

USTAR II™

Rotating Hinge Knee System



Surgical Technique Guide

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System Description

The USTAR II System is designed for extensive reconstruction of the hip and knee joint. Components have been designed based on 20 years experience with the previous USTAR system. The information contained in this surgical technique guide outlines the intended use of the instruments and implants. Surgeons select and utilize the system based on the individual needs of each patient.

The modularity of USTAR II system is designed to allow flexibility to address a variety of difficult surgical situations including the following:

- Proximal Femoral Replacement
- Distal Femoral Replacement
- Proximal Tibial Replacement
- Total Femoral Replacement
- Hinged Knee

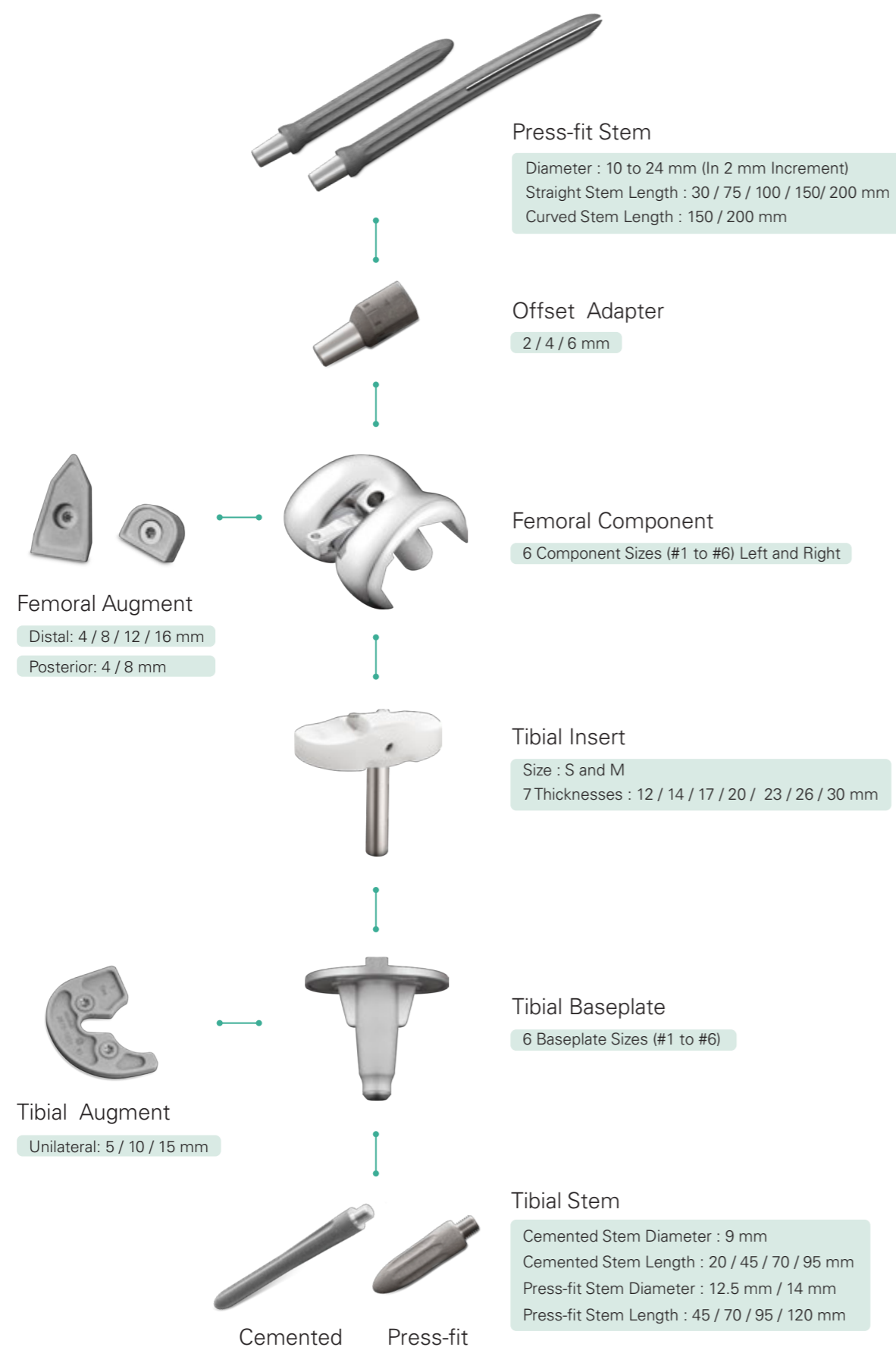
INDICATIONS

1. Metastatic tumor (i.e. osteosarcoma, chondrosarcoma, giant cell tumor or osteoma) where massive resection and transplantation are needed.
2. Severe hip or knee joint damage resulting from trauma where massive resection and transplantation are needed.
3. Non-inflammatory degenerative joint disease such as avascular necrosis, osteoarthritis, or traumatic arthritis.
4. Revision of previously failed total joint arthroplasty, osteotomy, or arthrodesis.
5. Joint instability resulting from excessive bone resection.

Please refer to the package inserts for important product information, including, but not limited to contraindications, warnings, precautions, and adverse effects.



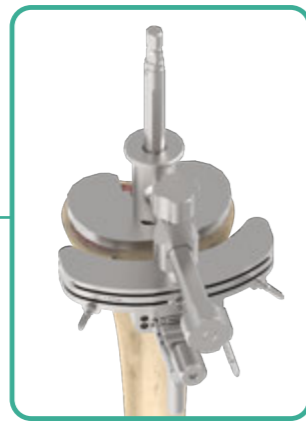
Hinge Knee Assembly



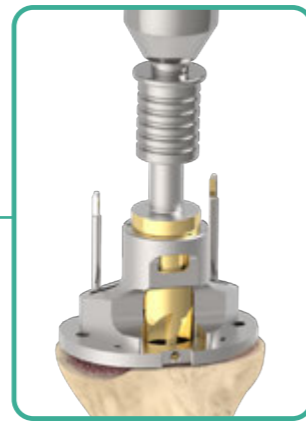
Revision Surgical Overview



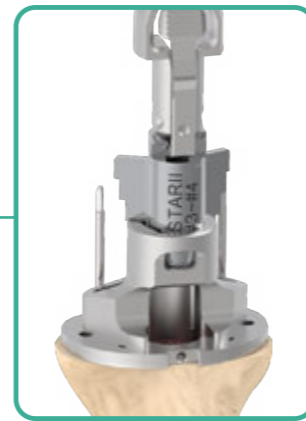
A. Component Removal



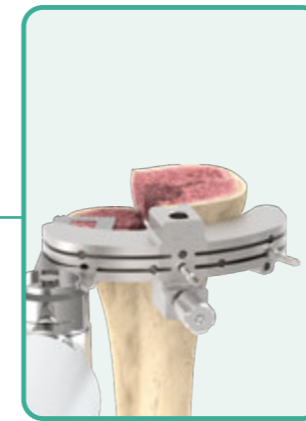
B. Establish Tibial Platform



C. Tibial Canal Preparation



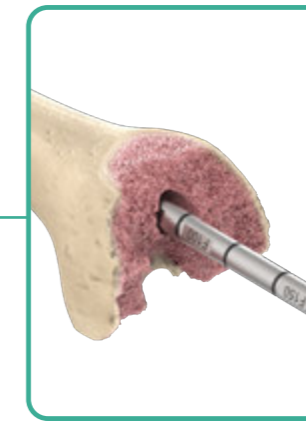
D. Finish Tibial Preparation



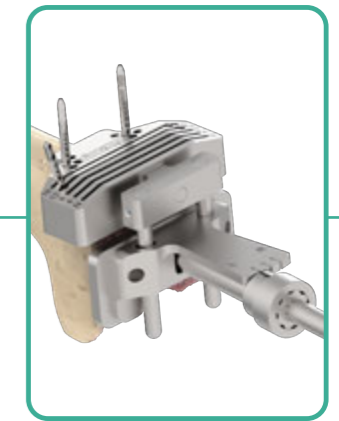
Optional Tibial Augment Preparation



E. Tibial Trialing



F. Femoral Canal Preparation



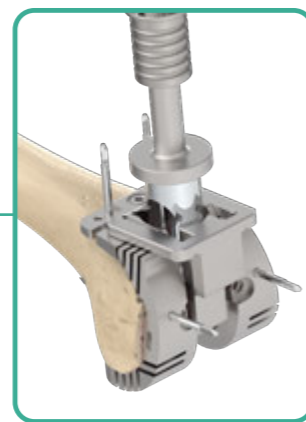
G. Distal Femoral Resection



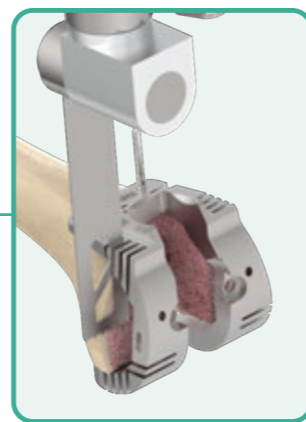
H. Femoral Sizing and Placement



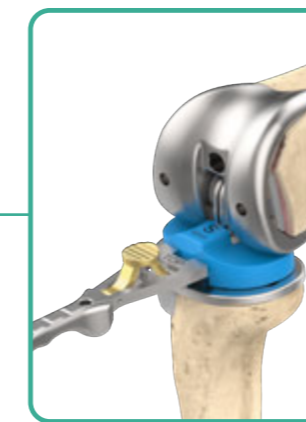
Optional Gap Assessment & Rotation Correction



I. Femoral Box Preparation



Optional Augment Preparation



J. Femoral Trialing



K. Implant Assembly



L. Implantation

Revision Procedure

A. Component Removal

If removing previously installed implant components, great care must be taken to preserve as much of the remaining bone as possible to avoid the risk of fracturing the residual bone stock. Through the use of small flexible osteotomes, saws, and high-speed burring instruments, bone preservation can usually be achieved. Fibrous tissue and cement debris should be removed as well.

B. Establish Tibial Platform

Set the knee in flexion to fully expose the tibial plateau. Use the **Twist Drill** to find the canal. Using the **T-Handle** to advance the **Tibial IM Rod** or **Tibial Stem Reamer** into the canal. Then remove the **T-Handle**.



Instruments



Twist Drill



T-Handle



Tibial IM Rod



Tibial Stem Reamer

B. Establish Tibial Platform

Attach the **IM Guide Collar** to the **Tibial IM Alignment Guide**. Slide the **Tibial Resection Guide** onto the **Tibial IM Alignment Guide**.

Slide the assembly over the Tibial IM Rod until the IM Guide Collar rests against the proximal tibial surface. Then tighten the Tibial IM Alignment Guide to the Tibial IM Rod. Slide the **Tibial Resection Guide** until it contacts the anterior tibia, then secure the position with the knob.



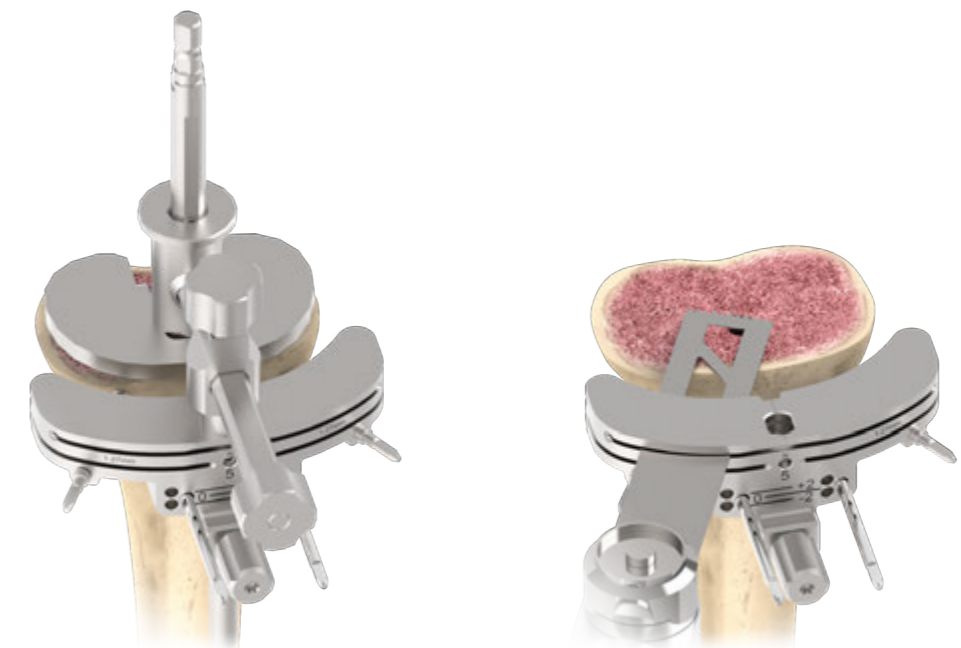
Instruments



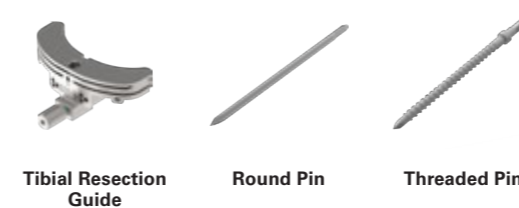
B. Establish Tibial Platform

Secure the **Tibial Resection Guide** with 2 **Round Pins** secured in the zero pin slot labeled '0'. Remove the intramedullary assembly, leaving the resection guide in place. +2 or -2 mm resection holes allow the resection guide to be shifted for additional adjustments. If needed, additional **Threaded Pins** may be used to further secure the resection guide.

Perform the proximal tibial resection using a standard .050" (1.27 mm) saw blade inserted through the resection slot labeled "N".



Instruments



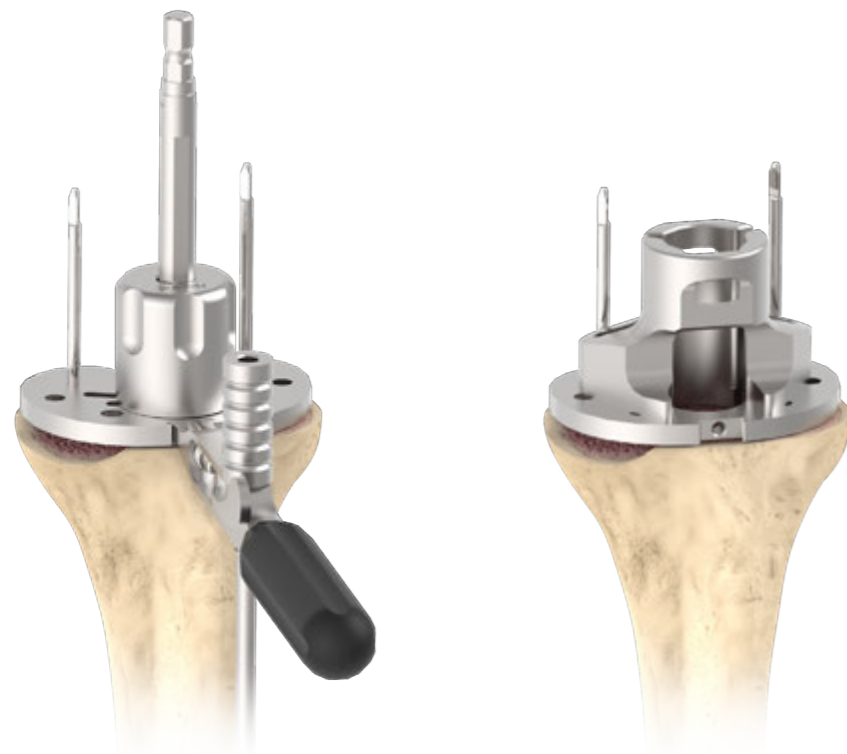
C.Tibial Canal Preparation

Select the **Tibial Sizing Template** option that provides the desired tibial coverage and attach it to the **Tibial Sizing Template Handle**. Place onto the resected tibial surface, then insert the **Tibial IM Rod** into the tibial canal. Slide the **Tibial Neutral Bushing** over the the **Tibial IM Rod** and onto the **Tibial Sizing Template**.

Attach the **Alignment Rod** to the **Tibial Sizing Template Handle** to help confirm optimal position.

Align the **Tibial Sizing Template** with the desired rotational position on the resected tibial surface, maintaining orientation with the the **Tibial IM Rod/Tibial Neutral Bushing** assembly. Secure with two **Round Pins**.

Remove the **Tibial Neutral Bushing**, **Tibial IM Rod** and the **Alignment Rod**. Attach the **Tibial Punch Guide** onto the sizing template.



Instruments

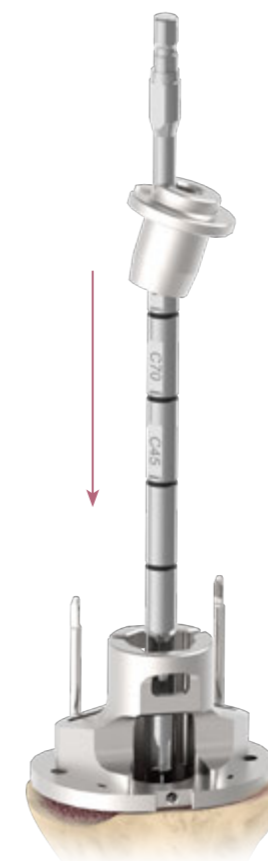


C.Tibial Canal Preparation

Insert the **Tibial Stem Drill** into the tibial canal. Place the **Tibial Stem Drill Sleeve** over the **Tibial Stem Drill**.

Different reamer diameters are available to obtain the desired stability. There are different reaming depths engraved on each reamer. Align the depth marking to the **Tibial Stem Drill Sleeve** in order to reach the appropriate depth of the desired stem length. Refer to the etched "C" depth marking for the 9 mm diameter cemented stem; and the etched "P" depth marking for the 12.5 mm and 14 mm diameter press-fit stem.

A 12.5 mm diameter reamer is recommended for an optimal press-fit of a 12.5 mm diameter press-fit tibial stem; while a 14 mm diameter reamer is recommended for an optimal press-fit of a 14 mm diameter press-fit tibial stem. If the desired stability is unable to achieve with the use of 12.5 mm and 14 mm reamers, the use of cemented stem is suggested.



Example of reaming for cemented tibial stem.
The etched marking **C70** indicates the appropriate depth of the 70 mm cemented tibial stem.



Example of reaming for Press-fit tibial stem.
The etched marking **P95** indicates the appropriate depth of the 95 mm press-fit tibial stem.

Instruments

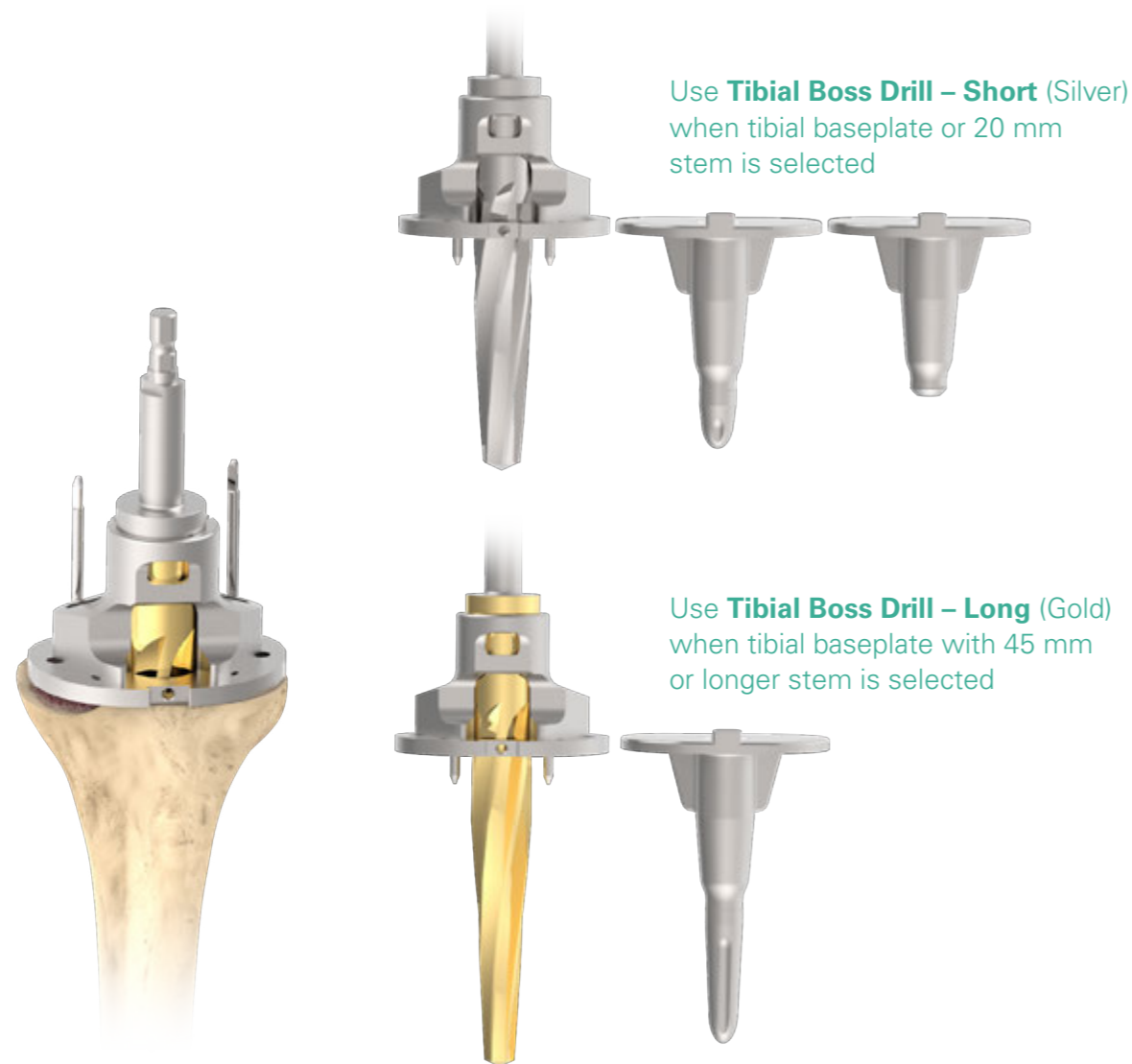


C. Tibial Canal Preparation

Select the correct **Tibial Boss Drill** for the selected tibial implant construct and advance through the **Tibial Punch Guide** until fully engaged.

For the tibial baseplate with no stem or a 20 mm stem, use the silver **Tibial Boss Drill - Short**.

For the tibial baseplate with a 45 mm stem or longer, use the gold **Tibial Boss Drill - Long**.



Instruments



D. Finish Tibial Preparation

D1. Optional Tibial Augment Preparation

If using an tibial baseplate augment component, attach the **Tibial Alignment Sleeve** onto the sizing template.

Reposition the tibial resection assembly and secure with two **Round Pins** to the anterior tibia. The **Tibial Resection Guide** can be used to perform 5 mm resection while the **Tibial Augment Resection Guide** can be used to perform 10 mm or 15 mm resection.



Instruments



D.Finish Tibial Preparation

D1. Optional Tibial Augment Preparation

An additional **Round Pin** may be placed into the central hole on the resection guide to serve as a resection stop guide to ensure a precise augment space preparation.

Remove the template, sleeve and alignment guide, leaving the resection guide in place, and complete bone resection for the augment space.



Instruments



Round Pin

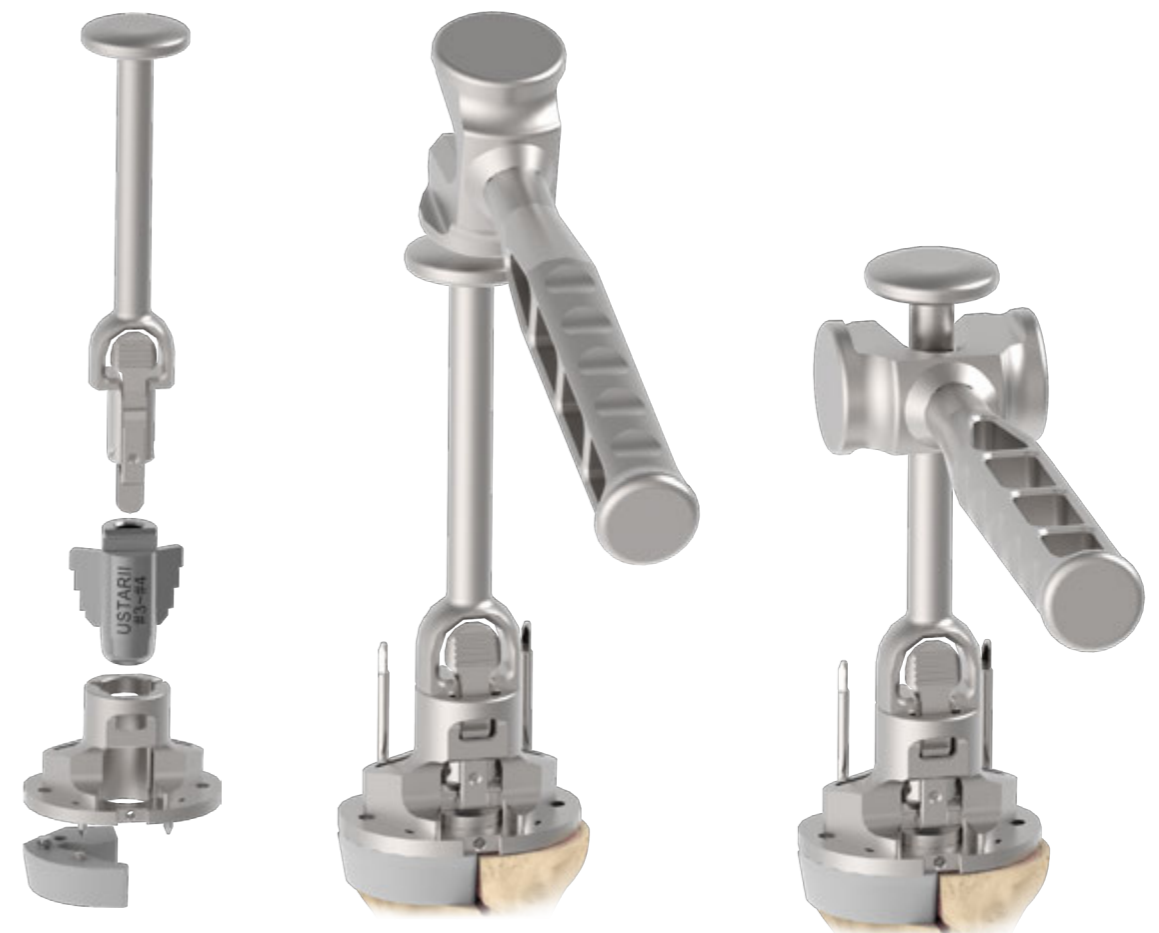
D.Finish Tibial Preparation

Attach the **Tibial Augment Trial** to the bottom of **Tibial Sizing Template** assembly.

Choose the **Tibial Punch** that corresponds to selected **Tibial Sizing Template** and attach it to the **Tibial Punch Handle**. The corresponding sizes are marked on the side of the **Tibial Punch**.

Advance the **Tibial Punch** through the **Tibial Punch Guide** until fully engaged.

Disengage the Tibial Punch assemblies with the **Slotted Hammer** and remove the **Tibial Sizing Template**.



Instruments



Tibial Punch



Tibial Punch Handle



Tibial Punch Guide



Slotted Hammer



Tibial Sizing Template
#1 ~ #6



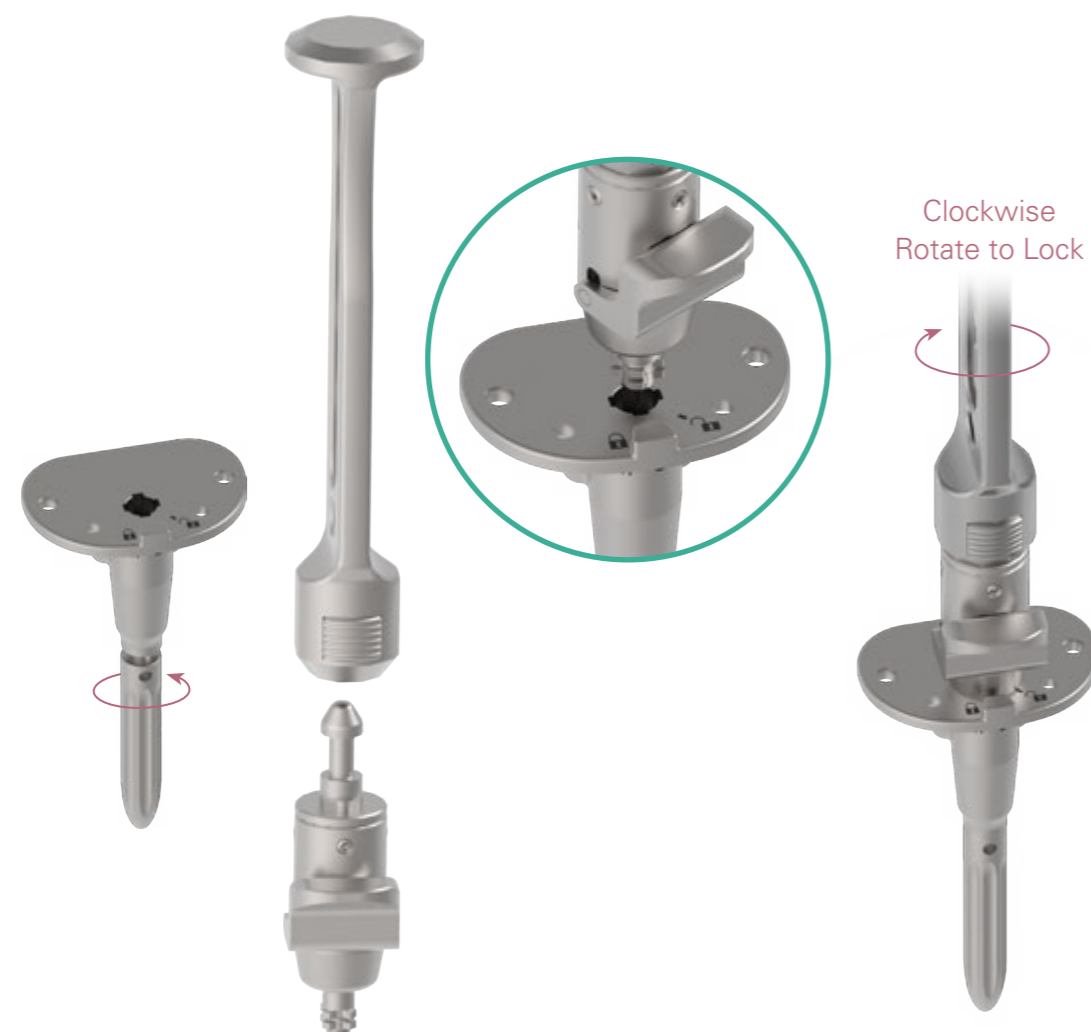
Tibial Augment Trial
5 / 10 / 15 mm

E. Tibial Trialing

If a tibial extension stem is selected, thread the corresponding **Tibial Stem Trial** into the bottom of the selected **Tibial Baseplate Trial**.

Attach the **Tibial Baseplate Trial Driver** to the **Modular Handle**.

Insert the tip of the **Tibial Baseplate Trial Driver** into the center hole of the tibial trial assembly and turn the driver $\frac{1}{4}$ turn in the clockwise direction to lock the driver into the tibial trial assembly.



Instruments



Tibial Baseplate Trial



Tibial Stem Trial



Modular Handle

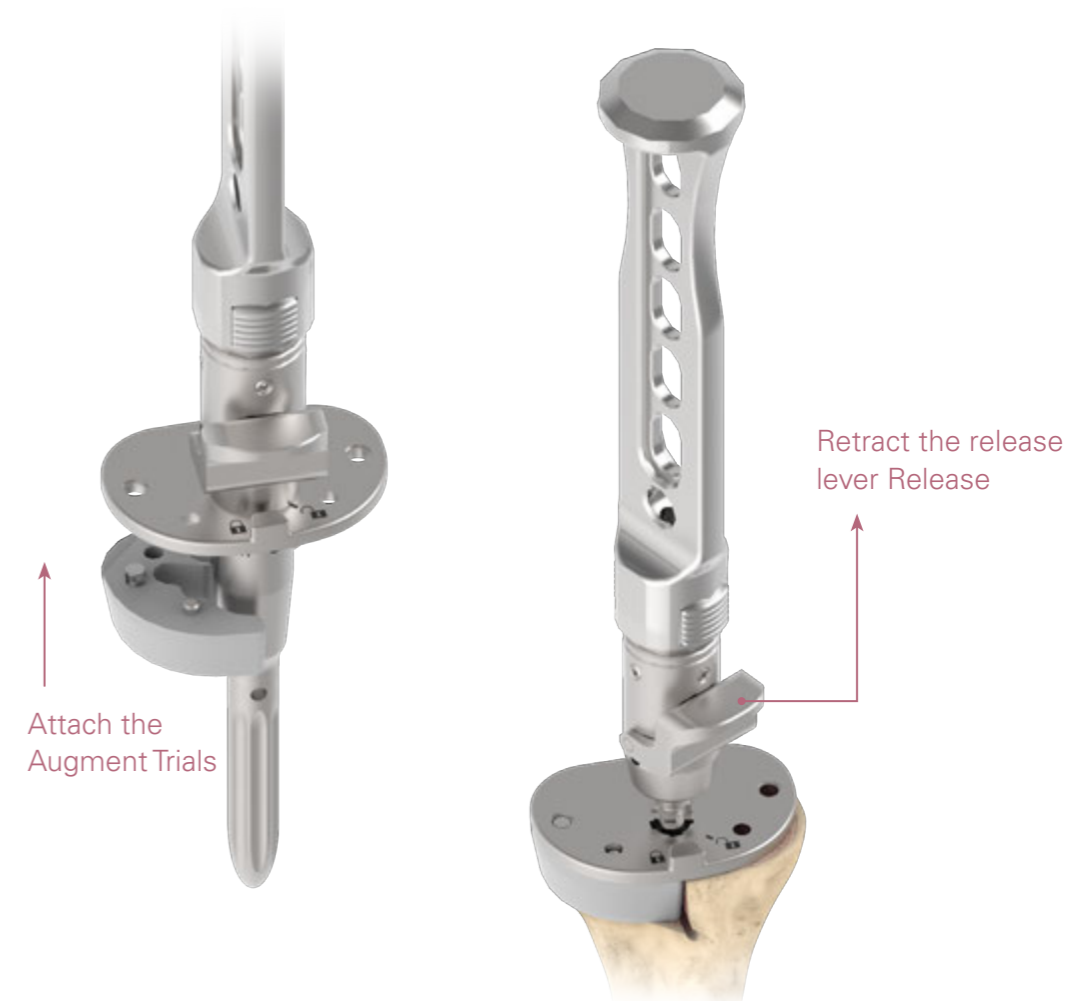


Tibial Baseplate Trial Driver

E. Tibial Trialing

Attach the **Tibial Augment Trial** to the bottom of tibial trial assembly.

Place the tibial trial assembly onto the resected tibial surface until fully seated into position. Retract the release lever to remove the **Tibial Baseplate Trial Driver**.



Instruments

Tibial Augment Trial
5 / 10 / 15 mm

Modular Handle



Tibial Baseplate Trial Driver

F. Femoral Canal Preparation

Create the femoral entry hole with the **Twist Drill** if needed.

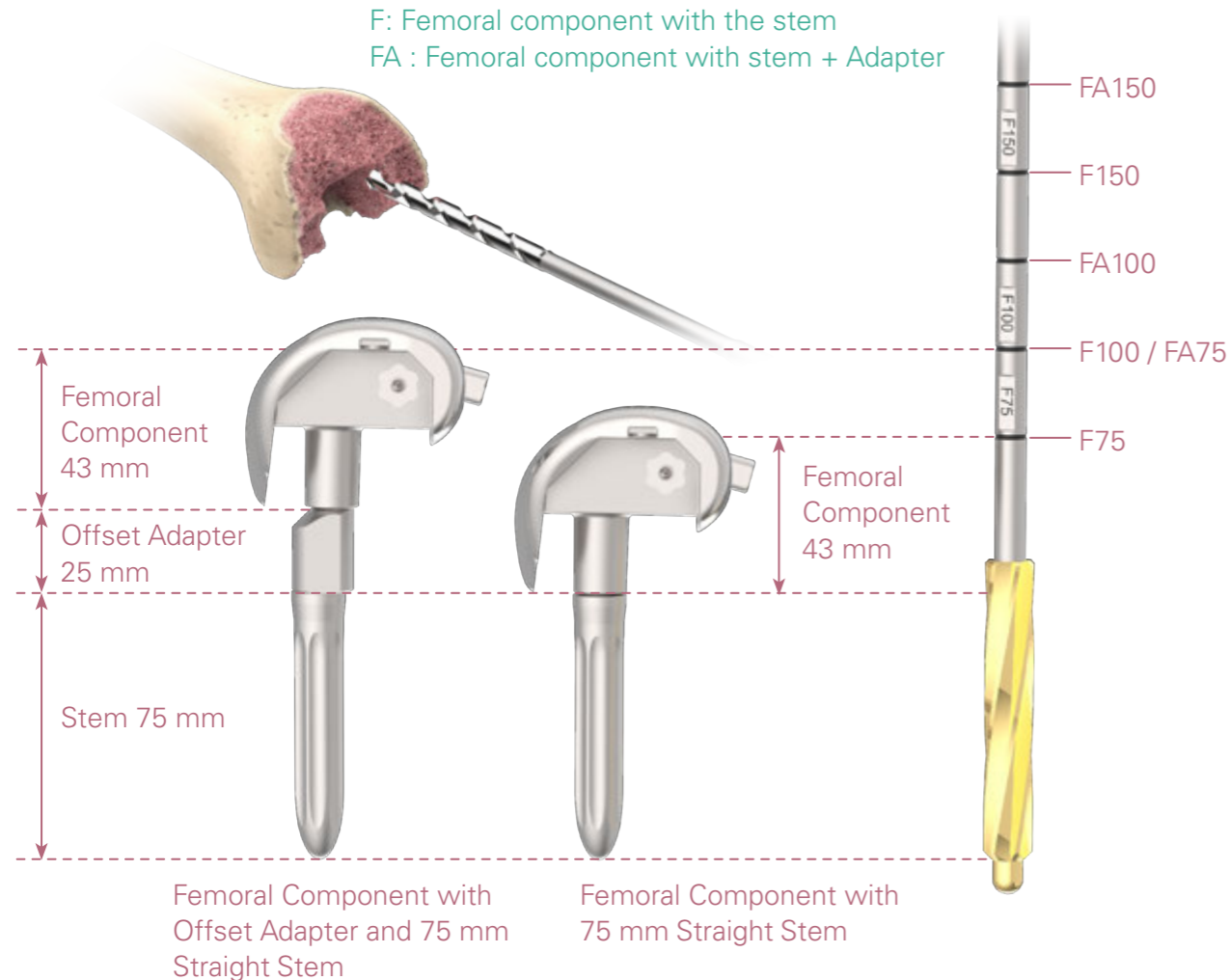
Ream the femoral canal starting with the 9 mm **Femoral Stem Reamer** and progressively increase the diameter until proper cortical contact is achieved at the desired depth. (Reamer options are available from 9 mm to 24 mm in 1 mm increments).

Note the etched markings on the femoral stems, the 'F' indicates the appropriate depth for a femoral component with a stem only with no offset adapter. The 'FA' indicates the appropriate depth for a femoral component with an offset adapter and stem.

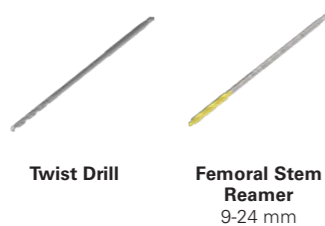
Note:

F: Femoral component with the stem

FA : Femoral component with stem + Adapter



Instruments



F. Femoral Canal Preparation

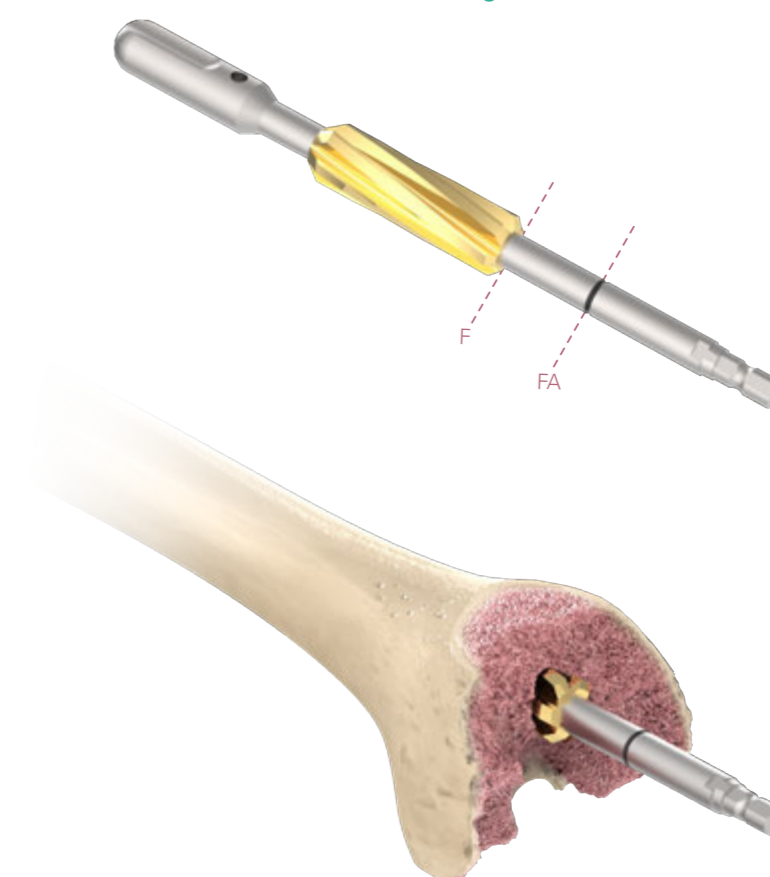
Choose the **Reamer Guide Rod** corresponding to the diameter of the last reamer used.

Attach the **Reamer Guide Rod** to the **Boss Reamer**, then ream the femoral canal to the depth until the indicator mark "F" on the **Boss Reamer** line up with the entry hole.

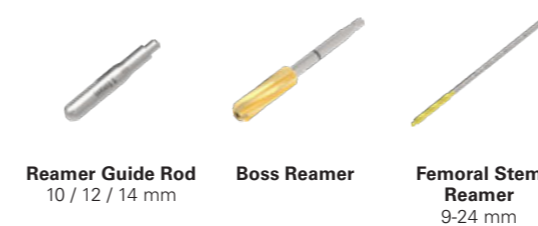
When the reaming process is completed, place the final reamer in the femoral cavity.

Note:

Using the boss reamer will not be necessary if the last **Femoral Stem Reamer** used is equal to or larger than 16 mm in diameter.



Instruments

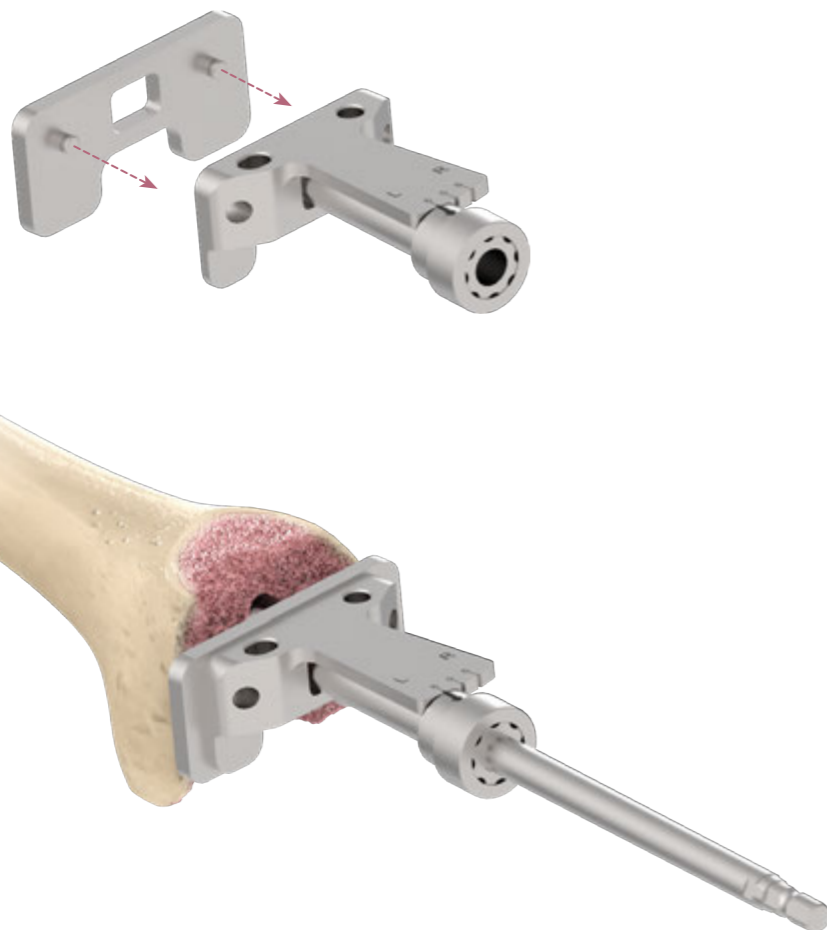


G. Distal Femoral Resection

Attach the **Distal Femoral Plate** to the **Femoral IM Alignment Guide** and slide the assembly onto the reamer until it is positioned against the distal femur.

Note:

USTAR II hinge knee **Femoral IM Alignment Guide** offers a fixed 6 degrees valgus angle distal femoral resection.



Instruments

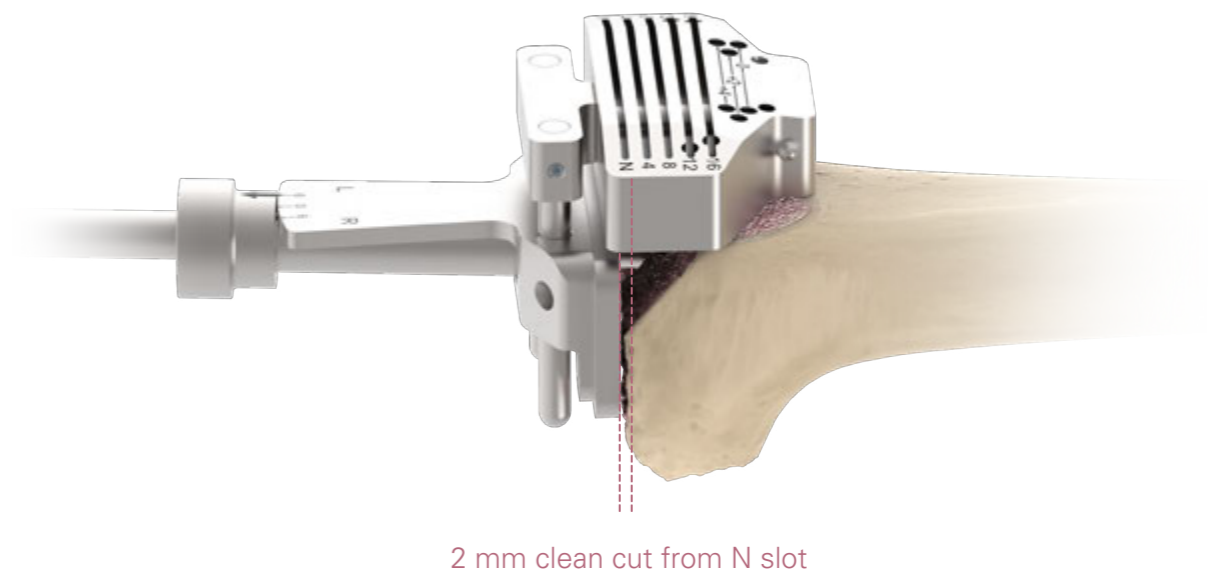


Distal Femoral Plate Femoral IM Alignment Guide

G. Distal Femoral Resection

Attach the **Distal Femoral Alignment Guide** to the **Distal Femoral Resection Guide** and then slide the assembly onto the **Femoral IM Alignment Guide**.

For a standard 2 mm resection, perform the resection through the "N" slot on the Distal Femoral Resection Guide to establish a 6 degree femoral valgus flat surface.



2 mm clean cut from N slot

Instruments



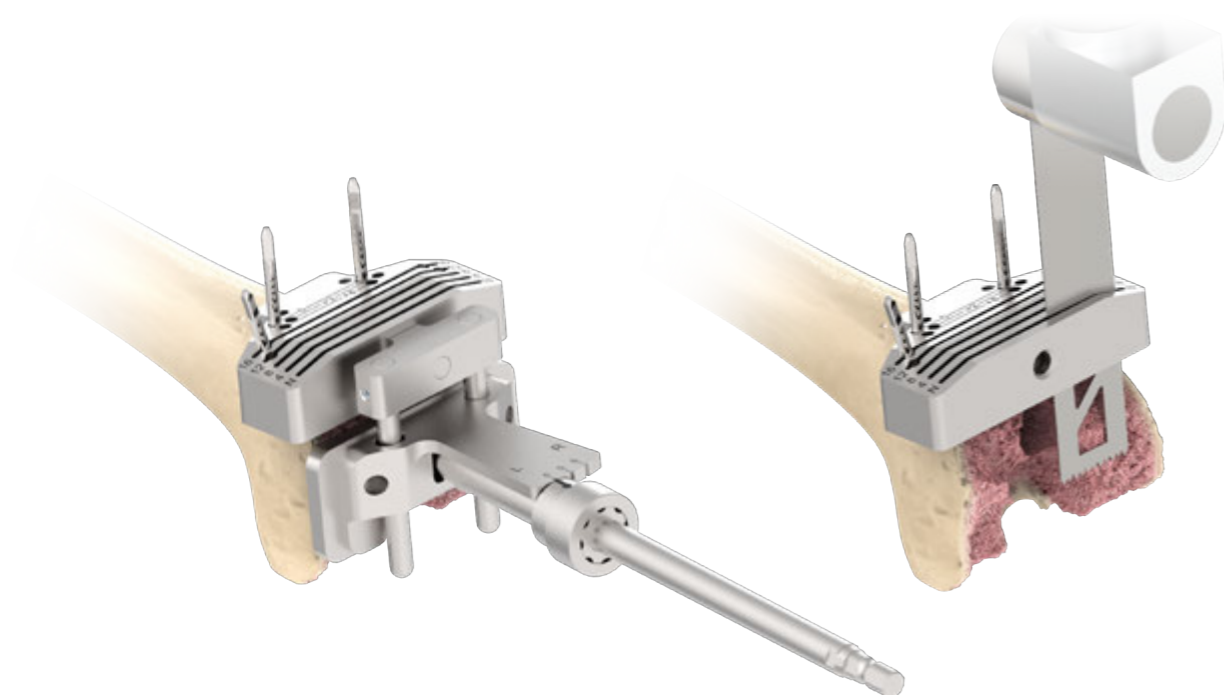
Distal Femoral Alignment Guide Distal Femoral Resection Guide

G. Distal Femoral Resection

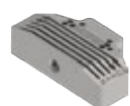
Pin the **Distal Femoral Resection Guide**. Then remove the alignment guide assembly from the reamer.

If adjustment to the resection is needed, utilize the +2 or +4 holes to relocate the **Distal Femoral Resection Guide** accordingly.

Perform distal femoral resection to appropriate cutting slot.



Instruments



Distal Femoral Resection Guide



Round Pin

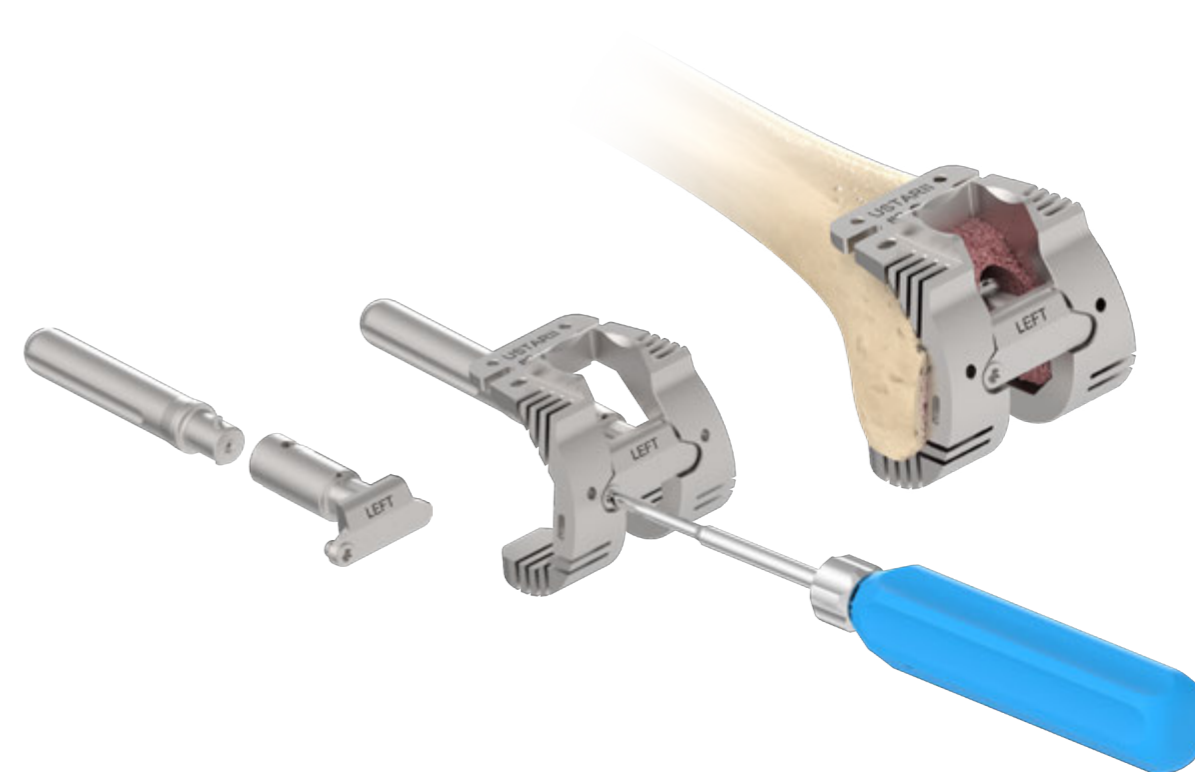
H. Femoral Sizing and Placement

Select an initial size component based on the removed component size or assessment based on the size and shape of the patient's femoral condyle.

Attach the applicable left or right **Femoral Valgus Adapter** to the selected size of **Stem Trial**.

Insert the **Femoral Valgus Adapter** onto the **Femoral Sizing Template** and connect with **Screwdriver**.

Insert the femoral sizing assembly into the canal and assess proper A-P / M-L size and position in relation to the femur.



Instruments



Stem Trial



Screwdriver Adapter T20



Driver Handle



Femoral Valgus Adapter



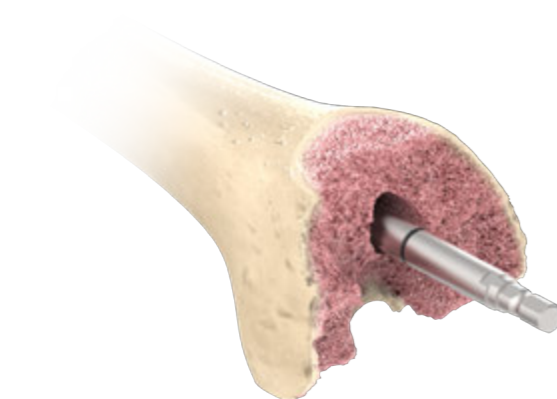
Femoral Sizing Template

H.Femoral Sizing and Placement

If the position of the **Femoral Sizing Template** is not optimal, use the Femoral Sizing and Placement Offset option.

Advance the **Boss Reamer** into the canal until the indicator mark "FA" lines up with the entry hole.

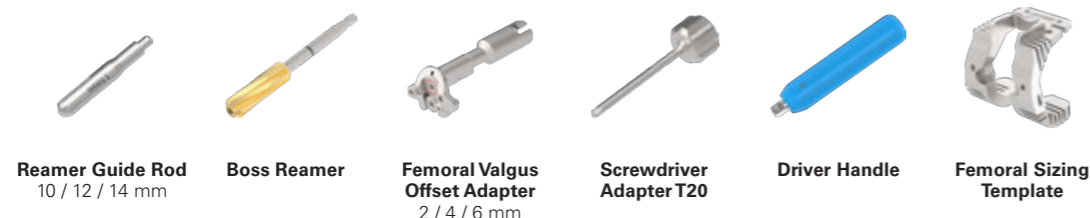
Assemble the selected size of the **Femoral Sizing Template**, **Valgus offset Adapter**, **Stem Trial** together with **Screwdriver Adapter T20**.



Note:
The boss reaming process will not be necessary if the last reamer used is equal to or larger than 16 mm.



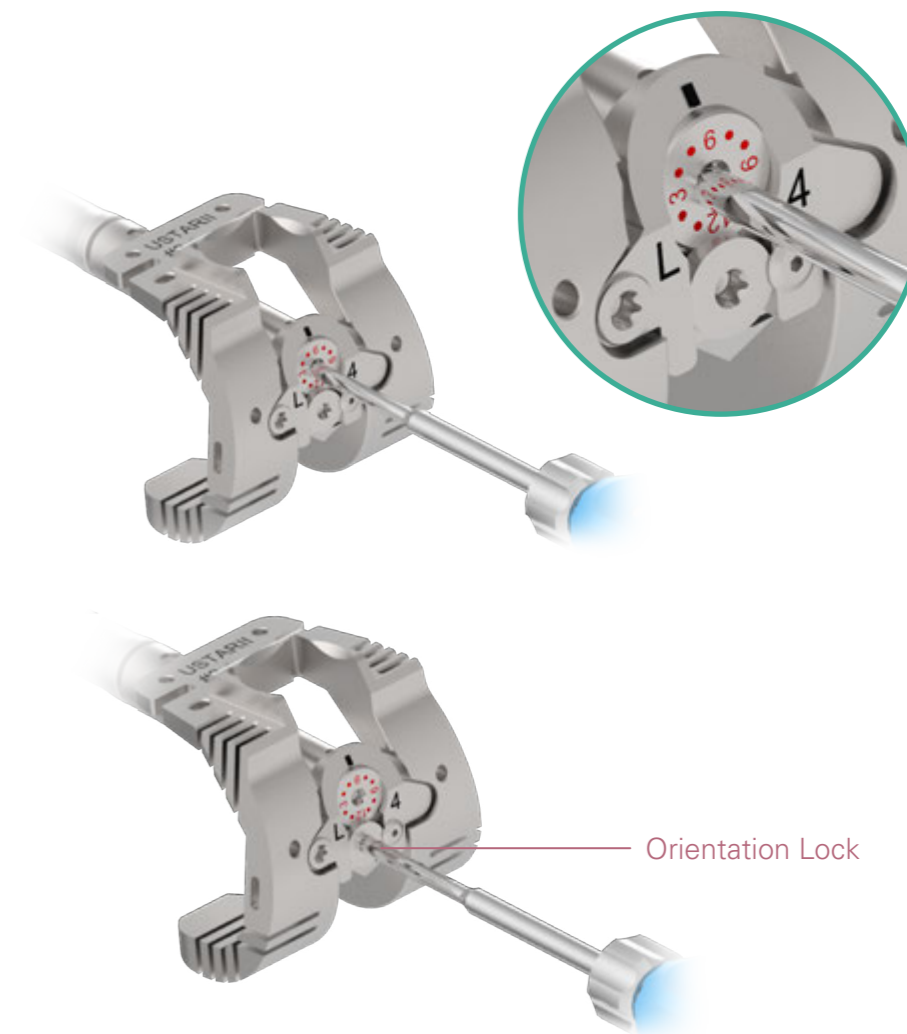
Instruments



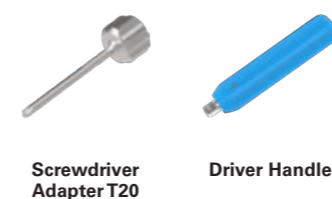
H.Femoral Sizing and Placement

Adjust the offset knob on the adapter with the screwdriver until optimal femoral coverage is achieved, then lock the desired offset with the orientation lock.

Insert the femoral sizing assembly into the canal and assess proper A-P / M-L size and position in relation to the femur.



Instruments



H. Femoral Sizing and Placement

H1. Gap Assessment & Rotation Correction

Place the selected **Tibial Spacer** thickness on the tibial baseplate assembly.

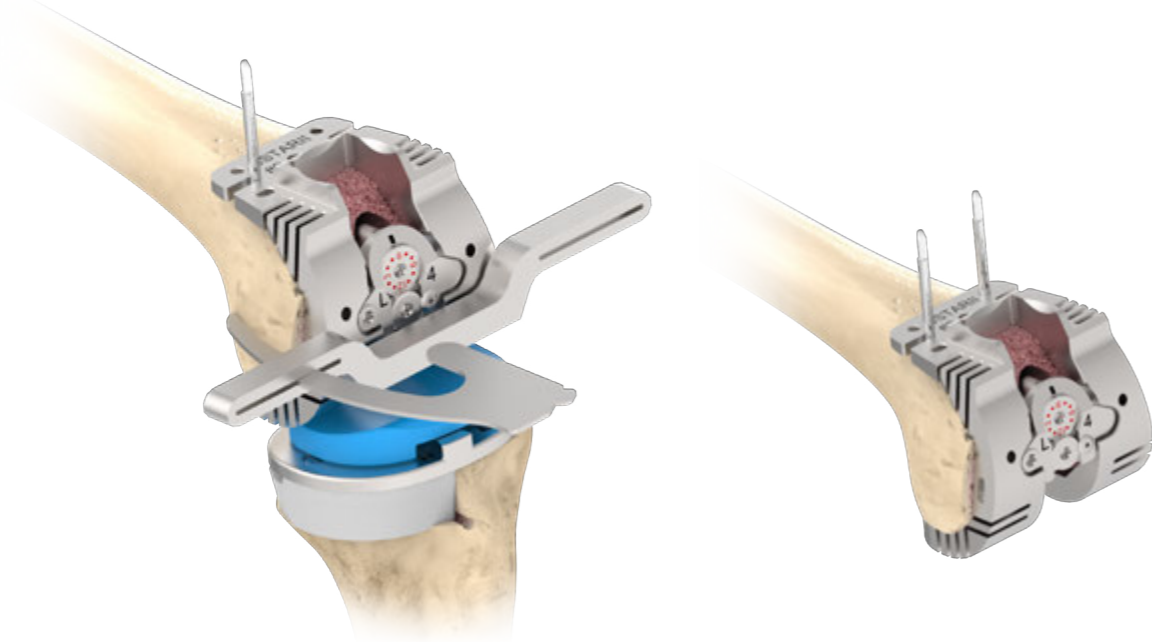
Secure the **Femoral Sizing Template** with a **Round Pin** in the anterior slot.

Insert the **Femoral Rotation Guide** into the slots on the **Femoral Sizing Template**.

To achieve the proper rotation, utilize the **Resection Check Blade** to align with the trans-epicondylar axis. Adjust rotation if needed.

Evaluate joint stability in flexion using the selected trial components. Switch to different **Tibial Spacer** thicknesses as needed to obtain optimal stability.

Once the **Femoral Sizing Template** is in the optimal rotation, alignment and stability, secure in place with a **Round Pin** in the anterior holes.



Instruments



Tibial Spacer

Femoral Sizing Template

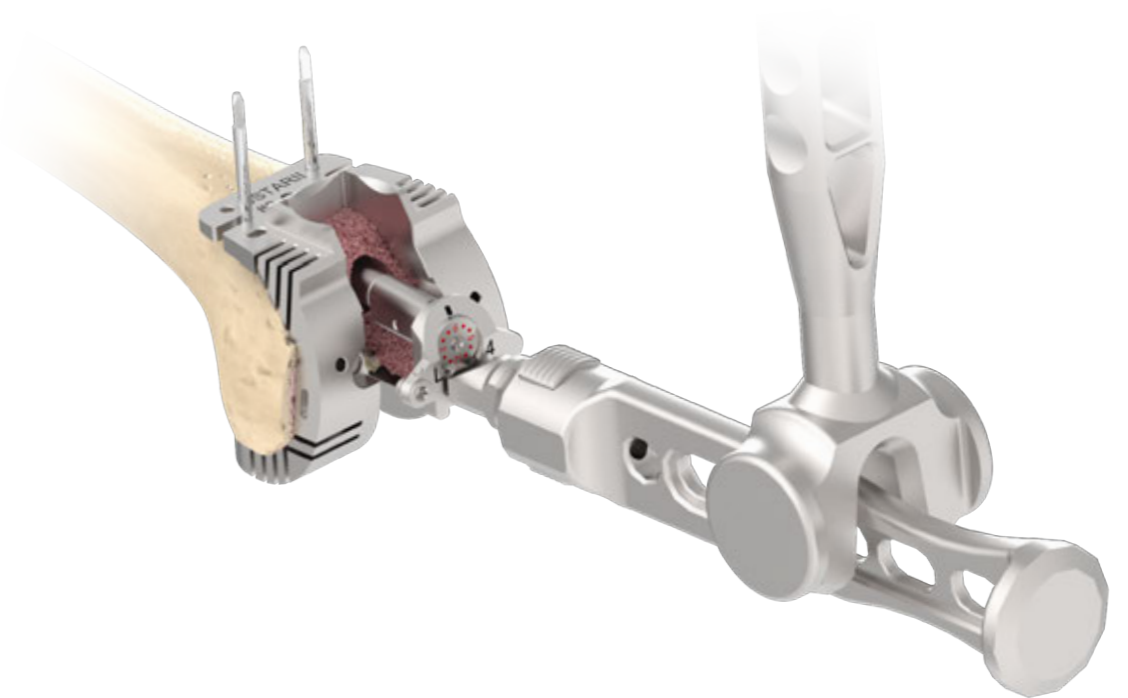
Femoral Rotation Guide

Resection Check Blade

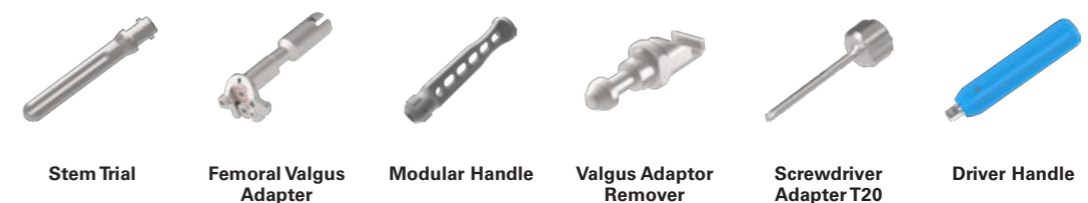
Round Pin

I. Femoral Box Preparation

Disassemble the **Femoral Valgus Adapter** and the **Femoral Sizing Template** with the screwdriver. Utilize the **Valgus Adapter Remover** to remove the **Femoral Valgus Adapter** and the **Stem Trial**.



Instruments



Stem Trial

Femoral Valgus Adapter

Modular Handle

Valgus Adapter Remover

Screwdriver Adapter T20

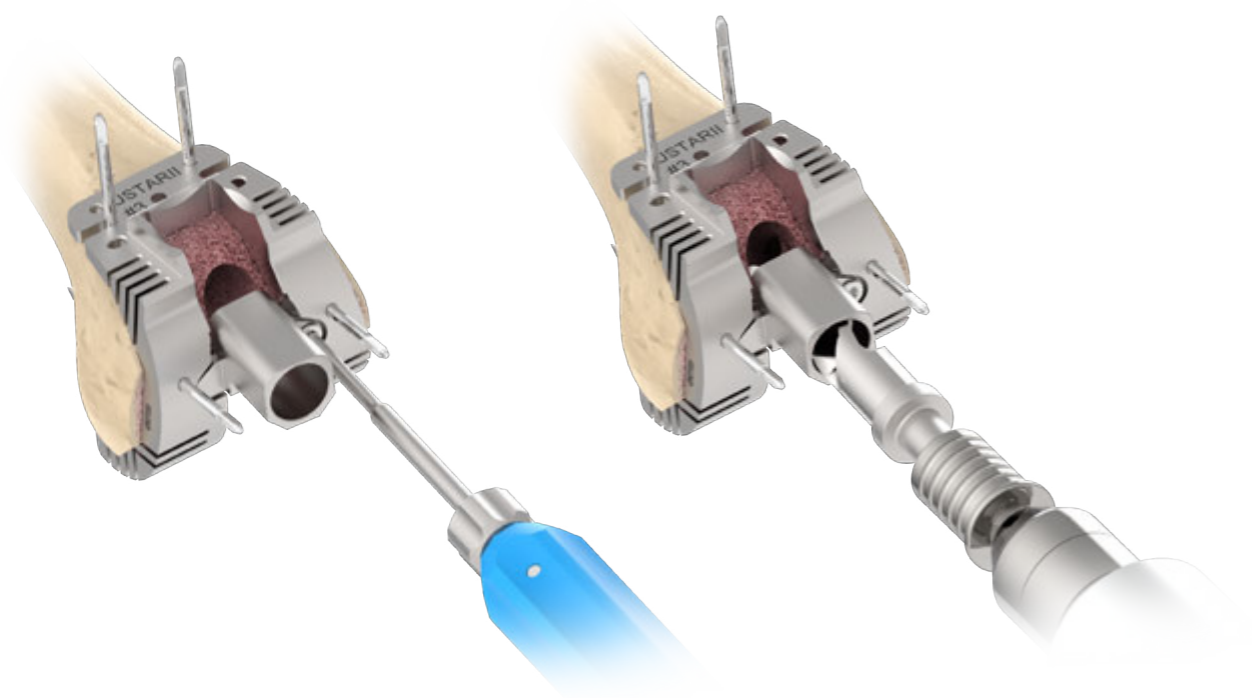
Driver Handle

I. Femoral Box Preparation

If offset is desired, secure the **Femoral Sizing Template** with two **Round Pins** on resected distal femoral surface.

Assemble the **Femoral Offset Drill Guide** onto the **Femoral Sizing Template** with the **Screwdriver T20**.

Drill through the **Femoral Offset Drill Guide** with the **Femoral Offset Boss Drill** until fully engaged.



Instruments



Femoral Offset Drill Guide



Screwdriver Adapter T20



Driver Handle



Femoral Offset Boss Drill

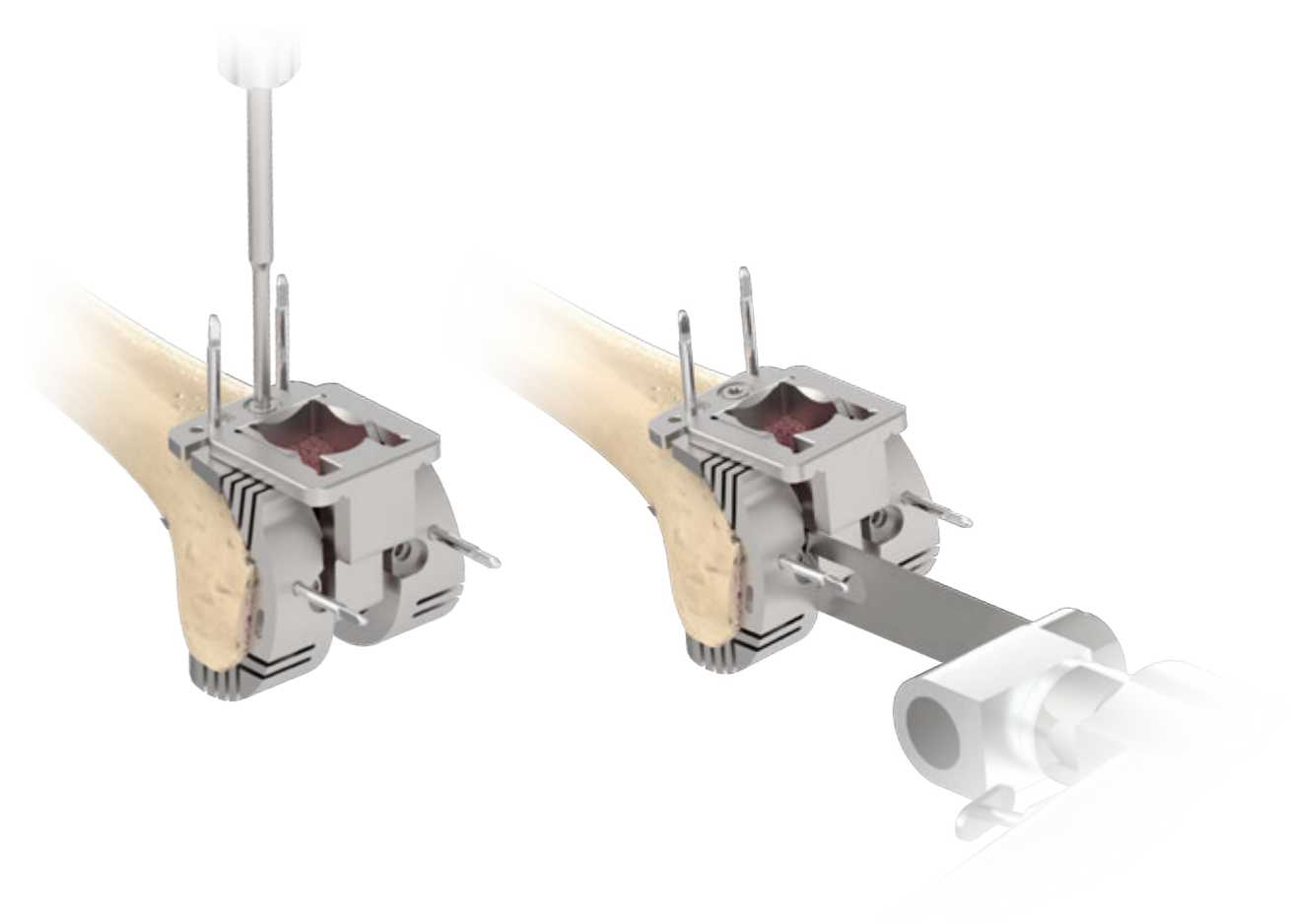


Femoral Sizing Template

I. Femoral Box Preparation

Assemble the **Box Cutting Guide** to the **Femoral Sizing Template** with the **Screwdriver**.

Using a standard 1.27 mm saw blade, complete a parallel bone resection through the posterior cortex.



Instruments



Box Cutting Guide



Driver Handle



Screwdriver Adapter T20



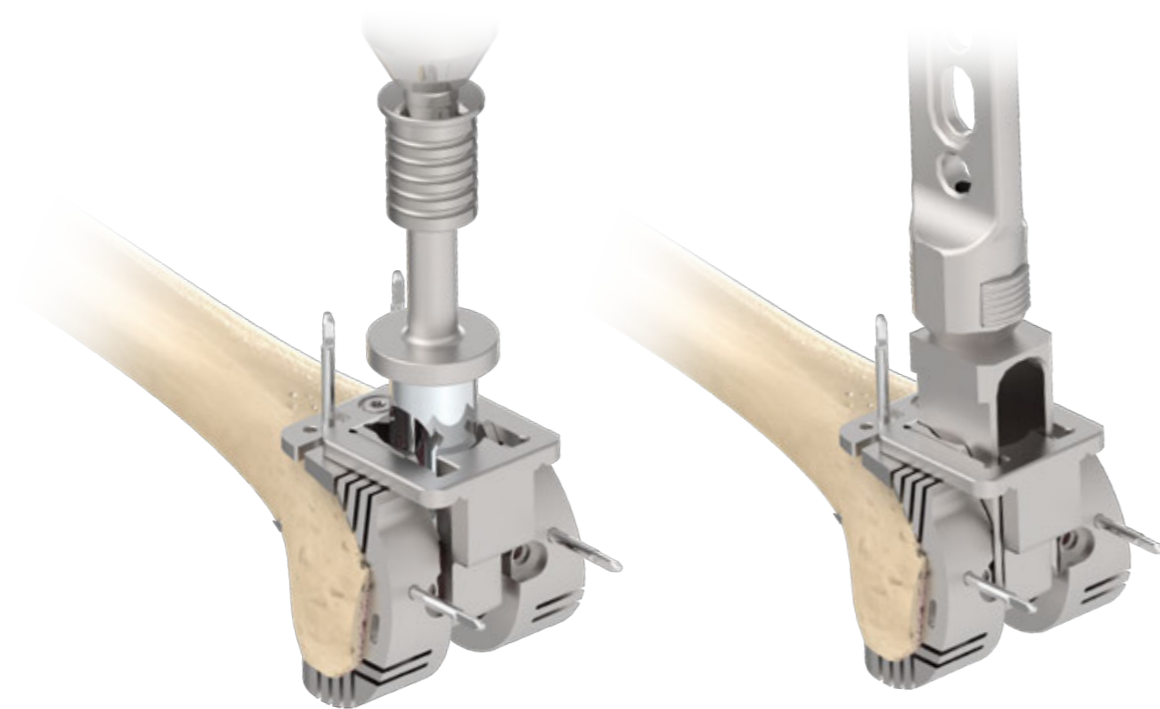
Femoral Sizing Template

I. Femoral Box Preparation

Using the **Box Reamer**, ream through **Box Cutting Guide** until the stop is fully engaged, in contact with the guide.

Using the **Box Chisel**, impact through the **Box Cutting Guide** to ensure the corners of the box housing are 'square'.

Remove the **Femoral Sizing Template/Box Cutting Guide** assembly.



Instruments



Modular Handle



Box Chisel



Femoral Sizing Template



Box Cutting Guide



Box Reamer
#1~#3 #4~#6

I. Femoral Box Preparation

I1. Optional Femoral Augment Preparation

If using a femoral augment, remove the fixation pins on the distal holes of the **Femoral Sizing Template**.

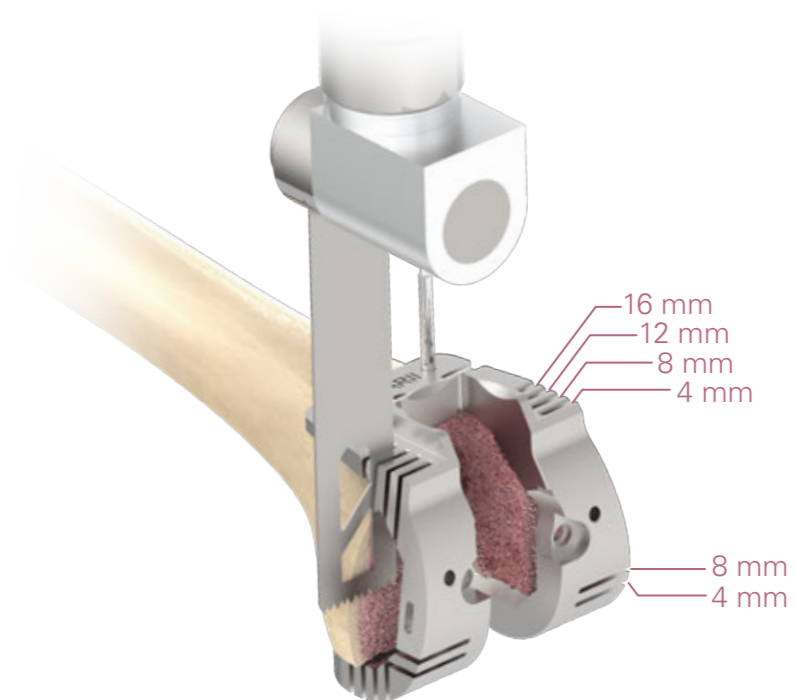
Complete the augment preparation using the applicable slot on the **Femoral Sizing Template**.

For distal augments, use the 4 / 8 / 12 or 16 mm anterior slots on the **Femoral Sizing Template** that match the equivalent distal augment sizes.

For posterior augments, use the 4 or 8 mm distal slots on the **Femoral Sizing Template** that match the equivalent posterior augment sizes.

Note:

12 or 16 mm distal augment is unable to fit with the posterior augment, thus if a 12 or 16 mm cut is prepared, no posterior cut would be needed.



Instruments



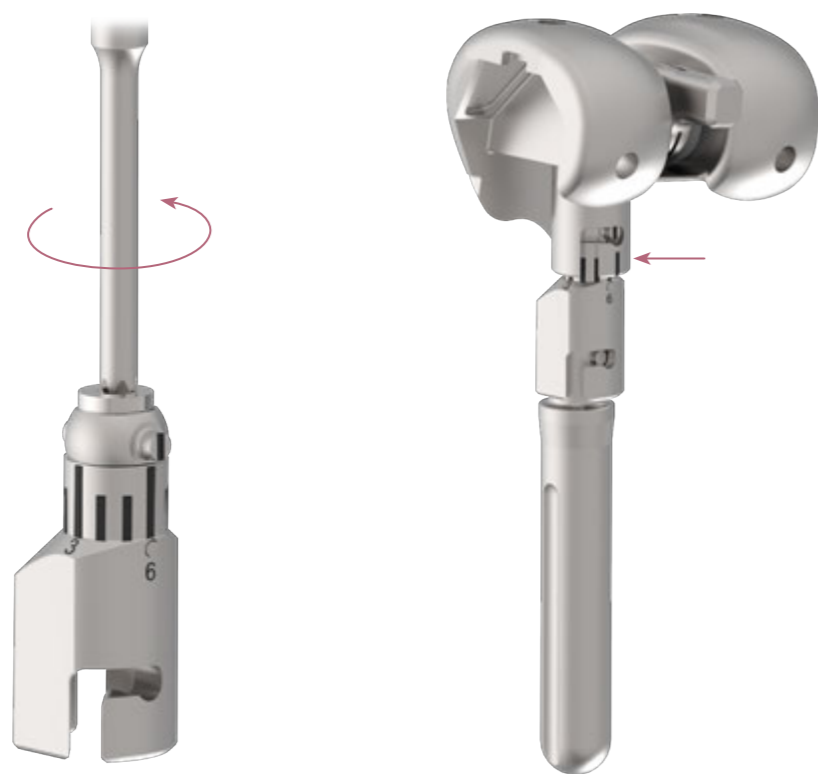
Femoral Sizing Template

J.Femoral Trialing

Assemble the **Femoral Trial**, the **Offset Adapter Trial** if needed, and the **Stem Trial**.

If using the **Offset Adapter Trial**, use the **Screwdriver** to prepare the **Offset Adapter Trial** by unlocking the knob on the top of the instrument.

Align the indicator on the **Offset Adapter Trial** to the predetermined offset number, then lock the knob.



Instruments

Offset Adapter Trial
2 / 4 / 6 mm

Femoral Trial

Stem Trial

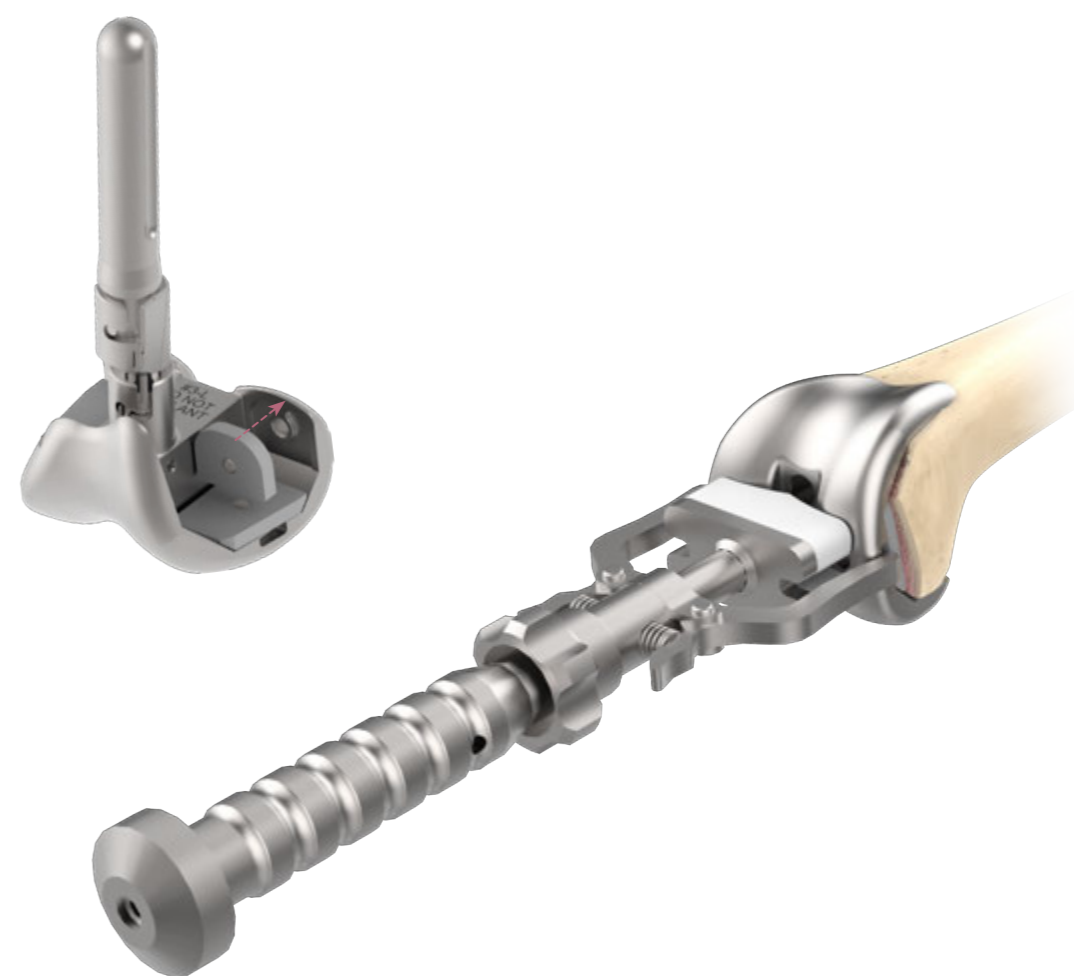
Driver Handle

Screwdriver
Adapter T20

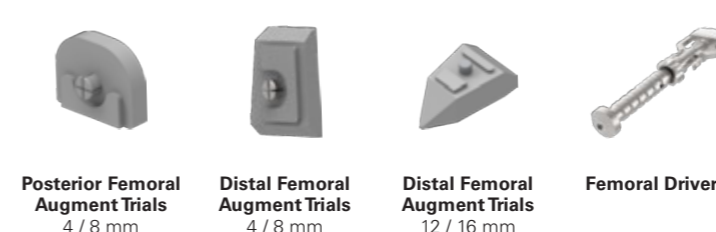
J.Femoral Trialing

Attach any selected **Posterior Femoral Augment Trials** and **Distal Femoral Augment Trials** to the selected **Femoral Trial**.

Place the femoral trial assembly onto the prepared femoral surface using the **Femoral Driver**.



Instruments

Posterior Femoral
Augment Trials
4 / 8 mmDistal Femoral
Augment Trials
4 / 8 mmDistal Femoral
Augment Trials
12 / 16 mm

Femoral Driver

J.Femoral Trialing

Identify the required **Tibial Insert Trial** and **Yoke Adapter** based on the selected **Tibial Baseplate Trial** size:

The #1 through #3 tibial baseplate size corresponds with the size S **Yoke Adapter**.

The #4 through #6 tibial baseplate size corresponds with the size M **Yoke Adapter**.

Insert the selected **Yoke Adapter** onto the the **Tibial Baseplate Trial**.

Connect the Yoke Adapter and the femoral assembly.



Instruments



Yoke Adapter
S / M

Tibial Baseplate
Trial

J.Femoral Trialing

Attach the selected **Tibial Insert Trial** to the **Tibial Insert Trial Handle** and connect to the **Yoke Adapter** on the tibial assembly.

Evaluate joint stability using the selected trial components. Switch to different **Tibial Insert Trial** thicknesses as needed to obtain optimal stability.



Instruments



Tibial Insert Trial

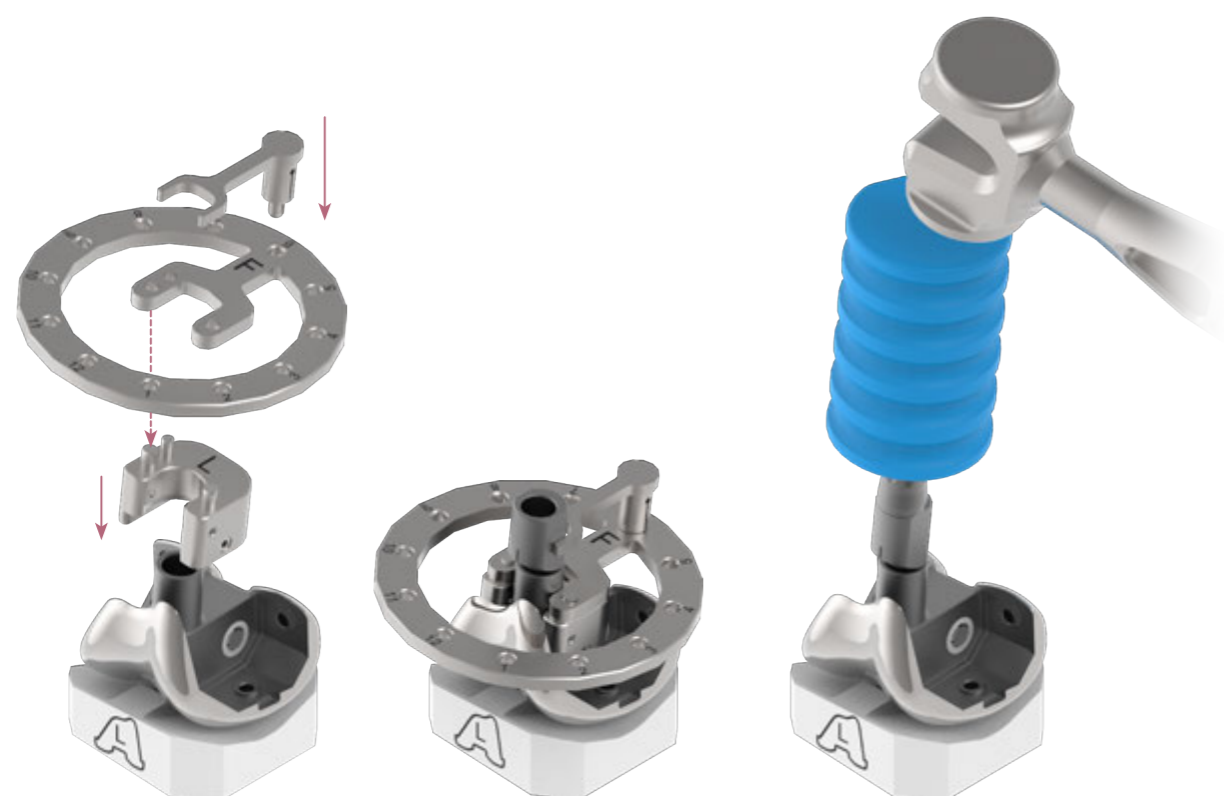
Tibial Insert Trial
Handle

K. Implant Assembly

Place the selected femoral component onto the **Distal Femur Impactor Base**.

If selected, connect the femoral component with the correct offset adapter by tapping the prosthesis with the **Stem Impactor** into position. To position the offset into proper orientation, seat the **Stop Tube** on the femoral component and place the **Femoral Offset Fixture** over the **Stop Tube**. Utilize the **Femoral Offset Wrench** to set the offset adapter to match the direction of the trial assembly.

Then, connect the selected stem component to the femoral component assembly by tapping the stem with the **Stem Impactor** in position.



Instruments



Distal Femur
Impactor Base

Stop Tube

Femoral Offset
Fixture

Femoral Offset
Wrench

Stem Impactor

K. Implant Assembly

Thread the femoral screw into the intercondylar hole to secure the assembly.

Using the **Screwdriver**, secure any selected distal augment first then any selected posterior augment.

Note:

The label of LM / RL can be found on the 4 and 8 mm distal augments which means Left Medial or Right Lateral, while the label LL / RM means Left Lateral and Right Medial.



Instruments



Driver Handle

Screwdriver
Adapter T20

Screwdriver L

Impactor Base
Distal Femur

K. Implant Assembly

If a tibial extension stem is selected, remove the distal plug on the tibial baseplate implant and assemble the tibial baseplate implant and tibial extension stem using the **Screwdriver Adapter T30**.

Place the selected tibial on the **Proximal Tibial Impactor Base**. Manually thread the selected tibial extension stem onto the baseplate.

Attach the **Torque Wrench 15 N-m** handle to the **Torque Wrench Adapter** that corresponds to the selected stem diameter.

Place the **Tibial Baseplate Wrench** over the baseplate. Complete tightening of the tibial implant assembly by applying 15 N-m of torque using the **Torque Wrench** assembly.

If selected, attach augment to the selected tibial baseplate implant using the **Screwdriver T20**.



Instruments



L. Implantation

If a cemented tibial stem is selected, Use the **Tibial Cement Restrictor Inserter** to introduce the selected cement restrictor to an adequate depth in the canal. Use the indicators on the shaft to set the depth.



The etched marking **C70** indicates the appropriate depth of the 70 mm cemented tibial stem

The diameter of cemented stem drill is 9 mm. Use cement restrictor size 8 to ensure smooth insertion



Cement Restrictor, I-Type		
Cat. No.	Size	Canal size (mm)
1907-1008	# 8	8 - 9

Instruments



L. Implantation

Attach the **Tibial Baseplate Driver** to the **Modular Handle**.

Insert the tip of the **Tibial Baseplate Driver** into the center hole of the tibial baseplate implant, then lock the tibial implant assembly.

Apply bone cement to proximal tibial resection and the distal surface of the baseplate. If using a cemented tibial stem, add cement to the prepared tibial canal.

Place the tibial implant assembly onto the prepared tibial surface. Attach the **Tibial Baseplate Impactor** to the **Modular Handle** and impact the prosthesis until fully seated against the resected bony surface.



Instruments



Modular Handle

Tibial Baseplate Driver

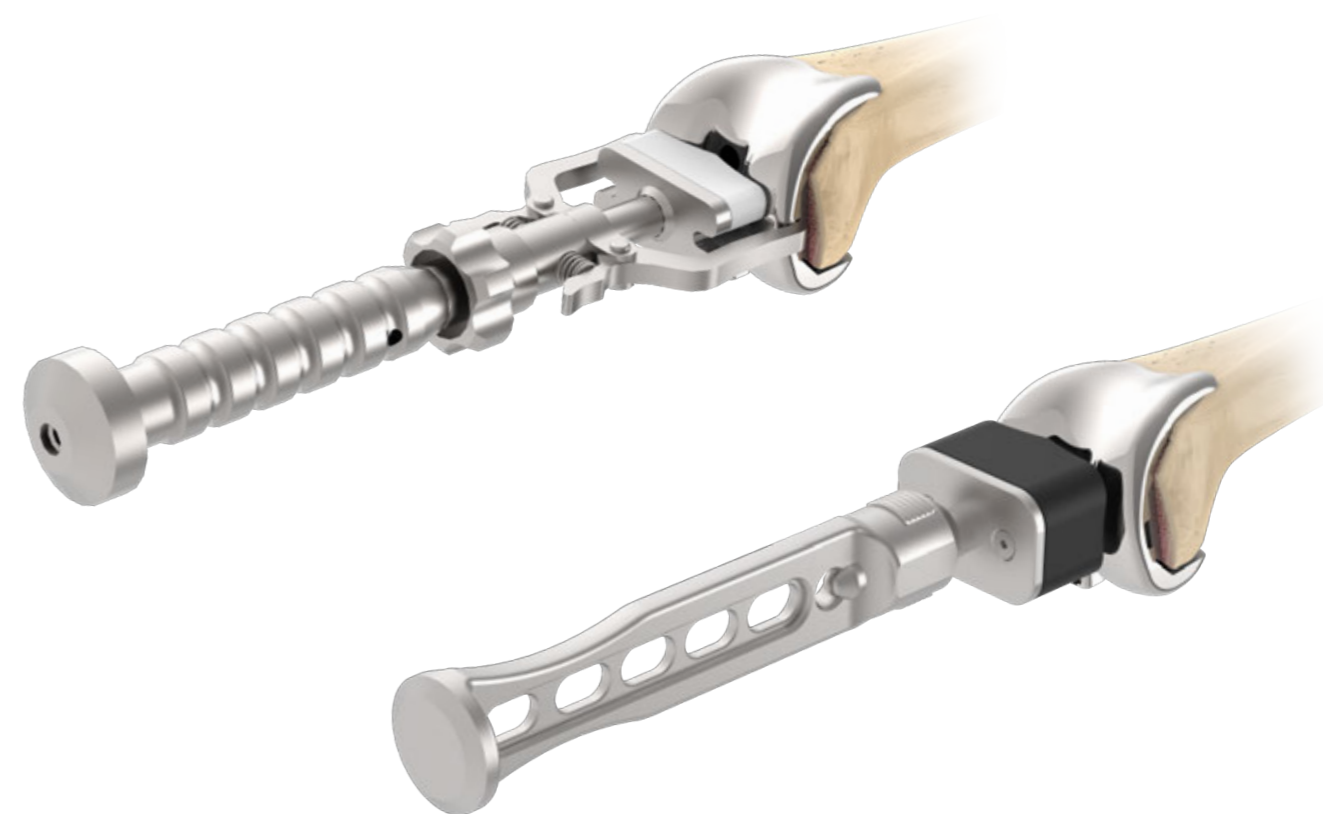
Tibial Baseplate Impactor

L. Implantation

Place the implant assembly onto the prepared femoral surface with **Femoral Driver**.

Attach the **Femoral Impactor** to the **Modular Handle** and impact the femoral component assembly until fully seated and in proper contact with the bone.

Remove the plastic protective cover on the femoral component after clean out the excessive cement.



Instruments



Femoral Driver

Femoral Impactor

Modular Handle

L. Implantation

Perform a final check to confirm the optimal tibial insert thickness with the selected **Tibial Insert Trial**.

Insert and evaluate using the **Tibial Insert Handle** as described in previous steps.



Instruments



Tibial Insert Trial



Tibial Insert Trial Handle

L. Implantation

With the knee in flexion, place the selected tibial insert onto the implanted tibial baseplate assembly, making sure to align with the hinge post of the femoral component.

With the knee in full extension, secure the tibial insert to the femoral prosthesis by tightening the built-in set screw inside the tibial insert with **Insert Set Screwdriver** to apply appropriate fixation torque.

Tighten the set screw until fully connected within the femoral component, confirming with the depth mark on the screwdriver.



Align the depth mark on the screwdriver according to the selected size of tibial insert. Align to the line marked S for size #S tibial insert; align the line marked M for size #M tibial insert.

If the depth mark is achieved but the torque limiter has not engaged, continue apply torque until engaged;

If the torque limiter is engaged before the depth mark is achieved, then the screw may not be correctly connected to the femoral component. Confirm the femoral assembly is fully seated in the tibial insert, then re-tighten the set screw.

Instruments

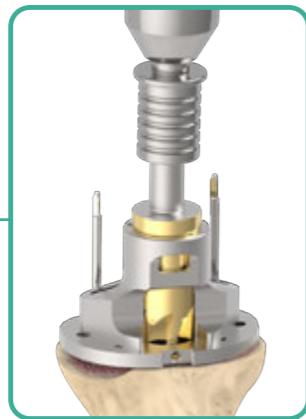


Insert Set Screwdriver

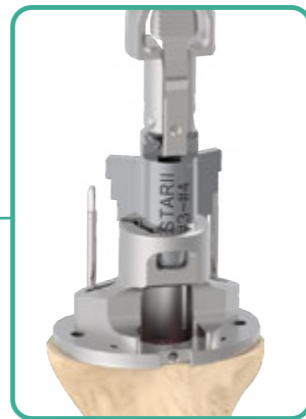
Primary Surgical Overview



M. Establish Tibial Platform



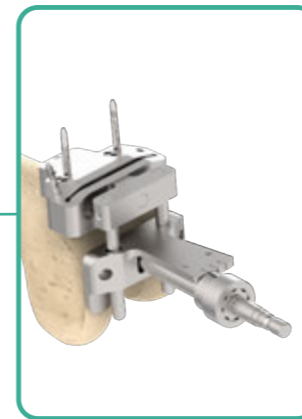
N. Tibial Canal Preparation



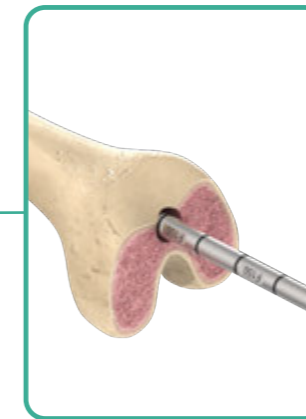
O. Finish Tibial Preparation



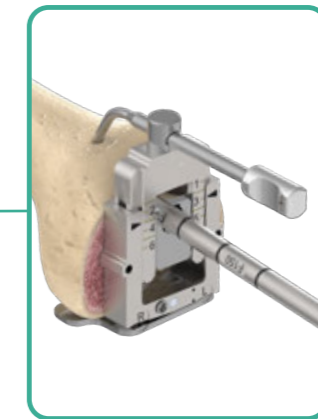
P. Tibial Trial



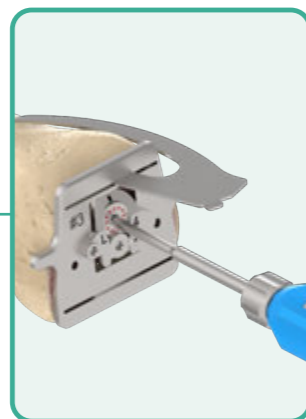
Q. Distal Femoral Resection



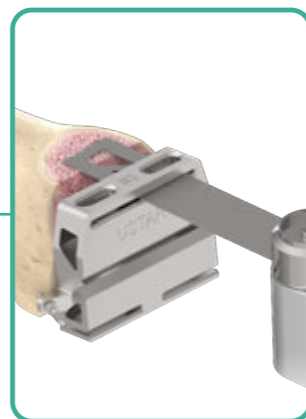
R. Femoral Canal Preparation



S. Femoral Sizing



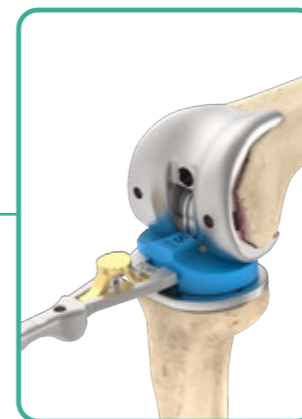
Optional Femoral Offset Evaluation



T. Femoral A/P and Chamfer Resection



U. Femoral Box Preparation



V. Femoral Trial



W. Implant Assembly



X. Implantation

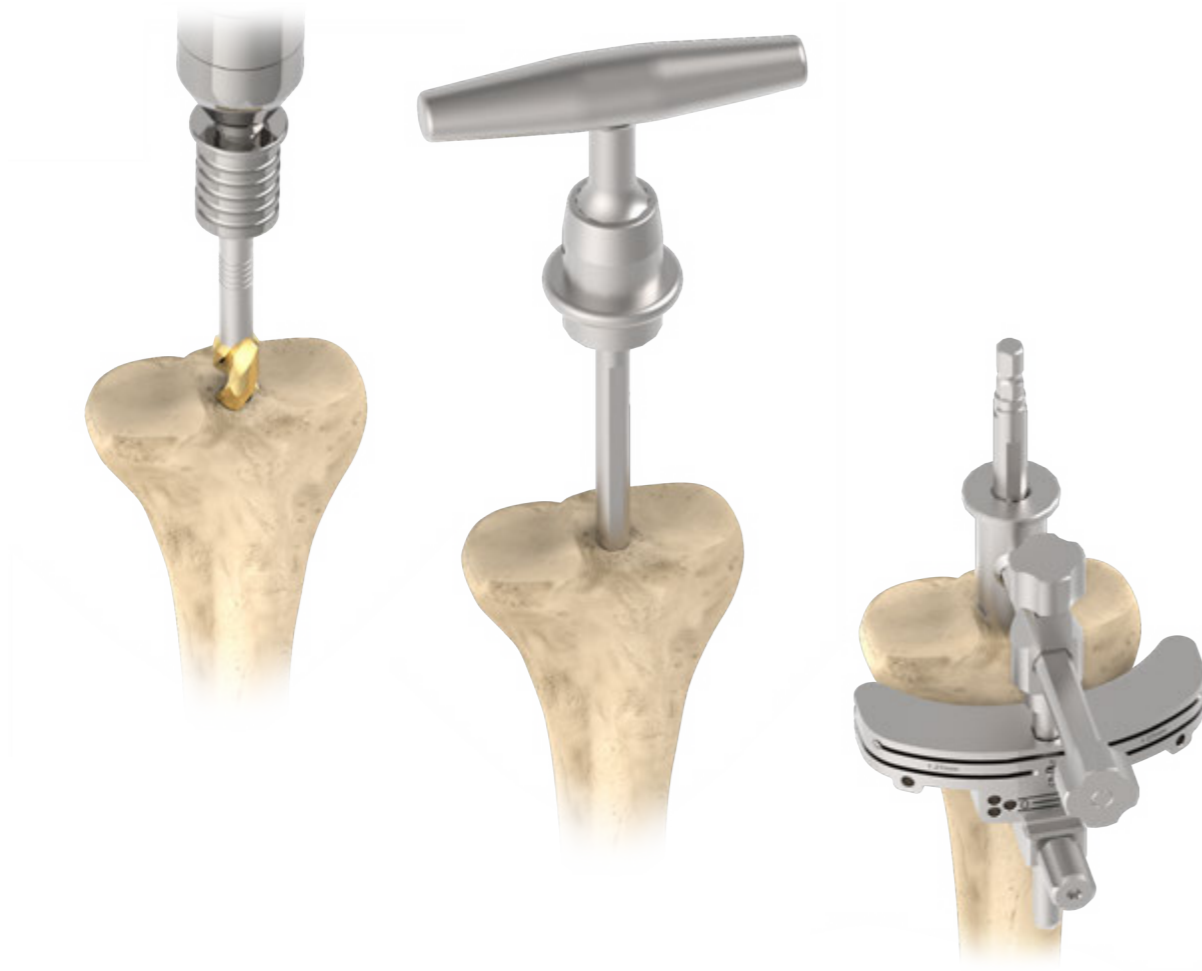
Primary Procedure

M. Establish Tibial Platform

Set the knee in flexion to fully expose the tibial plateau. Use the **Step Drill** to find the canal. The entry location shall be approximately 10 mm posterior to the origin of anterior cruciate ligament.

Using the **T-Handle**, advance the **Tibial IM Rod** into the canal. Then remove the **T-Handle**.

Assemble the **Tibial IM Alignment Guide** and the **Tibial Resection Guide** onto the **Tibial IM Rod**.



Instruments



Step Drill

T-Handle

Tibial IM Rod

Tibial Resection Guide

Tibial IM Alignment Guide

M. Establish Tibial Platform

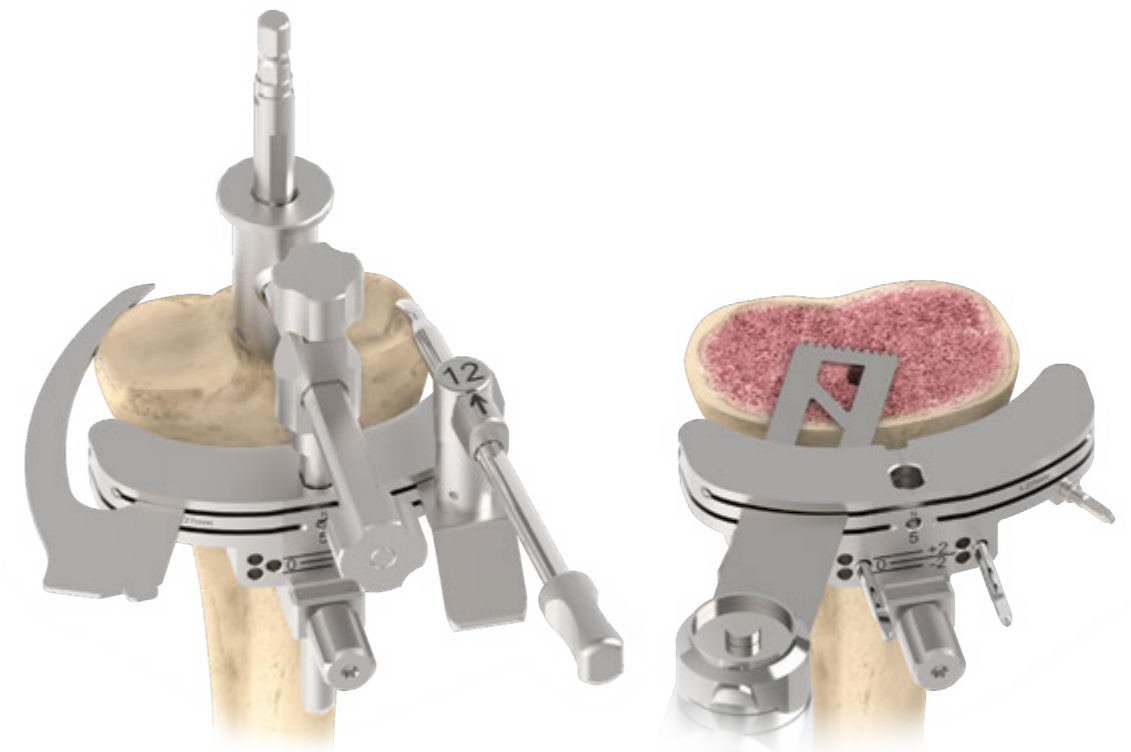
Insert the 12 mm **Tibial Stylus** into the first slot which was labeled "N" on the **Tibial Resection Guide**. Position the tip of the **Tibial Stylus** on the appropriate reference point of the tibial plateau to evaluate the standard 12 mm tibial bone resection from the joint line.

The **Resection Check Blade** may be inserted into the first slot labeled "N" on the **Tibia Resection Guide** to confirm positioning.

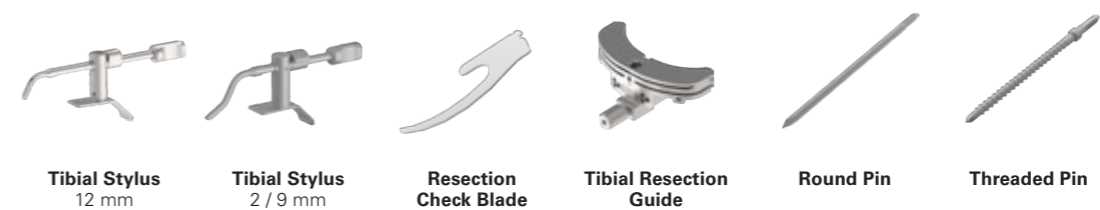
If a smaller resection is desired, an optional 2 mm / 9 mm **Tibial Stylus** is available.

Secure the **Tibial Resection Guide** with two **Round Pins** through the holes labeled 'O'. Remove the intramedullary assembly, leaving the resection guide in place. If needed, additional **Threaded Pins** may be used to further secure the resection guide.

Perform the proximal tibial resection using a standard .050" (1.27 mm) saw blade inserted through the first slot labeled "N".



Instruments

Tibial Stylus
12 mmTibial Stylus
2 / 9 mmResection
Check BladeTibial Resection
Guide

Round Pin

Threaded Pin

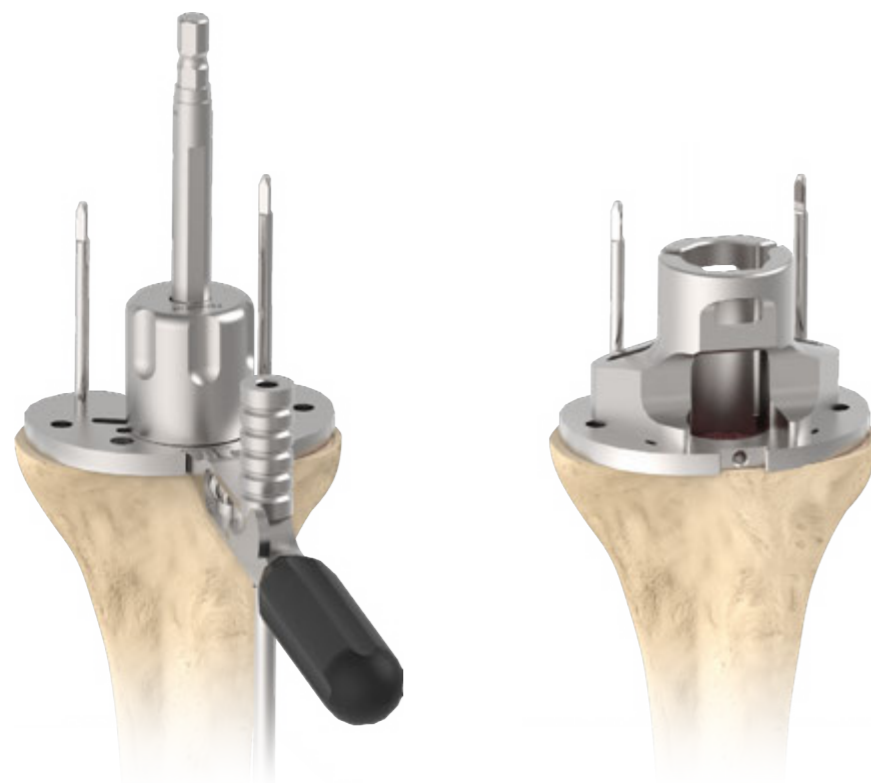
N.Tibial Canal Preparation

Select the **Tibial Sizing Template** that provides the desired tibial coverage and attach it to the **Tibial Sizing Template Handle**. Place onto the resected tibial surface, then insert the **Tibial IM Rod** into the tibial canal. Slide the **Tibial Neutral Bushing** over the the **Tibial IM Rod and** onto the **Tibial Sizing Template**.

Attach the **Alignment Rod** to the **Tibial Sizing Template Handle** to help confirm optimal position.

Align the **Tibial Sizing Template** with the desired rotational position on the resected tibial surface, maintaining orientation with the the **Tibial IM Rod/Tibial Neutral Bushing** assembly. Secure with two **Round Pins**.

Remove the **Tibial Neutral Bushing**, **Tibial IM Rod** and the **Alignment Rod**. Attach the **Tibial Punch Guide** onto the sizing template.



Instruments

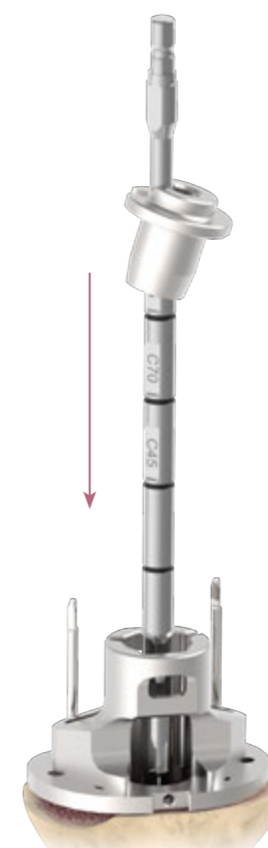


N.Tibial Canal Preparation

Insert the **Tibial Stem Drill** into the tibial canal. Place the **Tibial Stem Drill Sleeve** over the **Tibial Stem Drill**.

Different reamer diameters are available to obtain the desired stability. There are different reaming depths engraved on each reamer. Align the depth marking to the **Tibial Stem Drill Sleeve** in order to reach the appropriate depth of the desired stem length. Refer to the etched "C" depth marking for the 9 mm diameter cemented stem; and the etched "P" depth marking for the 12.5 mm and 14 mm diameter press-fit stem.

A 12.5 mm diameter reamer is recommended for an optimal press-fit of a 12.5 mm diameter press-fit tibial stem; while a 14 mm diameter reamer is recommended for an optimal press-fit of a 14 mm diameter press-fit tibial stem. If the desired stability is unable to achieve with the use of 12.5 mm and 14 mm reamers, the use of cemented stem is suggested.



Example of reaming for cemented tibial stem.
The etched marking **C70** indicates the appropriate depth of the 70 mm cemented tibial stem.



Example of reaming for Press-fit tibial stem.
The etched marking **P95** indicates the appropriate depth of the 95 mm press-fit tibial stem.

Instruments

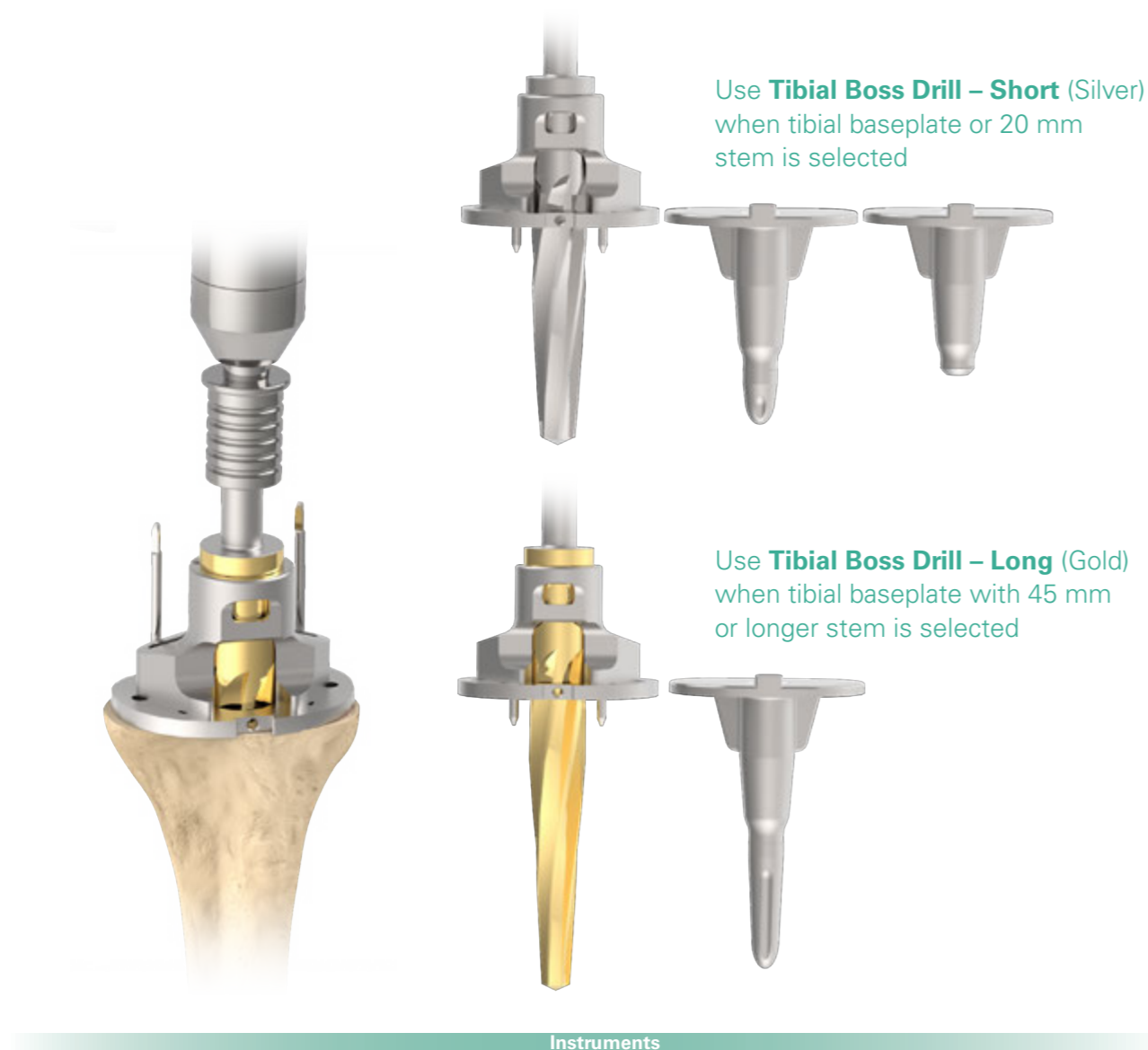


N. Tibial Canal Preparation

Select the correct **Tibial Boss Drill** for the selected tibial implant construct and advance through the **Tibial Punch Guide** until fully engaged.

For the tibial baseplate with no stem or a 20 mm stem, use the silver **Tibial Boss Drill - Short**.

For the tibial baseplate with a 45 mm stem or longer, use the gold **Tibial Boss Drill - Long**.



O. Finish Tibial Preparation

Choose the **Tibial Punch** that corresponds to selected **Tibial Sizing Template** and attach it to the **Tibial Punch Handle**. The corresponding sizes are marked on the side of the **Tibial Punch**.

Advance the **Tibial Punch** through the **Tibial Punch Guide** until fully engaged.

Disengage the Tibial Punch assemblies with the **Slotted Hammer** and remove the **Tibial Sizing Template**.



O.Finish Tibial Preparation

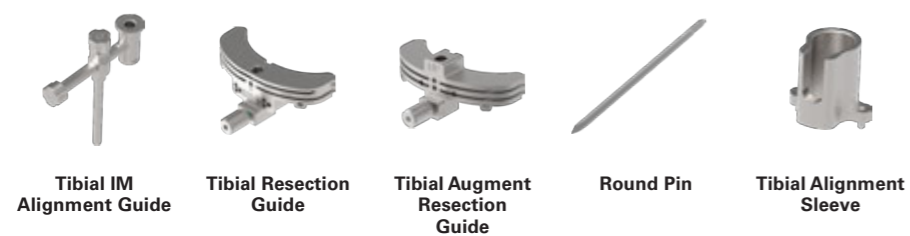
O1. Optional Tibial Augment Preparation

If using an tibial baseplate augment component, attach the **Tibial Alignment Sleeve** onto the sizing template.

Reposition the tibial resection assembly and secure with two **Round Pins** to the anterior tibia. The **Tibial Resection Guide** can be used to perform 5 mm resection while the **Tibial Augment Resection Guide** can be used to perform 10 mm or 15 mm resection.



Instruments

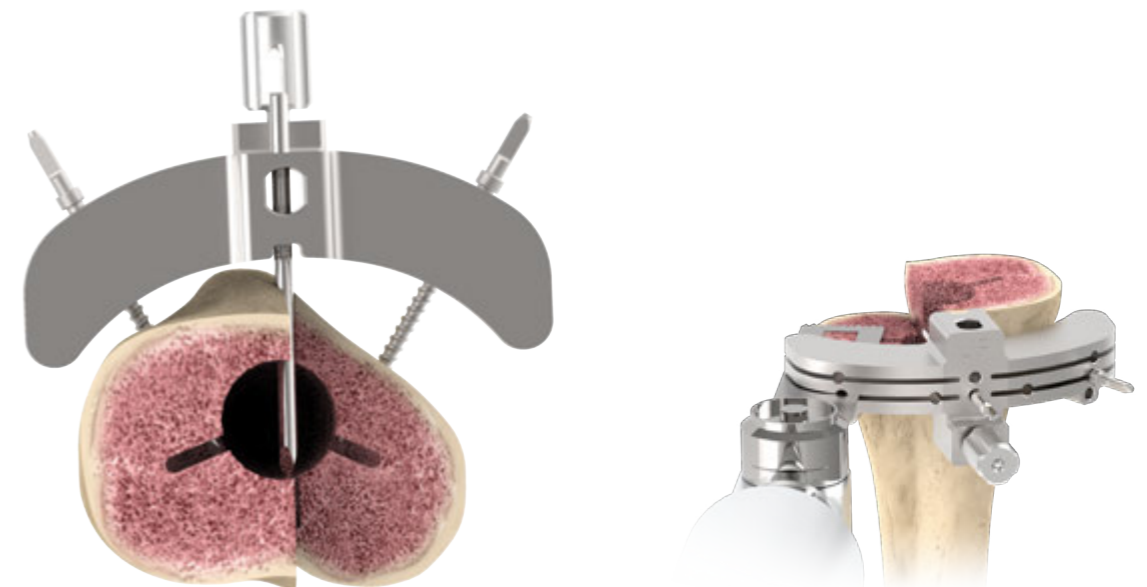


O.Finish Tibial Preparation

O1. Optional Tibial Augment Preparation

An additional **Round Pin** may be placed into the central hole on the resection guide to serve as a resection stop guide to ensure a precise augment space preparation.

Remove the template, sleeve and alignment guide, leaving the resection guide in place, and complete bone resection for the augment space.



Instruments



P.Tibial Trialing

If a tibial stem is selected, thread the corresponding **Tibial Stem Trial** into the bottom of the selected **Tibial Baseplate Trial**.

Attach the **Tibial Baseplate Trial Driver** to the **Modular Handle**.

Insert the tip of the **Tibial Baseplate Trial Driver** into the center hole of the tibial trial assembly and turn the driver $\frac{1}{4}$ turn in the clockwise direction to lock the driver into the tibial trial assembly.



Instruments



Tibial Baseplate Trial



Tibial Stem Trial



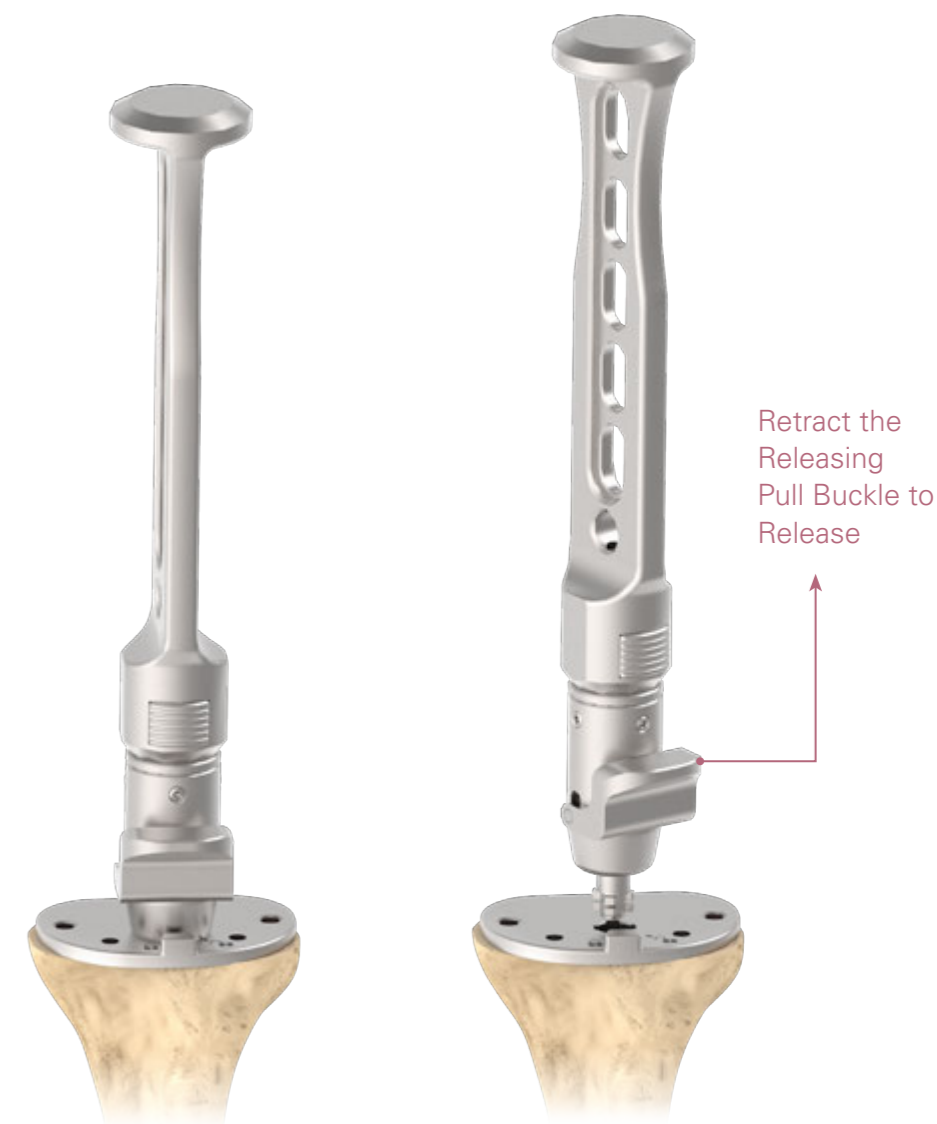
Modular Handle



Tibial Baseplate Trial Driver

P.Tibial Trialing

Place the tibial trial assembly onto the resected tibial surface and impact until fully seated into position. Retract the release lever to remove the **Tibial Baseplate Trial Driver**.



Instruments



Modular Handle

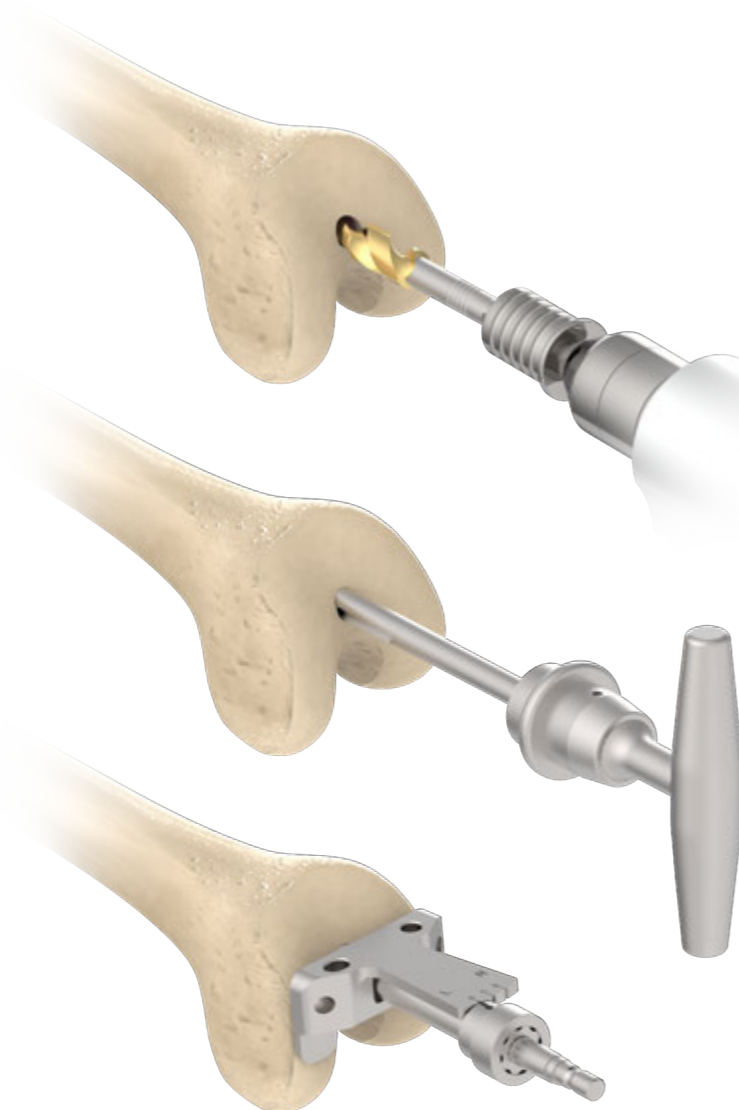


Tibial Baseplate Trial Driver

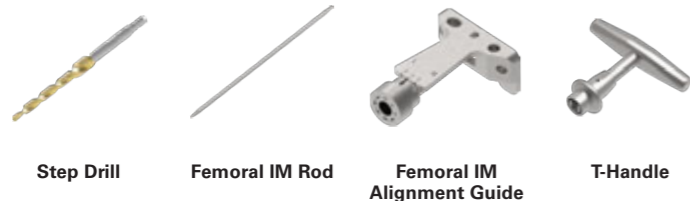
Q. Distal Femoral Resection

Use the **Step Drill** to create an opening into the femoral canal. The drill is inserted to a depth of approximately 100 mm into the femoral canal. This allows for depressurization of the canal when the **IM Rod** is inserted.

Set the **Femoral IM Alignment Guide** to the correct "R" or "L" for right or left knee. Slide the **Femoral IM Alignment Guide** through the **IM Rod** until it is seated against the distal femur. The alignment guide offers a fixed 6 degrees valgus angle.



Instruments



Step Drill

Femoral IM Rod

Femoral IM Alignment Guide

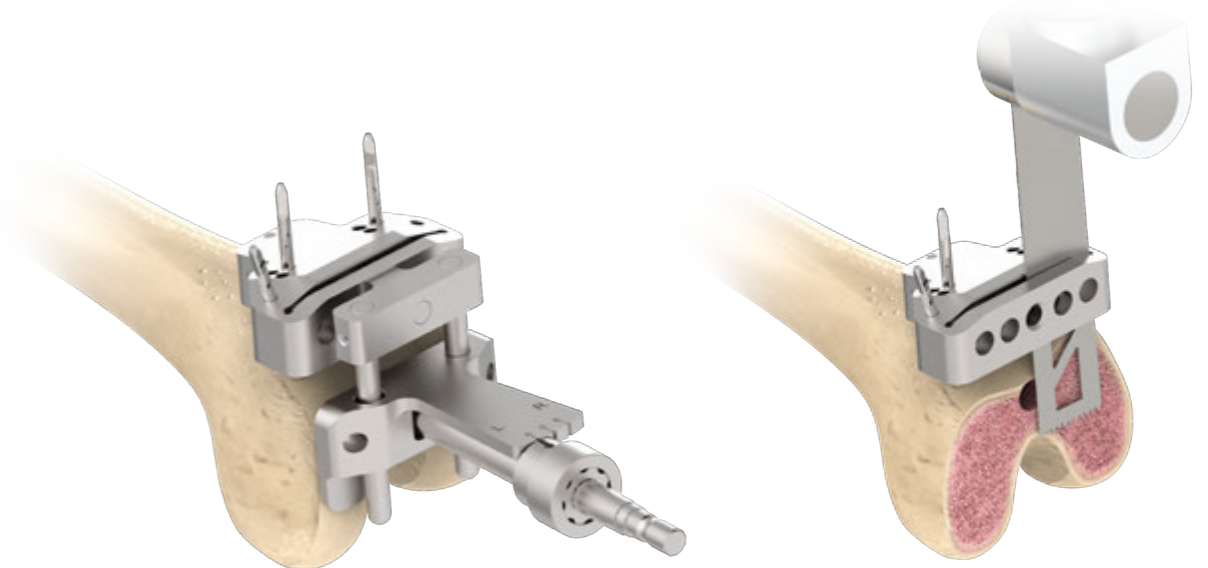
T-Handle

Q. Distal Femoral Resection

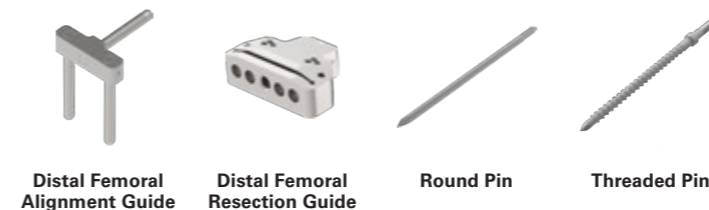
Attach the **Distal Femoral Alignment Guide** and the **Distal Femoral Resection Guide** to the **Femoral IM Alignment Guide**.

Drill pilot holes through the "0" pin holes on the resection guide with the **3.2 mm Drill**. Additional **Threaded Pins** may be placed to further secure the resection guide.

Remove the alignment guide assembly, and perform distal femoral resection through the slot on the **Distal Femoral Resection Guide**.



Instruments



Distal Femoral Alignment Guide

Distal Femoral Resection Guide

Round Pin

Threaded Pin

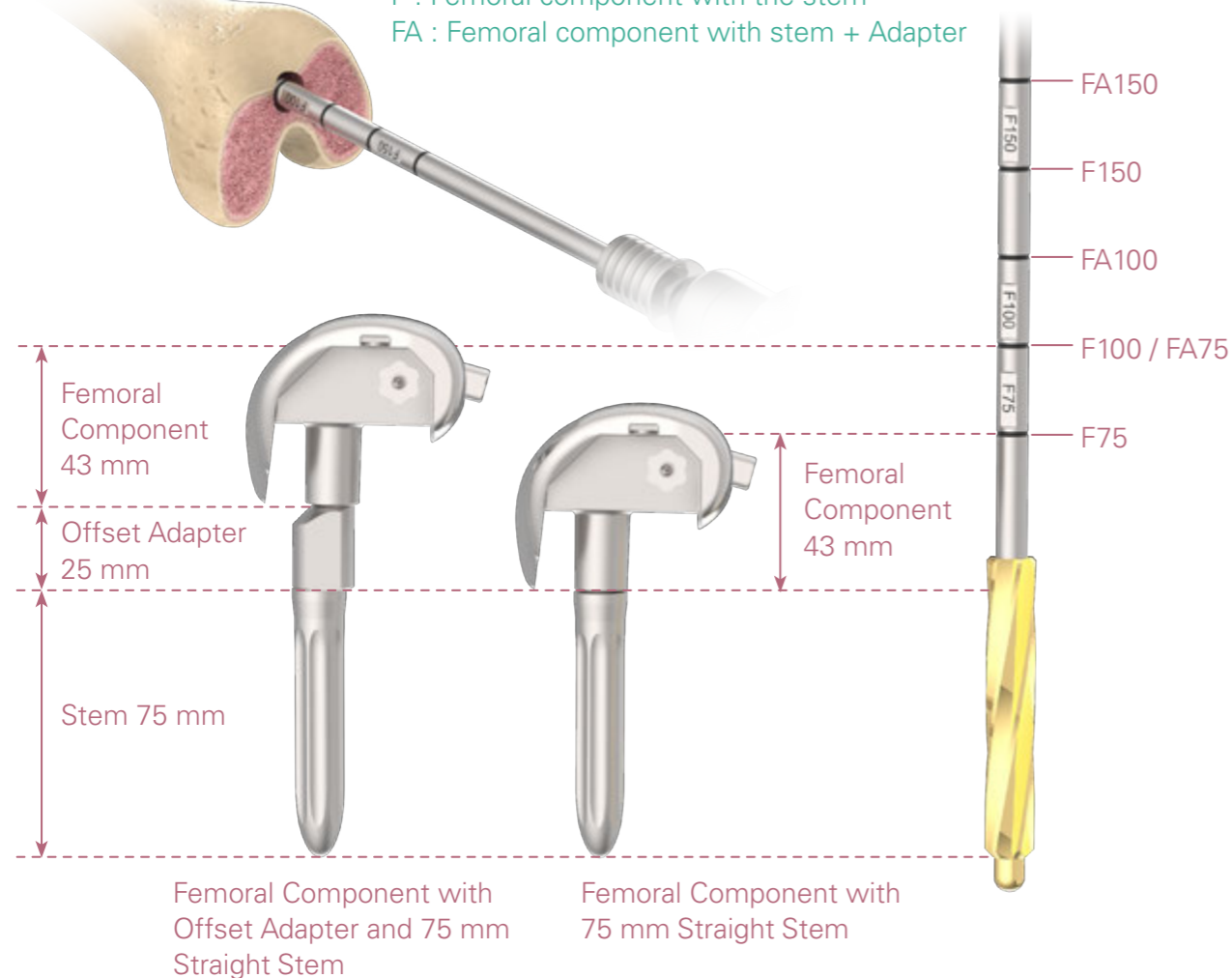
R.Femoral Canal Preparation

Ream the femoral canal starting with the 9 mm **Femoral Stem Reamer** and progressively increase the diameter until proper cortical contact is achieved at the desired depth. (Reamer options are available from 9 mm to 24 mm in 1 mm increments).

Note the etched markings on the femoral stems, the 'F' indicates the appropriate depth for a femoral component with a stem only with no offset adapter. The 'FA' indicates the appropriate depth for a femoral component with an offset adapter and stem.

Note:

F : Femoral component with the stem
FA : Femoral component with stem + Adapter



Instruments



Femoral Stem Reamer
9-24 mm

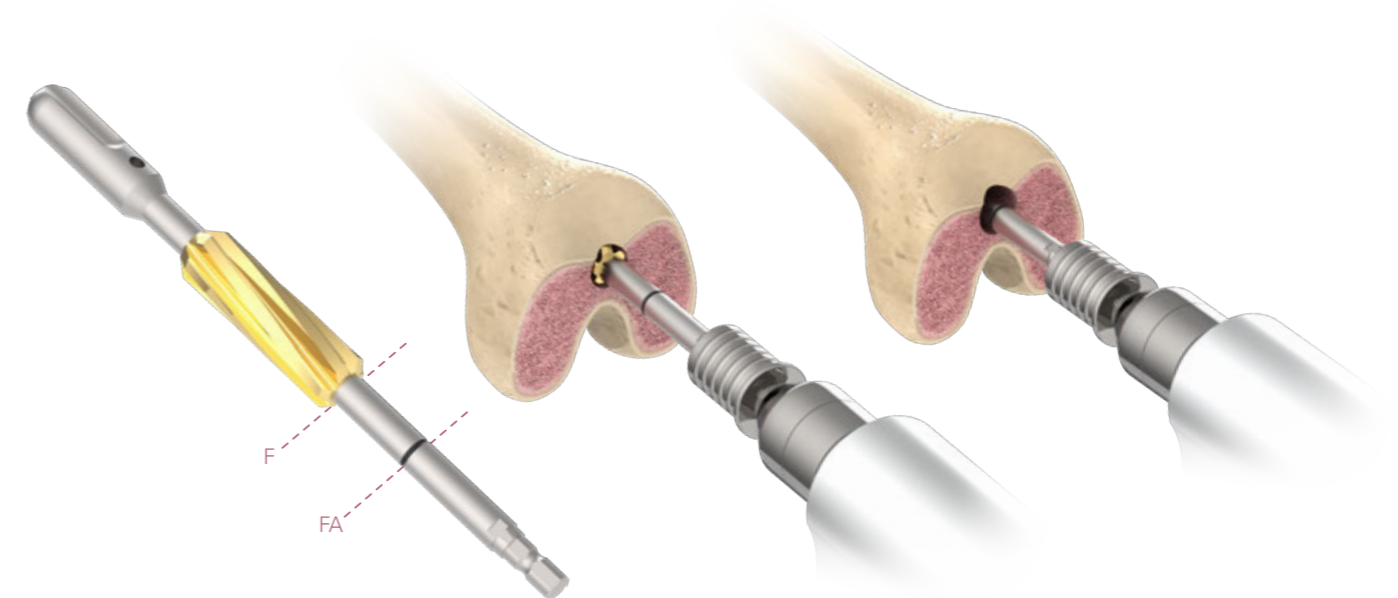
R.Femoral Canal Preparation

Choose the **Reamer Guide Rod** corresponding to the diameter of the last reamer used. Attach the **Reamer Guide Rod** to the **Boss Reamer**.

Ream the femoral canal to the depth until the indicator mark "F" on the **Boss Reamer** lines up with the entry hole. The boss reaming process will not be necessary if the last reamer used is larger than 16 mm.

(Optional) If offset is desired, ream to the indicator mark "FA".

As the reaming process is completed, place the last **Femoral Stem Reamer** in the femoral cavity.



Note:

Ream to F for non-offset boss preparation.
Ream to FA if offset is desired after femoral sizing.

Instruments



Reamer Guide Rod
10 / 12 / 14 mm



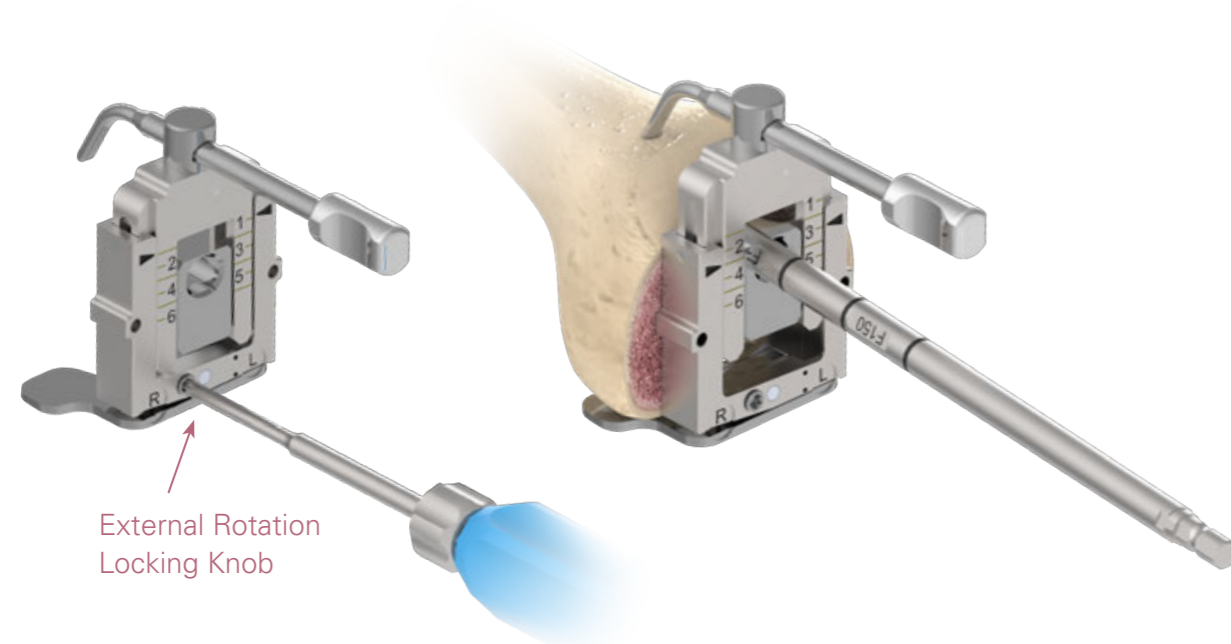
Boss Reamer

S.Femoral Sizing

Set the **Femoral Sizer** to the correct "R" or "L" for the patient and lock the external rotation locking knob with the **Screwdriver T20**. This will provide a set 3 degree external rotation. Note. Additional external rotation adjustment can be made at a later technique step.

Place the **Femoral Sizer** through the reamer and onto the resected distal femur surface with the posterior feet of the Femoral Sizer seated on the posterior condyles.

Position the stylus tip to contact the lowest point of the anterior femoral cortex. Confirm the optimal femoral component size based on the sizing options from the main panel of the **Femoral Sizer**.



Instruments



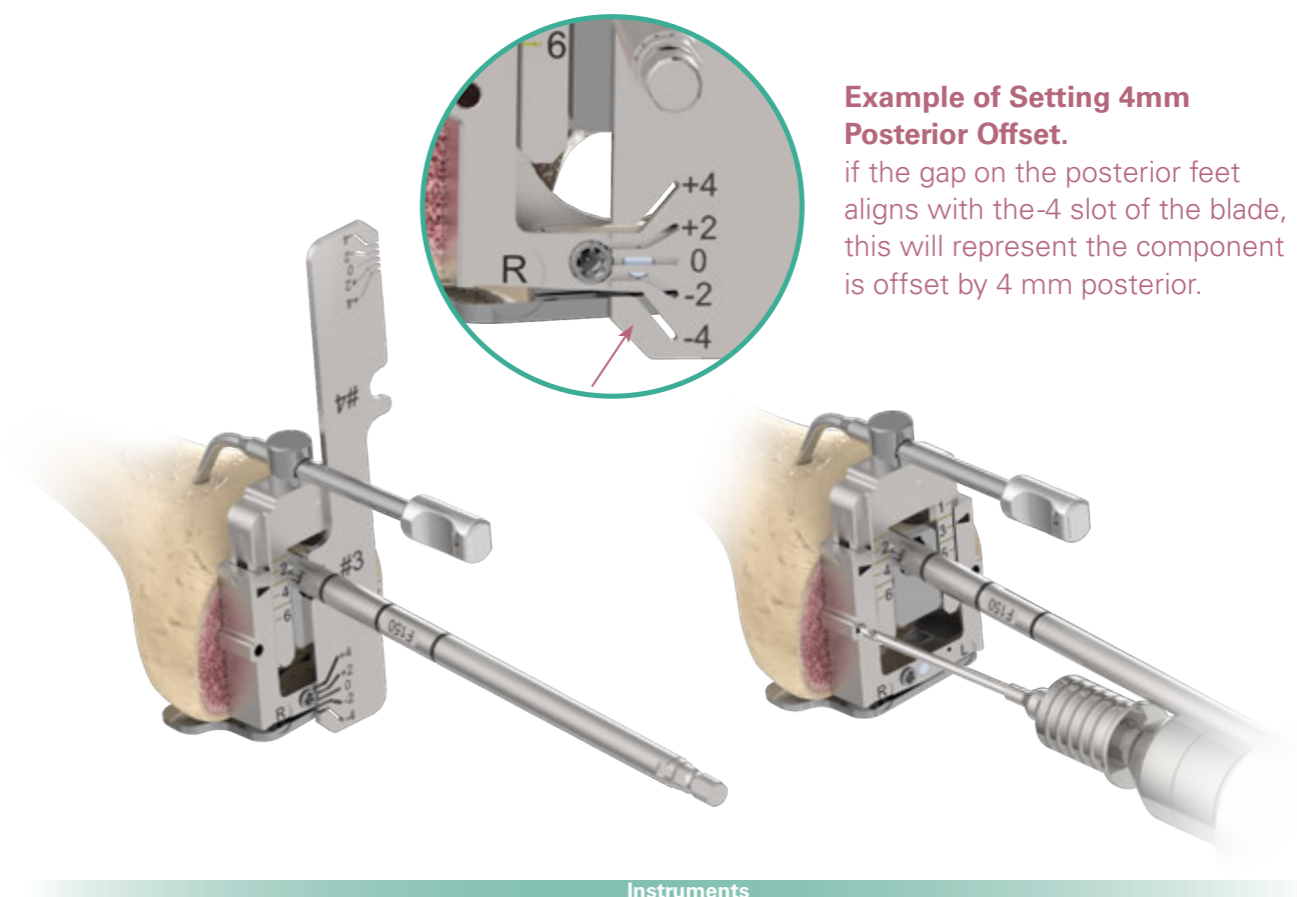
S.Femoral Sizing

S1. Optional A/P Offset Evaluation with Set 3 Degrees External Rotation

Determine preliminary A/P offset by attaching the **Femoral Offset Blade** that corresponds to the selected femoral size over the **Femoral Sizer** with the semi-circle cutout aligned with the reamer.

Note the offset marking adjacent to the gap between the posterior feet and the markings on the body of the **Femoral Sizer**. This will give a rough estimate of the A-P offset needed.

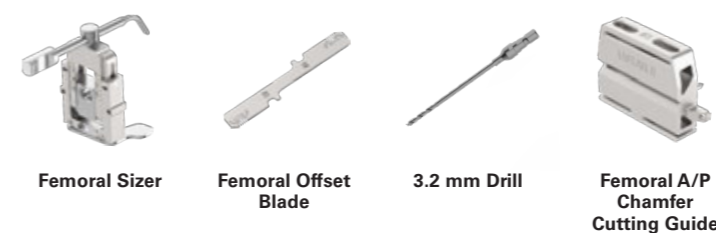
If no further M/L offset or external rotation adjustment is needed, make a pair of pilot holes through the pin holes on the **Femoral Sizer**. These pilot holes will be used to position the **Femoral A/P Chamfer Cutting Guide**. Remove the sizer assembly.



Example of Setting 4mm Posterior Offset.

if the gap on the posterior feet aligns with the -4 slot of the blade, this will represent the component is offset by 4 mm posterior.

Instruments

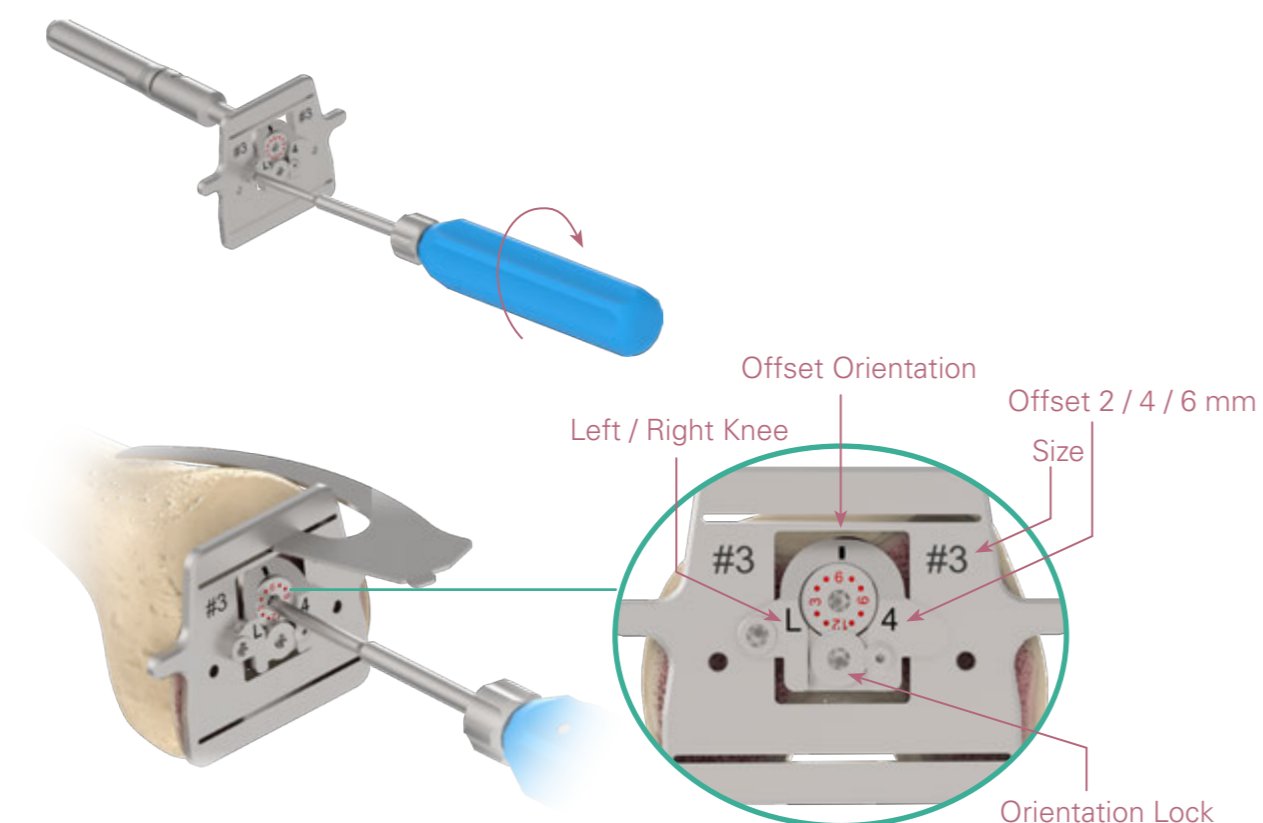


S.Femoral Sizing

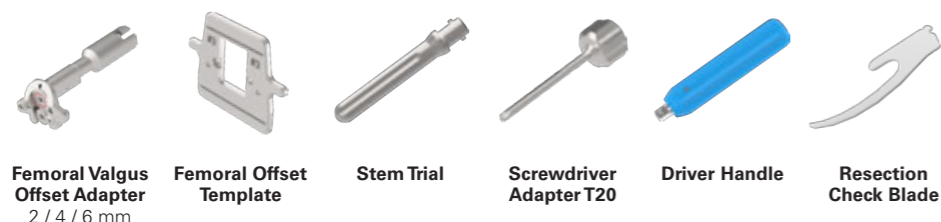
S2. Optional Femoral Offset Evaluation and with Adjustable External Rotation

To further evaluate external rotation adjustment or offset adjustment, assemble the selected size **Femoral Offset Template**, the selected size **Femoral Valgus Offset Adapter** (2/4/6 mm, Left or Right), **Stem Trial** together with **Screwdriver T20**.

Position the **Femoral Offset Template** assembly on the resected distal femoral surface. Evaluate offset level, implant coverage and external rotation with the **Femoral Offset Template**. Adjust the Offset Orientation knob using the **Screwdriver T20**. The projected A/P bone resection can be evaluated by inserting the **Resection Check Blade** into the resection slots.



Instruments



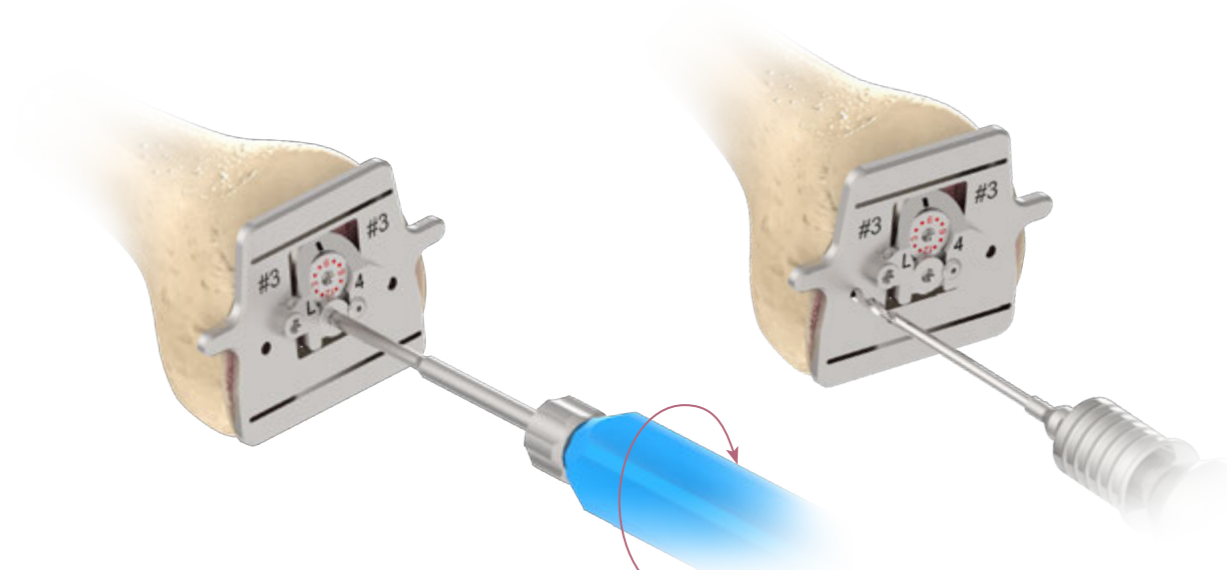
S.Femoral Sizing

S2. Optional Femoral Offset Evaluation and with Adjustable External Rotation

Once the ideal offset position is set, lock the offset knob with the **Screwdriver T20**.

Make a pair of pilot holes through the pin holes on the **Femoral Offset Template** with the **3.2 mm Drill**. These pilot holes will be used to position the **Femoral A/P Chamfer Cutting Guide**.

Remove the **Femoral Offset Template** assembly.



Instruments

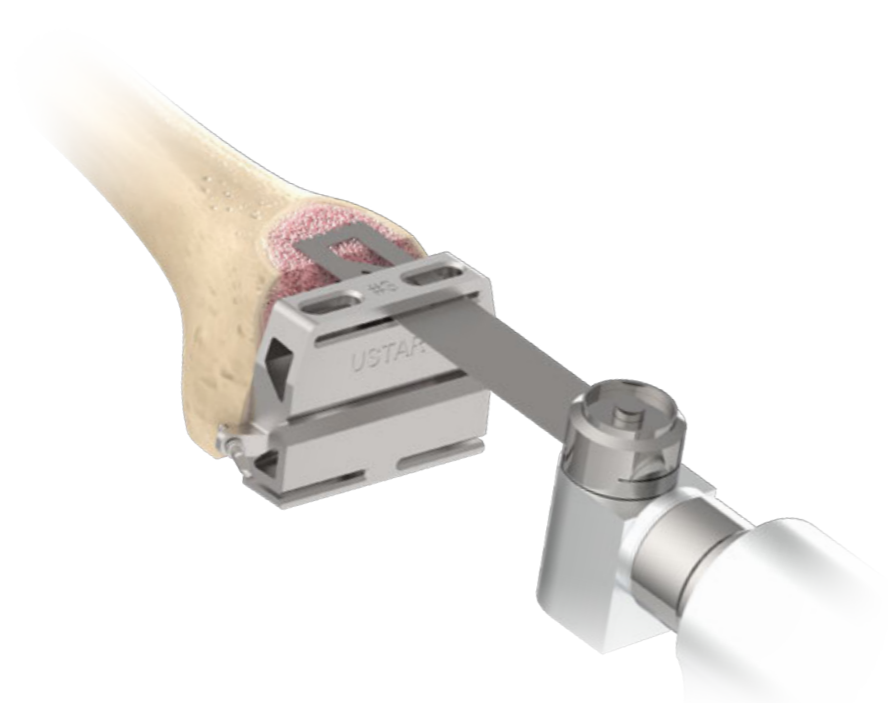


T.Femoral A/P and Chamfer Resection

Place the **Femoral A/P Chamfer Cutting Guide** into the pre-drilled pin holes.

Secure the cutting guide with **Threaded Pins** and complete the A/P and chamfer resections.

Remove the **Femoral A/P Chamfer Cutting Guide**.



Instruments



Femoral A/P
Chamfer
Cutting Guide

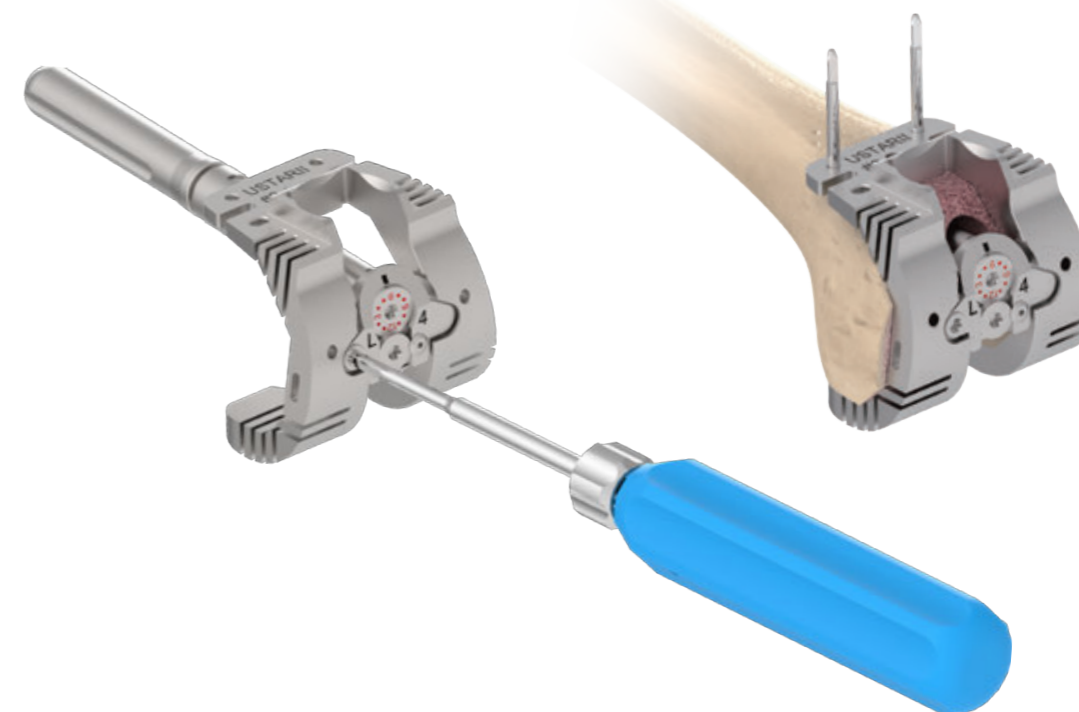


Threaded Pin

U.Femoral Box Preparation

Assemble the selected size of the **Femoral Sizing Template, Valgus offset Adapter, Stem Trial** together with **Screwdriver Adapter T20**.

Secure the **Femoral Sizing Template** assembly with **Round Pins** in the anterior holes.



Instruments



Femoral Sizing
Template



Stem Trial



Femoral Valgus
Adapter



Screwdriver
Adapter T20



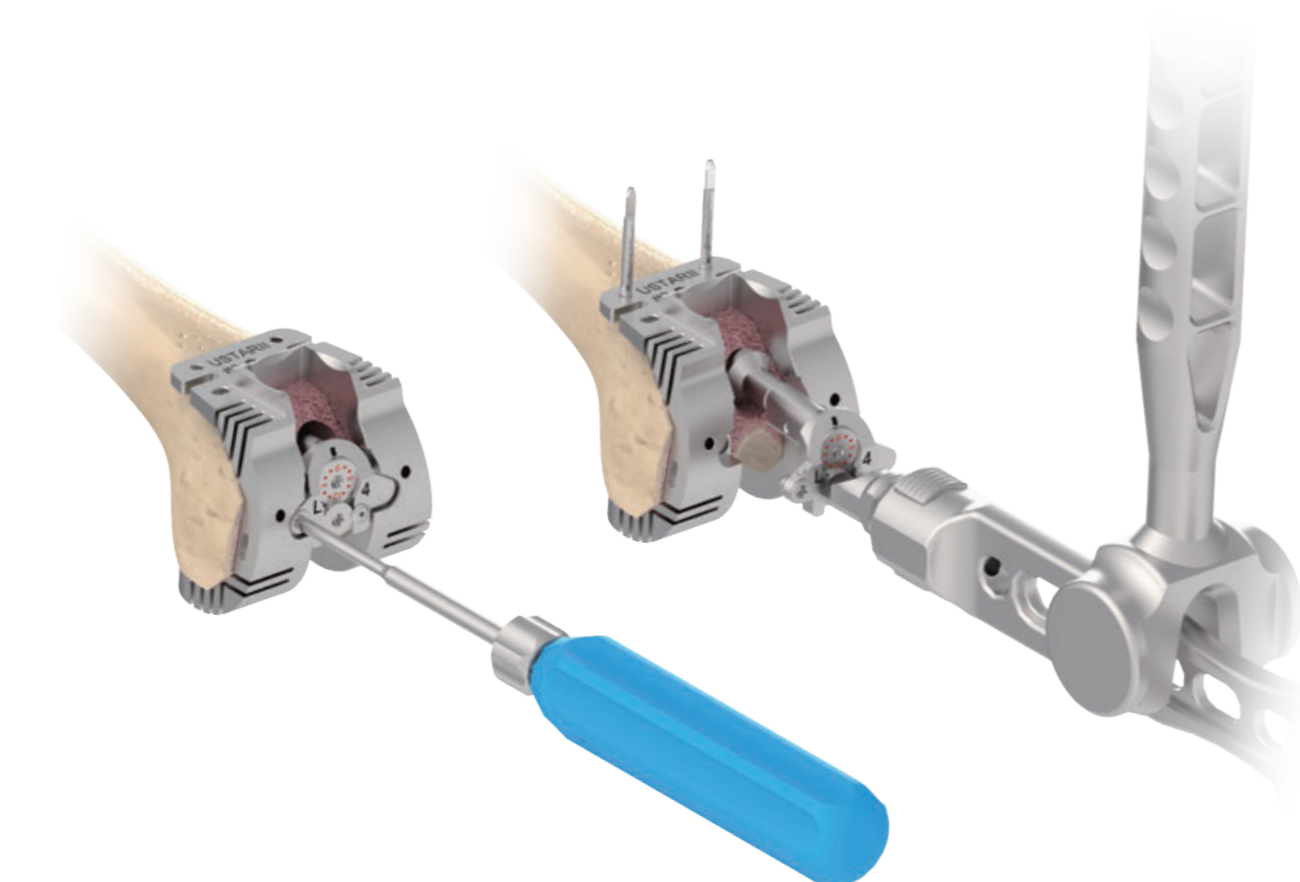
Driver Handle



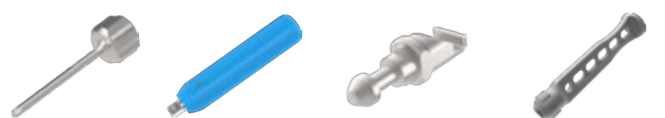
Round Pin

U.Femoral Box Preparation

Disassemble the **Femoral Valgus Adapter** and the **Femoral Sizing Template** with the screwdriver. Use the **Valgus Adapter Remover** to remove the **Femoral Valgus Adapter** and the **Stem Trial**.



Instruments

Screwdriver
Adapter T20

Driver Handle

Valgus Adapter
Remover

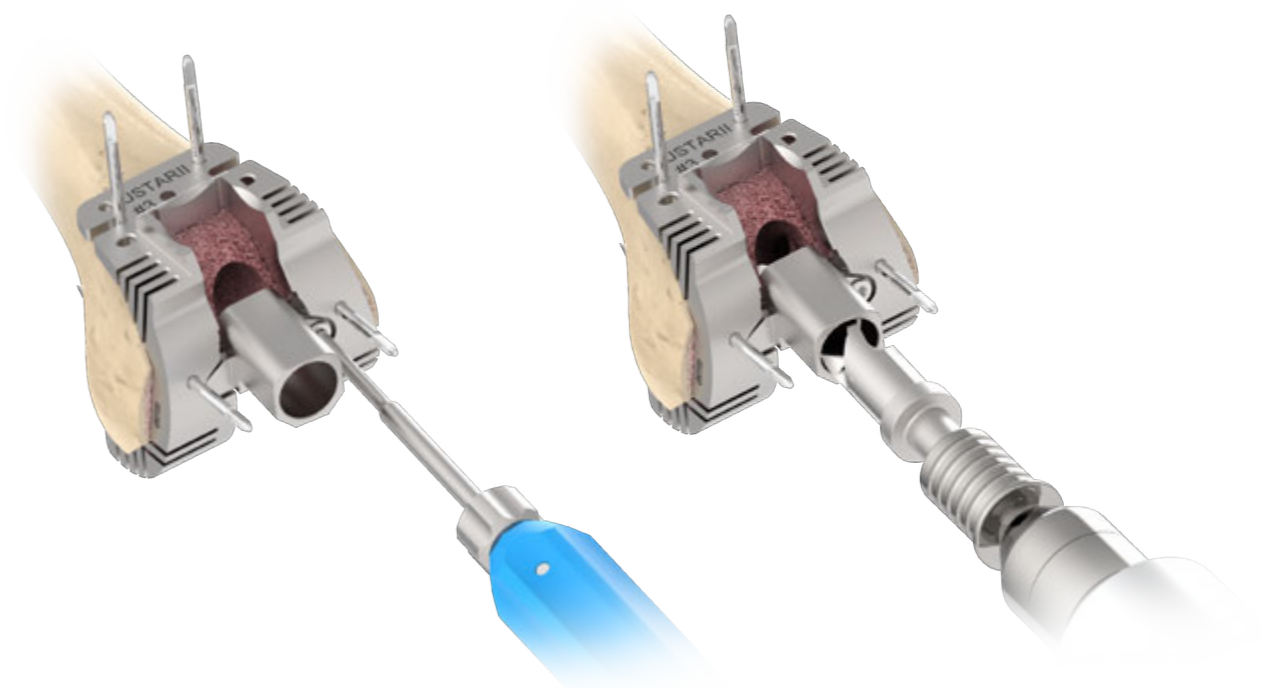
Modular Handle

U.Femoral Box Preparation

If offset is desired, secure the **Femoral Sizing Template** with two **Round Pins** on resected distal femoral surface.

Assemble the **Femoral Offset Drill Guide** onto the **Femoral Sizing Template** with the **Screwdriver**.

Drill through the **Femoral Offset Drill Guide** with the **Femoral Offset Boss Drill** until fully engaged.



Instruments

Femoral Offset
Drill GuideScrewdriver
Adapter T20

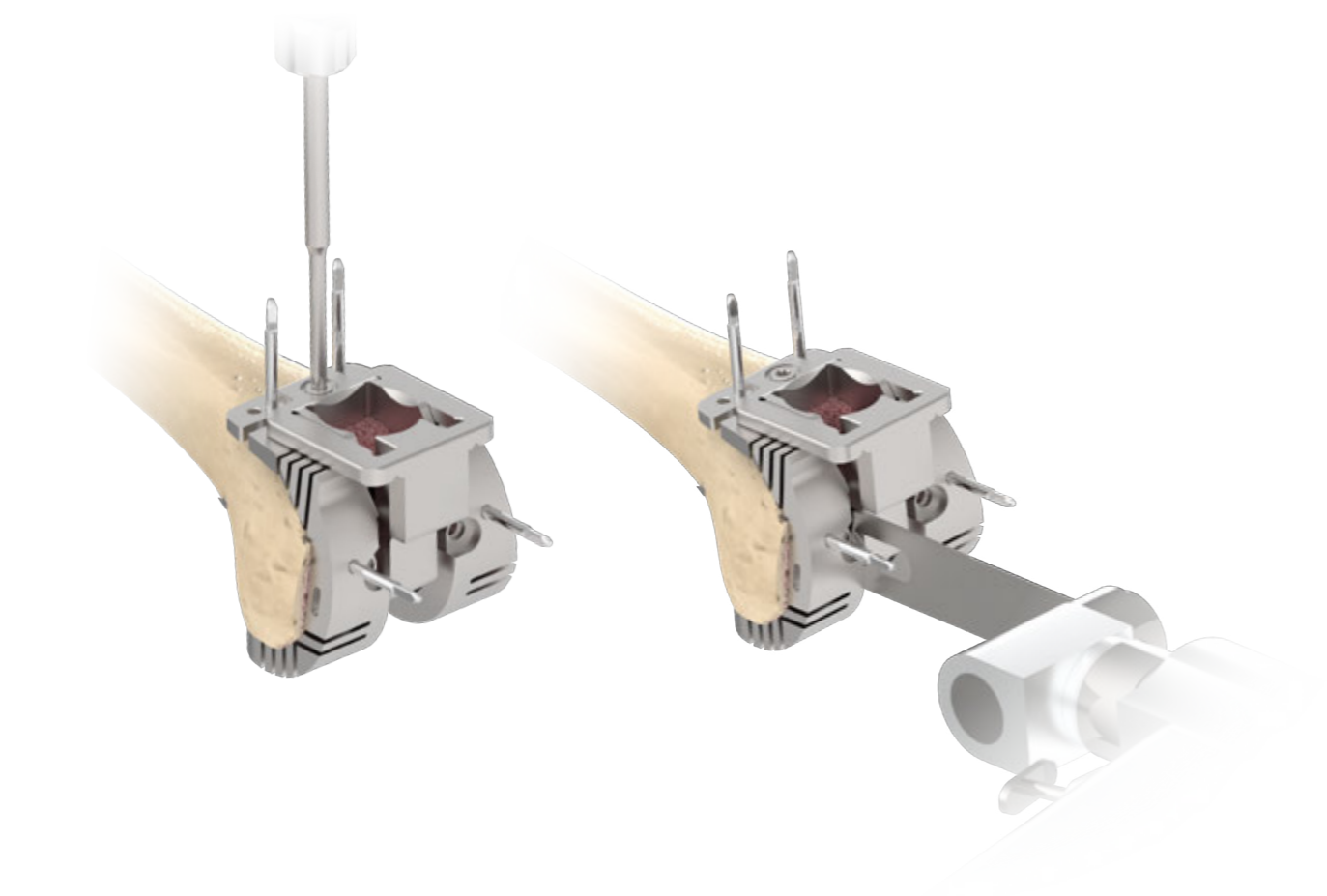
Driver Handle

Femoral Offset Boss
DrillFemoral Sizing
Template

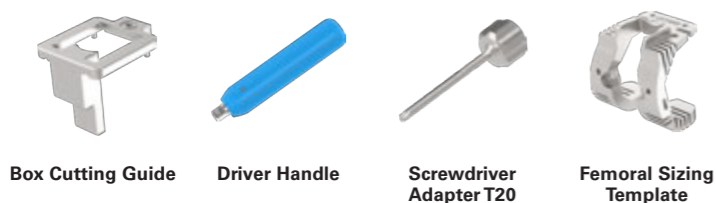
U.Femoral Box Preparation

Assemble the **Box Cutting Guide** to the **Femoral Sizing Template** with the **Screwdriver**.

Using a standard 1.27 mm saw blade, complete a parallel bone resection through the posterior cortex.



Instruments



Box Cutting Guide

Driver Handle

Screwdriver Adapter T20

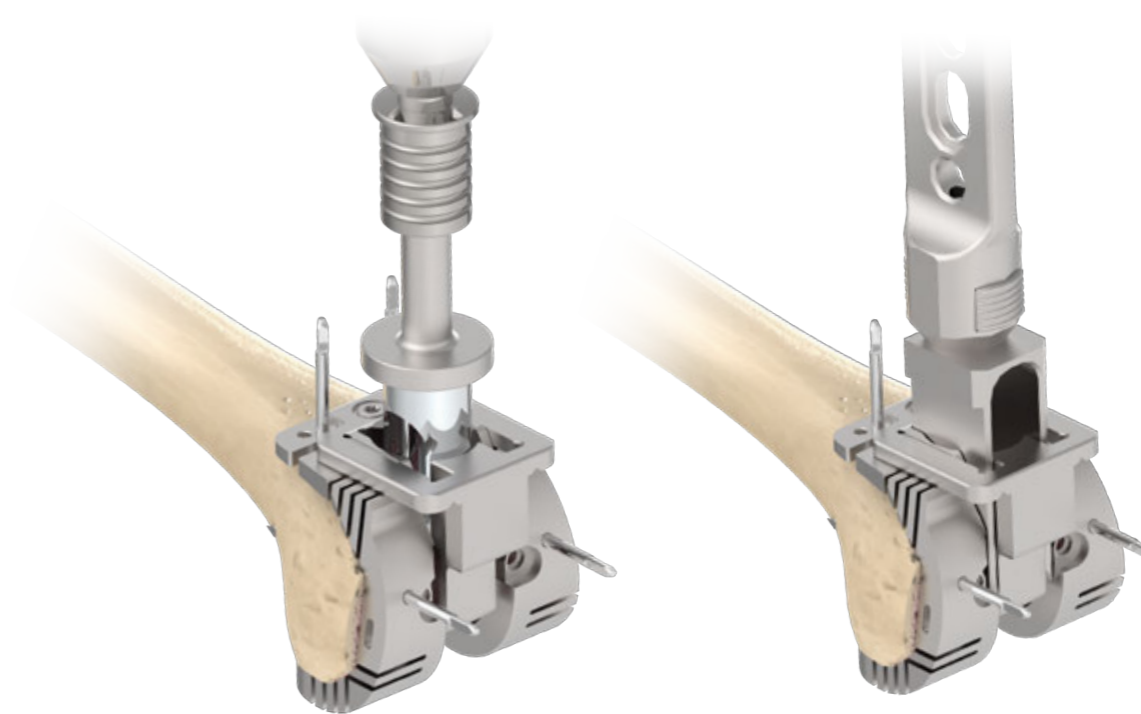
Femoral Sizing Template

U.Femoral Box Preparation

Using the **Box Reamer**, ream through **Box Cutting Guide** until the stop is fully engaged and in contact with the top surface of the guide.

Using the **Box Chisel**, impact through the **Box Cutting Guide** to ensure the corners of the box housing are 'square'.

Remove the **Femoral Sizing Template/Box Cutting Guide** assembly.



Instruments



Modular Handle

Box Chisel

Femoral Sizing Template

Box Cutting Guide

Box Reamer #1~#3 #4~6

U.Femoral Box Preparation

U1. Optional Femoral Augment Preparation

If using a femoral augment, remove the fixation pins on the distal holes of the **Femoral Sizing Template**.

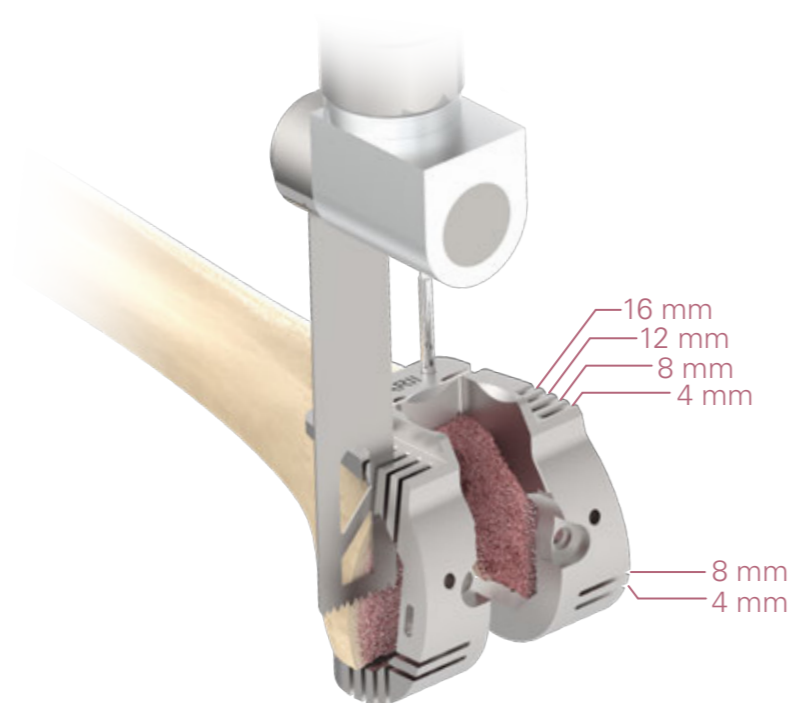
Complete the augment preparation using the applicable slot on the **Femoral Sizing Template**.

For distal augments, use the 4 / 8 / 12 or 16 mm anterior slots on the **Femoral Sizing Template** that match the equivalent distal augment sizes.

For posterior augments, use the 4 or 8 mm distal slots on the **Femoral Sizing Template** that match the equivalent posterior augment sizes.

Note:

12 or 16 mm distal augment is unable to fit with the posterior augment, thus if a 12 or 16 mm cut is prepared, no posterior cut would be needed.



Instruments



Femoral Sizing Template

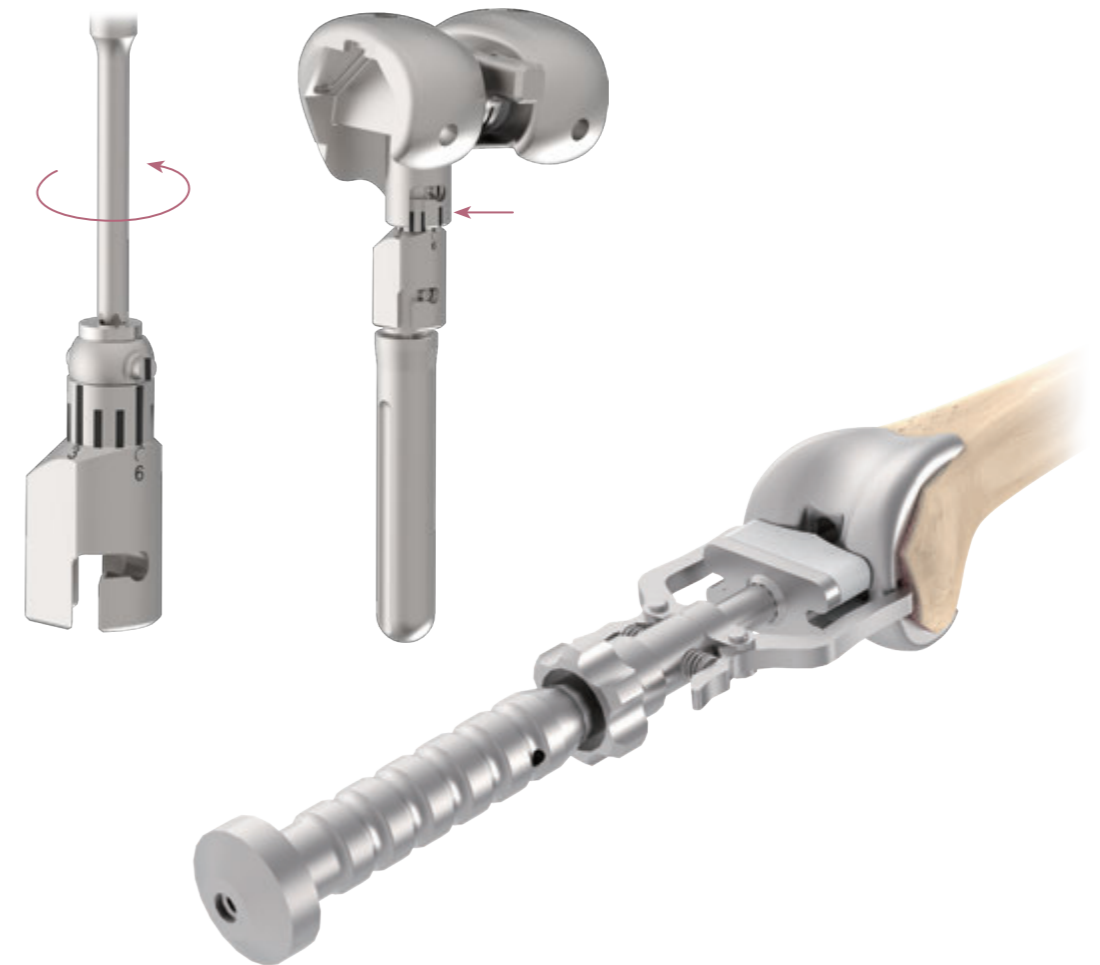
V.Femoral Trialing

Assemble the **Femoral Trial**, the **Offset Adapter Trial** if needed, and the **Stem Trial**.

If using the **Offset Adapter Trial**, use the **Screwdriver** to prepare the **Offset Adapter Trial** by unlock the knob on the top of the instrument.

Align the indicator on the **Offset Adapter Trial** to the predetermined offset number, then lock the knob.

Place the femoral trial assembly onto the prepared femoral surface using the **Femoral Driver**.



Instruments



Offset Adapter Trial
2 / 4 / 6 mm



Femoral Trial



Stem Trial



Driver Handle



Screwdriver
Adapter T20



Femoral Driver

V.Femoral Trialing

Identify the required **Tibial Insert Trial** and **Yoke Adapter Trial** based on the selected **Tibial Baseplate Trial** size:

The #1 through #3 tibial baseplate size corresponds with the size S **Yoke Adapter**.

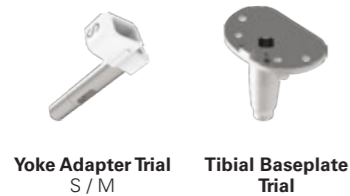
The #4 through #6 tibial baseplate size corresponds with the size M **Yoke Adapter**.

Insert the selected **Yoke Adapter Trial** onto the the **Tibial Baseplate Trial**.

Connect the yoke adapter and the femoral assembly.



Instruments



Yoke Adapter Trial
S / M

Tibial Baseplate
Trial

V.Femoral Trialing

Attach the selected **Tibial Insert Trial** to the **Tibial Insert Trial Handle** and connect to the **Yoke Adapter Trial** on the tibial assembly.

The #1 through #3 tibial baseplate size corresponds with the size S **Tibial Insert Trials**.

The #4 through #6 tibial baseplate size corresponds with the size M **Tibial Insert Trials**.

Evaluate joint stability using the selected trial components. Switch to different **Tibial Insert Trial** thicknesses as needed to obtain optimal stability.



Instruments



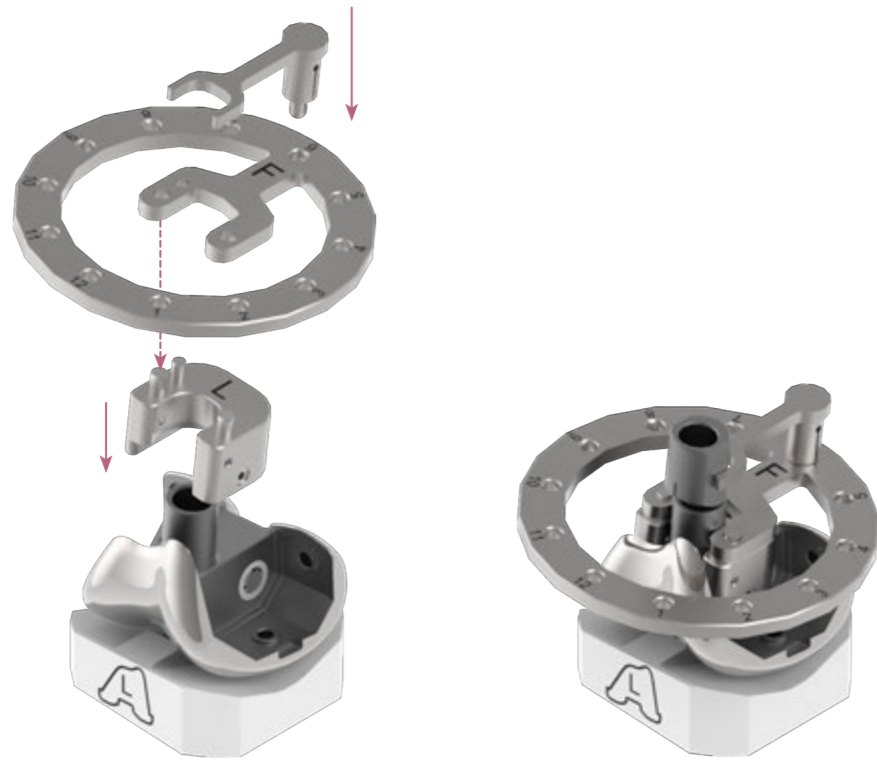
Tibial Insert Trial

Tibial Insert Trial
Handle

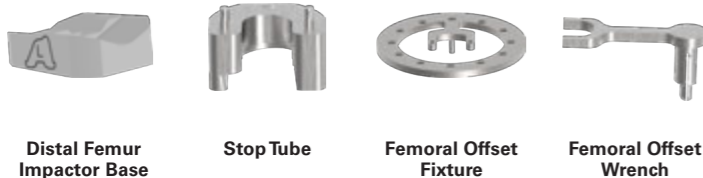
W. Implant Assembly

Place the selected femoral component onto the **Distal Femur Impactor Base**.

If selected, connect the femoral component with the correct offset adapter by tapping the prosthesis with the **Stem Impactor** in position. To position the offset into proper orientation, seat the **Stop Tube** on the femoral component and place the **Femoral Offset Fixture** over the **Stop Tube**. Utilize the **Femoral Offset Wrench** to set the offset adapter match the direction of the trial assembly.



Instruments



W. Implant Assembly

Connect the selected extension stem to the femoral component assembly by tapping the stem with the **Stem Impactor** in position.

Thread the femoral screw into the intercondylar hole to secure the assembly.



Instruments



W. Implant Assembly

If a tibial extension stem is selected, remove the distal plug on the tibial baseplate implant and assemble the tibial baseplate implant and tibial extension stem using the **Screwdriver Adapter T30**.

Place the selected tibial stem on the **Proximal Tibial Impactor Base**. Manually thread the selected tibial extension stem onto the baseplate.

Attach the **Torque Wrench 15 N-m** handle to the **Torque Wrench Adapter** that corresponds to the selected stem diameter.

Place the **Tibial Baseplate Wrench** over the baseplate. Complete tightening of the tibial implant assembly by applying 15 N-m of torque using the **Torque Wrench** assembly.



Instruments



Impactor Base Proximal Tibia Driver Handle Screwdriver Adapter, T30 Torque Wrench Adapter 9 mm 12.5 mm 14 mm Torque Wrench 15 N-m Tibial Baseplate Wrench

X. Implantation

If a cemented tibial stem is selected, use the **Tibial Cement Restrictor Inserter** to introduce the selected cement restrictor to an adequate depth in the canal. Use the indicators on the shaft to set the depth.



The etched marking **C70** indicates the appropriate depth of the 70 mm cemented tibial stem

The diameter of cemented stem drill is 9 mm. Use cement restrictor size 8 to ensure smooth insertion



Cement Restrictor, I-Type		
Cat. No.	Size	Canal size (mm)
1907-1008	# 8	8 - 9

Instruments



Tibial Cement Restrictor Inserter

X. Implantation

Attach the **Tibial Baseplate Driver** to the **Modular Handle**.

Insert the tip of the **Tibial Baseplate Driver** into the center hole of the tibial baseplate implant, then lock the tibial implant assembly.

Apply bone cement to proximal tibial resection and the distal surface of the baseplate. If using a cemented tibial stem, add cement to the prepared tibial canal.

Place the tibial implant assembly onto the prepared tibial surface. Attach the **Tibial Baseplate Impactor** to the **Modular Handle** and impact the tibial implant assembly until fully seated and in proper contact with the bone.



Instruments



Modular Handle

Tibial Baseplate Driver

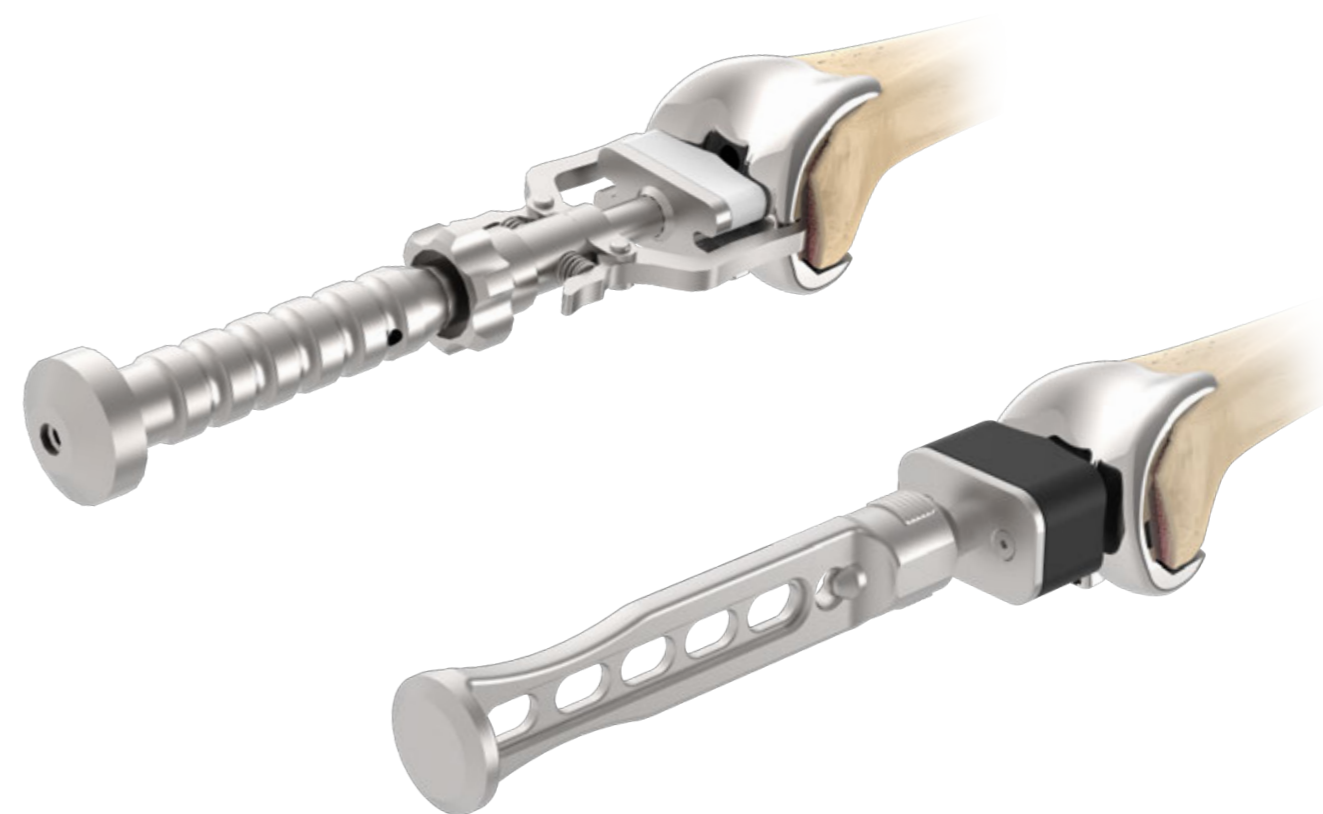
Tibial Baseplate Impactor

X. Implantation

Apply bone cement to distal femoral resection and the proximal surface of the femoral component.

Place the implant assembly onto the prepared femoral surface with **Femoral Driver**. Attach the **Femoral Impactor** to the **Modular Handle** and impact the femoral component assembly until fully seated and in proper contact with the bone.

Remove the plastic protective cover on the femoral component after clean out the excessive cement.



Instruments



Femoral Driver

Femoral Impactor

Modular Handle

X. Implantation

Perform a final check to confirm the optimal tibial insert thickness with the selected **Tibial Insert Trial**.

Insert and evaluate using the **Tibial Insert Handle** as described in previous steps.



Instruments



Tibial Insert Trial



Tibial Insert Trial Handle

X. Implantation

With the knee in flexion, place the selected tibial insert onto the implanted tibial baseplate assembly, making sure to align with the hinge post of the femoral component.

With the knee in full extension, secure the tibial insert to the femoral prosthesis by tightening the built-in set screw inside the tibial insert with **Insert Set Screwdriver** to apply appropriate fixation torque.

Tighten the set screw until fully connected within the femoral component, confirming with the depth mark on the screwdriver.



Align the depth mark on the screwdriver according to the selected size of tibial insert. Align to the line marked S for size #S tibial insert; align the line marked M for size #M tibial insert.

If the depth mark is achieved but the torque limiter has not engaged, continue apply torque until engaged;

If the torque limiter is engaged before the depth mark is achieved, then the screw may not be correctly connected to the femoral component. Confirm the femoral assembly is fully seated in the tibial insert, then re-tighten the set screw.


Instruments




Insert Set Screwdriver

Order Information

Femoral Component




Femoral Screw
2903-1014




	Left	Right	A/P	M/L
#1	2115-1310	2115-1410	52	56
#2	2115-1320	2115-1420	56	60
#3	2115-1330	2115-1430	60	64
#4	2115-1340	2115-1440	64	68
#5	2115-1350	2115-1450	68	72
#6	2115-1360	2115-1460	72	76

XPE Tibial Insert



	12 mm	14 mm	17 mm	20 mm	23 mm	26 mm	30 mm
S	2315-3211	2315-3212	2315-3213	2315-3214	2315-3215	2315-3216	2315-3217
M	2315-3241	2315-3242	2315-3243	2315-3244	2315-3245	2315-3246	2315-3247


Tibial Baseplate




	Cat. No.	A/P	M/L
#1	2215-1410	42	63
#2	2215-1420	45	66
#3	2215-1430	47	69
#4	2215-1440	50	72
#5	2215-1450	53	76
#6	2215-1460	56	80

Order Information


Tibial Baseplate Accessories




	Tibial Augment			
	5 mm	10 mm	15 mm LM / RL	15 mm LL / RM
#1	2815-1011	2815-1012	2815-1113	2815-1213
#2	2815-1021	2815-1022	2815-1123	2815-1223
#3	2815-1031	2815-1032	2815-1133	2815-1233
#4	2815-1041	2815-1042	2815-1143	2815-1243
#5	2815-1051	2815-1052	2815-1153	2815-1253
#6	2815-1061	2815-1062	2815-1163	2815-1263



	Cemented Tibial Stem			
	20 mm	45 mm	70 mm	95 mm
Ø9	2715-5109	2715-5209	2715-5309	2715-5409



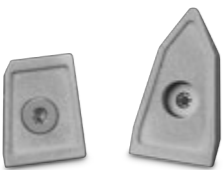
	Cement Restrictor, I-Type	
	Cat. No.	Canal size (mm)
#8	1907-1008	8 - 9



	Press-Fit Tibial Stem			
	45 mm	70 mm	95 mm	120 mm
Ø12.5	2715-7212	2715-7312	2715-7412	2715-7512
Ø14	2715-7214	2715-7314	2715-7414	2715-7514

Order Information

Femoral Component Accessories



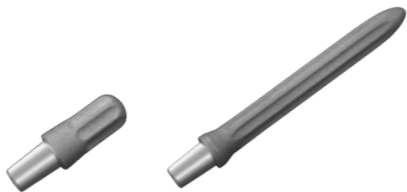
Distal Femoral Augment						
	4 mm LM / RL	4 mm LL / RM	8 mm LM / RL	8 mm LL / RM	12 mm	16 mm
#1	2603-5111	2603-5211	2603-5112	2603-5212	2603-5313	2603-5314
#2	2603-5121	2603-5221	2603-5122	2603-5222	2603-5323	2603-5324
#3	2603-5131	2603-5231	2603-5132	2603-5232	2603-5333	2603-5334
#4	2603-5141	2603-5241	2603-5142	2603-5242	2603-5343	2603-5344
#5	2603-5151	2603-5251	2603-5152	2603-5252	2603-5353	2603-5354
#6	2603-5161	2603-5261	2603-5162	2603-5262	2603-5363	2603-5364



Posterior Femoral Augment		
	4 mm	8 mm
#1	2603-5011	2603-5012
#2	2603-5021	2603-5022
#3	2603-5031	2603-5032
#4	2603-5041	2603-5042
#5	2603-5051	2603-5052
#6	2603-5061	2603-5062



Offset Adaptor		
2 mm	4 mm	6 mm
2903-1010	2903-1020	2903-1030



Straight Femoral Press-fit Stem					
	30 mm	75 mm	100 mm	150 mm	200 mm
Ø10	NA	2703-5011	2703-5021	2703-5051	2703-5061
Ø12	NA	2703-5012	2703-5022	2703-5052	2703-5062
Ø14	2703-5003	2703-5013	2703-5023	2703-5053	2703-5063
Ø16	NA	2703-5014	2703-5024	2703-5054	2703-5064
Ø18	NA	2703-5015	2703-5025	2703-5055	2703-5065
Ø20	NA	2703-5016	2703-5026	2703-5056	2703-5066
Ø22	NA	2703-5017	2703-5027	2703-5057	2703-5067
Ø24	NA	2703-5018	2703-5028	2703-5058	NA



Curved Femoral Press-fit Stem		
	150 mm	200 mm
Ø10	2703-5031	2703-5041
Ø12	2703-5032	2703-5042
Ø14	2703-5033	2703-5043
Ø16	2703-5034	2703-5044
Ø18	2703-5035	2703-5045
Ø20	2703-5036	2703-5046
Ø22	2703-5037	2703-5047
Ø24	2703-5038	NA



Each Step
We Care

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