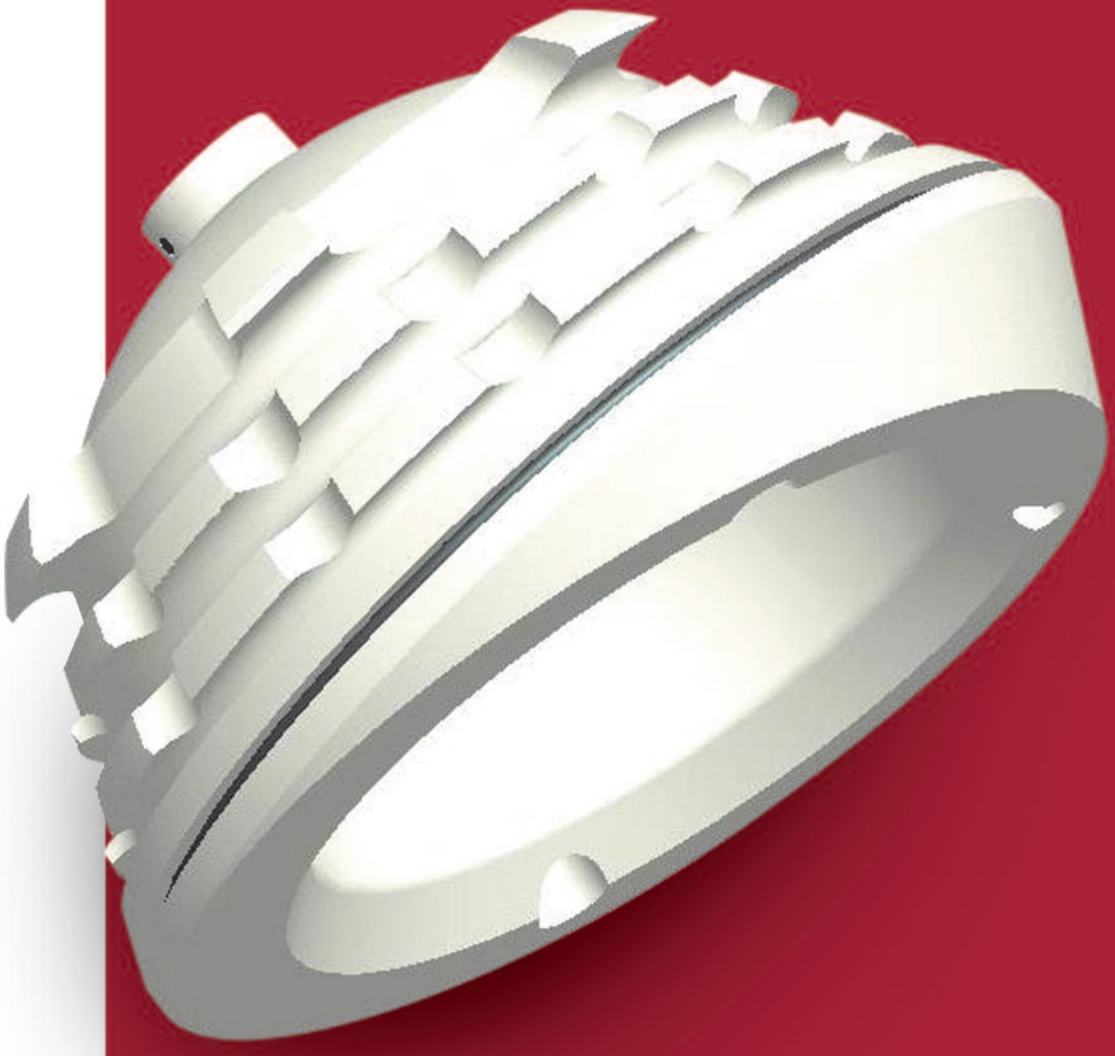
stryker

Orthopaedics

Polyethylene
Acetabular Cup

Surgical Technique



Polyethelene Acetabular Cup

Table of Contents

Indications

The indications for use for total hip arthroplasty include:

- 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, such as cementless fixation, as indicated by deficiencies of the acetabulum.

The Polyethylene Acetabular Cup is intended for Cemented use only.

Contraindications

- 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 post-operative care.
- Bone stock compromised by disease, infection or prior implantation which cannot provide adequate support and/or fixation to the cement mantle around the prosthesis.
- Skeletal immaturity.
- Obesity. An overweight or obese patient can produce loads on the prosthesis which can lead to failure of the fixation of the device or to failure of the device itself.

Warnings and Precautions

See implant package insert for warnings, precautions, adverse effects 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
- Proper size configuration is available

This publication sets forth detailed recommended procedures for using Stryker Orthopaedics devices and instruments. It offers guidance 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.

INTRODUCTION

This surgical protocol is a guide to preparing the acetabulum for the Polyethylene Acetabular Cup utilizing Exeter CuttingEdge instrumentation.

The Polyethylene Acetabular Cup is a highly cross-linked polyethylene cemented cup with a 10° face-changing rim, circumferential external grooves, and an X-ray wire to help easily identify the cup position on an X-ray. The Osteonics All Poly cups are available with an ID of 22.2 - 32 mm and an OD of 44 - 61 mm.

For sizing purposes the final Polyethylene Acetabular Cup used is to be 2mm smaller than the final reamer. Thus, if the largest reamer used is 56mm, then the cup used should be 54mm.

STEP 1

PRE-OPERATIVE PLANNING AND X-RAY EVALUATION

Pre-operative 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 intra-operative achievement of the established pre-operative goals.

Check all instruments and implants for any damage or defects before beginning the procedure.

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 (**Fig. 1**).

NOTE

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

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

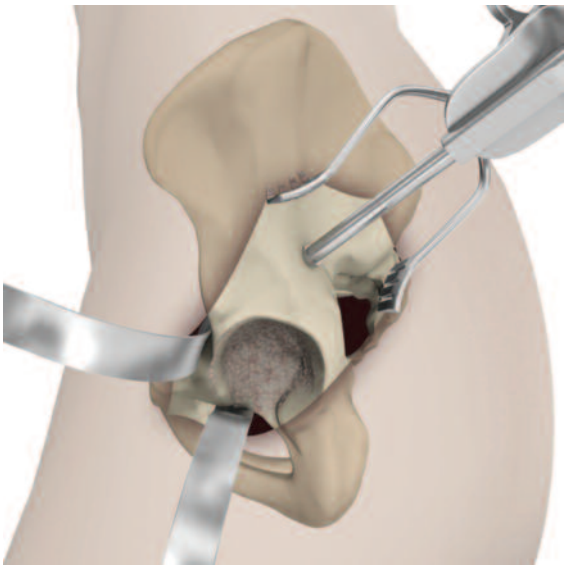


Figure 1

STEP 3

SOCKET PREPARATION

A. Spherical Reaming

To obtain optimal component positioning in the reaming process the reamer handle should be at 45° of abduction and 20° of anteversion (**Fig. 2**). The alignment guide, when perpendicular to the long axis of the patient, orients the reamer handle at 45° of abduction, thereby placing the axis of the spherical reamer at 45° of inclination. 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.

It is recommended that the initial reaming begin with a CuttingEdge 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 (**Fig. 3**). Reaming progresses in 1mm increments until final sizing is achieved.

Figure 2

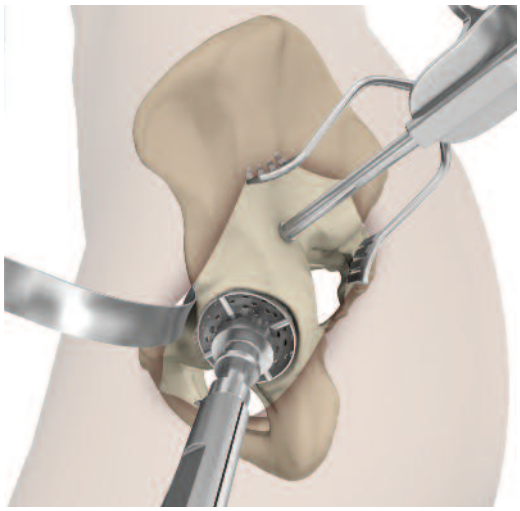


Figure 3

CAUTION

Only the CuttingEdge Spherical Reamers should be used to prepare the acetabulum.

CAUTION

All external alignment guides depend on knowing the patient is in a lateral decubitis 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.

TIP **William A. Leonne, Jr., MD**

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.

STEP 3

SOCKET PREPARATION *CONTINUED*

B. Final Reaming

The full profile of the Stryker 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 form the handle is performed by pulling back on the locking sleeve and rotating the reamer head a quarter-turn in a clockwise direction.

Care should be taken so as not to enlarge or distort the acetabulum by eccentric reaming. Final acetabular reaming ideally shows the hemispherical acetabulum denuded of cartilage, with the subchondral plate preferably intact. Where the subchondral bone is breached, cancellous bone will be exposed, which is an ideal surface for cement application. Holes will later be drilled into preserved subchondral bone for cement interdigitation.

Particular attention is paid to clear the rim of the acetabulum of cartilage and soft tissue and subchondral bone where possible, since it is important to achieve interdigitation of cement with bone in this area.

CAUTION

The CuttingEdge 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 may deflect to cut softer bone and resist hard bone. This situation may result in an irregularly shaped of enlarged acetabulum preparation.

STEP 4

TRIALING

Following the reaming procedure, a trial of the same diameter as the final implant size may be inserted into the reamed cavity. The trial may be used to assess fit, contact, and congruency of the trial with the acetabulum.

After choosing the appropriate size acetabular component, the cup is mounted on the cup introducer. A further rehearsal is made to ensure that the cup can be introduced through the soft tissues into the desired position without difficulty.

STEP 5

CEMENT FIXATION BONE PREPARATION

Thorough lavage of the socket is carried out to clean the interstices of the trabecular bone of bone debris, marrow and fat (**Fig. 4**). Fluid is sucked out of the wing of the ilium by the sucker aspirator (**Fig. 5**).

When the bone is clean, dry gauze swabs are packed into the acetabulum to further clean the bone and promote hemostasis.

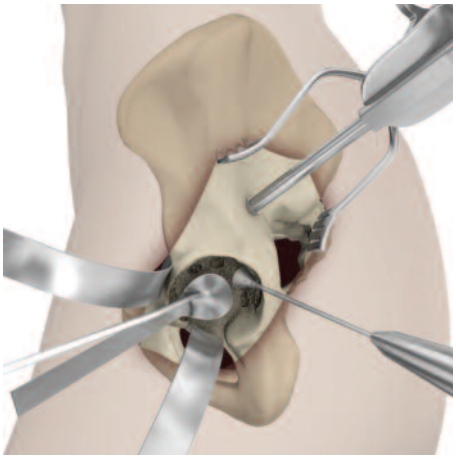


Figure 4

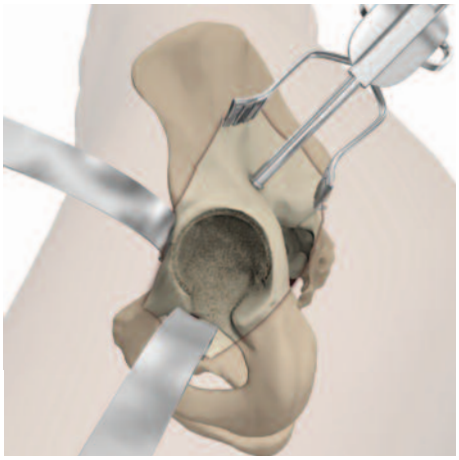


Figure 5

STEP 6

CEMENT INTRODUCTION

Cement mixing is commenced during the final bony preparation of the acetabulum. The cement may be handled approximately 3.5 minutes after commencement of mixing (Simplex cement at 20° centigrade). After introduction of the cement bolus, excess material is removed so the surface of the cement lies with a slightly concave surface within the mouth of the acetabulum. This step helps prevent the escape of surplus cement into the soft tissues when the acetabular pressurizer is used.

Pressurization of the cement is carried out using a disposable acetabular pressurizer on a handle (**Fig. 6**).

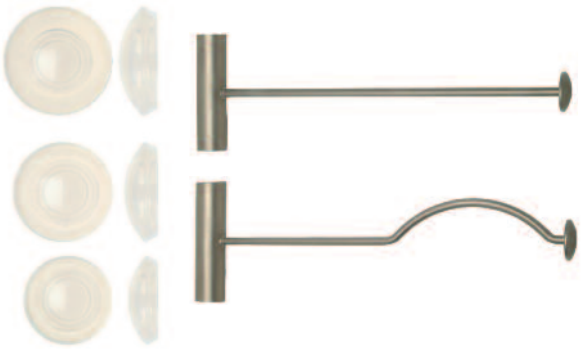


Figure 6

Three diameters are available so that an adequate seal can always be established at the socket rim. The pressurizing technique entails applying significant force onto the device to drive the cement into the bone and, by maintaining pressure, protect the bone cement interface from backbleeding from the host bone. The pressurizer is applied as soon as the cement has been placed in the acetabulum and full pressure is maintained until the cement viscosity has risen to a level suitable for cup insertion (**Fig. 7**), usually about 5 minutes after the commencement of mixing. In the elderly, or where a large surface area of open trabecular bone has been exposed, excess cement is pressurized into the acetabulum and a further bolus is required on top of the initial cement. This will become apparent when the pressurizer is removed. If more cement is to be used, then the existing cement should be clean and dry before it is applied.

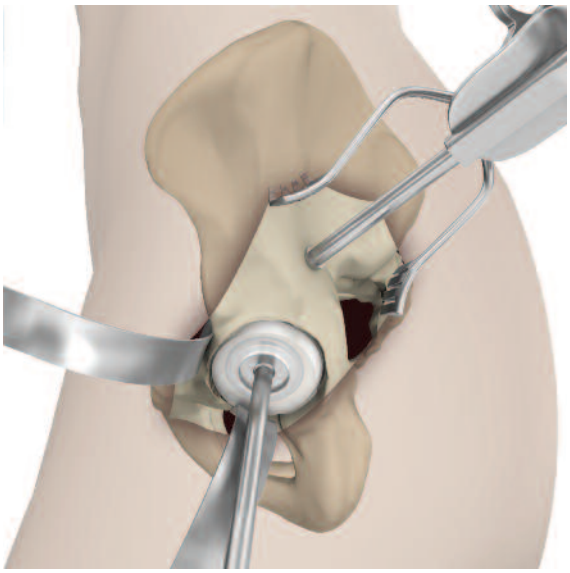


Figure 7

STEP 7

CUP IMPLANTATION

The appropriate size instrument ball for the cup positioner is selected to match the inner diameter of the cup insert. There are four sizes, 22 mm, 26 mm, 28 mm, and 32 mm. To assemble, thread the instrument ball onto the cup positioner, making sure the cup positioner is in the unlocked position. This will allow the instrument ball to be fully seated on the cup positioner. If the ball is not fully seated on the positioner, the ability of the instrument to properly hold the acetabular cup may be compromised.

The appropriate implant is then assembled to the cup positioner by placing the cup onto the instrument ball and pushing down on the top handle until it locks onto place; the scribe line on the prosthetic labrum should be aligned superior or where the trial procedure indicated. The silicon ring contained within the instrument ball expands when the top handle is in the locked position and holds the cup in place.

Once assembled, the implant/positioner assembly is positioned in the acetabulum with the top handle, in the locked position, aligned perpendicular to the plane of the floor. This puts the cup face angle at 45° of abduction. There are a total of five anteversion settings: 15° and 30° right or left, and neutral. To set the desired amount of anteversion, place the anteversion pin in the hole corresponding to the correct anteversion and either the right of left hip. By positioning the instrument so that the pin is 90° to the long axis of the patient, the cup face will be aligned with the selected amount of anteversion. To store the pin, place it in the hole on the inside of the handle.

Once the cup is properly positioned in the cement mantle and the cement is curing, lift up on the top handle to release the locking mechanism while still applying pressure to the cup. This will allow a firm pressure to be applied to the cup through the instrument ball only, without violating the integrity of the cement mantle.

Extra care should be taken to ensure the cup orientation is appropriately maintained and that the final position of the flange is at the prerehearsed position just within the mouth of the acetabulum. An axial cup pusher with head diameter corresponding to the cup ID is used to drive the cup into a

STEP 8

FINAL STEP

Clear any excess cement with a small curette (**Fig. 8**).

The post-operative radiograph should show good cement penetration and no radiolucent lines in any zone. The X-ray wire allows the surgeon to see the correct position of the cup.

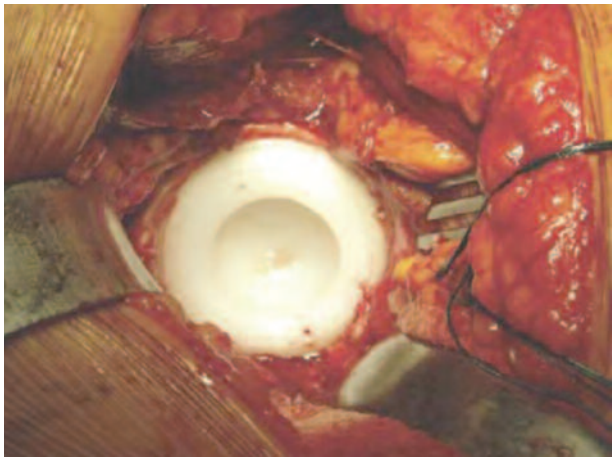


Figure 8

INSTRUMENT LISTING

Acetabular Cup Trials

Catalog Number	Outside Cup Diameter	Inner Bearing Diameter
2207-2240	40	22
2207-2244	44	22
2207-2248	48	22
2207-2252	52	22
2207-2256	56	22
2207-2261	61	22
2207-2644	44	26
2207-2646	46	26
2207-2648	48	26
2207-2652	52	26
2207-2654	54	26
2207-2656	56	26
2207-2658	58	26
2207-2661	61	26
2207-2844	44	28
2207-2846	46	28
2207-2848	48	28
2207-2850	50	28
2207-2852	52	28
2207-2854	54	28
2207-2856	56	28
2207-2858	58	28
2207-2861	61	28
2207-3248	48	32
2207-3252	52	32
2207-3254	54	32
2207-3256	56	32
2207-3258	58	32
2207-3261	61	32

Outside cup diameter includes built-in spacers.

INSTRUMENT LISTING

Cemented Cup Positioner Handle

	2104-1000

Pusher Heads

Used with the Cemented Cup Positioner Handle (2104-1000-63) for 22, 26, 28, 32mm inner bearing diameter cups.

22mm	2104-1022
26mm	2104-1026
28mm	2104-1028
32mm	2104-1032

Replacement O-Ring

22mm	992104-0022
26mm	992104-0026
28mm	992104-0028
32mm	992104-0032

Straight Handle (for acetabular cement pressurization)

	0935-0-001

Curved Handle (for acetabular cement pressurization)

	0935-0-002

Acetabular Cement Seal (5 pack)

Ø 54mm	0935-0-054
Ø 60mm	0935-0-060
Ø 66mm	0935-0-066

IMPLANT LISTING

Implant Listing

Polyethylene Acetabular Cup	Inner Diameter (mm)	Outer Diameter (mm)
61-2240	22	40
61-2244	22	44
61-2248	22	48
61-2252	22	52
61-2256	22	56
61-2261	22	61
61-2642	26	42
61-2644	26	44
61-2646	26	46
61-2648	26	48
61-2652	26	52
61-2654	26	54
61-2656	26	56
61-2658	26	58
61-2661	26	61
61-2844	28	44
61-2846	28	46
61-2848	28	48
61-2850	28	50
61-2852	28	52
61-2854	28	54
61-2856	28	56
61-2858	28	58
61-2861	28	61
61-3248	32	48
61-3252	32	52
61-3254	32	54
61-3256	32	56
61-3258	32	58
61-3261	32	61

Outside cup diameter includes built-in spacers.

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