim can be added to the Broach Handle and then re-broach using the next size larger Broach (35 mm).

Adding the 4 mm Broach Stop Shim will distalize the Femoral Component by 4 mm, and upsizing a Broach/Sleeve size will ensure that the Broach sits in the original depth location in the femur but has extended distally by 4 mm.

If it is desired to distalize the extension gap by less than 4 mm, simply decrease the Broach Stop Shim by 4 mm and impact the Broach further, but not far enough to seat the Broach Stop as this will return to the original loose extension gap.

Disconnect the Broach Handle Assembly leaving the new Broach in position.

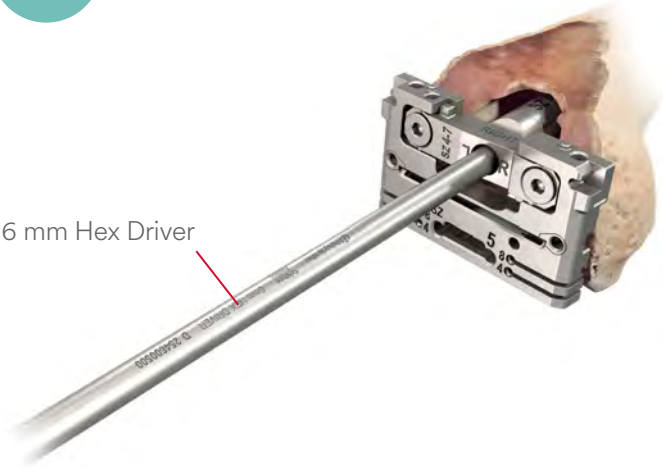


Femoral Preparation

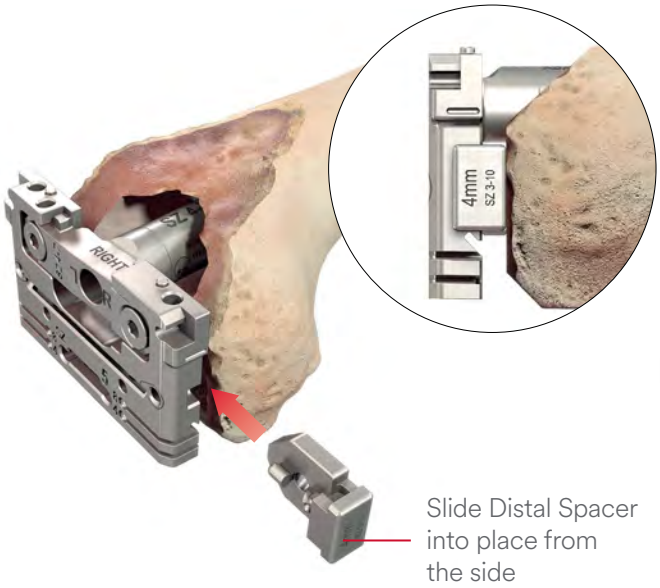
Adjusting Extension Gap

Conventional Cut Guide

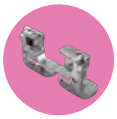
Femoral Sleeve and Stem



Reassemble the Conventional Cut Guide Assembly to the new Broach retained in the bone leaving the Central Bolt slightly loose.



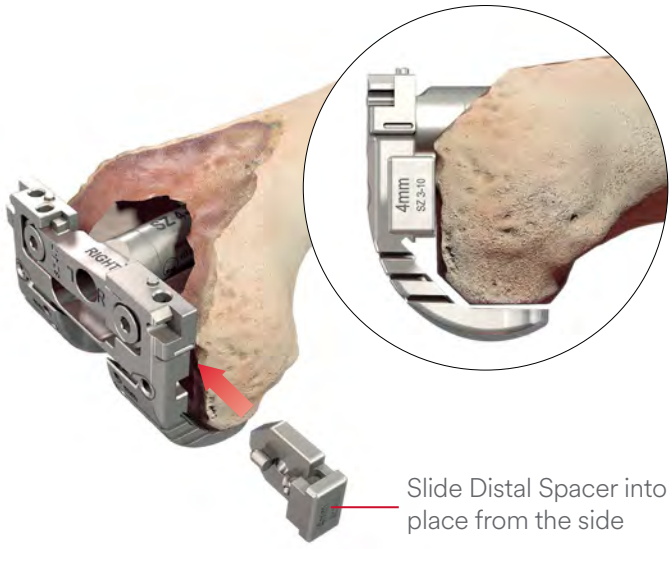
Add the Distal Spacers that correspond to the Broach Stop Shim that was utilized.



FE Guide

Femoral Sleeve and Stem

Reassemble the FE Guide Assembly to the new Broach retained in the bone leaving the Central Bolt slightly loose.



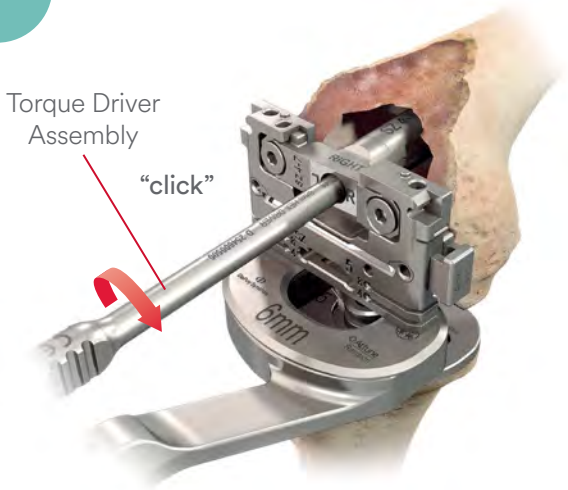
Add the Distal Spacers that correspond to the Broach Stop Shim that was utilized.

Femoral Preparation

Establishing the Flexion Gap and Setting Rotation

Conventional Cut Guide

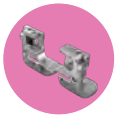
Femoral Sleeve and Stem



Return the knee to flexion, re-introduce the Revision Spacer Block Assembly (or Femoral Positioner Assembly), set the rotation of the Conventional Cut Guide and lock the Central Bolt.

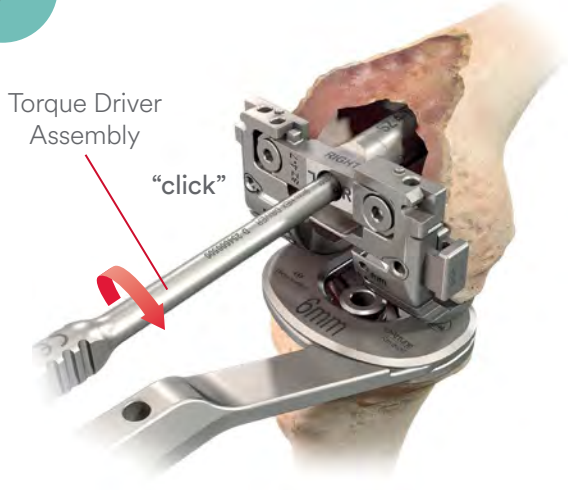
Pin the Conventional Cut Guide and proceed with femoral preparation.

For completing femoral resections with a Sleeve, proceed to **page 108.**



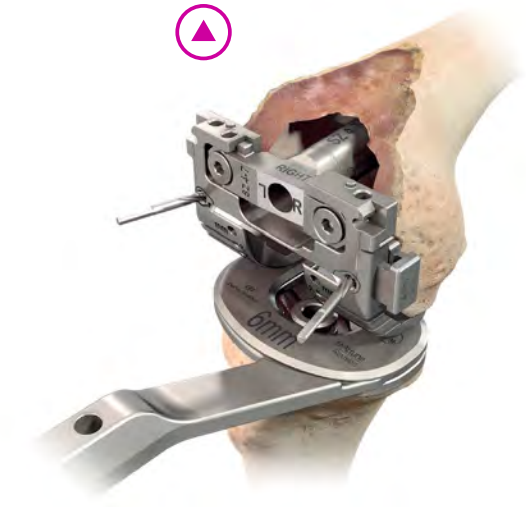
FE Guide

Femoral Sleeve and Stem



Return the knee to flexion, re-introduce the Revision Spacer Block Assembly, set the rotation of the FE Guide and lock the Central Bolt.

▲



Pin the FE Guide and proceed with femoral preparation.

For completing femoral resections with a Sleeve, proceed to **page 108**.

▲ Warning:

If posterior condylar bone is present, it may affect the ability to rotate the FE Guide.

Femoral Preparation

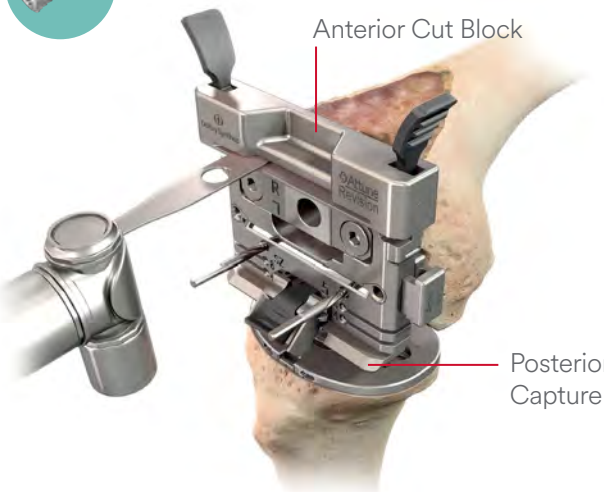
Anterior and Posterior Resections


Conventional Cut Guide


Straight Stem


Offset Stem


Femoral Sleeve and Stem



Straight Stem Assembly Depicted

Remove the Spacer Block or Femoral Positioner prior to performing femoral resections.

Attach the Anterior Cut Block and perform the anterior resection.

Assemble the corresponding sized Posterior Capture to the Cut Guide and perform the posterior resection. If Posterior Augments are required, the Posterior Augment resection may be made through the Augment slots in the Cut Guide.

For completing femoral resections with a Straight Stem or Sleeve, proceed to **page 110**.

For completing femoral resections with an Offset Stem, proceed to **page 111.**


FE Guide


Straight Stem


Offset Stem


Femoral Sleeve and Stem

Straight Stem Assembly Depicted

Remove the Spacer Block prior to performing femoral resections.

Attach the Anterior Cut Block and perform the anterior resection.

Perform the posterior resection. If Posterior Augments are required, the Posterior Augment resection may be made through the Augment slots in the FE Cut Guide.

Proceed to **page 109**.

■ Notes:

When using an Offset Stem in smaller sizes of femur, certain orientations of the Femoral Offset Guide may inhibit the ability to complete the anterior resection. Therefore, prior to completing the anterior resection, check for Saw Blade impingement on the Femoral Offset Guide. If necessary, prior to initiating the anterior cut, the Conventional Cut Guide or FE Guide can be pinned and the Femoral Offset Guide removed using the System Handle.

Femoral Preparation


FE Guide


Straight Stem

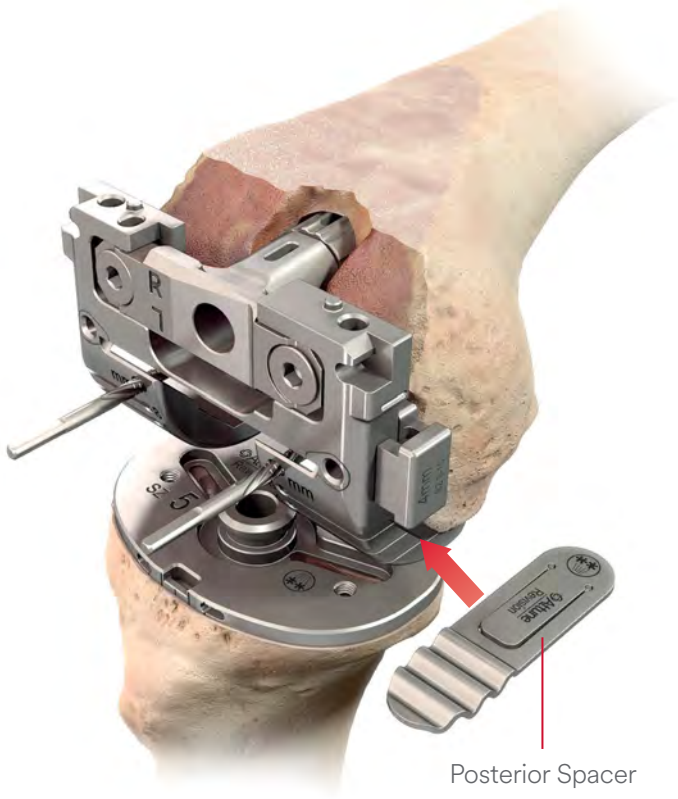

Offset Stem


Femoral Sleeve and Stem

The Posterior Spacer may be inserted in to the posterior slots of the FE Guide to aid in stabilizing the Guide during subsequent resections or bone preparation.

For completing femoral resections with a Straight Stem or Sleeve, proceed to **page 110**.

For completing femoral resections with an Offset Stem, proceed to **page 111**.



Femoral Preparation

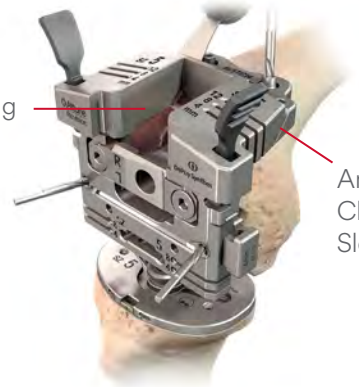
Chamfer and Distal Augment Resections


Conventional Cut Guide


Straight Stem


Femoral Sleeve and Stem

Perform the posterior chamfer resection.



Attach the Notch Cutting Guide and perform the anterior chamfer and any necessary Distal Augment resections. If Distal Augment resections were made, Distal Spacers may be inserted in the Conventional Cut Guide to stabilize the Guide. ▲

For Box preparation with a Straight Stem, go to **page 116**.

For completing the Box resection with a Sleeve, proceed to **page 118**.

▲ Warning:

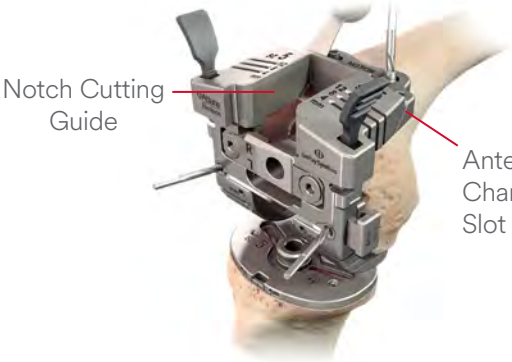
If Pins were added to the distal surface of the Conventional Cut Block, they will need to be removed from the deficient side prior to performing any Augment resections.


FE Guide


Straight Stem


Femoral Sleeve and Stem

Perform the posterior chamfer resection.



Attach the Notch Cutting Guide and perform the anterior chamfer and any necessary Distal Augment resections. If Distal Augment resections were made, Distal Spacers may be inserted in the FE Guide to stabilize the Guide. ▲

For Box preparation with a Straight Stem, proceed to **page 116.**

For completing the Box resection with a Sleeve, proceed to **page 118**.

▲ Warning:

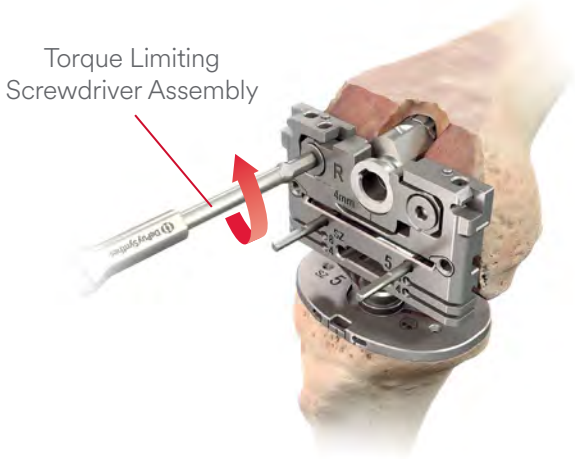
If Pins were added to the distal surface of the FE Guide, they will need to be removed from the deficient side prior to performing any Augment resections.

Femoral Preparation

Anterior and Posterior Resections

Conventional Cut Guide

Offset Stem

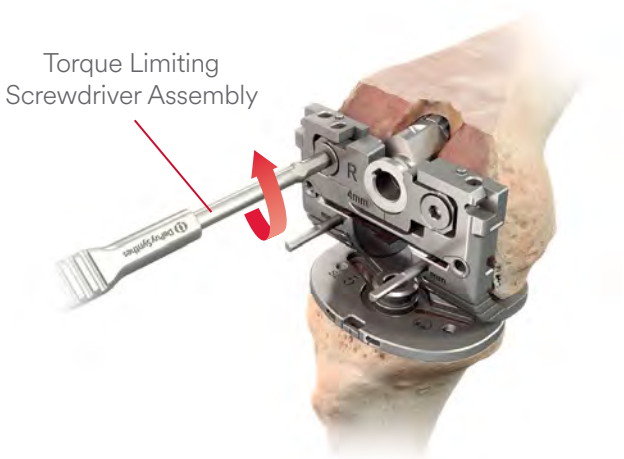


To perform the anterior and posterior chamfer, box resection and any necessary Distal Augment resections, disconnect the Femoral Offset Guide from the Conventional Cut Guide.

Connect the Revision System Handle to the Femoral Offset Guide Assembly and translate the Femoral Offset Guide distal to the Conventional Cut Guide.

FE Guide

Offset Stem



To perform the anterior and posterior chamfer, box resection and any necessary Distal Augment resections, disconnect the Femoral Offset Guide from the FE Guide.

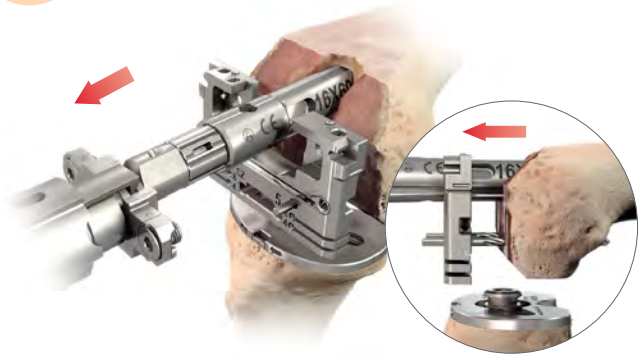
Connect the Revision System Handle to the Femoral Offset Guide Assembly and translate the Femoral Offset Guide distal to the FE Guide.

Femoral Preparation

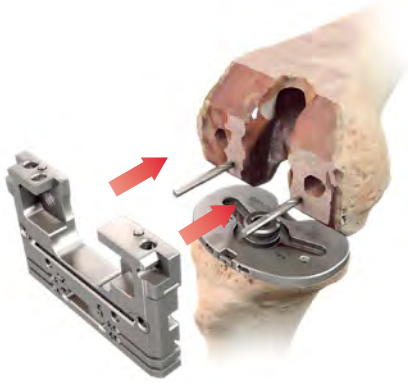
Anterior and Posterior Resections

Conventional Cut Guide

Offset Stem



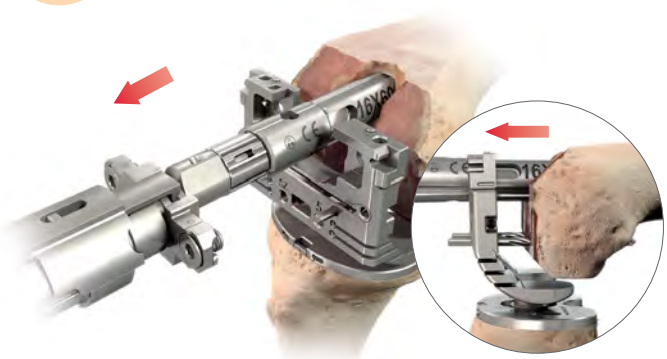
While translating the Femoral Offset Guide out of the prepared femur, separately translate the Conventional Cut Guide along the Parallel Pins.



Once the Femoral Offset Guide, Stem Stabilizer, and Stem Trial have cleared the prepared femur, re-introduce the Conventional Cut Guide onto the distal femur *via* the Parallel Pins.

FE Guide

Offset Stem



While translating the Femoral Offset Guide out of the prepared femur, separately translate the FE Guide along the Parallel Pins.

Once the Femoral Offset Guide, Stem Stabilizer, and Stem Trial have cleared the prepared femur, re-introduce the FE Guide onto the distal femur *via* the Parallel Pins.

■ Notes:

In cases of significant distal bone loss, one could proceed to the Cut Through Trial workflow at this time with the Femoral Offset position noted. The Box resection and Boss Ream may alternatively be made through the Cut Through Trial.

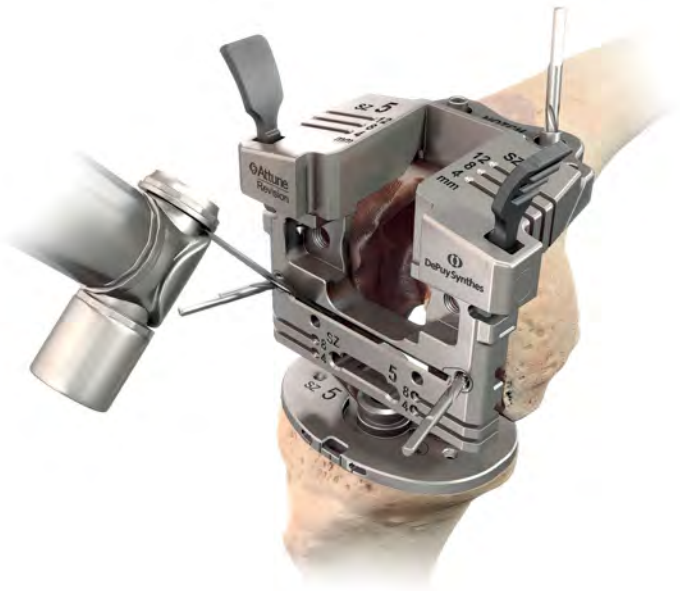
For smaller magnitude offsets and/or smaller diameter Stem Stabilizers and Stem Trials, the Femoral Offset Guide may be extracted from the femur without simultaneously having to remove the Conventional Cut Guide or FE Guide in these situations, the Angled Pin Holes can be used in preference to the Parallel Pin Holes for initial fixation.

Femoral Preparation

Chamfer and Distal Augment Resections

Conventional Cut Guide

Offset Stem



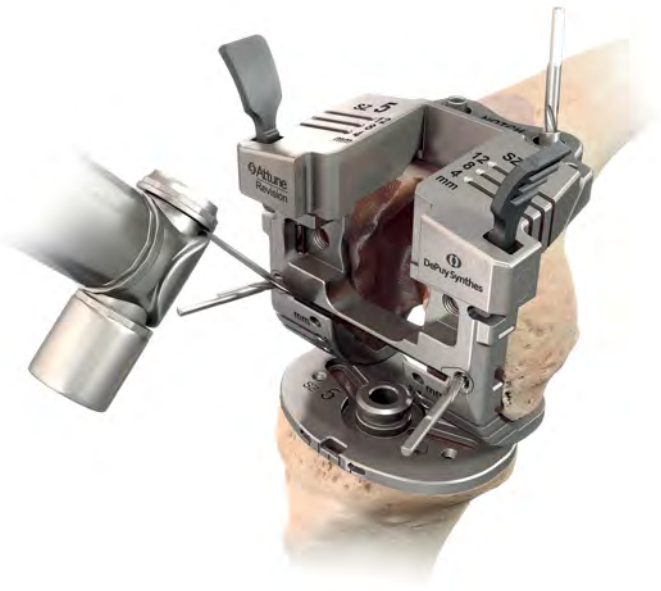
Pin through the Convergent Pin Holes, and remove all Parallel Pins. Complete the posterior chamfer resection.

Attach the Notch Cutting Guide and perform the anterior chamfer and any necessary Distal Augment resections. If Distal Augment resections were made, Distal Spacers may be inserted in the Conventional Cut Guide to stabilize the Guide.

For Boss and Offset Adaptor preparation with an Offset Stem, proceed to **page 114**.

FE Guide

Offset Stem



Pin through the Convergent Pin Holes, and remove all Parallel Pins. Complete the posterior chamfer resection.

Attach the Notch Cutting Guide and perform the anterior chamfer and any necessary Distal Augment resections. If Distal Augment resections were made, Distal Spacers may be inserted in the FE Guide to stabilize the Guide.

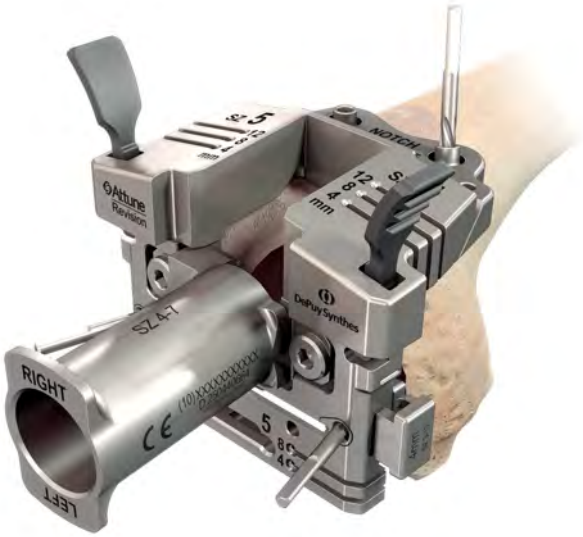
For Boss and Offset Adaptor preparation with an Offset Stem, proceed to **page 114**.

Femoral Preparation

Boss and Offset Adaptor Reaming

Conventional Cut Guide

Offset Stem



Assemble the appropriately sized Conventional Cut Guide Reamer Guide with the correct orientation facing upwards, “Left or Right”, to the Conventional Cut Guide.

FE Guide

Offset Stem

Assemble the appropriately sized Conventional Cut Guide Reamer Guide with the correct orientation facing upwards, “Left or Right”, to the FE Guide.

■ Notes:

The Notch Cutting Guide size must match the Conventional Cut Guide or the FE Guide size.

Additional fixation may be achieved utilizing the Omni-ball Pin Holes in the Notch Cutting Guide which allow for an adjustable Pin direction and position Pins superiorly in the Anterior Femur.

Femoral Preparation

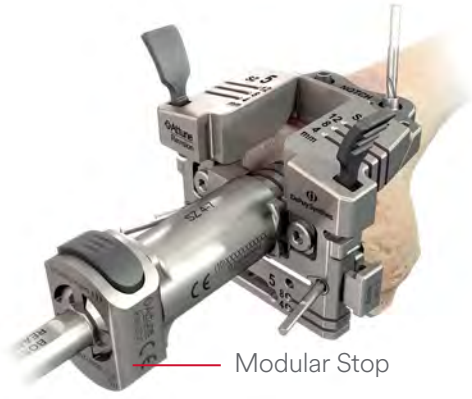
Boss and Offset Adaptor Reaming

Conventional Cut Guide

Offset Stem

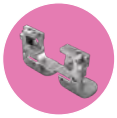
Assemble the Modular Stop to the Offset Drill and prepare the femoral canal.

Seat the Drill to the Stop.



With the Femoral Offset Adaptor prepared, remove the Offset Drill and Conventional Cut Guide Reamer Guide from the Cutting Guide Assembly.

For Box Resection, proceed to **page 116**.



FE Guide

Offset Stem

Assemble the Modular Stop to the Offset Drill and prepare the femoral canal.

Seat the Drill to the Stop.

With the Femoral Offset Adaptor prepared, remove the Offset Drill and Conventional Cut Guide Reamer Guide from the FE Guide Assembly.

For Box Resection, proceed to **page 116**.

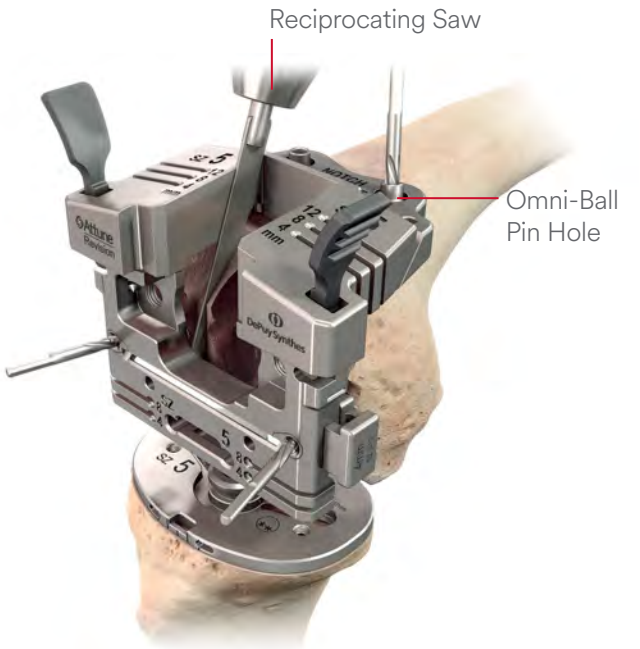
Femoral Preparation

Box Resection


Conventional Cut Guide


Straight Stem


Offset Stem



With the Notch Cutting Guide attached, complete resection of the two sides and top of the box with a Reciprocating Saw Blade.

Optionally, the Notch Guide may be pinned through the Parallel Pin Holes to allow for removal of the Conventional Cut Guide to complete the Box resection, if desired.

With the femoral preparation complete, remove the Conventional Cut Guide Assembly.

For Boss preparation with a Straight Stem, proceed to **page 117.**

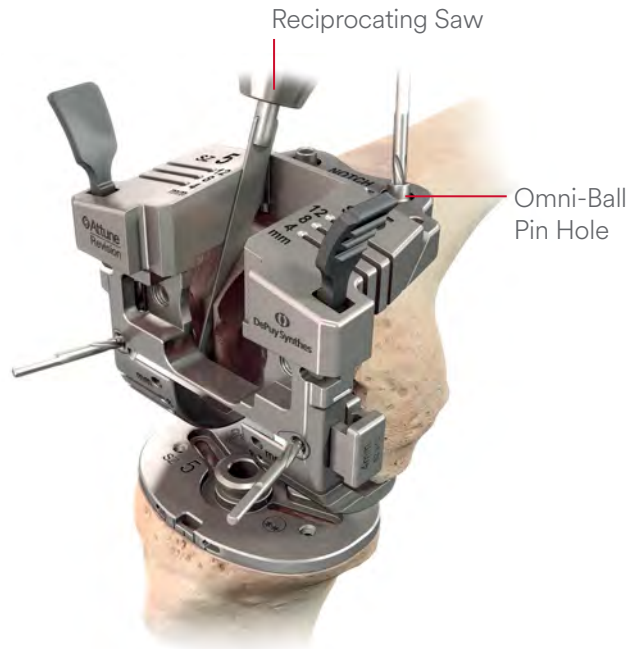
For Femoral Trial Assembly with Offset Stem with a Cut Through Trial proceed to **page 120.**

For Femoral Trial Assembly with Offset Stem with a Solid Femoral Trial proceed to **page 121.**


FE Guide


Straight Stem


Offset Stem



With the Notch Cutting Guide attached, complete resection of the two sides and top of the box with a Reciprocating Saw Blade.

Optionally, the Notch Guide may be pinned through the Parallel Pin Holes to allow for removal of the FE Guide to complete the Box resection, if desired.

With the femoral preparation complete, remove the FE Guide Assembly.

For Boss preparation with a Straight Stem, proceed to **page 117.**

For Femoral Trial Assembly with Offset Stem with a Cut Through Trial proceed to **page 120.**

For Femoral Trial Assembly with Offset Stem with a Solid Femoral Trial proceed to **page 121.**

Femoral Preparation

Boss Reaming

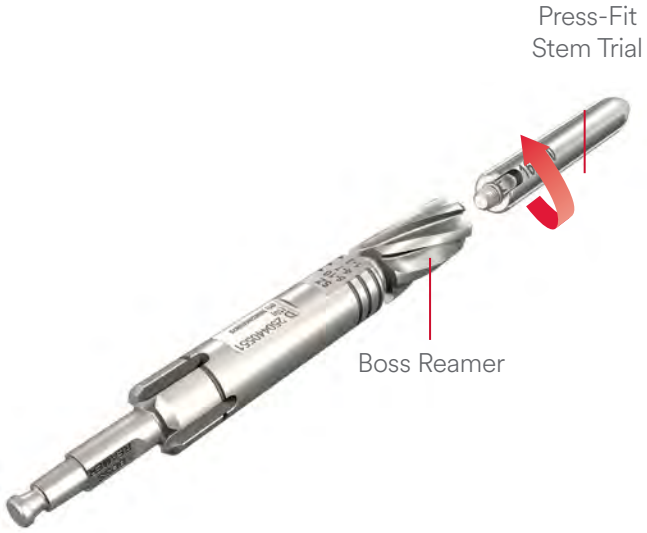

Conventional Cut Guide


FE Guide


Straight Stem

Remove all Pins and the Conventional Cut Guide or FE Guide Assembly from the bone.

Assemble the appropriate Stem Trial to the Femoral Boss Reamer.



Utilize the Stem Trial in the reamed femoral canal to pilot the Boss Reamer until the appropriate femoral size marking in the grouping of markings on the Boss Reamer is aligned with the distal surface of the femur. If Distal Augments were prepared, the size grouping line should be proud of the respective distal femur surface by the thickness of the Distal Augment(s).

The size groupings on the Boss Reamer represent the distal bone surface and not the anticipated joint line.

For Femoral Trial Assembly with Offset Stem with a Cut Through Trial proceed to **page 120**.

For Femoral Trial Assembly with Offset Stem with a Solid Femoral Trial proceed to **page 121**.

▲ Warning:

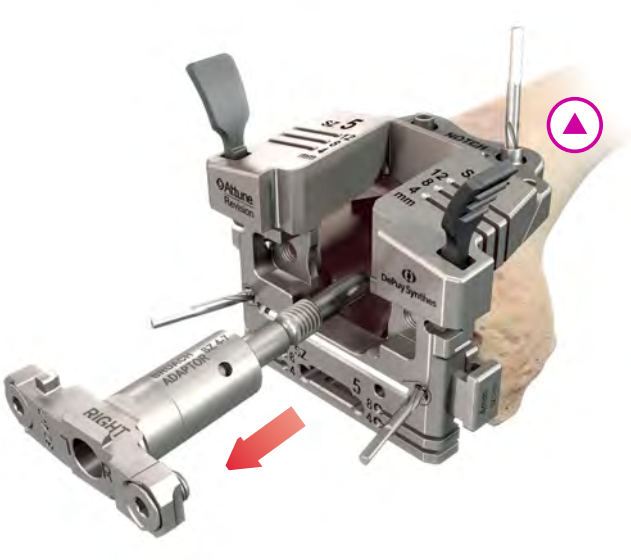
Do not reverse ream.

Femoral Preparation

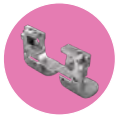
Box Resection


Conventional Cut Guide

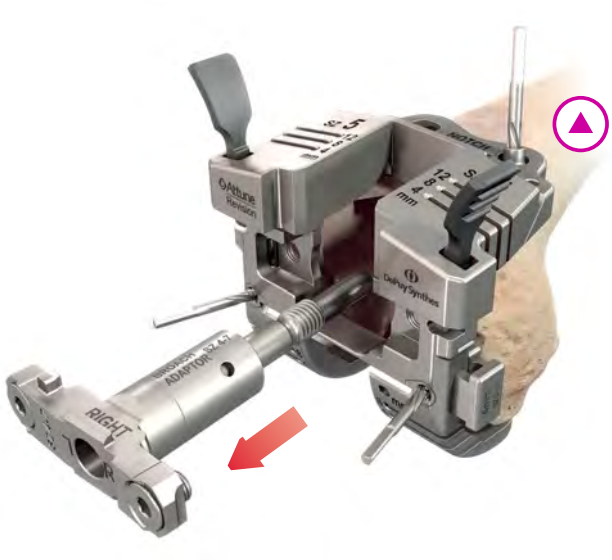

Femoral Sleeve and Stem



To allow for complete resection of the box, disengage and remove the Broach Adaptor from the Conventional Cut Guide and Broach by releasing the two Hexes in the Cutting Block and the one Hex in the Broach Adaptor. An additional Pin may be added to the Notch Cutting Guide to aid in fixation.


FE Guide


Femoral Sleeve and Stem



To allow for complete resection of the box, disengage and remove the Broach Adaptor from the FE Guide and Broach by releasing the two Hexes in the Cutting Block and the one Hex in the Broach Adaptor. An additional Pin may be added to the Notch Cutting Guide to aid in fixation.

▲ Warning:

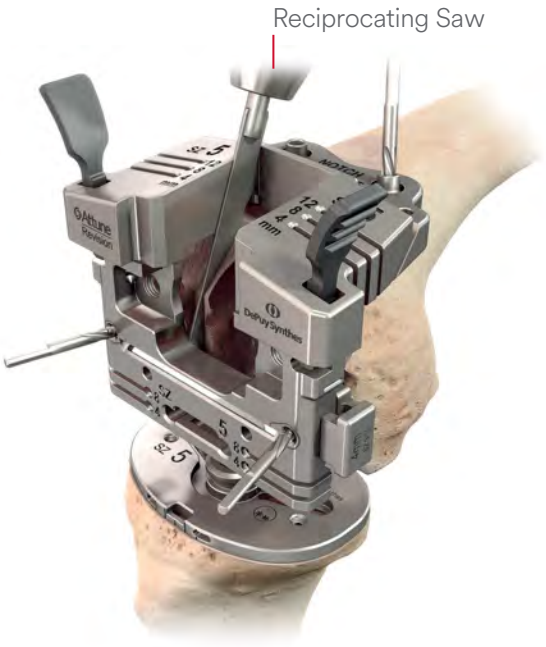
Care should be taken when placing a Pin through the Omni-Ball Hole in the Notch Cutting Guide which allow for an adjustable Pin direction to angle the Pin towards the periphery of the bone to avoid pinning into the Femoral Broach.

Femoral Preparation

Box Resection

Conventional Cut Guide

Femoral Sleeve and Stem



With the Notch Cutting Guide attached, complete resection of the two sides and top of the box with a Reciprocating Saw Blade.

Optionally, the Notch Guide may be pinned through the Parallel Pin Holes to allow for removal of the Conventional Cut Guide to complete the Box resection, if desired.

With the femoral preparation complete, remove the Conventional Cut Guide Assembly leaving the Broach in place.

For Femoral Trial assembly with a Broach, go to **page 122.**

FE Guide

Femoral Sleeve and Stem

With the Notch Cutting Guide attached, complete resection of the two sides and top of the box with a Reciprocating Saw Blade.

Optionally, the Notch Guide may be pinned through the Parallel Pin Holes to allow for removal of the FE Guide to complete the Box resection, if desired.

With the femoral preparation complete, remove the FE Guide Assembly leaving the Broach in place.

For Femoral Trial assembly with a Broach, go to **page 122.**

■ Notes:

The Notch Cutting Guide size must match the Conventional Cut Guide or FE Guide size.

Additional fixation may be achieved utilizing the Omni-Ball Pin Holes in the Notch Cutting Guide which allows for an adjustable Pin direction and position Pins superiorly in the Anterior Femur.

Femoral Preparation

Seating the Femoral Trial for Cut Through Trials


Cut Through Trial


Straight Stem


Offset Stem

▲

Assemble the Femoral Trial with the Box Trial, Boss Trial or appropriate Offset Adaptor Trial, Stem Trial Bolt, Stem Trial as described on **pages 53 and 56**, and any appropriate Augment Trials as described on **page 59.**

If offset is being used, position the Femoral Offset Adaptor Trial to the offset orientation previously noted from the Femoral Offset Guide (**page 103**) and tighten the Stem Trial Bolt. Utilize the marking on the posterior aspect of the Box Trial and corresponding number on the Offset Boss Adaptor Trial as described on **page 56.**

Introduce the Femoral Trial Assembly to the prepared femur. Utilize the ATTUNE System Impactor to seat the Femoral Trial.

Introduce the Revision Tibial Insert Trial and proceed to **Setting Tibial Base Rotation on page 150.**

▲ Warning:

If the box resection is not complete, the mating components may not seat.

▲ Warning:

The ATTUNE Revision Femoral Augment Trials contain magnets. These devices should be kept at a safe distance from a patient's active implantable medical device(s) (i.e. pacemaker) in order to avoid adversely affecting the device. The Femoral Augment Trials should be kept at an appropriate location when not in use in the surgical site.

■ Notes:

If the Cut Through Trial is unstable, pinning anteriorly is an option.

Femoral Preparation

Seating the Femoral Trial for Solid Femoral Trials


Solid Femoral Trial


Straight Stem

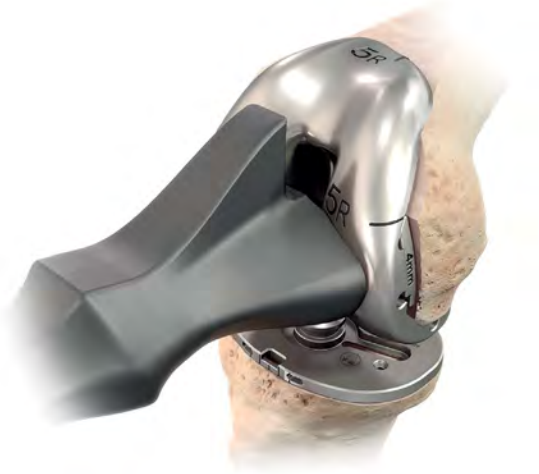

Offset Stem

▲ Assemble the Femoral Trial, Boss Trial or appropriate Offset Adaptor Trial, Stem Trial Bolt, Stem Trial as described on **pages 55 and 56**, and any appropriate Augment Trials as described in **page 59.**

If offset is being used, position the Femoral Offset Adaptor Trial to the offset orientation previously noted from the Femoral Offset Guide (**page 103**), and tighten the Stem Trial Bolt. Utilize the marking on the posterior aspect of the Femoral Box and corresponding number on the Offset Boss Adaptor Trial as described on **page 55**.

Introduce the Femoral Trial Assembly to the prepared femur. Utilize the ATTUNE System Impactor to seat the Femoral Trial.

Proceed to **Setting Tibial Base Rotation on page 150.**



▲ Warning:

If the box resection is not complete, the connecting components may not seat.

▲ Warning:

The ATTUNE Revision Femoral Augment Trials contain magnets. These devices should be kept at a safe distance from a patient's active implantable medical device(s) (i.e. pacemaker) in order to avoid adversely affecting the device. The Femoral Augment Trials should be kept at an appropriate location when not in use in the surgical site.

Femoral Preparation

Seating the Femoral Trial for Cut Through Trials

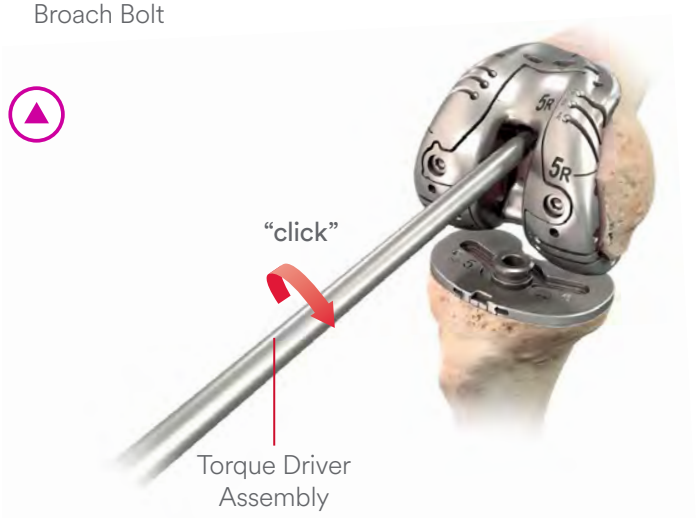

Cut Through Trial


Femoral Sleeve and Stem

Assemble the Cut Through Femoral Trial with the Box Trial as described on **page 57** and any appropriate Augment Trials as described on **page 59**. ▲

Introduce the Femoral Trial Assembly to the prepared femur and introduce the Femoral Broach Bolt through the hole in the Box Trial and into the Femoral Broach. Tighten with the Torque Driver with 6 mm Hex Driver.

▲



Proceed to **Setting Tibial Base Rotation on page 150.**

▲ Warning:

The ATTUNE Revision Femoral Augment Trials contain magnets. These devices should be kept at a safe distance from a patient's active implantable medical device(s) (i.e. pacemaker) in order to avoid adversely affecting the device. The Femoral Augment Trials should be kept at an appropriate location when not in use in the surgical site.

▲ Warning:

If impaction of the Femoral Trial is necessary, the ATTUNE System Impactor is recommended.

■ Notes:

If the Femoral Trial Assembly and Broach Trial Bolt do not engage in the Broach, slightly extract the Broach with the Broach Handle, attach the Femoral Trial Assembly to the Broach via the Broach Bolt leaving it slightly loose to allow the instruments to locate within the prepared cavity, and advance the Trial construct until seated to the prepared depth.

Femoral Preparation

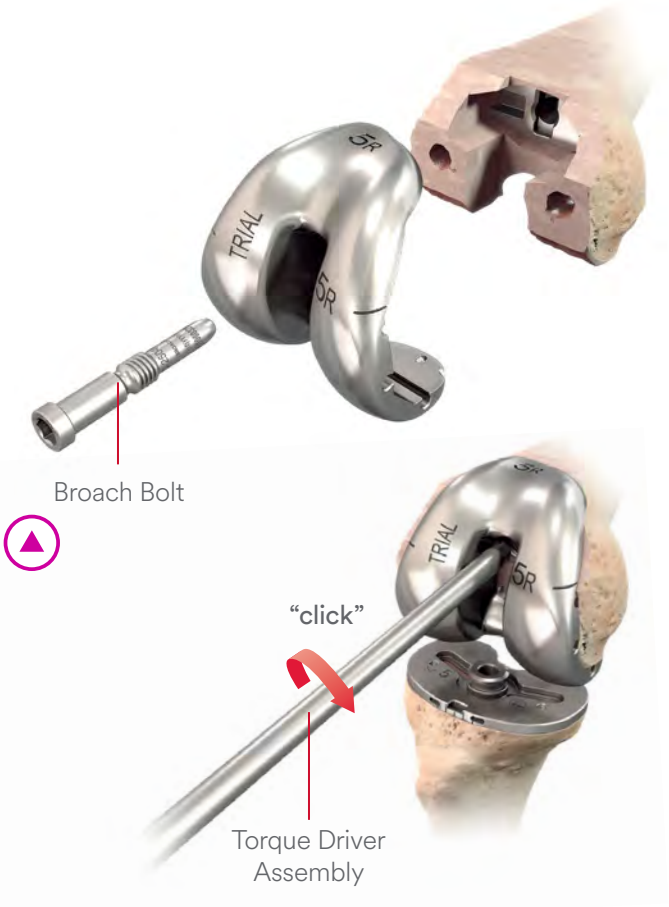
Seating the Femoral Trial for Solid Femoral Trials

Solid Femoral Trial

Femoral Sleeve and Stem

Assemble the Femoral Trial with the appropriate Augment Trials as described on **page 59**. ▲

Introduce the Femoral Trial Assembly to the prepared femur and introduce the Femoral Broach Bolt through the hole in the Femoral Box and into the Femoral Broach. Tighten with the Torque Driver with 6 mm Hex Driver.



▲

Proceed to **Setting Tibial Base Rotation on page 150.**

■ Notes:

If the Femoral Trial Assembly and Broach Trial Bolt do not engage in the Broach, slightly extract the Broach with the Broach Handle, attach the Femoral Trial Assembly to the Broach via the Broach Bolt leaving it slightly loose to allow the instruments to locate within the prepared cavity, and advance the Trial construct until seated to the prepared depth.

▲ Warning:

The ATTUNE Revision Femoral Augment Trials contain magnets. These devices should be kept at a safe distance from a patient's active implantable medical device(s) (i.e. pacemaker) in order to avoid adversely affecting the device. The Femoral Augment Trials should be kept at an appropriate location when not in use in the surgical site.

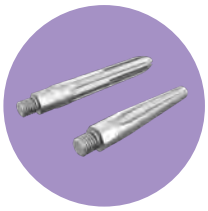
▲ Warning:

If impaction of the Femoral Trial is necessary, the ATTUNE System Impactor is recommended.

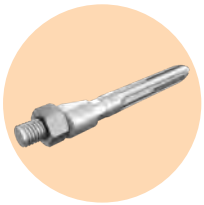
Femoral Preparation

Setting Femoral Position

Cut Through Trial



Straight Stem
Proceed to **page 125**



Offset Stem
Proceed to **page 128**

Femoral Sleeve and Stem
Proceed to **page 139**

■ Notes:

Prior to proceeding to the Femoral Sleeve and Stem workflow the Straight Stem workflow must be completed.

Femoral Preparation

Cut Through Trial

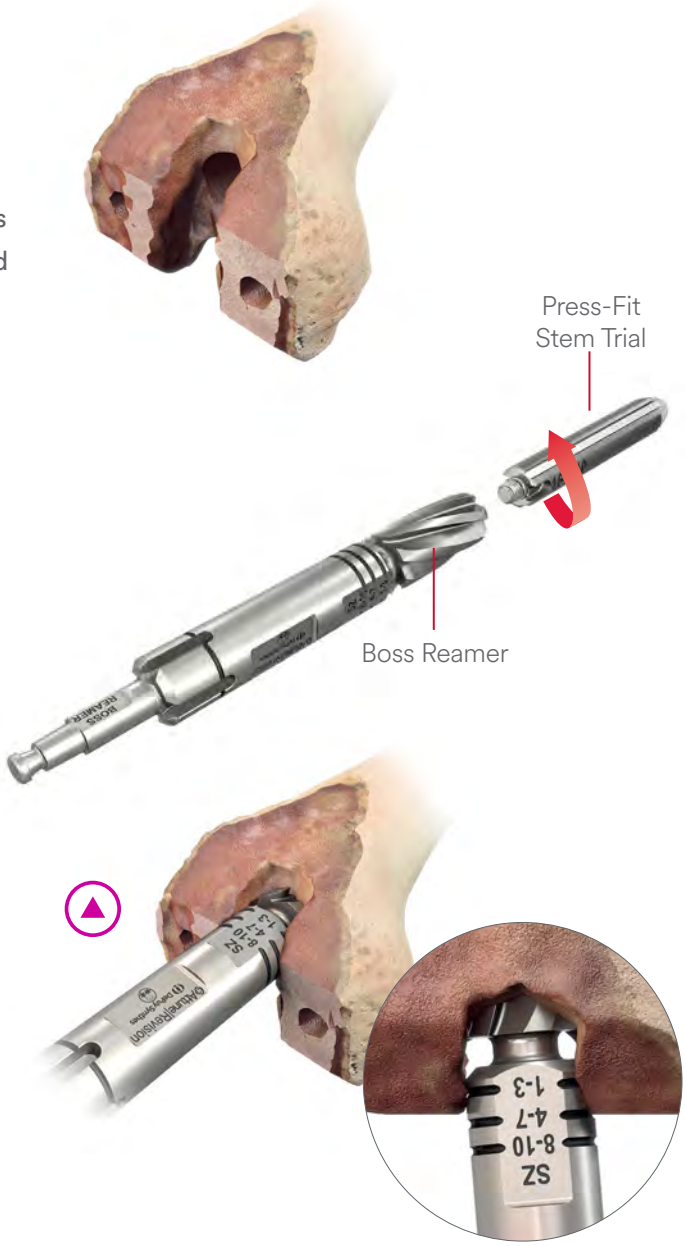
Cut Through Trial

Straight Stem

If there is substantial bone loss, once the femoral canal has been prepared and if the femoral size has been determined to be a size 3 or larger following the methods described from **pages 74 - 78**, then it is possible to use the Cut Through Trial workflow. Ream for the Femoral Boss by assembling the appropriate Stem Trial to the Femoral Boss Reamer.

Utilize the Stem Trial in the reamed femoral canal to pilot the Boss Reamer until the appropriate femoral size marking in the grouping of markings on the Boss Reamer is aligned with the distal surface of the femur. If Distal Augments were prepared, the size grouping line should be proud of the respective distal femur surface by the thickness of the Distal Augment(s).

The size groupings on the Boss Reamer represent the distal bone surface and not the anticipated joint line.



■ Notes:

The Cut Through Trials are available in Sizes 3 - 10. The Conventional Cut Guide must be utilized to prepare femurs of Sizes 1 or 2.

■ Notes:

If the prior Femoral Component was malrotated, the revised femur bone may influence the rotation of the Cut Through Trial if not mindful of this when assessing femoral position.

▲ Warning:

Do not reverse ream.

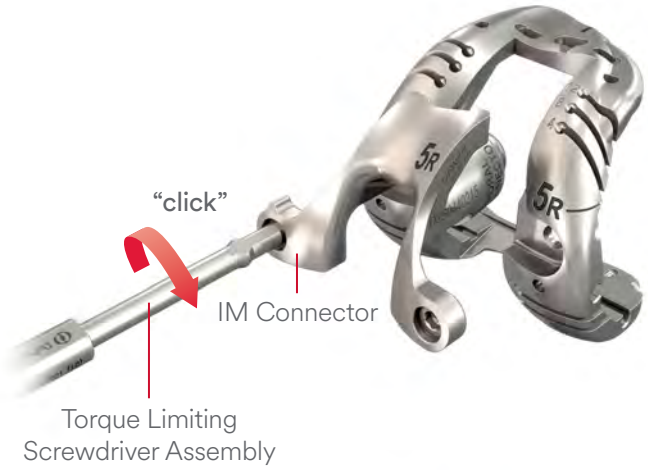
Femoral Preparation

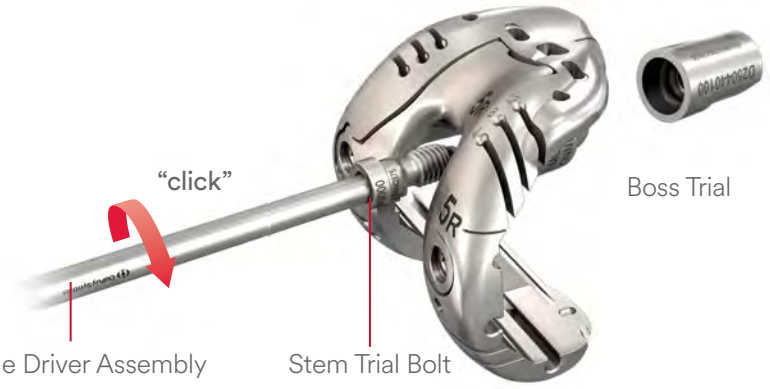
Cut Through Trial Assembly

Cut Through Trial

Straight Stem

Assemble the Cut Through Trial to the corresponding IM Connector, Stem Trial Bolt, Boss Trial, and appropriate Stem Trial.





■ Notes:

To aid in stabilizing the femoral rotation, Posterior Augment Trials may be added to the Cut Through Trials.

The Cut Through Trial IM Connector is size and side specific.

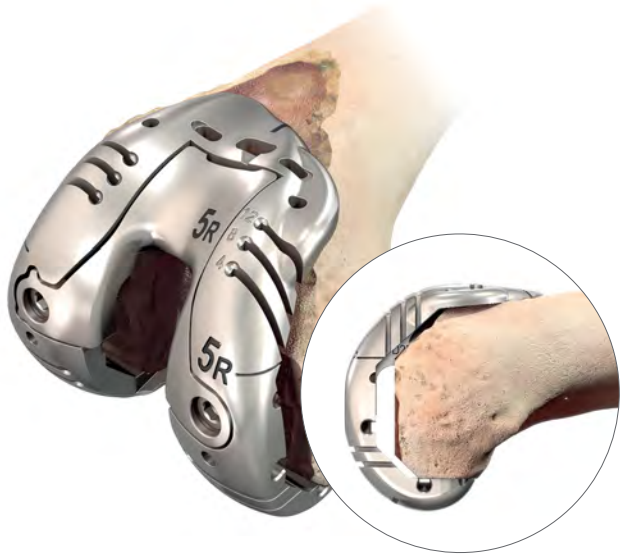
Femoral Preparation

Cut Through Trial Placement

Cut Through Trial

Straight Stem

Introduce the Femoral Trial Assembly to the prepared femur. Allow the Femoral Trial Assembly to sit slightly proud of the femoral bone to allow for joint line assessment.



Trial proud to allow for joint line assessment

Optionally, the Distalizing Gauge may be utilized to provide an additional reference to the epicondyles.

For Gap Balancing, Setting Rotation, and completing femoral resections with a Straight Stem, proceed to **page 131.**

■ Notes:

It is optional to allow the Femoral Trial to sit proud. This option allows for final assessment of the superior/inferior position to be determined with the aid of an Insert Trial or Spacer Block.

▲ Warning:

To prevent the potential for femoral bone fracture the IM Connector and Cut Through Trial should only be used in the cases with substantial bone loss.

Otherwise go to Revision Femoral with a Straight Stem utilizing the Conventional Cut Guide on page 80.

Femoral Preparation

Cut Through Trial Assembly

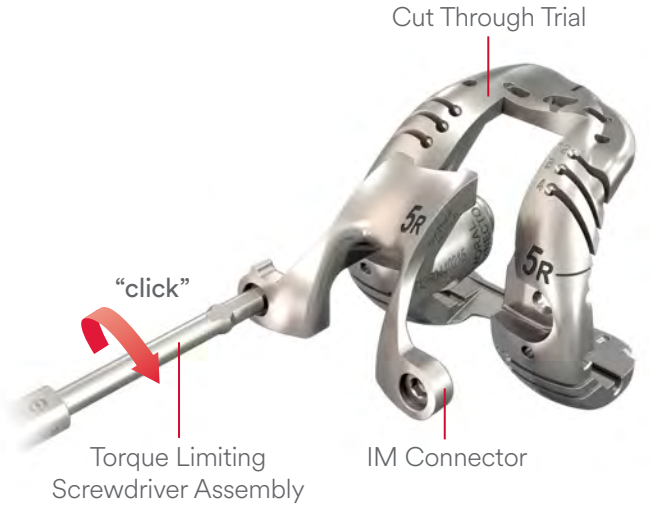
Cut Through Trial

Offset Stem

▲

Once the femoral canal has been prepared using the Canal Reamers and the femoral size has been determined following the methods described from **pages 74 to 78**, proceed with this workflow only if there is substantial bone loss, enough to allow for the Cut Through Trial assembled with the IM Connector, Offset Boss Adaptor Trial, and appropriate Stem Trial to be introduced to the femoral bone.

Assemble the Cut Through Trial to the corresponding IM Connector by tightening the Hexes.



■ Notes:

The Cut Through Trials are available in Sizes 3 - 10. The Conventional Cut Guide must be utilized to prepare femurs of Sizes 1 or 2.

▲ Warning:

To prevent the potential for femoral bone fracture the IM Connector and Cut Through Trial should only be used in the cases with substantial bone loss.Otherwise go to Revision Femoral with Offset Stem utilizing the Conventional Cut Guide on page 90.

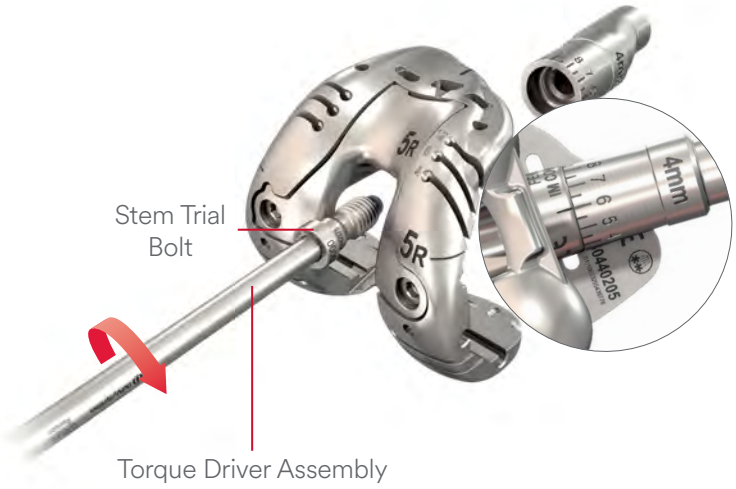
Femoral Preparation

Cut Through Trial Assembly

Cut Through Trial

Offset Stem

Loosely assemble the Stem Trial Bolt to the Femoral Offset Adaptor Trial through the IM Connector using the Torque Limiting Screwdriver Assembly.



Orient the Femoral Offset Adaptor Trial to the estimated offset orientation to achieve desired femoral position and tighten the Stem Trial Bolt.

Thread the Stem Trial on to the Femoral Offset Adaptor Trial.

Femoral Preparation

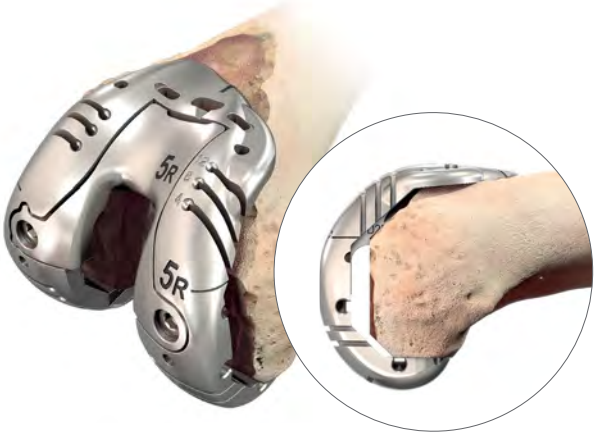
Cut Through Trial Placement

Cut Through Trial

Offset Stem

Introduce the Femoral Trial Assembly into the femur.

Allow the Femoral Trial Assembly to sit slightly proud of the femoral bone to allow for joint line assessment.



Trial proud to allow for joint line assessment

Optionally, the Distalizing Gauge may be utilized to provide and additional reference to the epicondyles.

Femoral Preparation

Gap Balancing and Setting Rotation

Cut Through Trial

Straight Stem

Offset Stem

■ Notes:

If preparing for an Offset Stem, fine-tune the Cut Through Trial rotation, then tighten the Femoral Offset Adaptor Trial to the IM Connector (or Box Trial) with the Stem Trial Bolt and assemble to the bone. This can be loosened, removed, rotationally adjusted, and re-tightened during gap balancing, as necessary. If an acceptable offset position cannot be achieved, replace the Femoral Offset Adaptor Trial with one of another magnitude (2 mm, 4 mm or 6 mm) and reposition the Cut Through Trial.

The ATTUNE Revision Knee System provides two instrument options to balance the flexion gap with the Cut Through Trial: ATTUNE Primary INTUITION PS Tibial Insert Trials, and ATTUNE Revision Spacer Block and Shim.

It is recommended to use the ATTUNE Primary INTUITION PS Insert Trials as the ATTUNE Revision Tibial Insert Trial is not compatible with the IM Connector.

- Primary PS Insert Trial

- Revision Spacer Block

■ Notes:

When choosing Tibial Insert Trials with which to balance the flexion gap, it should be noted that the Revision Tibial Inserts are available in 2 mm increments (6 - 26 mm), while the ATTUNE Primary Tibial Inserts are available in 1 mm increments (5 - 8 mm) and 2 mm increments (10 - 20 mm).

Femoral Preparation

Balance Soft Tissue

Cut Through Trial

Straight Stem

Offset Stem

As the knee comes out to full extension, if the tension in the medial and lateral collateral ligaments is unequal, appropriate soft tissue releases should be performed in a manner to allow the tension to be equal on both the medial and lateral sides of the knee.

Should the selected joint line by the positioning of the Trials differ widely from the joint line anatomical markers, the surgeon has the ability to change the distal/proximal position of the Femoral Component but will have to mirror these changes with appropriate selection of the Tibial Insert and changes to the femoral sizing.

For solutions to address discrepancies between Flexion and Extension, refer to the chart on **page 100.**

Femoral Preparation

Flexion/Extension Balancing


Cut Through Trial


Straight Stem


Offset Stem

Set rotation and balance the flexion space and, when possible, re-establish the joint line.

- Revision Spacer Block and Shim
- PS Insert Trial

Once desired flexion/extension balance is achieved, note the final Insert thickness used.

If the thinnest Revision Tibial Insert Trial/Spacer Block Assembly may not be utilized, the surgeon has two options:

- The Femoral Cut Through Trial can be downsized which allows increase of the flexion space
- Alternatively, the tibial resection may be increased with a further resection of two or more additional millimeters. This maneuver will also increase the extension gap. Further tibial resection may require that tibial preparation be repeated

Femoral Preparation

Flexion/Extension Balancing

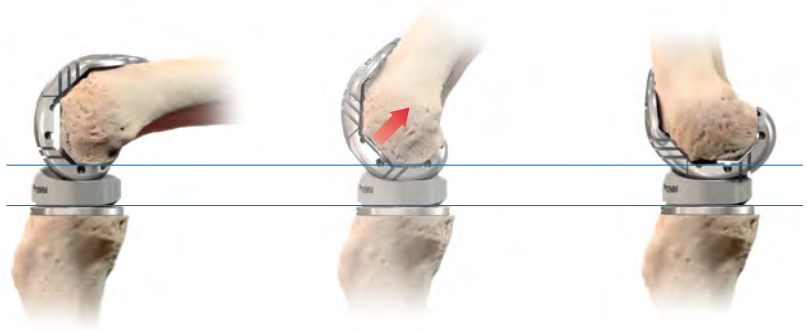

Cut Through Trial


Straight Stem


Offset Stem

Once the desired flexion space is achieved, with the Tibial, Femoral, and ATTUNE PS Tibial Insert Trials or Revision Spacer Block and Shim retained in the joint, gently take the knee into extension.

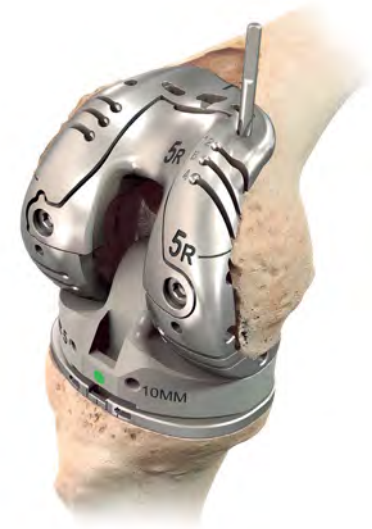
Allow the Femoral Trial to translate proximally in the femoral canal such that when the knee reaches full extension, the extension space will then match the flexion space.



As the leg goes into extension, the Femoral Trial is able to slide up the canal (along the Stem Trial) until it gets to full extension and the extension space then matches the flexion space.

Check that the Femoral Trial is appropriately distalized to maintain tension in the medial and lateral collateral ligaments, and pin the Femoral Trial in position. To allow for trial reduction, the Antero-Medial Pin Hole should be utilized on the Femoral Trial.

The process of assessing flexion and extension gaps may be repeated until desired balance is achieved. Refer to the table on **page 100** to aid in balancing the flexion and extension gaps.



■ Notes:

As an additional reference, if preferred, the interface of the Femoral Trial and Tibial Insert Trial represents the joint line of the implant and should be aligned to the meniscal scar as a re-establishment of the native joint line.

Femoral Preparation

Augment Resections


Cut Through Trial

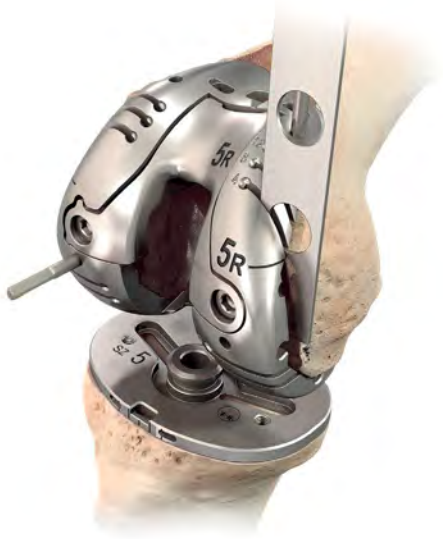

Straight Stem

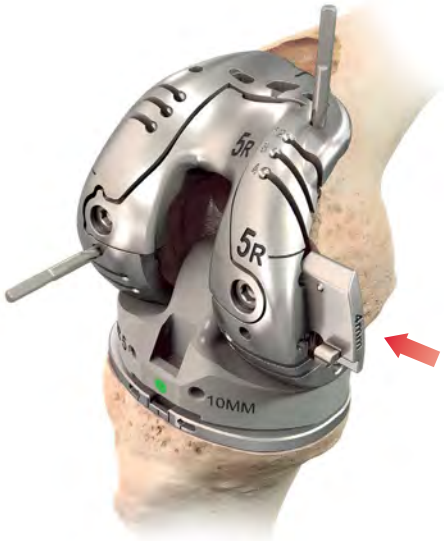

Offset Stem

Pin the distal surface of the Cut Through Trial. With the Femoral Trial pinned in place, if Femoral Augments are required, remove the Tibial Insert Trial or Revision Spacer Block Assembly and make the appropriate resections through the Distal and/or Posterior Augment slots ensuring that Pins are not in the way of the resections.

If Distal Augments are required on both the Medial and Lateral sides, pin one side first and resect the opposite side. Assemble the appropriate Augment Trial to the resected side and pin through the augmented distal surface. Remove the opposite distal pin and complete the opposite side resection and insert the corresponding Augment Trial.

Insert the appropriate Femoral Augment Trials by loading from the side of the Femoral Trial.





▲ Warning:

The ATTUNE Revision Femoral Augment Trials contain magnets. These devices should be kept at a safe distance from a patient's active implantable medical device(s) (i.e. pacemaker) in order to avoid adversely affecting the device. The Femoral Augment Trials should be kept at an appropriate location when not in use in the surgical site.

Femoral Preparation

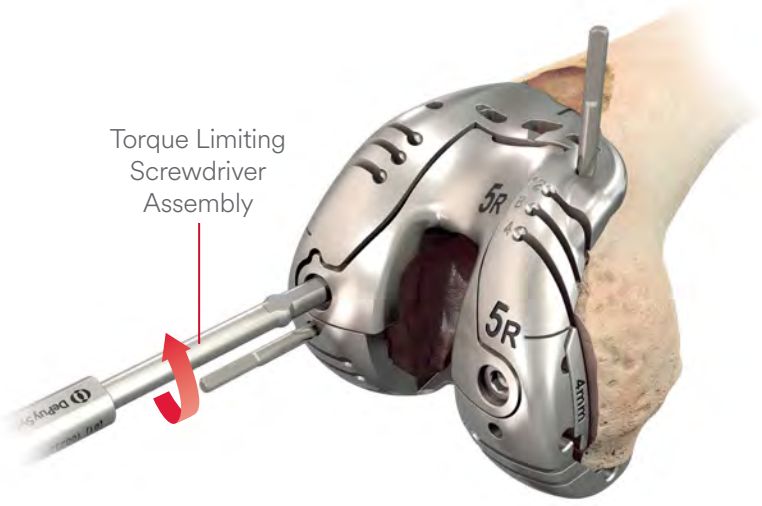
Box Resection

Cut Through Trial

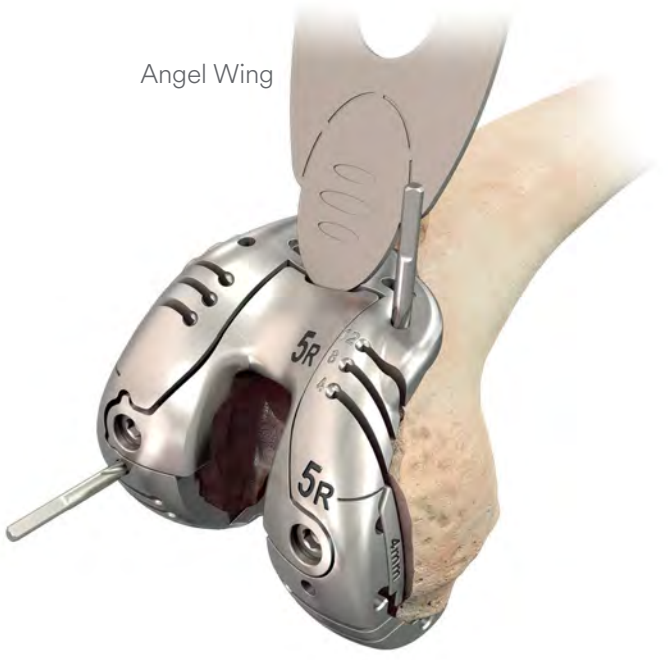
Straight Stem

Offset Stem

With the Femoral Trial pinned in place, remove the Tibial Insert Trial or Revision Spacer Block and Shim. Disconnect the two distal Hexes and remove the IM Assembly utilizing the Angel Wing.



Slide the wide end of the Angel Wing in to the slot on the anterior flange between the Cut Through Trial and IM Connector and lever the IM Connector distally.



Femoral Preparation

Box Resection


Cut Through Trial


Straight Stem


Offset Stem

A Reciprocating Saw is recommended for resecting the sides of the Femoral Box. Use the side walls of the box opening on the Cut Through Trial as a Guide.

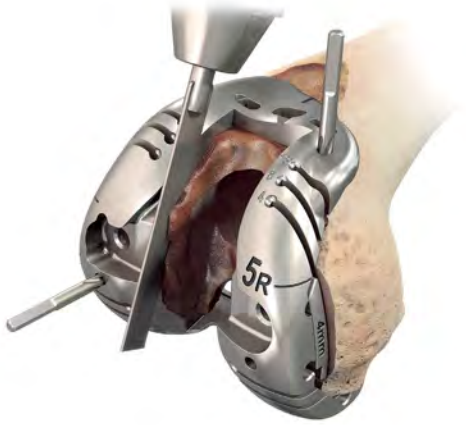
Attach the Box Cut Platform to the anterior flange of the Cut Through Trial and proceed to resect the top of the box with the Reciprocating Saw or Narrow Saw Blade.

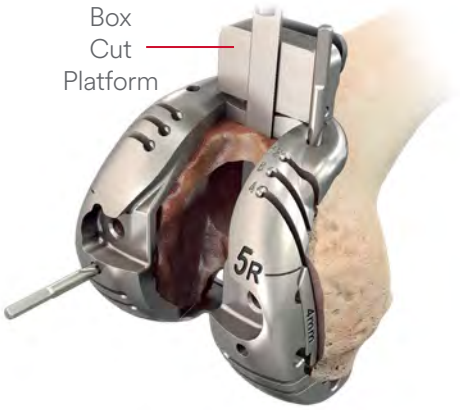
A groove is machined into the bridge between the posterior condyles, once the top of the box resection has been completed this groove is fully visible.

Check completeness of the box resection using the Angel Wing against the Box Cut Platform and along the sides of the box opening in the Cut Through Trial.

Remove the Box Cut Platform and the Cut Through Trial from the prepared femur.

For Femoral Trial Assembly with a Straight or Offset Stem, proceed to **page 138.**





▲ Warning:

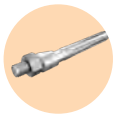
If the box resection is not complete, the connecting components may not seat.

Femoral Preparation

Seating the Femoral Trial


Cut Through Trial


Straight Stem


Offset Stem

Assemble the Femoral Trial, Box Trial, Stem Trial Bolt, Boss Trial or Offset Adaptor Trial, and Stem Trial as described on **page 54** and any appropriate Augment Trials as described on **page 59**.

If offset is being used, position the Femoral Offset Adaptor Trial to the offset orientation previously noted in the Cut Through Trial with Offset Stem workflow from **pages 128 - 130**, and tighten the Stem Trial Bolt.

Introduce the Femoral Trial Assembly to the prepared femur. Utilize the ATTUNE System Impactor to seat the Femoral Trial Assembly.

Proceed to **Setting Tibial Base Rotation on page 150**.

If desired, to add a Sleeve to the construct proceed to **page 139.**

▲ Warning:

The ATTUNE Revision Femoral Augment Trials contain magnets. These devices should be kept at a safe distance from a patient's active implantable medical device(s) (i.e. pacemaker) in order to avoid adversely affecting the device. The Femoral Augment Trials should be kept at an appropriate location when not in use in the surgical site.

Femoral Preparation

Broaching

Cut Through Trial

Femoral Sleeve and Stem

The following workflow is for an intraoperative transition from a well balanced Cut Through Trial with a Long Straight Stem to a Sleeve and Stem Preparation using the Cut Through Trial.

■ Notes:

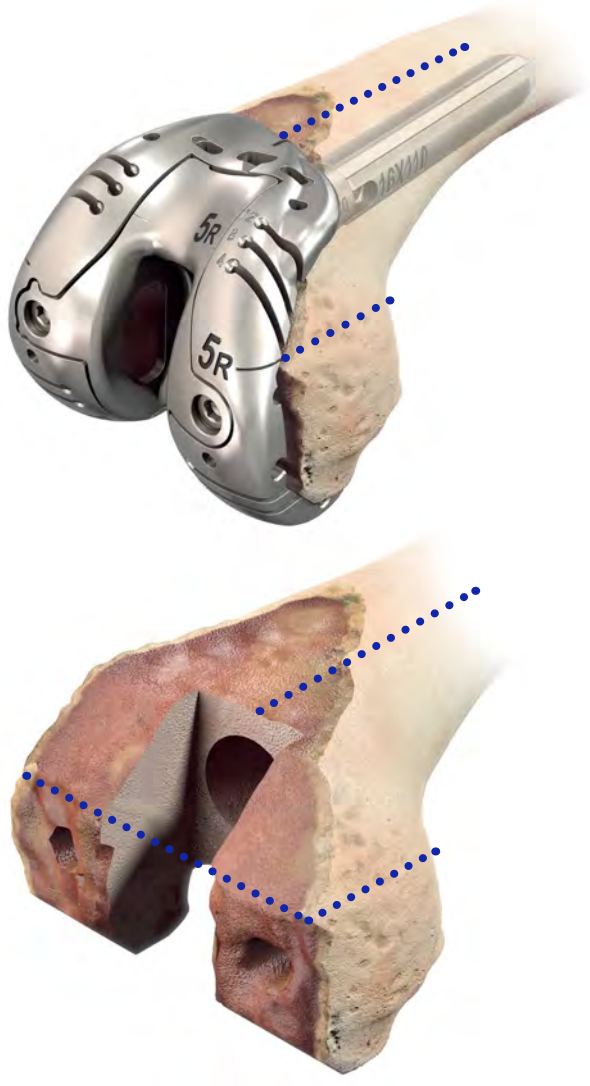
Prior to continuing with this workflow the Straight Stem workflow must be completed.

Once the flexion and extension gaps have been established through the Cut Through Trial **and the box resection has been performed** proceed with the following steps for Broach Preparation.

Translate the lines on the medial, lateral sides and anterior flange of the Cut Through Trial onto the distal femoral bone.

These lines represent the A/P and M/L positions of the Femoral Boss and shall correspond with the desired Broach axis as the subsequent Broaching steps are performed. See image on **page 143**.

Connect the lines on the medial and lateral femur across the distal surface of the femur.



Femoral Preparation

Broaching

Cut Through Trial

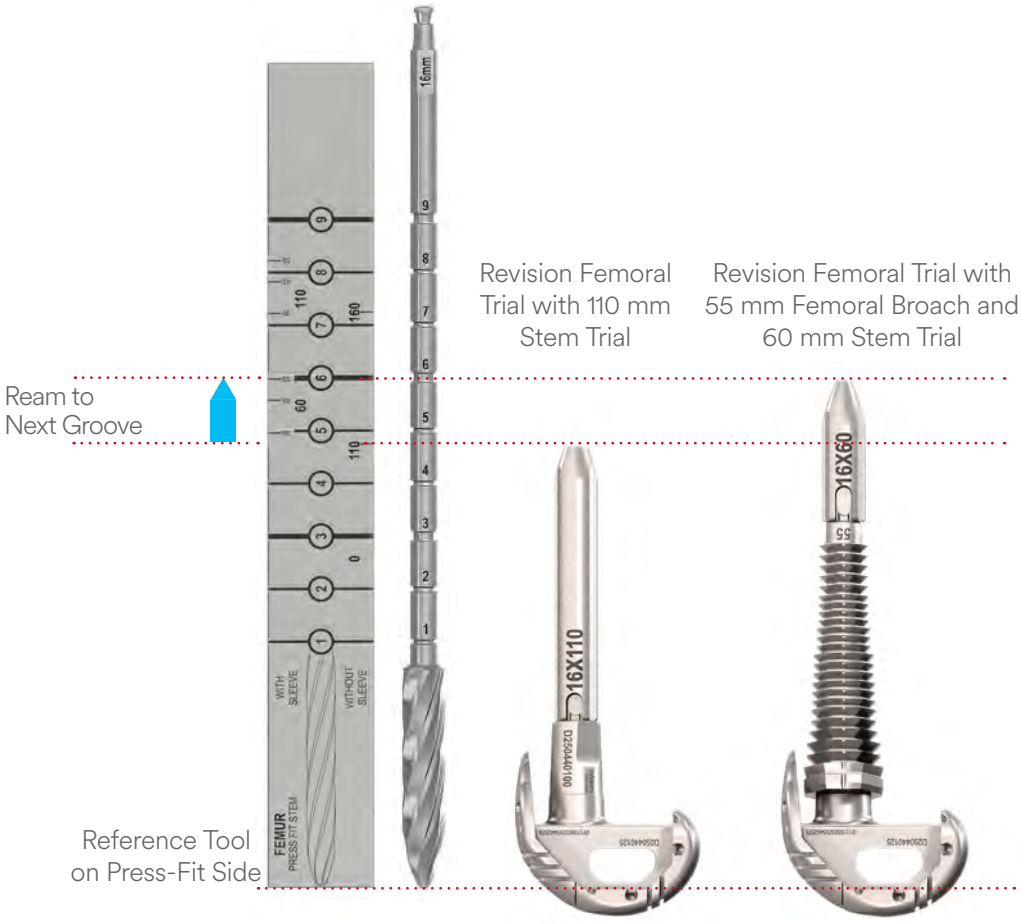
Femoral Sleeve and Stem

Revisit the Femur Reference Tool to ensure that the femoral canal has been reamed to the appropriate depth for a Femoral Broach and Stem.

Example of Reamer Reference Tool use for Press-Fit Stem and Femoral Sleeve:

The Cut Through Trial assessment was performed with a 110 mm Stem Trial and Pre-operative Planning suggested use of a 55 mm Sleeve. To accommodate the Sleeve within the overall construct length, a 60 mm Stem should now be used instead of the 110 mm Stem.

Ream to Groove 6. The resultant implant construct (Femoral Component, 60 mm Stem, 55 mm Femoral Sleeve) will align with the Femoral Sleeve Trial construct but will be slightly longer than the 110 mm Stem Trial *without sleeve* as can be seen by comparing the position of the 55 mm Sleeve and 60 mm Stem versus the 110 mm Stem without Sleeve on the Reamer Reference Tool.



Femoral Preparation

Broaching

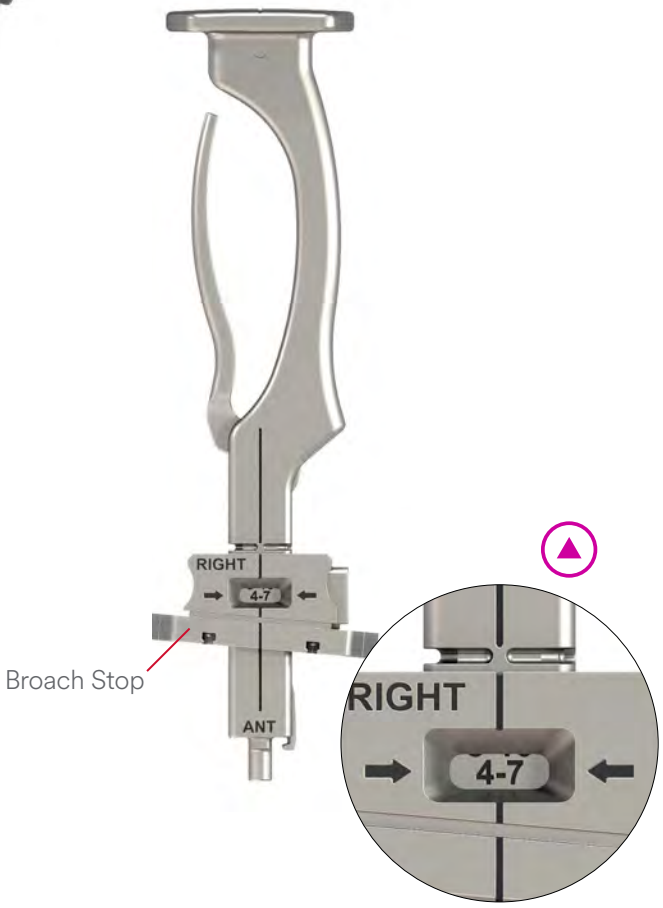
Cut Through Trial

Femoral Sleeve and Stem

Assemble the corresponding Stem Trial to the smallest Femoral Broach.

If utilizing the KINCISE™ Surgical Automated System for Femoral Broaching, proceed to Appendix A on Page 216.

Connect the correct side, “Left or Right”, Broach Stop of the appropriate size grouping, 1 - 3, 4 - 7, 8 - 10, to the Revision Broach Handle.



▲ Warning:

A Broach Stop must be utilized when broaching the femur.

Femoral Preparation

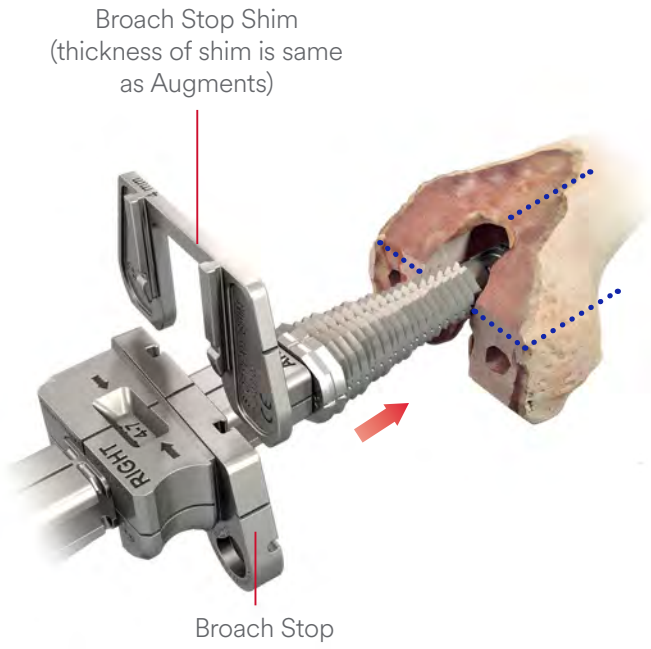
Broaching

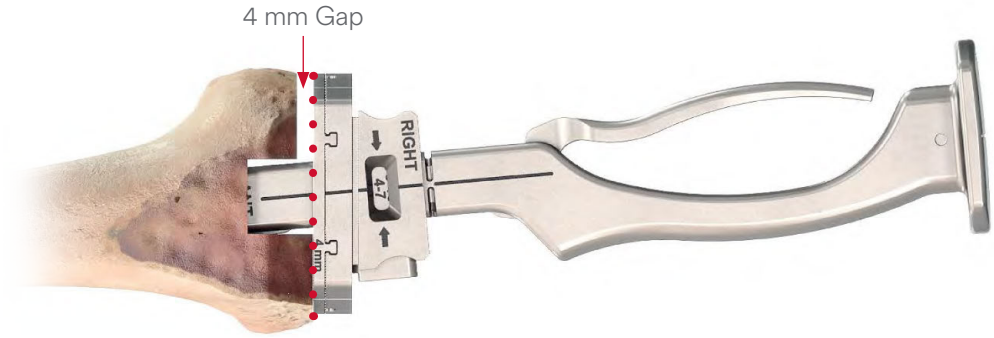
Cut Through Trial

Femoral Sleeve and Stem

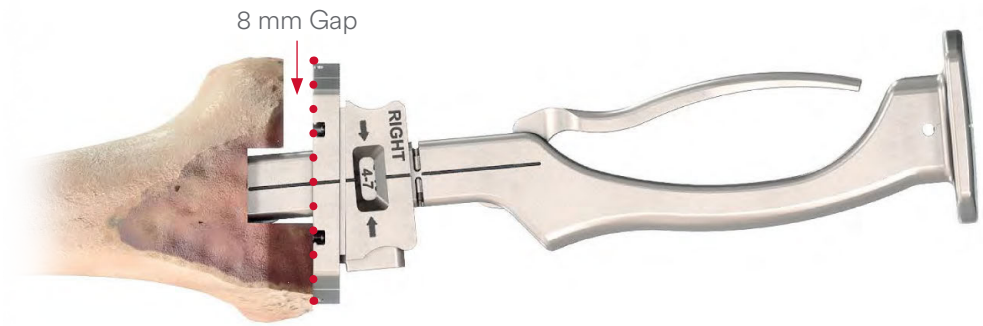
If Distal Augment Trials were utilized in the Cut Through Trial to achieve desired placement of the Femoral Component, apply the Broach Stop Shim that corresponds to the thinnest of the Distal Augment Trials utilized.

Example
8 mm Distal Medial and 4 mm Distal Lateral - Utilize the 4 mm Broach Stop Shim
8 mm Distal Medial and NO Distal Lateral - No Broach Stop Shim is to be applied





8 mm Distal Medial and 4 mm Distal Lateral



8 mm Distal Medial and NO Distal Lateral

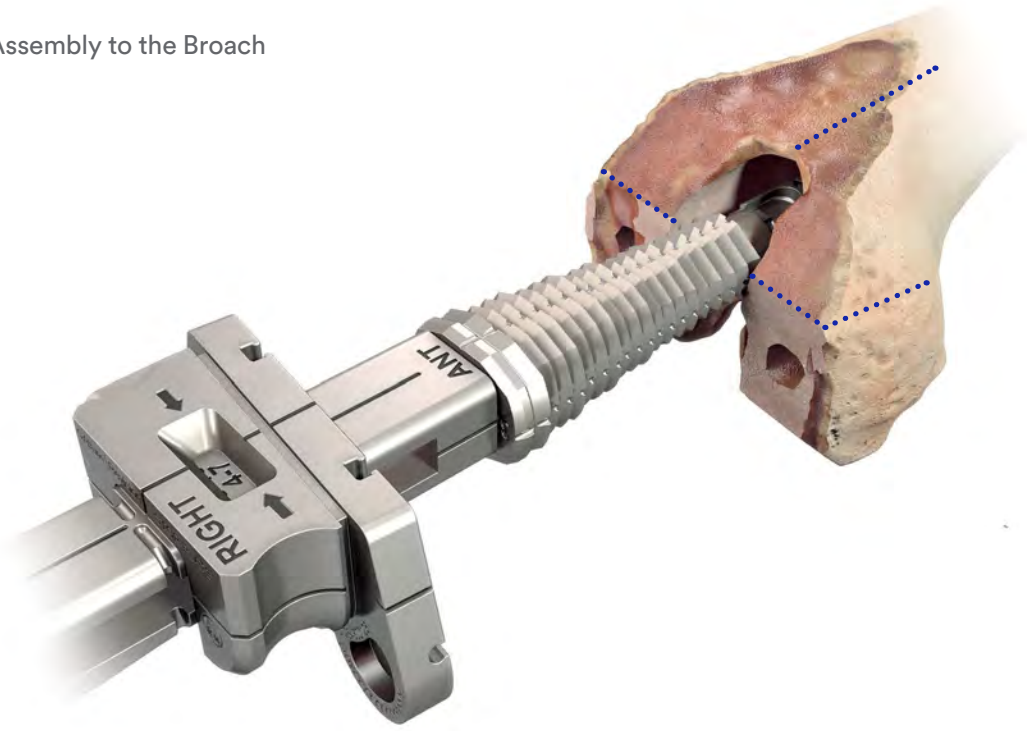
Femoral Preparation

Broaching

Cut Through Trial

Femoral Sleeve and Stem

Connect the Broach Assembly to the Broach Handle Assembly.



Femoral Preparation

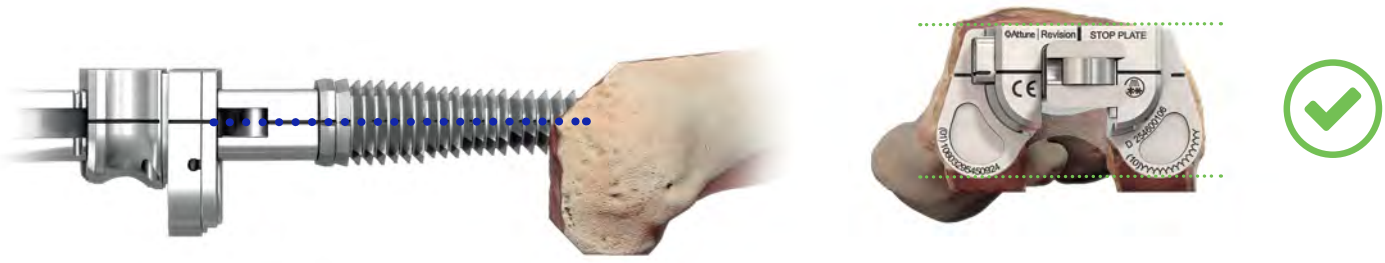
Broaching

Cut Through Trial

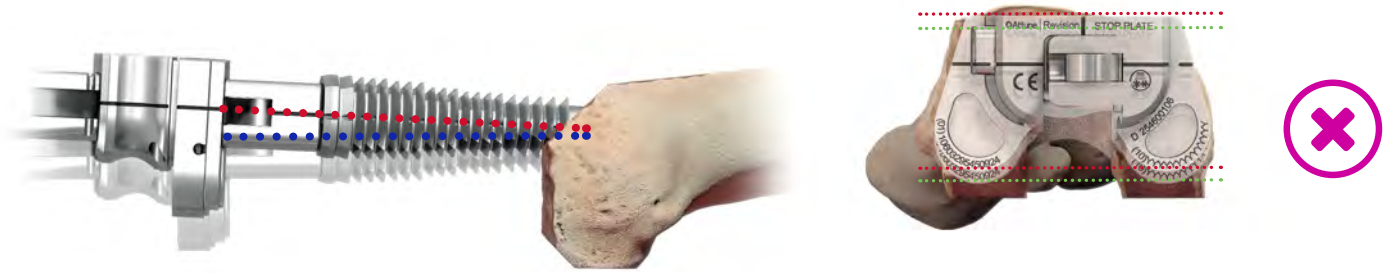
Femoral Sleeve and Stem

Utilize the A/P reference line indicated on the distal femur along with the marking lines along the side of the Broach, Broach Handle and Broach Stop to aid in guiding the placement of the Femoral Broach during Broaching.

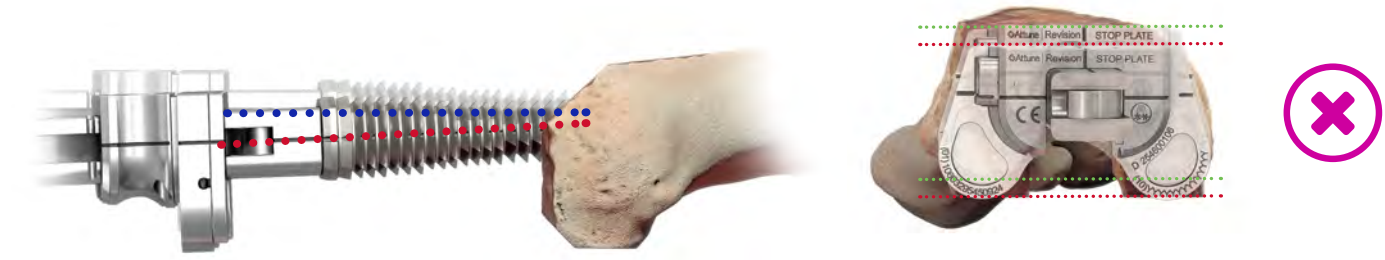
Frequently check that the A/P position indicated by the lines along the sides of the Broach, Broach Handle, Broach Stop, and/or Broach Stop Shims has not migrated anteriorly or posteriorly with respect to the A/P reference line on the distal femur.



Broach Aligned with Reference Marks



Broach Shift Anterior



Broach Shift Posterior

Femoral Preparation

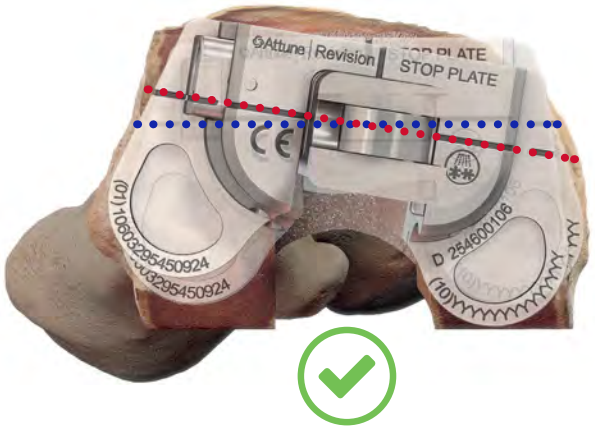
Broaching

Cut Through Trial

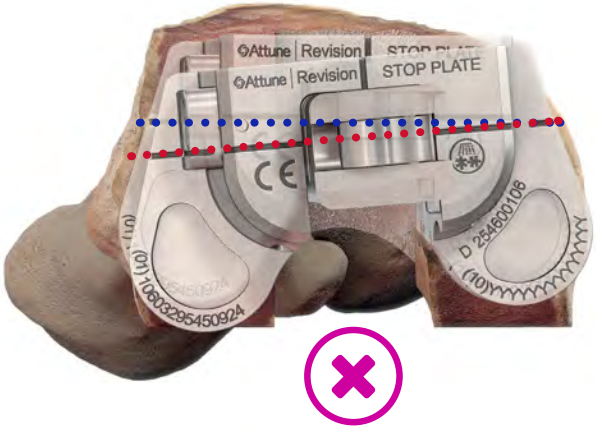
Femoral Sleeve and Stem

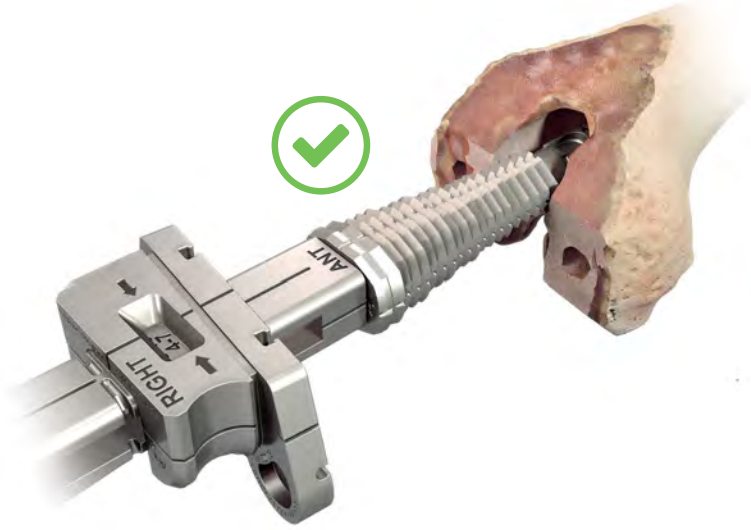
If rotation is required for Femoral Broach fixation then the markings on the medial and lateral aspects of the Broach will not align to the markings on the femoral bone and the distance between the marked line on the femur and the line on the Broach should be equivalent on both the medial and lateral sides.

Uniform Rotation



Non-Uniform Rotation





Femoral Preparation

Broaching

Cut Through Trial

Femoral Sleeve and Stem

Every effort in broaching should be made to align the markings on the Femoral Broach with those on the distal femur so that the position of the Femoral Component is not shifted.

		Options to Address Broach Positional Variation
Broach Positional Variation from Original Cut Through Trial with Stem Assessment	If the M/L position of the Broach shifts	The Conventional Cut Guide and Notch Guide should be utilized to re-prepare the box resection in the correct M/L placement
		Assess bone coverage and potential overhang/underhang introduced by new M/L position
	If the Broach shifts anteriorly	Assess the impact to the flexion space and potentially upsize the Femoral Component. Assess potential overhang of the new femoral size
		If upsizing is not possible, assess the need to resect more posterior bone and/or increase the Insert thickness and proximalize the Broach
	If the Broach shifts posteriorly	Assess the impact to the anterior cortex as well as the flexion space and potentially downsize the Femoral Component. Assess potential overhang/underhang/notching of the new femoral size
		If downsizing is not possible, assess the need to resect more anterior bone, decrease the Insert thickness, and distalize the Broach by increasing the Broach size and utilizing the Broach Stop Shims
	If the Broach non-uniformly rotates with respect to the A/P reference line. For example see previous page	This will result in either anterior or posterior shift of the Broach. See the above options to address either shift
	If the Broach uniformly rotates with respect to the A/P reference line. For example see previous page	No adjustment is necessary

For Sleeve/Femoral Component compatibility, refer to **page 86.**

■ Notes:

With the construct change from a femur with a long Stem to a femur with a Sleeve and shorter Stem, one can anticipate there may be some subtle changes in the position of the femur.

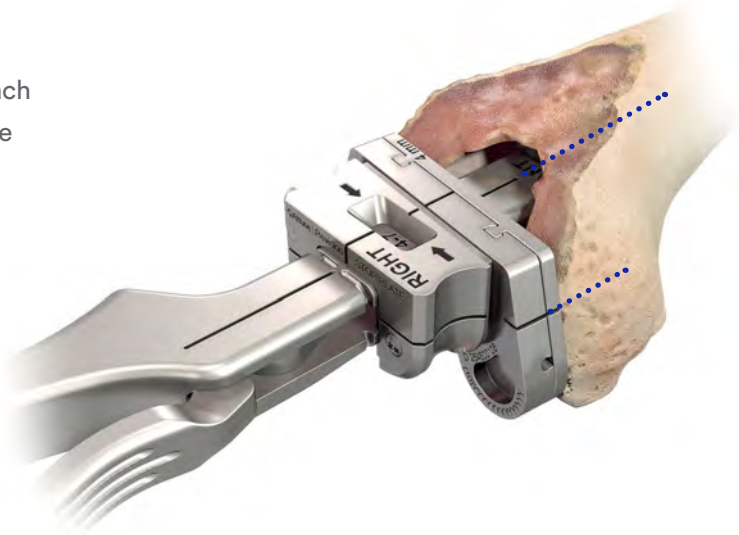
Femoral Preparation

Broaching

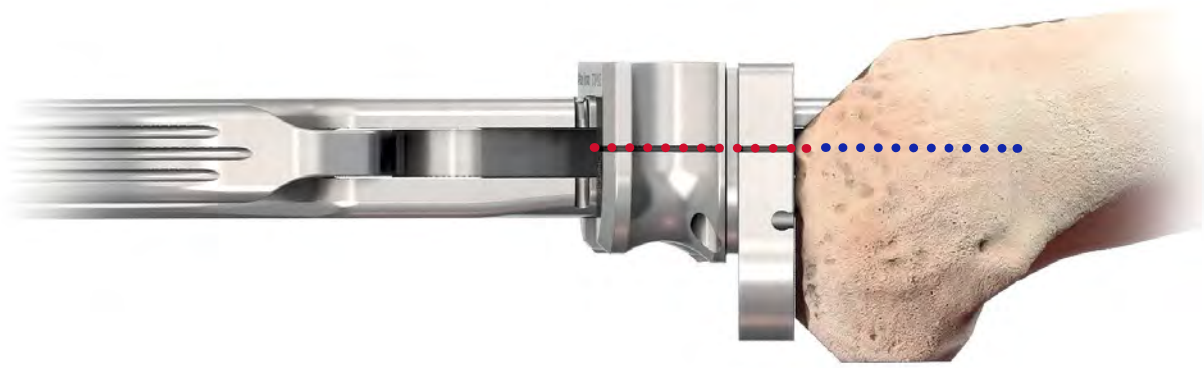
Cut Through Trial

Femoral Sleeve and Stem

Advance the Broach until the Broach Stop, or Broach Stop Shim is seated on the most prominent surface of the distal femur.



Check that the Broach is rotationally stable. If not, progressively increase the Broach size until rotational stability is achieved.



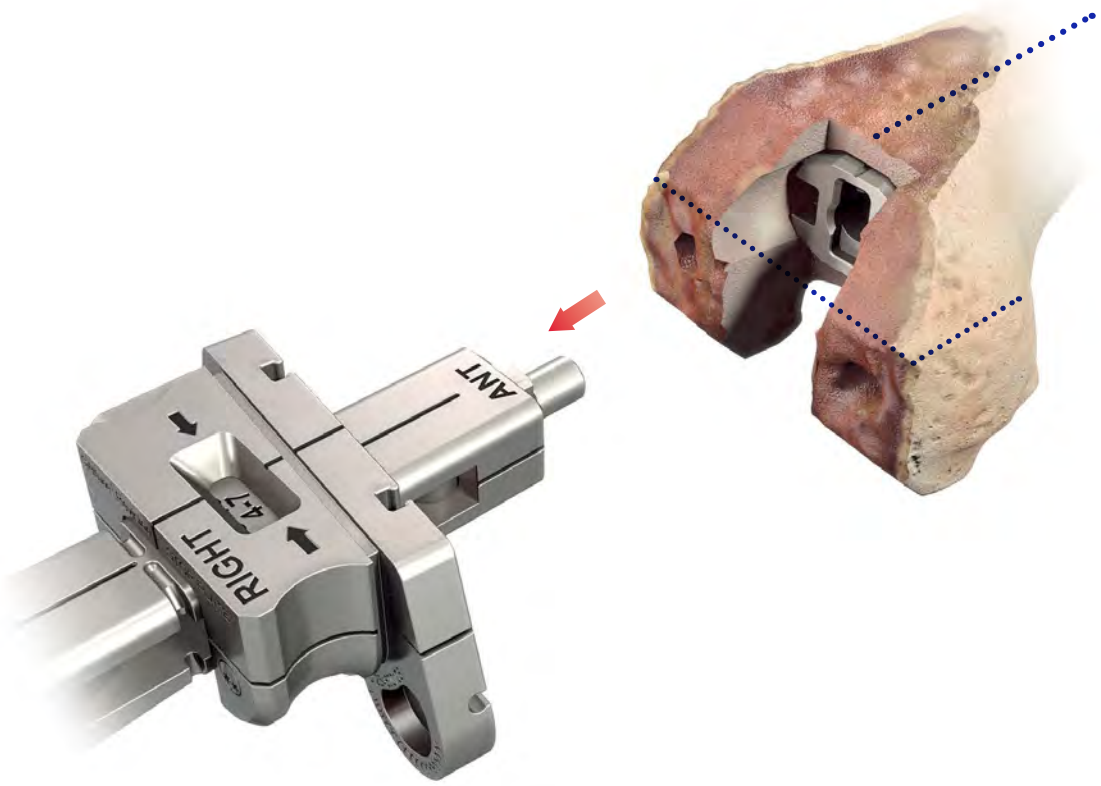
Femoral Preparation

Broaching

Cut Through Trial

Femoral Sleeve and Stem

After progressively broaching the femoral canal to stability, detach the Broach Handle.



For Femoral Trial Assembly with a Broach, proceed to **page 149**.

Femoral Preparation

Seating the Femoral Trial

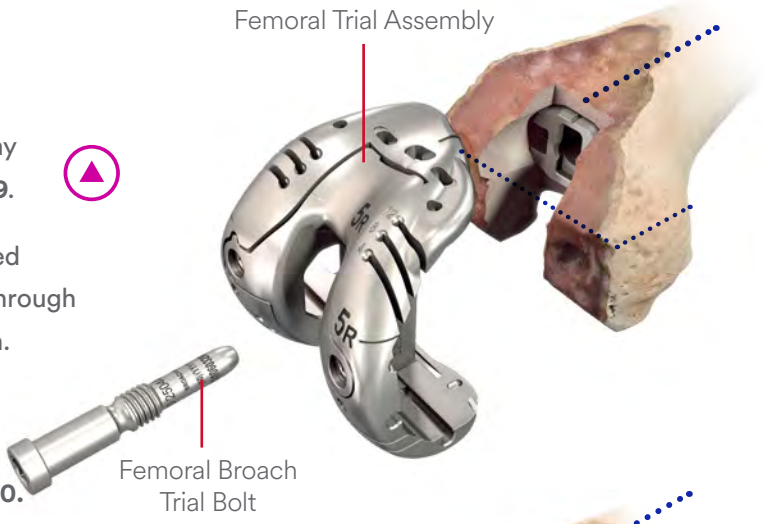
Cut Through Trial

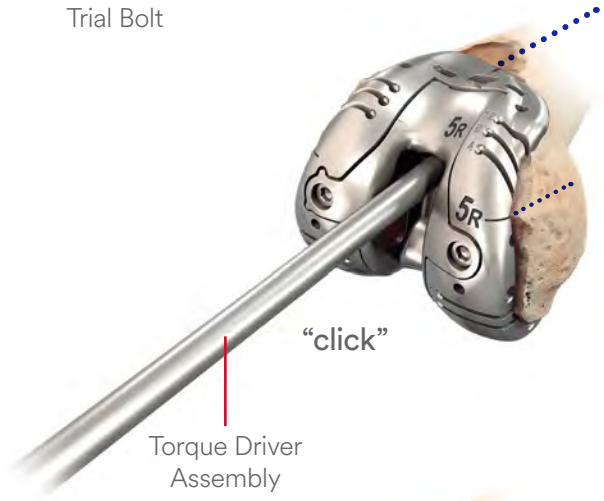
Femoral Sleeve and Stem

Assemble the Femoral Trial with the Box Trial and any appropriate Augment Trials as described on **page 59**.

Introduce the Femoral Trial Assembly to the prepared femur and introduce the Femoral Broach Trial Bolt through the hole in the Box Trial and into the Femoral Broach. Tighten with the Torque Driver with 6 mm Hex Driver.

Proceed to **Setting Tibial Base Rotation on page 150.**





▲ Warning:

The ATTUNE Revision Femoral Augment Trials contain magnets. These devices should be kept at a safe distance from a patient's active implantable medical device(s) (i.e. pacemaker) in order to avoid adversely affecting the device. The Femoral Augment Trials should be kept at an appropriate location when not in use in the surgical site.

■ Notes:

If the Cut Through Trial Assembly and Broach Trial Bolt do not engage in the Broach, slightly extract the Broach with the Broach Handle, attach the Cut Through Trial Assembly to the Broach via the Broach Bolt leaving it slightly loose to allow the instruments to locate within the prepared cavity, and advance the Trial construct until seated to the prepared depth using the ATTUNE System Impactor.

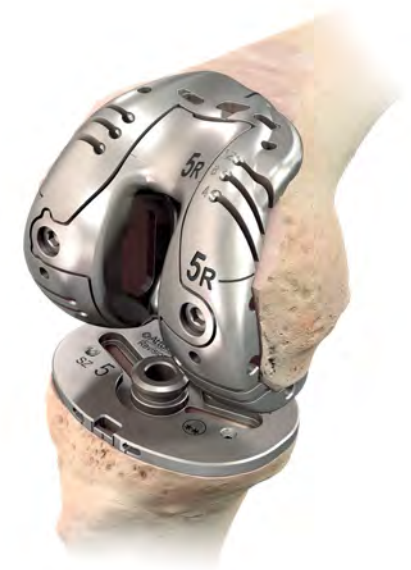
Setting Tibial Base Rotation

Now set the Tibial Base rotation with the surgeon's preferred technique. Options include:

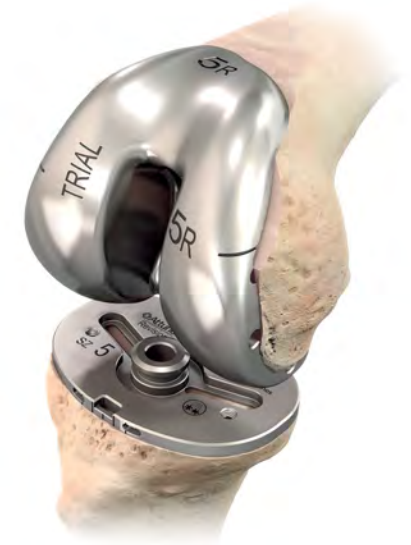
- Optimizing Tibial plateau coverage
- Alignment with the medial third of the Tibial Tubercle

If Tibial Augment preparation is required, proceed to **page 151.**

If Tibial Augments are not required or have been prepared previously in the procedure, proceed to Keel Preparation on **page 153.**



Cut Through Trial



Solid Femoral Trial

Tibial Augment Preparation

With the RP Base orientation determined, Tibial Augment resection may be performed at this time if it has not previously been prepared.

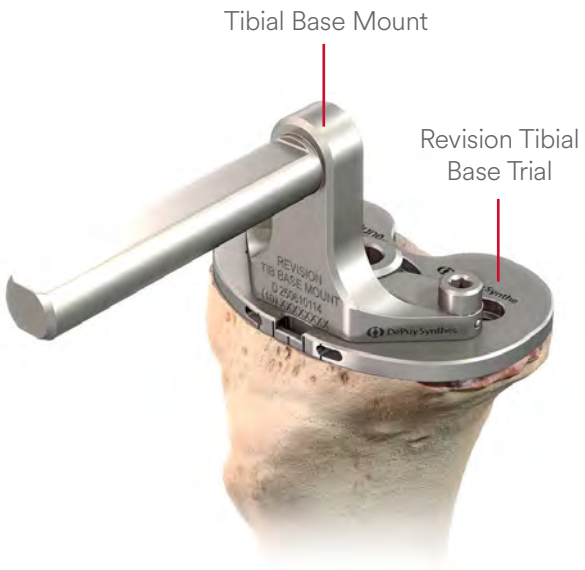
Assemble the Revision Base Mount to the Tibial Base Trial.

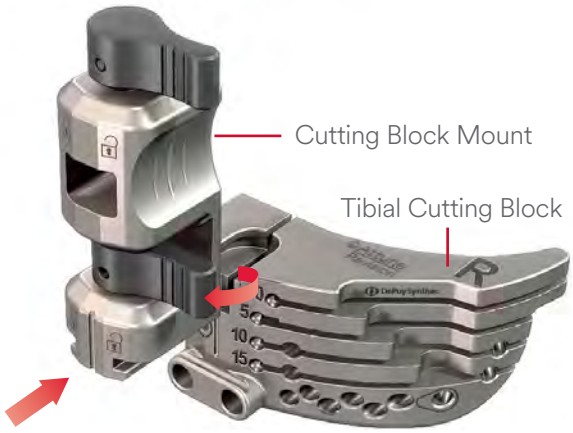
Assemble the Cutting Block Mount to the Revision Tibial Cutting Block and connect to the Base Mount.

Make the appropriate Augment resection taking care to maintain proper tibial rotation.

The 0 (zero) slot is aligned with the bottom surface of the tray. It does not allow for a clean-up resection at this stage; to perform a clean-up resection return to either **page 33** for EM Tibial Resection or **page 43** for IM Tibial Resection.

Once any necessary Tibial Augment resections are complete, remove all Tibial Augment resection instruments. Should Lateral Augments be required, if exposure permits, utilize the opposite leg Tibial Cutting Block. Ensure all bone debris is cleared from the joint space.





■ Notes:

To complete the Augment resection, the Tibial Base Trial and additional tibial instrumentation may need to be removed from the bone after pinning the Cutting Block in place. The vertical slot in the central aspect of the Tibial Cutting Block may aid in initiating the center line of the Tibial Augment resection.

▲ Warning:

When Tibial Augments are used with the ATTUNE Revision RP Tibial Base, only the 29 mm ATTUNE Tibial Sleeves may be used. For the ATTUNE Revision RP Tibial Base Size 2, Tibial Augments or a Tibial Sleeve may be used individually, but not in combination.

Tibial Augment Preparation

If Tibial Augments have been prepared, assemble the appropriate Tibial Augment Trial to the correct side of the Revision RP Base Trial with the Torque Limiting Screwdriver Assembly.

Place the Revision RP Base Trial Assembly back onto the tibia to check the fit.

The Tibial Base Trial Extractor connected to the Revision System Handle may be utilized to aid in seating the Trial construct.

For Keel Preparation, proceed to **page 153.**

Keel Preparation

If not previously prepared, attach the Revision Keel Punch corresponding to the correct tibial size grouping (1 - 2, 3 - 5, 6 - 8, and 9 - 10) to the Revision System Handle.

Impact the Keel Punch into the cancellous bone until the Keel Punch is fully seated with the Tibial Base Trial. Remove the Keel Punch and Handle.

▲ Warning:

Keel punching is only allowed with the RP Base Trial and RP Stem Adaptor or the RP Base Trial and the Tibial Sleeve Trials.

Patella Resection and Preparation – Instrument Assembly

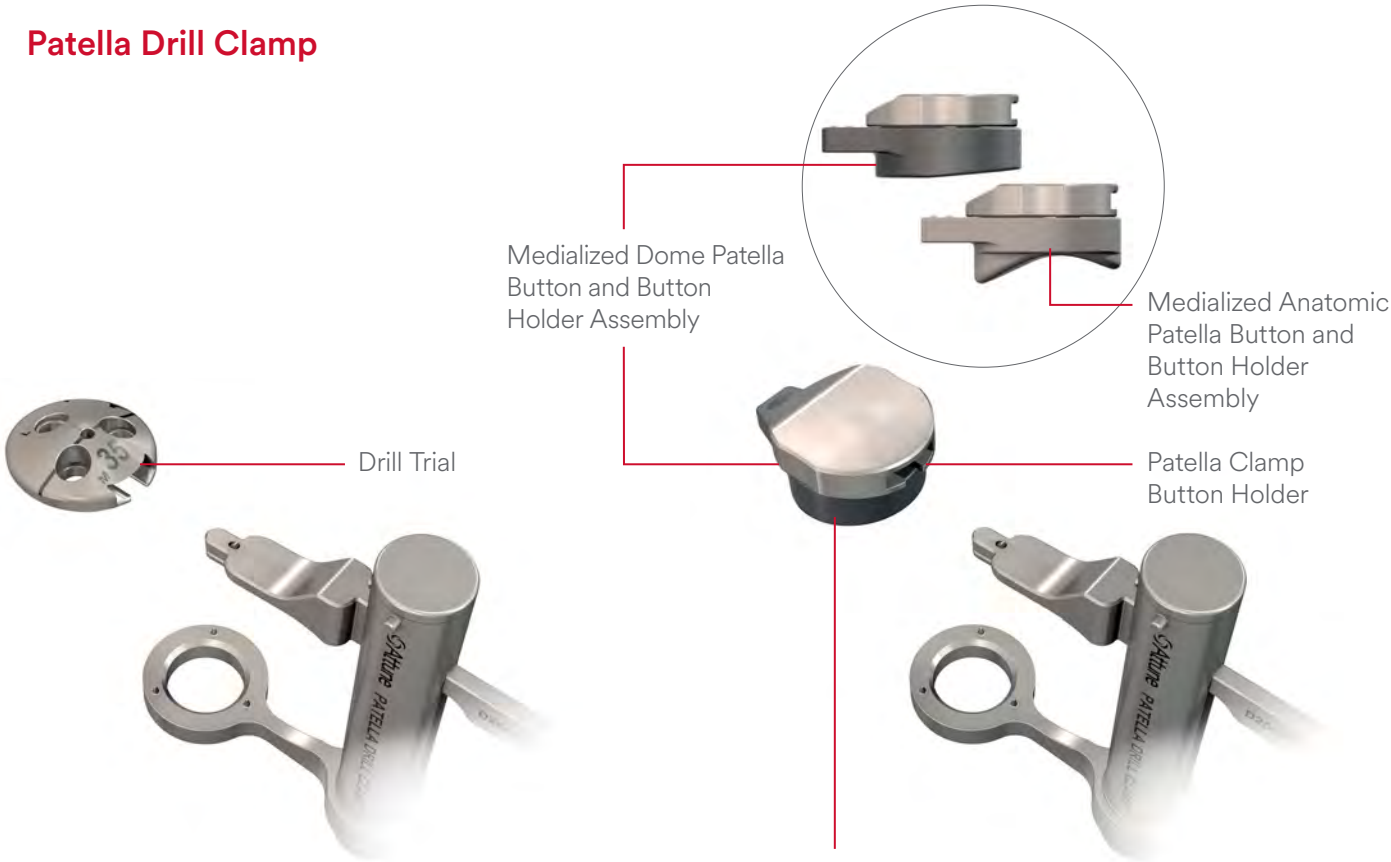
Patella Resection Guide

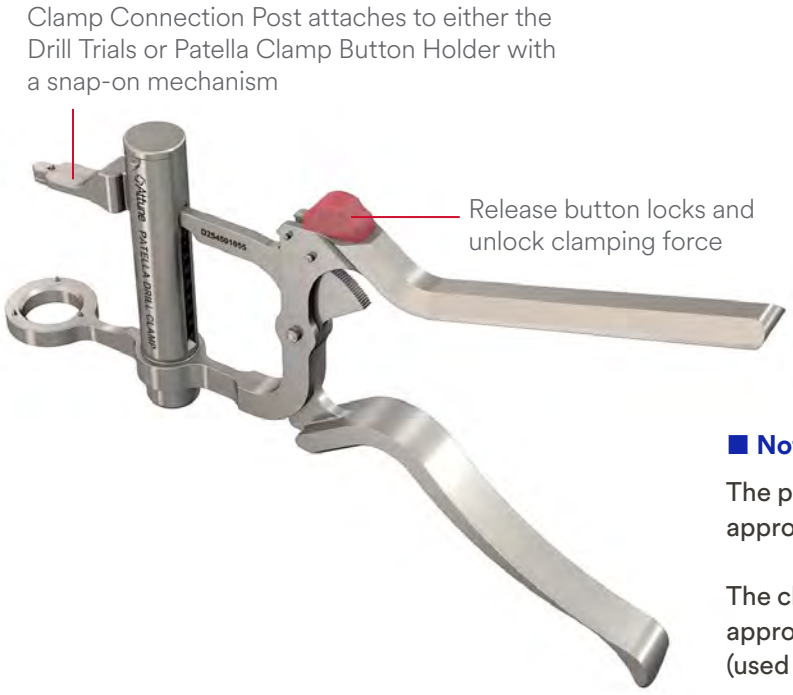
Patella Drill Trials

Assemble by inserting the Trial Handle into the slot on the Drill Trial until it clicks into place.

Patella Resection and Preparation – Instrument Assembly

Patella Drill Clamp





■ Notes:

The patella instrumentation is designed for a medial approach only.

The clamp and trial handle are designed for a medial approach only. The Resection Guide and Drill Trials (used as stand alone without the clamp) can be used for a medial or lateral approach.

Patella Resection

Use the Caliper to estimate the thickness of the patella and evaluate the level of bone resection. The Height Gauge on the Patella Resection Guide accounts for a resection of 9.5 mm of bone, which is the average thickness of the ATTUNE Knee Systems Patellae.

Patella Guide Shim

Place the leg in extension and evert the patella.

Position the Patella Resection Guide so the Height Gauge is against the articular surface of the patella. Align the serrated jaws at the medial and lateral margins of the articular surface. Engage the largest tooth on the lateral side then engage the largest tooth on the opposite side to temporarily secure the clamp while allowing for rotation of the patella until the inferior and superior orientation is achieved and clamp fully.

▲ Warning:

If the patellar thickness is less than 21.5 mm, the thickness of the bone remaining after resection would be less than 12 mm and resecting less bone should be considered.

If less resection is required, the Patella Guide Shim is available which reduces the depth of the resection to 7.5 mm.

Patella Resection

Perform the resection using an Oscillating Saw through the Saw Capture.

If desired, place a Patella Wafer on the resected surface by hand to protect the patellar bone bed.

■ Notes:

When resecting the patella, care should be taken to avoid Saw Blade excursion into the Femoral Trials or Implants.

Patella Implant Options

Medialized Anatomic Patella

Medialized Dome Patella

Patella Size Chart

Size	Thickness
29	8.5 mm
32	9 mm
35	9.5 mm
38	10 mm
41	10.5 mm

Two patella options are available, the Medialized Dome Patella or the Medialized Anatomic Patella.

The Medialized Anatomic Patella is designed to be conforming with the Femoral Component and has a built in range of +/- 15 degrees freedom of rotation from its optimal position. Therefore, accurate alignment of the Patella Drill Trial is important for proper patella placement and tracking.

The following steps will aid in accurate alignment of both patella designs, but is particularly critical for the Medialized Anatomic Patella.

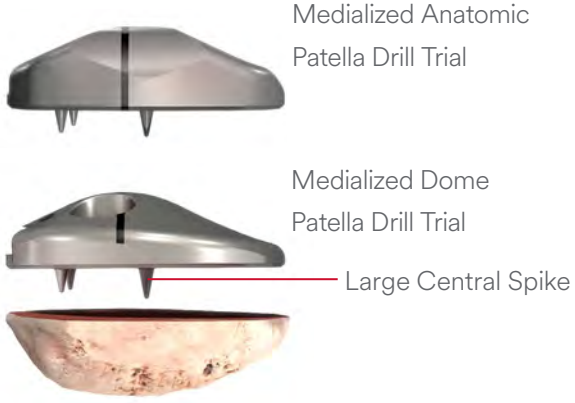
Patella Drill Trialing

If used, remove the Patella Wafer from the patella. Place the Patella Drill Trial on the resected patella to assess bone coverage.
Select the correct size of Patella Drill Trial for maximum patella bone coverage. Verify the medial lateral location of the patella implant apex relative to the native anatomy ridge.

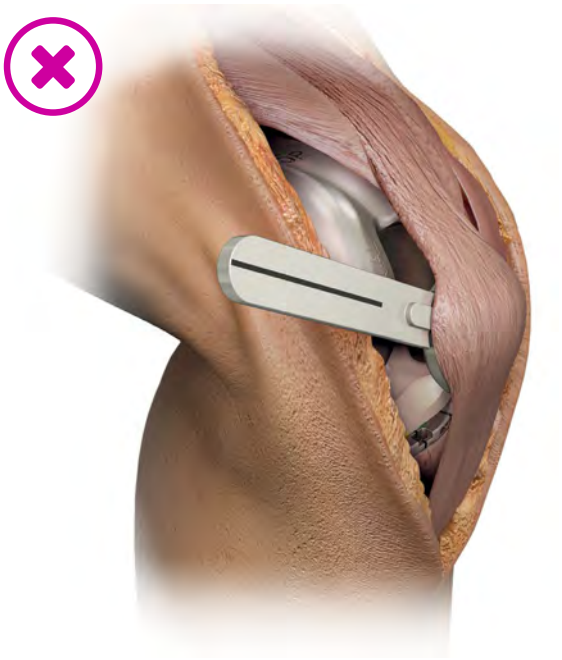
Patella Drill Trialing

Press the trial onto the bone manually or with the Patella Modular Clamp and Clamp Ring to engage spikes.

The Drill Trials have one larger central spike to allow engagement of only the central spike so that the Drill Trial may be rotated about the central axis to aid in assessment of its optimal position prior to being fully seated on bone.



Correct Trial Handle Alignment



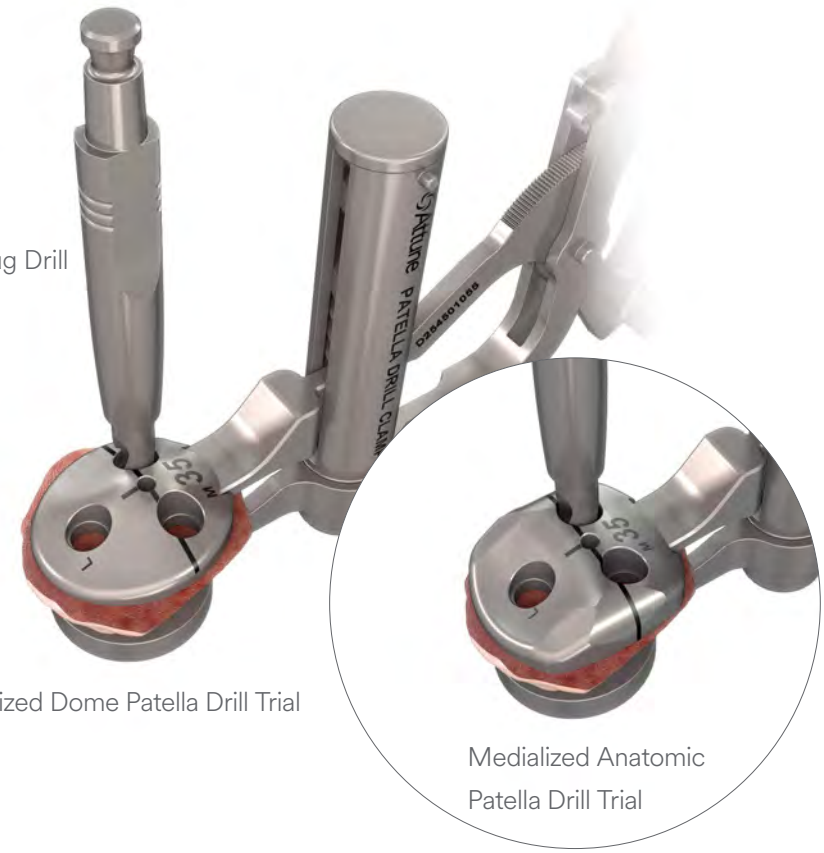
Incorrect Trial Handle Alignment

■ Notes:

In a case where a short patella tendon raises concern about the Medialized Anatomic Patella contacting the top of the spine of the PS Femoral Component, it is recommended to downsize the patella, superiorize and medialize its position. If that recommended positioning does not resolve the concern, the surgeon should consider using the medialized dome patella.

Lug Hole Preparation

Patella/Femoral Lug Drill



Medialized Dome Patella Drill Trial

Medialized Anatomic
Patella Drill Trial

▲ Use the Patella Modular Clamp to secure the Drill Trial if desired. Drill the holes using the Patella/Femoral Lug Drill.

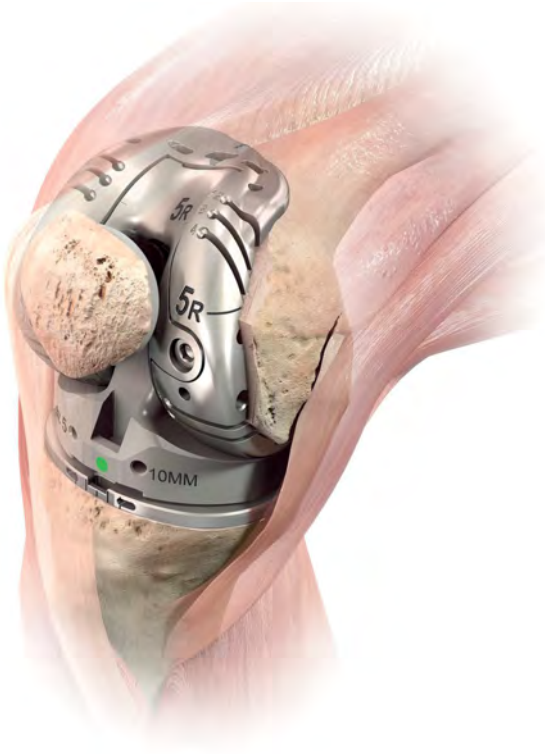
▲ Warning:

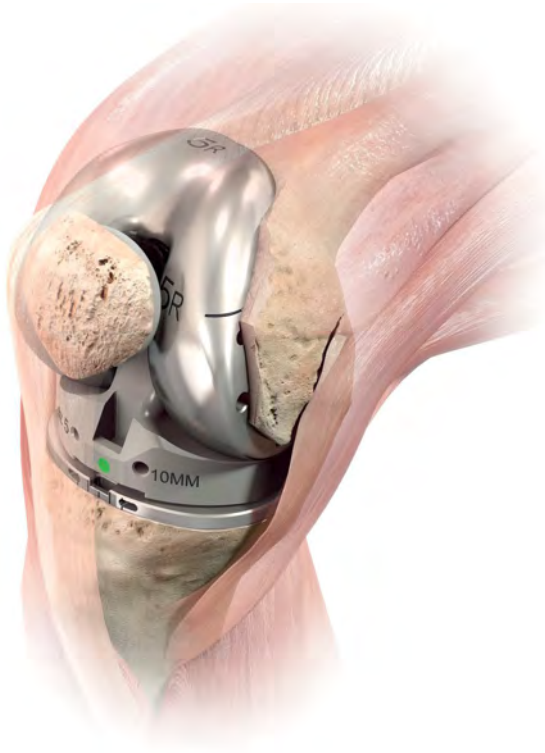
If the surgeon is not satisfied with alignment or tracking of the Medialized Anatomic Patella Trial after drilling the peg holes, it is recommended to use a Medialized Dome Patella. The patella peg hole preparation is identical for the Medialized Dome Patella and the Medialized Anatomic Patella.

Final Trial Assessment

Introduce the RP Insert Trial from the top down, over the central feature in the RP Base Trial.

Complete final Trial evaluation and proceed to Trial removal.





RP Insert Trial Removal

To remove the Tibial Insert Trial, fully flex the knee and connect the Insert Trial Handle to the anterior features on the Tibial Insert Trial and lift the Insert Trial up and out of the joint space, over the central feature of the RP Base Trial.

Femoral Trial Removal

Remove any Pins prior to extracting the Trial Assemblies.

Remove the Revision Tibial Insert Trial using the ATTUNE Primary INTUITION Insert Trial Handle.

When using an Offset Adaptor or a Femoral Sleeve **ensure that the Central Bolt is tightened prior to extraction.**

To remove the Femoral Trial Assembly, assemble the Femoral Extractor to the Central Bolt feature of the Femoral Box Trial and extract from the prepared femur. If necessary, the Slap Hammer may be assembled to the Femoral Extractor to aid in Trial removal.

Retain the Trial Assembly to aid in setting rotation for final Implant Assembly.

■ Notes:

If the Broach or Offset Adaptor Trial loosens during extraction from the femur, then partially assemble the Trial back to the bone and tighten the Central Bolt to regain the correct Trial orientation. This will then be used to aid in setting the rotation of the Final Implant Assembly.

Tibial Trial Removal

Remove any Pins prior to extracting the Trial Assemblies.

For Tibial Sleeve Trial or Broach constructs **ensure that the Central Bolt is tightened prior to extraction.** To remove the Revision RP Tibial Base Trial, assemble the Revision Tibial Base Trial Extractor to the Revision System Handle and slide the assembly over the central feature of the RP Tibial Base Trial and extract from the prepared tibia.

Retain the Trial Assembly to aid in setting rotation for final Implant Assembly.

■ Notes:

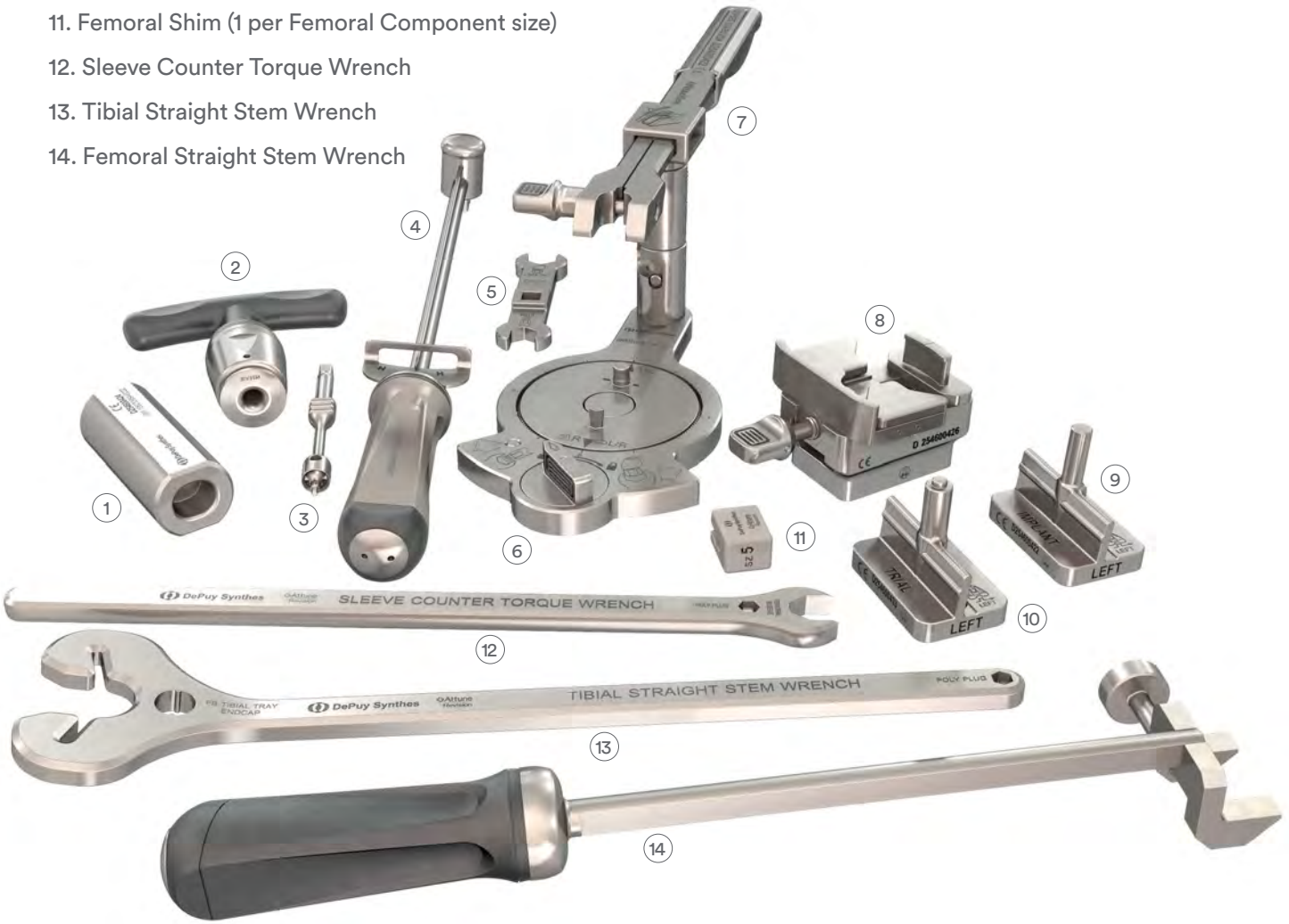
If the Broach or Tibial Sleeve Trial loosens during extraction from the tibia, then partially assemble the Trial back to the bone and tighten the central Bolt to regain the correct Trial orientation. This will then be used to aid in setting the rotation of the Final Implant Assembly.

Implant Assembly Instructions

There are 14 Assembly Instruments in the system to aid in the building of the final Implant construct:

1. Revision Sleeve Impactor
2. Torque Driver
3. Augment 2.5 mm Wobble Bit
4. Implant Assembly Wrench
5. Assembly Wrench Adaptor
6. Assembly Base
7. Offset Stabilizer
8. Tibial Vice
9. Femoral Implant Post
10. Femoral Trial Post
11. Femoral Shim (1 per Femoral Component size)
12. Sleeve Counter Torque Wrench
13. Tibial Straight Stem Wrench
14. Femoral Straight Stem Wrench

After extracting the ATTUNE Revision Trial from the prepared bone, **retain the assembled trial construct** to reference in the definitive Implant Assembly.



Augment Assembly

Straight Stem

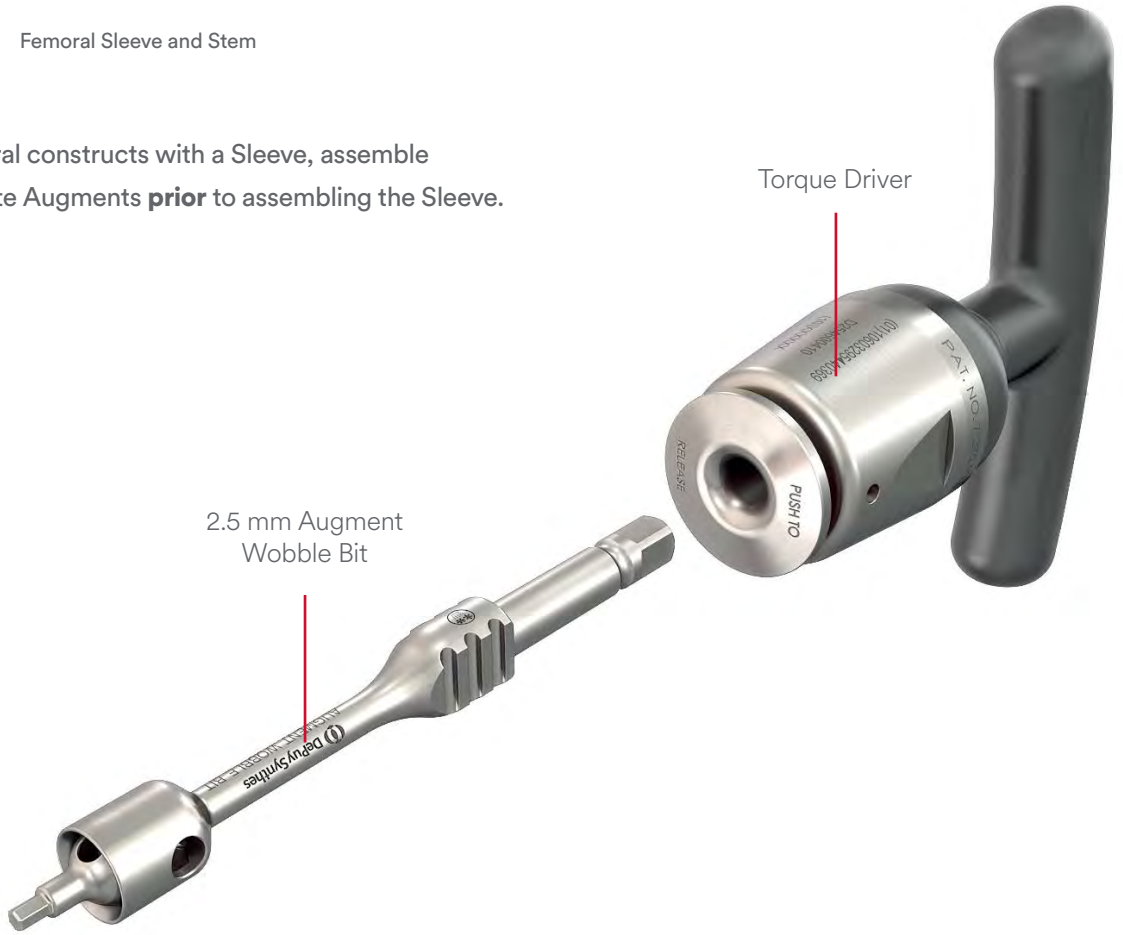
For all Revision RP Tibial Bases or Femoral constructs with Straight Stems, assemble appropriate Augments **after** assembling any Stems.

Offset Stem

For all Revision Femoral constructs with Offset Stems, assemble appropriate Augments **prior** to adding the Offset Adaptor and Stem.

Femoral Sleeve and Stem

For Femoral constructs with a Sleeve, assemble appropriate Augments **prior** to assembling the Sleeve.



Tibial Augment Assembly

Tibial Augment Implants are shared across two Tibial Base sizes (1 - 2, 3 - 4, 5 - 6, 7 - 8, 9 - 10).

- The 5 mm Tibial Augments may be utilized on either the Medial or Lateral side of the Tibial Base.
- The 10 and 15 mm Tibial Augments are side specific and come in LM/RL or LL/RM offerings.

Using the 2.5 mm Wobble Bit and Augment Screws, affix the previously prepared for Tibial Augment(s) to the backside of the previously prepared for (size-specific) Revision Tibial Base Implant.

Ensure both Augment Screws are engaged with the Revision Tibial Base Implant prior to completing fixation. Attach the Torque Driver to the 2.5 mm Wobble Bit and continue to turn until a “click” is heard, to ensure adequate screw fixation.

■ Notes:

Using the 2.5 mm Wobble Bit by hand to start each Augment Screw prior to attaching the Torque Driver may assist by providing tactile feedback.

Augment Assembly

Femoral Augment Assembly

Using the Torque Driver with the 2.5 mm Wobble Bit, assemble the appropriate Posterior Augment(s) to the correct location(s) of the Revision Femoral Implant.

Tighten the Femoral Augment Collet using the Torque Driver until a “click” is heard.

If a Posterior Augment is in place, the Distal Augment Implant will assemble into the distal location by rocking into location around the Posterior Augment. Otherwise, the Distal Augment will assemble into the distal location by loading from the proximal location.

▲ Warning:

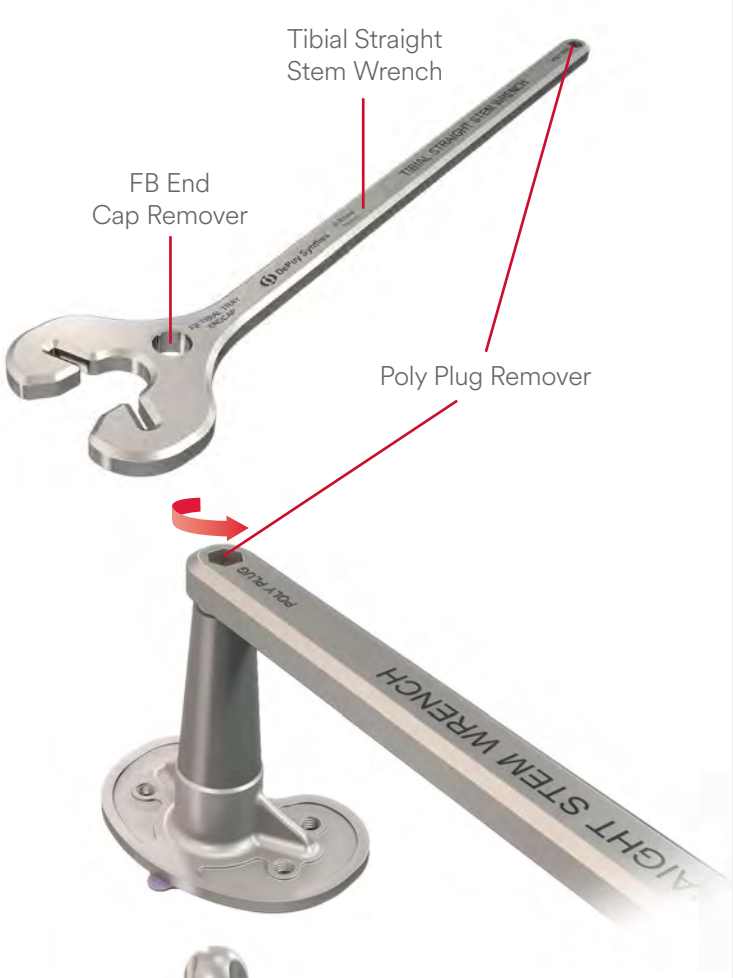
Always assemble Posterior Augments to the Revision Femoral Component prior to any Distal Augments.

Revision RP Tibial Base and Straight Stem Implant Assembly

Straight Stem

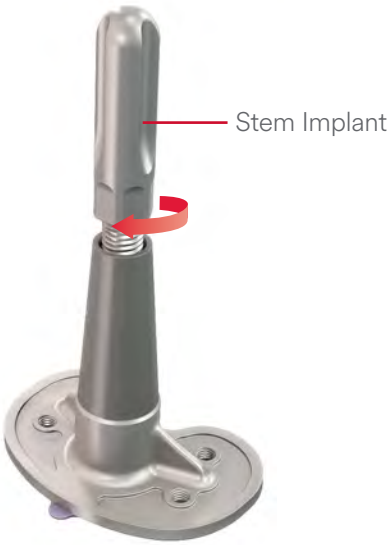
■ Notes:

The Base Protector should be retained on the Tibial Base during Assembly and Seating of the Tibial Base.



Remove the Poly Plug from the Revision RP Tibial Base Implant by utilizing Poly Plug Remover in the Tibial Straight Stem Wrench and rotating the Tibial Straight Stem Wrench **counter clockwise** to unscrew the Poly Plug.

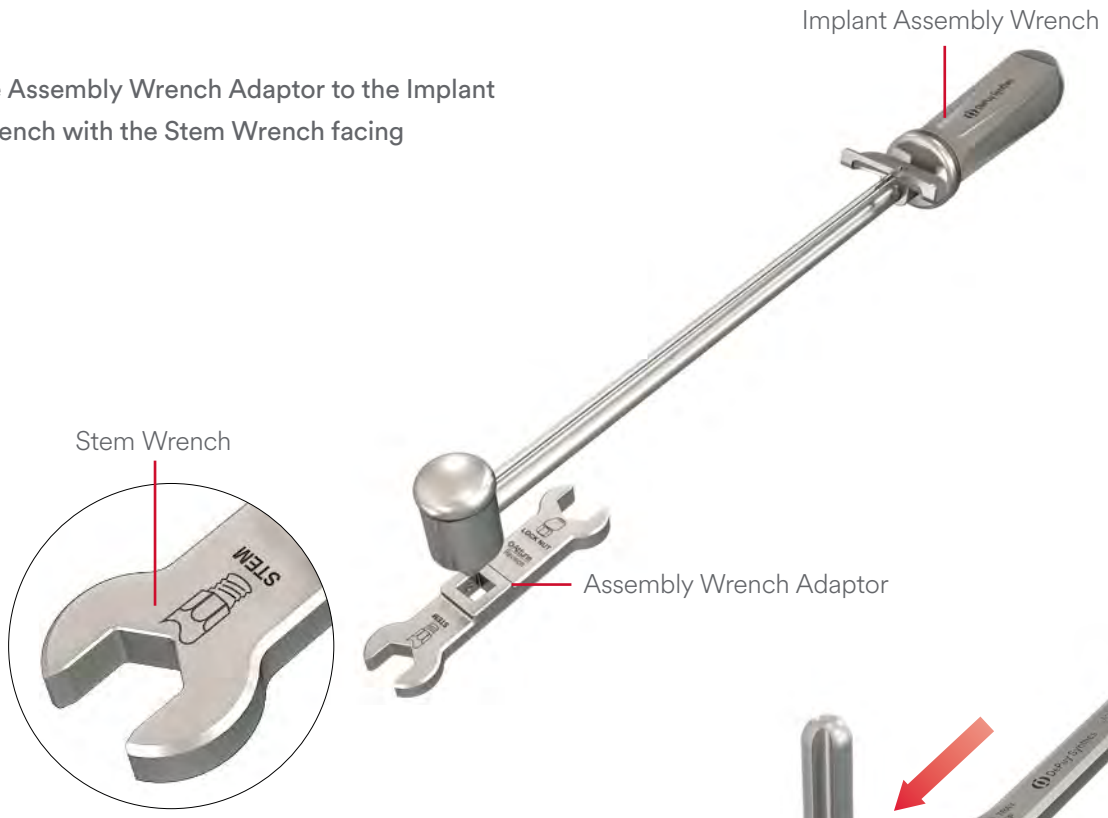
Thread the appropriate Stem Implant into the Revision RP Tibial Base until hand tight.



Revision RP Tibial Base and Straight Stem Implant Assembly

Straight Stem

Assemble the Assembly Wrench Adaptor to the Implant Assembly Wrench with the Stem Wrench facing outwards.



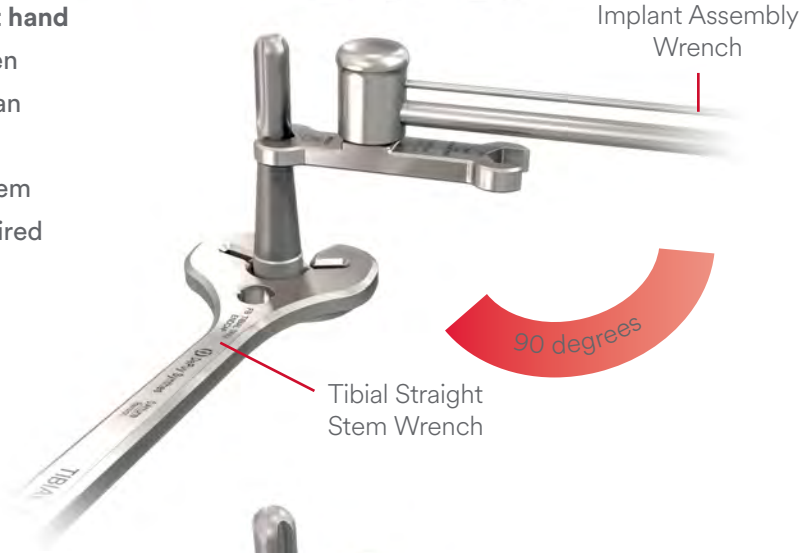
Place the Tibial Straight Stem Wrench over the Keels of the Revision RP Tibial Base Implant. For Stem diameters of 20 mm or greater, to avoid contact with the Stem, the Tibial Straight Stem Wrench should be assembled from the anterior of the Base and then dropped down onto the Keels.

Revision RP Tibial Base and Straight Stem Implant Assembly

Straight Stem

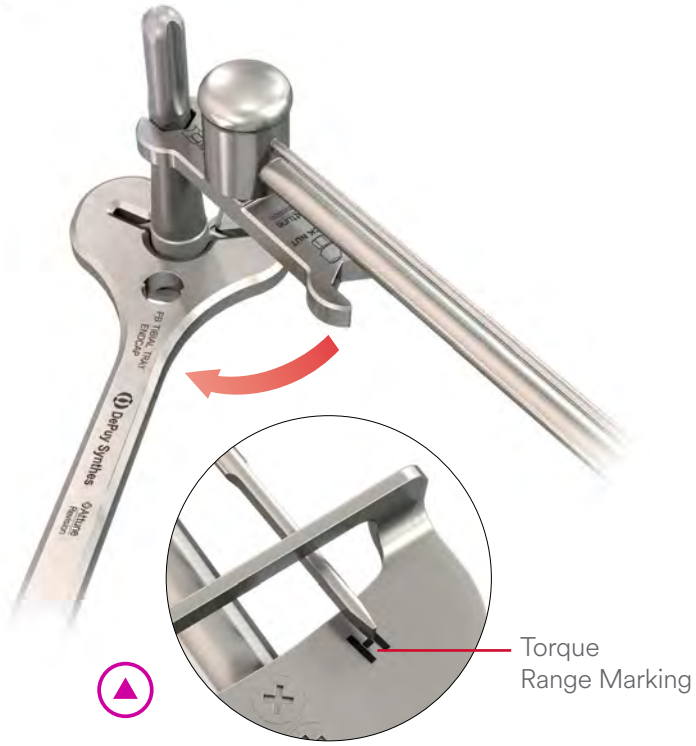
Hold the **Tibial Straight Stem Wrench in the left hand,** ensuring that the surface of the Tibial Straight Stem Wrench is flush on the Revision Tibial Base.

Hold the **Implant Assembly Wrench in the right hand** and position on the Hex of the Stem that has been threaded onto the Tibial Base, trying to achieve an angle of approximately 90 degrees between the Implant Assembly Wrench and Tibial Straight Stem Wrench. This will make it easier to apply the desired torque.



Gradually bring hands together to rotate the Implant Assembly Wrench until the marker is within the torque range marking.

Always assemble Tibial Augments after Straight Stems as described on **page 167.**



▲ Warning:

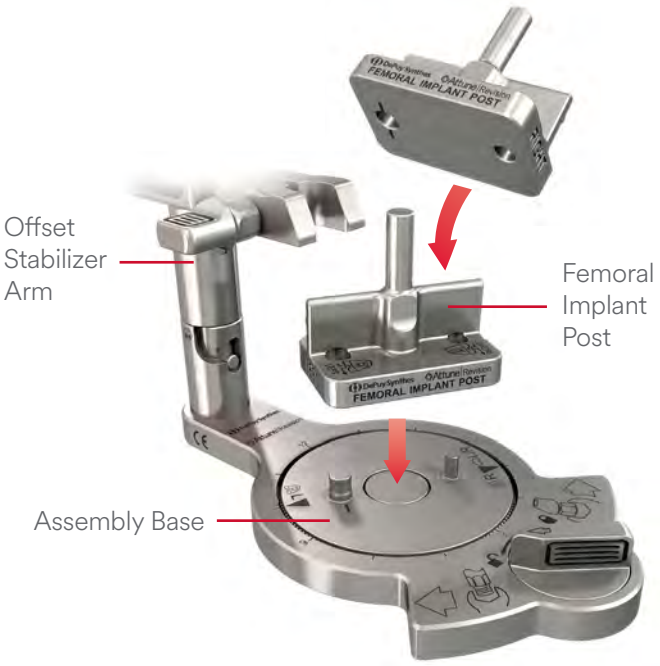
Do not apply so much torque that the marker fully passes the torque range marking.

Revision Femoral Component and Straight Stem Implant Assembly

Straight Stem

Assemble Femoral Augments **after** Stems as described on **page 168**.

Assemble the Femoral Implant Post and Offset Stabilizer Arm to the Assembly Base by aligning the boss and hole marked with a line.



Slide the appropriate **sized** Femoral Shim onto the correct wing, Left or Right, of the Femoral Implant Post. For example, for a size 4 Femoral select the 4 Femoral Shim.

Revision Femoral Component and Straight Stem Implant Assembly

Straight Stem

Remove the Poly Plug from the Revision Femoral Implant by utilizing the Poly Plug Remover in the Tibial Straight Stem Wrench or Sleeve Counter Torque Wrench and rotating the Poly Plug counter clockwise.

Place the Revision Femoral Implant on the Femoral Implant Post by engaging the post in the boss area.

Rotate the Femoral Implant on the Assembly Base untill the “Left”or “Right” arrow for the respective Femoral Component is pointing to the “9 o’clock” position. This orientation helps with access to the Stem for tightening, without being obstructed by the Femoral Anterior Flange.

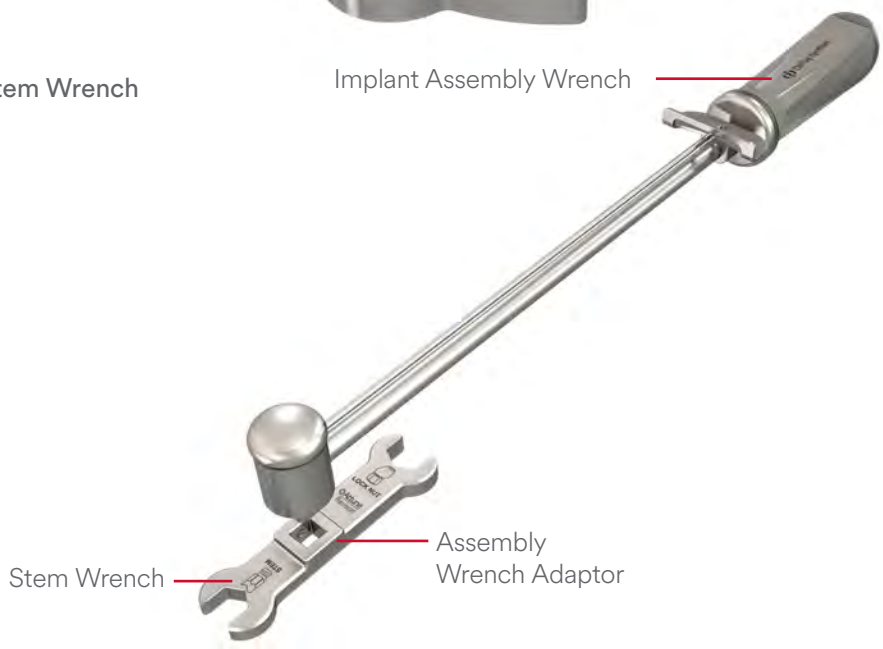
Revision Femoral Component and Straight Stem Implant Assembly

Straight Stem

Lock the orientation by rotating the Front Base Knob to the locked position.

Thread the appropriate Stem on the Revision Femoral Implant until hand tight.

Assemble the Assembly Wrench Adaptor to the Implant Assembly Wrench with the Stem Wrench outward.

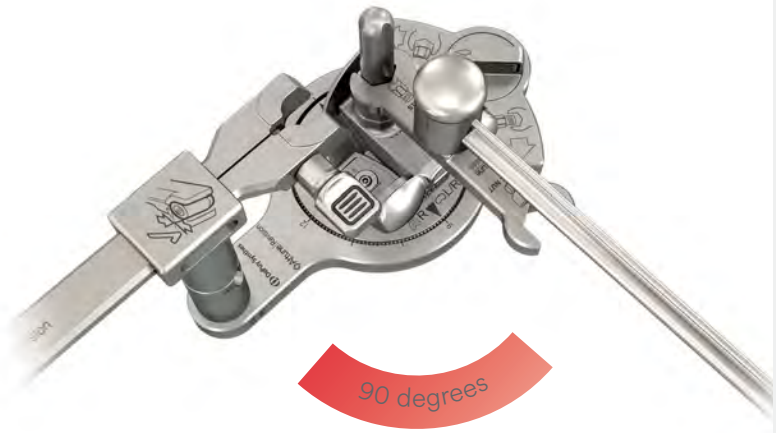


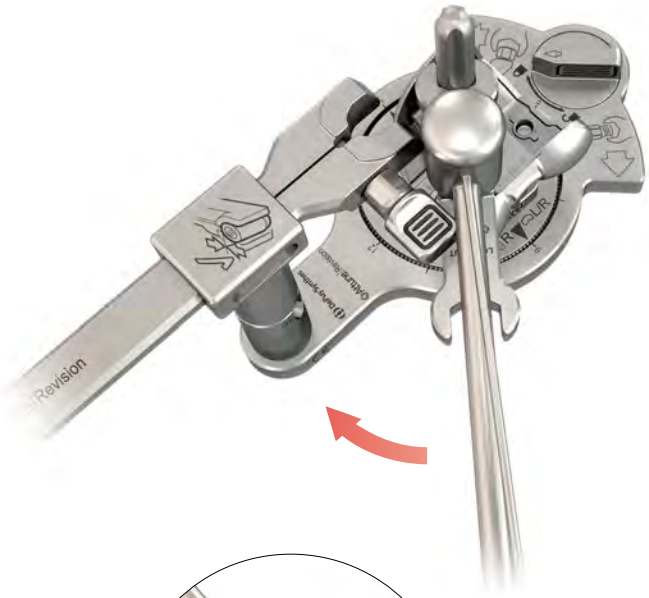
Revision Femoral Component and Straight Stem Implant Assembly

Straight Stem

Hold the **Offset Stabilizer Arm in the left hand**.

Hold the **Implant Assembly Wrench in the right hand** and position on the Hex of the Stem that has been threaded to the Femoral Implant, trying to achieve an angle of approximately 90 degrees between the Implant Assembly Wrench and Offset Stabilizer Arm. This will make it easier to apply the desired torque.





Gradually rotate the Implant Assembly Wrench towards the Offset Stabilizer Arm until the marker is within the torque range marking. ▲

▲ Warning:

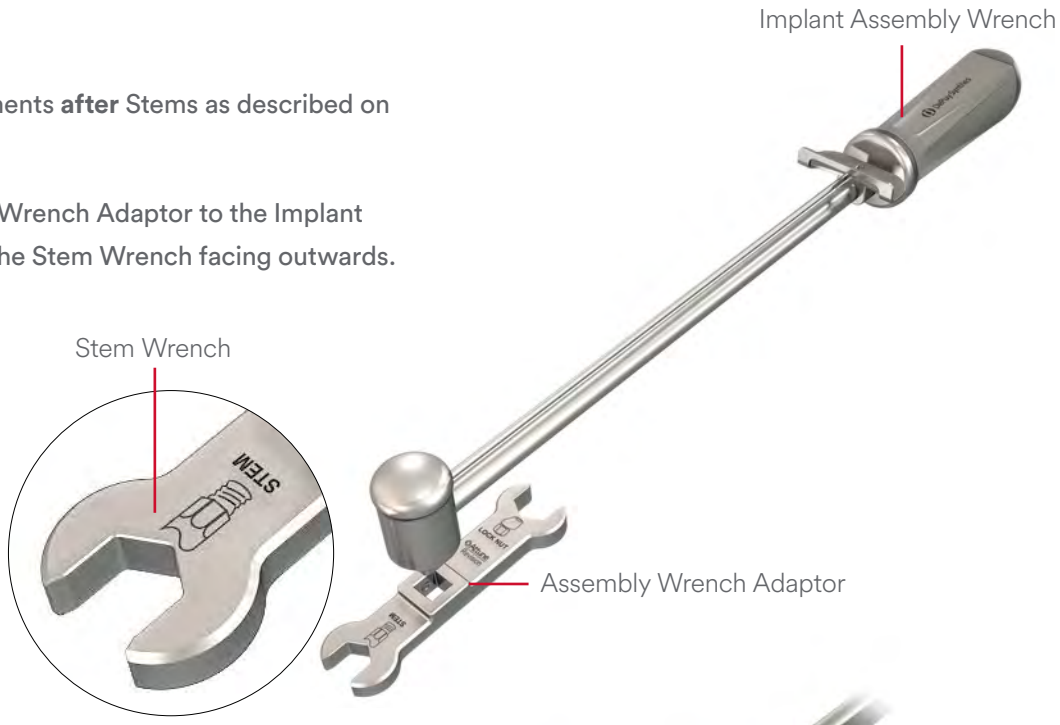
Do not apply so much torque that the marker fully passes the torque range marking.

Alternative Revision Femoral Component and Straight Stem Implant Assembly

Straight Stem

Assemble Femoral Augments **after** Stems as described on **page 168.**

Assemble the Assembly Wrench Adaptor to the Implant Assembly Wrench with the Stem Wrench facing outwards.



Place the ATTUNE Revision Femoral Straight Stem Wrench around the box of the Femoral Implant between the anterior flange and posterior condyles. The handle of the Femoral Straight Stem Wrench should run above the posterior condyles of the femoral implant.

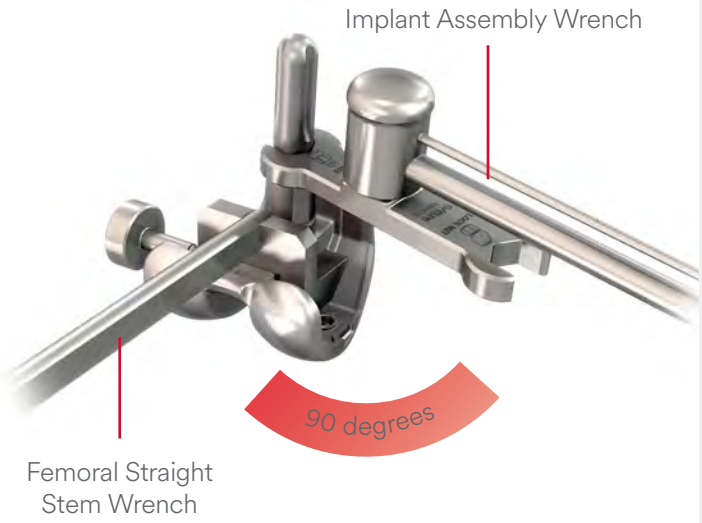
Tighten the thumb screw on the Stem Wrench until it is secured against the side of the box. Thread the desired Stem Implant on the Femoral Boss until hand tight.

Alternative Revision Femoral Component and Straight Stem Implant Assembly

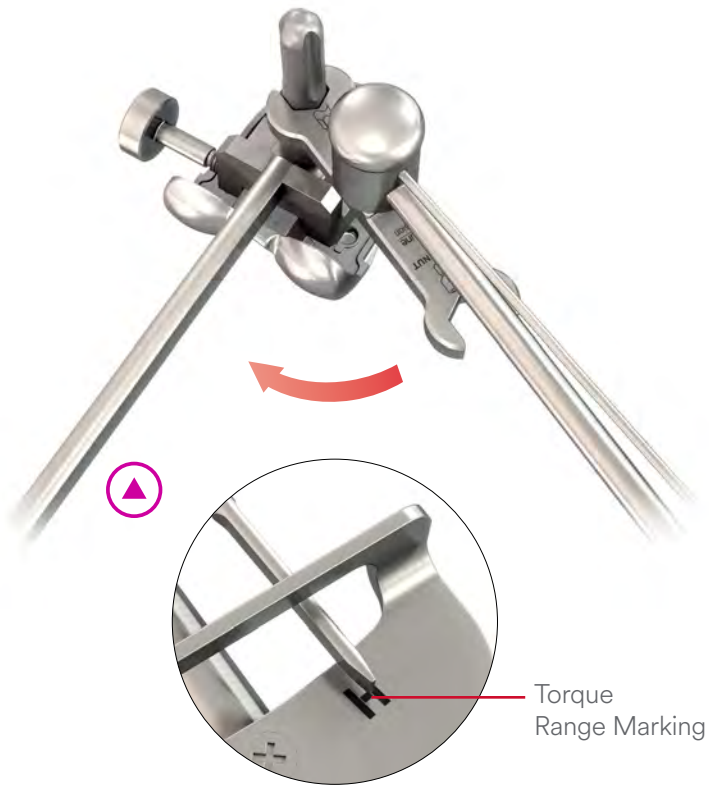
Straight Stem

Hold the **Femoral Straight Stem Wrench in the left hand.**

Hold the **Implant Assembly Wrench in the right hand** and position on the Hex of the Stem that has been threaded to the Femoral Implant, trying to achieve an angle of approximately 90 degrees between the Implant Assembly Wrench and Femoral Straight Stem Wrench. This will make it easier to apply the desired torque.



Gradually rotate the Implant Assembly Wrench towards the Femoral Straight Stem Wrench until the marker is within the torque range marking.



▲ Warning:

Do not apply so much torque that the marker fully passes the torque range marking.

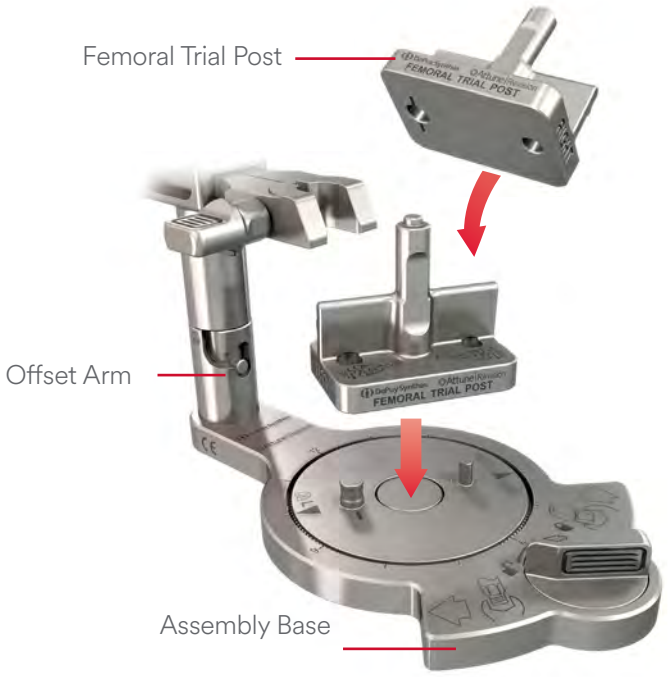
Revision Femoral Component and Offset Stem Implant Assembly

Offset Stem

Assemble Femoral Augments **before** Stems as described on **page 168**.

The intent of the Offset Assembly Instruments is to have the offset orientation on the Implant replicate the orientation of the offset in the Trial construct. It does this in two steps:

1. Use the Trial to set the orientation of the Assembly Jig.
2. Use the Assembly Jig to set the orientation of the Offset Adaptor on the Implant.



Assemble the Femoral Trial Post and Offset Stabilizer Arm to the Assembly Base by aligning the boss and hole marked with a line.

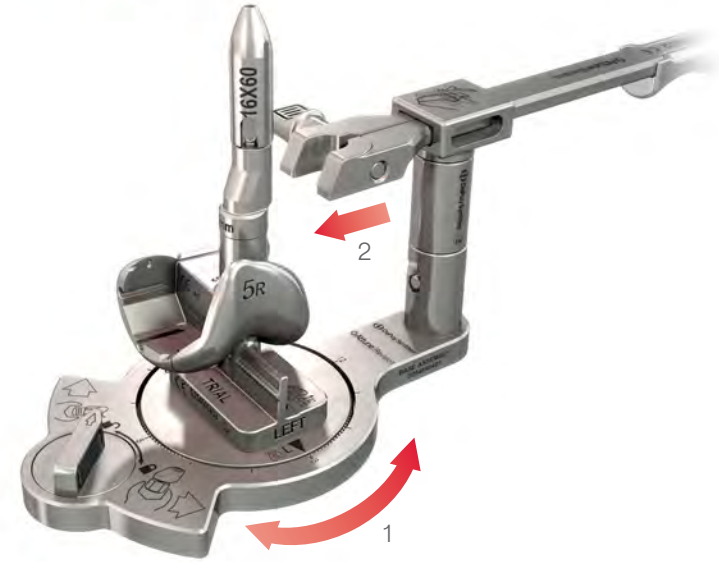
Slide the appropriate sized Femoral Shim onto the correct wing, Left or Right, of the Femoral Trial Post. For example, for a size 4 Femoral select the 4 Femoral Shim.

Revision Femoral Component and Offset Stem Implant Assembly

Offset Stem

Place the final Femoral Offset Trial construct on the Femoral Trial Post by engaging the Femoral Post in the Trial Boss.

Orient the Femoral Offset Adaptor Trial to the Offset Stabilizer Arm and slide the Arm to contact the Trial.



▲ Warning:

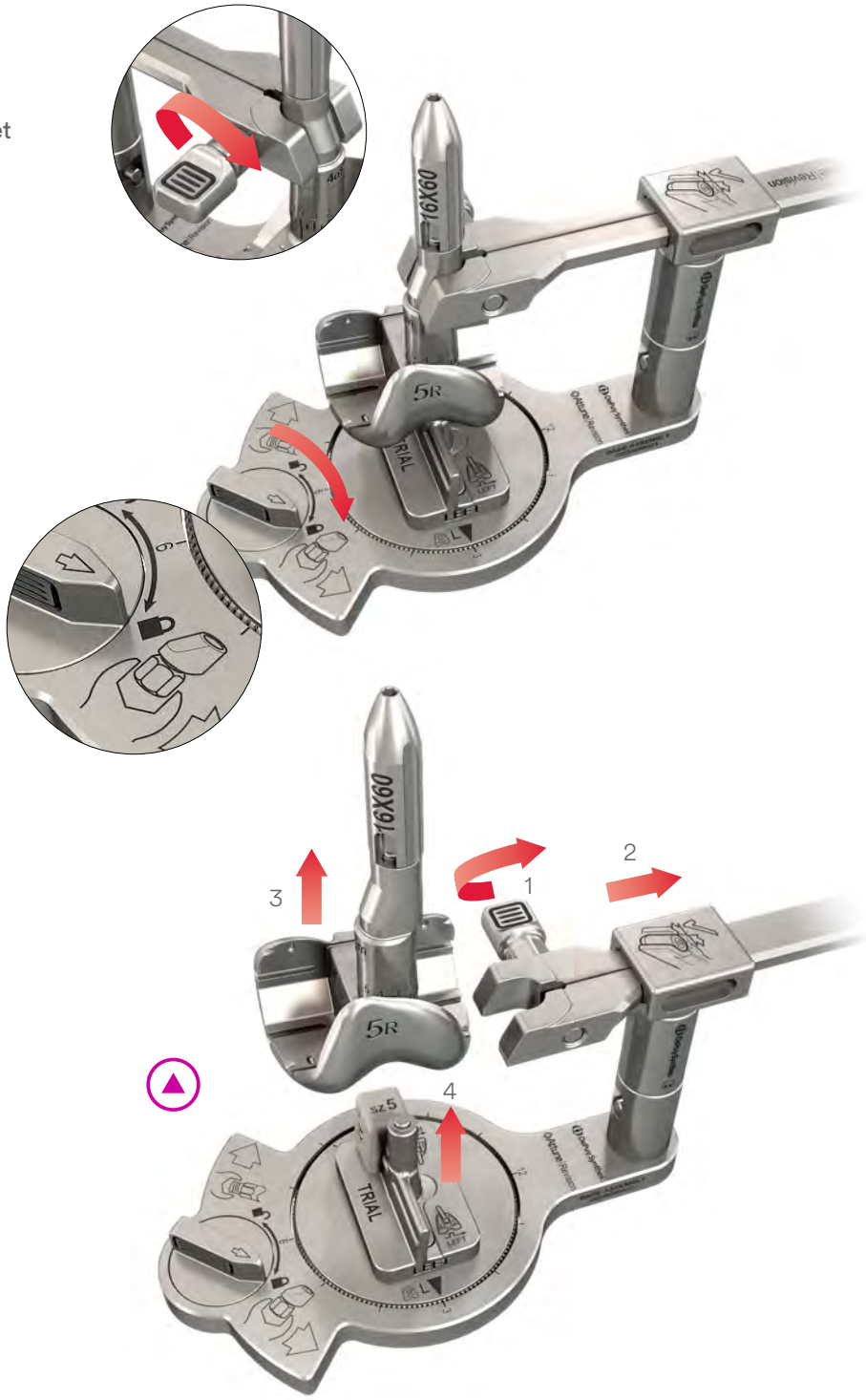
In order to ensure that the Offset Adaptor is not inserted 180 degrees out of position, ensure that the black mark on the Femoral Offset Adaptor Trial is visibly positioned within the window of the Offset Stabilizer and that the Trial construct offset number matches the number on the Base corresponding to the “left or right” mark as appropriate.

Aligned with the Alignment Window

Revision Femoral Component and Offset Stem Implant Assembly

Offset Stem

Lock the Offset Stabilizer Arm using the Offset Locking Knob. Lock the orientation of the the Femoral Offset Adaptor by rotating the Front Base Knob to the locked position.



The Assembly Jig is now locked and rep the Trial orientation.

1. Loosen the Offset Stabilizer Arm from t Femoral Offset Adaptor Trial.
2. Slide the Offset Stabilizer Arm backwa
3. Lift the Femoral Trial Assembly out of t Assembly Base.
4. Lift the Femoral Trial Post out of the As Base.

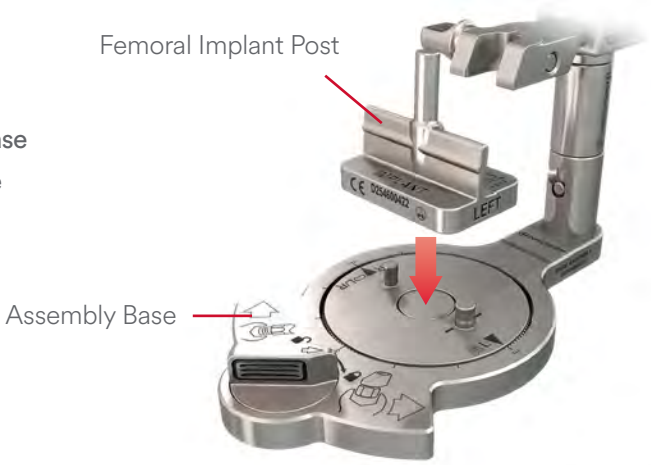
▲ Warning:

Do not unlock Assembly Base Knob, as this has set your orientation.

Revision Femoral Component and Offset Stem Implant Assembly

Offset Stem

Assemble the Femoral Implant Post to the Assembly Base and transfer the Shim from the Femoral Trial Post to the Femoral Implant Post.



Remove the Poly Plug from the Revision Femoral Implant by utilizing the Poly Plug Remover in the Tibial Straight Stem Wrench or Sleeve Counter Torque Wrench and rotating the Poly Plug counter clockwise.

Revision Femoral and Component Offset Stem Implant Assembly

Offset Stem

Place the Revision Femoral Implant on the Femoral Implant Post by engaging the post in the boss area of the Implant.

Ensure the Offset Locking Nut is in the correct starting position by rotating in the opposite direction of the arrow on the Offset Adaptor until hand tight.

Ensure the line on the Locking Nut is closest to the Femoral Component.

Thread the Offset Adaptor clockwise on to the Revision Femoral Implant until the Offset Adaptor is fully seated.

Revision Femoral and Component Offset Stem Implant Assembly

Offset Stem

Once fully seated, rotate the Offset Adaptor counter clockwise until it aligns with the Offset Stabilizer Arm.

Slide the Offset Stabilizer Arm forward and tighten on to the Offset Adaptor by rotating the Offset Stabilizer Arm Lock Knob clockwise. Ensure the black mark is aligned in the alignment window.

The implant has now been aligned to the orientation of the Assembly Jig, which was set off of the Trial.

The next step is to tighten the Offset Locking Nut and Stem.

Rotate the Offset Locking Nut in the direction of the arrow on the Offset Adaptor Implant until hand tight.

▲ Warning:

Do not rotate the Offset Adaptor more than 360 degrees.

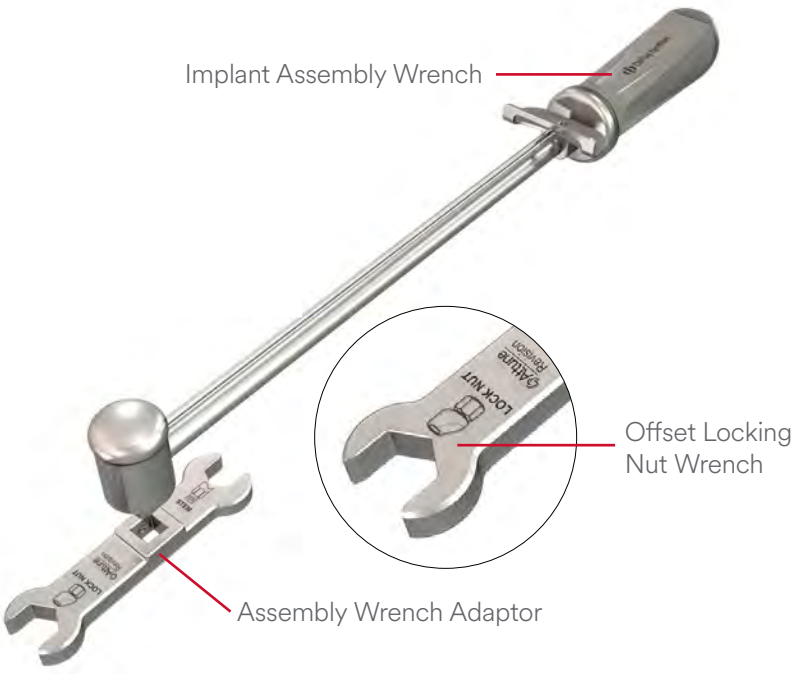
▲ Warning:

In order to ensure that the Offset Adaptor is not inserted 180 degrees out of position, ensure that angled face of the Offset Adaptor is away from the Offset Stabilizer Arm.

Revision Femoral Component and Offset Stem Implant Assembly

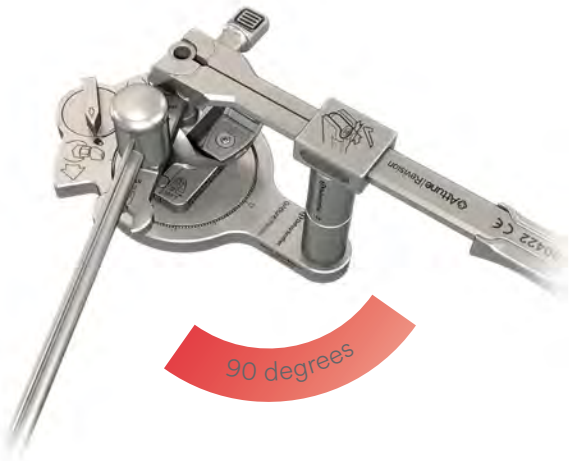
Offset Stem

Assemble the Assembly Wrench Adaptor to the Implant Assembly Wrench, with the Offset Locking Nut Wrench facing outward.



Holding the **Implant Assembly Wrench with left hand**, assemble it to the Offset Locking Nut so that the angle between the Implant Assembly Wrench and the Offset Stabilizer Arm is approximately 90 degrees. This will make it easier to apply the desired torque.

Hold the **Offset Stabilizer in the right hand** and rotate the Implant Assembly Wrench counter clockwise, gradually bringing hands together to tighten the Locking Nut until the marker is within the torque range marking. ▲



▲ Warning:

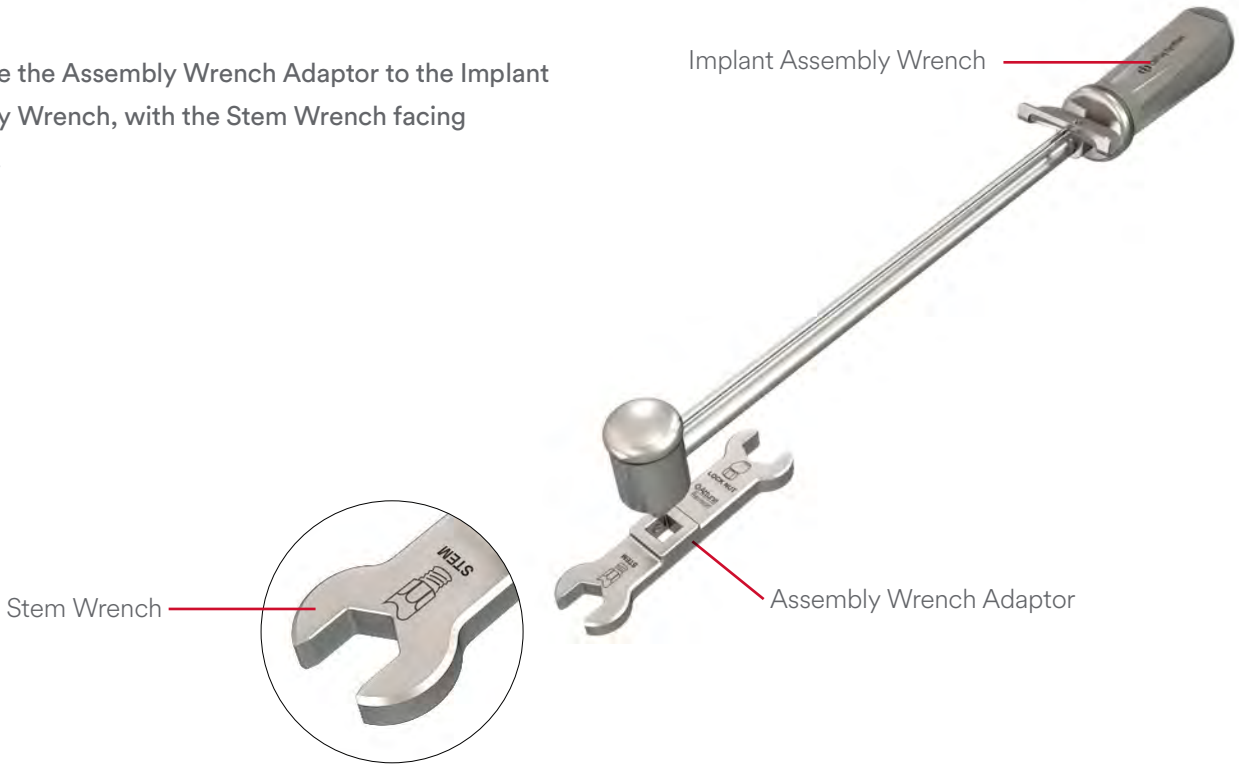
Do not apply so much torque that the marker fully passes the torque range marking.

Revision Femoral Component and Offset Stem Implant Assembly

Offset Stem

Thread the appropriate Stem on to the Offset Adaptor by rotating the Stem clockwise on to the Offset Adaptor until hand tight.

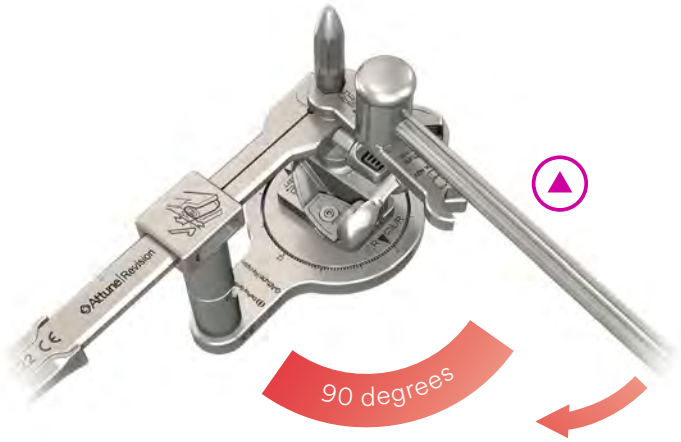
Assemble the Assembly Wrench Adaptor to the Implant Assembly Wrench, with the Stem Wrench facing outward.



Revision Femoral Component and Offset Stem Implant Assembly

Offset Stem

Hold the **Implant Assembly Wrench in the right hand** and position on the Hex of the Stem that has been threaded on to the Revision Femoral Implant to create an angle of approximately 90 degrees with the Offset Stabilizer Arm.



Grasp the **Offset Stabilizer Arm with left hand** and gradually bring hands together to rotate the Implant Assembly Wrench clockwise to tighten the Stem until the marker is within the torque range marking.

Loosen the front knob first to release any tension in the system. Then loosen the Locking Knob of the Offset Stabilizer Arm and slide back. Finally loosen the Tibial Vice Knob to remove the final Implant construct.

Confirm visually that the implant offset is in the correct orientation relative to the Trial.

Trial **Implant**

▲ Warning:

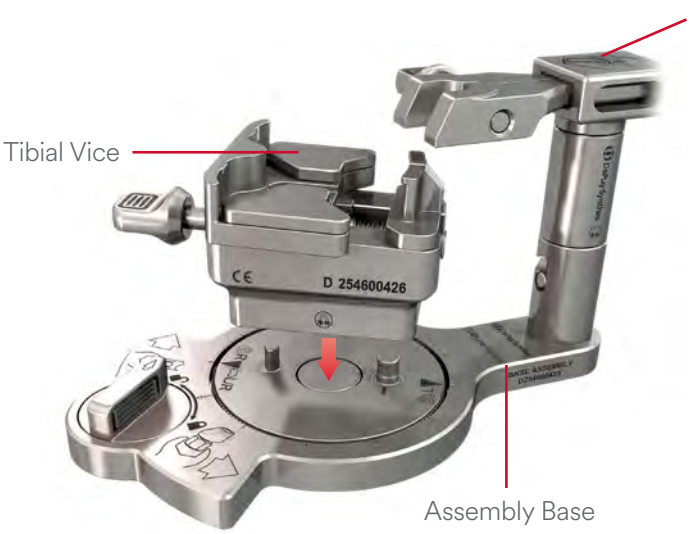
Do not apply so much torque that the marker fully passes the torque range marking.

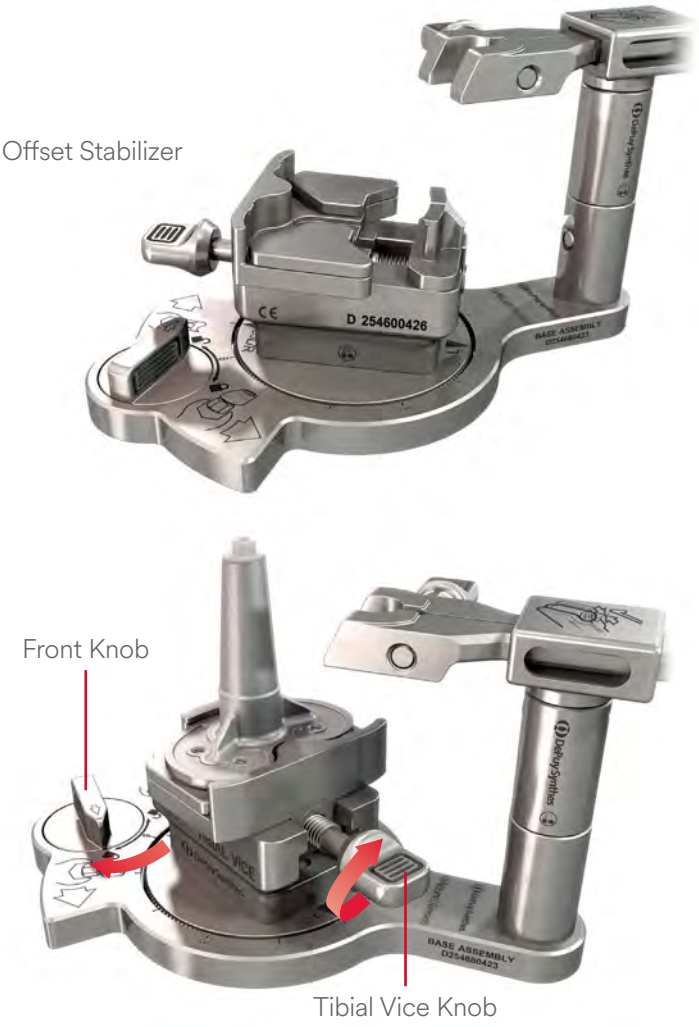
Revision RP Tibial Base with Sleeve Assembly

Tibial Sleeve and Stem

■ Notes:

Note: The Base Protector should be retained on the Tibial Base during assembly and seating of the Tibial Base.





Assemble the Tibial Vice and Offset Stabilizer to the Assembly Base. For this construct, the Base is required to provide support and countertorque, but is not used to control the rotation of the Sleeve.

Place the RP Tibial Base Implant in the Tibial Vice and:
1) Rotate the Tibial Vice Knob to tighten the Tibial Vice to the Tibial Implant.

2) Rotate the Tibial Vice Assembly until it is in the 12 o'clock position and lock the orientation of the Tibial Vice by rotating the Front Knob to the locked position.

▲ Warning:

When Tibial Augments are used with the ATTUNE Revision RP Tibial Base, only the 29 mm ATTUNE Tibial Sleeves may be used. For the ATTUNE Revision RP Tibial Base Size 2, Tibial Augments or a Tibial Sleeve may be used individually, but not in combination.

Always assemble Tibial Augments after Straight Stems as described on **page 165.**

Revision RP Tibial Base with Sleeve Assembly

Tibial Sleeve and Stem

Using the retained Tibial Trial Assembly and Sleeve Orientation features as a reference, position the Tibial Sleeve Implant in the correct orientation on the Revision RP Tibial Base.

RP Base Trial with Tibial Broach Construct

RP Base Trial with Tibial Sleeve Trial Construct

RP Base with Tibial Sleeve Implant

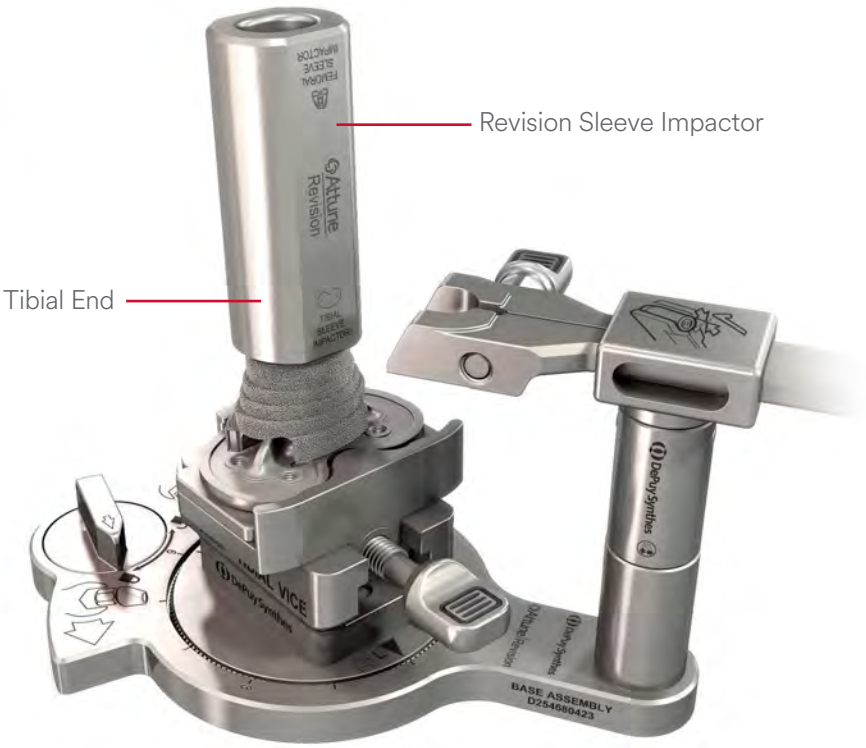
Orientation features

Revision RP Tibial Base with Sleeve Assembly

Tibial Sleeve and Stem

Once the desired rotation has been set, gently press on the Tibial Sleeve to establish an initial taper engagement.

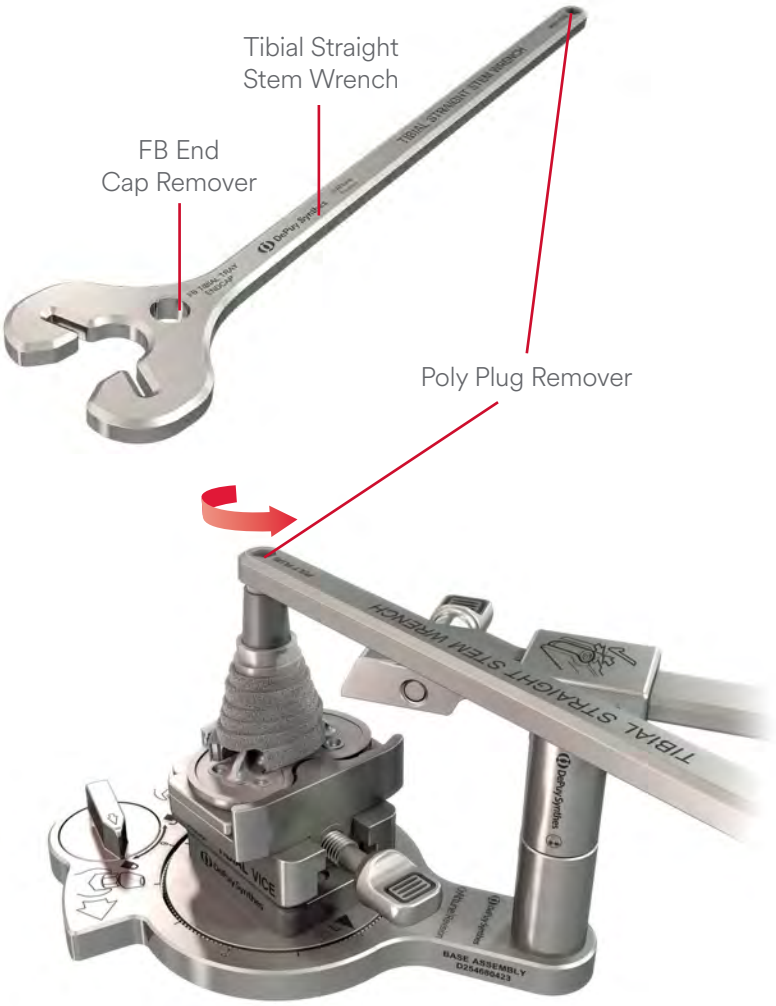
Fully seat and lock the Sleeve taper on the RP Tibial Base, using the Tibial End of the ATTUNE Revision Sleeve Impactor and a mallet.



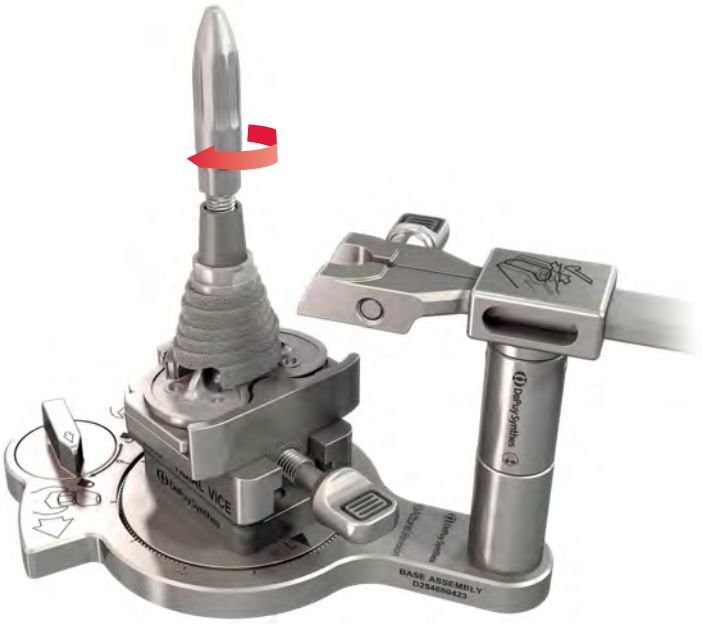
Revision RP Tibial Base with Sleeve Assembly

Tibial Sleeve and Stem

To assemble the Stem to the Revision RP Tibial Base and Sleeve construct, remove the Poly Plug from the Revision RP Tibial Base Implant by utilizing the Poly Plug Remover in the Tibial Straight Stem Wrench and rotating the Wrench counter clockwise to unscrew the Poly Plug.



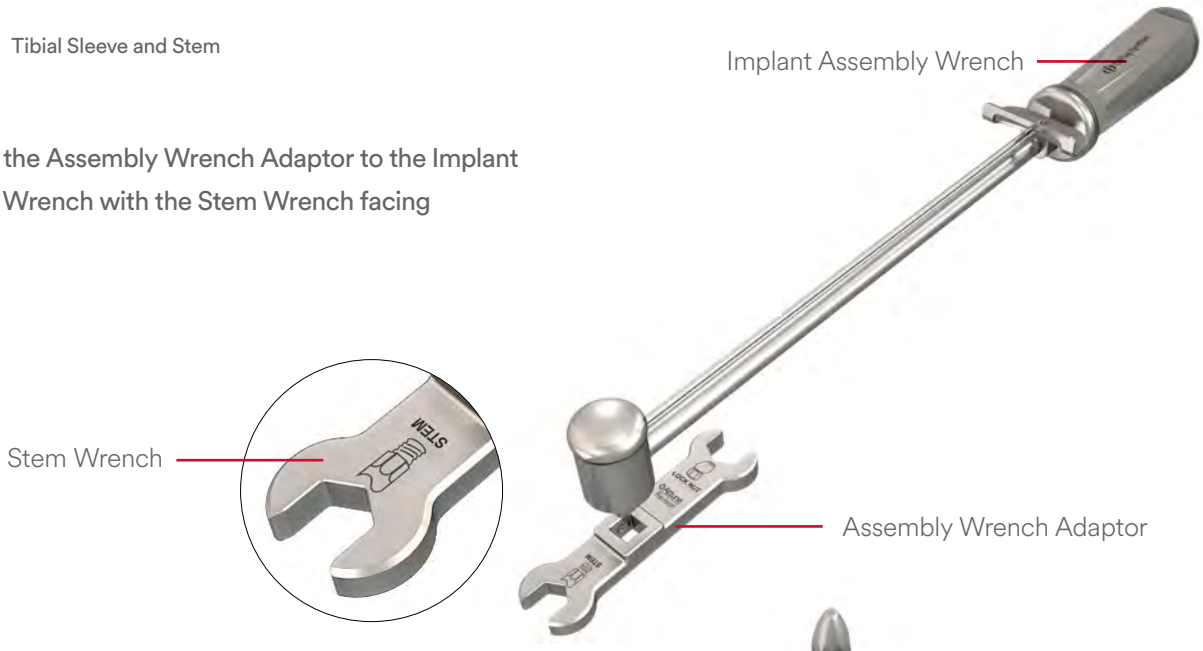
Thread the appropriate Stem onto the Revision RP Tibial Base Implant until hand tight.



Revision RP Tibial Base with Sleeve Assembly

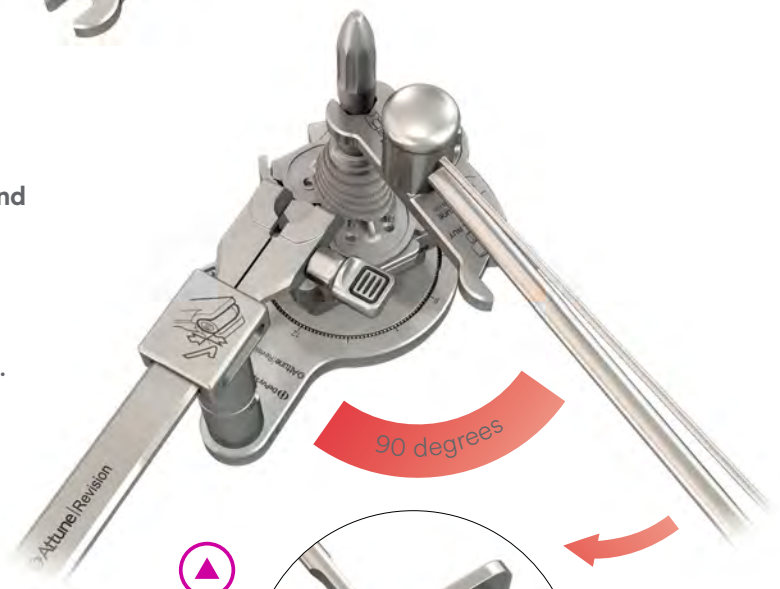
Tibial Sleeve and Stem

Assemble the Assembly Wrench Adaptor to the Implant Assembly Wrench with the Stem Wrench facing outward.



Hold the **Offset Stabilizer Arm in the left hand.**

Hold the **Implant Assembly Wrench in the right hand** and position on the Hex of the Stem that has been threaded to the Tibial Implant, trying to achieve an angle of approximately 90 degrees between the Implant assembly Wrench and Offset Stabilizer Arm. This will make it easier to apply the desired torque.



Gradually rotate the Implant Assembly Wrench towards the Offset Stabilizer Arm until the marker is within the torque range marking.

▲ Warning:

Do not apply so much torque that the marker fully passes the torque range marking.

Revision RP Tibial Base with Sleeve Assembly

Tibial Sleeve and Stem

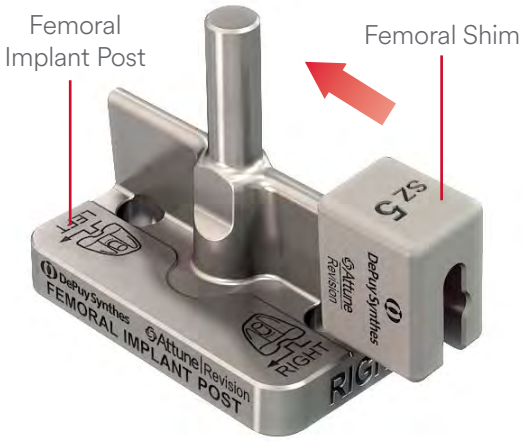
Loosen the Tibial Vice to remove the Final Implant construct. Confirm visually that the Implant Sleeve is in the correct orientation relative to the Trial.

Always assemble Tibial Augments **after** Straight Stems as described on **page 167.**

Revision Femoral Component and Femoral Sleeve Assembly

Femoral Sleeve and Stem

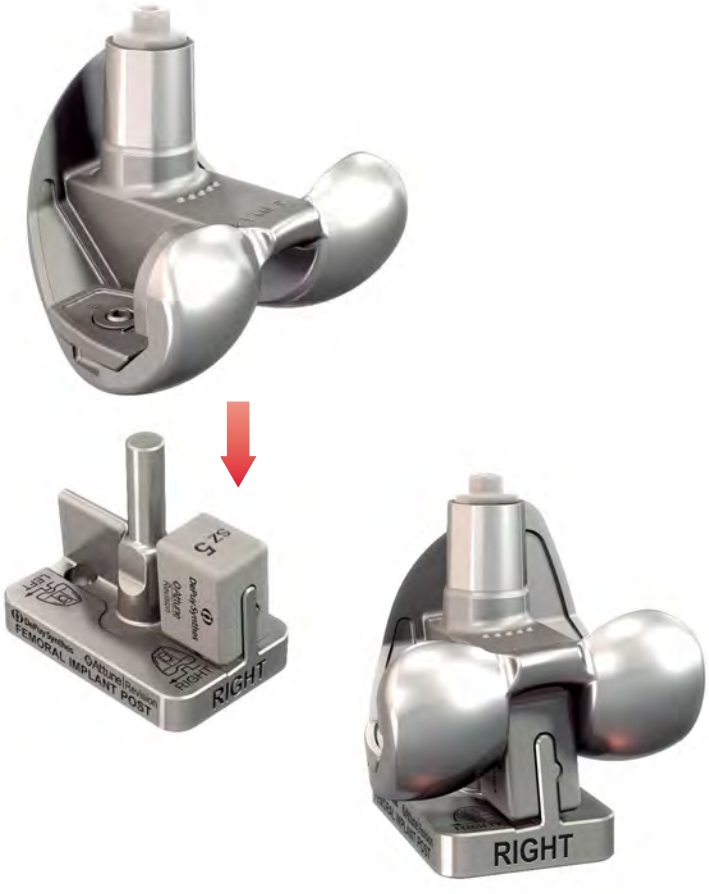
Assemble Augments to the Femoral Implant before Stems or Sleeves.



Slide the appropriate sized Femoral Shim onto the correct wing, Left or Right, of the Femoral Implant Post.

For example, for a size 4 Femoral select the 4 Femoral Shim.

The Poly Plug should be retained in the Revision Femoral Component when being assembled with a Femoral Sleeve.



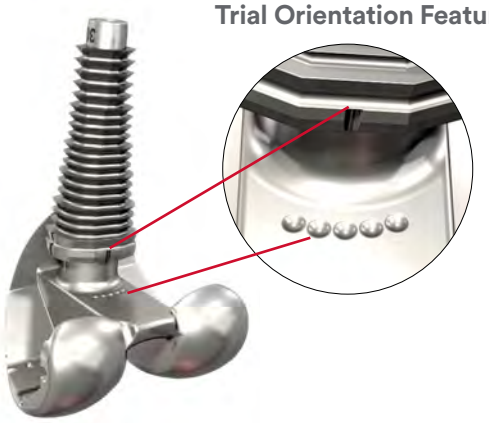
Place the Revision Femoral Implant on the Femoral Implant Post.

Revision Femoral Component and Femoral Sleeve Assembly

Femoral Sleeve and Stem

Using the retained Femoral Trial Assembly and Sleeve orientation features as a reference, position the Femoral Sleeve Implant in the correct orientation on the Revision Femoral Implant.

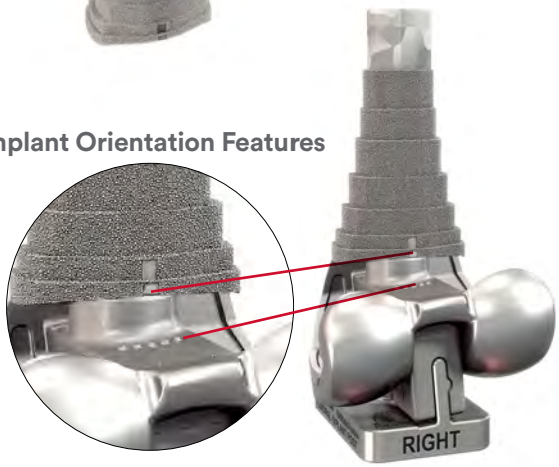
Trial Orientation Features



Remove the Poly Plug from the Femoral Sleeve by utilizing the Poly Plug Remover in the Sleeve Counter Torque Wrench and rotating the Poly Plug counter clockwise.

Once the desired rotation has been set, gently press on the Femoral Sleeve to establish an initial taper engagement.

Implant Orientation Features



Fully seat and lock the Sleeve Taper on the Revision Femoral Implant, using the Femoral End of the ATTUNE Revision Sleeve Impactor and a mallet.

■ Notes:

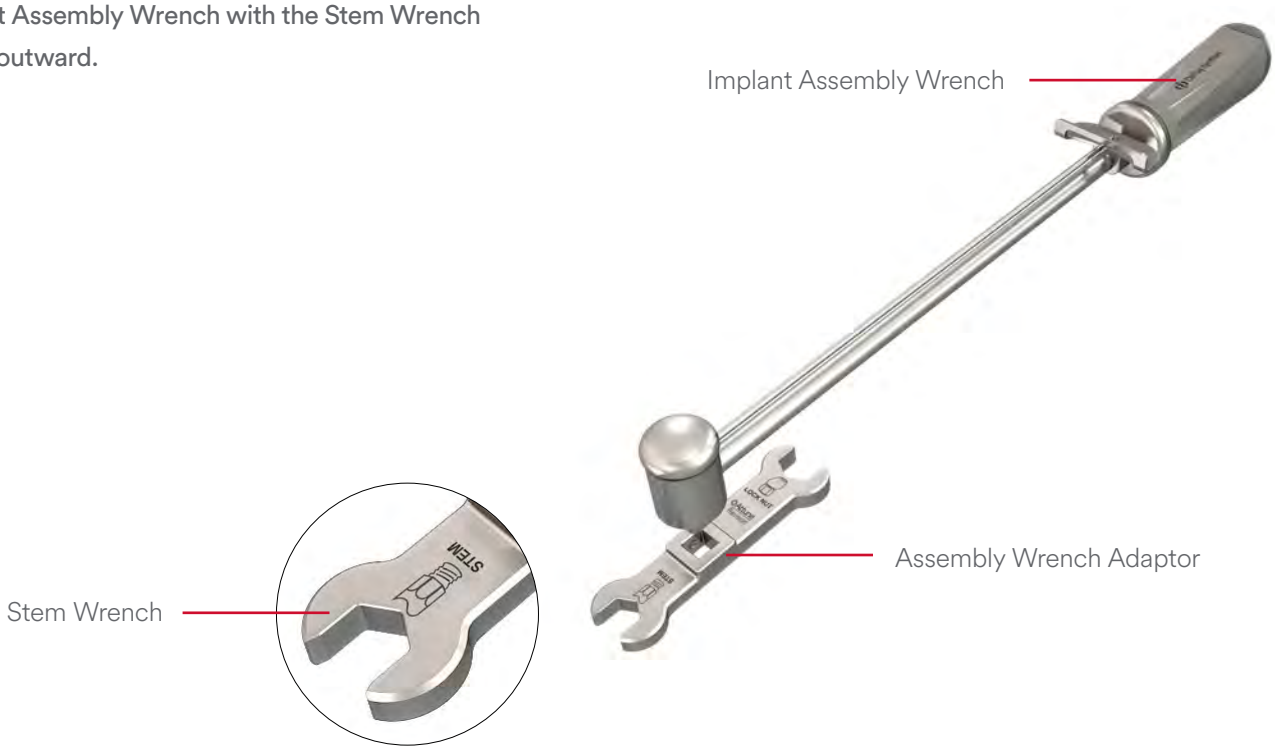
To aid in visualization, the Femoral Trial and Broach Assembly may be placed on the Femoral Trial Post.

Revision Femoral Component and Femoral Sleeve Assembly

Femoral Sleeve and Stem

Thread the appropriate Stem on to the Femoral Sleeve until hand tight.

Assemble the Assembly Wrench Adaptor to the Implant Assembly Wrench with the Stem Wrench facing outward.

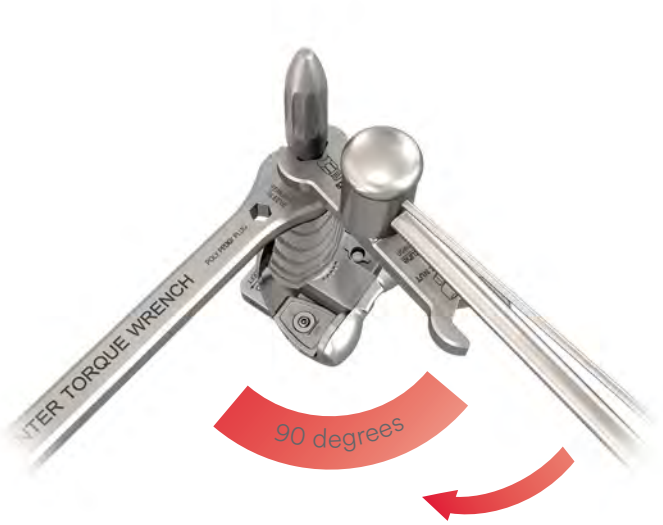


Revision Femoral Component and Femoral Sleeve Assembly

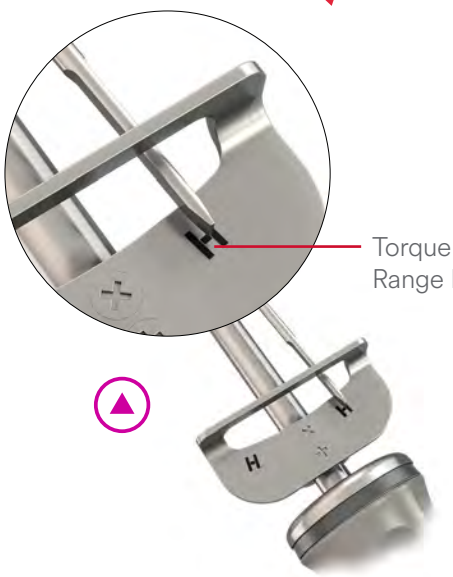
Femoral Sleeve and Stem

Hold the **Implant Assembly Wrench in the right hand** and position on the Hex of the Stem that has been threaded on to the Revision Femoral Implant.

Hold the **Sleeve Counter Torque Wrench in the left hand** and position on the Femoral Sleeve to create an angle of approximately 90 degrees with the Implant Assembly Wrench. This will make it easier to apply the desired torque.



Gradually rotate the Implant Assembly Wrench towards the Sleeve Counter Torque Wrench until the marker is within the torque range marking.



Using the alignment features of the Femoral Trial and Implant confirm visually that the Implant Sleeve is in the correct orientation relative to the Trial.

▲ Warning:

Do not apply so much torque that the marker fully passes the torque range marking.

Cementing Technique

▲

Bone should be cleansed and dried prior to applying cement and implantation of all components.

During cementing of implants, movement of the components should be minimized while the cement is curing.

Things to consider:

- Avoid leaving dead space in the prepared bone
- When a Press-Fit Stem is to be implanted, no cement should be applied to the Stem or the medullary canal
- When implanting a Porous Coated Sleeve, do not put cement on the sleeve or in the medullary canal

For additional information on cementing, please refer to the "Guidance for Cementing Primary Total Knee Replacements" document.

▲ Warning:

Blood lamination can reduce the mechanical properties of the cement; therefore, it is vital to choose cement that reaches its working phase quickly. If applying cement to both the implant and bone, implantation should be completed early in its dough state to ensure good cement-cement adhesion and reduce the risk of dry laminations; which can weaken the cement.

Revision RP Tibial Construct alone or with Cemented Stems, Augments and/or Cemented Sleeves

Consider the use of a cement restrictor.

Apply a thick layer of cement to the bone, the implant surface or to both. ▲

It is critical to ensure that cement fully surrounds the cone of the Revision RP Tibial Base Implant and any Cemented Stems, Augments and/or Cemented Tibial Sleeves.

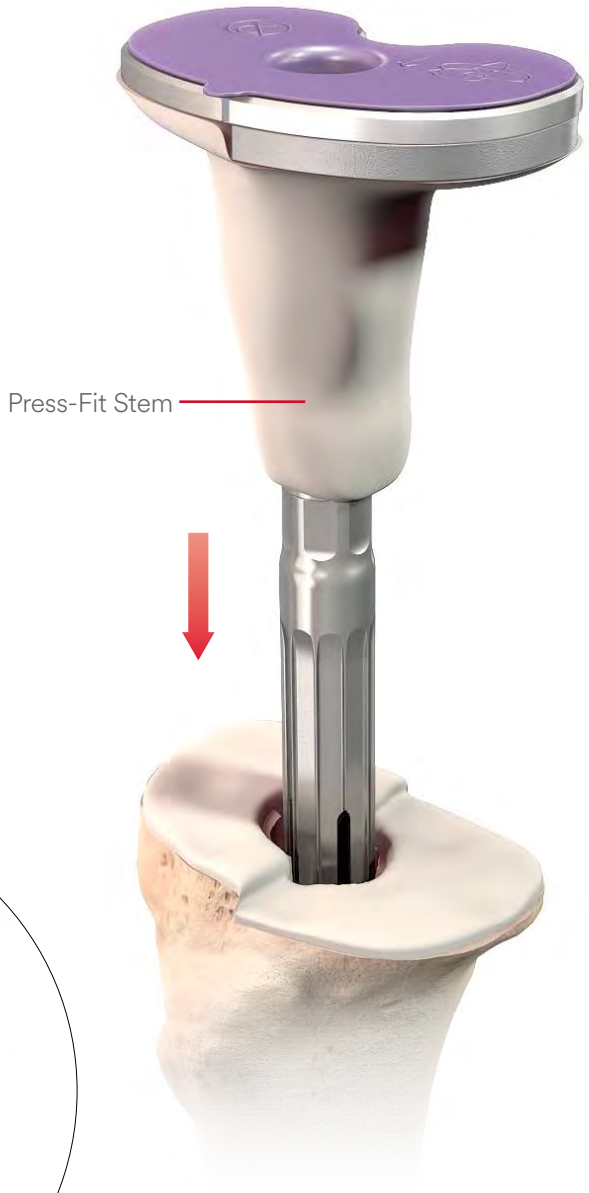
▲ Warning:

When Tibial Augments are used with the ATTUNE Revision RP Tibial Base, only the 29 mm ATTUNE Tibial Sleeves may be used. For the ATTUNE Revision RP Tibial Base Size 2, Tibial Augments or a Tibial Sleeve may be used individually, but not in combination.

Revision RP Tibial Construct with Press-Fit Stems and/or Augments

Apply a thick layer of cement to the proximal tibial bone, the underside and cone of the Revision RP Tibial Base Implant and the bone contacting surface of any Tibial Augments.

Care should be taken to avoid cement from contacting the Press-Fit Stem while being driven down the canal.



Revision RP Tibial Construct with Press-Fit Stems, Porous Coated Sleeves, and/or Augments

Apply a thick layer of cement to the proximal tibial bone, the underside of the Revision RP Tibial Base implant and the bone contacting surface of any Tibial Augments. ▲

Care should be taken to avoid cement from contacting the Press-Fit Stem and the Porous Coated Sleeve while being driven down the canal.

▲ Warning:

When Tibial Augments are used with the ATTUNE Revision RP Tibial Base, only the 29 mm ATTUNE Tibial Sleeves may be used. For the ATTUNE Revision RP Tibial Base Size 2, Tibial Augments or a Tibial Sleeve may be used individually, but not in combination.

Revision Femoral Construct with Cemented Stems, Augments, and/or Cemented Sleeves

Consider the use of a cement restrictor.

Apply a thick layer of cement to the Revision Femoral Component and any Cemented Stems, Augments or Sleeves on the femur.

Revision Femoral Construct with Press-Fit Stems and Augments

Apply a thick layer of cement to the distal femoral bone, the Revision Femoral Component, and the bone contacting surface of any Augments.

Care should be taken to avoid cement from contacting the Press-Fit Stem while being driven down the canal. ▲

▲ Warning:

If cementing the Offset Adaptor, difficulties in extraction may be encountered.

Revision Femoral Construct with Press-Fit Stems and Porous Coated Sleeves and Augments

Apply a thick layer of cement to the distal femoral bone, the Revision Femoral Component, and the bone contacting surface of any Augments.

Care should be taken to avoid cement from contacting the Press-Fit Stem and the Porous Coated Sleeve while being driven down the canal.

Seating the Tibial Construct

Carefully insert the Revision Tibial Base Implant using the ATTUNE System Impactor, avoiding malrotation.

Impact to seat the Revision RP Tibial Implant and to pressurize the cement.

Then use a Curette to remove all extruded cement.

▲ Warning:

To prevent damage to the bearing surface, do not remove the Base Protector before impacting the Base. Care must be taken not to pull cement from under the edge of the Implant in order to ensure the edges remain sealed.

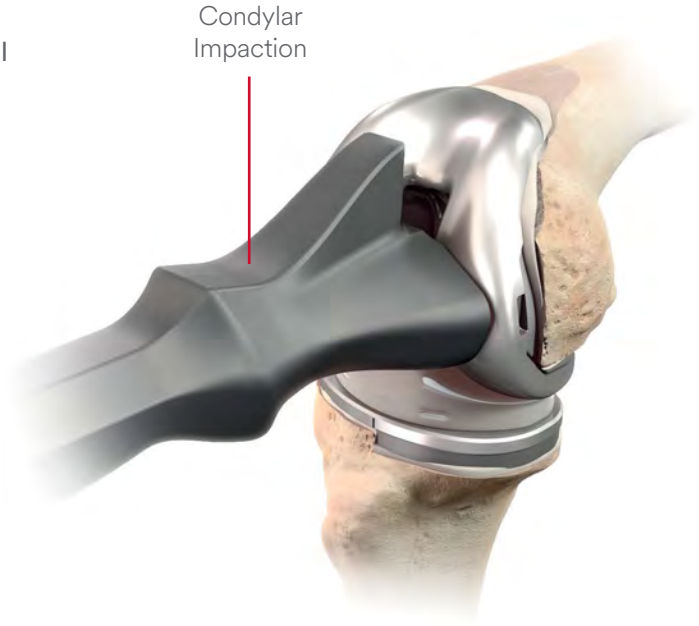
Seating the Femoral Construct

Place the Revision Femoral Component Assembly onto the bone by hand.

Seat the Femoral Component Assembly using the ATTUNE System Impactor.

Use only condylar impaction to seat the Revision Femoral Component Assembly. Notch impaction will attempt to extend the implant relative to the Stem or Sleeve and be in conflict with the bone preparation.

Then use a Curette to remove all extruded cement.



Tibial Trial Extraction

With the Revision RP Tibial Base, the INTUITION RP Trial Post may be utilized with the Insert Trial Assembly to perform Trial reduction.

The ATTUNE Primary INTUITION Insert Trial Handle can then be used to aid in removal of Tibial Insert Trials.

Connect the Insert Trial Handle to the anterior features on the Tibial Insert Trial and pull Assembly up and out of the joint space to remove the Tibial Insert Trial.

This upward movement works with the geometry of the condyles to aid in removal of the Tibial Insert Trial.

Tibial Insert Implantation

ATTUNE Revision RP Insert Implantation

For final implantation of the Revision RP Tibial components, insert the final Tibial Insert from the top.

Tibial Insert Implantation

ATTUNE PS or CR Insert Implantation

If an ATTUNE Primary PS or CR Insert is being utilized with the Revision RP Tibial Base, the INTUITION RP Trial Post may be utilized with the Insert Trial Assembly to perform Trial reduction.

For final implantation, insert the final Tibial Insert from the top.

Final Patella Preparation

Connect the Patella Clamp Button Holder to the Patella Drill Clamp.

Medialized Anatomic Patella Button

Medialized Dome Silicone Button and Patella Clamp Button Holder

Apply cement to the patella implant. Thoroughly clean the cut surface of the patella with pulsatile lavage. Apply cement to the surface of the patella and insert the component.

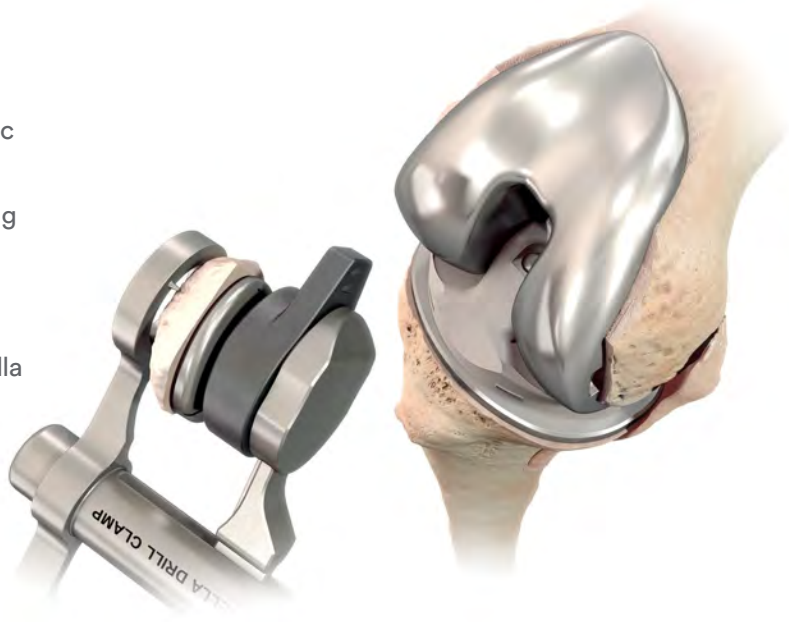
Patella Component Implantation

The Medialized Dome or Medialized Anatomic Patella Buttons are designed to fully seat and stabilize the implant as the cement polymerizes.

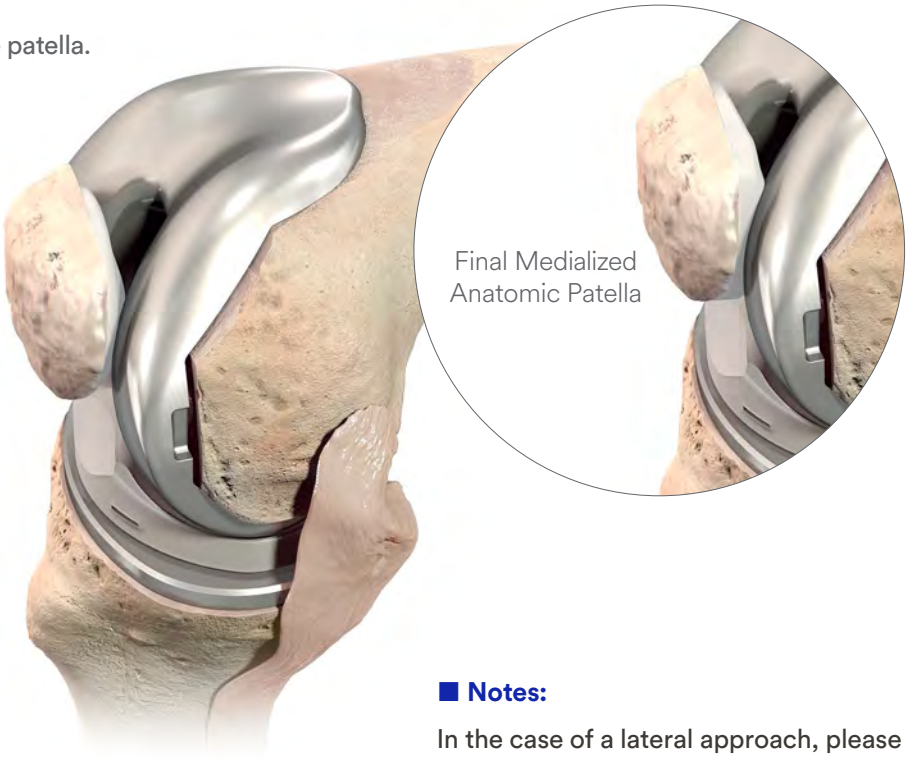
Center the Medialized Dome or Medialized Anatomic Patella Button and Button Holder Assembly over the articular surface of the implant and the metal backing plate against the anterior cortex of the patella, avoiding skin entrapment.

Engage the Patella Drill Clamp to firmly hold the Patella Implant until polymerization is complete. Remove all extruded cement with a Curette.

Release the Patella Drill Clamp by unlocking the Locking-Switch on the handle and slightly squeezing the Patella Drill Clamp Handles to disengage the locking mechanism.



Reduce the patella.



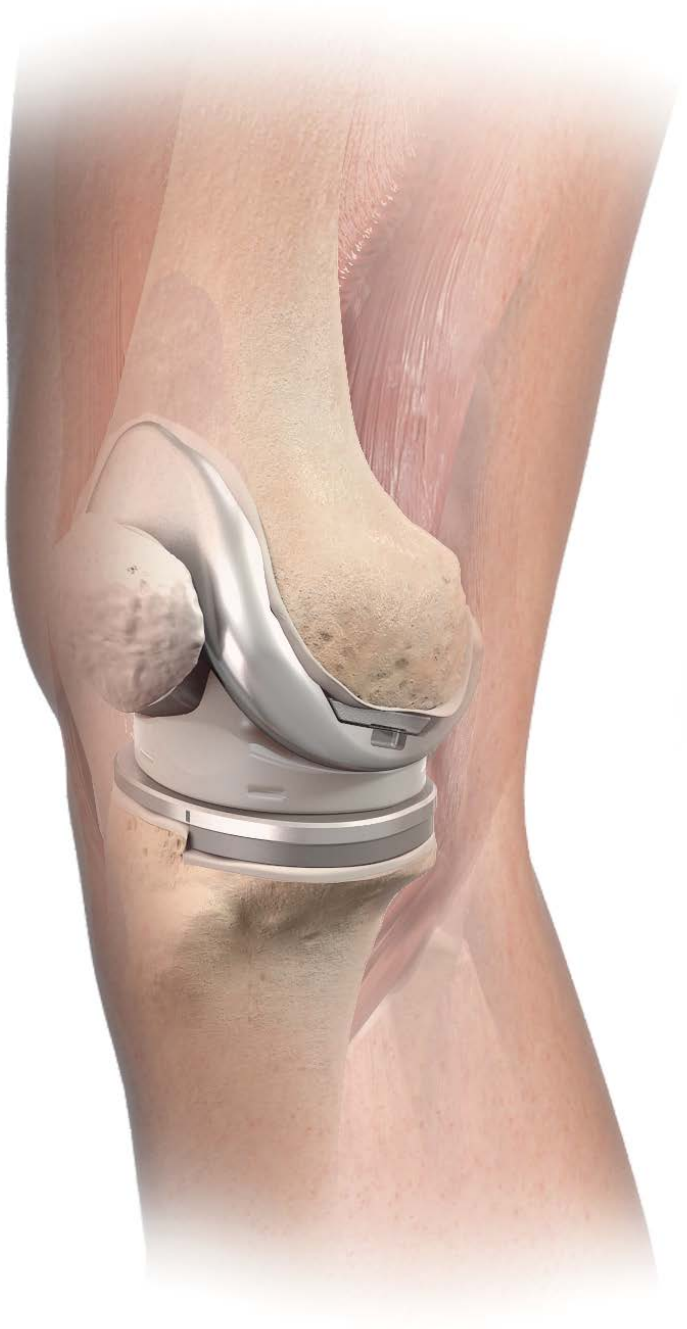
■ Notes:

In the case of a lateral approach, please consider that the clamp ring matches the medialized geometry of the implant specific for a medial approach.

Final Cement Curing

Confirm seating by circumferential inspection. Move the leg into extension, and then lift the leg back into flexion for final removal of excess cement.

Once all components are implanted, extending the leg will further pressurize the cement. The leg should then remain in extension until the cement hardens for the appropriate time depending on the cement type used.



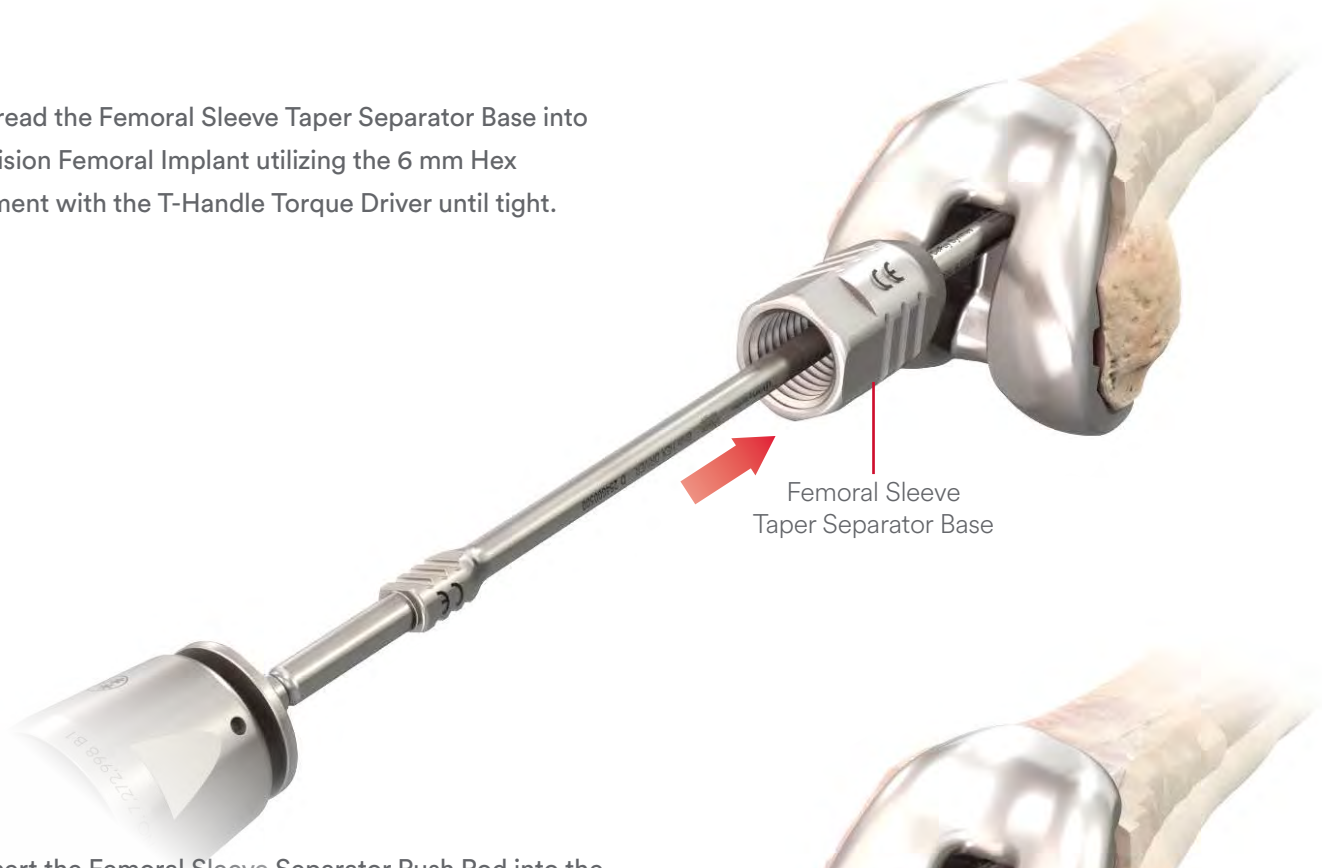
▲ Warning:

Care should be taken when flexing the knee past 45 degrees to avoid putting force on the posterior aspect of the Tibial Base while the cement is curing.

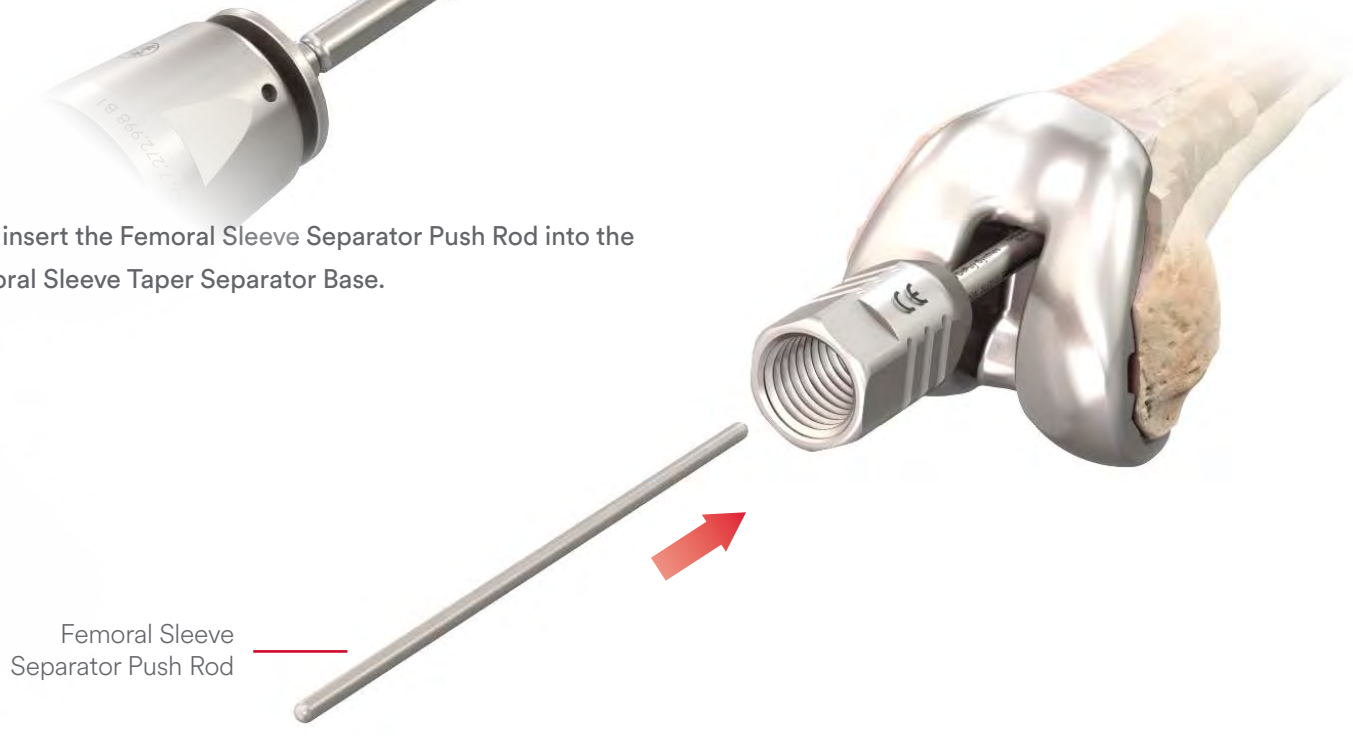
Femoral Sleeve Disassembly

Should a Femoral Sleeve Implant need to be removed from an ATTUNE Revision Femoral Component Implant, use the Femoral Sleeve Taper Separator:

Fully thread the Femoral Sleeve Taper Separator Base into the Revision Femoral Implant utilizing the 6 mm Hex Attachment with the T-Handle Torque Driver until tight.

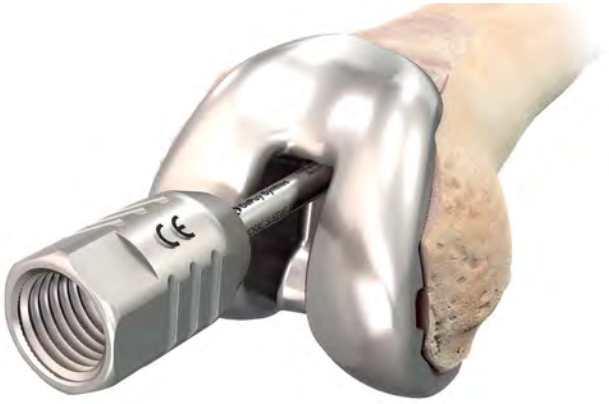


Fully insert the Femoral Sleeve Separator Push Rod into the Femoral Sleeve Taper Separator Base.



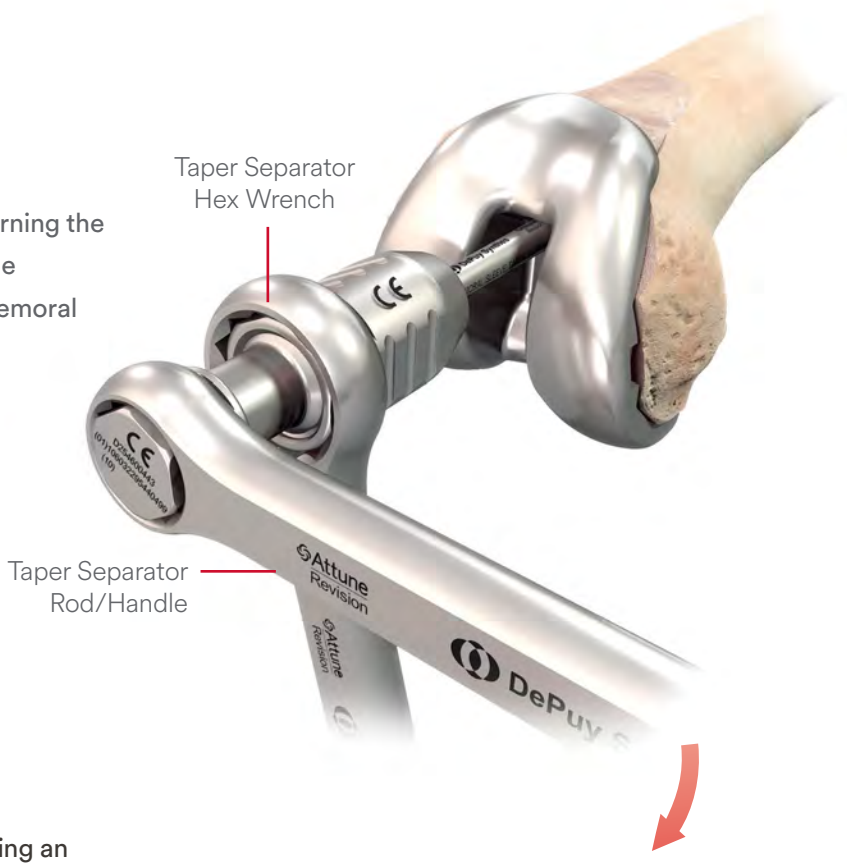
Femoral Sleeve Disassembly

Thread the Femoral Sleeve Taper Separator Driver into the Femoral Sleeve Taper Separator Base.



Place the Hex of the Taper Separator Hex Wrench onto the Femoral Sleeve Taper Separator Base. Place the Hex of the Taper Separator Rod/Handle onto the Femoral Sleeve Taper Separator Driver.

Hold the Taper Separator Hex Wrench while turning the Taper Separator Rod/Handle clockwise until the Revision Femoral Implant separates from the Femoral Sleeve.



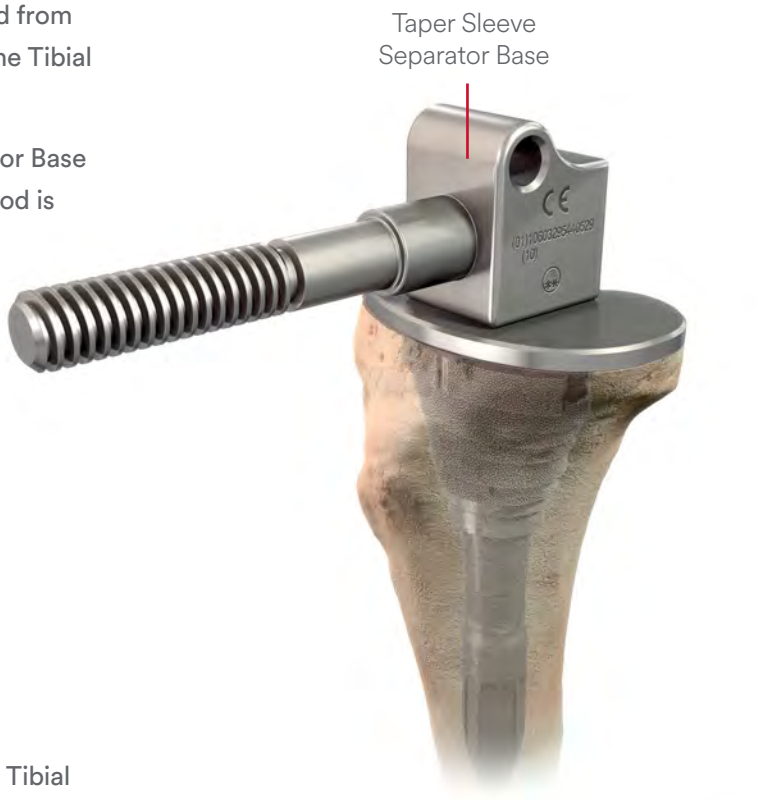
■ Notes:

If unable to disassemble the Sleeve after applying an initial torque, it may be necessary to tap the end of the Separator Driver with a mallet, re-adjust wrench placement, and re-apply torque with the wrenches.

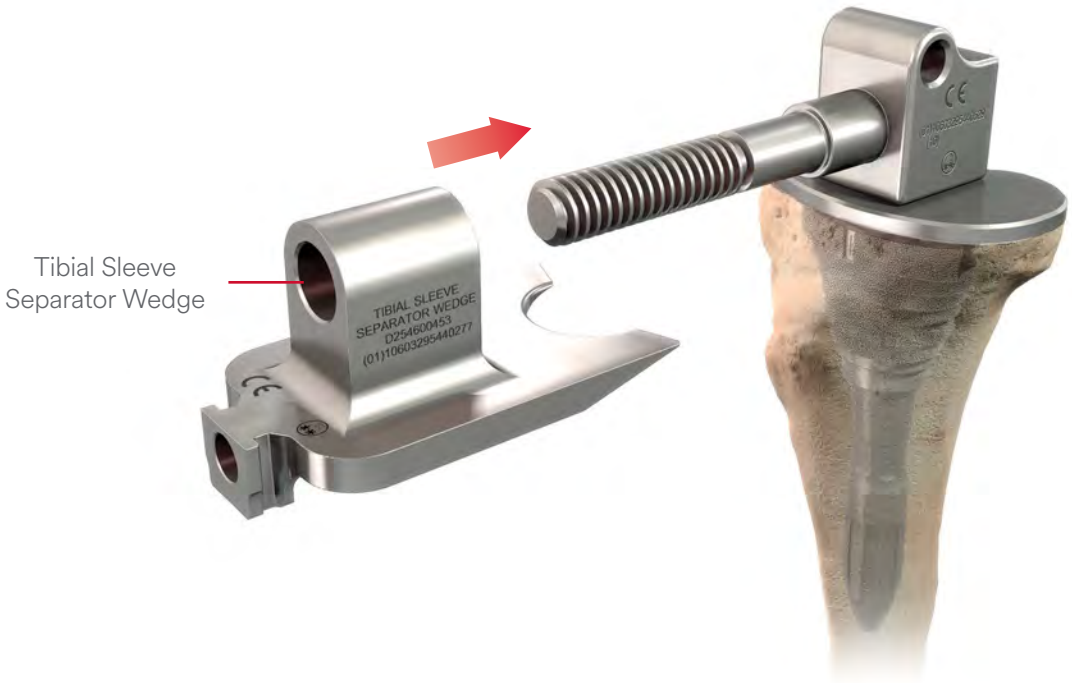
Tibial Sleeve Disassembly

Should a Tibial Sleeve Implant need to be removed from an ATTUNE Revision RP Tibial Base Implant, use the Tibial Sleeve Taper Separator Instruments:

Insert the tapered rod of the Tibial Sleeve Separator Base into the Tibial Base Implant. Ensure the threaded rod is directed anteriorly.



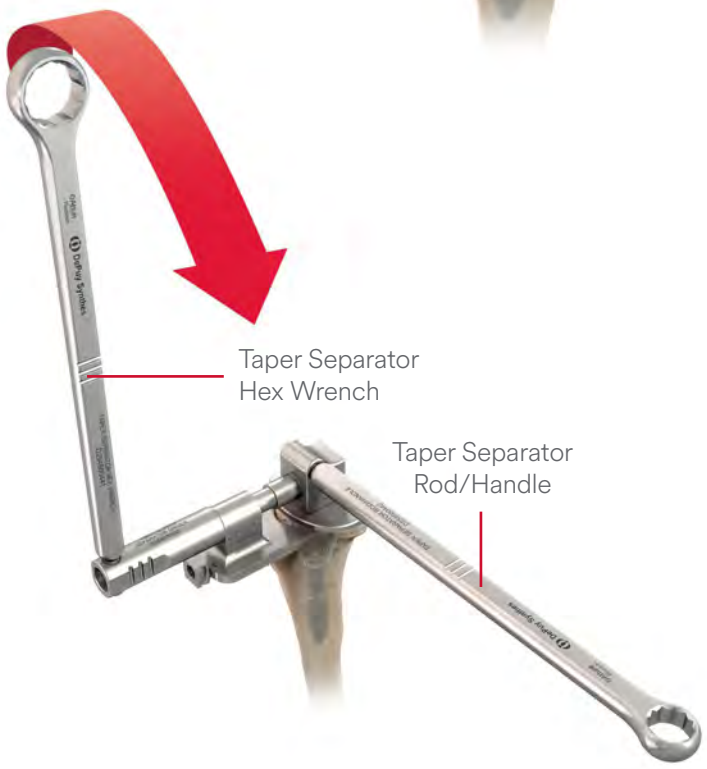
Insert the Tibial Sleeve Separator Wedge onto the Tibial Sleeve Separator Base with the wedge directed towards the Tibial Base Implant.



Tibial Sleeve Disassembly

Thread the Tibial Sleeve Separator Driver onto the Tibial Sleeve Separator Base.

1. Insert the tip of the Taper Separator Hex Wrench into the Tibial Sleeve Separator Driver. Insert the tip of the Taper Separator Rod/Handle into the Tibial Sleeve Separator Base.
2. Hold the Taper Separator Rod/Handle while turning the Taper Separator Hex Wrench clockwise to advance the Tibial Sleeve Separator Wedge to disengage the taper.
3. Remove the Taper Separator Hex Wrench and Rod/Handle.
4. Attach the Revision System Handle to the Tibial Sleeve Separator Wedge and impact the end of the System Handle to separate the tapers.
5. Continue repeating steps 1 - 4 until the tapers separate.



Appendix A: Tibial Preparation with the KINCISE™ Surgical Automated System

Tibial Broaching

Tibial Sleeve and Stem

With the RP Conical Reamer removed from the tibia,attach the appropriately sized Stem Trial to the 29 mm Tibial Broach.

Attach the KINCISE ATTUNE Revision Broach Adapter to the KINCISE Surgical Impactor.

To connect the Broach Adapter to the KINCISE Surgical Impactor, rotate the Locking Collar to the unlocked position by aligning the arrow symbol on the Locking Collar with the unlock symbol on the body.

Insert the KINCISE ATTUNE Revision Broach Adapter into the KINCISE Surgical Impactor then rotate the Locking Collar back to the locked position.

Connect the 29 mm ATTUNE Revision Tibial Broach to the KINCISE ATTUNE Revision Broach Adapter. Press the thumb button to open the latch to allow for connection to the Broach.

▲ Warning:

Ensure the Broach Adapter is fully locked to the handpiece before use to prevent the Adapter from disengaging during use.

Appendix A: Tibial Preparation with the KINCISE™ Surgical Automated System

Tibial Preparation

Tibial Sleeve and Stem

The Broaches are asymmetrical. Position the “ANT” engraving on the Broach anteriorly.

By pulling the trigger on the KINCISE Surgical Impactor, impact the Broach into the tibia until the top surface of the Broach is at the planned proximal tibial resection surface.

Check for rotational stability of the Broach. If the Broach moves in the canal, it is not rotationally stable.

▲ Warning:

During continuous use, follow the duty cycle of 5 seconds of use, followed by a 10 second rest for up to 8 cycles. Once 8 cycles are complete, allow the Surgical Inpactor to cool for a minimum of 4 minutes before continued use.

■ Notes:

The Stem Trial helps guide the Broach along the axis previously reamed.

Appendix A: Tibial Preparation with the KINCISE™ Surgical Automated System

Tibial Preparation

Tibial Sleeve and Stem

If the Broach is unstable or does not fill the bone defect, repeat with consecutively larger Broaches until the desired fit and fill is achieved.

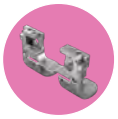
Remove the KINCISE ATTUNE Revision Broach Adapter and KINCISE Surgical Impactor, leaving the Broach in place.

Continue to follow the steps for Tibial Preparation on Page 48 to complete prep for final Sleeve and Stem.

Appendix A: Femoral Preparation with the KINCISE™ Surgical Automated System

Femoral Sleeve and Stem

Conventional Cut Guide

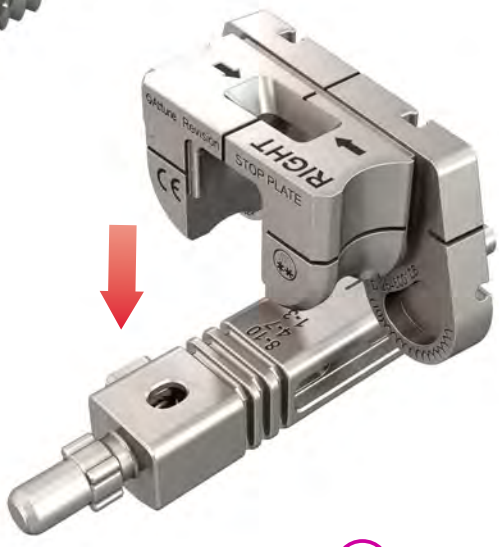


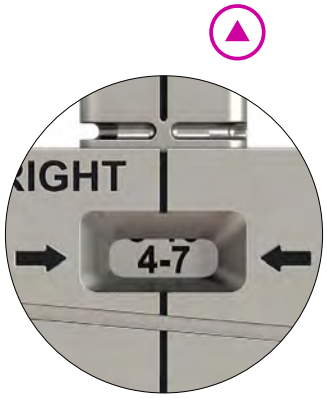
FE Guide

Femoral Sleeve and Stem

Assemble the corresponding Stem Trial to the smallest Femoral Broach.

Connect the correct side, “Left or Right”, Broach Stop of the appropriate size grouping, 1-3, 4-7, 8-10, to the KINCISE ATTUNE Revision Broach Adapter.





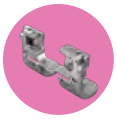
▲ Warning:

A Broach Stop must be utilized when broaching the femur.

Appendix A: Femoral Preparation with the KINCISE™ Surgical Automated System

Femoral Sleeve and Stem


Conventional Cut Guide


FE Guide


Femoral Sleeve and Stem

Connect the Broach Assembly to the KINCISE Surgical Impactor and introduce to the reamed femoral canal.

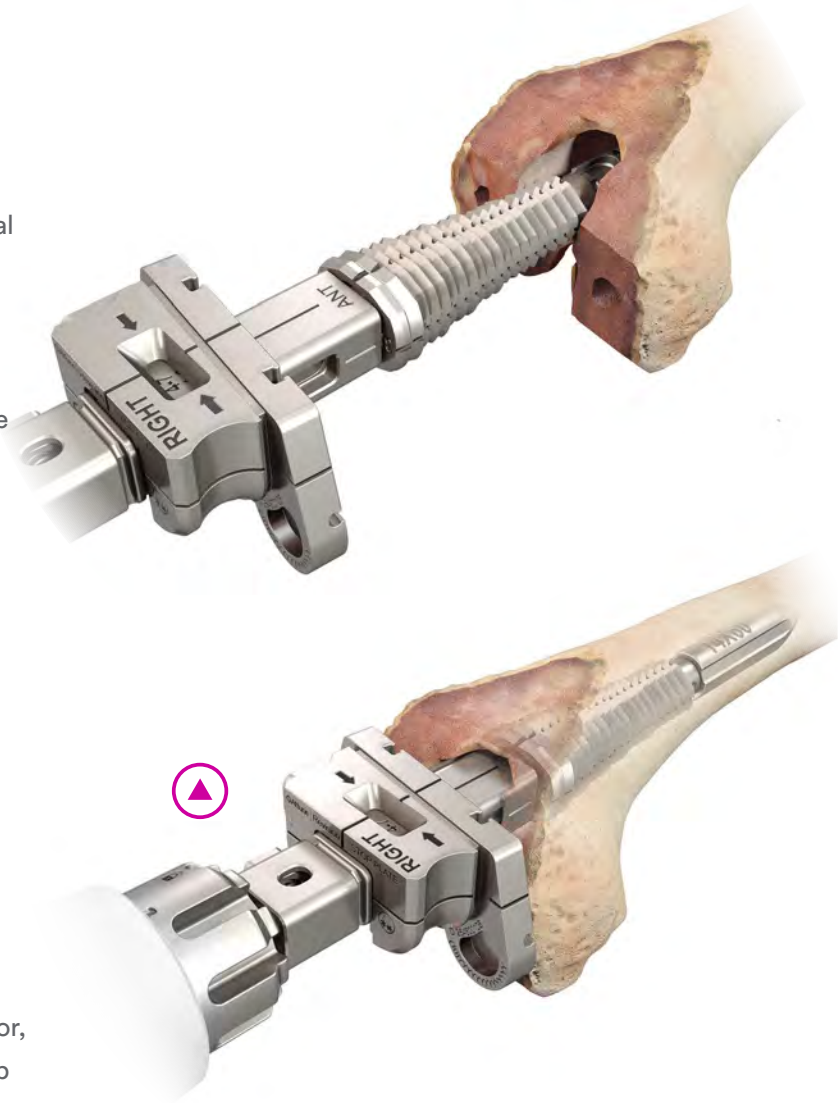
To connect the KINCISE ATTUNE Revision Broach Adapter to the KINCISE Surgical Impactor, rotate the Locking Collar to the unlocked position by aligning the arrow symbol on the Locking Collar with the unlock symbol on the body.

Insert the KINCISE ATTUNE Revision Broach Adapter into the KINCISE Surgical Impactor then rotate the Locking Collar back to the locked position.

Connect the 30 mm Femoral Broach to the KINCISE ATTUNE Revision Broach Adapter. Press the thumb button to open the latch to allow for connection to the Broach.

Position of the Femoral Broach should be done as described on Page 84 of this technique.

By pulling the trigger on the KINCISE Surgical Impactor, impact the Broach into the femur until the Broach Stop or Broach Stop/Shim is contacting the most prominent aspect of the distal femur. If there is significant bone loss on the distal femur, consider putting Broach Stop Shims on the Broach Stop to aid in to replicate the expected joint line when broaching.



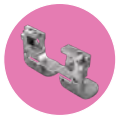
▲ Warning:

Ensure the Broach Adapter is fully locked to the handpiece before use to prevent the Adapter from disengaging during use.

Appendix A: Femoral Preparation with the KINCISE™ Surgical Automated System

Distal Clean-Up Resection

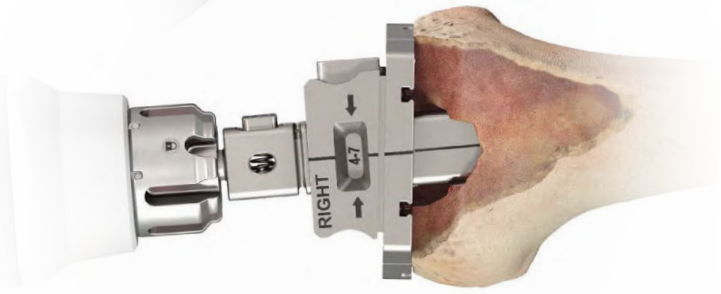
Conventional Cut Guide



FE Guide

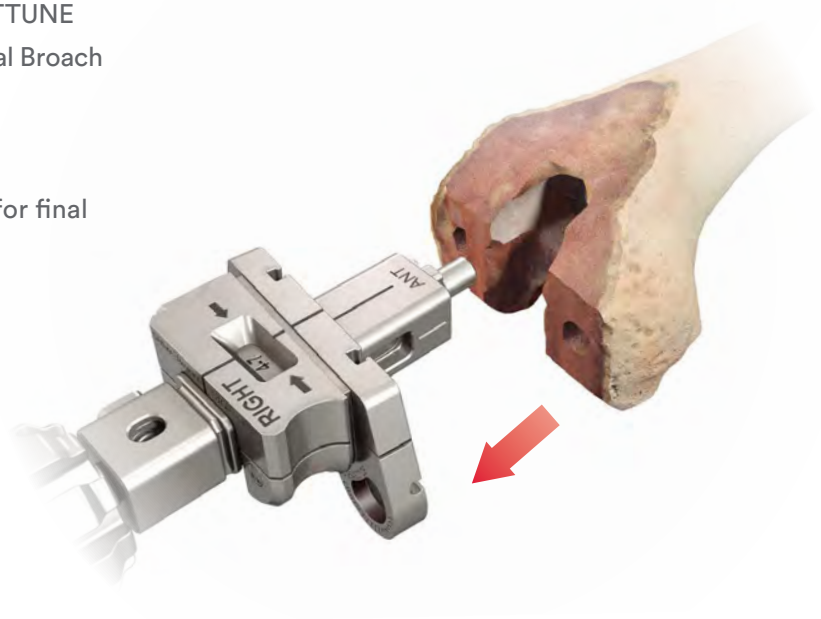
Femoral Sleeve and Stem

If desired, once rotational stability and the corresponding Broach size are achieved, a distal clean-up resection may be performed using the proximal surface of the Broach Stops or Broach Stop Shim, if used. If a resection is performed, reseat the Broach.



Disconnect the Broach from the KINCISE ATTUNE Revision Broach Adapter, leaving the Femoral Broach in the bone.

Continue to follow the steps for Femoral Preparation on Page 89 to complete prep for final Sleeve and Stem.



Compatibility Information

ATTUNE RP Tibial Inserts to ATTUNE Revision CRS Femoral Component / ATTUNE Revision RP Tibial Base Compatibility[1]

		ATTUNE Revision CRS Femoral Component	**ATTUNE RP Tibial Base**	**ATTUNE Revision RP Tibial Base**
		ATTUNE CRS	ATTUNE Revision RP	ATTUNE Revision RP
Tibial Insert	ATTUNE CR RP Tibial Insert	No	Yes	Yes
	ATTUNE PS RP Tibial Insert	Yes	Yes	Yes
	ATTUNE Revision CRS RP Tibial Insert	Yes	No	Yes

Patella to ATTUNE Revision CRS Femoral Component Compatibility[1]

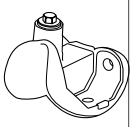
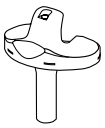
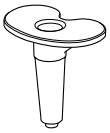
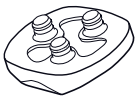
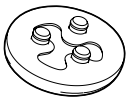
		ATTUNE Revision CRS Femoral Component
Patella	ATTUNE Medialized Dome	Yes
	ATTUNE Medialized Anatomic	Yes

ATTUNE Revision Offset Adaptor Compatibility[1]

	ATTUNE Revision Offset Adaptor
ATTUNE Revision Femoral Sleeves	No
ATTUNE Revision RP Tibial Base	No
ATTUNE Revision Cemented Stems	No
ATTUNE Revision CRS Femoral Component	Yes
ATTUNE Revision Press-Fit Stems	Yes

Compatibility Data

Table 7: ATTUNE Revision Knee RP Compatibility Chart1

SIZE SZ																
Pink	1	1	2	3								29	32	35	38	41
Dark Blue	2	2	2	3	4							29	32	35	38	41
Grey	3	3	2	3	4	5						29	32	35	38	41
Black	4	4	2	3	4	5	6						32	35	38	41
Green	5	5		3	4	5	6	7					32	35	38	41
Yellow	6	6			4	5	6	7	8				32	35	38	41
Light Blue	7	7				5	6	7	8	9				35	38	41
Red	8	8					6	7	8	9	10			35	38	41
Purple	9	9						7	8	9	10				38	41
Brown	10	10							8	9	10				38	41

Symbols on Surgical Instruments

Some of the instruments have markings on them for guidance.

The interpretation of these markings is as detailed in the table below.

Symbol or Text	Definition
	Cleaning position here
	Dismantle for cleaning
	Unlock
	Lock
L	Left
R	Right
CR	ATTUNE Cruciate Retaining Implant
PS	ATTUNE Posterior Stabilized Implant
RP	Rotating Platform
L	Lateral (for Patella Trials)
M	Medial (for Patella Trials)
LL	Left Lateral
RL	Right Lateral
FB	Fixed Bearing
	Femoral Implant Icon
	Base Protector
FEM	Femur

Symbol or Text	Definition
FLEXION	Flexion
EXTENSION	Extension
SZ	Size
TIB	Tibia
	Caution
DEG	Degrees
CEM	Cemented
LM	Left Medial
RM	Right Medial
	Cemented/Press-Fit Stem Assembly Icon
	Offset Adaptor Assembly Icon
	Femoral Implant Icon
	Femoral Trial Icon
	Indication Arrow
	Offset Adaptor Gap Assessment Icon
ANT	Anterior

Notes

Reference

1. DePuy Synthes. ATTUNE Revision Fixed Bearing and Rotating Platform System Compatibility. 09 Aug 2021. Adaptiv #103236081

Please refer to the instructions for use for a complete list of indications, contraindications, warnings and precautions.

This publication is not intended for distribution outside of the EMEA region.

DePuy Synthes
THE ORTHOPAEDICS COMPANY OF Johnson & Johnson

Manufactured or distributed by:

DePuy Orthopaedics, Inc.
700 Orthopaedic Drive
Warsaw, IN 46582
USA
To order (USA): 800-523-0322
To order (Canada): (844)-243-4321

DePuy International, Ltd.
St Anthony's Road
Leeds LS11 8DT
England
Tel: +44 (0) 113 270 0461

DePuy (Ireland)
Loughbeg, Ringaskiddy
Co. Cork, Ireland
Tel: +35 (321) 491 4000
Fax: +35 (321) 491 4199

Depuy Ireland UC
Loughbeg, Ringaskiddy CO.
Cork, Ireland
Tel: +35 (321) 491 4000
Fax: +35 (321) 491 4199

Note: For recognized manufacturer, refer to the product label.

www.depuysynthes.com

129250-230809 EMEA