stryker®

Trident® Acetabular System

PSL Surgical Protocol

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Indications for Trident Ceramic Insert with Ceramic Head

Primary or revision hip arthroplasty due to:

- Non-inflammatory degenerative arthritis (osteoarthritis, avascular necrosis, traumatic arthritis, slipped capital epiphysis, pelvic fracture, failed fracture fixation, or diastrophic variant), or
- Inflammatory joint disease.

Contraindications for Trident Ceramic Insert with Ceramic Head

- Any active or suspected latent infection in or about the hip joint.
- Any mental or neuromuscular disorder which would create an unacceptable risk of prosthesis instability, prosthesis fixation failure, or complications in postoperative care.
- Bone stock compromised by disease, infection, or prior implantation which cannot provide adequate support and/or fixation to the prosthesis.
- Skeletal immaturity.

Indications for Trident Polyethylene Insert with Metal or Ceramic Head

- Painful, disabling joint disease of the hip resulting from: degenerative arthritis, rheumatoid arthritis, post-traumatic arthritis or late stage avascular necrosis.
- Revision of previous unsuccessful femoral head replacement, cup arthroplasty or other procedure.
- Clinical management problems where arthrodesis or alternative reconstructive techniques are less likely to achieve satisfactory results.
- Where bone stock is of poor quality or inadequate for other reconstructive techniques as indicated by deficiencies of the acetabulum.

Contraindications for Trident Polyethylene Insert with Metal or Ceramic Head

- Any active or suspected latent infection in or about the hip joint.
- Any mental or neuromuscular disorder which would create an unacceptable risk of prosthesis instability, prosthesis fixation failure, or complications in postoperative care.
- Bone stock compromised by disease, infection or prior implantation which cannot provide adequate support and/or fixation to the prosthesis.
- Skeletal immaturity.

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

Before using 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 the following GreatBatch IFUs: MAN-000020, and MAN-000026.

For Trident Polyethylene and Alumina Ceramic Inserts with PSL Acetabular Shells

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Introduction

The Trident Acetabular System utilizes the Cutting*Edge* Total Hip Acetabular Instrumentation. This surgical technique is a guide to preparing the acetabulum for the Trident PSL Acetabular System Implants utilizing a single set of acetabular instruments.

The Trident PSL Acetabular System is a two-piece component design that is assembled during surgery. Trident PSL HA Acetabular Shells provide a 1.8mm peripheral press-fit. The true Trident PSL shape is designed to achieve a 1.0-1.8mm interference fit. Trident PSL shells have a 1.8mm oversize periphery (e.g., 52mm shell = 53.8mm periphery at the rim of the shell).

Reference the Trident Acetabular System Compatibility Table for sizing options (**TABLE 1**).

The Trident Acetabular System utilizes the patented Innerchange Locking Mechanism. This unique locking mechanism helps provide a secure interface between the ceramic or polyethylene insert and the shell.

Trident Alumina Ceramic Inserts gain fixation within the shell by means of mating tapers. Rotational stability between the components is achieved when the shell's anti-rotational barbs interlock with the insert scallops. **The Trident Alumina Ceramic Inserts must exclusively be used with Stryker Orthopaedics Alumina Heads.**

The Trident Polyethylene Inserts lock into the shell by means of a circumferential ring that engages the shell's mating groove. Rotational stability is achieved when the shell's anti-rotational barbs interlock with the insert scallops.

TABLE 1: Compatibility Table

Femoral Head, X3 Liner and Cup Compatibility Chart											
Shell Size, Liner Alpha Code, and Liner Thickness (mm) for Standard Liners											
Trident PSL Shell		**40**	**42**	**44**	**46, 48**	**50, 52**	**54, 56**	**58, 60**	**62, 64**	**66, 68**	**70, 72**
Trident Hemispherical Shell		**42**	**44**	**46**	**48, 50**	**52, 54**	**56, 58**	**60, 62**	**64, 66**	**68, 70**	**72, 74**
Tritanium Hemispherical Shell		**44**	**46**	**48**	**50, 52**	**54, 56**	**58, 60**	**62, 64**	**66, 68**	**70, 72**	**74 - 80**
Liner Alpha Code		**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Anatomic Femoral Heads	44mm						3.8	5.4	7.1	8.6	10.6
	40mm					3.8	5.8	7.4	9.1	10.6	12.6
	36mm				3.9	5.9	7.9	9.4	11.2	12.7	14.7
Femoral Heads	32mm		3.9	4.9	5.9	7.9	9.9	11.4	13.2	14.7	16.7
	28mm	4.9	5.9	6.9	7.9	9.9	11.9	13.4	15.2	16.7	18.7
	26mm			7.9	8.9	10.9	12.9	14.4	16.2	17.7	19.7
	22mm	7.8	8.8	9.8	10.8	12.8	14.8	16.3	18.1	19.6	21.6

Trident PSL Acetabular Shell							
Alpha Code	**Trident PSL HA Shell Size (mm)**	**Trident 0°, 10° Inserts (mm)**	**Trident Eccentric 0°, 10° Inserts (mm)**	**Trident Alumina 0° Inserts (mm)**	**Trident Elevated Rim Inserts (mm)**	**Trident 0° Constrained Inserts (mm)**	**Trident 10° Constrained Inserts (mm)**
A	40	22, 28**	–	–	–	–	–
B	42	22, 28**, 32**	28*	–	–	–	–
C	44	22, 26, 28, 32**	28	–	28	–	–
D	46, 48	22, 26, 28, 32, 36**	28, 32	28	28	22	–
E	50, 52	22, 26, 28, 32, 36, 40**	28, 32, 36	32	28, 32, 36	22	22
F	54, 56	22, 26, 28, 32, 36, 40**, 44**	28, 32, 36	32	28, 32, 36	28	22
G	58, 60	22, 26, 28, 32, 36, 40**, 44**	28, 32, 36	36	28, 32, 36	28	28
H	62, 64	22, 26, 28, 32, 36, 40**, 44**	28, 32, 36	36	28, 32, 36	32	28
I	66, 68	22, 26, 28, 32, 36, 40**, 44**	28, 32, 36	36	28, 32, 36	32	28
J	70, 72	22, 26, 28, 32, 36, 40**, 44**	28, 32, 36	–	28, 32, 36	32	28

NOTE: Refer to Tritanium Primary Acetabular System Surgical Protocol, TRITAN-SP-2, when implanting Tritanium Primary Hemispherical Acetabular Shells.

* Available in 0° only.
** Available in X3 only and 0° only.

Trident PSL HA Acetabular Shell

X3 Polyethylene Insert

LFIT CoCr† Femoral Head

BIOLOX *delta*† Ceramic Femoral Head

BIOLOX *delta*† Anatomic Ceramic Femoral Head with Universal Adapter Sleeve

Trident Alumina Ceramic Insert

Alumina Ceramic Femoral Head

† For use with Polyethylene Inserts only

Step 1: Preoperative Planning and X-ray Evaluation

Preoperative planning and X-ray evaluation aids in the selection of the most favorable implant style and optimal size for the patient's anatomy and hip pathology. Selecting potential implant styles and sizes can facilitate operating room preparation and assure availability of an appropriate size selection. X-ray evaluation may also help detect anatomic anomalies that could prevent the intraoperative achievement of the established preoperative goals.

James A. D'Antonio, M.D. Tip:

"Templating is an important step in the procedure because it allows surgeons to estimate the size of the implant to be used. Assess the center of rotation and offset of the hip to determine inferior location of the acetabular component relative to the tear drop."

Step 2: Acetabular Preparation

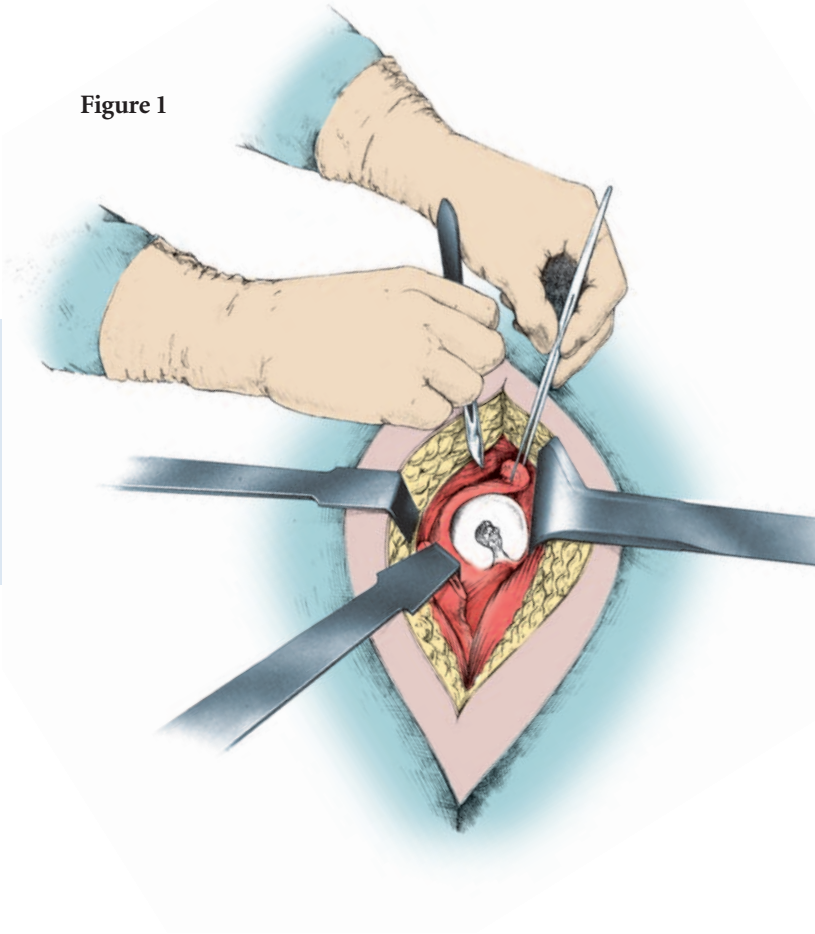
The acetabulum is prepared by the release and removal of soft tissue using the surgeon's preferred technique to gain adequate exposure for reaming. Excision of the labrum and osteophytes allows for proper visualization of the bony anatomy and improves ease of reaming.

Note: Careful identification and removal of osteophytes can help reduce the possibility of bone-to-bone or component-to-bone impingement.

Stryker Orthopaedics' Femoral and Wing Retractors can be utilized to gain acetabular exposure (**Figure 1**).

With the acetabulum exposed, bony defects can be identified. If necessary, bone grafting options may be considered prior to reaming.

Figure 1



Step 3a: Spherical Reaming

Caution: Only the Cutting*Edge* Spherical Reamer should be used to prepare the acetabulum for Trident acetabular components.

To obtain optimal component positioning in the reaming process, a 45/20° Abduction/Anteversion Alignment Guide can be attached to the Cutting*Edge* Reamer Handle (**Figure 2**). The alignment guide, when perpendicular to the long axis of the patient, will orient the reamer handle at 45° of abduction, thereby placing the axis of the spherical reamer at 45° of inclination (**Figure 3**). The reamer handle may be positioned at 20° of anteversion by aligning the left/right anteversion rod on the alignment guide so that it is parallel to the long axis of the patient.

CAUTION: All external alignment guides depend on knowing the patient is in a lateral decutibus position, therefore acceptable to anteversion.

NOTE: Changes in pelvic tilt and pelvic flexion caused by: patient positioning on the table as well as disease in the contralateral hip, spine and pelvis may impact a surgeon's ability to achieve component placement at 45/20° abduction/anteversion.

William A. Leone, Jr., M.D. Tip:

"To assess pelvic motion and help achieve the recommended 45° abduction and 20° anteversion, an optional Pelvic Alignment Level (PAL) may be used. For recommended technique, refer to PAL Pelvic Alignment Level Surgical Protocol, LSP61."

John Andronaco, M.D. Tip:

"Be sure to check for and remove internal osteophytes prior to reaming for the implant to prevent lateralizing the shell."

It is recommended that the initial reaming begin with a Cutting*Edge* Spherical Reamer that is 4mm smaller than the templated or gauged size. The reamer is attached to the reamer handle by pushing down and applying a quarter-turn to lock in place (**Figure 4**). Reaming progresses in 1mm increments until final sizing is achieved.

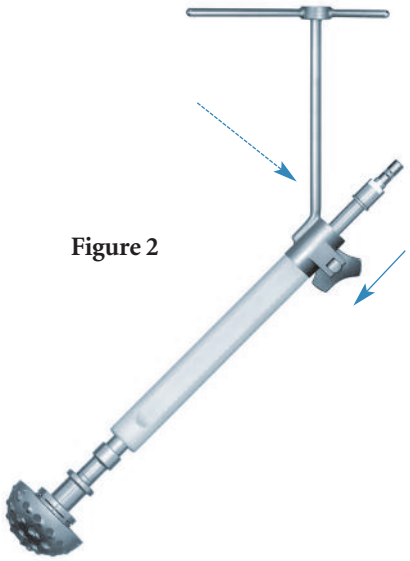


Figure 2

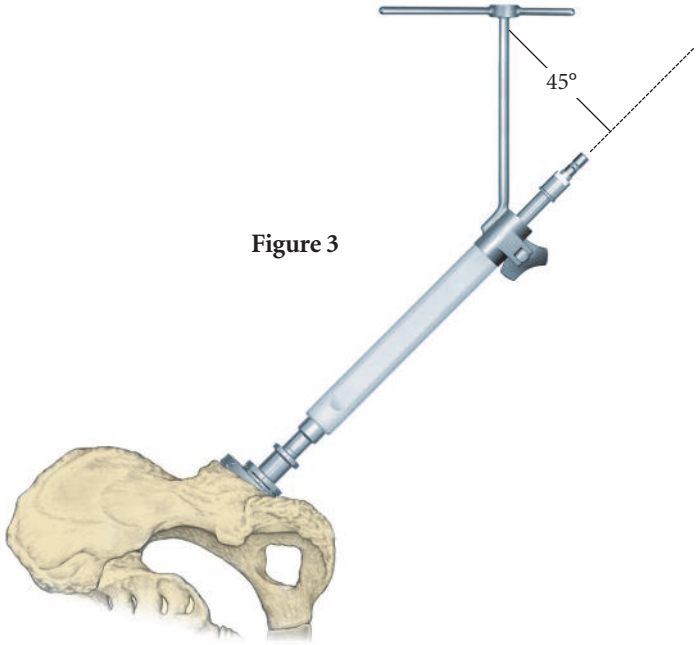


Figure 3

Step 3b: Final Reaming

The Trident PSL HA shell periphery is 1.8mm larger than the stated size (e.g., 52mm shell = 53.8mm periphery at the rim of the shell). The size of the Trident PSL HA shell selected should be the same as the largest diameter of the Cutting*Edge* Spherical Reamer used. Surgical judgment is used to assess bone stock, amount of interference, and proper amount of reaming as desired. When implanting the Trident PSL HA shell, the 1.8mm of interference fit is not always necessary when dense, hard, sclerotic bone is encountered. This can reduce the potential for problems that may typically occur in dense bone such as acetabular fracture, failure to fully seat the implant, or slight deformation of the titanium shell, making seating of the insert more difficult.

NOTE: The amount of interference fit should be determined intraoperatively based upon the patient's bone quality.

The full profile of the Cutting*Edge* Spherical Reamer necessitates reaming to the full depth. The reamer head should be driven to the point where the rim/cross bar contacts the acetabular wall at the peripheral lunate region. Removal of the reamer from the handle is performed by pulling back on the locking sleeve and rotating the reamer head a quarter-turn in a clockwise direction (**Figure 4**).

Care should be taken so as not to enlarge or distort the acetabulum by eccentric reaming. Ream to unicortical plate to medialize the shell. Ream to the full depth of the Cutting*Edge* Spherical Reamer to seat the reamer in the socket.

NOTE: Trident PSL Acetabular Shells contain a 1.8mm peripheral press-fit built into the shell as marked (e.g., 52mm = 53.8mm).

NOTE: The Cutting*Edge* Spherical Reamers are very aggressive and perform best when sharp. Care should be taken to protect the reamer from unnecessary handling, as dull or damaged cutting teeth may cause improper reaming. Dull cutting teeth will deflect to cut softer bone and resist hard bone. This situation may result in an irregularly shaped or enlarged acetabulum preparation.

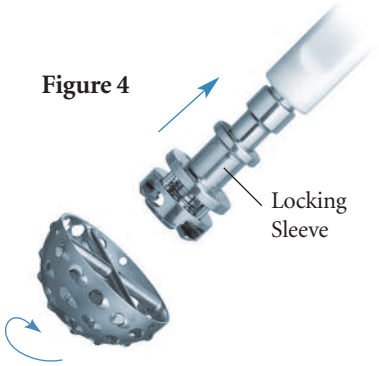


Figure 4

Step 4: Evaluation with Window Trials

Following the reaming procedure, the appropriate Trident Universal Window Trial (**Table 2**), is threaded onto the Cutting*Edge* Shell Positioner/Impactor and placed in the acetabulum to evaluate the size and congruity of the preparation (**Figure 5**). Use the trial that has the same diameter as that of the last spherical reamer used. The trial is "windowed" for visualization and assessment of fit, contact and congruency of the trial within the acetabulum. By inserting the Trident Trial Insert into the Trident Universal Window Trial (**Figures 6 & 7**), joint mechanics can be evaluated. To ensure that the Trial Insert is well fixed to the Trident Universal Window Trial during the trial evaluation, an Acetabular Trial Insert Containment Screw can be used. Use of the Containment Screw Kit (2230-0010) is optional (**Figure 6**).

To facilitate insertion/removal of the Trial Insert, Holding Forceps may be placed into the two holes in the plastic face.

Note: The window trial is threaded onto the impactor at the threaded hole in the dome of the window trial. It is important to fully engage the threads and seat the impactor against the window trial. Otherwise, the threads on the window trial could become damaged, resulting in difficulty with the removal of the window trial from the acetabulum.

TABLE 2: Trident Universal Window Trial/Trial Insert Sizing

Trial Insert Compatibility Class	Reamer Size (mm)	Trident Universal Window Trial (mm)
A	40	40
B	42	42
C	44	44
D	46	46
D	48	48
E	50	50
E	52	52
F	54	54
F	56	56
G	58	58
G	60	60
H	62	62
H	64	64
I	66	66
I	68	68
J	70	70
J	72	72

Figure 5

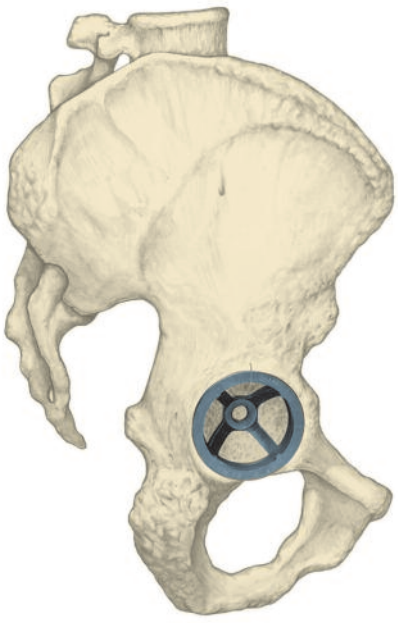


Figure 6

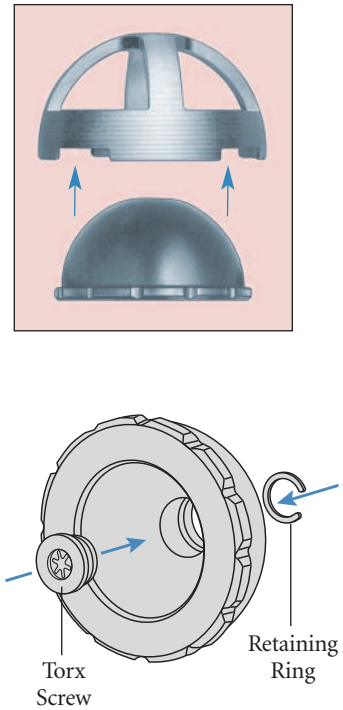
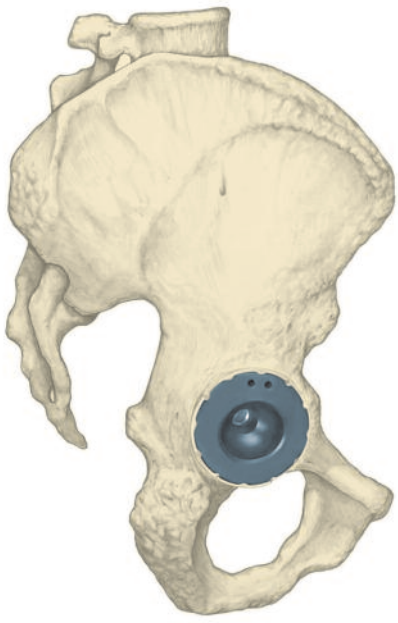


Figure 7



Step 5: Trident PSL HA Acetabular Shell Implantation

Assess acetabulum and surrounding soft tissue prior to shell introduction to ensure nothing is preventing shell implantation. After completing the trial reduction, select the appropriately sized Trident PSL HA Shell as clearly identified on the product label. Ensure the patient is in the correct position. At this step it is prudent to reassess patient positioning in the surgical field.

If desired, the Cutting*Edge* Abduction/Anteversion Alignment Guide can be attached to the Cutting*Edge* Shell Positioner/ Impactor to help establish the recommended 45° of abduction/ inclination and 20° of anteversion (**Figures 8 & 9**).

CAUTION: The Alignment Guide may yield inaccurate placement if the pelvis has moved from the original position during intraoperative manipulation. Small changes in pelvic flexion will greatly affect anteversion. The Alignment Guide is only one aid to assist with proper implant positioning. The surgeon must also rely on anatomic landmarks to avoid improper positioning of components.

The metal shell is threaded onto the impactor at the threaded hole in the dome of the metal shell. It is important to fully engage the threads and seat the impactor against the shell. Failure to fully engage the threads and seat the impactor could result in thread damage and subsequent difficulty removing the impactor from the shell.

If the cluster screw hole pattern shell is utilized, the holes are intended to be oriented superiorly (**Figure 10**). During shell introduction into the acetabulum, minimize damage to the shell coating by using retractor instrumentation.

NOTE: Shell positioning must be carefully considered when selecting certain inserts as hooded options are not available in all sizes to adjust joint stability. Proper positioning of the Trident Acetabular Shell will minimize potential impingement and provide optimal stability and articulation between the Insert and Head. As with any acetabular system, excessive vertical orientation and/or anteversion of the shell should be avoided as this may lead to premature wear and/or noise of the components' surfaces.

Figure 8

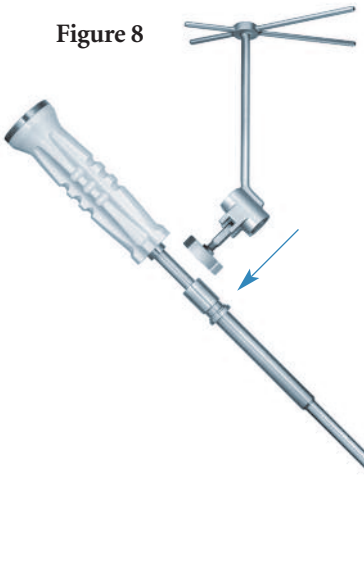


Figure 9

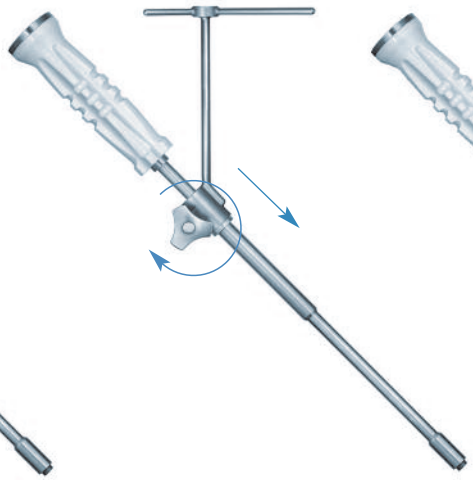
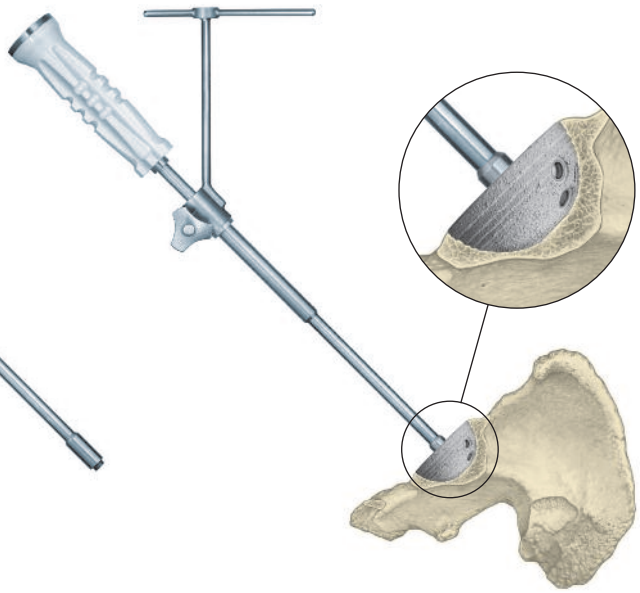


Figure 10



Step 5: Trident PSL HA Acetabular Shell Implantation (cont.)

The recommended metal shell abduction angle of 45° is determined by positioning the alignment guide perpendicular to the long axis of the patient (**Figure 11**).

Metal shell anteversion is set at approximately 20° by moving the cup impactor so that the left/right anteversion rod is parallel to the long axis of the patient (**Figure 12**). The metal shell is impacted into the acetabulum using a mallet until a tight, stable, press-fit is achieved. The thumbscrew on the alignment guide is then loosened to remove the guide. After removing the guide, the impactor handle is carefully unthreaded from the shell (**Figure 12**).

The depth of the shell seating may now be determined by viewing through the threaded hole in the dome. If it is determined that the shell is not fully seated, the Cutting*Edge* Final Cup Impactor may then be required to assist in impacting the shell until it is completely seated in the prepared acetabulum.

If utilizing the optional dome home plug, assess that the plug is fully threaded into the shell to prevent liner impingement.

Figure 11

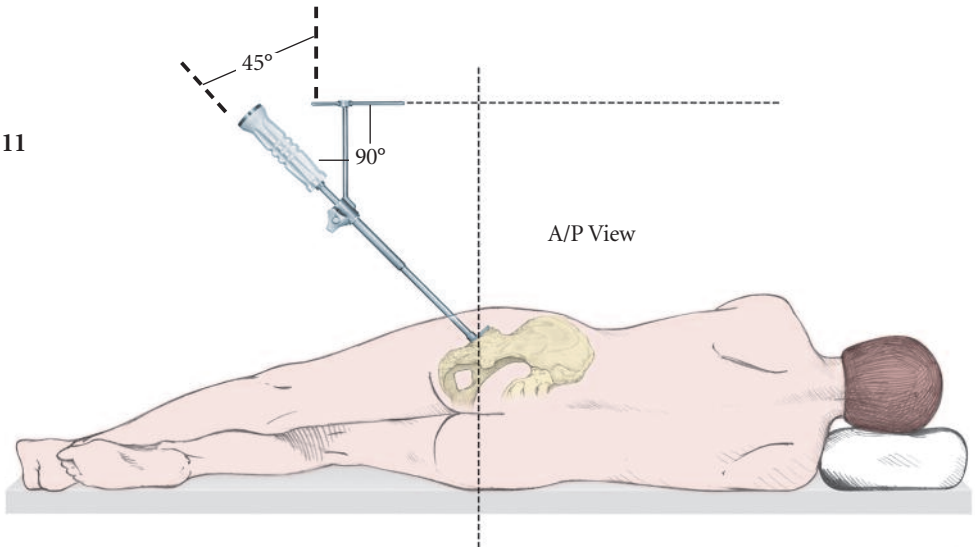
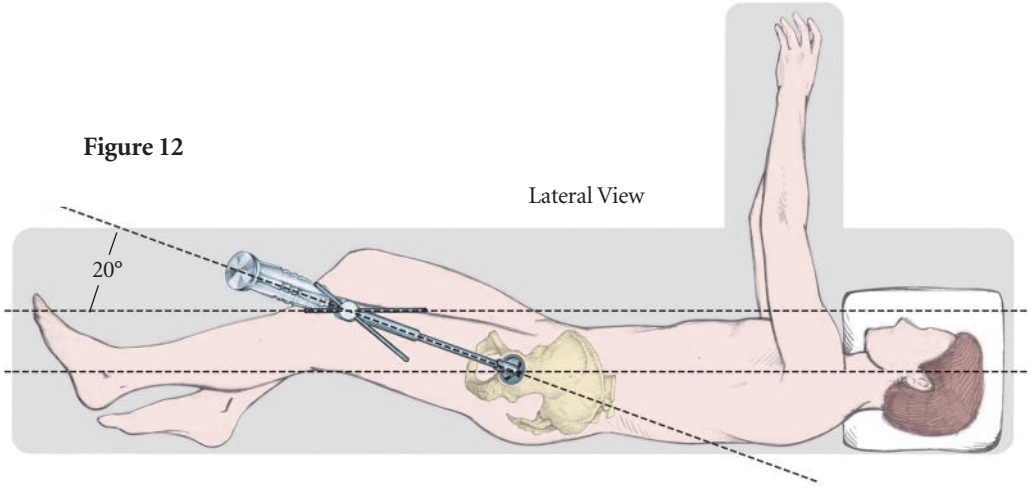


Figure 12



Step 5A: Optional Screw Utilization

If the option to use screws is selected, then only Stryker Orthopaedics Torx Bone Screws can be used. Stryker Orthopaedics offers 6.5mm diameter cancellous bone screws for use in the shell dome, which are available in a variety of lengths (**Table 3**). Stryker Orthopaedics Cancellous Bone Screws are designed to be inserted or removed only with the assistance of Stryker Orthopaedics screw instruments.

After determination of the proper site for screw placement, a 3.3mm diameter drill is passed through a drill guide to the desired depth (**Figure 13**). The screw hole is then assessed to determine the hole's depth. The properly sized screw is then selected and implanted into the bone using Stryker Orthopaedics Screw Drivers with a high torque configuration driver head (**Figure 14**).

After screw implantation, assess that the screw head is seated flush against the shell to help prevent improper seating of the acetabular liner.

NOTE: In hard bone, the use of 6.5mm dome screws prepared in the usual fashion may be difficult. The use of a 4.0mm drill bit can make the utilization easier, without substantial compromise of screw purchase.

CAUTION: Do not pass a drill, screw or any other instrumentation beyond the inner table of the pelvis. Malposition of either the shell screw hole orientation, screw hole preparation or improper use of the screws themselves may contribute to detrimental clinical consequences.

CAUTION: Do not apply torque in excess of 69 in-lbs. to the screw. This may result in damage to the screw or driver instrument. To reach 69 in-lbs. unnecessary excessive force has to be applied. Power driven screw inserters may exceed 69 in-lbs.

TABLE 3: Stryker Orthopaedics Cancellous 6.5mm Bone Screws

Screw Lengths (mm)	Catalog Number
16	2030-6516-1
20	2030-6520-1
25	2030-6525-1
30	2030-6530-1
35	2030-6535-1
40	2030-6540-1
45	2030-6545-1
50	2030-6550-1
55	2030-6555-1
60	2030-6560-1

Figure 13

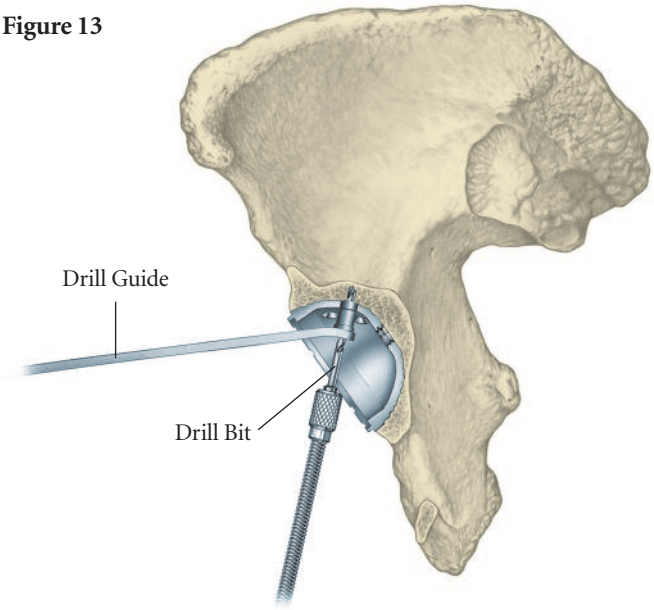
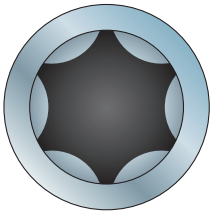


Figure 14



Torx Drive Head

Step 6: Trial Insert Reduction

After metal shell implantation, insert the Trident Trial liner into the Trident PSL HA shell. At this point the patient should be taken through a complete range of motion using the final selected implant sizes (**Table 4**). Careful assessment of impingement at the extreme range of motion should be performed. A final check of hip mechanics should be completed to include range of motion consistent with the patient's normal daily activities. At this point joint laxity should also be assessed, understanding the type of anesthetic used and its effects on soft tissue.

NOTE: When using ceramic-on-ceramic implants, impingement should be carefully assessed and avoided during range of motion. Excessive joint laxity has also been associated with noise in ceramic on ceramic bearings. Impingement can result in increased wear in metal-polyethylene systems.

Step 7: Insert Implantation

1. Select the appropriate size Silicone Insert Positioner Tip that corresponds to the ID of the final implant selected.
2. Load Silicone Insert Positioner Tip into Insert Positioner/ Impactor Handle (**Figure 15**).

   Optional Instrument:
   Curved positioner/impactor instrument: Silicone insert positioner tip can be loaded into the curved positioner/ impactor handle as an alternative to the straight handle for use with 22–36mm heads.
3. Load either the polyethylene or ceramic insert into Insert Positioner Tip. Press firmly to ensure insert is being securely held (**Figure 16**).

NOTE: Use caution handling ceramic components during assembly because of brittle nature of the ceramic material. All components are pre¬sterilized and cannot be sterilized after opening.

4. Ensure that the inside of the shell is clean and free of soft tissue or any other debris, which could prevent the insert from properly seating in the shell.

TABLE 4: Trident Insert Trials

●=0° (2200-XXX) and 10° (2210-XXX) ○=Elevated Rim (2260-XXX)							
Alpha Code	**22mm**	**26mm**	**28mm**	**32mm**	**36mm**	**40mm**	**44mm**
A	●		●*				
B	●		●*	●*			
C	●	●	●○	●*			
D	●	●	●○	●	●*		
E	●	●	●○	●○	●○	●*	
F	●	●	●○	●○	●○	●*	●*
G	●	●	●○	●○	●○	●*	●*
H	●	●	●○	●○	●○	●*	●*
I	●	●	●○	●○	●○	●*	●*
J	●	●	●○	●○	●○	●*	●*

Trident Eccentric Trials 0° (2240-XXX) 10° (2250-XXX)			
Alpha Code	**28mm**	**32mm**	**36mm**
B	●*		
C	●		
D	●	●	
E	●	●	●
F	●	●	●
G	●	●	●
H	●	●	●
I	●	●	●
J	●	●	●

* Available in 0° only

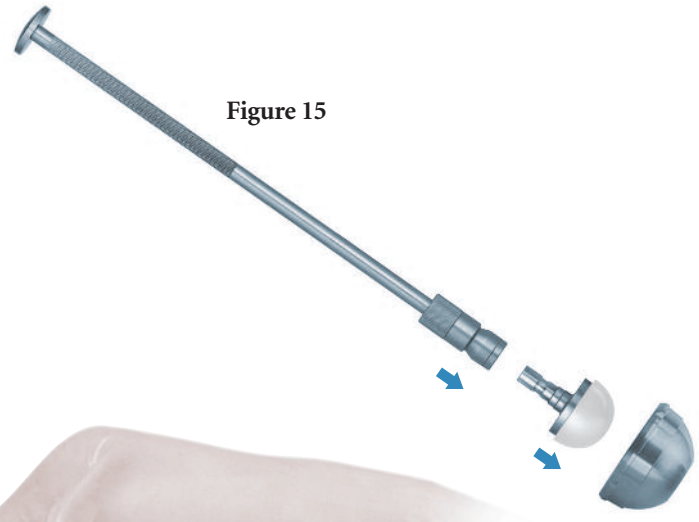


Figure 15

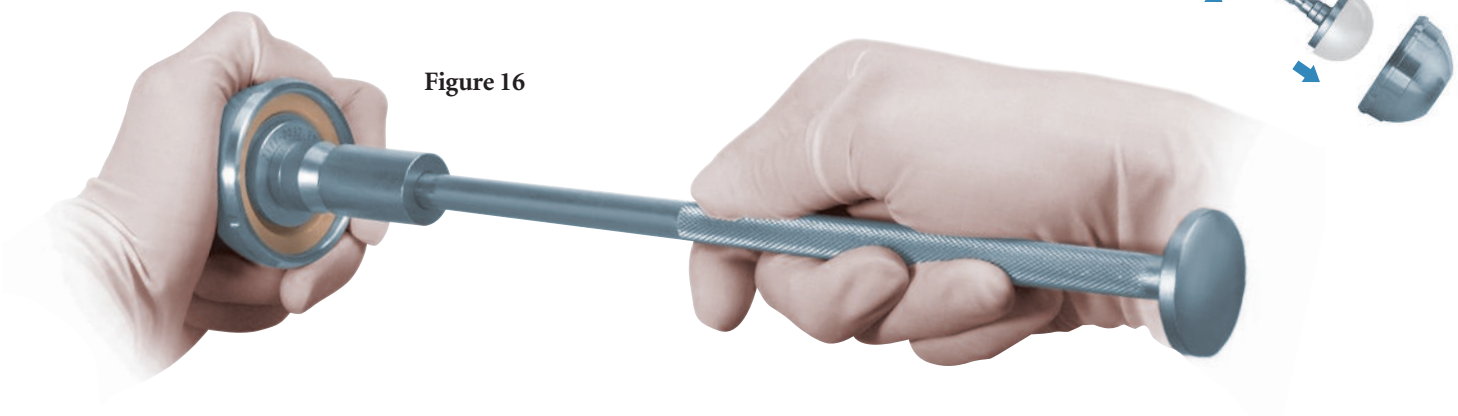


Figure 16

Step 7: Insert Implantation (cont.)

5. Gently introduce the ceramic or polyethylene insert making sure that the insert flange scallops are aligned with the slot at the rim of the shell (this allows seating the insert at the initial position supported by four indexing barbs). Once the insert is seated at the initial position, slowly turn and drop the insert into the final pre-locking position (**Figure 17**).

NOTE: Having a clear view of the rim of the acetabulum will allow easier visualization of the shell's slot and indexing barbs for proper positioning and seating of the insert.

6. Remove Silicone Insert Positioner Tip from the Insert Positioner/Impactor Handle.

7. Select appropriate size Plastic Insert Impactor Tip.

8. Load Plastic Insert Impactor Tip on to the to Insert Positioner/Impactor Handle.

9. Position Insert Positioner/Impactor Handle into ID of insert. Take care to align handle with axis of shell. Strike handle with approximately four firm mallet blows to fully seat insert.

NOTE: In order to obtain a secure lock it is recommended to use only the hard plastic Insert Impactor Tips to impact the ceramic and polyethylene inserts.

10. Verify insert is fully seated and properly aligned into the acetabular shell. Check the taper lock by running a small osteotome around the periphery of the shell/insert interface.

As with any modular interface under load, there is a potential for micromotion and associated fretting and/or corrosion.

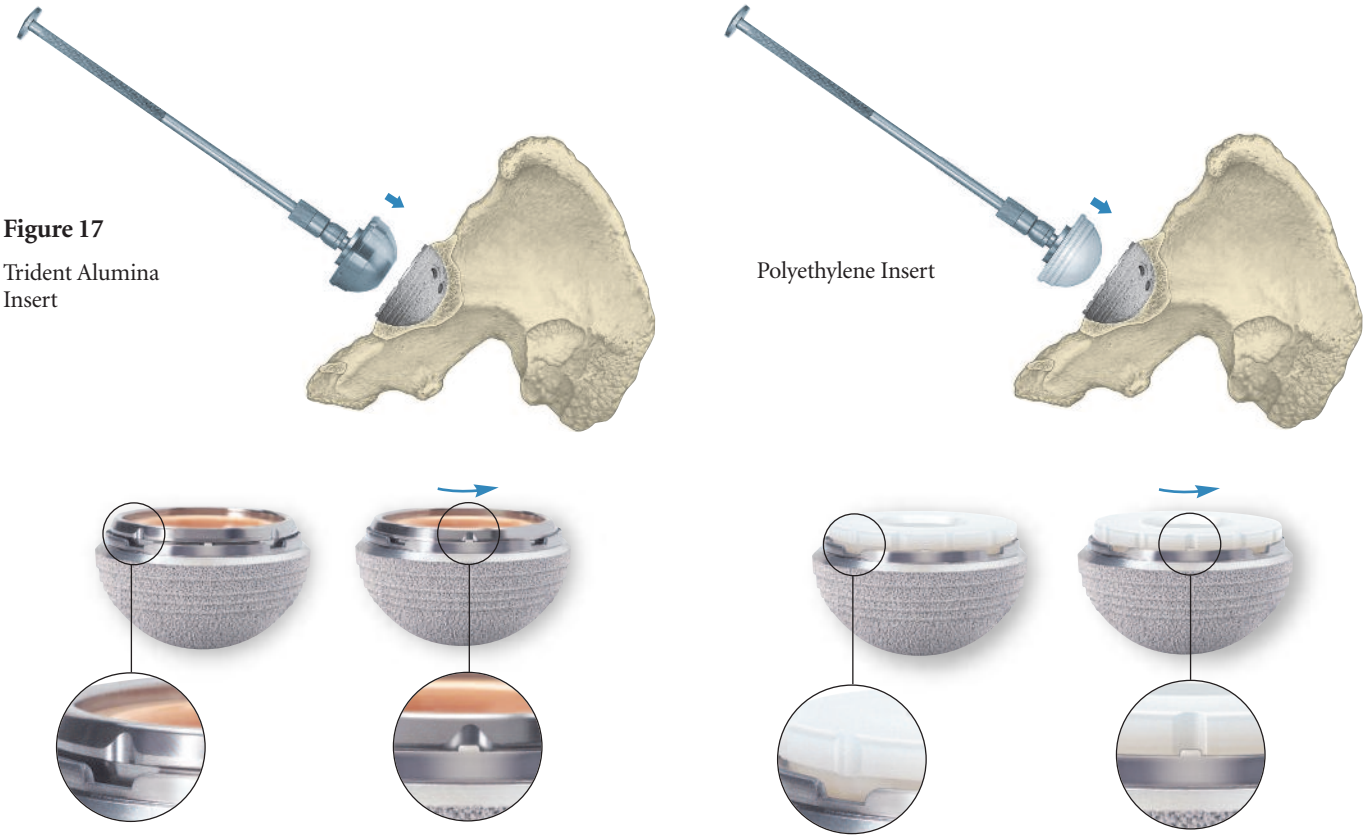


Figure 17

Trident Alumina Insert

Polyethylene Insert

Step 8: Head Assembly

Prior to head assembly, neck length selection may be re-evaluated using a Stryker V40 or C-taper Trial Head. Place the Trial Head onto the stem neck taper and reduce the hip to verify that the mechanics have not been altered due to implant seating.

Remove the Trial Head and dry the implant trunnion with a laparatomy sponge or sterile towel.

Select the appropriate corresponding V40 or C-taper Femoral Head size and place it onto the dry trunnion of the femoral stem with a slight twist. Impact the head with two moderate blows using the Stem Head Impactor (1104-1000) (**Figure 18**).

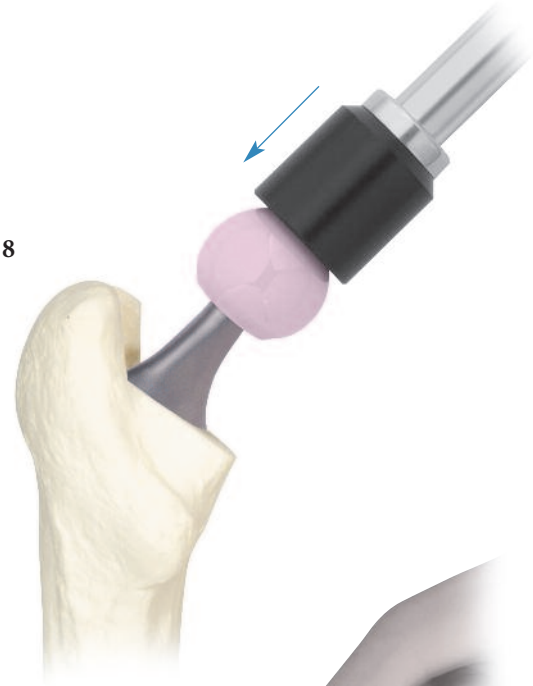


Figure 18

OPTIONAL STEP

NOTE: When selecting a BIOLOX *delta* Anatomic or BIOLOX *delta* Universal Taper Ceramic Femoral Head for implantation, use of a Universal Adaptor Sleeve is necessary (Table 4).

Table 4: Universal Adaptor Sleeves

Universal Adaptor Sleeve Part Numbers	Taper	Stem Material Compatibility
19-0XXXT	C-Taper	TMZF, Ti-6Al-4V, CoCr
6519-T-XXX	V40	TMZF, Ti-6Al-4V, CoCr, Stainless Steel

After completing the trialing process, intraoperatively 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 (**Figure 19**).

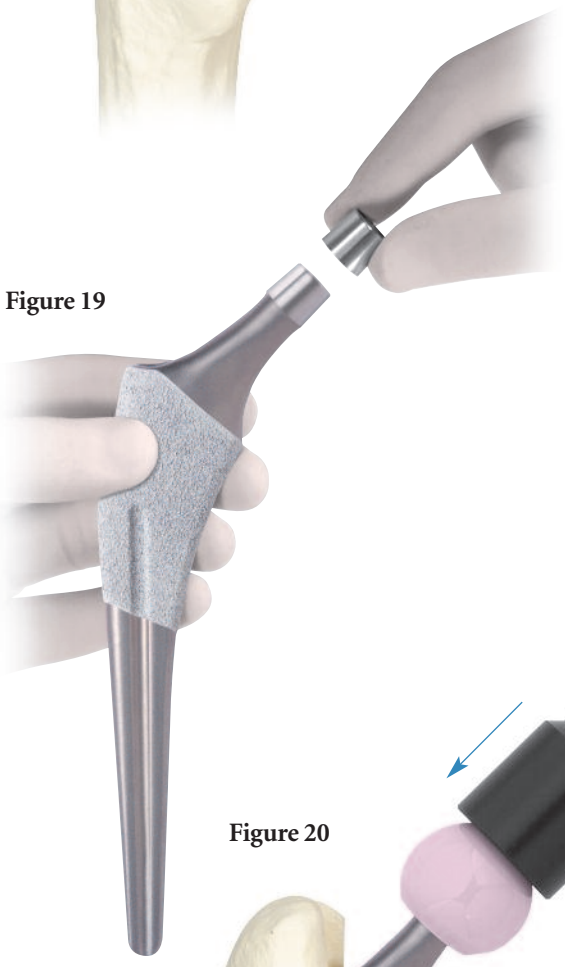


Figure 19

NOTE: In no instance should any attempt be made to pre-assemble the Adaptor Sleeve inside the BIOLOX *delta* Anatomic or BIOLOX *delta* Universal Ceramic head.

Intraoperatively assemble the BIOLOX *delta* Anatomic or BIOLOX *delta* Universal Taper Ceramic head onto the sleeved femoral stem and set with one to three moderate blows using the Stem Head Impactor (1104-1000) (**Figure 20**). Care must be taken to avoid excessive impact forces when assembling the Ceramic Head to the sleeved femoral component.

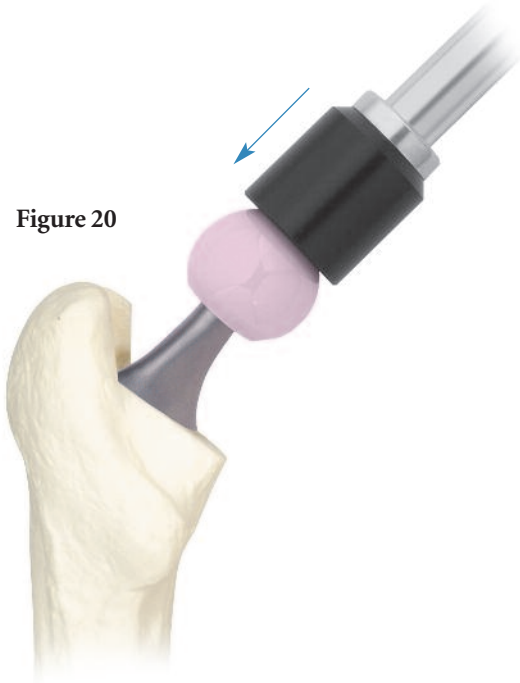


Figure 20

Removal of the Insert and Shell

NOTE: Prior to performing a liner exchange, visually assess the shell's locking mechanism for damage. If damaged, shell should be replaced.

Ceramic Insert Removal

The Trident Alumina Insert Removal Tool is designed to provide the surgeon with two options for extracting the ceramic insert from the Trident shell.

Option 1: "Flat Head"

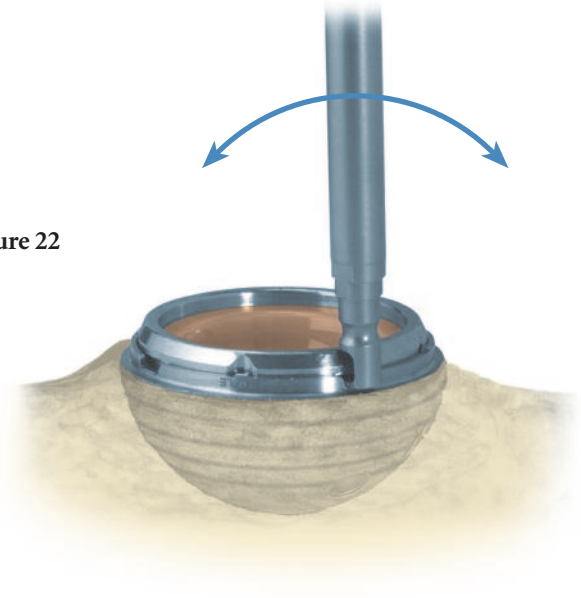
Connect the "T" handle to the L-shaped end of the removal tool. Insert the flat end of the removal tool between the shell and ceramic insert at one of the four notches at the shell rim. While applying continuous force toward the center of the shell, twist the "T" handle (like a screwdriver), to dislodge the ceramic insert (**Figure 21**). It may be required to repeat this procedure at the other notches in order to successfully disengage the taper.

Option 2: "L-Shaped"

Insert the L-shaped end of the removal tool between the shell and ceramic insert at one of the four notches at the shell rim. Apply continuous force toward the center of the shell, and lever the tool in a plane tangent to the shell's outside edge, to dislodge the ceramic insert (**Figure 22**). It may be required to repeat this procedure at the other notches in order to successfully disengage the taper. The removal tool may be attached to the Insert Positioner/ Impactor Handle to increase leverage and length for larger patients.

Figure 21

Figure 22



Removal of the Insert and Shell (cont.)

Polyethylene Insert Removal

Utilize a 3/16" (5mm) drill bit to create an off-center hole in the polyethylene insert. Use the "T" handle (1101-2100) to thread the Polyethylene Insert Removal Tool (2112-0010) into the insert, and advance the tool to the medial wall of the shell to dislodge the insert (**Figures 23 & 24**).

Revising the Trident Acetabular Shell with a Trident Insert

Should it become necessary to remove the insert, a new Trident Ceramic or Polyethylene Insert can be inserted into the Trident Acetabular Shell.

1. Carefully remove the Trident Insert (refer to instructions, pages 12 and 13).
2. The Trident Insert Trials are used to evaluate the shell face position and provide a final check of hip biomechanics. Polyethylene inserts are available in various configurations and sizes, including 0, 10 degree and constrained insert options. The polyethylene inserts provide 12 different insert orientations within the shell to provide optimal joint stability.
3. Follow **Step 7: Implantation Technique**, to insert the new insert.

Removal of a Shell

Should removal of the metal shell ever become necessary, an osteotome or small burr can be passed around the cup periphery to loosen the fixation interface (**Figure 24**). The Cutting*Edge* Universal Shell Positioner can be threaded into the dome hole of the cup. A Slotted Mallet is slid over the positioner shaft to assist with the shell removal.

Figure 23

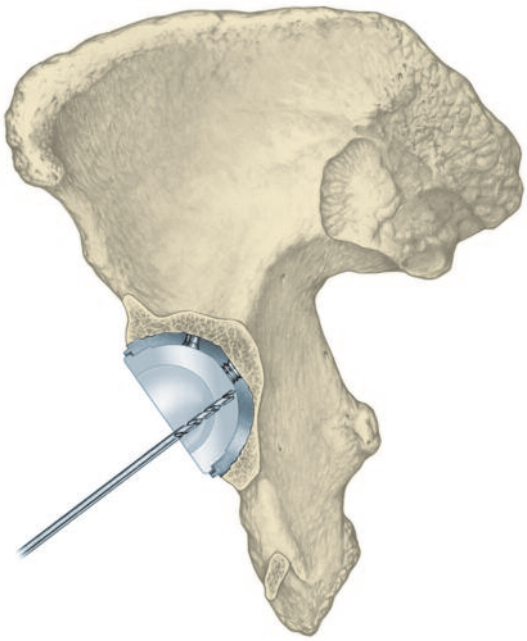
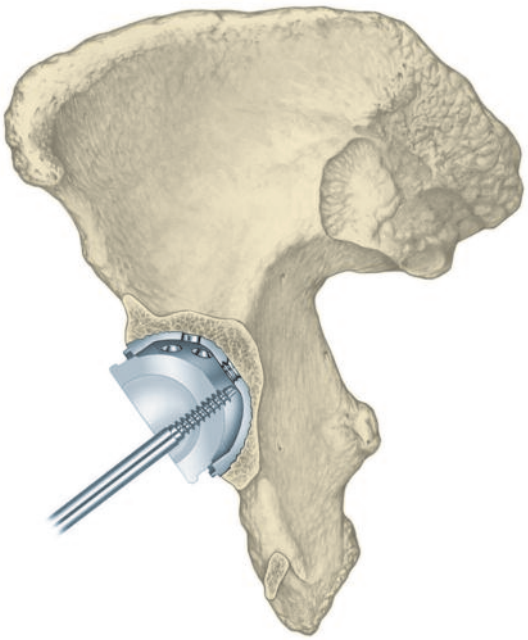


Figure 24



Head Disassembly

The Head Disassembly Instrument is used to remove an impacted head. Inspect the stem neck trunnion to verify that no damage has occurred prior to impacting a replacement head. A replacement head may then be attached to the stem neck taper and secured using the Stem Head Impactor.

Revision of V40 or C-Taper Alumina and BIOLOX *delta* Ceramic Heads

Revision to a Ceramic Head

If the ceramic head needs to be revised for any reason, a new ceramic head must not be affixed to the existing stem trunnion because the taper will have been deformed through assembly with the first ceramic head component. If the surgeon wishes to revise with a ceramic head, the entire hip stem must be replaced as well. If the surgeon wishes to revise with a metal head, either the ceramic insert must be replaced with a Stryker Orthopaedics Trident Polyethylene Insert or the entire acetabular component must be replaced with a metal/polyethylene alternative.

When removing an Alumina and BIOLOX *delta* V40 head on a well-fixed stem, the V40 Adapter Sleeve (17-0000E) may be used to convert the V40 trunnion to a C-taper trunnion. This will allow for revision to a new ceramic femoral head on an unused trunnion. Refer to **LCHS/DS** for surgical protocol information.

Revision to a Metal Head

In the case of revision to a metal head, if the original stem and its trunnion appear intact, the original hip stem need not be replaced.

Revision of BIOLOX *delta* Anatomic Universal Taper or BIOLOX *delta* Universal Taper Ceramic Heads

If the ceramic head needs to be revised for any reason, remove the ceramic head with the Head Disassembly Instrument (1118-6000 or 6059-9-505 depending on femoral head size – **Figures 25 & 26**) and remove the Universal Adaptor Sleeve with the Ceramic Head Sleeve Disassembly Adaptor (1118-1005). If the surgeon wishes to revise with another BIOLOX *delta* Universal Taper ceramic head, place a new Universal Adaptor Sleeve onto the stem trunnion and then assemble the BIOLOX *delta* Universal Taper ceramic head onto the sleeved stem trunnion. If the surgeon wishes to revise with a V40 or C-taper ceramic or CoCr head, place the new femoral head directly onto the previously sleeved femoral component.

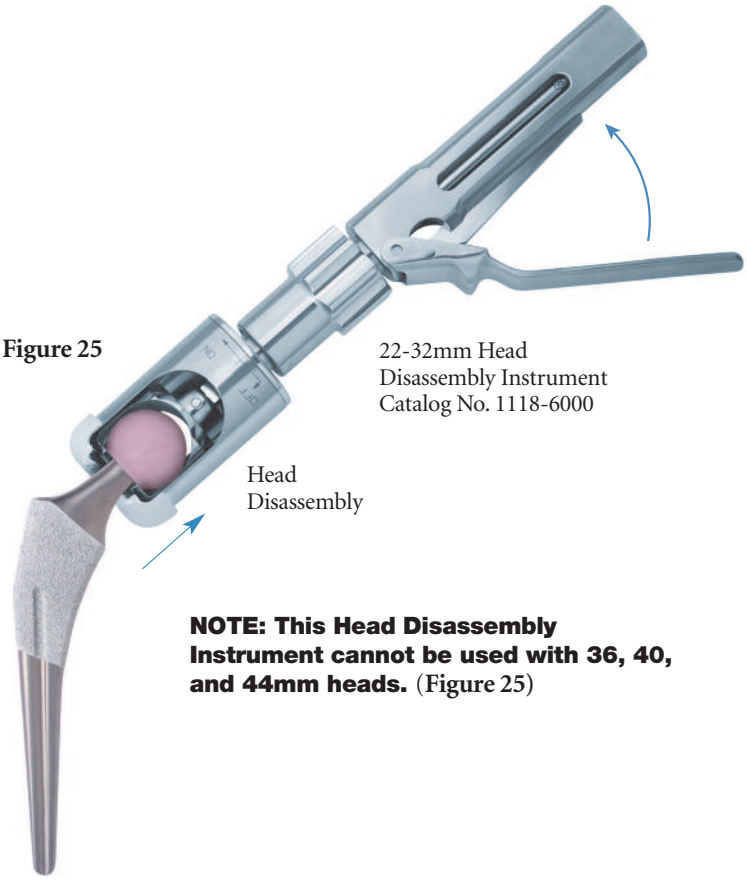
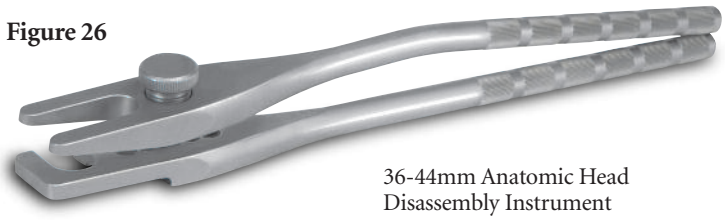


Figure 25

22-32mm Head
Disassembly Instrument
Catalog No. 1118-6000

NOTE: This Head Disassembly Instrument cannot be used with 36, 40, and 44mm heads. (Figure 25)

Figure 26



36-44mm Anatomic Head
Disassembly Instrument
Catalog No. 6059-9-505

Trident Acetabular System PSL Catalog Information

Trident PSL HA Solid Back Shells

Implant Catalog No.	Shell Size (mm)	Rim Dia. (mm)	Window Trial Catalog No.
540-11-40A	40	41.8	2208-2040A
540-11-42B	42	43.8	2208-2042A
540-11-44C	44	45.8	2208-2044A
540-11-46D	46	47.8	2208-2046A
540-11-48D	48	49.8	2208-2048A
540-11-50E	50	51.8	2208-2050A
540-11-52E	52	53.8	2208-2052A
540-11-54F	54	55.8	2208-2054A
540-11-56F	56	57.8	2208-2056A
540-11-58G	58	59.8	2208-2058A
540-11-60G	60	61.8	2208-2060A
540-11-62H	62	63.8	2208-2062A
540-11-64H	64	65.8	2208-2064A
540-11-66I	66	67.8	2208-2066A
540-11-68I	68	69.8	2208-2068A
540-11-70J	70	71.8	2208-2070A
540-11-72J	72	73.8	2208-2072A

Trident PSL HA Cluster Shells

Implant Catalog No.	Shell Size (mm)	Rim Dia. (mm)	Screw Holes	Window Trial Catalog No.
542-11-40A	40	41.8	3	2208-2040A
542-11-42B	42	43.8	3	2208-2042A
542-11-44C	44	45.8	3	2208-2044A
542-11-46D	46	47.8	3	2208-2046A
542-11-48D	48	49.8	3	2208-2048A
542-11-50E	50	51.8	5	2208-2050A
542-11-52E	52	53.8	5	2208-2052A
542-11-54F	54	55.8	5	2208-2054A
542-11-56F	56	57.8	5	2208-2056A
542-11-58G	58	59.8	5	2208-2058A
542-11-60G	60	61.8	5	2208-2060A
542-11-62H	62	63.8	5	2208-2062A
542-11-64H	64	65.8	5	2208-2064A
542-11-66I	66	67.8	5	2208-2066A
542-11-68I	68	69.8	5	2208-2068A
542-11-70J	70	71.8	5	2208-2070A
542-11-72J	72	73.8	5	2208-2072A

V40 Taper BIOLOX *delta* Ceramic Heads

Catalog No.	Diameter (mm)	Offset (mm)	Trial Catalog No.
6570-0-028	28	-4	6264-8-028
6570-0-328	28	-2.7	6264-8-928
6570-0-128	28	0	6264-8-128
6570-0-228	28	+4	6264-8-228
6570-0-032	32	-4	6264-8-032
6570-0-132	32	0	6264-8-132
6570-0-232	32	+4	6264-8-232
6570-0-036	36	-5	6264-8-036
6570-0-436	36	-2.5	6264-8-436
6570-0-136	36	0	6264-8-136
6570-0-536	36	+2.5	6264-8-536
6570-0-236	36	+5	6264-8-236
6570-0-736	36	+7.5	6264-8-736

C-Taper BIOLOX *delta* Ceramic Heads

Catalog No.	Diameter (mm)	Offset (mm)	Trial Catalog No.
18-28-3	28	-2.5	1100-2897A
18-2800	28	0	1100-2800A
18-2825	28	+2.5	1100-2825A
18-2805	28	+5	1100-2805A
18-32-3	32	-2.5	1100-3297A
18-3200	32	0	1100-3200A
18-3225	32	+2.5	1100-3225A
18-3205	32	+5	1100-3205A
18-36-5	36	-5	1100-3699A
18-36-3	36	-2.5	1100-3697A
18-3600	36	0	1100-3600A
18-3625	36	+2.5	1100-3625A
18-3605	36	+5	1100-3605A
18-3675	36	+7.5	1100-3675A

C-Taper LFIT CoCr Heads

Catalog No.	Diameter (mm)	Offset (mm)	Trial Catalog No.
06-2200	22	0	1100-2200A
S-1400-HH22	22	+2.5	1100-2225A
06-2205	22	+5	1100-2205A
06-2210	22	+10	1100-2210A
06-2600	26	0	1100-2600A
S-1400-HH62	26	+2.5	1100-2625A
06-2605	26	+5	1100-2605A
S-1400-HH64	26	+7.5	1100-2675A
06-2610	26	+10	1100-2610A
06-2898	28	-3	1100-2898A
06-2800	28	0	1100-2800A
S-1400-HH82	28	+2.5	1100-2825A
06-2805	28	+5	1100-2805A
S-1400-HH84	28	+7.5	1100-2875A
06-2810	28	+10	1100-2810A
06-3299	32	-5	1100-3299A
S-1400-HH31	32	-2.5	1100-3297A
06-3200	32	0	1100-3200A
S-1400-HH32	32	+2.5	1100-3225A
06-3205	32	+5	1100-3205A
S-1400-HH34	32	+7.5	1100-3275A
06-3210	32	+10	1100-3210A

C-Taper LFIT CoCr Anatomic Heads

Catalog No.	Diameter (mm)	Offset (mm)	Trial Catalog No.
06-3699	36	-5	1100-3699A
06-3697	36	-2.5	1100-3697A
06-3600	36	+0	1100-3600A
06-3625	36	+2.5	1100-3625A
06-3605	36	+5	1100-3605A
06-3675	36	+7.5	1100-3675A
06-3610	36	+10	1100-3610A
06-4099	40	-5	1100-4099A
06-4097	40	-2.5	1100-4097A
06-4000	40	+0	1100-4000A
06-4025	40	+2.5	1100-4025A
06-4005	40	+5	1100-4005A
06-4075	40	+7.5	1100-4075A
06-4010	40	+10	1100-4010A
06-4499	44	-5	1100-4499A
06-4497	44	-2.5	1100-4497A
06-4400	44	+0	1100-4400A
06-4425	44	+2.5	1100-4425A
06-4405	44	+5	1100-4405A
06-4475	44	+7.5	1100-4475A

BIOLOX *delta* Universal Taper Ceramic Heads

Catalog No.	Head Size (mm)	Offset
6519-1-028	28	+0mm
6519-1-032	32	+0mm
6519-1-036	36	+0mm
6519-1-040	40	+0mm
6519-1-044	44	+0mm

Universal Trial Heads

Taper	Catalog No.	Diameter (mm)	Offset (mm)
C-Taper	1100-4497A	44	–2.5
C-Taper	1100-4425A	44	+2.5
V40	6264-8-728	28	-2.5
V40	6264-8-632	32	-2.5
V40	6264-3-236	36	+4.0
V40	6264-8-940	40	-2.5
V40	6264-8-944	44	-2.5

Universal Adapter Sleeves - Titanium

Taper	Catalog No.	Offset
C-Taper	19-0325T	-2.5mm
C-Taper	19-0000T	+0mm
C-Taper	19-0025T	+2.5mm
C-Taper	19-0005T	+5mm
V40	6519-T-025	-2.5mm
V40	6519-T-100	+0mm
V40	6519-T-204	+4mm

V40 Taper LFIT CoCr Heads

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

V40 Taper LFIT CoCr Anatomic Heads

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

V40 Taper Alumina Ceramic Heads

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

C-Taper Alumina Ceramic Heads

Catalog No.	Diameter (mm)	Offset (mm)	Trial Catalog No.
17-28-3E	28	–2.5	1100-2897A
17-2800E	28	+0	1100-2800A
17-2805E	28	+5	1100-2805A
17-32-3E	32	–2.5	1100-3297A
17-3200E	32	+0	1100-3200A
17-3205E	32	+5	1100-3205A
17-36-5E	36	–5	1100-3699A
17-3600E	36	+0	1100-3600A
17-3605E	36	+5	1100-3605A

The V40 Adapter Sleeve (catalog #17-0000E) enables the C-Taper Alumina Heads to be used with the existing Stryker V40 taper.

2111-0000B
Insert Positioner/Impactor Handle

Silicone Insert Positioner Tips

2111-0022	22mm
2111-0026	26mm
2111-0028	28mm
2111-0032	32mm
2111-0036	36mm
2111-0040	40mm
2111-0044	44mm

Plastic Insert Impactor Tips

2111-3022	22mm
2111-3026	26mm
2111-3028	28mm
2111-3032	32mm
2111-3036	36mm
2111-3040	40mm
2111-3044	44mm

1118-6000
22mm – 32mm Head Disassembly Instrument

6059-9-505
36mm-44mm Anatomic Head Disassembly Instrument

1118-1005
Ceramic Head Sleeve Disassembly Adapter

1101-2100
T-Handle

2102-0003
Hudson to Stryker Adapter

2102-0410
Acetabular Reamer Handle

2112-0000
Ceramic Removal Tool

2112-0010
Polyethylene Removal Tool

2101-0200
Cutting*Edge*
Shell Positioner/Impactor Handle

2101-0210
Cutting*Edge*
Abduction/Anteversion Alignment Guide

Offset Options

Offset Reamer Handle	T6320
Metal Handle Offset Cup Impactor	510912
Cup Impactor Alignment Guide	T7718
Reamer/Cup Impactor Case	T7396

Cutting*Edge* Acetabular Reamers

2102-0438	38mm
2102-0439	39mm
2102-0440	40mm
2102-0441	41mm
2102-0442	42mm
2102-0443	43mm
2102-0444	44mm
2102-0445	45mm
2102-0446	46mm
2102-0447	47mm
2102-0448	48mm
2102-0449	49mm
2102-0450	50mm
2102-0451	51mm
2102-0452	52mm
2102-0453	53mm
2102-0454	54mm
2102-0455	55mm
2102-0456	56mm
2102-0457	57mm
2102-0458	58mm
2102-0459	59mm
2102-0460	60mm
2102-0461	61mm
2102-0462	62mm
2102-0463	63mm
2102-0464	64mm
2102-0465	65mm
2102-0466	66mm
2102-0467	67mm
2102-0468	68mm
2102-0469	69mm
2102-0470	70mm
2102-0471	71mm
2102-0472	72mm

Templates:
LTEM59B Trident PSL
LTEM60B1-2 Trident Hemispherical

Trident Universal Window Trials

2208-2040A	40mm
2208-2042A	42mm
2208-2044A	44mm
2208-2046A	46mm
2208-2048A	48mm
2208-2050A	50mm
2208-2052A	52mm
2208-2054A	54mm
2208-2056A	56mm
2208-2058A	58mm
2208-2060A	60mm
2208-2062A	62mm
2208-2064A	64mm
2208-2066A	66mm
2208-2068A	68mm
2208-2070A	70mm
2208-2072A	72mm
2208-2074A	74mm

Cases

2402-0020
Case (not including lid and trays)

2402-0090
Lid

2402-0040
Top Tray: Insert Trials (0° & 10°)

2402-0060
Middle Tray: Universal Window Trials

2402-0080
Bottom Tray: Preparation Tray

2402-1000
LFIT Anatomic V40 Single Layer Sterilization Case

2402-1020
LFIT Anatomic V40 Instrument Tray

8000-0150
LFIT Anatomic Sterilization Case Lid

2402-1010
LFIT Anatomic C-Taper Single Layer Sterilization Case

2402-1030
LFIT Anatomic C-Taper Instrument Tray

8000-0150
LFIT Anatomic Sterilization Case Lid

Stryker Orthopaedics Bone Screw Instrumentation Kit
Hip-Bone Screw

2230-0010
Acetabular Trial Insert Containment Screw Kit

Contains 5 screws and retaining rings. (Containment Screw Kit is optional - screws come pre-assembled with the Eccentric and Constrained trial inserts.)

Eccentric/Constrained Cases and Trays (for trials only)

The system provides the option of either a Single Tier or Double Tier case. The Double Tier Case accommodates both the 10° Constrained Insert Trial Tray and the Eccentric Trial Tray.

8000-0200
Double Tier Case

8000-0100
Single Tier Case

2402-1100
Trident 10° Constrained Insert Trial Tray

2402-3020
Trident 0° and All-Poly Constrained Insert Trial Tray

2402-3090
Trident 0° and All-Poly Constrained Insert Trial Lid

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A surgeon must always rely on his or her own professional clinical judgment when deciding whether to use a particular product when treating a particular patient. Stryker does not dispense medical advice and recommends that surgeons be trained in the use of any particular product before using it in surgery.

The information presented is intended to demonstrate the breadth of Stryker product offerings. A surgeon must always refer to the package insert, product label and/or instructions for use before using any Stryker product. The products depicted are CE marked according to the Medical Device Directive 93/42/EEC. Products may not be available in all markets because product availability is subject to the regulatory and/or medical practices in individual markets. Please contact your Stryker representative if you have questions about the availability of Stryker products in your area.

TRIDEN-SP-3
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