3D ACT ABM

ACETABULAR RECONSTRUCTION SYSTEM

DESIGN RATIONALE & OPERATIVE TECHNIQUE

jri Orthopaedics

An AK MEDICAL Company

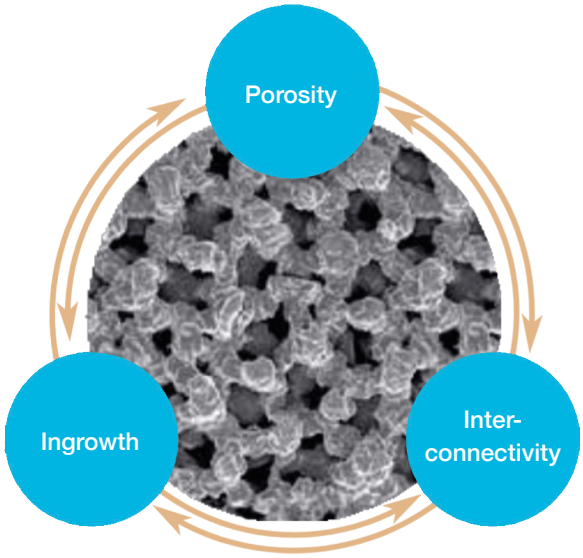
Contents

ABM Anatomical reconstruction Biology Mechanics

3D ACT TRABECULAR METAL

Using proven and established design and 3D printing technology, we have developed a highly porous structure with predictable pore size.

3D ACT is a high-porosity titanium alloy prepared using the EBM stacking method which has an internal three-dimensional structure similar to cancellous bone trabeculae. Compared with other types of microporous structures, 3D ACT porous materials have pore diameters of between 600 to 800 µm and porosity of 80%. Pore interconnectivity is 100%. The 3D ACT biological fixation to the bone.



The 3D process utilizes a high-power electron beam (EBM) that generates the energy needed to high melting capacity of the alloy powder. This process under vacuum produces implants with no residual stress.

A key benefit of the 3D ACT Acetabular Reconstruction System is that the highly porous structure is fully integrated into the implant and therefore there is little risk of detachment of the porous structure as found in traditional implant manufacturing methods.

AIMS OF ACETABULAR RECONSTRUCTION

The aims of acetabular reconstruction are to produce stable fixation of a prosthesis, in the correct anatomical position so that it will lead to a functional pain free hip over many years.

The majority of acetabular revisions can be performed with just an uncemented hemispherical cup. Porous coating, porous metal or hydroxyapatite promotes biological fixation between the host bone and the shell. However, there are instances where the available bone stock is insufficient to support a hemispherical cup and in these circumstances reconstruction of the bone stock is necessary to achieve a stable acetabular reconstruction. Historically, bone graft was often used to reconstruct these bony defects and whilst successful with small defects, the more extensive defects often failed. This led to the introduction of porous metal augments of different shapes and sizes which could be securely fixed to the pelvis to replace the missing bone. Restoring the anatomy allows for correct anatomical placement of the acetabular component and maximum potential for hip function.

3D ACT ABM ACETABULAR AUGMENT

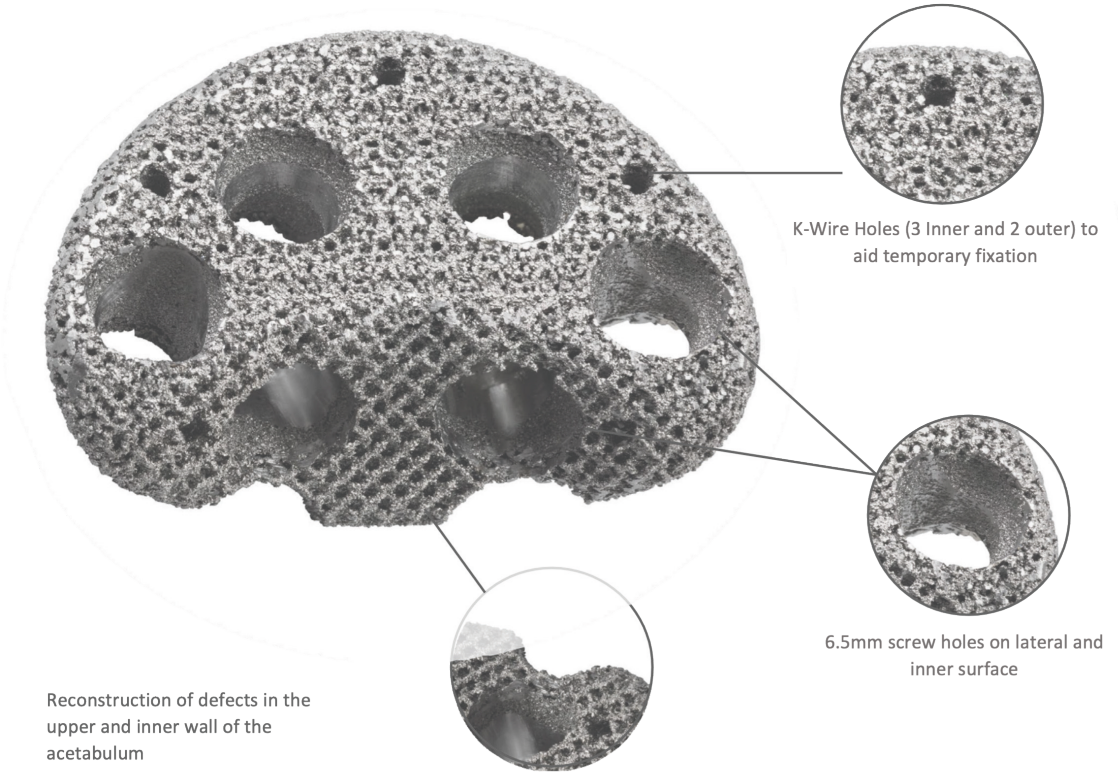
These augments can be used to reconstruct segmental defects involving the rim of the acetabulum or cavity defects within the acetabulum.

Specific design features allow for the placement of temporary K wires in the augment before secure fixation is achieved with screws. There is also a recessed section inferiorly which allows access for those important screws passing through the acetabular cup and into the dome of the acetabulum.

Modular Augment system has augments available in 15 sizes (Diameter 50/52, 54/56 and 58/60mm) and (Thickness 10,15, 20 and 25mm).

3D ACT ABM

ACETABULAR AUGMENT



K-Wire Holes (3 Inner and 2 outer) to aid temporary fixation

6.5mm screw holes on lateral and inner surface

Reconstruction of defects in the upper and inner wall of the acetabulum

Recessed screw hole to allow for bypassing cup-screws

3D ACT

ABM COLUMN BUTTRESS & SHIM

When the host bone cannot provide sufficient support for the hemispherical acetabular component, buttresses and shims can be used to provide structural support where necessary.

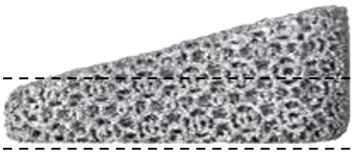
- Available in short / long. Left, right or central
- Polished surface
- 6.5mm screw fixation

3D ACT

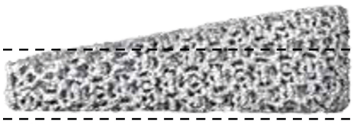
ABM COLUMN BUTTRESS & SHIM

These are available as left, right and central options, in both short (4 hole) and long (6 hole) formats.

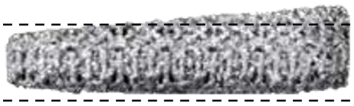
If stability is required when using the Buttress the 3D ACT ABM Shims can be used.



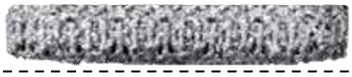
15°



10°

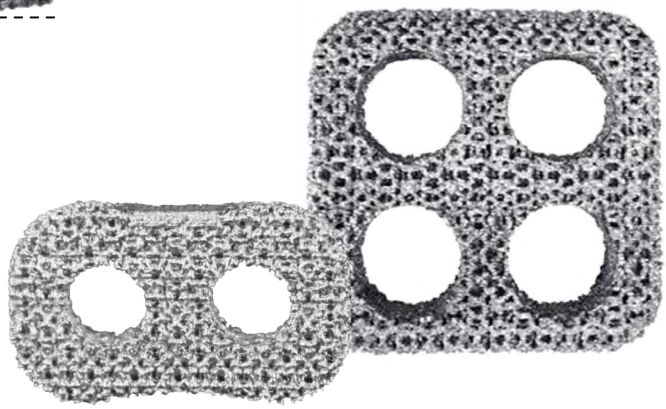


5°



0°

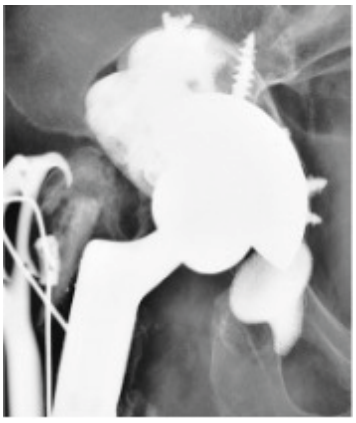
6.5mm screw holes to connect to the Buttress



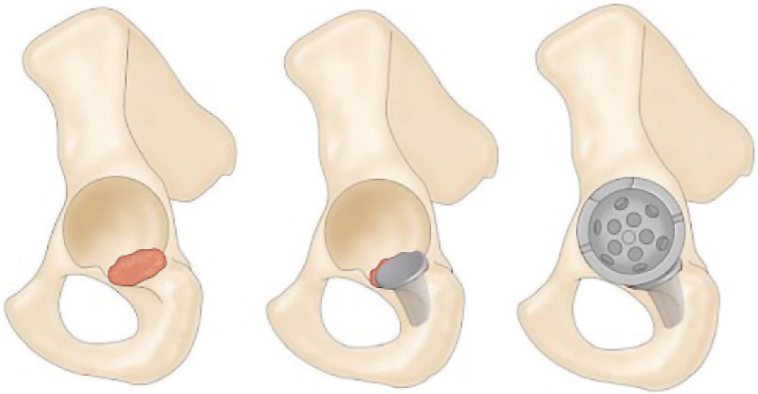
3D ACT

ABM LOTUS AUGMENT

The Lotus augment has been designed to sit in the ischium and provide stability to the hemispherical cup where there is ischial bone loss. This inferior enhanced fixation of the cup has been shown in laboratory studies to provide additional anti-rotational stability to the construct and thereby lessen the chance of cup tilt failure[1].



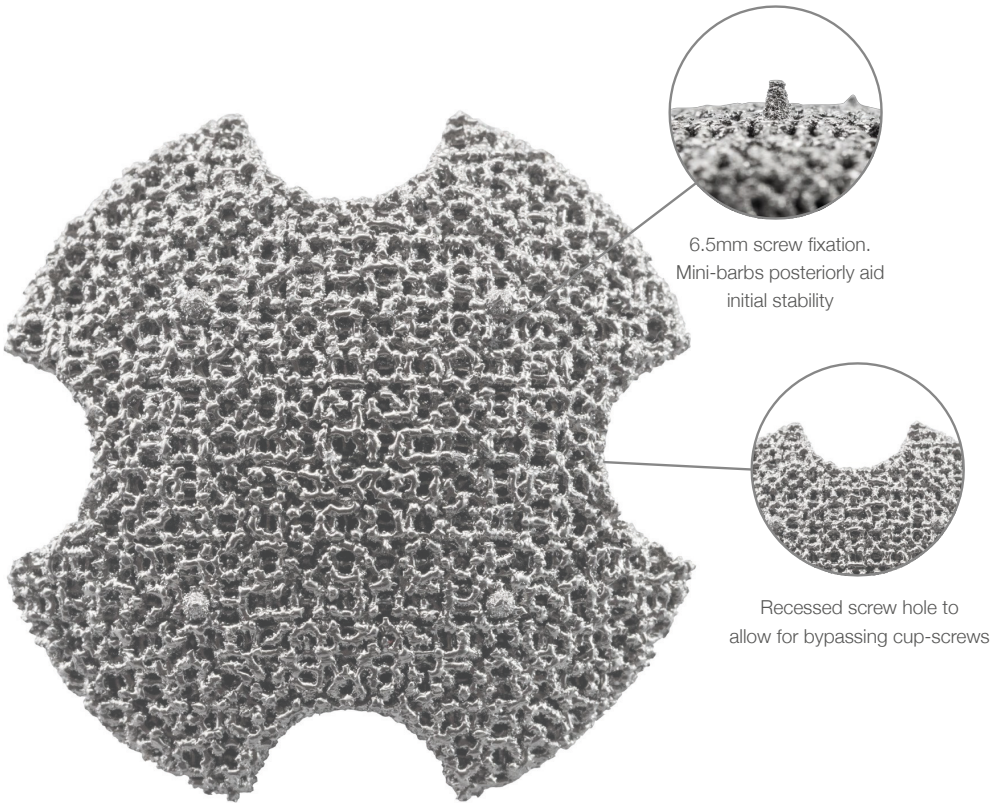
The Lotus augments are available in 4 diameters (20, 25, 30 and 35mm), and can be trialled to determine size and position.

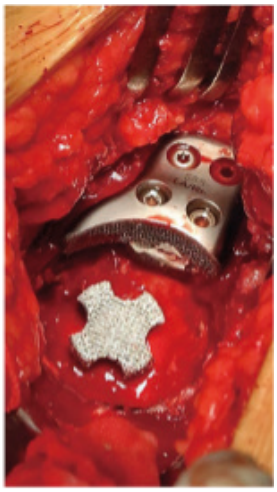


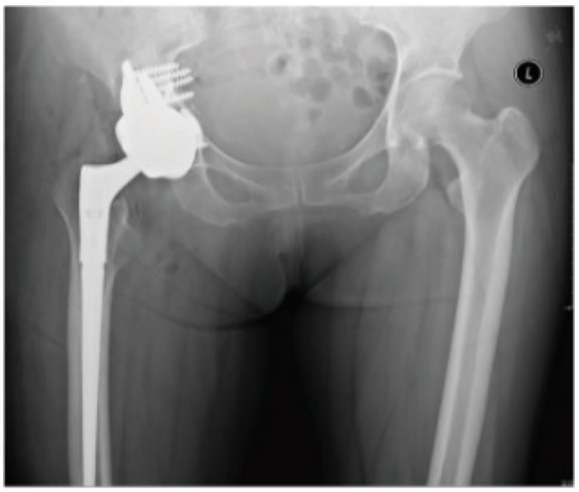
3D ACT

ABM RESTRICTOR

Providing support and integrity to a medial wall defect. They are available in 4 sizes.







3D ACT

ACETABULAR CUP

The 3D ACT ABM Acetabular Reconstruction System is fully compatible with the 3D ACT Acetabular Cup. Manufactured using the same E-Beam Technology, the 3D ACT Acetabular Cup comes in a multi-hole format to give the Surgeon the additional option of using screws for secondary fixation.

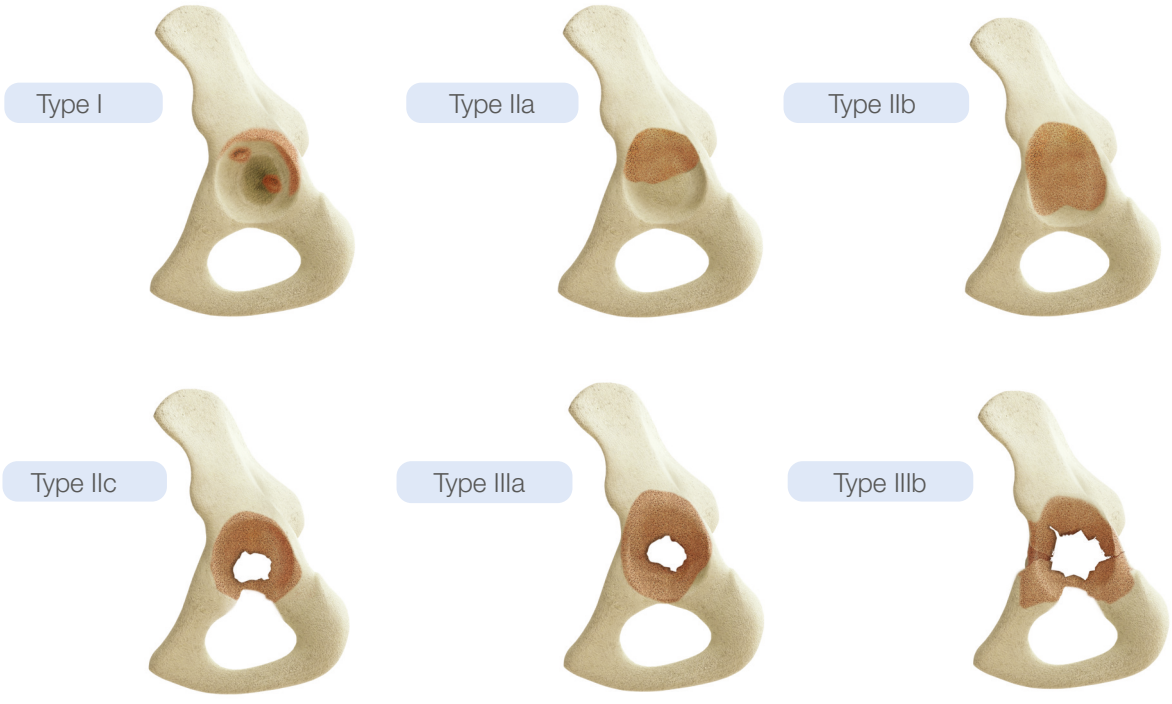
Highly porous and constructed in one piece (to avoid particle shedding) the 3D ACT Acetabular Cup offers a high friction coefficient of 0.93 to cortical bone and 1.08 to cancellous bone promoting immediate stability.

Available with both highly cross-linked and BIOLOX® *delta* Ceramic Liners 3D ACT Acetabular Cup is available in sizes from 48mm to 70mm with the choice of both hooded highly cross-linked polyethylene and BIOLOX® *delta* Ceramic Liners in both 32mm or 36mm dependent on cup size.

ACETABULAR DEFECT CLASSIFICATION FOR REVISION HIP SURGERY

A number of different classification systems exist but the Paprosky classification (1994) is the most used. It is a very useful and practical classification and is based on the ability of the remaining acetabular rim to provide inherent stability for a cementless hemispherical socket.

Category	Description	X-Ray findings	Intra-operative Findings
Type I	Minimum bone loss	No migration, minimal lysis	Supportive rim
Type IIa	Columns intact and supportive	Superior migration <2cm, teardrop intact no ischial lysis	Rim distorted but fully supportive
Type IIb	Columns intact and supportive	Superior migration <2cm, teardrop intact no ischial lysis	<30% superior rim defect but fully supportive
Type IIc	Columns intact and supportive	Medial migration, teardrop obliterated	Medial wall absent
Type IIIa	Columns non-supportive	Superiolateral migration >2cm teardrop partly intact, moderate ischial lysis	Rim deficiency 10-2 o'clock
Type IIIb	Columns non-supportive	Superiolateral migration >2cm teardrop obliterated, severe ischial lysis	Rim deficiency 9-5 o'clock



Type I defects have minimal bone loss and as the hemispherical shape of the acetabulum is maintained, a cup like the 3D ACT ABM acetabular cup is entirely appropriate for reconstruction. Cancellous bone grafting can be used to fill any cavitary defects present.

Type II defects have some distortion of the acetabular rim but the rim is still fully supportive of a hemispherical cup as 60% or more of the rim is still present along with intact anterior and posterior columns. The 3D ACT ABM acetabular cup will achieve stable fixation in these circumstances.

Type III defects involve major bone loss as there has been migration of the existing acetabular component greater than 2cm leading to destruction of the acetabular rim and supporting structures. Type III defects are sub divided into IIIA and IIIB. If the acetabulum is considered as a circular structure like a clock face, Type IIIA defects have a rim defect from ten o'clock to two o'clock. (30-60% of bone destruction). The medial wall and ischium are intact and with the superolateral migration of the component, the defect is often referred to as an "up and out" defect. Augments are required for reconstruction in these cases as a hemispherical cup alone cannot achieve sufficient stability. Depending upon the size and location of the defect, an augment or buttress will be required.

Type IIIb is a much greater problem for reconstruction as the bone loss is more extensive. Using the clock face analogy, the bone defect runs from nine o'clock to five o'clock (>60% of bone stock) and involves both walls and columns with obliteration of the tear drop and severe lysis of the ischium. The migration is superomedial leading to an 'up and in" defect.

Multiple augments either alone or cemented together are often required in these defects. The Lotus Augment plays an important role in cases where there is severe ischial lysis as it can offer inferior support to the 3D ACT ABM hemispherical cup and make the construct a much more stable structure.

It is important to note that patients with Type IIIB defects have a high risk of pelvic discontinuity and this needs to be looked for at the time of reconstruction.

SURGICAL TECHNIQUE

ACETABULAR ASSESSMENT AND PLANNING

Thorough preoperative planning is essential prior to undertaking any revision procedure to minimise the risk of complications developing. Radiographic imaging should include an AP radiograph of the pelvis and either Judet views of the affected hip (iliac oblique and obturator oblique views) or a CT scan of the pelvis as a minimum. A simple AP radiograph of the pelvis will not give a full assessment of the bone defects present. It is important to be able to assess the integrity of both the anterior and posterior columns as this will determine the inherent stability of the acetabulum and guide the surgeon as to which reconstructive options are appropriate.

After removal of the previous acetabular component make a full assessment of the acetabulum. Is the rim intact? Are there any defects in the floor or walls? Is the acetabulum a stable structure or is there a fracture or discontinuity present?

3D ACT ACETABULAR CUP

SURGICAL TECHNIQUE

If the acetabulum is deemed to be stable, it is now time to start power reaming. It is important when starting to ream with the initial smaller reamers to hold the reamer handle firmly and position it low, otherwise there can be tendency for the reamer to migrate in a cranial direction and as the reamers get sequentially bigger this may inadvertently take away good bone. Having got the reamer at the inferior margin of the acetabulum, its position needs to be checked for both version and abduction. The natural acetabulum usually lies in 10-15 degrees of anteversion and so reaming should be in this direction. If the anterior wall is well preserved, one can assess the required degree of anteversion digitally. It is important not to have the margin of the component proud of the anterior wall otherwise soft tissue impingement of the adjacent soft tissues may occur.

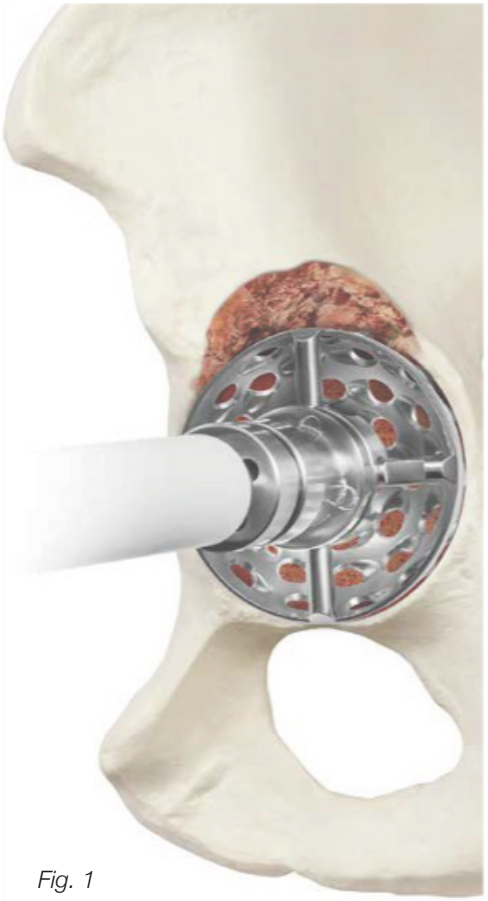


Fig. 1

The ideal position of abduction for the cup is 40-45 degrees. It is important to hold the reamer slightly less than this, as if reamed at 40-45 degrees, when the patient stands the degree of abduction will be greater and this is not ideal.

Progressively increase the size of the reamers (available in 1mm increments) until enough bone contact with the reamer is achieved *(Fig. 1)*. Do not change the reamer unless it is fully situated within the bony margins of the acetabulum. Increasing the size before it is fully situated within the acetabulum will simply lead to loss of the supporting rim. The key is to have some 'purchase' between the anterior and posterior walls. This determines the size of the cup and not a cranial/caudal fit. Most acetabulae at the time of revision have some superior (cranial) deficiency and that, if significant, can be reconstructed (see 3D ACT ABM Augment - Surgical Technique).

The definitive cup is 2mm larger than it's nominal diameter. It is recommended practice to over-ream by 1mm relative to the nominal cup size to achieve press-fit.

Example for a size 50 Cup:

Ream to size 51mm

Trial size 50mm

Definitive Cup 50mm (true external diameter is 52mm)

Once the cup is seated in the acetabulum, the surgeon can if he or she wishes use 6.5mm screws (range 15/70 mm in 5mm increments) if additional fixation is required. This, however, is not essential if the surgeon is happy with the press fit.

Trial liners are available and can be placed in the implanted cup.

The 3D ACT Acetabular cup is suitable for Paprosky I, IIa and IIb defects as both columns are intact, and the bony acetabulum is stable.

3D ACT ABM AUGMENTS

For more severe acetabular defects eg Paprosky III, 3D ACT ABM augments can be used to fill bone defects and act as a load bearing structural support to replace the missing acetabular rim or provide a base for the cup by filling bone defects medially and superiorly.

Once the acetabulum has been reamed and if deemed not suitable for hemispherical cup press fit fixation, in view of bone defects present, the use of augments needs to be considered.

Whilst it is important to have stable placement between the augment and bone, try and minimise the removal of any additional bone in the areas where bone is already deficient. If necessary, use a hemispherical reamer or burr to smooth the surface *(fig.2).*

Tips:

1. ***The size of the acetabular augment should be determined according to the size of chosen acetabular cup, to ensure a satisfactory contact area between the acetabular augment and cup.***

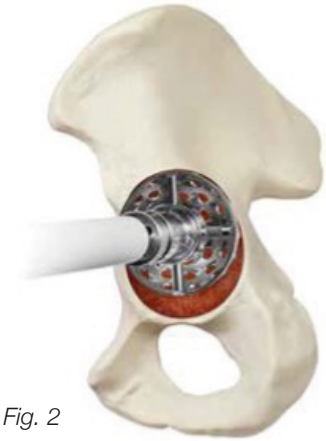


Fig. 2

2. ***Prepare the acetabular defect surface according to the chosen size of augment, using the reamer with the same size as outer diameter of augment, making the augment fit well with bone surface.***

Fig. 3

3. ***The acetabular augment with the same spherical diameter has different thicknesses. Use the trial to choose the thickness of the augment suitable for the size of the bone defect. (Thickness: 10mm, 15mm, 20mm and 25mm).***

Fig. 4

It is very much a process of trial and error when choosing the appropriate sized augment. In addition to having different radii of curvature, the augments come in 4 different thicknesses. With a 3D ACT hemispherical acetabular trial in place, choose a trial augment that best fits the defect and at the same time does not compromise the position of the acetabular shell. (fig.4) This is an important step as maximum host bone contact of the augment is necessary to provide long term stability of the construct. Once happy with sizing and positioning, the trial augment can be held in position with the augment forceps (fig. 3) or be temporarily fixed with a K wire. The interface and correct seating between the augment and host bone is more important than the interface between the acetabular shell and augment as this junction is to be filled with bone cement.

FIXATION OF THE AUGMENT

The definitive augment should be fixed in place prior to insertion of the acetabular shell. A minimum of 2, 2.0mm K wires should be passed through the K wire holes in the augment into the pelvic bone. If positioning and stability of the augment is satisfactory, the augment can now be securely fixed with screws. A 3.2mm drill bit with guide in position is carefully powered through the bone. (fig 5) It is important when using power tools in and around the acetabulum to consider vascular and neurological structures positioned on the inner side of the pelvis. A depth gauge is used to determine the length of 6.5mm cancellous bone screws. The chosen screws are inserted with a hand held screwdriver (fig 6) Insertion of a second screw is recommended before final seating of the first screw to avoid any unwanted movement of the augment.

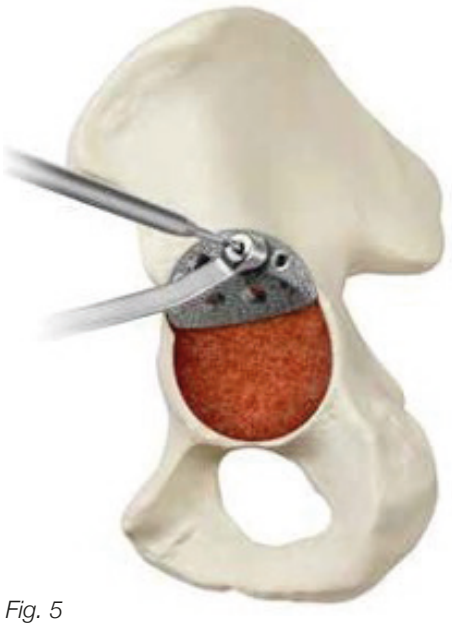


Fig. 5

Depending upon the site of the bone defect, it may not be appropriate to secure the augment with screws. This is often the case with Paprosky IIIB cases where there the bone defect is primarily medial. Two augments can be cemented together and then impacted into the floor where they can then act as a foundation for the hemispherical shell.

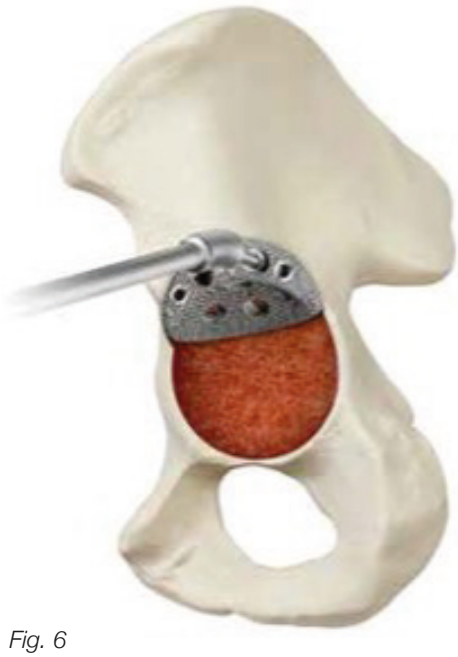


Fig. 6

ACETABULAR CUP INSERTION

Prior to positioning the cup in the acetabulum, place a small amount of bone cement, whilst still in its doughy state, along the concave margin of the augment (fig 7). This will help reduce any micromovement between the augment and shell before the construct becomes fully osseointegrated within the bone. It is important to not use too much as we don't want the cement to migrate into areas where it may impede biological fixation of the cup to the bone.

Screws for secondary fixation of the acetabular cup are not essential if secure fixation can be achieved by press fit alone. However, in many cases of revision arthroplasty, bone loss is such that secondary fixation with screws is essential as otherwise stable fixation could not be achieved. If screws are to be used, they must be positioned to avoid injury, in particular vascular injury. If a screw cannot achieve adequate purchase within the bone, it should be removed to prevent osteolysis.

When positioning the cup in the appropriate degree of anteversion and abduction it is important to have the screw holes positioned such that at least one screw can get access to the relatively dense bone in the acetabular dome. (fig 8). This means directing screws in a postero superior direction up into the posterior column. All screw heads need to be fully seated within their holes to allow the liner to be fully seated.

Once the cup is secure, bone wax should then be placed over the screw heads and in any empty screw holes

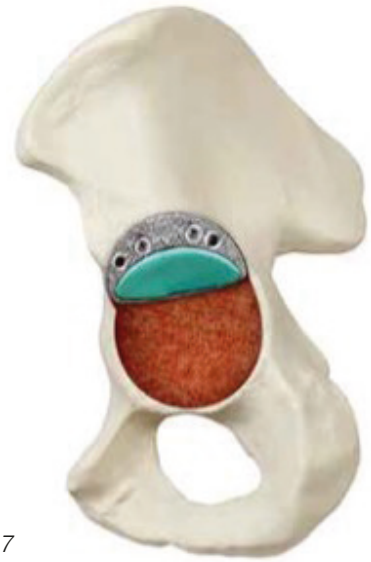


Fig. 7

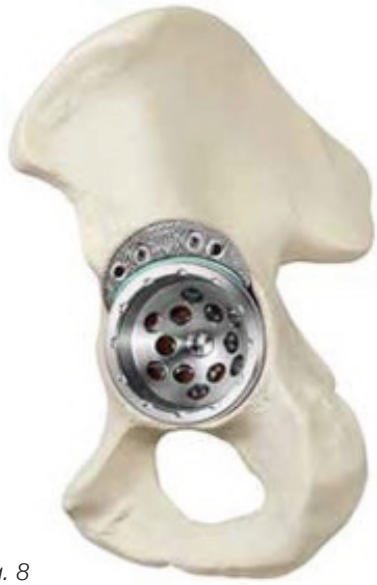


Fig. 8

3D ACT ABM BUTTRESS

SURGICAL TECHNIQUE

Choose the appropriate Buttress & Shim

In some cases, the acetabular defect is such that a buttress will provide better stability for the acetabular construct as opposed to an augment. As with augment selection, selection of the appropriate buttress is very much a trial and error method. It is important to choose the one that fits best even if it means using a right in a left acetabulum.

Fig. 9

Implant Buttress & Shim

Carefully strip away the soft tissues off the ilium with a periosteal elevator. Only remove enough soft tissue in order to position the buttress against the bone. With a 3D ACT hemispherical acetabular trial in place, position a buttress trial against the ilium and cover the defect. It may be necessary to remove small portions of bone in order to seat the trial at the acetabular margin but do not be aggressive. If necessary, change to a different buttress before removing any more bone. It is important to maximise host bone contact with the buttress in order to produce a stable construct. If there is a gap and the buttress 'rocks' from side to side, use a Shim trial to modify the under surface of the buttress.

The trials come in both 2 and 4 hole sizes, each with 4 different (0, 5,10 and 15 degree) angles of inclination. Once the position has been chosen, note the position of the buttress and mark the bone with cautery or pen.

Place doughy bone cement along the concave border of the buttress where it will come into contact with the cup. (Fig.10) Again, be careful with the amount, as if excessive, cement may fall away when the cup comes into contact with the buttress and may impede osseointegration of the cup.

If a Shim is to be used, ensure the definitive Shim is correctly orientated with the definitive buttress and the screw holes line up. Using cement in its doughy phase, cement the two components together, making sure no cement gets into the screw holes or on the under surface of the construct.

The buttress is held against the bone in the predesignated position, holes drilled with a 3.2mm drill, measured with a depth gauge and then fixed with 6.5mm cancellous screws. Do not overtighten the first screw until other screws have been placed.

Tip:

To achieve initial fixation, insert 6.5mm cancellous screws using the predrilled holes. Ensure screw placement avoids potential vascular and neurological injury *(Fig. 11).*

Fig. 10

Fig. 11

TRIAL AND IMPLANT 3D ACT ABM RESTRICTOR

If a medial wall defect is not too severe, a 3D ACT ABM restrictor can be used to cover the defect. There are 4 sizes (26mm, 32mm, 38mm, 44 mm) (fig.13) to choose from. The appropriate size is chosen after using a trial. It can be positioned either by hand or with the augment holder. Several taps with the augment impactor will seat the restrictor fully in place as mini barbs positioned on the back of the restrictor will gain purchase in the bone.

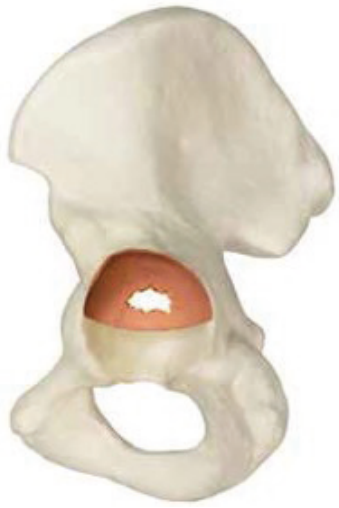


Fig. 12

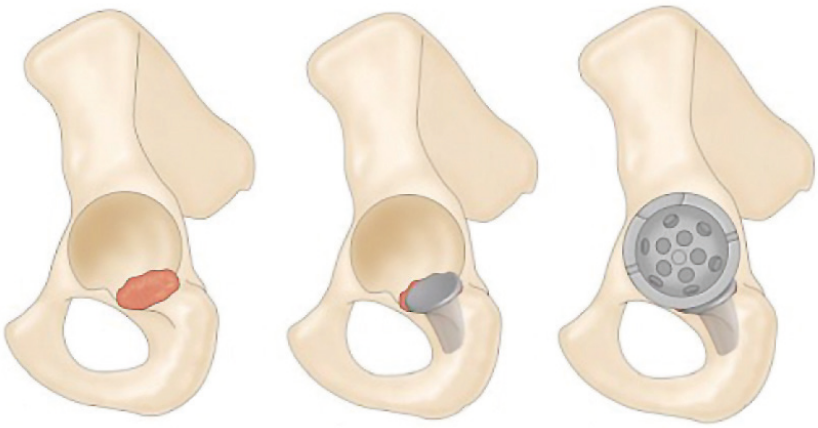
Tip:

The 3D ACT ABM Restrictor can be applied not only to the bone defect of the medial wall of the acetabulum, but also to the defect of the ischium rami and pubic rami.

Fig. 13

TRIAL AND IMPLANT THE 3D ACT ABM LOTUS

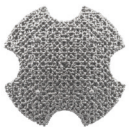
In case of ischial osteolysis the 3D ACT Lotus Augment can be used to provide inferior support of acetabular cup.



IMPLANTS & INSTRUMENTATION

3D ACT ABM Augment	
Product No.	Specification
A2510-5010	50/52×10
A2510-5015	50/52×15
A2510-5020	50/52×20
A2510-5025	50/52×25
A2510-5410	54/56×10
A2510-5415	54/56×15
A2510-5420	54/56×20
A2510-5425	54/56×25
A2510-5810	58/60×10
A2510-5815	58/60×15
A2510-5820	58/60×20
A2510-5825	58/60×25

3D ACT ABM Buttress	
Product No.	Specification
A2511-5803	58 Central Short
A2511-5804	58 Left Short
A2511-5805	58 Right Short
A2511-6600	66 Central Long
A2511-6604	66 Left Short
A2511-6605	66 Right Short
A2511-5800	58 Central Long
A2511-5801	58 Left Long
A2511-5802	58 Right Long
A2511-6603	66 Central Short
A2511-6601	66 Left Long
A2511-6602	66 Right Long



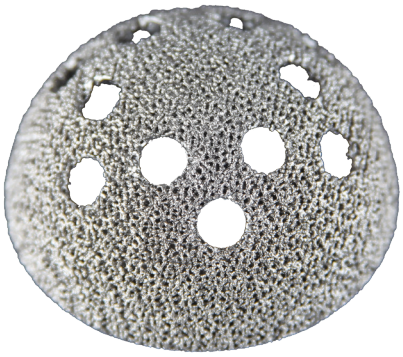
3D ACT ABM Restrictor	
Product No.	Specification
A2513-2605	26x5
A2513-2608	26x8
A2513-3205	32x5
A2513-3208	32x8

3D ACT ABM Shim	
Product No.	Specification
A2501-0400	4/0°
A2501-0405	4/5°
A2501-0410	4/10°
A2501-0415	4/15°
A2700-0400	4/0°Short
A2700-0405	4/5°Short
A2700-0410	4/10°Short
A2700-0415	4/15°Short

3D ACT ABM Lotus	
Product No.	Specification
A2514-2002	Diameter 20 mm, Right Ischium Ramus or Left Pubis Ramus
A2514-2502	Diameter 25 mm, Right Ischium Ramus or Left Pubis Ramus
A2514-3002	Diameter 30 mm, Right Ischium Ramus or Left Pubis Ramus
A2514-3502	Diameter 35 mm, Right Ischium Ramus or Left Pubis Ramus
A2514-2003	Diameter 20 mm, Left Ischium Ramus or Right Pubis Ramus
A2514-2503	Diameter 25 mm, Left Ischium Ramus or Right Pubis Ramus
A2514-3003	Diameter 30 mm, Left Ischium Ramus or Right Pubis Ramus
A2514-3503	Diameter 35 mm, Left Ischium Ramus or Right Pubis Ramus

ACT Screw	
Product No.	OD/ID (mm)
1300-2015	15mm
1300-2020	20mm
1300-2025	25mm
1300-2030	30mm
1300-2035	35mm
1300-2040	40mm
1300-2045	45mm
1300-2050	50mm
1300-2055	55mm
1300-2060	60mm
1300-2065	65mm
1300-2070	70mm

HXLPE (High Cross Linked Polyethylene) Liner	
Product No.	Liner Size/Cup Size (mm)
2329-4032	HXLPE Liner, 32/48
2329-4232	HXLPE Liner, 32/50
2329-4432	HXLPE Liner, 32/52
2329-4436	HXLPE Liner, 36/52
2329-4632	HXLPE Liner, 32/54
2329-4636	HXLPE Liner, 36/54
2329-4832	HXLPE Liner, 32/56
2329-4836	HXLPE Liner, 36/56
2329-5032	HXLPE Liner, 32/58
2329-5036	HXLPE Liner, 36/58
2329-5232	HXLPE Liner, 32/60
2329-5236	HXLPE Liner, 36/60
2329-5432	HXLPE Liner, 32/62-64
2329-5436	HXLPE Liner, 36/62-64
2329-5832	HXLPE Liner, 32/66-68
2329-5836	HXLPE Liner, 36/66-68
2329-6032	HXLPE Liner, 32/70
2329-6036	HXLPE Liner, 36/70



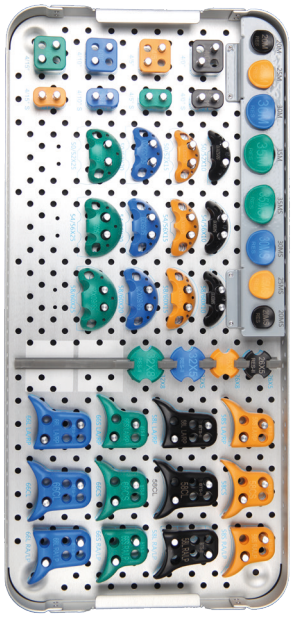
3D ACT Acetabular Cup	
Product No.	OD/ID (mm)
2321-4840	48/40
2321-5042	50/42
2321-5244	52/44
2321-5446	54/46
2321-5648	56/48
2321-5850	58/50
2321-6052	60/52
2321-6254	62/54
2321-6454	64/54
2321-6658	66/58
2321-6858	68/58
2321-7060	70/60

3D ACT BIOLOX® *delta* Ceramic Liner	
Product No.	Liner Size/Cup Size (mm)
A2400-32/40	Ceramic Liner, 32/48
A2400-32/42	Ceramic Liner, 32/50
A2400-36/44	Ceramic Liner, 36/52
A2400-36/46	Ceramic Liner, 36/54
A2400-36/48	Ceramic Liner, 36/56
A2400-36/50	Ceramic Liner, 36/58
A2400-36/52	Ceramic Liner, 36/60
A2400-36/54	Ceramic Liner, 36/62-64

Instrument List for ABM System 3D Printed Augment

Product No.	Description	Trial Colour	Specification
G30030-50/52X10	Augment Trial	Black	50/52×10
G30030-50/52X15		Yellow	50/52×15
G30030-50/52X20		Blue	50/52×20
G30030-50/52X25		Green	50/52×25
G30030-54/56X10		Black	54/56×10
G30030-54/56X15		Yellow	54/56×15
G30030-54/56X20		Blue	54/56×20
G30030-54/56X25		Green	54/56×25
G30030-58/60X10		Black	58/60×10
G30030-58/60X15		Yellow	58/60×15
G30030-58/60X20		Blue	58/60×20
G30030-58/60X25		Green	58/60×25
G30031-20MS	Lotus Augment Trial	Black	20MS
G30031-25MS		Yellow	25MS
G30031-30MS		Blue	30MS
G30031-35MS		Green	35MS
G30031-20M		Black	20M
G30031-25M		Yellow	25M
G30031-30M		Blue	30M
G30031-35M		Green	35M
G30032-26X5	Restrictor Trial	Black	26×5
G30032-26X8		Yellow	26×8
G30032-32X5		Blue	32×5
G30032-32X8		Green	32×8
G30033-58L-LA/RP	Buttress Trial	Black	58L LA/RP
G30033-58S-LA/RP		Yellow	58S LA/RP
G30033-58L-RA/LP		Black	58L RA/LP
G30033-58S-RA/LP		Yellow	58S RA/LP
G30033-58CL		Black	58CL
G30033-58CS		Yellow	58CS
G30033-66L-LA/RP		Blue	66L LA/RP
G30033-66S-LA/RP		Green	66S LA/RP
G30033-66L-RA/LP		Blue	66L RA/LP
G30033-66S-RA/LP		Green	66S RA/LP
G30033-66CL		Blue	66CL
G30033-66CS		Green	66CS
G30034-4/0	Shim Trial	Black	4/0°
G30034-4/5		Yellow	4/5°
G30034-4/10		Blue	4/10°
G30034-4/15		Green	4/15°
G30034-4/0S		Black	4/0°Short
G30034-4/SS		Yellow	4/5°Short
G30034-4/10S		Blue	4/10°Short
G30034-4/15S		Green	4/15°Short

Top Tray

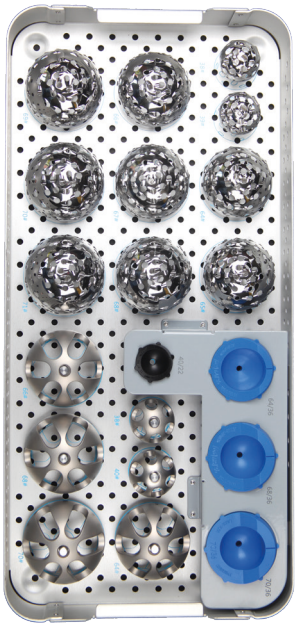


Middle Tray

Acetabular Reamers
Outer Diameter (mm)
38
39
64
65
66
67
68
69
70
71

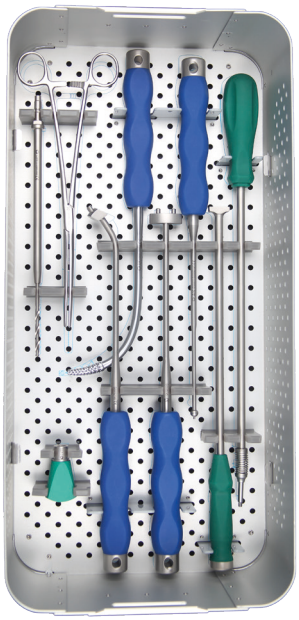
Trial Cups
Outer Diameter (mm)
38
40
64
66
68
70

Trial Liners
Cup Size/Liner Size (mm)
44/22
64/36
68/36
70/36



Bottom Tray

Product No.	Description
G20141	Augment Holder
G20144	Augment Drill
4710-III	Polyxial Screwdriver
G20143	Augment Impactor
G20142	Augment Impactor
G30035	Augment Adjuster
G30036	Augment Holder (Straight)
G30037	Augment Holder (Curved)
G30038	Lotus Rasp



Additional Acetabular Cup Trays are available on request.

References

[1] Hao Tang, et al. 'Inferior extended fixation utilizing porous titanium augments improves primary anti-rotational stability of the acetabular component'https://doi.org/10.1016/j.clinbiomech.2019.08.012

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爱康医疗 AKMEDICAL

3D 打印骨科世界

Beijing AK Medical Co., Ltd.

10 Baifuquan Road, Changping Science Park, Beijing, 102200, China

T: +86 10 8010 9581-61 E: sales@ak-medical.net W: www.ak-medical.net

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JRI Orthopaedics Ltd.

18 Churchill Way, 35A Business Park, Chapeltown, Sheffield, UK S35 2PY

T: 0114 345 0000 F: 0114 345 0004 W: www.jri-ltd.com