

Trinity™

Dual Mobility System
Surgical technique



Corin
Connected Orthopaedic Insight

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Trinity™

Dual Mobility System



Operative summary



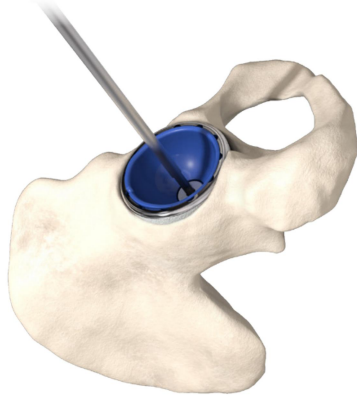
a. Acetabular reaming



b. Acetabular shell trial



c. Acetabular shell implantation



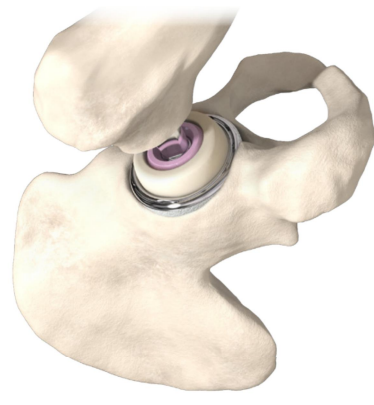
d. Acetabular liner trial



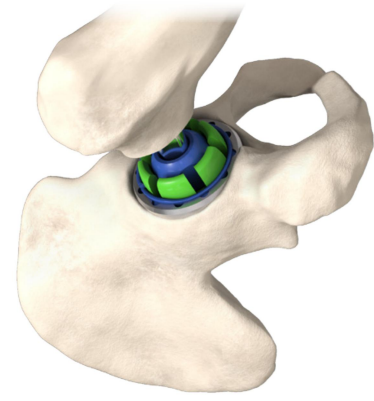
f. Liner insertion



g. Definitive insert - head assembly



h. Final reduction



e. Trial reduction

Overview



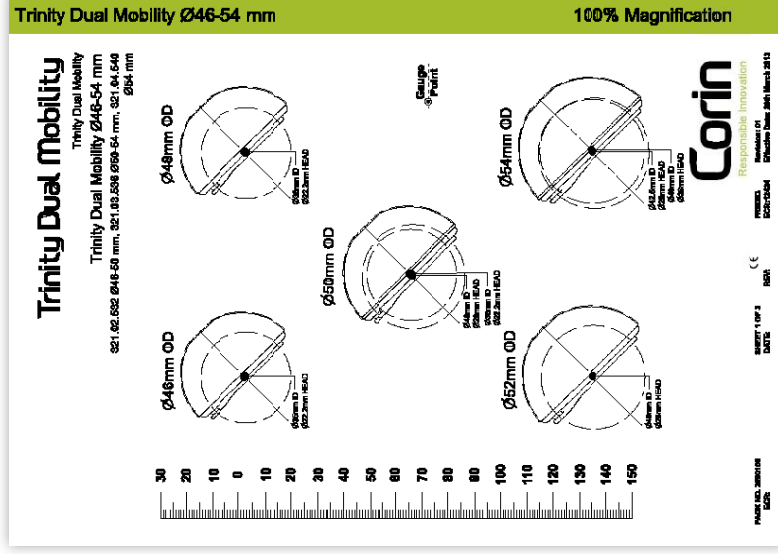
Introduction

The Trinity™ Dual Mobility System is a modular acetabular system consisting of two articulating surfaces in the same joint space. The system includes a highly polished Cobalt Chromium Alloy (CoCr) liner that articulates with an ECI^{Ma}™ (Vitamin E Ultra-High-Molecular-Weight Polyethylene) mobile insert. A Trinity™ femoral head, 22mm or 28mm CoCr* or 28mm ceramic** (BILOX® delta), articulates within the ECI^{Ma}™ mobile insert to allow for a second articulation. The Trinity™ Dual Mobility System is intended to be used only with compatible Trinity™ Acetabular Shells. The Trinity™ Dual Mobility System is designed for use with any Corin femoral stem*** with a 12/14 taper connection. The Trinity™ Dual Mobility System is intended for use in primary and revision total hip arthroplasty (THA) to provide increased stability and reduce pain by replacing the hip joint articulation where there is evidence of sufficient sound bone to seat and support the components.

*The Trinity™ extra long +7mm 28mm CoCr head is not indicated for use with the Trinity™ Dual Mobility System.

**Please refer to the Trinity™ Acetabular System's package insert (1974)

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



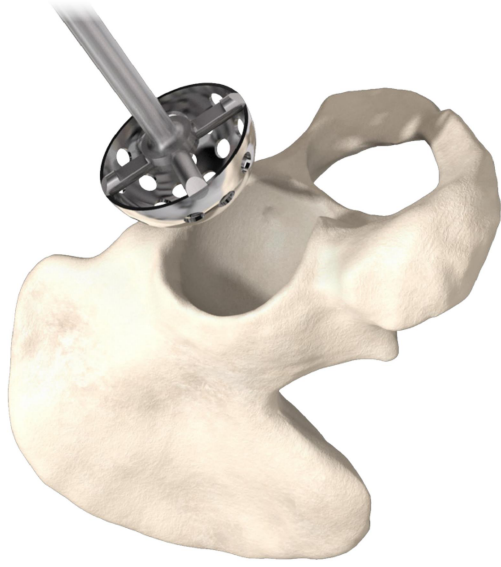
Pre-operative planning

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

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.

Operative technique



1. 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.

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 (1mm press-fit)	Trial	Shell size including coating
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



2. Acetabular shell trial

The appropriate sized shell trial is selected and attached to the introducer handle (available offset or straight). The shell trials are available in 2mm increments and are used to determine the definitive shell position and size. The shell trial represents the definitive shell position and is therefore 1mm smaller than the definitive implant. The windows in the trial can be used to confirm that full seating has been achieved.

Note: A complete trial reduction can be performed at this stage using the acetabular shell trial following steps 4 and 5.



3. Acetabular shell implantation

The acetabular shell component is securely threaded onto the acetabular introducer handle (available in offset or straight) and the shell is impacted until fully seated, indicated by a change in tone. Use the apical hole to check that the shell is fully seated. The transverse ligament is a useful landmark for shell orientation¹. The acetabular alignment guide can be used to assist in component orientation in abduction (45°) and anteversion (20°). **An apical hole occluder (packaged with the shell) is then screwed into the shell until flush using the straight screwdriver.**

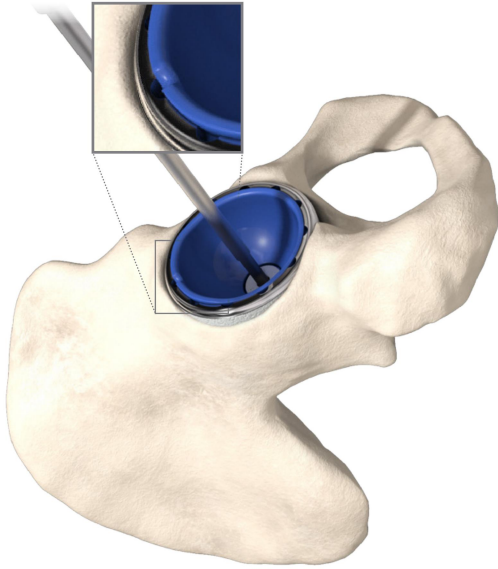
If screw insertion is required please see Appendix A (p12).

⚠ Careful consideration should be given to the position of the acetabular shell and the elevated lip portion of the liner as these can impact: range of motion, jump height and risk of impingement with femoral prosthesis or anatomy.

Rigid hex screwdriver



Ball ended screwdriver

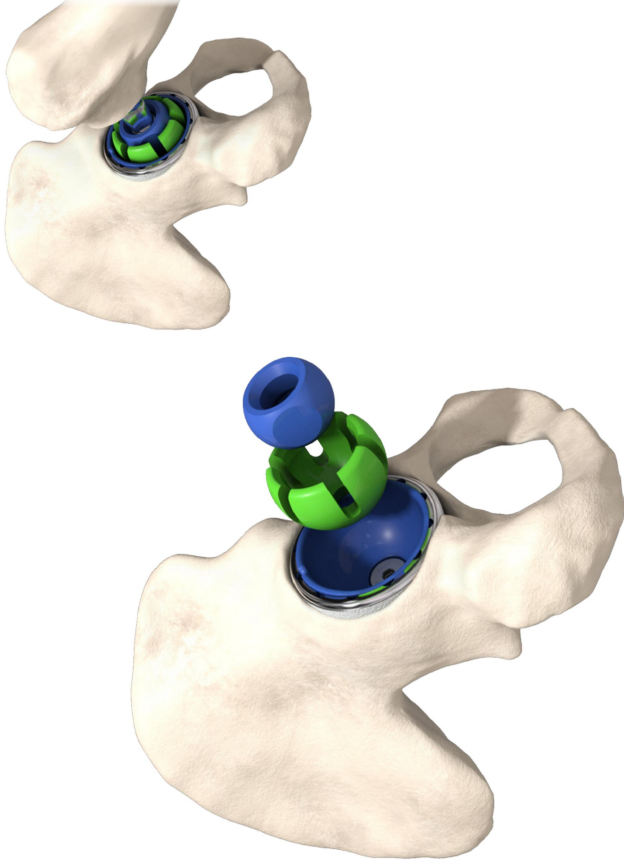


4. Acetabular liner trial

Following seating of the acetabular shell, the appropriate liner trial can be inserted. Verify that the anti-rotational tabs are correctly orientated in the shell.

The position of the elevated lip portion can be oriented according to the risk of dislocation in the specific patient. There is a cut out at the mid-point of the posterior wall which can be used to mark the final position of the liner.

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



5. Trial insert and head reduction

Place the 22mm or 28mm head trial into the compatible poly mobile insert trial to mimic the final articulation function of the Trinity™ Dual Mobility System according to the table on page 16.

Press the trial head into the poly mobile insert trial until a click is heard to indicate the trial head is locked into trial insert.

Place the insert/head trial unit onto the stem trunnion component and reduce the hip, checking for range of motion, impingement, hip stability and leg length.

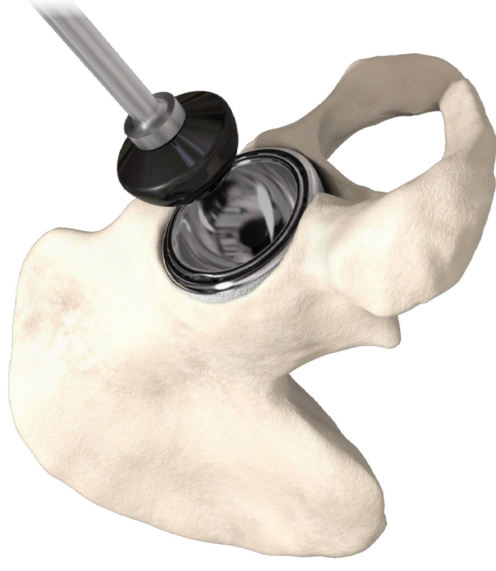


6. CoCr Liner implantation

Following insertion of the cup and trial reduction, the required CoCr liner is selected. Ensure the shell is free from any tissue or debris, and that all screws have been correctly countersunk before placing the liner in the correct position in the shell.

When inserting the CoCr 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.

Ensure the elevated lip position of the CoCr liner is placed in the desired location. Then check the rim of the CoCr liner is correctly aligned by running a finger around the rim of the shell to ensure the protrusion of the lip is uniform except in the portion of the elevated wall. If the posterior aspect of the liner can be viewed then the lower portion of the undercut should be level with the face of the shell. (fig 1)



The liner is correctly seated when there are no further movements of the liner within the shell.

The liner should be impacted using the correct size impactor head connected to the introducer on axis. To ensure the liner is seated securely impaction should be firmly repeated **three times**.

Note: Ensure the impactor heads are not scratched or damaged before impaction of the liners to ensure the highly polished inner surface of the CoCr liner is not damaged during liner implantation.

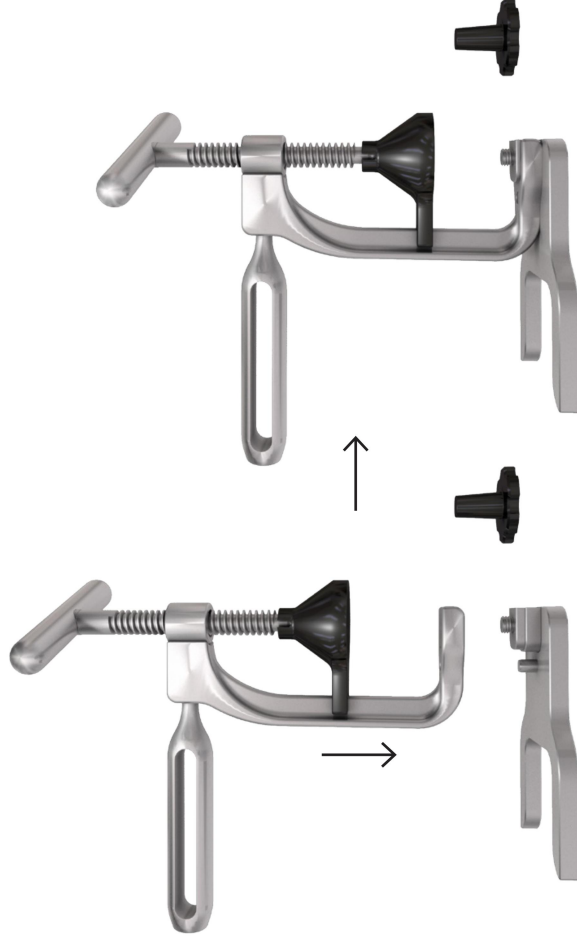
Fig 1.



At this point if necessary, another trial reduction can be completed to check the range of motion with the components assembled (definitive shell, definitive liner, trial insert and trial head) following step 5.

If the CoCr liner needs to be extracted, please see Appendix B.

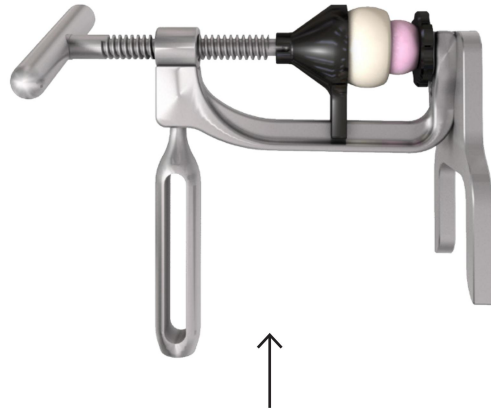
Note: the liner can be re-positioned once and only if the taper and/or bearing surface are not damaged



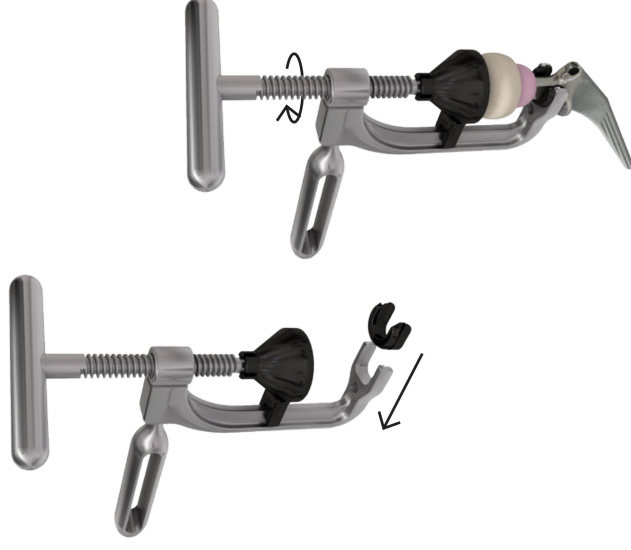
7. Definitive insert - head assembly

To assemble the definitive insert to the desired femoral head, utilise the head press.

1. Slide down the press over the base and screw the black taper component on the assembled base.
2. Unscrew the head press and place the femoral head over the black taper component
3. Position the ECiMa™ insert over the head and screw the T-handle until the insert is assembled with the head and an audible snap is heard when air is released from the construct.
4. Unscrew the press and check the head is free to rotate within the insert. If it does not rotate freely then place back on the press and repeat assembly.

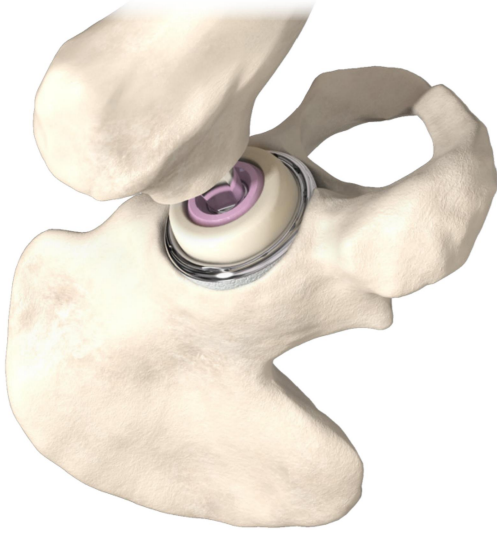


Once all components are properly placed, verify the correct head mobility in the insert. The implants are now ready to be impacted onto the femoral component using the head pusher.



When assembling an insert with stem and head in situ, slide the stem protection component (two sizes are available, one for taper size 2 and one for all the other tapers) into the forked end of the press and place over the in-situ stem and head. Assemble the insert as per step 7 above (sub-steps 3 and 4).

Appendix A



8. Final reduction and closure

Before placing the definitive assembled head - insert on the stem, thoroughly rinse the stem taper and carefully dry, ensuring it is free from debris. Place the head onto the stem taper use the head pusher at the pole of the assembled head - insert, and impact firmly in-line with the stem taper axis. 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.

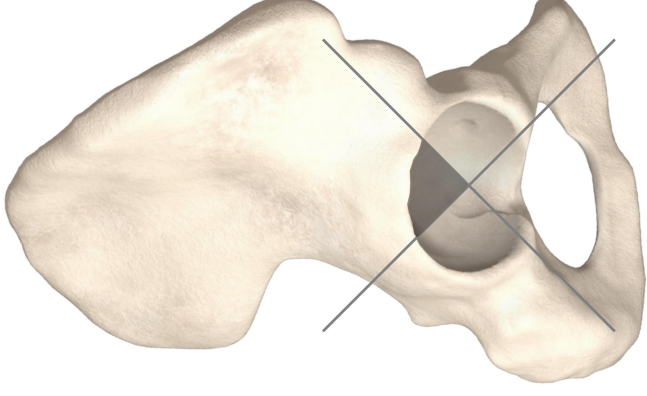


Fig 2.

Screw insertion

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 (UU) screwdriver*. These holes should be positioned appropriately in the posterior/superior quadrant, shown as the shaded region of Fig 2.



Fig 3.



Fig 4.

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:

1. The chosen occluder (where fitted) should be removed using the UJ screwdriver*.
2. The appropriate length of modular drill bit (15, 30, 45 or 60mm) 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 3). **Note: over-angulation by not seating the drill guide fully is to be avoided.**
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 4).
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 5).

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

Appendix B

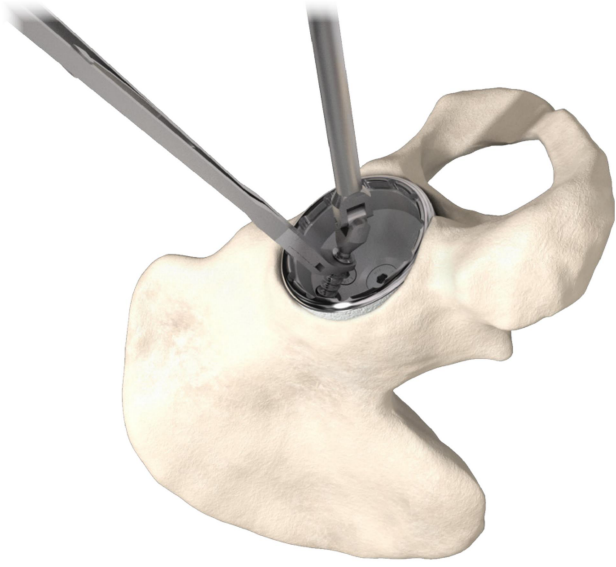
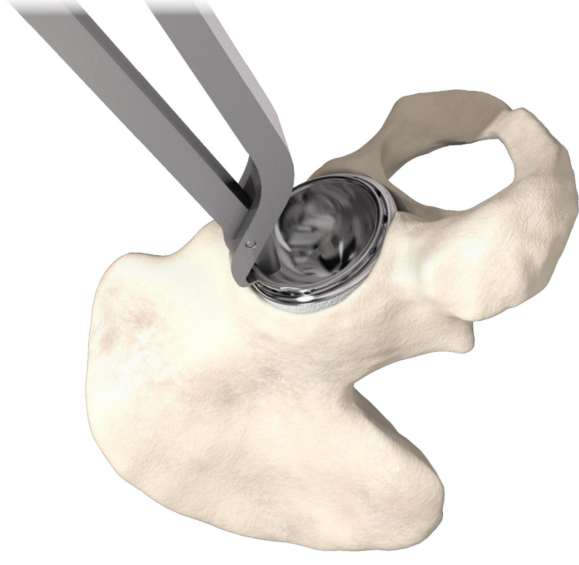


Fig 5.

Repeat 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.

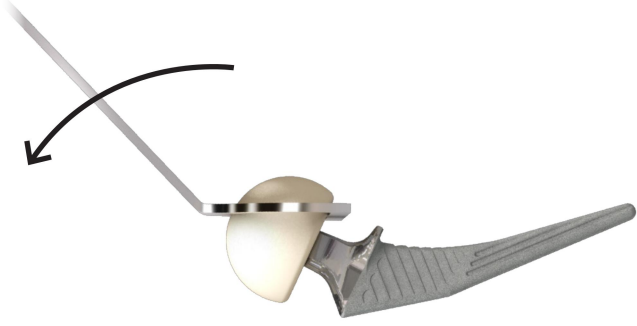


Liner extraction

If the CoCr liner needs to be extracted the liner extractor can be used by inserting the extractor in the notch on the outer edge of the elevated lip of the CoCr liner and then levering the CoCr liner against the rim of the acetabular shell.

Note: Revising the CoCr liner to a new CoCr liner should only be performed if the taper connection of the shell is not damaged.

Appendix C

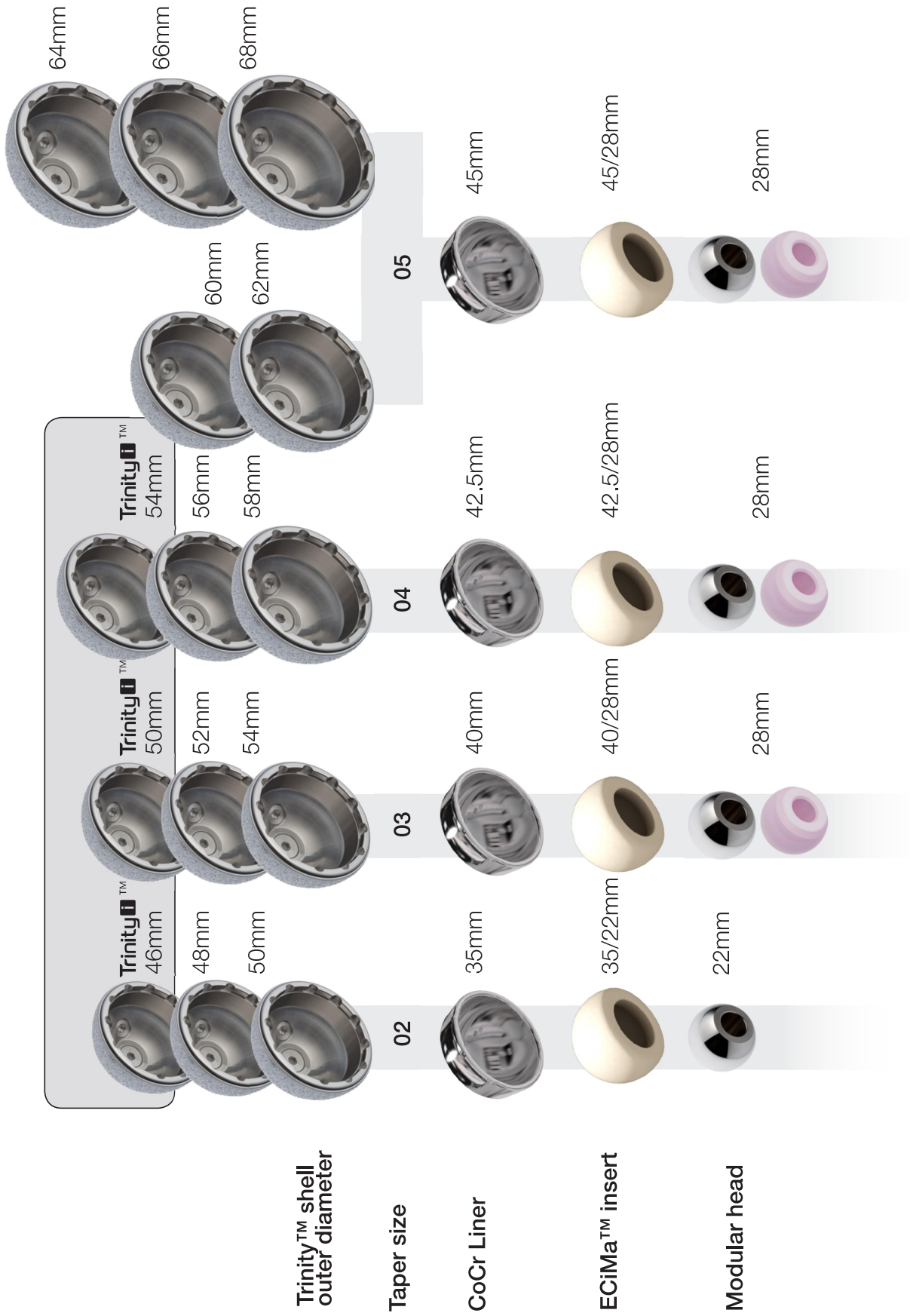


Removal of the insert

If it should be necessary to remove the mobile insert, position the insert extractor over the insert as shown above, and remove the insert by levering against its pole region.



Compatibility guide



Ordering information

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

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

321.02.346	46mm	Taper size 2	Trinity TM
321.02.348	48mm	Taper size 2	
321.02.350	50mm	Taper size 2	
321.03.350	50mm	Taper size 3	Trinity TM
321.03.352	52mm	Taper size 3	
321.03.354	54mm	Taper size 3	
321.04.354	54mm	Taper size 4	Trinity TM
321.04.356	56mm	Taper size 4	
321.04.358	58mm	Taper size 4	
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)

(Shells are packed with an apical occluder)

321.02.046	46mm	Taper size 2	Trinity TM
321.02.048	48mm	Taper size 2	
321.02.050	50mm	Taper size 2	
321.03.050	50mm	Taper size 3	Trinity TM
321.03.052	52mm	Taper size 3	
321.03.054	54mm	Taper size 3	



321.04.054	54mm	Taper size 4	Trinity TM
321.04.056	56mm	Taper size 4	
321.04.058	58mm	Taper size 4	
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	

Non-occluded (titanium plasma sprayed only)

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

320.02.346	46mm	Taper size 2	Trinity TM
320.02.348	48mm	Taper size 2	
320.02.350	50mm	Taper size 2	
320.03.350	50mm	Taper size 3	Trinity TM
320.03.352	52mm	Taper size 3	
320.03.354	54mm	Taper size 3	
320.04.354	54mm	Taper size 4	Trinity TM
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	



Occluders

- 321.100 Apical occluder
- 321.101 Screw hole occluder



6.5mm self-tapping cancellous bone screws

- 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



CoCr modular heads (12/14)

- E321.428 Extra short -5.0mm 28mm
- E321.322 Short -2.0mm 22mm
- E321.028 Short -3.5mm 28mm
- E321.022 Medium 0.0mm 22mm
- E321.128 Medium 0.0mm 28mm
- E321.122 Long +2.0mm 22mm
- E321.228 Long +3.5mm 28mm



BILOX® delta ceramic modular heads (12/14)

- 104.2800 Short -3.5mm 28mm
- 104.2805 Medium 0.0mm 28mm
- 104.2810 Long +3.5mm 28mm

CoCr liner

- 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

- 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



Indications

The Trinity™ Dual Mobility System is intended for use in the following indications:

1. Non-inflammatory degenerative joint disease, including osteoarthritis & avascular necrosis
2. Rheumatoid arthritis
3. Correction of functional deformity
4. Revision of previously failed total hip arthroplasty
5. Patients at increased risk of dislocation
6. Developmental dysplasia of the hip (DDH)

The Trinity™ Dual Mobility System is indicated for cementless use only.

Contraindications

1. Active infection
2. Osteomyelitis
3. Poor bone quality
4. Marked bone loss or bone resorption
5. Metabolic disorders which may impair bone formation
6. Vascular insufficiency
7. Muscular atrophy or neuromuscular disease
8. Allergy to implant material
9. Uncorrectable deformity
10. High levels of sporting activity, competitive sport or sports involving jolts or jerky movements
11. Revision after fracture of a ceramic component

References

1. Archbold HAP, Mockford B, Molloy D, McConway J, Ogonda L, Beverland D. The transverse acetabular ligament: an aid to orientation of the acetabular component during primary total hip replacement: a preliminary study of 1000 cases investigating postoperative stability. *J Bone Joint Surg, [Br]* 2006;88-B(7):883.

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