



Trinity™

Advanced bearing acetabular system
Surgical Technique

Corin
Connected Orthopaedic Insight



Trinity™

Performance | Versatility | Technology

2

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Description

The Corin Trinity™ Acetabular System is a modular acetabular cup system consisting of a press fit, titanium alloy shell for use with either ceramic¹ or polyethylene liners and a dedicated range of ceramic (i.e. BIOLOX® delta) and cobalt chrome alloy modular 12/14 taper femoral heads providing ceramic on ceramic¹, ceramic on polyethylene and metal on polyethylene articulations for use in total hip replacement procedures using any Corin approved femoral stem² with a 12/14 taper connection.

The acetabular shell has a rough titanium plasma spray coating in compliance with BS ISO 5832-2 with an additional top layer of electrochemically deposited calcium phosphate (CaP) coating³ in compliance with ASTM F1609-08.

The acetabular shell is provided with or without screw holes permitting the use of dedicated titanium bone screws to provide additional fixation if required. Titanium occluders are provided to occlude unused screw holes and an apical introducer hole, where appropriate³.

The Trinity™ Acetabular System is intended for use in total hip arthroplasty in skeletally mature patients, to provide increased mobility and reduce pain by replacing the damaged hip joint articulation where there is evidence of sufficient sound bone to seat and support the components.

Ancillary instruments (dedicated and generic) are also provided. A marking on the ancillary instruments allows immediate identification of the size of the ancillary instruments to be used and to ensure compatibility between the different devices.

For a more detailed description of the implants and their utilisation, please refer to the IFU, or contact your Corin representative.

¹ Ceramic liners and ceramic on ceramic articulations are not approved for use in the USA.

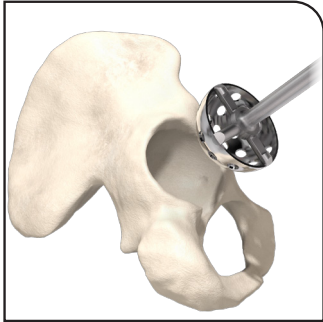
² Ceramic femoral heads are indicated only with Corin titanium stems in the USA.

³ Trinity™ Non-occluded Ti Plasma shells are supplied without an electrochemically deposited coating or screw hole occluders.

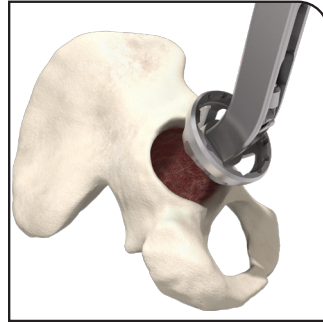
Disclaimers

- Please refer to the instructions for use for further information
- Please [also] refer to the instructions for use or other labelling associated with the devices identified in this surgical technique for additional information.
- Please refer to the instructions for use for a complete list of indications, contraindications, warnings and precautions.
- The product images shown are for illustration purposes only and may not be an exact representation of the product.
- For more information on ordering of instruments specific to the product in scope, please contact your Corin representative.

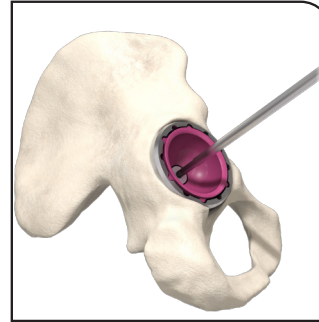
Operative summary



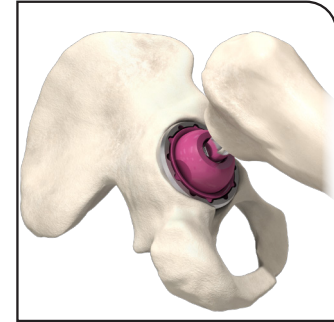
a. Acetabular reaming



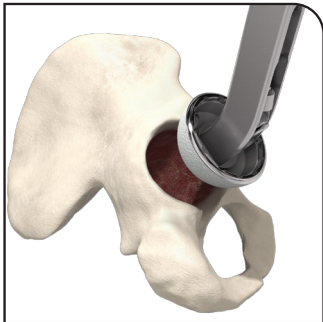
b. Acetabular shell trial



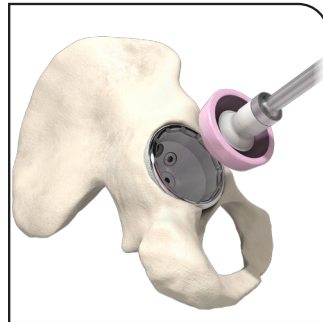
c. Acetabular liner trial



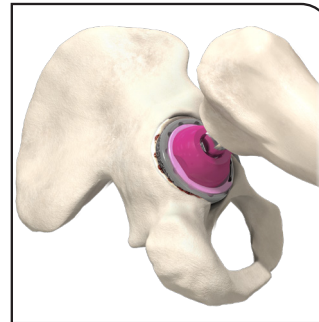
d. Trial reduction



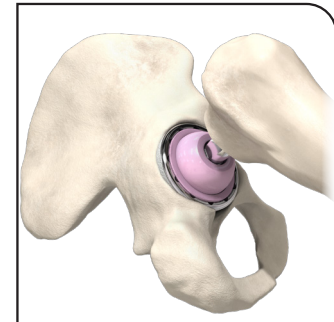
e. Acetabular shell implantation



f. Liner insertion



g. Final trial reduction



h. Final reduction

Operative technique

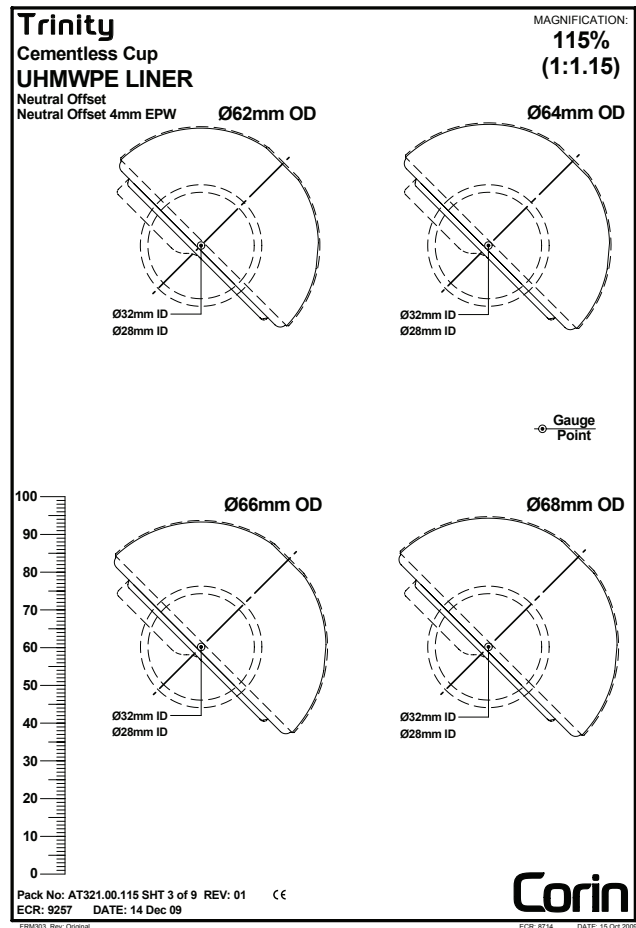


1. Preoperative planning

The radiograph is assessed using the Trinity™ X-ray templates for the position of the acetabular component and the optimal size for the patient's hip anatomy. The Trinity™ X-ray templates are available digitally and in acetate format at 100%, 110% 115% and 120% magnification.

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 improved visualisation of the bony anatomy and improves ease of reaming.



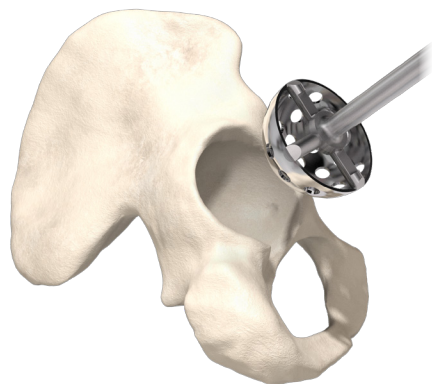


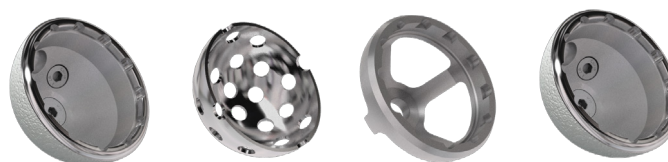
Fig. 1

3. Acetabular reaming

Initially a reamer of 6-8mm smaller than the anticipated size should be used to deepen the acetabulum to bleeding subcondral bone and the level determined by pre-operative templating. Subsequent reamers should be used to centre and deepen the socket until it becomes a true hemisphere (Fig. 1).

Hemispherical acetabular reamers are available in 1mm increments. The Trinity™ shell, including coating, is 1mm larger than the nominal size (as labelled). To achieve a 1mm press-fit in hard bone the acetabulum should be reamed line to line with the nominal cup size. In order to achieve a 2mm press-fit, it is recommended that the surgeon reams 1mm less than the nominal size.

Reamer guide



Nominal shell size as labelled	Ream line-to-line ream (1 mm press-fit)	Trial	Shell size including coating
44mm	44mm	44mm	45mm
46mm	46mm	46mm	47mm
48mm	48mm	48mm	49mm
50mm	50mm	50mm	51mm
52mm	52mm	52mm	53mm
54mm	54mm	54mm	55mm
56mm	56mm	56mm	57mm
58mm	58mm	58mm	59mm
60mm	60mm	60mm	61mm
62mm	62mm	62mm	63mm
64mm	64mm	64mm	65mm
66mm	66mm	66mm	67mm
68mm	68mm	68mm	69mm

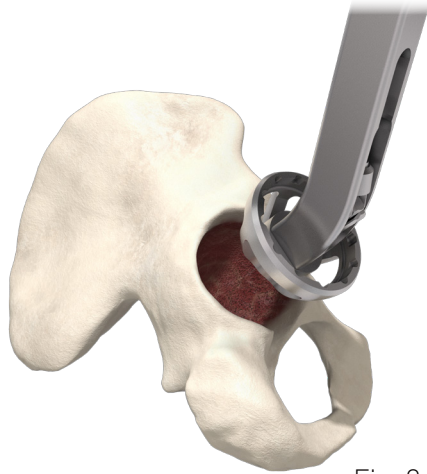


Fig. 2

4. Acetabular shell trial

The appropriate sized shell trial is selected and attached to the introducer handle (Fig.2), which is available as offset or straight.

⚠ Do not use liner impactor for shell trial impaction.

The shell trials are available in 2mm increments and are used to determine the definitive shell position and size. The shell trial represents the implant minus the coating and is therefore 1mm smaller than the definitive implant (i.e. the geometry of the cup without the coating).

The windows in the trial can be used to confirm that full seating has been achieved.

Rigid hex
screwdriver



Ball ended
screwdriver

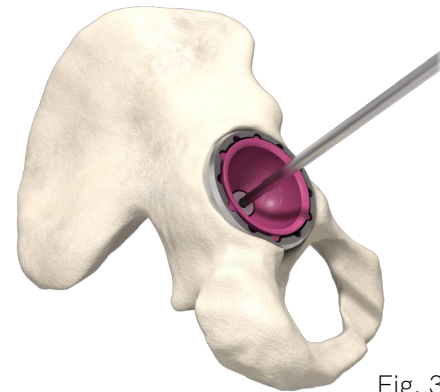


Fig. 3

5. Acetabular liner trial

Following seating of the acetabular shell trial, the appropriate liner trial (ceramic or polyethylene) can be inserted. The straight rigid hex screwdriver or the ball ended screwdriver is used to lock this into position via the apical screw hole (Fig. 3).

Note: The ball ended screwdriver is only intended to be used for trial liner implantation NOT for inserting the definitive apical occluder.

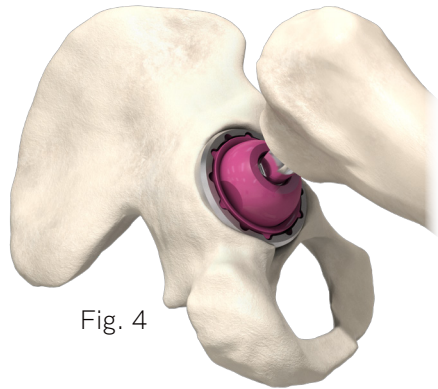


Fig. 4

6. Trial reduction

The appropriate femoral head trial is used to perform a trial reduction, taking the hip through a full range of motion and stability assessment with all trial components in position (Fig. 4). Once the position of the shell trial is correct diathermy can be used around the rim to mark the depth and orientation of the shell when seated.

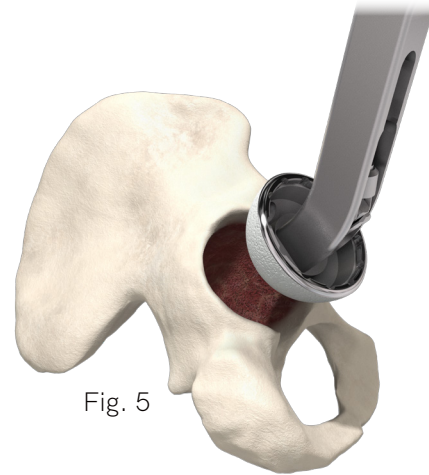


Fig. 5

7. Acetabular shell implantation

The shell must be fully threaded onto the introducer handle prior to impaction. Impact the shell until it is fully seated, which is indicated by a change in tone.

▲ Do not use liner impactor for shell impaction (Fig. 5).

The transverse ligament is a useful landmark for shell orientation. The acetabular alignment guide can be used to assist in component orientation in abduction (45°) and anteversion (15°).

Note: An apical hole occluder (packaged with the shell) is then screwed into the shell until flush using the straight screwdriver.

If screw insertion is required, please see Appendix A (p14).

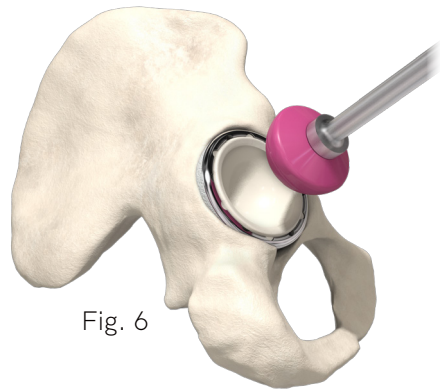


Fig. 6

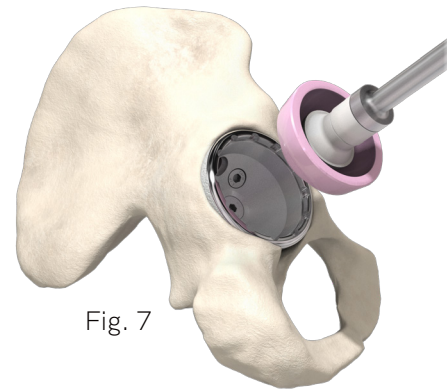


Fig. 7

8. Liner insertion

Following insertion of the femoral component, the required liner is selected (ceramic or polyethylene). Ensure the shell is free from any tissue or debris, and that the screws have been correctly countersunk before placing the liner in the correct position in the shell.

For the polyethylene liner verify that the anti-rotational tabs are correctly orientated in the shell before fully seating using the impactor connected to the pusher or the straight introducer (Fig. 6). Verify the liner is fully seated and that the anti-rotational tabs are flush with the castellations in the acetabular shell.

If the polyethylene liner needs to be extracted please see Appendix B (p16).

When inserting the ceramic liner the sucker should be used to ensure accurate alignment of the liner within the shell. The liner should be positioned centrally on the introducer (Fig. 7).

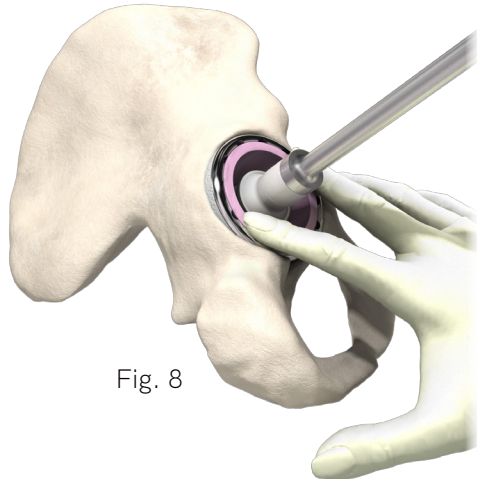


Fig. 8

The ceramic liner is securely held in place with two fingers, one placed either side of the rim, whilst the sucker is detached (Fig. 8).

Ensure the ceramic liner is correctly aligned by running a finger around the rim of the shell, the liner and shell rim should be on the same plane. Correct the alignment if necessary.

Impact firmly using the impactor connected to the pusher or the straight introducer.

If the ceramic liner needs to be extracted, please see Appendix B (p16).

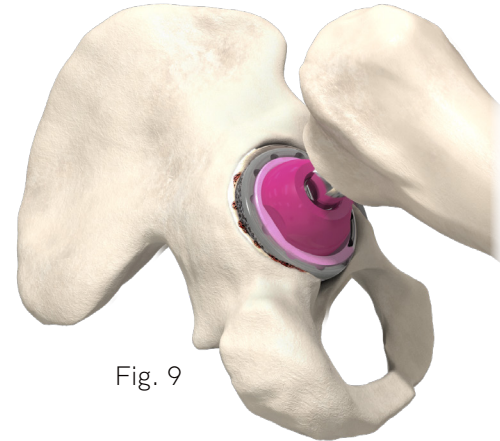


Fig. 9

9. Final trial reduction

A final trial reduction is performed to assess the range of motion, hip stability and limb length using a trial modular head (Fig. 9).

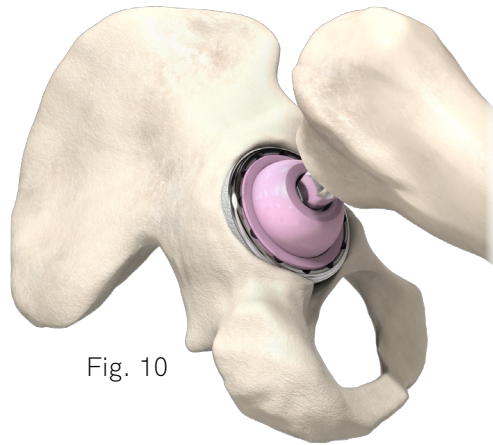


Fig. 10

10. Final reduction and closure

The required head size and length is selected. Before placing the definitive head on the stem, thoroughly rinse the stem taper and carefully dry, ensuring it is free from debris. The head is then placed on the stem taper by twisting lightly and using axial manual pressure until it is seated firmly.

Place the plastic head impactor on to the pole of the head, and impact lightly with the hammer in an axial direction. Tapping of the impactor on the head plastically distorts the surface structure of the metal taper causing an optimal distribution of pressure and a torsion-resistant fixation.

⚠ Never use a metal hammer directly on the BIOLOX® delta head, only the plastic head impactor provided.

The hip is reduced, the range of motion, hip stability and limb length are checked. The hip is closed using the surgeon's preferred technique (Fig. 10).

Appendix A - Screw insertion

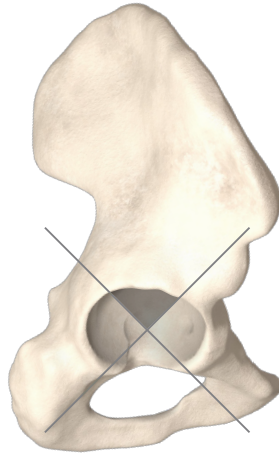


Fig. 11

The acetabular cluster shell and non-occluded shell in the Trinity™ range have three screw holes. In the cluster shell these holes are each pre-sealed with an occluder that must be removed before screw placement (either before the cup is implanted or when it is in situ) using the universal-joint (UJ) screwdriver*. These holes should be positioned appropriately in the posterior/superior quadrant, shown as the shaded region of Fig 11.

The 6.5mm diameter Trinity™ self-tapping cancellous bone screws can be used with the cluster shell and with the non-occluded shell. Screw placement should be done using the following sequence:

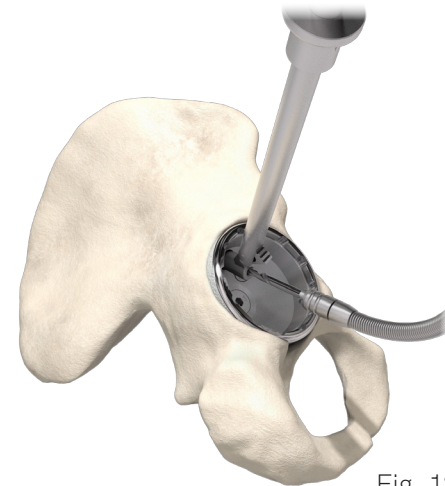


Fig. 12

1. The chosen occluder (where fitted) should be removed using the UJ screwdriver*.
2. The appropriate length of modular drill bit (40,59,70 mm) is attached to the flexible drive-shaft.
3. Locate the drill guide inside and central to the selected screw hole ensuring it is fully seated before drilling. The drill guide can be tilted to give the desired drilling angle (Fig 12).

Note: over-angulation by not seating the drill guide fully is to be avoided.

* The UJ screwdriver found in the screw tray is only intended for removing occluders and the implantation of cancellous bone screws.

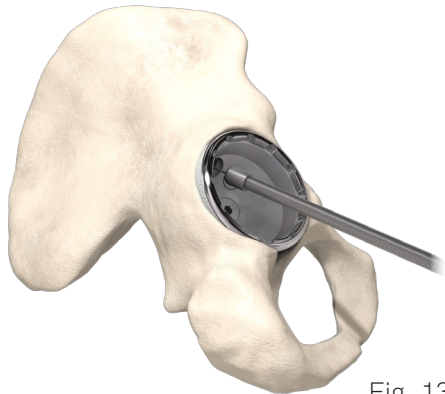


Fig. 13

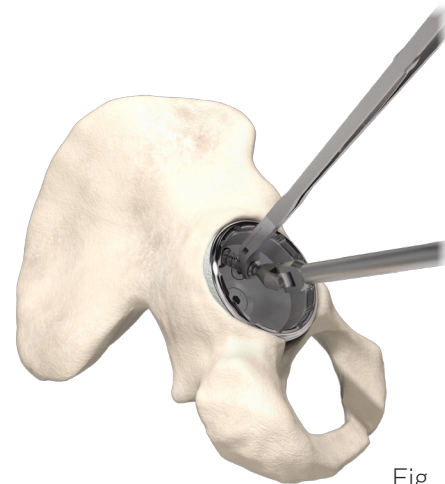


Fig. 14

4. The drill bit can now be carefully advanced through the hole in the drill guide into the cancellous bone. Drilled holes will match the effective length of the drill bit.
5. Verify hole depth using the depth gauge to determine the length of screw required (Fig 13).
6. The appropriate length of Trinity™ screw (15, 20, 25, 30, 35, 40, 45, 50, 55, 60 or 65mm) can then be inserted through the shell and into the cancellous bone using the UJ screwdriver*. Screw forceps can be used to hold the screw while inserting it (Fig 14).

Repeat sub-steps 1 to 6 for a second or third screw as required.

Once all of the required screws are in situ a final check should be made to ensure that they are securely seated within the recess without over-tightening.

* The UJ screwdriver found in the screw tray is only intended for removing occluders and the implantation of cancellous bone screws.

Appendix B - Liner extraction



Fig. 15

If the polyethylene liner needs to be extracted, the polyethylene liner extractor can be used. The longer arm of the extractor is placed inside the bearing and the shorter arm clamped to the outside rim. The extractor wheel is then turned to extract the polyethylene liner (Fig. 15).

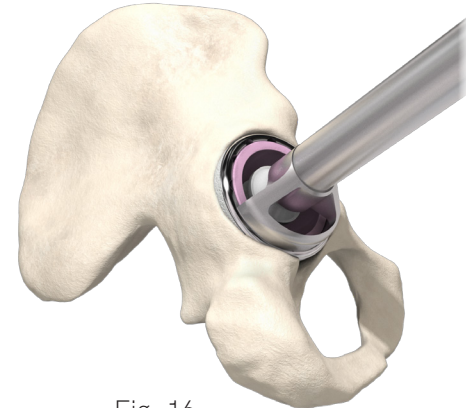
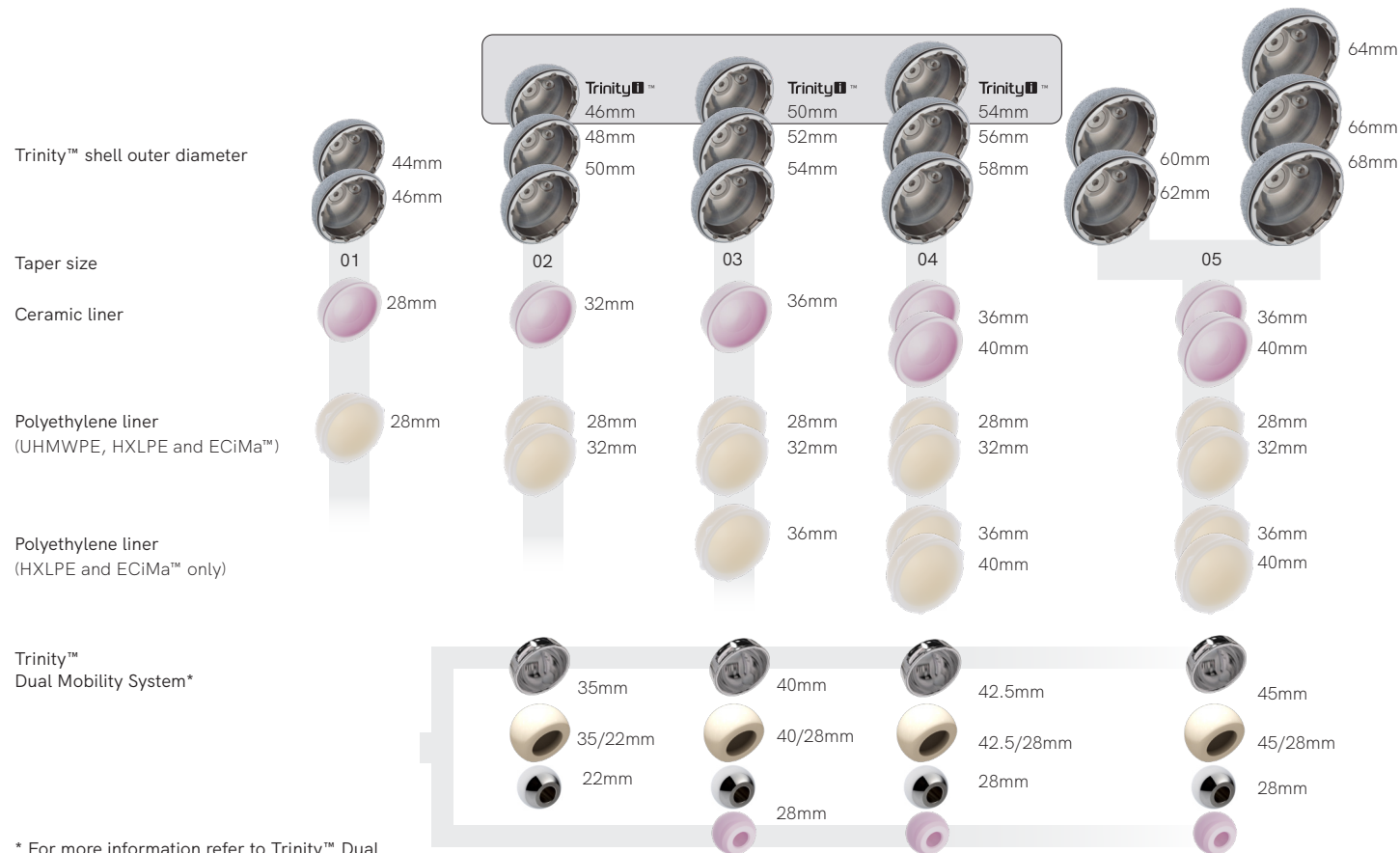


Fig. 16

If the ceramic liner needs to be extracted the ceramic liner extractor rod is attached to the sucker and placed in the liner. The extractor plate and handle then slides over the rod. The tabs on the plate are placed in the shell castellations and the locking screw is tightened. The extractor is lightly tapped and the ceramic liner can be removed (Fig. 16).

If the ceramic liner is misaligned prior to impaction the extractor can be used to remove the liner. The liner must be checked for damage (and if so disposed of) prior to reseating.

Compatibility guide



* For more information refer to Trinity™ Dual Mobility System surgical technique

**See ordering information for product availability.

Ordering information

Acetabular cluster shells (titanium plasma and Biomimetic Cementless Technology coating)

Product code	Size	
Taper 1		
321.01.344	44mm	Taper size 1
321.01.346	46mm	Taper size 1
Taper 2		
321.02.346	46mm	Taper size 2 Trinity™
321.02.348	48mm	Taper size 2
321.02.350	50mm	Taper size 2
Taper 3		
321.03.350	50mm	Taper size 3 Trinity™
321.03.352	52mm	Taper size 3
321.03.354	54mm	Taper size 3
Taper 4		
321.04.354	54mm	Taper size 4 Trinity™
321.04.356	56mm	Taper size 4
321.04.358	58mm	Taper size 4
Taper 5		
321.05.360	60mm	Taper size 5
321.05.362	62mm	Taper size 5
321.05.364	64mm	Taper size 5
321.05.366	66mm	Taper size 5
321.05.368	68mm	Taper size 5



Acetabular no hole shells (titanium plasma and Biomimetic Cementless Technology coating)

Product code	Size	
Taper 1		
321.01.044	44mm	Taper size 1
321.01.046	46mm	Taper size 1
Taper 2		
321.02.046	46mm	Taper size 2 Trinity™
321.02.048	48mm	Taper size 2
321.02.050	50mm	Taper size 2
Taper 3		
321.03.050	50mm	Taper size 3 Trinity™
321.03.052	52mm	Taper size 3
321.03.054	54mm	Taper size 3
Taper 4		
321.04.054	54mm	Taper size 4 Trinity™
321.04.056	56mm	Taper size 4
321.04.058	58mm	Taper size 4
Taper 5		
321.05.060	60mm	Taper size 5
321.05.062	62mm	Taper size 5
321.05.064	64mm	Taper size 5
321.05.066	66mm	Taper size 5
321.05.068	68mm	Taper size 5



(Shells are packed with an apical occluder)

Occluders

(Shells are packed with an apical occluder and screw hole occluders are pre-assembled in the shells)

Product code	Name
321.100	Apical occluder
321.101	Screw hole occluder



6.5mm self-tapping cancellous bone screws

Product code	Size
321.015	15mm
321.020	20mm
321.025	25mm
321.030	30mm
321.035	35mm
321.040	40mm
321.045	45mm
321.050	50mm
321.055	55mm
321.060	60mm
321.065	65mm



Non-occluded (titanium plasma sprayed only)

Product code	Size	
320.01.344	44mm	Taper size 1
320.01.346	46mm	Taper size 1
320.02.346	46mm	Taper size 2 Trinity ™
320.02.348	48mm	Taper size 2
320.02.350	50mm	Taper size 2
320.03.350	50mm	Taper size 3 Trinity ™
320.03.352	52mm	Taper size 3
320.03.354	54mm	Taper size 3
320.04.354	54mm	Taper size 4 Trinity ™
320.04.356	56mm	Taper size 4
320.04.358	58mm	Taper size 4
320.05.360	60mm	Taper size 5
320.05.362	62mm	Taper size 5
320.05.364	64mm	Taper size 5
320.05.366	66mm	Taper size 5
320.05.368	68mm	Taper size 5



(Apical occluders are packed separately from the shells but should be used for both the ceramic and polyethylene liners)

CoCr modular heads (12/14)

Product code	Size		
E321.428	Extra short	-5.0mm	28mm
E321.432	Extra short	-6.0mm	32mm
E321.436	Extra short	-8.0mm	36mm
E321.440	Extra short	-8.0mm	40mm
E321.028	Short	-3.5mm	28mm
E321.032	Short	-4.0mm	32mm
E321.036	Short	-4.0mm	36mm
E321.040	Short	-4.0mm	40mm
E321.128	Medium	0.0mm	28mm
E321.132	Medium	0.0mm	32mm
E321.136	Medium	0.0mm	36mm
E321.140	Medium	0.0mm	40mm
E321.228	Long	+3.5mm	28mm
E321.232	Long	+4.0mm	32mm
E321.236	Long	+4.0mm	36mm
E321.240	Long	+4.0mm	40mm
E321.328	Extra long*	+7.0mm	28mm
E321.332	Extra long	+7.0mm	32mm
E321.336	Extra long	+8.0mm	36mm
E321.340	Extra long	+8.0mm	40mm



BILOX® delta ceramic modular heads (12/14)

Product code	Size		
104.2800	Short	-3.5mm	28mm
104.3200	Short	-4.0mm	32mm
104.3600	Short	-4.0mm	36mm
104.4000	Short	-4.0mm	40mm
104.2805	Medium	0.0mm	28mm
104.3205	Medium	0.0mm	32mm
104.3605	Medium	0.0mm	36mm
104.4005	Medium	0.0mm	40mm
104.2810	Long	+3.5mm	28mm
104.3210	Long	+4.0mm	32mm
104.3610	Long	+4.0mm	36mm
104.4010	Long	+4.0mm	40mm
104.3215	Extra long	+7.0mm	32mm
104.3615	Extra long	+8.0mm	36mm
104.4015	Extra long	+8.0mm	40mm



*Extra long 28mm CoCr head is not indicated for use with Trinity™ Dual Mobility inserts

CoCr liner

Product code	Size	
321.02.532	Size 2	Ø35mm
321.03.536	Size 3	Ø40mm
321.04.540	Size 4	Ø42.5mm
321.05.540	Size 5	Ø45mm



ECiMa™ insert

Product code	Size	
325.02.034	Size 2	Ø35/22mm
325.03.040	Size 3	Ø40/28mm
325.04.042	Size 4	Ø42.5/28mm
325.05.045	Size 5	Ø45/28mm



Liners

Taper size	Liner size	ECiMa™ neutral offset liner	ECiMa™ +4mm offset liner	ECiMa™ +4mm offset oblique liner	ECiMa™ neutral offset 4mm EPW liner
1	28	322.01.628	322.01.728	322.01.828	322.01.928
2	28	322.02.628	322.02.728	322.02.828	322.02.928
	32	322.02.632	322.02.732	322.02.832	322.02.932
3	28	322.03.628	322.03.728	322.03.828	322.03.928
	32	322.03.632	322.03.732	322.03.832	322.03.932
	36	322.03.636	322.03.736	322.03.836	322.03.936
4	28	322.04.628	322.04.728	322.04.828	322.04.928
	32	322.04.632	322.04.732	322.04.832	322.04.932
	36	322.04.636	322.04.736	322.04.836	322.04.936
	40	322.04.640	322.04.740	322.04.840	322.04.940
5	28	322.05.628	322.05.728	322.05.828	322.05.928
	32	322.05.632	322.05.732	322.05.832	322.05.932
	36	322.05.636	322.05.736	322.05.836	322.05.936
	40	322.05.640	322.05.740	322.05.840	322.05.940



Liners

Taper size	Liner size	BIOLOX® delta ceramic liner	UHMWPE neutral offset liner	UHMWPE +4mm offset liner	UHMWPE +4mm offset oblique liner	UHMWPE neutral offset 4mm EPW liner	HXLPE neutral offset liner	HXLPE +4mm offset liner	HXLPE +4mm offset oblique liner	HXLPE neutral offset 4mm EPW liner
1	28mm	321.01.428*	321.01.028*	321.01.128*	321.01.228*	321.01.328*	321.01.628	321.01.728	321.01.828	321.01.928
2	28mm	-	321.02.028	321.02.128	321.02.228	321.02.328	321.02.628	321.02.728	321.02.828	321.02.928
	32mm	321.02.432*	321.02.032*	321.02.132*	321.02.232*	321.02.332*	321.02.632	321.02.732	321.02.832	321.02.932
3	28mm	-	321.03.028	321.03.128	321.03.228	321.03.328	321.03.628	321.03.728	321.03.828	321.03.928
	32mm	-	321.03.032	321.03.132	321.03.232	321.03.332	321.03.632	321.03.732	321.03.832	321.03.932
	36mm	321.03.436*	-	-	-	-	321.03.636	321.03.736	321.03.836	321.03.936
4	28mm	-	321.04.028	321.04.128	321.04.228	321.04.328	321.04.628	321.04.728	321.04.828	321.04.928
	32mm	-	321.04.032	321.04.132	321.04.232	321.04.332	321.04.632	321.04.732	321.04.832	321.04.932
	36mm	321.04.436*	-	-	-	-	321.04.636	321.04.736	321.04.836	321.04.936
	40mm	321.04.440*	-	-	-	-	321.04.640	321.04.740	321.04.840	321.04.940
5	28mm	-	321.05.028	321.05.128	321.05.228	321.05.328	321.05.628	321.05.728	321.05.828	321.05.928
	32mm	-	321.05.032	321.05.132	321.05.232	321.05.332	321.05.632	321.05.732	321.05.832	321.05.932
	36mm	321.05.436*	-	-	-	-	321.05.636	321.05.736	321.05.836	321.05.936
	40mm	321.05.440*	-	-	-	-	321.05.640	321.05.740	321.05.840	321.05.940

* Not available in the US.



Indications

The Trinity™ acetabular system is indicated for use in:

- non-inflammatory degenerative joint disease including osteoarthritis and avascular necrosis
- rheumatoid arthritis
- correction of functional deformity
- developmental dysplasia of the hip (DDH)/congenital dysplasia of the hip (CDH)
- Corin approved femoral stems

Contraindications

- Infection
- Osteomyelitis
- Sepsis
- Osteomalacia
- Distant foci of infections
- Osteoporosis
- Marked bone loss or bone resorption
- Metabolic disorders which may impair bone formation
- Vascular insufficiency
- Muscular atrophy or neuromuscular disease
- Allergy to implant material
- Severe deformity



Manufacturer

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