

Restoration[®] Modular Revision Hip System

Surgical protocol



Restoration Modular Cone Body/Conical Distal Stem Femoral components Using the Restoration Modular instrument system

Indications for Use

- Noninflammatory degenerative joint disease, including osteoarthritis and avascular necrosis;
- Rheumatoid arthritis;
- Correction of functional deformity;
- Revision procedures where other treatments or devices have failed; and,
- Nonunions, femoral neck fractures, and trochanteric fractures of the proximal femur with head involvement that are unmanageable using other techniques.
- Primary and revision total hip arthroplasty as well as in the presence of severe proximal bone loss. These femoral stems are designed to be press-fit into the proximal femur.

Contraindications

- Active infection or suspected latent infection in or about the hip joint;
- Bone stock that is inadequate for support or fixation of the prosthesis;
- Skeletal immaturity;
- Any mental or neuromuscular disorder that would create an unacceptable risk of prosthesis instability, prosthesis fixation failure, or complications in postoperative care.

See package insert for warnings, precautions, adverse effects, information for patients and other essential product information.

Before using Restoration Modular instrumentation, verify:

- Instruments have been properly disassembled prior to cleaning and sterilization;
- Instruments have been properly assembled post-sterilization;
- Instruments have maintained design integrity; and,
- Proper size configurations are available.
- For instructions for Cleaning, Sterilization, Inspection and Maintenance of Orthopaedic Medical Devices, refer to LSTPI-B and SLI0001.

Additional Components

Stryker Orthopaedics offers a wide variety of additional components that are compatible with the Restoration Modular Femoral components, including femoral bearing heads, acetabular components, Restoration Acetabular Wedge Augments, and Dall-Miles Grips, Grip Plates and Cables. The surgeon should refer to each component's surgical technique for a discussion of the surgical procedure and to each component's Instructions for Use for associated Indications. The Restoration Modular Hip System is compatible only with Stryker Orthopaedics femoral bearing heads listed in the chart on page 20 and 23.

This publication sets forth detailed validated procedures for using the Restoration Modular Revision Hip System. It offers instructions that you should heed, but, as with any such technical guide, each surgeon must consider the particular needs of each patient and make appropriate adjustments when and as required.

System overview

The Modular Cone Body/Conical Distal Stem Femoral components are part of the Restoration Modular Revision Hip System.

The titanium alloy (Ti-6Al-4V ELI) Cone Bodies are circumferentially plasma sprayed with commercially pure titanium and then over-sprayed with PureFix HA. Seven Cone Body diameters are available (range 19mm through 31mm in 2mm increments) with four vertical offsets: +0mm (STD), +10mm, +20mm, and +30mm. These vertical offsets may be used to adjust overall stem length intraoperatively. (See Sizing Charts on page 4.)

Cone Bodies incorporate a V40 taper and are compatible with CoCr, BioloX delta Ceramic and Alumina Ceramic Femoral Heads.

The Conical Distal Stems are available in four lengths – 115mm, 155mm, 195mm, and 235mm. The 115mm distal stem length comes in 12 fluted, conical diameters from 12mm to 23mm in 1mm increments. The 155mm, 195mm and 235mm distal stem lengths comes in 15 fluted, conical diameters from 14mm to 28mm in 1mm increments. The 115mm, 155mm and 195mm Conical Distal Stems are offered with a straight design option. The 195mm Conical Distal Stem is also offered with a bowed option. The 235mm Conical Distal Stem is only offered with a bowed option.

The total length of the Cone Body/Conical Distal Stem construct will be dependent upon the body and stem chosen. Standard stem lengths are measured from the +0mm (STD) Cone Body with a +0mm (STD) Femoral Head from the head center to the distal tip of each of the four lengths of Conical Distal Stems. Review Sizing Charts for stem lengths on page 4.

Note: The Cone Body/Conical Distal Stem lengths are measured using the +0mm (STD) Cone Body with a +0mm (STD) Femoral Head from the head center to the distal tip of the Conical Distal Stem.

Stem length options

Cone Body Sizes and Head Offsets with V40 Femoral Heads available in 22mm, 26mm, 28mm, 32mm, 36mm, 40mm & 44mm

Cone body sizes	-4mm*	+0mm (STD)	+4mm	+8mm	+12mm
19mm	31mm	34mm	37mm	40mm	43mm
21mm	33mm	36mm	39mm	42mm	45mm
23mm	37mm	40mm	43mm	46mm	49mm
25mm	41mm	44mm	47mm	50mm	53mm
27mm	41mm	44mm	47mm	50mm	53mm
29mm	41mm	44mm	47mm	50mm	53mm
31mm	41mm	44mm	47mm	50mm	53mm

*Not available in 22mm or 26mm diameter head (see Head Compatibility chart on pages 20 or 23).

Cone body/Conical distal stem sizes

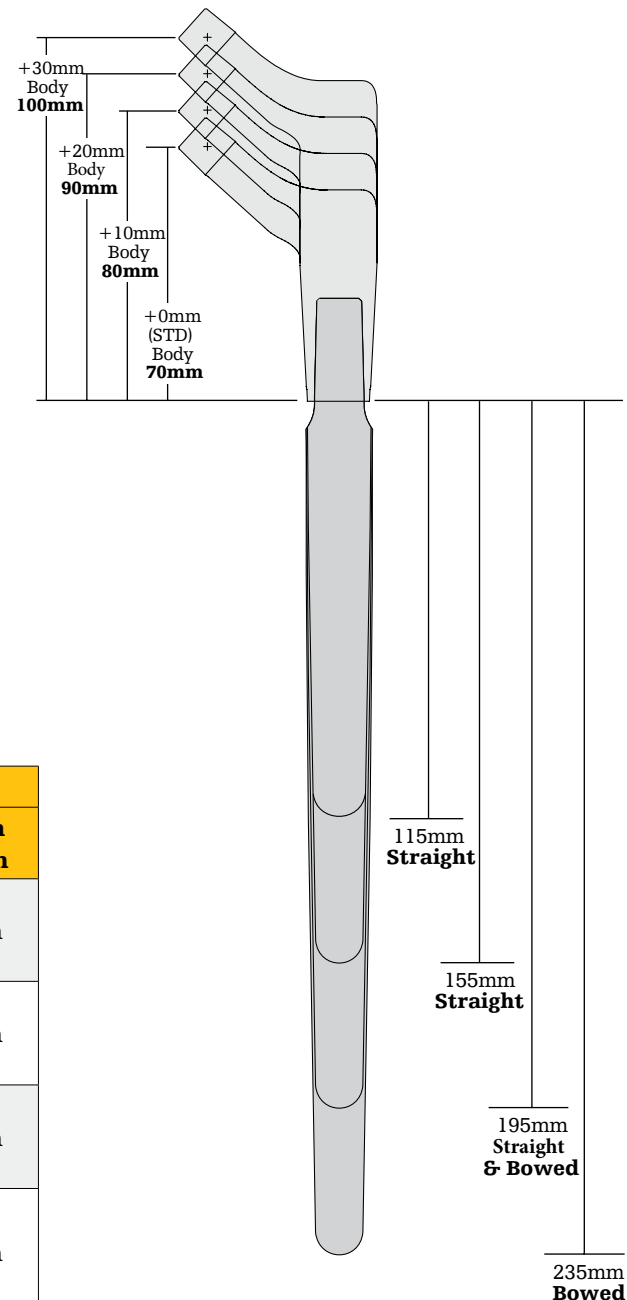
Cone body sizes	Neck angles	Distal stem lengths	Distal stem diameters
19mm	132°	115mm	12mm**, 13mm** - 23mm in 1mm increments
21mm			
23mm			
25mm		155mm, 195mm, 235mm	
27mm			
29mm			
31mm			

** The 12mm diameter stem is only compatible with a 19mm proximal body diameter and a maximum +5mm Head offset

** The 13mm diameter stem is compatible with up to a maximum 23mm proximal body diameter

Cone body/Conical distal stem combined overall lengths

Conical distal stem sizes	Cone body heights			
	70mm +0mm (STD)	80mm +10mm	90mm +20mm	100mm +30mm
115mm Length 12mm - 23mm dia. (Straight)	185mm	195mm	205mm	215mm
155mm Length 14mm-28mm dia. (Straight)	225mm	235mm	245mm	255mm
195mm Length 14mm-28mm dia. (Straight & bowed)	265mm	275mm	285mm	295mm
235mm Length 14mm-28mm dia. (Bowed)	305mm	315mm	325mm	335mm



Bone defect classifications

Type 1 - Minor Bone Loss

- The metaphysis is expanded, but intact.
- The calcar is partially absent.
- There is minimal bone loss anteriorly and posteriorly.
- The diaphysis is intact.

Type 2 - Significant Bone Loss

- The metaphysis is compromised.
- There is no calcar.
- There is minimal bone loss anteriorly and posteriorly.
- The available proximal bone may be thin, sclerotic, and incapable of support.
- The diaphysis is intact.

Type 2A - The calcar is non-supportive, but the diaphysis is still intact.

Type 2B - The calcar is non-supportive, the anterolateral metaphysis is deficient, but the diaphysis is still intact.

Type 2C - The calcar is non-supportive and the posteromedial part of the metaphysis is deficient, but the diaphysis is still intact.

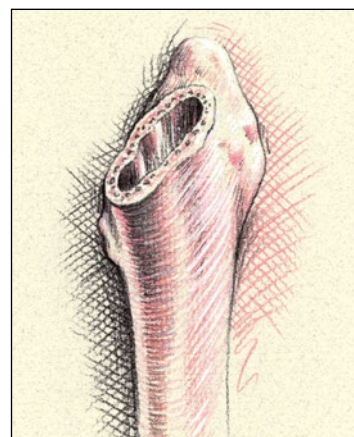
Type 3 - Massive Bone Loss

- Complete circumferential bone loss in the metaphysis, extending to the diaphysis.
- The metaphysis and part of the diaphysis are deficient.
- The anterolateral bone and supporting subtrochanteric metaphyseal bone are absent.
- The metaphysis is not stable and will not offer rotational stability.
- There is massive bone loss anteriorly and posteriorly.
- The stability of the implant is dependent on distal diaphyseal fixation.

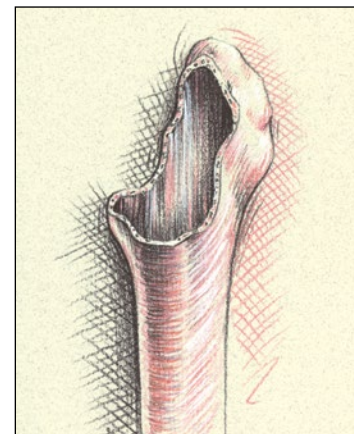
Type 4 - Massive Bone Loss

- Extensive circumferential segmental bone loss proximally.
- Extensive cavitory loss involving the entire diaphysis.
- Extensive ectasia of the diaphysis.
- Proximal femoral allograft required with reduction osteotomy of the diaphysis.
- Cortical diaphyseal bone is often thin and needs to be supplemented with cortical strut grafts.
- Segmental defects can be repaired with cortical strut graft and cerclage wiring, and cavitory defects can be filled with impacted particulate graft.

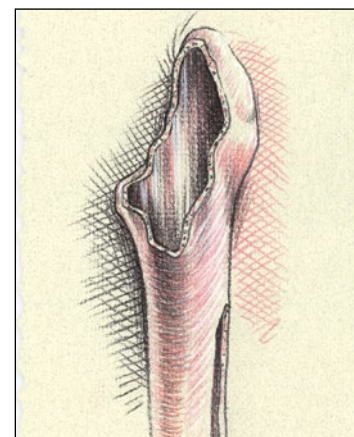
Type 1



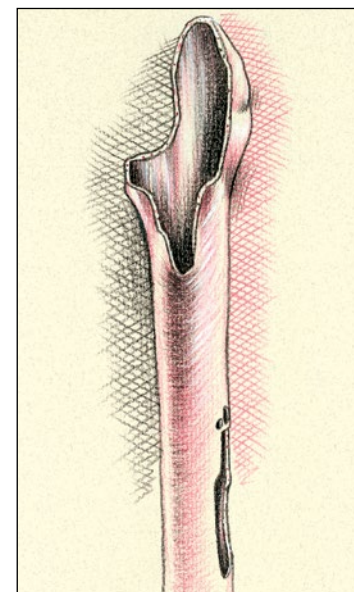
Type 2



Type 3



Type 4



Preoperative evaluation and planning

The Restoration Modular Cone Body/Conical Distal Stem Femoral Hip System offers a complete set of femoral X-ray templates for the surgeon to help assess the implant requirements. All seven Cone Body Templates (with four vertical offsets each) can be combined with each of the Conical Distal Stem Templates. All templates are at 120% magnification. The use of mag markers facilitate accurate magnification measurements. If mag markers are not used, measure the existing implants on the X-ray to help ensure that magnification is approximately 120%.

Preoperative planning is strongly recommended for leg length planning, measuring the length of the existing prosthesis being revised, predicting the potential use and type of trochanteric osteotomy, the Cone Body size and vertical offset, and the Conical Distal Stem diameter and length of the prosthesis to be implanted.

Anterior-Posterior (A/P) and Medial-Lateral (M/L) radiographs are necessary for X-ray templating. In cases of severe femoral-compromise, a full A/P pelvic X-ray of the operative side as well as the contralateral side is helpful to assess the biomechanical requirements of the reconstruction. The lateral X-ray is informative in that it will show the anterior bow of the femur, which is useful when templating with the 115mm straight, 155mm straight, 195mm straight and bowed, or 235mm bowed long stems.

First, position an acetabular template over the A/P radiograph, aligning the acetabular shell surface with the subchondral bone. Mark the center of rotation of the acetabulum indicated on the template.

Place the appropriate two-piece femoral template on the radiograph. Ensure that the distal length of the prosthesis will be sufficiently anchored in good cortical bone. The necessary proximal body height is selected to anatomically correct the leg length.

Important: Adjunctive proximal fixation/ support is required for stem diameters of 12mm and 13mm, and is recommended for stem diameters of 14mm and larger.

Patient selection

Proper implant selection is critical to the stability and longevity of the femoral stem implant in hip arthroplasty. Proper implant selection must consider design, fixation, and environmental variables including patient weight, age, bone quality and size, activity level and preoperative level of health, as well as the surgeon's experience and familiarity with the implant device. Longevity and stability of the implant may be affected by these factors. Surgeons should advise patients of these factors.

The smaller sized femoral stem implants are intended for use in patients with smaller intramedullary femoral canals. Their geometry has been reduced to accommodate the anatomy of the smaller intramedullary femoral canal, which thereby decreases their fatigue-strength and load-bearing characteristics. Therefore, patients with high physical activity levels, poor bone quality, or who are overweight may be poor candidates for the smaller femoral implant stem.

Patients with high-activity level and/or higher weight patients are at greater risk for implant complications or failures. For patients with poor proximal bone quality, the use of supplemental adjunctive proximal fixation/support is advised for implant stability.

The surgeon must evaluate each situation carefully based upon the patient's clinical presentation before making any decisions regarding the selection of the implant.



A full range of implant sizes provides choice in selecting an implant to meet the specific demands of each patient.

Determine the approximate implant size

Note that the tip of the greater trochanter is approximately at the same level as the center of rotation of the femoral head. If no change in leg length is necessary, then the Cone Body and Femoral Head center that is closest to the center of rotation marks the appropriate neck length and femoral head offset required. If leg lengthening is required, choose the Cone Body height and offset that places the center of the femoral head on the overlay above the center of rotation. If it is necessary to shorten the length of the femoral neck, then select the Femoral Head center below the center of rotation.

Once the proximal geometry has been determined, select the appropriate Conical Distal Stem diameter of the implant by establishing the region of the femoral cortices that appears to be free from defects that will allow the implant to achieve 4cm - 6cm of suitable distal fixation. Determine also the length required to place the distal stem tip two-to-three canal diameters below the lowest distal defect.

Important: Do not plan to use the +30mm Cone Body or the +12mm Femoral Head preoperatively. Use the next larger diameter Conical Distal Stem in the same implant length so that additional vertical offset, neck length, and femoral head offset options are available for adjusting leg length intraoperatively.

Patient positioning and surgical approach

Revision total hip surgery presents challenges not seen in primary surgery. Therefore, each surgeon should position the patient and use the surgical approach for revision total hip arthroplasty with which he is most familiar. Patient positioning, prepping and draping, the skin incision, soft tissue dissection, and hip dislocation are performed according to the surgeon's preferred technique, making certain to adequately expose the acetabulum and femur as required by each revision situation.

There are also many femoral and trochanteric osteotomy techniques available to surgeons that assist in implant removal, overall reconstruction, and finally, postoperative management. The surgeon should use osteotomies that he is most familiar with and that best fit the challenge faced by each particular revision situation.

Note: To help reduce the potential for femoral fracture, it is recommended that areas of defects in the femur are prophylactically cabled prior to reaming and stem insertion. Dall-Miles Cables work well to assist the surgeon in this step. See the Dall-Miles surgical technique for details on the use of this system.



Cement removal

Implant removal and subsequent cement removal can be a challenging proposition. Surgeons should utilize methods they are most familiar with or are most appropriate for the many revision situations that may arise. The Gray Revision Instruments are helpful in removing the existing acetabular and femoral prostheses as well as bone cement if present.

After removal of the femoral component, the acetabular component is removed and the acetabulum is prepared. Cement and fibrous tissue still present in the femoral canal may be left to help minimize blood loss during acetabular preparation. After the acetabulum has been prepared, any remaining cement, scar tissue, or debris in the femoral canal may be removed and reaming begun.

Neck resection guide - primary surgery

A Neck Resection Guide is available for those instances where a surgeon chooses to utilize the Cone Body and Conical Distal Stem implants in a primary surgery, or to excise additional bone in a revision scenario.

The resection level should be identical to the level chosen during preoperative templating. Key features of the Neck Resection Guide (**Figure 1**):

1. The slotted area in the proximal portion of the guide helps to reference the proximal tip of the greater trochanter. This is a good landmark that generally coincides with the center of rotation for the femoral head. Align the Cone Body size and its corresponding engraved line with the tip of the trochanter. The notches on the medial extension of the guide correspond with the head centers of the noted diameters.
2. The angled surface provides a plane for marking the level of the cut, or it can be used as a cutting surface for the saw blade. The neck resection is made on the lower angled surface.
3. The long tail of the guide is used for alignment with the femoral shaft axis. It is designed to be inserted under the soft tissues of the posterior aspect of the femur.

Note: The femoral neck resection may need to be modified in some challenging clinical situations such as angular and rotational deformity. Individual adjustments to the neck cut should be made as necessary to allow for appropriate seating and version adjustment of the Cone Body. A calcar shortening osteotomy could be considered.

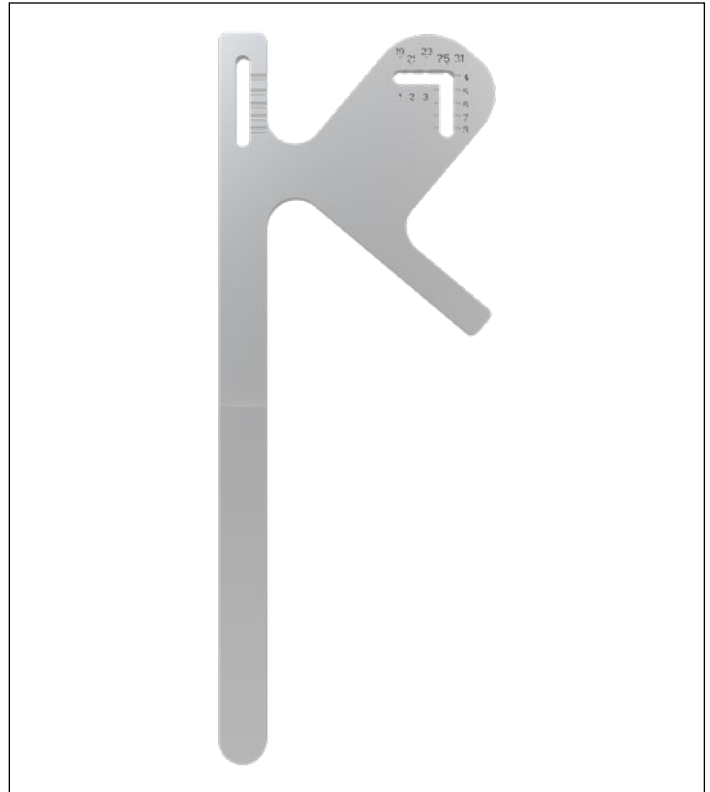


Figure 1

Modular Box Osteotome and 10mm Starter Reamer

The Modular Box Osteotome may be used to open the proximal-femur prior to use of the 10mm Starter Reamer. The Modular Box Osteotome is attached to the Orthonomic Modular Handle.

After the osteotomy has been performed, the Modular Box Osteotome is introduced into the anatomic axis of the femoral shaft (**Figure 2**). This will remove a wedge of bone at the medial base of the greater trochanter, helping to achieve neutral/lateral alignment of the 10mm Starter Reamer.

Use of the 10mm Starter Reamer and depth markings

The 10mm Starter Reamer is used with the Orthonomic T-Handle to open the femoral canal and aid in determining the orientation of the femoral axis. Assemble the 10mm Starter Reamer to the Orthonomic T-Handle and target the piriformis fossa to open the canal. Care must be taken to centralize the 10mm Starter Reamer within the femoral canal before subsequent reaming is performed, avoiding extra osseous penetration with the tip.

As a reference, there are four depth marking grooves on the shaft of the 10mm Starter Reamer which correspond to the distance from the tip of the greater trochanter to the tip of the 115mm, 155mm, 195mm or 235mm Conical Distal Stem, respectively. Measurement for depth insertion of the 10mm Starter Reamer when used with all Cone Body / Conical Distal Stems is at the tip of the greater trochanter.

Ream until the desired stem length groove aligns with the tip of the greater trochanter as planned during preoperative templating (**Figure 3**).

Note: To help reduce the potential for femoral fracture, it is recommended that areas of defects in the femur are prophylactically cabled prior to reaming and stem insertion. Dall-Miles Cables work well to assist the surgeon in this step. See the Dall-Miles surgical technique for details on the use of this system.



Figure 2

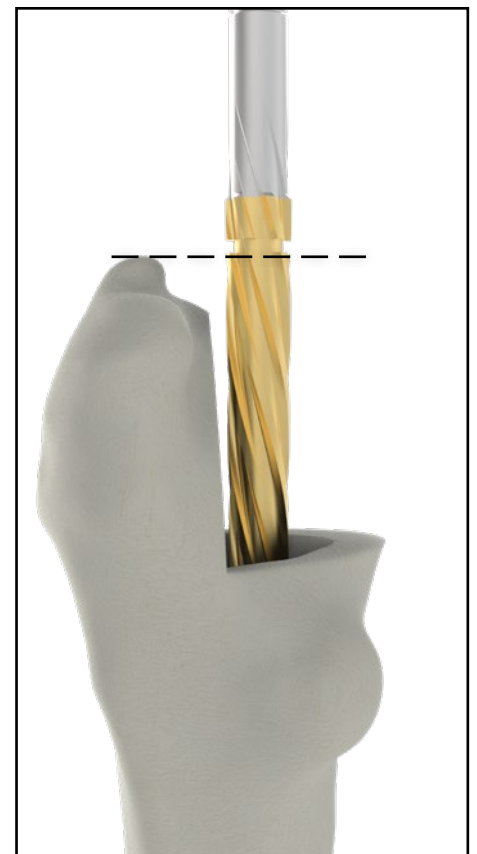


Figure 3

Clear-Out Reamer

The Clear-Out Reamer is used to open up the proximal portion of the canal when preparing the 12mm, 13mm and 14mm Conical Distal Stems. The Clear-Out Reamer is used after the 10mm Starter Reamer and before the Conical Distal Reamers.

The function of this reamer is two-fold. First, it is designed to prepare the canal to accept the initial 19mm Proximal Cone Reamer. Second, it is designed to prepare the canal for the tapered junction of the 12mm and 13mm Conical Distal Stems since the tapered junction diameter is slightly larger than 13mm.

The Clear-Out Reamer is inserted into the canal until the correct depth marking on the shaft aligns with the tip of the greater trochanter. When preparing for the Cone Body, the line corresponding to the preoperatively templated Cone Body (+0mm (STD), +10mm, +20mm, or +30mm) should align with the tip of the greater trochanter (**Figure 4**).

Important: Adjunctive proximal fixation/support is required for stem diameters of 12mm and 13mm, and is recommended for stem diameters of 14mm and larger.

Note: If when inserting the 12mm or 13mm stem it is observed that the stem sits proud and is not stable, it is recommended to remove the stem and re-introduce the Clear-Out Reamer to a depth 5mm deeper from the shaft marking initially referenced. This will aid in removing any proximal bone that may potentially interfere with stem seating.

Note: When introducing the Clear-Out Reamer, care should be taken not to fracture potentially compromised trochanteric bone and to avoid surrounding soft tissue.



Figure 4

Distal Reaming

Use of the Conical Distal Reamer – 115mm, 155mm, 195mm, 235mm Stems

Conical distal reaming for the 115mm, 155mm, 195mm, or 235mm Conical Distal Stems is accomplished by use of a T-Handle or on power. Select the diameter of a Conical Distal Reamer starting with a size one or two millimeters smaller than the templated size. The reamer diameters are available in 1mm increments from 11mm - 28mm. There are four depth marking grooves on the shaft of the 11mm through 23mm Conical Distal Reamers which correspond to the distance from the tip of the greater trochanter to the tip of the 115mm, 155mm, 195mm or 235mm Conical Distal Stem, respectively (**Figure 5**). There are three depth marking grooves on the shaft of the 24mm through 28mm Conical Distal Reamers which correspond to the distance from the tip of the greater trochanter to the tip of the 155mm, 195mm or 235mm Conical Distal Stem (**Figure 6**).

Note that the tip of the greater trochanter is approximately at the same level as the center of rotation of the femoral head. Therefore, the depth markings also correspond to the distance from the center of a +0mm (STD) Femoral Head implant on the +0mm (STD) Cone Body to the tip of the 115mm, 155mm, 195mm, or 235mm Conical Distal Stem.

If the greater trochanter is off or not present, the measurements made during preoperative templating are necessary to determine the approximate location of the greater trochanter or head center. Alternately, measurements may be taken from an X-ray of the contralateral side.

Ream until the desired stem length depth groove aligns with the tip of the greater trochanter, or other landmark as planned during preoperative templating.

Note: Conical Distal Reamers for preparing a 115mm length stem are gold in color and are available in sizes 11mm through 23mm only

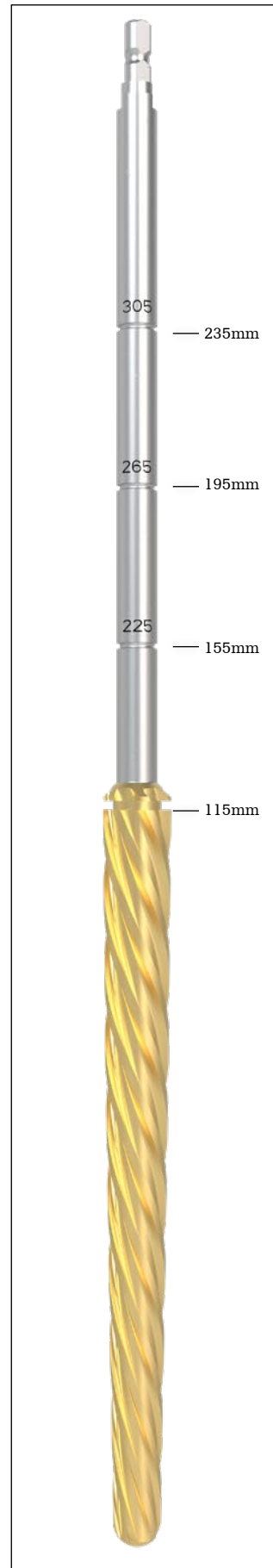


Figure 5
11mm - 23mm
Conical Distal Reamers

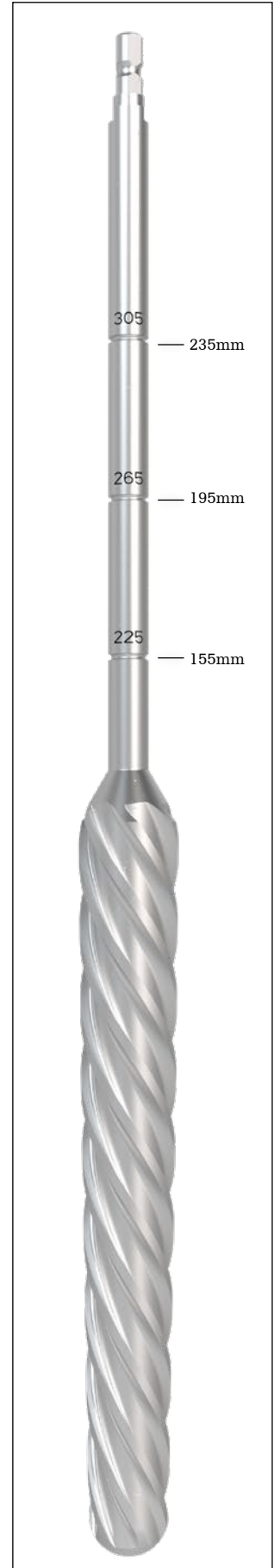


Figure 6
24mm - 28mm
Conical Distal Reamers

Distal Reaming (continued)

Use of the Conical Distal Reamer – 115mm, 155mm, 195mm, 235mm Stems (continued)

Progressively ream until resistance accompanied by cortical chatter is encountered. The reamers must be advanced into the femoral canal until the appropriate groove depth markings align with the tip of the greater trochanter, or approximate center of rotation (**Figure 7**).

If good cortical contact is not achieved, increase the reamer diameter in 1mm increments and insert only as deep as the grooves based on distal stem templating.

Note: If preparing for a 115mm stem and reaching 23mm diameter without encountering resistance / cortical chatter it is recommended to select a smaller diameter Conical Distal Reamer and advance it to the 155mm groove.

Suggestion: As in the Preoperative Planning Section, it is recommended that the femoral canal be reamed to the +0mm (STD) Cone Body level so that there are three remaining Cone Body height options (+10mm, +20mm, and +30mm) available during stem insertion.

Note: Intraoperative X-rays are valuable to gauge the position of the Conical Distal Reamers relative to the A/P and M/L femoral cortices and to the anterior bow of the femur.

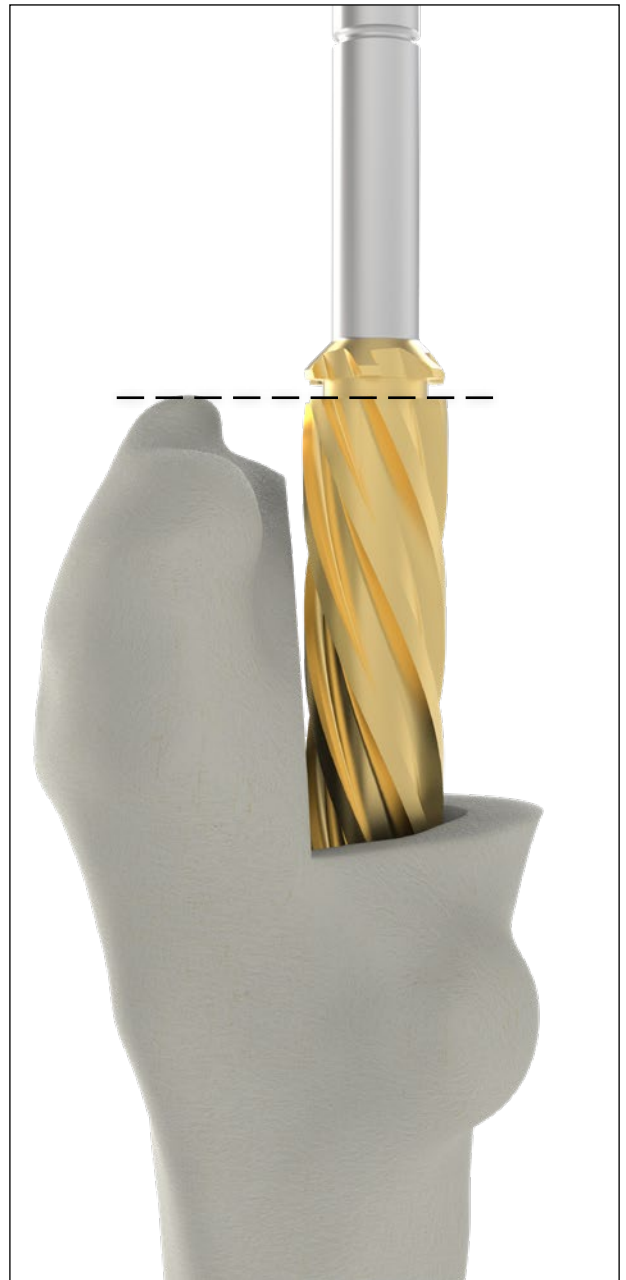


Figure 7

Optional - Trialing the Distal Stem

Conical Distal Stem Trials are available for the 115mm Conical Distal Stems. The Conical Distal Stem Trials include features to visually distinguish them from the Conical Distal Stem implant. These include the marking "TRIAL", proximal "castle" grooves, a thru-hole below the trunnion and a circumferential trunnion groove which will be visible on radiographic and fluoroscopic images (**Figure 8**)

When distal reaming is complete, select the Conical Distal Stem Trial that is the same diameter as the final reamer and the necessary length for stem stability.

Thread the Conical Distal Stem Trial Impactor to the appropriate size Conical Distal Stem Trial (**Figure 9**)

The Conical Distal Stem Trial Impactor should be fully threaded and secured to the Conical Distal Stem Trial prior to impaction to help prevent damage to the threads on the Trial or the Impactor. Excessive torque is not required. Attach the Orthonomic Modular Handle to the Conical Distal Stem Trial Impactor.

The Conical Distal Stem Trial Impactor has four depth groove markings that correspond to the center of a +0mm (STD) Femoral Head implant on each of the four Cone Bodies (+0mm (STD), +10mm, +20mm, and +30mm). The distal-most Cone Body groove corresponds to the center of the +0mm (STD) Cone Body with a +0mm (STD) Femoral Head in place (**Figure 10**).

Impact the Conical Distal Stem Trial into the femoral canal until the Trial will not advance any further. The Conical Distal Stem Trial provides a general indication of Distal Stem seating height as well as rotational and axial stability.

Caution: The Conical Distal Stem Trials are designed to be identical in size and geometry to their corresponding Conical Distal Stems. Do not over-impact the Conical Distal Trial in order to prevent the Conical Distal Trial from remaining fixed in the femoral canal. Do not over torque the Distal Stem Trial when checking rotational stability so as not to disrupt the femoral bone preparation.



Figure 8

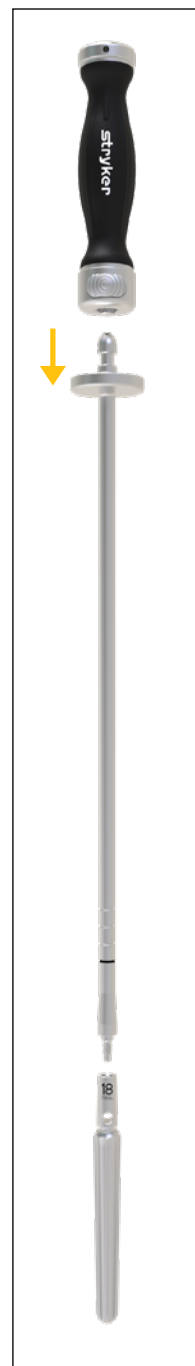


Figure 9

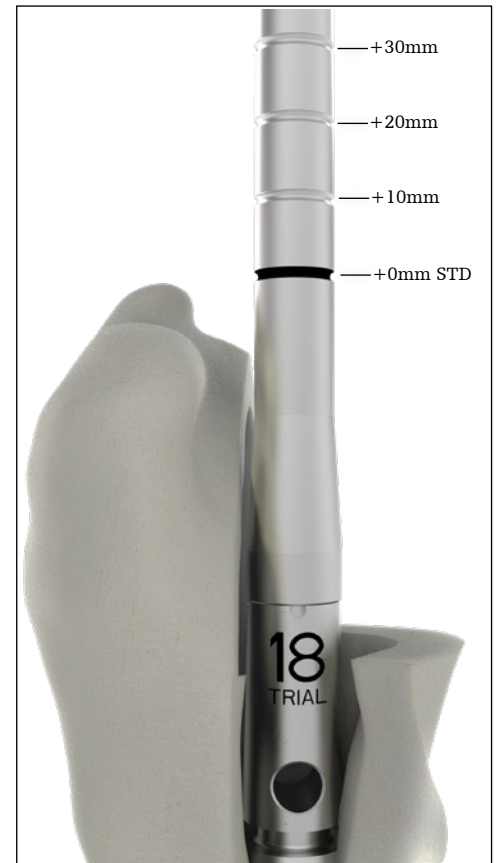


Figure 10

Optional - Trial Reduction with the Conical Distal Stem Trial and Cone Body Trial

If desired the proximal femur can be prepared with the Conical Distal Stem Trial in place and the Cone Body Trials can be attached to the Conical Distal Stem Trials. The surgical steps to follow are the same as preparing and trialing the proximal femur with the definitive Conical Distal Stem implanted as described under the Cone Body Preparation and Cone Body Trial sections of this surgical protocol.

When trialing is complete re-attach the Conical Distal Stem Trial Impactor to the Conical Distal Stem Trial. The Conical Distal Stem Trial Impactor should be fully threaded and secured to the Conical Distal Stem Trial prior to extraction to help prevent damage to the threads on the Trial or the Impactor. Attach the Orthonomic Modular Handle to the Conical Distal Stem Trial Impactor. Remove the Conical Distal Stem Trial from the femur carefully in an axial manner so as not to disrupt the femoral bone preparation.

The McReynolds Sliding Hammer can be assembled onto the shaft of the Conical Distal Stem Trial Impactor to aid in removing the Conical Distal Stem Trial (**Figure 11**).

Note: Do not use the Distal Stem Impactor / Reaming Post for extraction of the Conical Distal Stem Trial.

Caution: The final Conical Distal Stem may not sit exactly in the same position as the Conical Distal Stem Trial. To help facilitate proper seating of the final Cone Body and avoid proximal bone fracture, it is required that the final proximal Cone ream be performed with the final Conical Distal Stem implanted as described in the Cone Body Preparation section of this surgical protocol.



Figure 11

Implant Insertion – Distal Stem

Choose the appropriate Conical Distal Stem corresponding to the last diameter reamer used and length reamed. Attach the Distal Stem Impactor Adapter to the Distal Stem Impactor / Reaming Post. Thread the appropriate Conical Distal Stem onto the Distal Stem Impactor / Reaming Post. Attach the Orthonomic Modular Handle to the Distal Stem Impactor Adapter (Figure 12).

Note: Do not use the Conical Distal Stem Trial Impactor for insertion of the Conical Distal Stem implant.

The Distal Stem Impactor / Reaming Post has four depth groove markings that correspond to the center of a +0mm (STD) Femoral Head implant on each of the four Cone Bodies (+0mm (STD), +10mm, +20mm, and +30mm) (Figure 13). The distal-most Cone Body groove corresponds to the center of the +0mm (STD) Cone Body with a +0mm (STD) Femoral Head in place.

Note: Preoperative planning should have ensured that the tip of the distal stem will pass any distal defects by two to three canal diameters and will have a 4cm - 6cm of satisfactory mechanical stability. Make sure that sufficient distal fixation is attained with all Conical Distal Stems, especially those that are significantly larger than the templated stem size.

Note: The 12mm diameter stem is only compatible with a 19mm proximal body diameter and a maximum +5mm Head offset

The 13mm diameter stem is compatible with up to a maximum 23mm proximal body diameter.



Figure 12

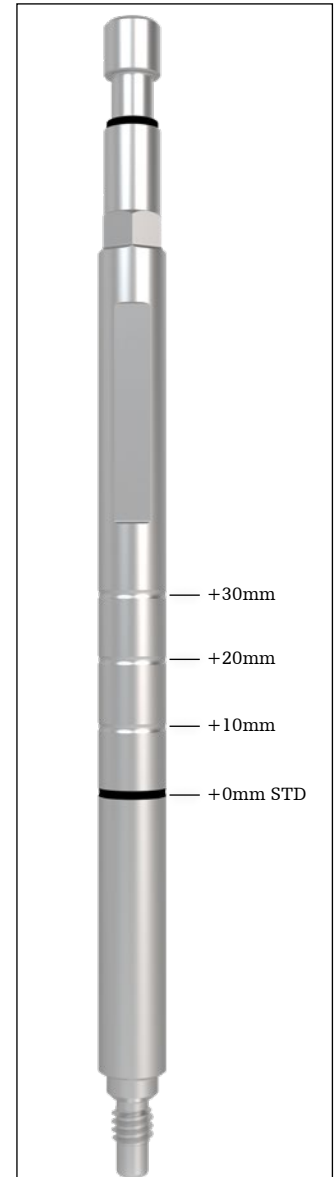


Figure 13

Impact the Conical Distal Stem into the femoral canal until the stem will not advance any further, achieving rotational stability and preventing subsidence. View the depth groove on the Distal Stem Impactor / Reaming Post. These will align with the tip of the greater trochanter and will determine which body length will be used (+0mm (STD), +10mm, +20mm, or +30mm) (**Figure 14**). Generally, the depth groove of the Distal Stem Impactor / Reaming Post corresponds to the measurement taken during preoperative templating, however, it may be one of the other levels.

Note: If when inserting the 12mm or 13mm stem it is observed that the stem sits proud and is not stable, it is recommended to remove the stem and re-introduce the Clear -Out Reamer to a depth 5mm deeper to remove any proximal bone that may potentially interfere with stem seating.

The Conical Distal Stem may advance further into the canal than originally templated and reamed. The Cone Body is available in four heights to help restore the proper leg length. If the distal stem advances beyond the +30mm Proximal Cone Body level, ream up with the next size distal reamer and insert the corresponding distal diameter stem.

Remove the Distal Stem Impactor Adapter by depressing on the gold colored button, leaving the Distal Stem Impactor / Reaming Post attached to the Conical Distal Stem (**Figure 15**). The Distal Stem Impactor / Reaming Post will act as a guidepost for proximal reaming.

Note: Depending on the bow of the femur, the trunnion of a Straight Conical Distal Stem may sit against the anterior femur upon insertion. The Bowed Conical Distal Stem is designed to move the trunnion off the anterior cortex in the same type of femur.

Optional - The Distal Stem Inserter (6278-1-200D) can be used to aid in version control when impacting the Conical Distal Stem.

Thread the appropriate Conical Distal Stem onto the Distal Stem Inserter. The distal end of the inserter has a hex geometry with a spring-loaded threaded end that mates with a corresponding geometry on the stem. Make sure the distal tip of the Distal Stem Inserter is correctly aligned with the hex orientation feature of the insertion hole of the implant. Fully and securely attach the instrument to the Conical Distal Stem by turning the locking knob clockwise.

Upon seating the Conical Distal Stem in the femoral canal, remove the Distal Stem Inserter by turning the locking knob counter-clockwise on top of the inserter. Thread the Distal Stem Impactor / Reaming Post to the Conical Distal Stem. The Distal Stem Impactor / Reaming Post will act as a guidepost for proximal reaming.



Figure 14

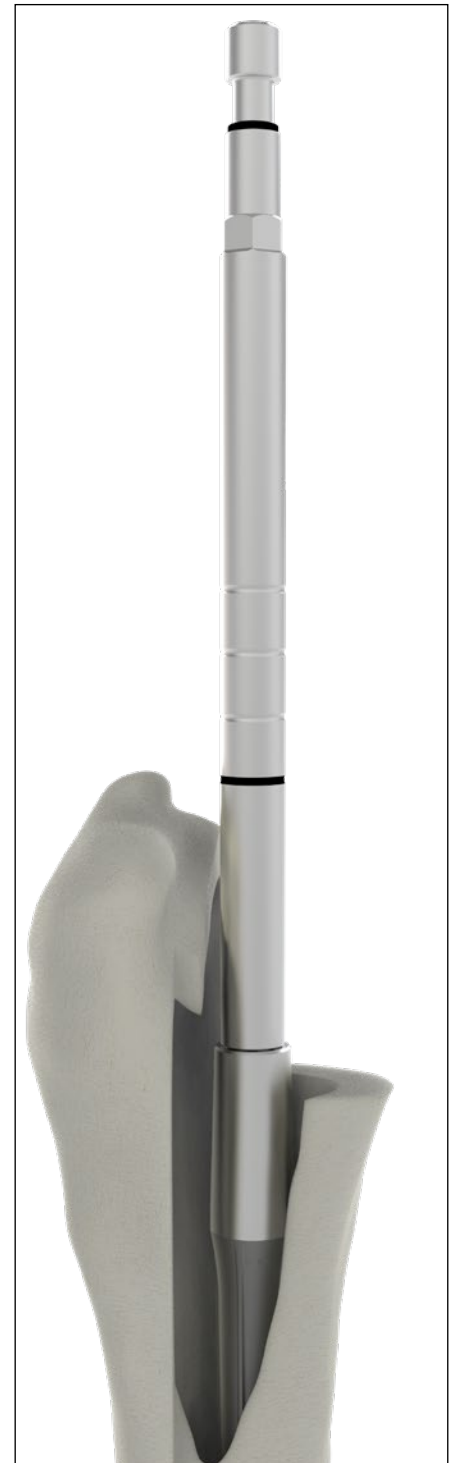


Figure 15

Cone Body preparation

The Cone Bodies are prepared by Proximal Cone Reamers which are available in 7 diameters: 19mm, 21mm, 23mm, 25mm, 27mm, 29mm, and 31mm. These diameters are measured at the most proximal level of the coating on the medial side of the Cone Body implant.

Make sure the Distal Stem Impactor / Reaming Post is fully seated and tightened to the distal stem. Starting with the 19mm Proximal Cone Reamer, commence proximal preparation for the Cone Body.

Caution: Failure to fully seat the Distal Stem Impactor / Reaming Post, or failure to fully bottom out the Proximal Cone Reamer on the Distal Stem Impactor / Reaming Post may prevent proper preparation of the bone for the Cone Body.

Proximal Cone Reaming

Attach the Proximal Cone Reamer to a power source and advance it over the Distal Stem Impactor / Reaming Post until it bottoms out on the post and it is impossible to advance the reamer further - visualize this by looking at the laser-marked alignment groove (on the Distal Stem Impactor / Reaming Post and Proximal Cone Reamer) or view the top of the proximal slot, which when fully seated, will show no gap between the Proximal Cone Reamer and the Distal Stem Impactor / Reaming Post (**Figure 16**).

Proximal Cone reaming progresses in 2mm increments until satisfactory contact within the trochanteric region is felt. Make note of the +0mm (STD), +10mm, +20mm, and +30mm reamer grooves, using the tip of the greater trochanter as the stopping point, since this will dictate the Cone Body height to be used (**Figure 17**). If another landmark is used, note that the Proximal Cone Reamer grooves generally correspond with the femoral head center.

Generally the depth groove of the Cone Reamer corresponds to the measurement taken during preoperative templating, however, it may be one of the other levels.

Note: The 12mm diameter stem is only compatible with a 19mm proximal body diameter and a maximum +5mm Head offset

The 13mm diameter stem is compatible with up to a maximum 23mm proximal body diameter.

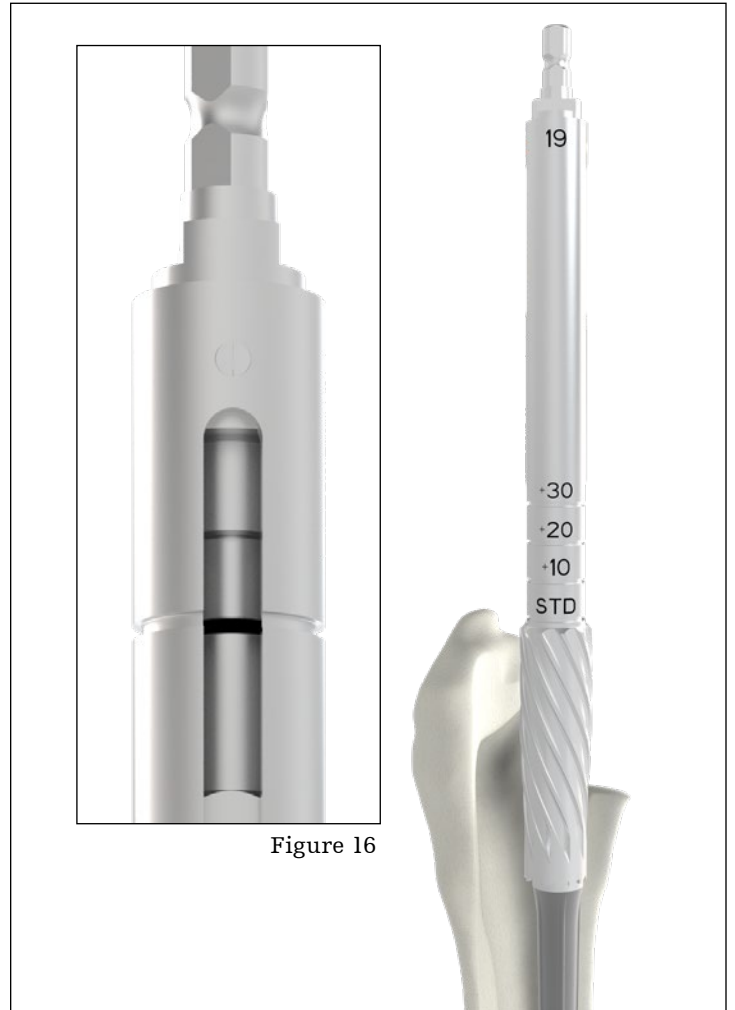


Figure 16

Figure 17

Cone Body Trial

Assemble the appropriate Cone Body Trial to Conical Distal Stem

Re-attach the Distal Stem Impactor Adapter and Orthonomic Modular Handle to the Distal Stem Impactor / Reaming Post. Unthread the Distal Stem Impactor / Reaming Post from the implanted Conical Distal Stem.

Select the Cone Body Trial corresponding to the final Proximal Cone Reamer diameter and proper height based on the reamer grooves. Assemble the 8mm Hex Locking Bolt Driver to the Orthonomic T-Handle. Position the appropriate Cone Body Trial with the integral locking bolt onto the Distal Stem. Determine the appropriate version for the Cone Body Trial and then tighten the locking bolt with the 8mm Hex Locking Bolt Driver (**Figure 18**). Excessive torque is not required.



Figure 18

Cone Body Trial (continued)

Attach Trial Head

Select the head diameter according to surgeon preference. The Femoral Head Trials have a circumferential groove, which identifies the level of the center of rotation. Select the desired neck length based on preoperative templating from the chart below. Attach the Femoral Head Trial to the Cone Body Trial (**Figure 19**).

Head	Head size	Head offsets
V40 Taper CoCr	22	+0, +3, +8
	26	-3, +0, +4, +8, +12
	28	-4, +0, +4, +8, +12
	32	-4, +0, +4, +8, +12
	36	-5, +0, +5, +10
	40	-4, +0, +4, +8, +12
	44	-4, +0, +4, +8, +12
V40 Taper Alumina Ceramic	28	-2.7, +0, +4
	32	-4, +0, +4
	36	-5, +0, +5
C-Taper Alumina Ceramic (when used with C-Taper Adaptor Sleeve-catalog #17-0000E)	28	-2.5, +0, +5
	32	-2.5, +0, +5
	36	-5, +0, +5
V40 Taper BIOLOX delta Ceramic	28	-4, -2.7, +0, +4
	32	-4, +0, +4
	36	-5, -2.5, +0, +2.5, +5, +7.5
C-Taper BIOLOX delta Ceramic (when used with C-Taper Sleeve - catalog #17-0000E)	28	-2.5, +0, +2.5, +5
	32	-2.5, +0, +2.5, +5
	36	-5, -2.5, +0, +2.5, +5, +7.5
Universal Taper BIOLOX delta Ceramic (when used with Universal Taper Sleeve - catalog #6519-T-XXX)	28	-2.5, +0, +4
	32	-2.5, +0, +4
	36	-2.5, +0, +4
	40	-2.5, +0, +4
	44	-2.5, +0, +4

Perform a trial reduction and assess the hip for stability, leg length, and overall range of motion. Adjust the Cone Body Trial as necessary to achieve maximum joint stability. Mark the desired anteversion on the bone with methylene blue or with a Bovie, in line with the neck. Carefully remove the Femoral Head Trial and Cone Body Trial.

If additional leg length is required, a longer proximal body may be used so long as the current trial is not a +30mm length body.

Additionally, if the trial reduction indicates that a Femoral Head with a “skirt” is required, it may be possible to increase the body height by 10mm and use a shorter Femoral Head to produce an equivalent neck length without using a “skirted” Femoral Head. This may be beneficial in increasing range of motion.



Figure 19



Figure 20

Note: If the Cone Body Trial becomes fixed in the canal, it may be removed with a bone hook or Trial Body Removal Device (Figure 20).

Cone Body insertion

Cone Body Impaction

Based on the trial reduction, select the appropriate height Cone Body implant. Lavage the area surrounding the proximal taper of the Conical Distal Stem. Wipe the Conical Distal Stem trunnion clean, and align the neck and trunnion of the Cone Body implant with the methylene blue marking, indicating the desired anteversion on the Conical Distal Stem trunnion. Attach the Orthonomic Modular Handle to the Modular Proximal Body Impactor. Attach the Modular Proximal Body Impactor to the Cone Body (**Figure 21**) and impact the Cone Body implant onto the trunnion of the Conical Distal Stem maintaining proper anteversion (**Figure 22**). The impaction of the Cone Body onto the trunnion of the Conical Distal Stem attaches the components with a taper lock.

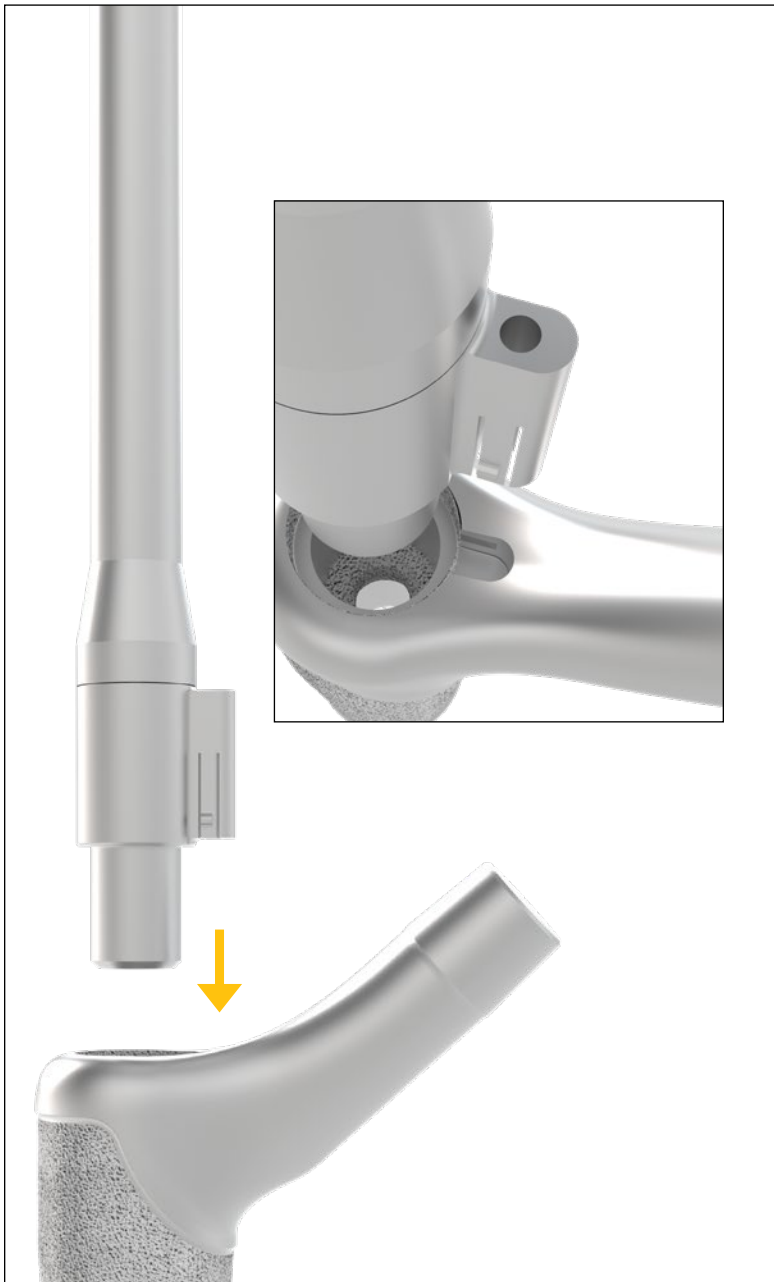


Figure 21



Figure 22

Locking Bolt assembly and tightening/ bone grafting

Locking Bolt assembly and tightening

Assemble the Modular Steady Handle / Head Impactor to the Orthonomic Modular Handle (**Figure 23**).

Note: Check the Modular Steady Handle / Head Impactor to make sure the plastic component is fully threaded to the metal component. Do not disassemble the plastic and metal components.

Assemble the 5mm Hex Locking Bolt Driver to the Orthonomic T-Handle. Place the Locking Bolt into the Cone Body and tighten the Locking Bolt with the 5mm Hex Locking Bolt Driver (**Figure 24**). Assemble the Torque Wrench and Torque Wrench Adapter, and apply a minimum of 150in-lb and a maximum of 180in-lb torque to ensure that the Locking Bolt is sufficiently tightened (**Figure 25**). The Modular Steady Handle / Head Impactor must be used to hold the anteversion of the Cone Body in place while applying torque. The Modular Steady Handle / Head Impactor assembles to the Cone Body neck and is designed to counter balance the torque applied to the bolt to help ensure that only the implant and not the femur is torqued.

IMPORTANT: A visual check should be made to make sure the proximal body is fully seated on the distal stem prior to tightening the locking bolt. For Cone Body sizes 21mm - 31mm, when the body and stem tapers are fully engaged, the entire head of the locking bolt will be seen 1mm - 2mm above the shoulder of the Cone Body (Figure 26**). For the 19mm Cone Body, when the body and stem tapers are fully engaged, the underside of the locking bolt engaged, the underside of the locking bolt head will be about 1mm below the shoulder of the Cone Body (**Figure 27**).**

Note: The Conical Distal Stems have Spirallock threads that are designed not to loosen if the Locking Bolt is sufficiently tightened. The Spirallock thread form is designed to: reduce vibration loosening, provide a more uniform load distribution, reduce stress concentration, reduce fatigue failure, and eliminate the need for additional locking devices such as end caps.

Bone Grafting

Femoral deficiencies should be planned for and appropriately addressed as discussed in the preoperative planning part of this protocol. If the femoral cortex above the diaphyseal stem fixation point is deficient, the surgeon should be prepared to apply cortical strut grafts to repair and strengthen the femur.

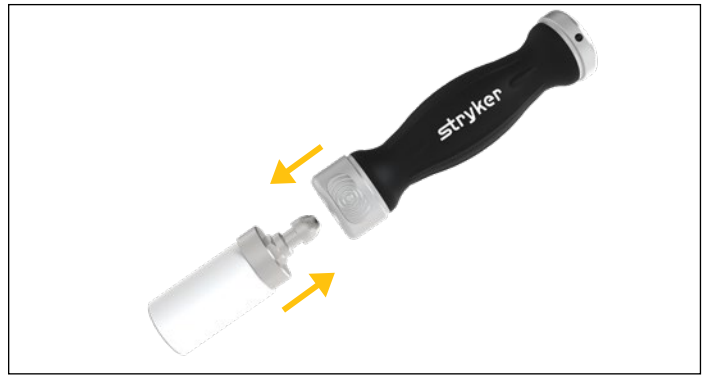


Figure 23



Figure 24



Figure 25

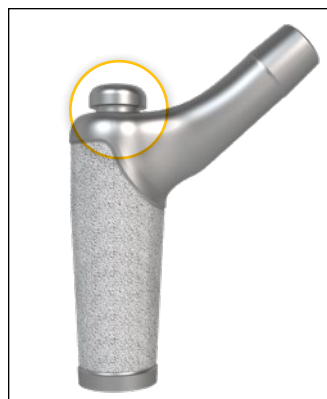


Figure 26
Cone Body Sizes 21mm-31mm

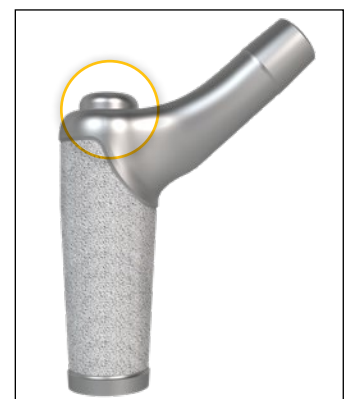


Figure 27
Cone Body Size 19mm

Final Trial Reduction

Attach Head Trial

Select the head diameter according to surgeon preference. The Femoral Head Trials have a circumferential groove, which identifies the level of the center of rotation (**Figure 28**). Select the desired Femoral Head Trial based on trial reduction from the chart below. Attach the Femoral Head Trial to the Cone Body. The head center of the Femoral Head Trial, when attached to the implant construct, should correspond with the tip of the greater trochanter.

At this point, a final trial reduction can be performed using the attached Femoral Head Trial.

Head	Head size	Head offsets
V40 Taper CoCr	22	+0, +3, +8
	26	-3, +0, +4, +8, +12
	28	-4, +0, +4, +8, +12
	32	-4, +0, +4, +8, +12
	36	-5, +0, +5, +10
	40	-4, +0, +4, +8, +12
	44	-4, +0, +4, +8, +12
V40 Taper Alumina Ceramic	28	-2.7, +0, +4
	32	-4, +0, +4
	36	-5, +0, +5
C-Taper Alumina Ceramic (when used with C-Taper Adaptor Sleeve - catalog #17-0000E)	28	-2.5, +0, +5
	32	-2.5, +0, +5
	36	-5, +0, +5
V40 Taper BIOLOX delta Ceramic	28	-4, -2.7, +0, +4
	32	-4, +0, +4
	36	-5, -2.5, +0, +2.5, +5, +7.5
C-Taper BIOLOX delta Ceramic (when used with C-Taper Sleeve - catalog #17-0000E)	28	-2.5, +0, +2.5, +5
	32	-2.5, +0, +2.5, +5
	36	-5, -2.5, +0, +2.5, +5, +7.5
Universal Taper BIOLOX delta Ceramic (when used with Universal Taper Sleeve - catalog #6519-T-XXX)	28	-2.5, +0, +4
	32	-2.5, +0, +4
	36	-2.5, +0, +4
	40	-2.5, +0, +4
	44	-2.5, +0, +4

Impact Head onto Cone Body Trunnion

Select the appropriate corresponding V40 Femoral Head (CoCr, Alumina Ceramic, Biolox delta Ceramic) or sleeve and place it onto the clean, dry trunnion of the femoral stem with a slight twist. Impact the head with moderate impactions in line with the neck using the Modular Steady Handle / Head Impactor. (**Figure 29**).

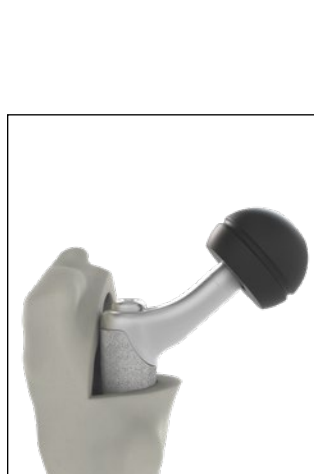


Figure 28



Figure 29

Optional Step: When selecting a BIOLOX delta Universal Taper Ceramic Femoral Head (6519-1-0xx) for implantation, use of a Universal Adaptor Sleeve is necessary.

Catalog No.	Offset (mm)	Taper
6519-T-025	-2.5	V40
6519-T-100	+0	V40
6519-T-204	+4	V40

After completing the trialing process, intra-operatively assemble the adaptor sleeve to the femoral stem manually. The Universal Adaptor Sleeve must be fully seated on the stem taper before the head is assembled.

Note: In no instance should any attempt be made to pre-assemble the adaptor sleeve inside the BIOLOX delta Universal Ceramic Head.

Intra-operatively assemble the BIOLOX delta Universal Taper Ceramic Head onto the sleeved femoral stem and set with moderate impactions in line with the neck using the Modular Steady Handle / Head Impactor. Care must be taken to avoid excessive impact forces when assembling the Ceramic Head to the sleeved femoral component.

Reduce Joint and Close

Relocate the Femoral Head into the acetabular cup and check the stability and range of motion. The surgical site is then closed according to the standard procedure for the surgical approach chosen.

Postoperative Care

Postoperative care should progress according to surgeon preference and recommendation.

Restoration Modular Cone Body/Conical Distal Stem Removal

If new components are to be disassembled during surgery (i.e., to readjust version), inspect the proximal body and distal stem closely for damage prior to re-impacting the body onto the distal stem. If the proximal body or distal stem shows damage, do not reuse the components but instead re-implant new, undamaged components.

Note: The Locking Bolt must be removed prior to using stem removal instruments. The Locking Bolt can be removed using the 5mm Hex Locking Bolt Driver (Figure 30).

Cone Body Removal

The Body/Stem Separator is made up of three parts: Jackscrew, Puller, and a reverse-thread Chuck Adapter (Figure 31). Two Quick Connect Handles are used with the Body/Stem Separator, which assist in counter-rotation when tightening with the Orthonomic T-Handle.

Unthread the Jackscrew completely from the Puller prior to inserting through the Cone Body. Ensure that the Chuck Adapter is fully threaded into the Puller, keeping in mind that the Chuck Adapter and Puller are reverse-threaded. Insert the Puller/Chuck Adapter assembly through the Cone Body until the Chuck Adapter is fully inserted. An audible click will be heard along with a decrease in resistance upon full insertion.

Thread the Jackscrew through the Puller/Chuck Adapter by hand until the Jackscrew cannot be advanced further. Insert the Quick Connect Handle(s) into the upper hub of the Puller. The Quick Connect Handles are spring-loaded and will engage when rotated to the correct position. Assemble the Orthonomic T-Handle to the Jackscrew and turn the Orthonomic T-Handle until the Cone Body disengages from the distal stem (Figure 32).

Note: If the Body / Stem Separator fails to disengage the proximal body from the distal stem, unthread the Jackscrew completely and thread the McReynolds Proximal Body Adapter through the Puller / Chuck Adapter. Attach the McReynolds Slap Hammer Assembly to the McReynolds Proximal Body Adapter and use the slap hammer to remove the components

Note: In order to remove the body from the Puller assembly, remember that the Chuck Adapter is a reverse-thread, and must be completely removed from the assembly to release the body.



Figure 30



Figure 31



Figure 32

Restoration Modular Cone Body/Conical Distal Stem Removal (continued)

Distal Stem Removal

Assemble the McReynolds Adapter to the McReynolds Driver-Extractor Assembly. Thread the McReynolds Adapter into the insertion feature of the Conical Distal Stem (**Figure 33**). Use the Sliding Hammer to remove the Conical Distal Stem from the canal.

Note: Do not use the Distal Stem Impactor / Reaming Post or Conical Distal Stem Trial Impactor for removal of the Conical Distal Stem implant.

Removal of the Restoration Modular Cone Body/ Conical Distal Stem Assembly

The McReynolds Adapter/McReynolds Driver-Extractor assembly may be threaded through the Cone Body into the distal stem to remove the entire stem assembly. Use the Sliding Hammer to remove the stem assembly from the canal (**Figure 34**).

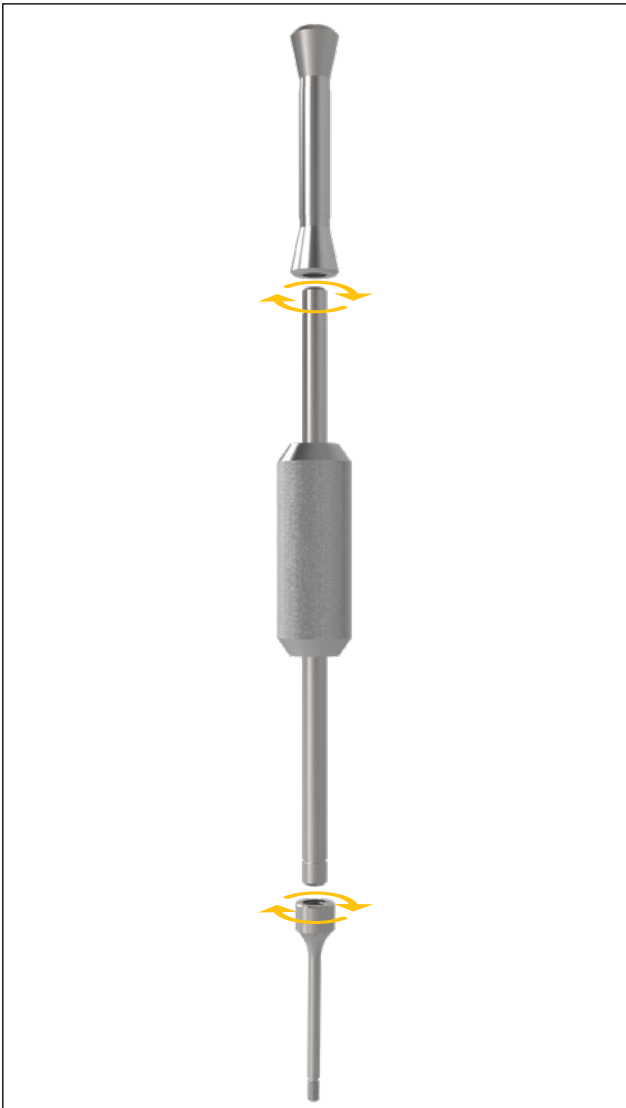


Figure 33



Figure 34

Cone Bodies



Cone Bodies	
Catalog No.	Size
6276-1-019	19mm +0mm (STD)
6276-1-119	19mm +10mm
6276-1-219	19mm +20mm
6276-1-319	19mm +30mm
6276-1-021	21mm +0mm (STD)
6276-1-121	21mm +10mm
6276-1-221	21mm +20mm
6276-1-321	21mm +30mm
6276-1-023	23mm +0mm (STD)
6276-1-123	23mm +10mm
6276-1-223	23mm +20mm
6276-1-323	23mm +30mm
6276-1-025	25mm +0mm (STD)
6276-1-125	25mm +10mm
6276-1-225	25mm +20mm
6276-1-325	25mm +30mm
6276-1-027	27mm +0mm (STD)
6276-1-127	27mm +10mm
6276-1-227	27mm +20mm
6276-1-327	27mm +30mm
6276-1-029	29mm +0mm (STD)
6276-1-129	29mm +10mm
6276-1-229	29mm +20mm
6276-1-329	29mm +30mm
6276-1-031	31mm +0mm (STD)
6276-1-131	31mm +10mm
6276-1-231	31mm +20mm
6276-1-331	31mm +30mm

Conical Distal Stems



Conical Distal Stems-Straight	
Catalog No.	Size
6276-7-014	14mm x 155mm
6276-7-015	15mm x 155mm
6276-7-016	16mm x 155mm
6276-7-017	17mm x 155mm
6276-7-018	18mm x 155mm
6276-7-019	19mm x 155mm
6276-7-020	20mm x 155mm
6276-7-021	21mm x 155mm
6276-7-022	22mm x 155mm
6276-7-023	23mm x 155mm
6276-7-024	24mm x 155mm
6276-7-025	25mm x 155mm
6276-7-026	26mm x 155mm
6276-7-027	27mm x 155mm
6276-7-028	28mm x 155mm

Conical Distal Stems-Straight	
Catalog No.	Size
6276-7-114	14mm x 195mm
6276-7-115	15mm x 195mm
6276-7-116	16mm x 195mm
6276-7-117	17mm x 195mm
6276-7-118	18mm x 195mm
6276-7-119	19mm x 195mm
6276-7-120	20mm x 195mm
6276-7-121	21mm x 195mm
6276-7-122	22mm x 195mm
6276-7-123	23mm x 195mm
6276-7-124	24mm x 195mm
6276-7-125	25mm x 195mm
6276-7-126	26mm x 195mm
6276-7-127	27mm x 195mm
6276-7-128	28mm x 195mm

Conical Distal Stems - Straight	
Catalog No.	Size
6276-7-412	12mm x 115mm
6276-7-413	13mm x 115mm
6276-7-414	14mm x 115mm
6276-7-415	15mm x 115mm
6276-7-416	16mm x 115mm
6276-7-417	17mm x 115mm
6276-7-418	18mm x 115mm
6276-7-419	19mm x 115mm
6276-7-420	20mm x 115mm
6276-7-421	21mm x 115mm
6276-7-422	22mm x 115mm
6276-7-423	23mm x 115mm

Conical Distal Stems-Bowed	
Catalog No.	Size
6276-7-214	14mm x 195mm
6276-7-215	15mm x 195mm
6276-7-216	16mm x 195mm
6276-7-217	17mm x 195mm
6276-7-218	18mm x 195mm
6276-7-219	19mm x 195mm
6276-7-220	20mm x 195mm
6276-7-221	21mm x 195mm
6276-7-222	22mm x 195mm
6276-7-223	23mm x 195mm
6276-7-224	24mm x 195mm
6276-7-225	25mm x 195mm
6276-7-226	26mm x 195mm
6276-7-227	27mm x 195mm
6276-7-228	28mm x 195mm

Conical Distal Stems-Bowed	
Catalog No.	Size
6276-7-314	14mm x 235mm
6276-7-315	15mm x 235mm
6276-7-316	16mm x 235mm
6276-7-317	17mm x 235mm
6276-7-318	18mm x 235mm
6276-7-319	19mm x 235mm
6276-7-320	20mm x 235mm
6276-7-321	21mm x 235mm
6276-7-322	22mm x 235mm
6276-7-323	23mm x 235mm
6276-7-324	24mm x 235mm
6276-7-325	25mm x 235mm
6276-7-326	26mm x 235mm
6276-7-327	27mm x 235mm
6276-7-328	28mm x 235mm

Restoration Modular Revision Hip System: surgical protocol

Stryker Orthopaedics has validated the following reusable instrument trays with Aesculap's SterilContainer System and with CSR wrap. Refer to LSTPI-B (Instructions for Cleaning, Sterilization, Inspection, and Maintenance of Reusable Medical Devices).

Part No.	Description
6147-0-100	Universal Lid
6278-9-700	Restoration Modular General Instruments Tray
6278-9-701	Restoration Modular Auxiliary Instruments Tray
6278-9-702	Restoration Modular Extraction Instruments Tray
6278-9-703	Restoration Modular Conical Distal Reamer Tray (10mm -17mm)
6278-9-704	Restoration Modular Conical Distal Reamer Tray (18mm - 23mm)
6278-9-705	Restoration Modular Conical Distal Reamer Tray (24mm -28mm)
6278-9-706	Restoration Modular Proximal Cone Reamers Tray (19mm-31mm)
6278-9-708	Restoration Modular Conical Distal Stem Trials Tray 115mm
6278-9-805	Restoration Modular Cone Body Trials Tray #1 (19mm-25mm)
6278-9-806	Restoration Modular Cone Body Trials Tray #2 (27mm-31mm)

Restoration Modular General Instruments Tray 6278-9-700

Part No.	Description
6264-8-032R	-4mm offset, 32mm dia. FEM Head Trial
6264-8-132R	+0mm offset, 32mm dia. FEM Head Trial
6264-8-232R	+4mm offset, 32 mm dia. FEM Head Trial
6264-8-332R	+8mm offset, 32mm dia. FEM Head Trial
6264-8-432R	+12mm offset, 32mm dia. FEM Head Trial
6264-8-632R	-2.5mm offset, 32mm dia. FEM Head Trial
6264-8-036R	-5mm offset, 36mm dia. FEM Head Trial
6264-8-136R	+0mm offset, 36mm dia. FEM Head Trial
6264-8-236R	+5mm offset, 36mm dia. FEM Head Trial
6264-8-336R	+10mm offset, 36mm dia. FEM Head Trial
6264-8-436R	-2.5mm offset, 36mm dia. FEM Head Trial
6264-8-536R	+2.5mm offset, 36mm dia. FEM Head Trial
6264-8-736R	+7.5mm offset, 36mm dia. FEM Head Trial
6264-8-040R	-4mm offset, 40mm dia. FEM Head Trial
6264-8-140R	+0mm offset, 40mm dia. FEM Head Trial
6264-8-240R	+4mm offset, 40mm dia. FEM Head Trial
6264-8-340R	+8mm offset, 40mm dia. FEM Head Trial
6264-8-440R	+12mm offset, 40mm dia. FEM Head Trial
6264-8-940R	-2.5mm offset, 40mm dia. FEM Head Trial
6278-1-360	Modular Proximal Body Impactor
1020-2900	Orthonomic Modular Handle
6278-1-300	Distal Stem Impactor / Reaming Post
6278-1-310	Distal Stem Impactor Adapter
6278-1-070	Modular Steady Handle / Head Impactor
1101-2200	Orthonomic T-Handle
6278-9-050	Trial Body Removal Device

Restoration Modular Auxiliary Instruments Tray 6278-9-701

Part No.	Description
6278-1-200D	Distal Stem Inserter
6278-8-100	Conical Distal Stem Trial Impactor
6278-9-090	Large T-Handle
6278-1-150	Neck Resection Guide
1601-1210	Modular Box Osteostome

Restoration Modular Extraction Instruments Tray 6278-9-702

Part No.	Description
6869-1-000	Shaft - McReynolds Driver / Extractor
6869-2-000	Driving Handle McReynolds Driver / Extractor
6869-3-000	Sliding Hammer - McReynolds Driver / Extractor
6260-4-090	McReynolds Adapter
8000-0000	Quick Connect Handle (2)
6278-9-070	Body / Stem Separator
6278-9-080	McReynolds Proximal Body Adapter

Restoration Modular Conical Distal Reamer Tray (10mm-17mm) 6278-9-703

Part No.	Description
6278-8-310	10mm Conical Starter Reamer
6278-8-311	11mm Conical Distal Reamer
6278-8-312	12mm Conical Distal Reamer
6278-8-313	13mm Conical Distal Reamer
6278-8-314	14mm Conical Distal Reamer
6278-8-315	15mm Conical Distal Reamer
6278-8-316	16mm Conical Distal Reamer
6278-8-317	17mm Conical Distal Reamer
6278-5-600	Clear-Out Reamer

Restoration Modular Conical Distal Reamer Tray (18mm-23mm) 6278-9-704

Part No.	Description
6278-8-318	18mm Conical Distal Reamer
6278-8-319	19mm Conical Distal Reamer
6278-8-320	20mm Conical Distal Reamer
6278-8-321	21mm Conical Distal Reamer
6278-8-322	22mm Conical Distal Reamer
6278-8-323	23mm Conical Distal Reamer

Restoration Modular Conical Distal Reamer Tray (24mm-28mm) 6278-9-705

Part No.	Description
6278-8-324	24mm Conical Distal Reamer
6278-8-325	25mm Conical Distal Reamer
6278-8-326	26mm Conical Distal Reamer
6278-8-327	27mm Conical Distal Reamer
6278-8-328	28mm Conical Distal Reamer

Restoration Modular Proximal Cone Reamers Tray (19mm-31mm) 6278-9-706

Part No.	Description
6278-1-519	19mm Proximal Cone Reamer
6278-1-521	21mm Proximal Cone Reamer
6278-1-523	23mm Proximal Cone Reamer
6278-1-525	25mm Proximal Cone Reamer
6278-1-527	27mm Proximal Cone Reamer
6278-1-529	29mm Proximal Cone Reamer
6278-1-531	31mm Proximal Cone Reamer
6278-5-100	5mm Locking Bolt Driver
6278-5-120	8mm Locking Bolt Driver
6260-4-080	Torque Wrench Adapter
6060-2-640	Torque Wrench

Restoration Modular Cone Body Trials Tray #1 (19mm - 25mm) 6278-9-805

Part No.	Description
6278-1-019	19mm +0mm (STD) Cone Body Trial
6278-1-119	19mm +10mm Cone Body Trial
6278-1-219	19mm +20mm Cone Body Trial
6278-1-319	19mm +30mm Cone Body Trial
6278-1-021	21mm +0mm (STD) Cone Body Trial
6278-1-121	21mm +10mm Cone Body Trial
6278-1-221	21mm +20mm Cone Body Trial
6278-1-321	21mm +30mm Cone Body Trial
6278-1-023	23mm +0mm (STD) Cone Body Trial
6278-1-123	23mm +10mm Cone Body Trial
6278-1-223	23mm +20mm Cone Body Trial
6278-1-323	23mm +30mm Cone Body Trial
6278-1-025	25mm +0mm (STD) Cone Body Trial
6278-1-125	25mm +10mm Cone Body Trial
6278-1-225	25mm +20mm Cone Body Trial
6278-1-325	25mm +30mm Cone Body Trial

Restoration Modular Cone Body Trial Tray #2 (27mm - 31mm) 6278-9-806

Part No.	Description
6278-1-027	27mm +0mm (STD) Cone Body Trial
6278-1-127	27mm +10mm Cone Body Trial
6278-1-227	27mm +20mm Cone Body Trial
6278-1-327	27mm +30mm Cone Body Trial
6278-1-029	29mm +0mm (STD) Cone Body Trial
6278-1-129	29mm +10mm Cone Body Trial
6278-1-229	29mm +20mm Cone Body Trial
6278-1-329	29mm +30mm Cone Body Trial
6278-1-031	31mm +0mm (STD) Cone Body Trial
6278-1-131	31mm +10mm Cone Body Trial
6278-1-231	31mm +20mm Cone Body Trial
6278-1-331	31mm +30mm Cone Body Trial

Restoration Modular Conical Distal Stem Trials Tray 115mm 6278-9-708

Part No.	Description
6278-8-412	12mm X 115mm Conical Distal Stem Trial
6278-8-413	13mm x 115mm Conical Distal Stem Trial
6278-8-414	14mm x 115mm Conical Distal Stem Trial
6278-8-415	15mm x 115mm Conical Distal Stem Trial
6278-8-416	16mm x 115mm Conical Distal Stem Trial
6278-8-417	17mm x 115mm Conical Distal Stem Trial
6278-8-418	18mm x 115mm Conical Distal Stem Trial
6278-8-419	19mm x 115mm Conical Distal Stem Trial
6278-8-420	20mm x 115mm Conical Distal Stem Trial
6278-8-421	21mm x 115mm Conical Distal Stem Trial
6278-8-422	22mm x 115mm Conical Distal Stem Trial
6278-8-423	23mm x 115mm Conical Distal Stem Trial

Femoral head implants & trials: BIOLOX delta Ceramic

V40 Taper BIOLOX delta Ceramic Heads

Catalog no.	Diameter (mm)	Offset (mm)	Trial catalog no.
6570-0-028	28	-4	6264-8-028R
6570-0-328	28	-2.7	6264-8-928R
6570-0-128	28	+0	6264-8-128R
6570-0-228	28	+4	6264-8-228R
6570-0-032	32	-4	6264-8-032R
6570-0-132	32	+0	6264-8-132R
6570-0-232	32	+4	6264-8-232R

V40 Taper BIOLOX delta Ceramic Anatomic Heads

Catalog no.	Diameter (mm)	Offset (mm)	Trial catalog no.
6570-0-036	36	-5	6264-8-036R
6570-0-436	36	-2.5	6264-8-436R
6570-0-136	36	+0	6264-8-136R
6570-0-536	36	+2.5	6264-8-536R
6570-0-236	36	+5	6264-8-236R
6570-0-736	36	+7.5	6264-8-736R

Universal Taper BIOLOX delta Ceramic Heads*

Catalog no.	Diameter (mm)	Offset (mm)
6519-1-028	28	-2.5, 0, +4
6519-1-032	32	-2.5, 0, +4
6519-1-036	36	-2.5, 0, +4
6519-1-040	40	-2.5, 0, +4
6519-1-044	44	-2.5, 0, +4

Universal Adapter V40 Sleeves - Titanium

Catalog no.	Offset (mm)
6519-T-025	-2.5
6519-T-100	+0
6519-T-204	+4

Additional Universal V40 Trial Heads

Catalog no.	Diameter (mm)	Offset (mm)
6264-8-728R	28	-2.5
6264-8-632R	32	-2.5
6264-8-436R	36	-2.5
6264-8-940R	40	-2.5
6264-8-944R	44	-2.5

*Must be used with Universal Adapter Sleeve, catalog # 6519-T-XXX

C-Taper BIOLOX delta Ceramic Heads**

Catalog no.	Diameter (mm)	Offset (mm)
18-28-3	28	-2.5
18-2800	28	+0
18-2825	28	+2.5
18-2805	28	+5
18-32-3	32	-2.5
18-3200	32	+0
18-3225	32	+2.5
18-3205	32	+5

**Must be used with a C-Taper Sleeve catalog #17-0000E.

C-Taper BIOLOX delta Ceramic Anatomic Heads**

Catalog no.	Diameter (mm)	Offset (mm)
18-36-5	36	-5
18-36-3	36	-2.5
18-3600	36	+0
18-3625	36	+2.5
18-3605	36	+5
18-3675	36	+7.5

**Must be used with a C-Taper Sleeve catalog #17-0000E.

Femoral head implants & trials: Alumina Ceramic

V40 Taper Alumina Ceramic Heads

Catalog no.	Diameter (mm)	Offset (mm)	Trial catalog no.
6565-0-028	28	-2.7	6264-8-928R
6565-0-128	28	+0	6264-8-128R
6565-0-228	28	+4	6264-8-228R
6565-0-032	32	-4	6264-8-032R
6565-0-132	32	+0	6264-8-132R
6565-0-232	32	+4	6264-8-232R
6565-0-036	36	-5	6264-8-036R
6565-0-136	36	+0	6264-8-136R
6565-0-236	36	+5	6264-8-236R

C-Taper Alumina Ceramic Heads*

Catalog no.	Diameter (mm)	Offset (mm)
17-28-3E	28	-2.5
17-2800E	28	+0
17-2805E	28	+5
17-32-3E	32	-2.5
17-3200E	32	+0
17-3205E	32	+5
17-36-5E	36	-5
17-3600E	36	+0
17-3605E	36	+5

*Must be used with a C-Taper Sleeve catalog #17-0000E.

Femoral head implants & trials: CoCr

V40 Taper LFIT Heads

Catalog no.	Diameter (mm)	Offset (mm)	Trial catalog no.
6260-9-122	22	+0	6264-8-122R
6260-9-222	22	+3	6264-8-222R
6260-9-322	22	+8	6264-8-322R
6260-9-026	26	-3	6264-8-026R
6260-9-126	26	+0	6264-8-126R
6260-9-226	26	+4	6264-7-226R
6260-9-326	26	+8	6264-8-326R
6260-9-426	26	+12	6264-8-426R
6260-9-028	28	-4	6264-8-028R
6260-9-128	28	+0	6264-8-128R
6260-9-228	28	+4	6264-8-228R
6260-9-328	28	+8	6264-8-328R
6260-9-428	28	+12	6264-8-428R
6260-9-032	32	-4	6264-8-032R
6260-9-132	32	+0	6264-8-132R
6260-9-232	32	+4	6264-8-232R
6260-9-332	32	+8	6264-8-332R
6260-9-432	32	+12	6264-8-432R

V40 Taper LFIT Anatomic Heads

Catalog no.	Diameter (mm)	Offset (mm)	Trial catalog no.
6260-9-036	36	-5	6264-8-036R
6260-9-136	36	+0	6264-8-136R
6260-9-236	36	+5	6264-8-236R
6260-9-336	36	+10	6264-8-336R
6260-9-040	40	-4	6264-8-040R
6260-9-140	40	+0	6264-8-140R
6260-9-240	40	+4	6264-8-240R
6260-9-340	40	+8	6264-8-340R
6260-9-440	40	+12	6264-8-440R
6260-9-044	44	-4	6264-8-044R
6260-9-144	44	+0	6264-8-144R
6260-9-244	44	+4	6264-8-244R
6260-9-344	44	+8	6264-8-344R
6260-9-444	44	+12	6264-8-444R

V40 Vitallium

Catalog no.	Diameter (mm)	Offset (mm)	Trial catalog no.
6260-4-122	22	+0	6264-8-122R
6260-4-222	22	+3	6264-8-222R
6260-4-322	22	+8	6264-8-322R
6260-5-026	26	-3	6264-8-026R
6260-5-126	26	+0	6264-8-126R
6260-5-226	26	+4	6264-7-226R
6260-5-326	26	+8	6264-8-326R
6260-5-426	26	+12	6264-8-426R
6260-5-028	28	-4	6264-8-028R
6260-5-128	28	+0	6264-8-128R
6260-5-228	28	+4	6264-8-228R
6260-5-328	28	+8	6264-8-328R
6260-5-428	28	+12	6264-8-428R
6260-5-032	32	-4	6264-8-032R
6260-5-132	32	+0	6264-8-132R
6260-5-232	32	+4	6264-8-232R
6260-5-332	32	+8	6264-8-332R
6260-5-432	32	+12	6264-8-432R

Joint Replacement

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