



Surgical Technique

Amplitude is an internationally renowned orthopaedic company that has built a reputation for exceptional engineering, reliable clinical results, and cohesive collaboration with the world's leading surgeons.



Table of Contents

saturne® Acetabular Cup	4
Surgical Technique Overview	6
Pre-Operative Planning	8
Step 1 - Acetabular Preparation	9
Step 2 - Acetabular Trialling & Positioning	10
Step 3 - Implant Impactor Assembly	11
Step 4 - Final Cup Insertion	13
Step 5 - Final Cup Impaction	13
Step 6 - Trial Reduction	14
Step 7 - Femoral Head & Liner Assembly	15
Step 8 - Final Implant Reduction	16
Instrumentation	17
Appendix A - saturne® cemented	20
Appendix B - saturne® reconstruction	22

saturne® Acetabular Cup

Amplitude's **saturne®** system is a range of dual mobility acetabular cups suitable for primary and reconstruction total hip arthroplasty. Launched in Europe in 2000, the range includes cementless, cemented, and reconstruction options with more than 10 years' clinical use in Australia.

The dual mobility concept emerged in France in 1974 and is now recognised for reducing the risk of dislocation through broad articulation with the liner and the use of small head diameters to reduce wear.

saturne®'s hemispherical cup features an anatomical cut-out designed to optimise fit around the posterior edge of the acetabulum. The depth of the cut-out is proportionate to the diameter of each cup size.

The cup shape is identical for the **saturne®** cementless, cemented and reconstruction versions, enabling them to share the same instrumentation and liner range. **saturne®** cementless is the most commonly used of the three implant options.

This technique describes the surgical steps primarily for implanting the **saturne®** cementless components - please see Appendices A and B for additional information and surgical steps for the cemented and reconstruction cups.

saturne® cementless

	Ø44mm	Ø46mm	Ø48mm	Ø50mm	Ø52mm	Ø54mm	Ø56mm	Ø58mm	Ø60mm	Ø62mm	Ø64mm
saturne® cup											
Ø22.2mm liner											
Ø28mm liner											

*Blue highlighted implants are sent as standard in Australia. Other liner sizes available upon request.

Material

The cementless **saturne®** is made from Stainless Steel (M30NW) with a dual coating of plasma-sprayed titanium 80 µm + Hydroxyapatite (HA) 80 µm.

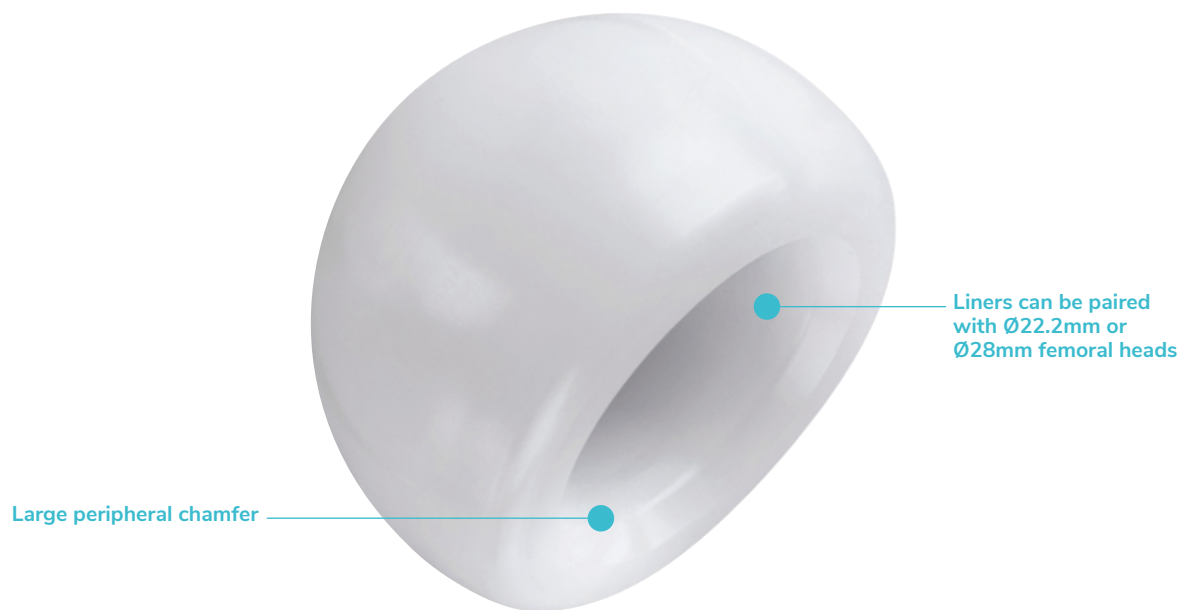
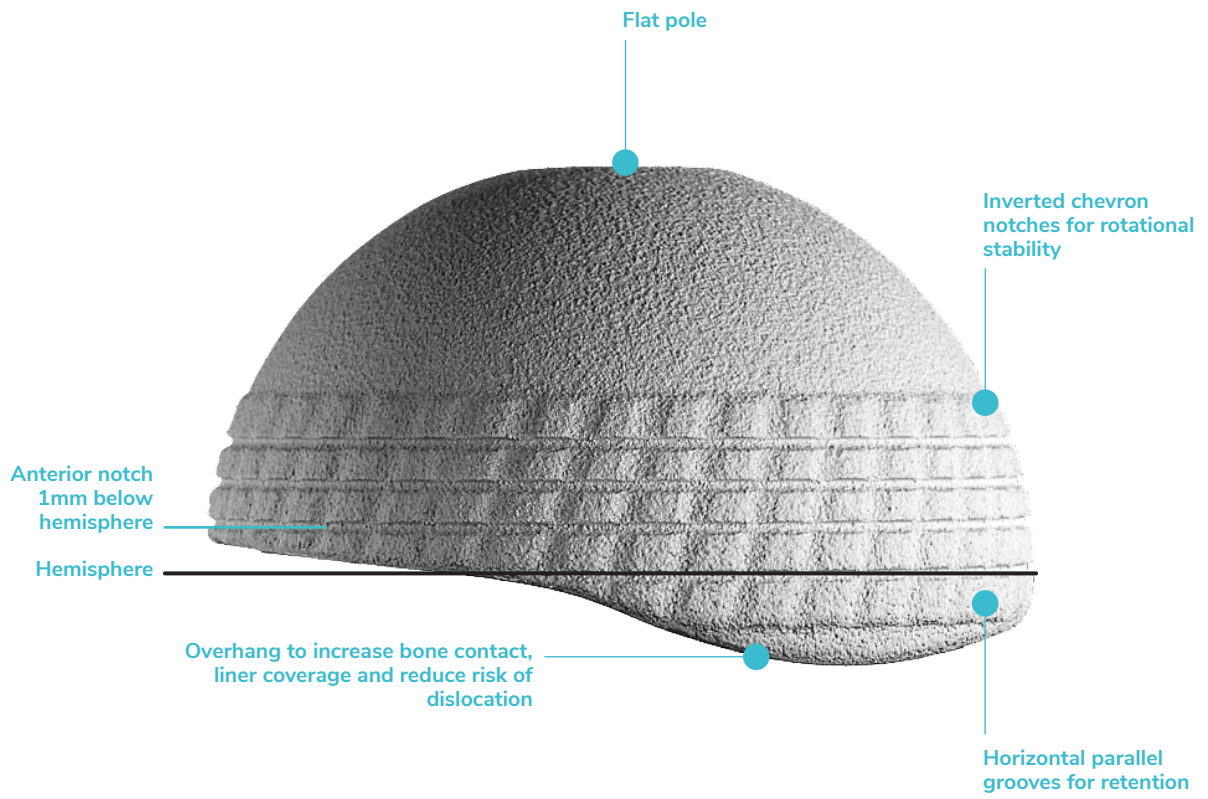
The liner is made of Ultra High Molecular Weight Polyethylene (UHMWPE).

Fixation

Primary fixation is achieved with the 0.5 mm press-fit on the peripheral rim and enhanced by the inverted chevron notches and horizontal parallel grooves around the cup equator. The flat pole of the cup helps to disperse impaction loads and avoid contact with the bone to maximise the press-fit around the rim.


Range of Motion

The absence of screw holes makes the articulating surface completely smooth and uninterrupted. The large peripheral chamfer at the threshold of the head socket provides a greater range of motion without contact with the stem neck. This reduces the risk of dislocation and polyethylene wear. The rounded, highly polished cup rim prevents liner abrasion during joint reduction, lowering the risk of pain caused by psoas impingement.



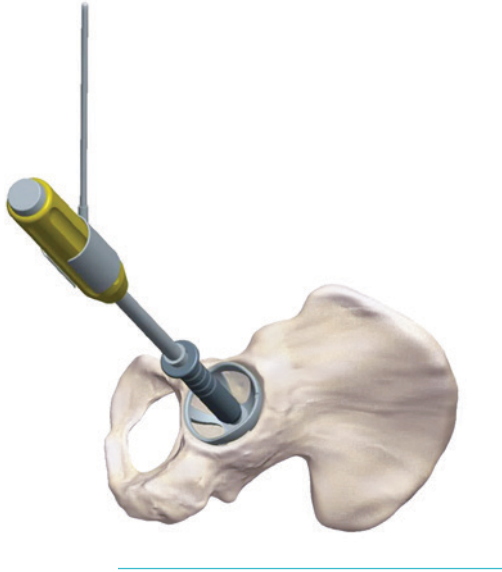
Surgical Technique Overview

1
Acetabular Preparation




This diagram illustrates the first step of the surgical technique: acetabular preparation. A long, silver, cylindrical retractor is positioned over the acetabulum of a human pelvis. The retractor's distal end is inserted into the acetabulum, and its proximal end is held at an angle. The retractor is used to create a smooth, spherical socket in the bone.

2
Acetabular Trialling and Positioning



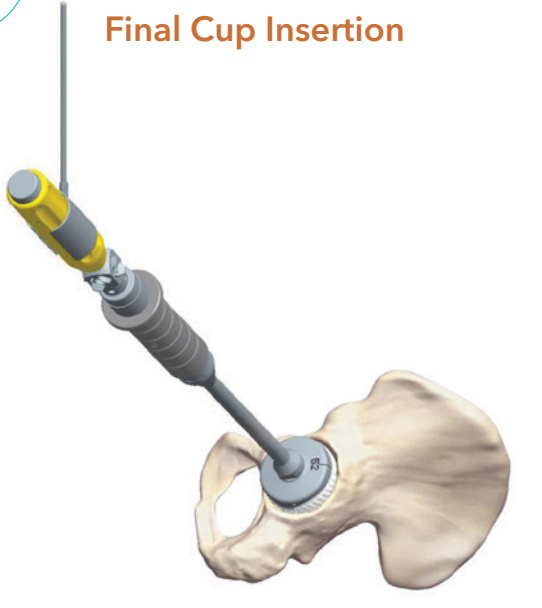
This diagram shows the second step: acetabular trialling and positioning. A yellow and grey impactor is used to position a trial cup within the prepared acetabulum. The impactor is held at an angle, and the trial cup is being pushed into the socket. The impactor's handle is yellow and grey, and the cup is grey.

3
Implant Impactor Assembly



This diagram illustrates the third step: implant impactor assembly. A yellow and grey impactor is shown in a vertical orientation. The impactor is used to assemble the final implant into the acetabulum. The impactor's handle is yellow and grey, and the cup is grey.

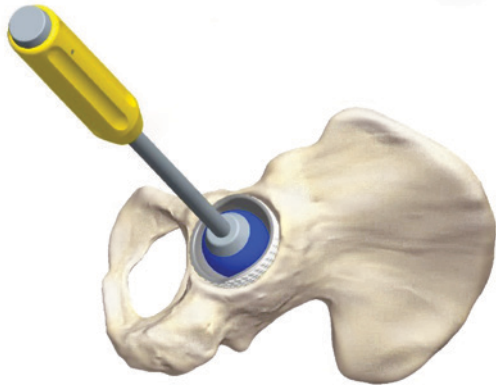
4
Final Cup Insertion



This diagram shows the final step: final cup insertion. The impactor is used to insert the final cup into the acetabulum. The impactor is held at an angle, and the cup is being pushed into the socket. The impactor's handle is yellow and grey, and the cup is grey.

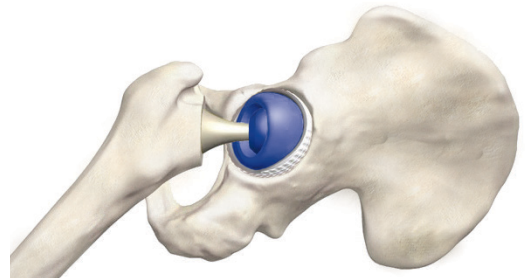
5

Final Cup Impaction



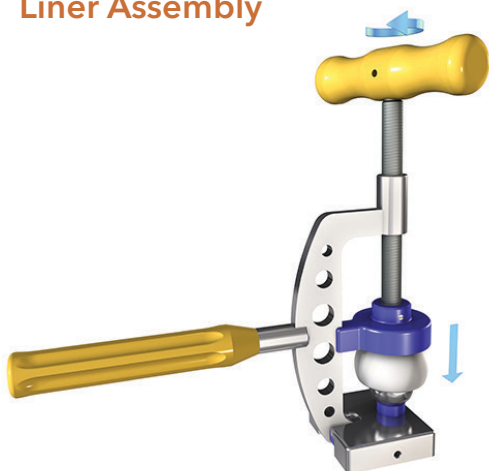
6

Trial Reduction



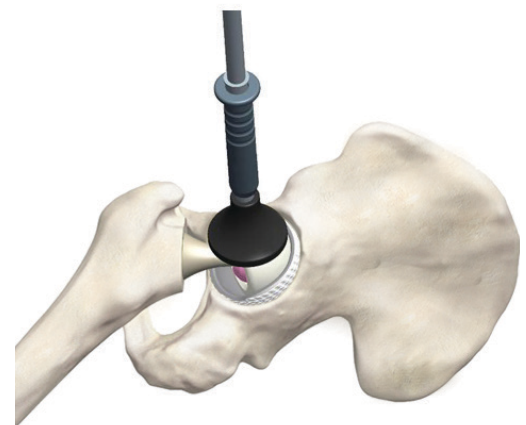
7

Femoral Head and Liner Assembly

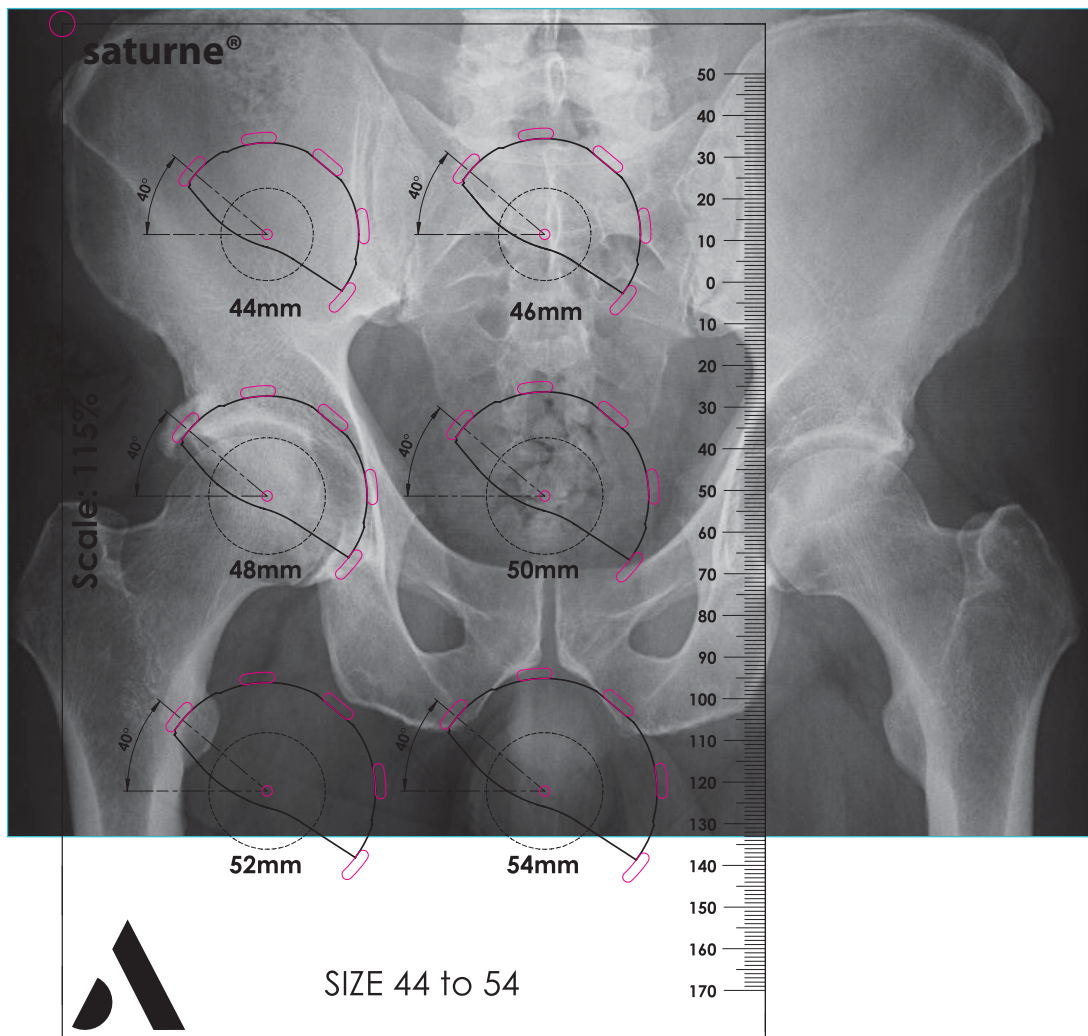


8

Final Implant Reduction



Pre-Operative Planning



saturne® templates are available in hard copy and electronic files for pre-operative planning.

Templates are provided to:

- Determine the joint centre
- Identify the depth of the acetabulum
- Assess the position of the cup
- Determine the cup size

NOTE

The provided templates have a 1:15 scale but are also available with other scaling upon request.

1 Acetabular Preparation

1. Remove any peripheral osteophytes and resect the labrum. Make sure to remove any osteophytes that could obstruct cup placement.
2. Prepare the acetabulum by starting with an acetabular reamer four to five sizes below the planned size.
3. Gradually increase the reamer diameter until good peripheral support is achieved and bleeding subchondral bone has been exposed.
4. Clear out the base of the acetabulum, making sure to remove any bone fragments that could interfere with placement of the trial cup.



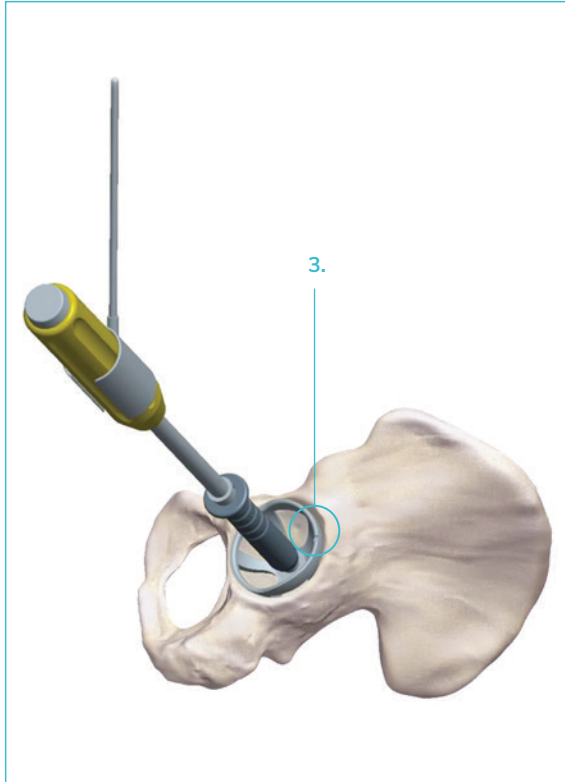
NOTE

The recommended reaming technique for the saturne® cup is line-to-line with the final implant size.

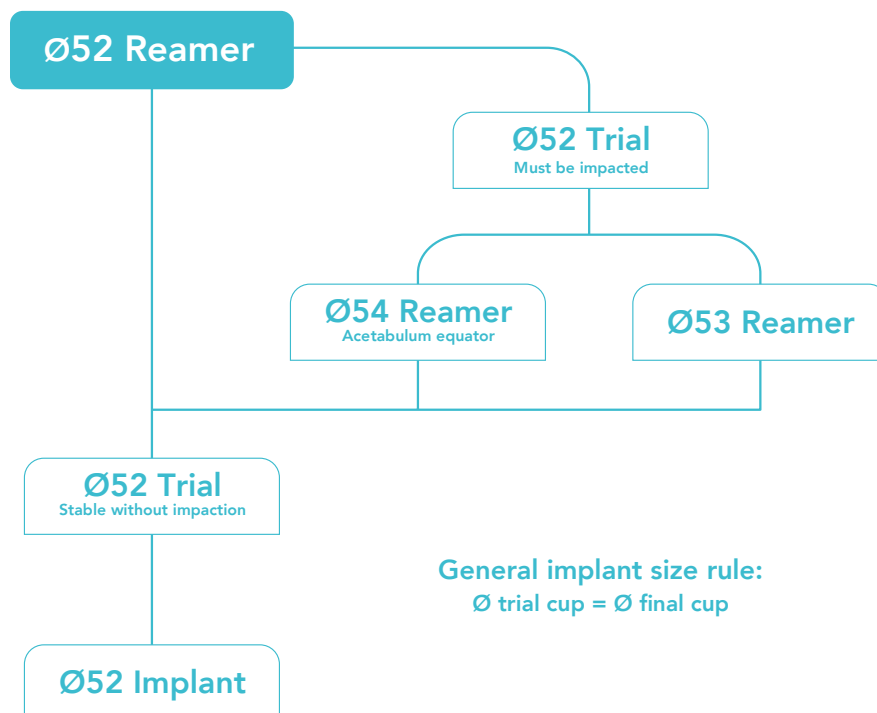
NOTE

Make sure not to go past the acetabular fossa (external lamina). The reamed cavity must be completely circular.

2 Acetabular Trialling & Positioning



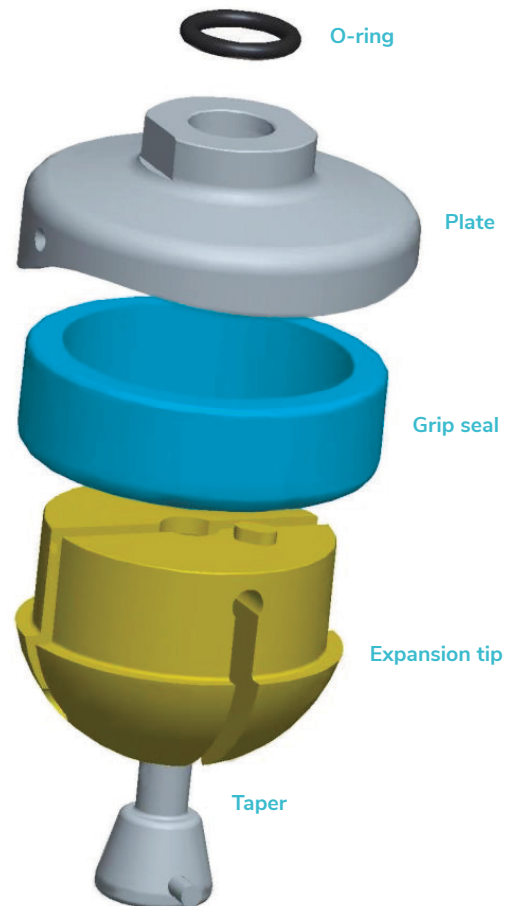
1. Assemble a trial cup on the universal handle. The chosen size must be the same diameter as the last reamer used. The trial has the same dimensions as the implant, without taking into account the press-fit. The alignment guide can be placed on the impactor handle to set a 45° angle relative to the vertical plane.
2. Introduce the trial cup while maintaining the inclination and anteversion providing the best bone coverage. The trial cup must make contact with the entire perimeter of the acetabulum and be stable without any protrusion.
3. The notch on the top of the trial cup must be positioned in the axis of the obturator foramen and across from it (180°).
4. When the cup diameter and position are validated, mark the position on the acetabulum (with the diathermy), aligned with the notch. The final implant has a corresponding laser mark that should be aligned with the recorded position in order to accurately reproduce the orientation.



3 Implant Impactor Assembly

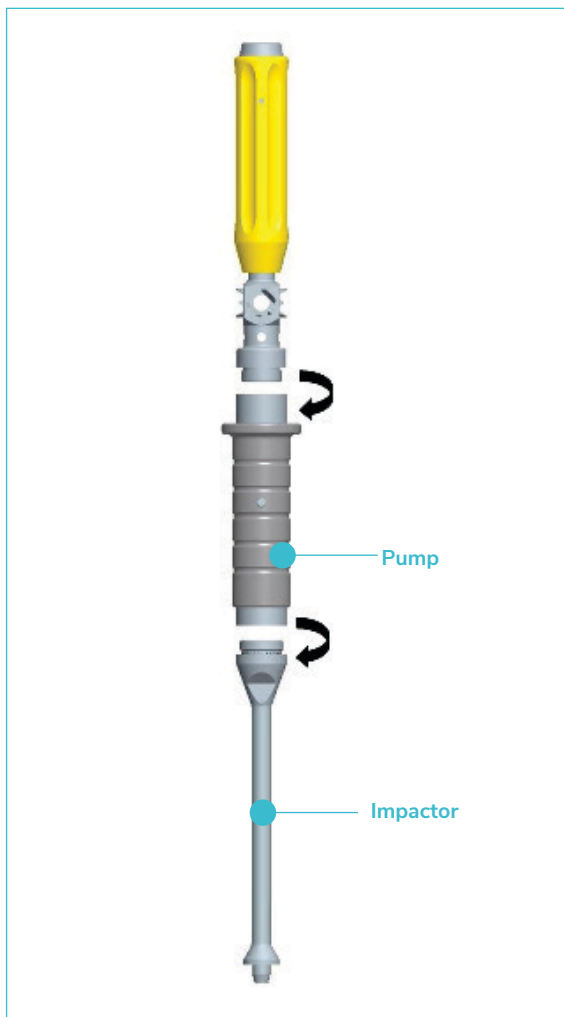
Cup Impactor Tip Assembly

1. Select the cup impactor set that matches the size of the final implant.
2. Gather the five cup impactor components (O-ring, plate, grip seal, expansion tip, and taper) and ensure that the plate and the expansion tip are the same size (check engraving on the instruments).
3. Assemble the components as shown and align the peg of the expansion tip so that it fits inside the slot in the plate.



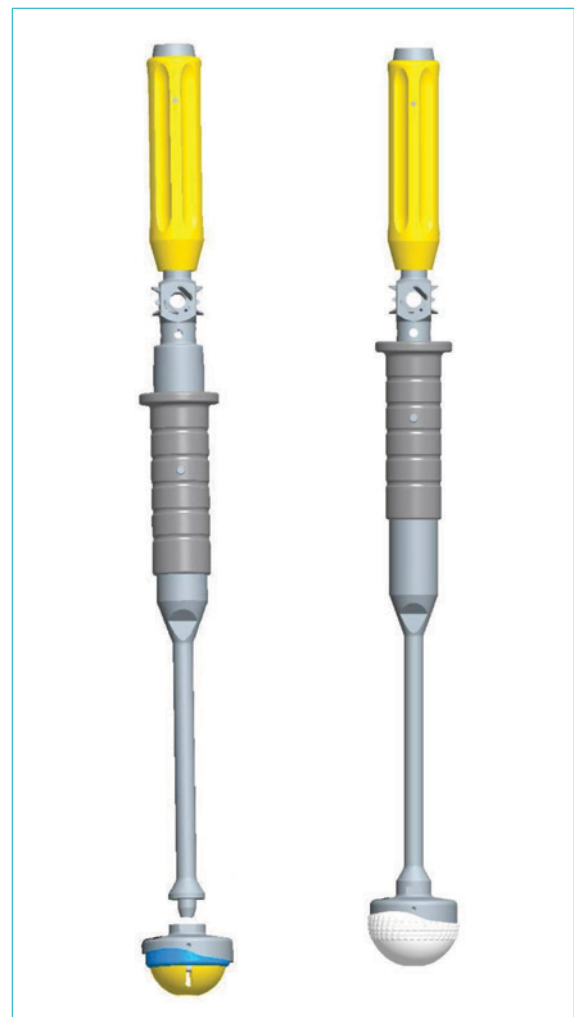
NOTE

The grip seal has a flat side and a rounded side. The flat side must be flush with the metal plate and the rounded side sits under the step cut out on the expansion tip. It is important to have the seal in the correct orientation to achieve vacuum retention with the cup.



Vacuum Impactor Assembly

1. Attach the pump to the handle using the screw thread.
2. Place the slider in the UNLOCK position.
3. Thread the impactor extension onto the assembly and tighten using the spanner.

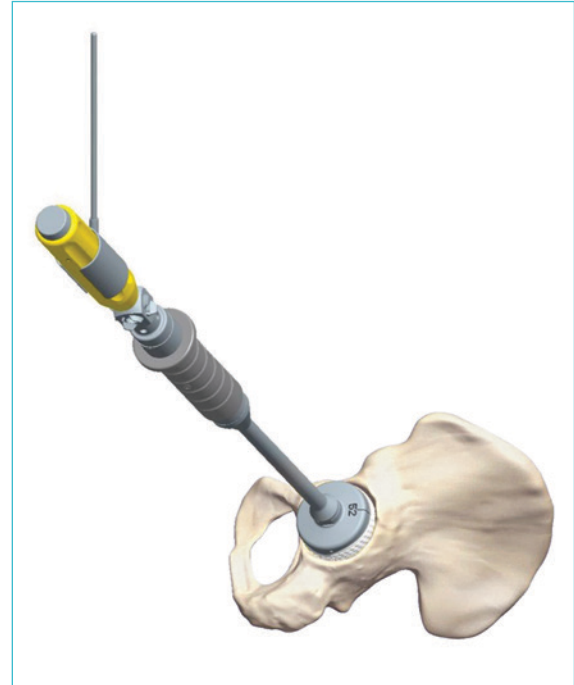


Final Cup Attachment

1. Partially screw the impaction tip to the vacuum impactor assembly (4 to 5 rotations) but do not fully tighten. Final tightening should be done once the implant is positioned on the cup.
2. Place the cup on the impaction tip, aligning the laser mark on the rim of the cup with the groove at the top of the impaction tip.
3. Tighten the impaction tip until a good resistance is achieved (5 to 6 rotations).
4. Pull down and twist the pump slider into the "LOCK" position.

4 Final Cup Insertion

1. Slide the alignment guide collar onto the impactor handle.
2. Position the definitive cup into the prepared acetabulum. Align the laser mark on the impactor with the marking made on the bone to ensure the cut out is in the optimal orientation.
3. Seat the cup with a series of firm mallet blows on the end of the impaction handle
4. Once the cup is fully seated and stable, pull back on the slider and twist 90° to the UNLOCK position to release the vacuum lock and remove the handle from the implant.

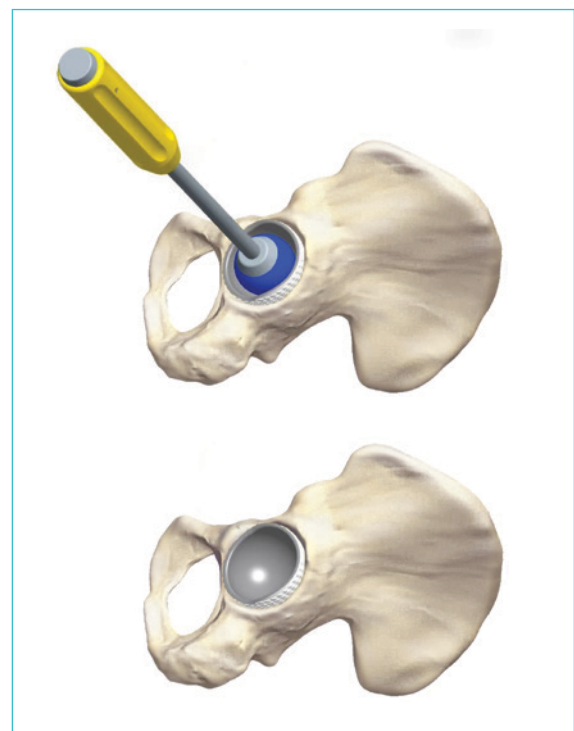


5 Final Cup Impaction

1. After inspecting the cup position, finish impacting the implant with the final cup impactor.

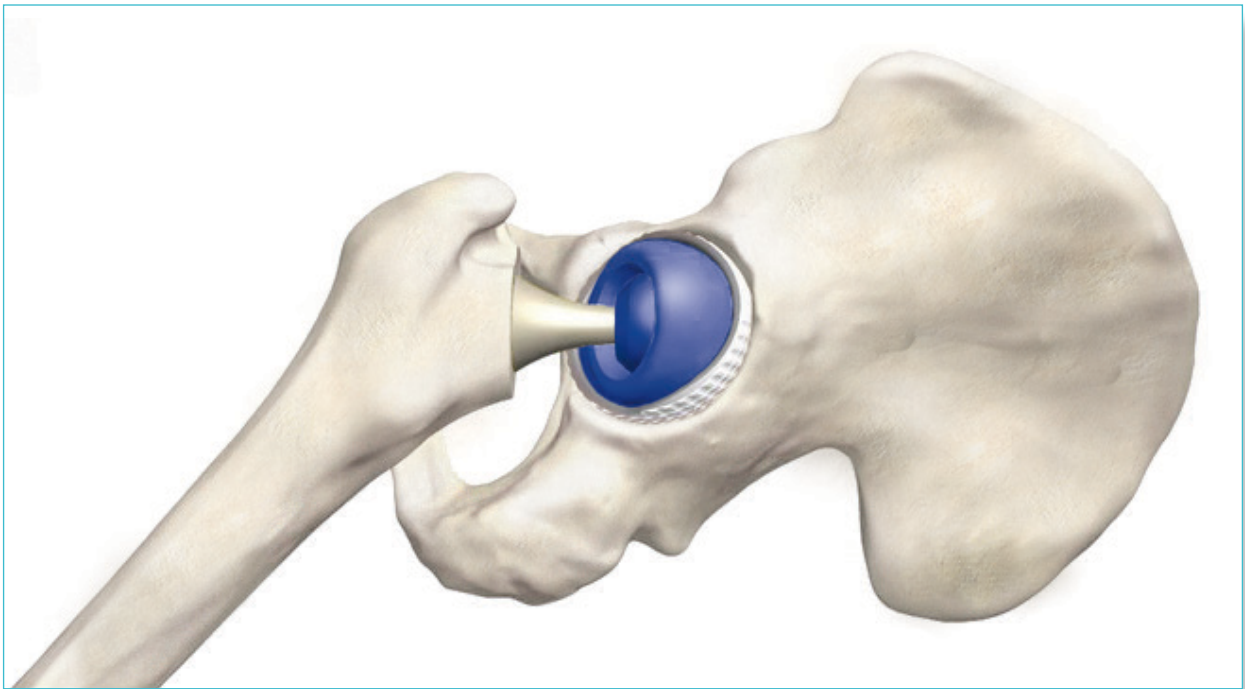
NOTE

If minor adjustments are required to the cup orientation in situ, the final cup impactor has a cut out which allows it to sit on the rim of the final implant for reorientation without damaging the definitive implant.

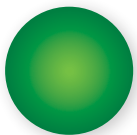


6 Trial Reduction

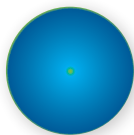
1. Select the trial liner for dual mobility of the same size as the final cup, and matching the desired femoral head size.
2. Perform mobility and stability trials with the femoral stem in place.
3. Remove all trial components when stability is validated.



Trial liners use the following colour code matching the corresponding head trial:



ø22mm



ø28mm



short neck



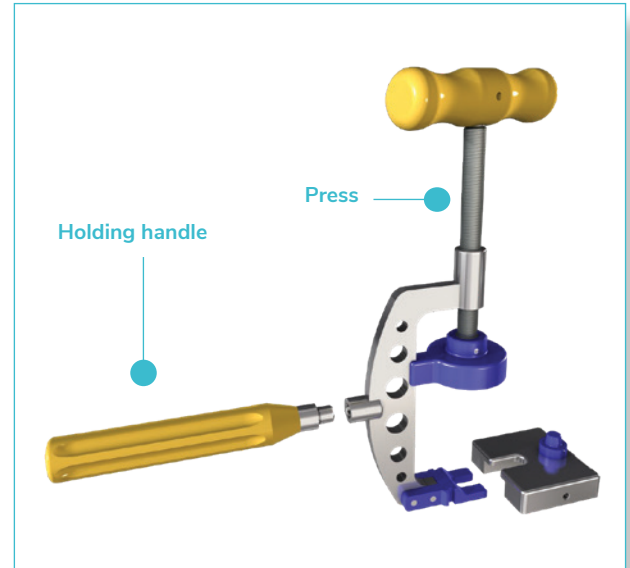
medium neck



long neck

7 Femoral Head & Liner Assembly

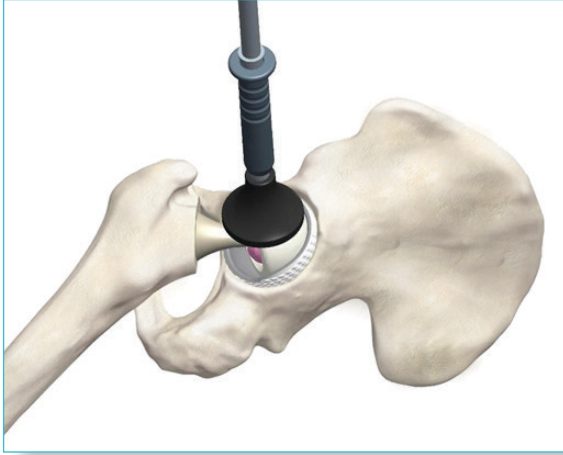
1. Thread the holding handle onto the dual-mobility liner press until secure. Slide the press base onto the assembly, ensure the blue head holder is facing upwards. Fully loosen the T-handle to completely open the press.
2. Place the definitive femoral head onto the blue holder on the base.



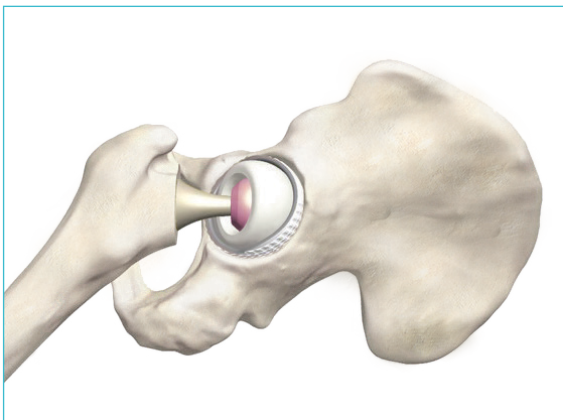
3. Place the definitive liner over the top of the head and hold in position with fingers either side while turning the T-handle to compress the liner onto the femoral head. An audible noise indicates that the liner's retaining mechanism has been cleared. Continue to turn the T-handle until a second noise is heard or the handle reaches the end of its travel. This will eliminate any air caught within the liner.
4. Make sure the head can move freely within the liner before moving to the next step.



8 Femoral Head & Liner Assembly



1. Place the femoral head and liner on the stem taper.
2. Impact and reduce the joint using the liner impaction tip assembled on the universal handle.

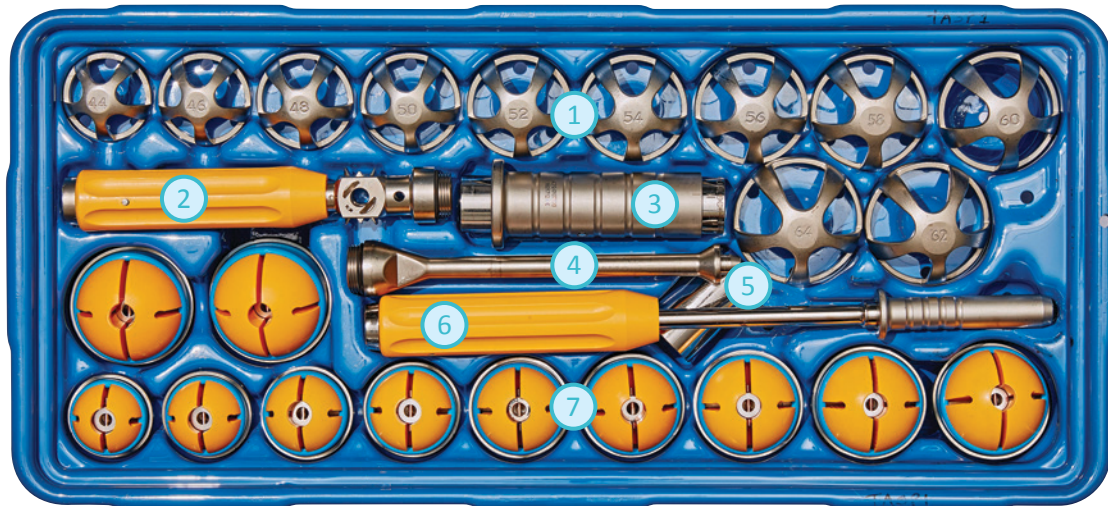


NOTE

Make sure there are no foreign bodies between the liner and cup during the reduction step.

Instrumentation

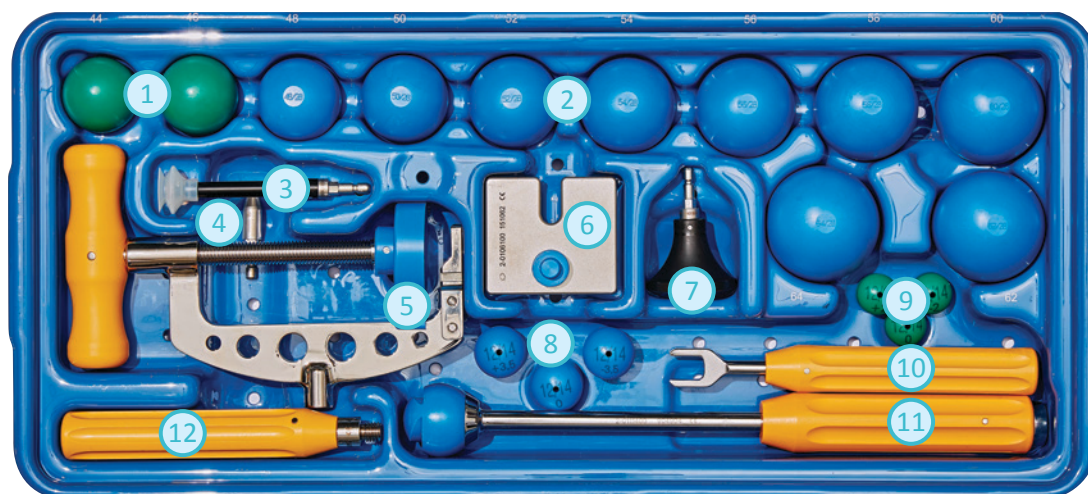
Vacuum Impactor Cup Trials Tray



KEY	DESCRIPTION	REFERENCE	QTY
1	Trial Dual Mobility Cup - Sizes 44 to 64	2-0105844 to 2-0105864	1ea
2	Dual Mobility Cup Handle - Conventional/Navigated	2-0107800	1
3	Pump Impactor for Dual Mobility Cup	2-0107700	1
4	Extension for Dual Mobility Cup Impactor	2-0116700	1
5	Cup Alignment Guide	2-0102000	1
6	Universal Handle	2-0101000	1
7	Dual Mobility Cup Handle/Impactor - Sizes 44 to 64	2-0108144 to 2-0108164	1ea

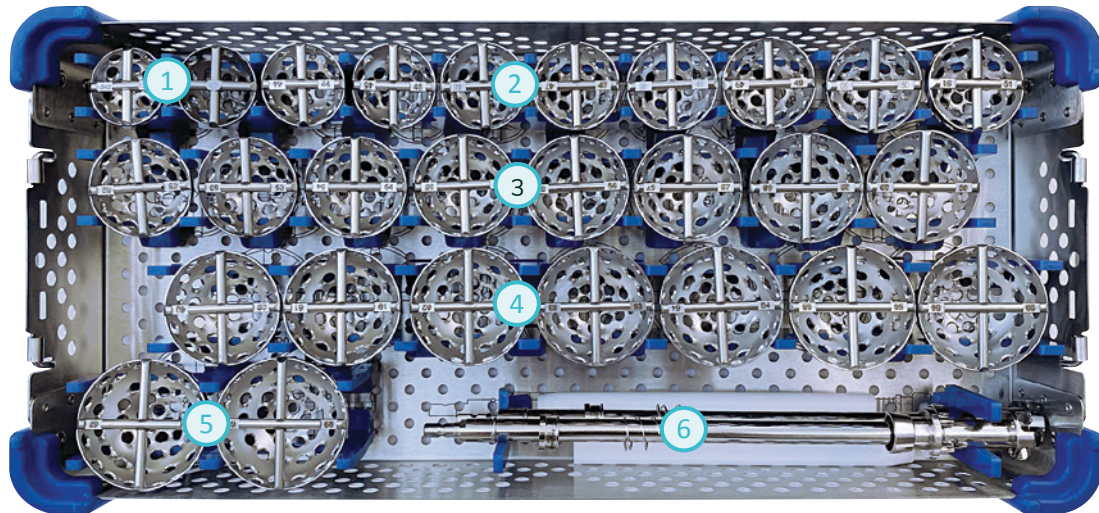
Instrumentation

Liner Trials Tray



KEY	DESCRIPTION	REFERENCE	QTY
1	Trial Liner for Dual Mobility Cup - Sizes 22/44 - 22/46	2-0105644 - 2-0105646	1ea
2	Trial Liner for Dual Mobility Cup - Sizes 28/48 - 28/64	2-0105748 - 2-0105764	1ea
3	Insert Extractor Impactor	2-0107600	1
4	Hex Driver Adaptor	2-0106400	1
5	Dual Mobility Press + 12/14 Fork (attached to press)	2-0105900 / 2-0113100	1
6	Base for Press (Includes Blue Post)	2-0106100	1
7	Head Pusher	2-0107000	1
8	Trial Heads - Blue - Size 28 - S,M,L	2-0196101 - 2-0196103	1ea
9	Trial Heads - Green - Size 22 - S,M,L	2-0196104 - 2-0196106	1ea
10	Wrench	2-0205500	1
11	Dual Mobility Final Impactor	2-0111400	1
12	Holding Handle for Clamp	2-0104200	1

Acetabular Reamer Tray



KEY	DESCRIPTION	REFERENCE	QTY
1	Reamer Head 42mm - 43mm	2-0192942 - 2-0192943	1ea
2	Reamer Head 44mm - 51mm	112-092-044 - 112-092-051	1ea
3	Reamer Head 52mm - 59mm	112-092-052 - 112-092-059	1ea
4	Reamer Head 60mm - 66mm	112-092-060 - 112-092-066	1ea
5	Reamer Head 67mm - 68mm	112-092-067 - 112-092-068	1ea
6	Reamer Handle + White Sleeve	112-092-005	2

Appendix A - saturne[®] cemented

The saturne[®] cemented cup was launched in 2003 and is suitable for primary and reconstruction total hip arthroplasty.

Material

The saturne[®] cemented cup is made from Stainless Steel (M30NW). The exterior surface has cement grooves and a microblasted surface finish.

Range

There are 9 sizes of the saturne[®] cemented cup: Ø44 to Ø60mm.

Fixation

The external grooved surface ensures even cement distribution and implant stability – vertical grooves for rotational stability, and horizontal grooves for axial stability.

Surgical Technique

The surgical technique for the cemented cup is exactly the same as for saturne[®] cementless cups, except for the following steps:

Step 2 - Acetabular Trialling and Positioning

1. Determine the stability of the trial cup; if it is easily seated in the prepared acetabulum you should select a final implant the same size as the trial.
2. If the trial cup has a tight fit to the acetabulum it is recommended to select a final implant that is one size smaller than the trial to allow for a cement mantle.

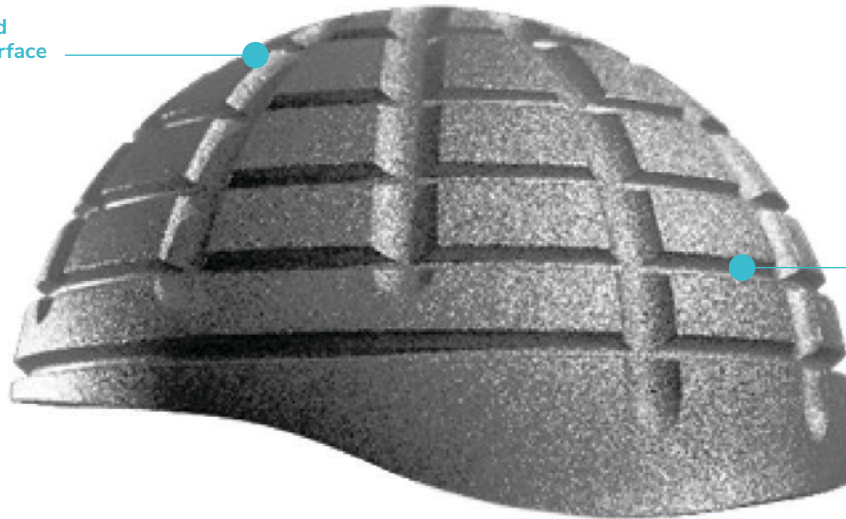
Step 5 - Final Cup Impaction

Once the cup has been impacted into the cement using the vacuum impactor, it is advised to use the final implant impactor instrument to apply pressure to the cup and hold in place whilst the cement cures.

Step 3 - Implant Impactor Assembly

3. When assembling the final implant to the impactor tip, the cemented cup does not need to be assembled as tightly as the cementless version.
4. Attach with slightly fewer rotations (2-3) in order to be able to remove the impactor more easily, without affecting the position of the cup whilst the cement is setting.

Grit-blasted external surface



























Cement-spreading groove



Mirror polished inner surface

saturne® cemented

	Ø44mm	Ø46mm	Ø48mm	Ø50mm	Ø52mm	Ø54mm	Ø56mm	Ø58mm	Ø60mm
saturne® cup									
Ø22.2mm liner									
Ø28mm liner									

*Blue highlighted implants are sent as standard in Australia. Other liner sizes available on request.

Appendix B - saturne® reconstruction

The saturne® Reconstruction cup was launched in 2000 and is specially designed for reconstruction total hip arthroplasty.

Material

saturne® is made from Stainless Steel (M25W) with a dual coating of plasma-sprayed titanium 80 µm + Hydroxyapatite (HA) 80 µm.

Fixation

The hemispherical cup has a flattened pole to maximise the press fit effect. Two pre-shaped, malleable and separable fixation flanges angled at 35° can be used with any available Ø4.5mm screws. The positioning hook inserts into the obturator foramen.

Range of motion

The chamfers on the internal aspect of the liner provide a greater range of motion without contact with the stem neck. This reduces the risk of polyethylene wear due to impingement. The rounded, highly polished cup rim also prevents liner abrasion during joint reduction.

Surgical Technique

The surgical technique for saturne® reconstruction is exactly the same as for saturne® cementless cups, except for the following steps:

Step 3 - Implant Impactor Assembly

The flanges of the saturne® reconstruction cup must be orientated to sit flush against the wall of the acetabulum when seated. This can be done before or after impaction on the cup:

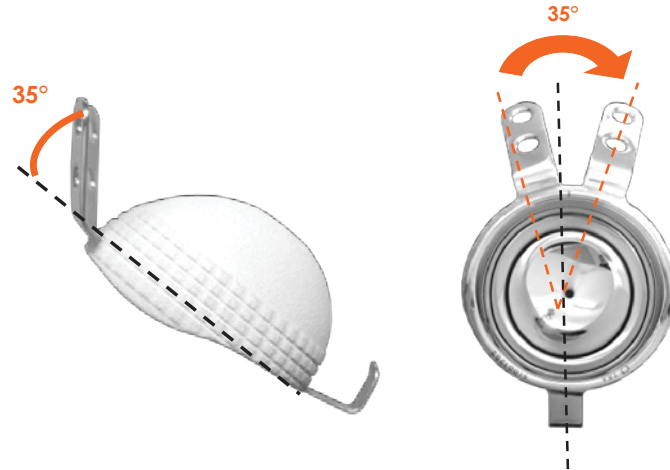
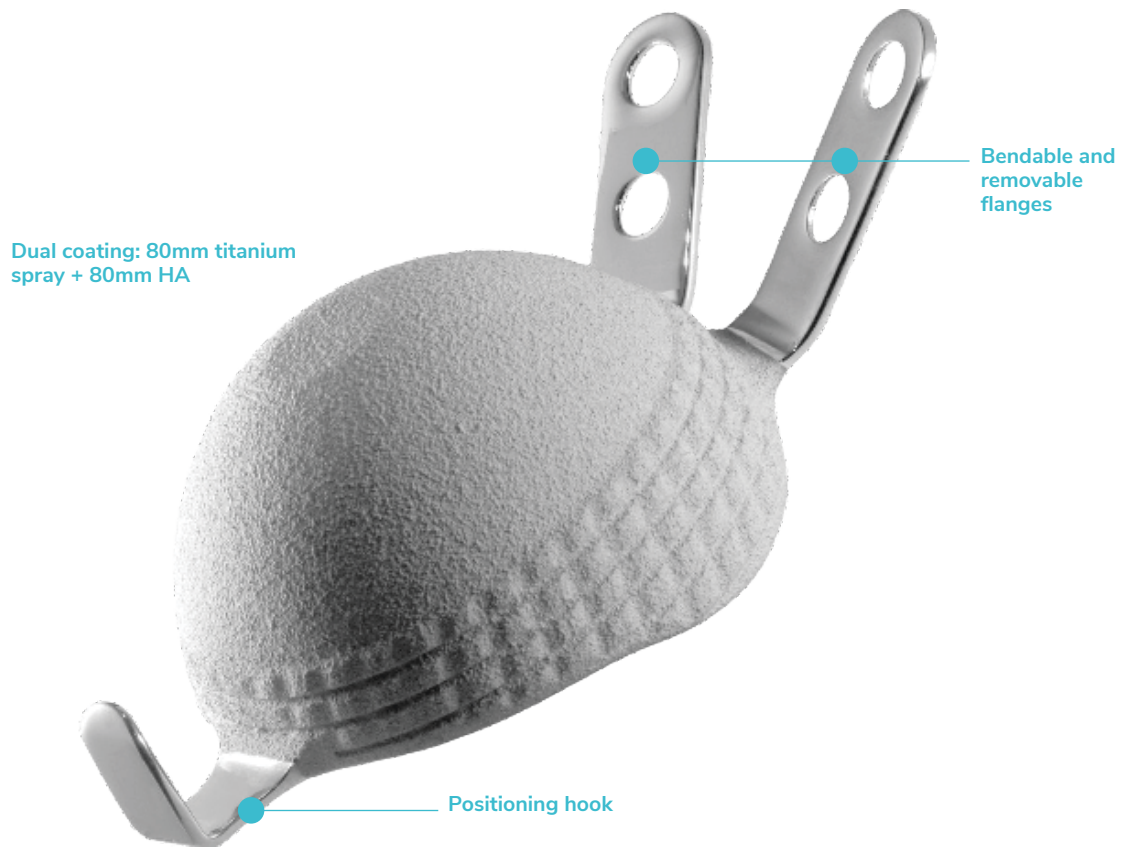
- **Before:** Position the cup in the prepared acetabulum by hand to assess the angles required for the flanges. Remove the cup from the acetabulum and use the flange bender instrument to adjust the angle of the flanges on the back table. Assemble the final cup on the impaction handle to be impacted into the prepared acetabulum.
- **After:** Assemble the final cup on the impaction handle and impact the cup until it is seated with a good fixation in the prepared acetabulum. Using the flange bender, adjust the angles of the flanges until they are flush with the acetabulum walls.

Step 4 - Final Cup Impaction

1. Position the final cup in the acetabulum making sure the hook is positioned at the top of the obturator foramen. Impact the cup in the acetabulum. It is important to anchor the cup well with the positioning hook to prevent over inclination of the cup.
2. Remove the instrumentation and further impact with the final impactor.
3. Secure the saturne® reconstruction cup fixation using Ø4.5 mm cortical bone screws.

NOTE

Up to 4 screws can be inserted depending on the fixation requirements and bone quality, in most cases 2 well-fixed screws should suffice.



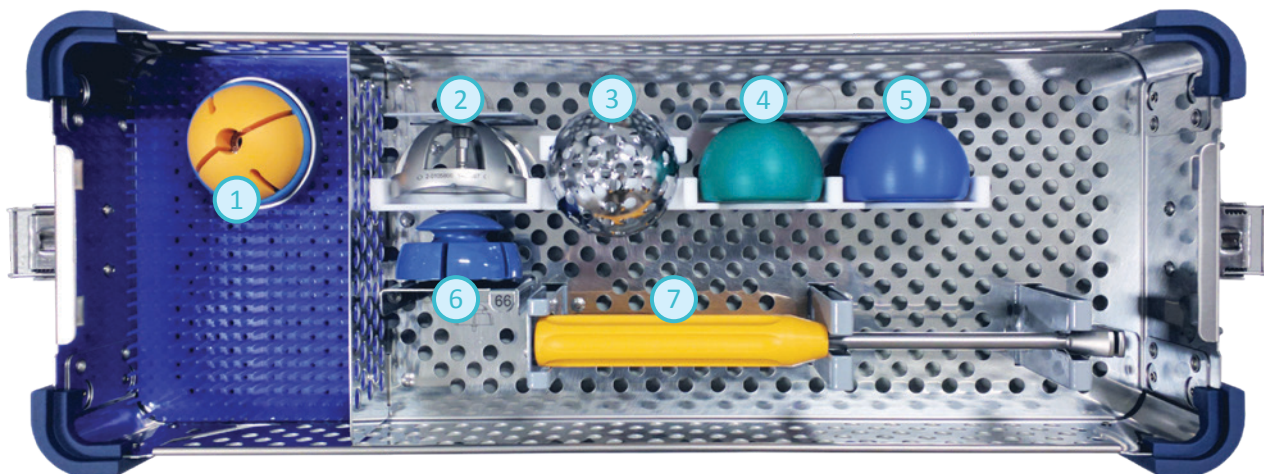
saturne® reconstruction

	Ø50mm	Ø52mm	Ø54mm	Ø56mm	Ø58mm	Ø60mm	Ø62mm	Ø64mm	Ø66mm
saturne® cup									
Ø22.2mm liner									
Ø28mm liner									

*Blue highlighted implants are sent as standard in Australia. Other liner sizes available on request.

Instrumentation

Reconstruction Tray



KEY	DESCRIPTION	REFERENCE	QTY
1	Dual mobility cup handle/impactor Size 66	2-0191066	1
3	Acetabular reamer Ø66	MFR3100661	2
2	Trial Liner for Dual Mobility Cup - Sizes 66	2-0105866	9
4	Trial liner for dual mobility cup Size 66/22	2-0105666	1
5	Trial liner for dual mobility cup Size 66/28	2-0105766	1
6	saturne® impactor tip Size 66	2-0199566	1
7	Flange bender	2-0108900	1



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