Surgical Technique

smith&nephew

CONTOUR®

Acetabular Rings

CONTOUR® Acetabular Rings

Surgical technique completed
in conjunction with

Joseph Schatzker MD,
BSc (Med.), FRCS (C)

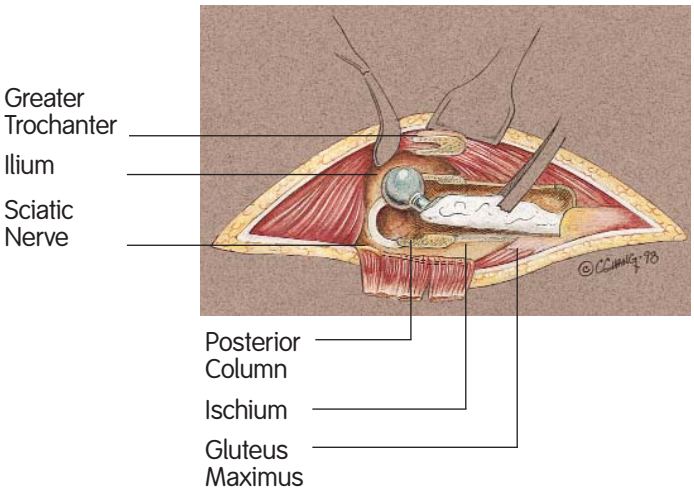
Allan E. Gross, MD,
FRCS (C)

CONTOUR Acetabular Rings can prove to be a most viable surgical solution for acetabular defects in primary and revision procedures. Used in conjunction with allograft bone, the CONTOUR design protects the graft while providing a stable base of fixation for the cement and the polyethylene cup. In addition, CONTOUR Acetabular Rings allow proper anatomical positioning of the polyethylene socket independent of the metal ring.

Nota Bene

The technique description herein is made available to the healthcare professional to illustrate the authors' suggested treatment for the uncomplicated procedure. In the final analysis, the preferred treatment is that which addresses the needs of the patient.

Positioning of the Patient



In primary cases, the patient may be positioned either supine or in the lateral decubitus position. All revisions are done with the patient in the lateral decubitus position.

Surgical Exposure
For primary implantation of the Reinforcement ring, the exposure is the same as for a primary total hip replacement.

The CONTOUR® Acetabular Reconstruction ring requires a more extensive exposure because access must be gained from superoposteriorly down the posterior column to the ischium. Posterior column defects require structural grafting more often than anterior column defects. Exposure of this magnitude necessitates a trochanteric osteotomy, but it is our experience that an anterior trochanteric slide, rather than a transverse trochanteric osteotomy, is sufficient and provides a more stable fixation of the greater trochanter after the surgery.

Preparation of the Acetabulum

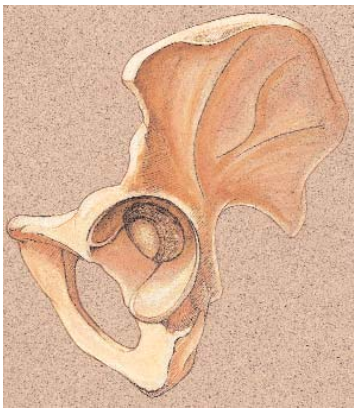
The previous implant must be removed without causing any further bone loss. Once the implant is removed, all cement and membrane must be carefully extracted. Great care should be exercised in removing intrapelvic cement. A CT-scan combined with dye supplement to visualize the great vessels and the ureter may be required. In the absence of infection, cement may be left in its intrapelvic position and allograft is then interposed between the cement and the CONTOUR® Reconstruction ring.

It is extremely important to define completely the entire circumference of the acetabulum to be able to define a defect as contained or uncontained. If acetabular reamers are used, the outer diameter of the implant should match or be 2mm larger than the final reamer.

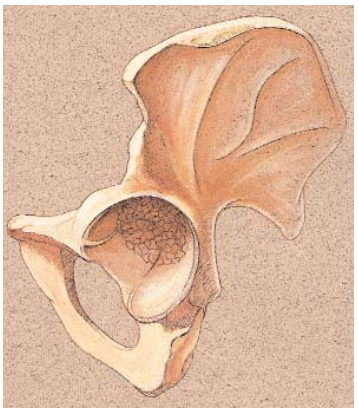
Preparation and Implantation of the Bone Graft

Medial wall defects, particularly if extensive, are covered with cancellous allograft slices prepared from femoral heads. The remainder of the defects are filled with morsellized allograft bone. The morsellized bone should be small chunks instead of a slurry of bone which would make impaction impossible. In the case of uncontained segmental acetabular defects, bulk allograft must be used. Although it is preferable to use true acetabular allograft bone, some defects can be managed with male femoral heads.

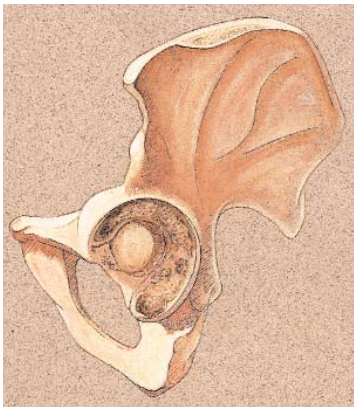
Morsellized allograft bone is used to fill cavitary defects. It is firmly impacted with smooth acetabular impaction domes. Reverse seat reamers can also be used, but these do not provide the same degree of impaction. Major medial wall deficiencies should be managed with slices of allograft to provide containment of the morsellized allograft bone used to fill the remainder of the defect. This prevents the morsellized allograft bone from being impacted into the pelvis.



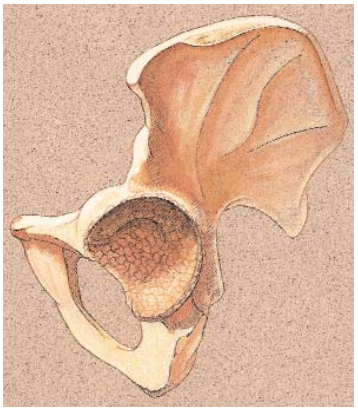
Contained cavity defect



Morsellized allograft bone impacted into cavity defect



Global contained cavity defect including medial wall

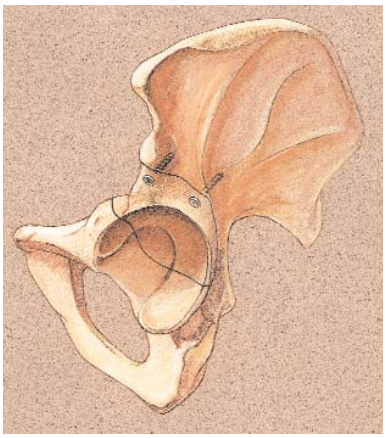


Morsellized allograft bone impacted into global cavitary defect

Preparation and Implantation of the Bone Graft

If there is a major segmental defect, this must be defined accurately by clearing all soft tissue from the acetabular boundaries. Once the defect is defined, the structural allograft is sculpted to fit the defect and then held with two cancellous screws. The most common reconstruction involves the posterior column. In this case, the screws are usually directed superiorly into the dome. Structural allograft is often combined with morsellized allograft that is used to fill adjacent cavitary defects.

Major column defect



Restoration of bone stock by major column allograft

Reinforcement Ring Surgical Technique

Indications for the CONTOUR® Reinforcement Ring
The CONTOUR Reinforcement Ring is used where the bone deficits are such that the surgeon can still get adequate support for the ring superoposteriorly and inferomedially against the host bone. The indications for this device are:

1. Primary Hip Replacement
   - Severe osteoporosis
   - Large acetabular erosions or cysts
   - Mild to moderate protrusio where the ring can still be seated superoposteriorly and inferomedially against host bone

2. Revision Arthroplasty of the Hip
   - Contained cavitary defects in conjunction with morsellized allograft bone
   - For small segmental rim defects that do not involve the columns but may require a small structural graft that can be protected by the ring

Contraindications for CONTOUR Reinforcement Ring

1. Major segmental defects involving the dome or posterior column
2. Medial wall segmental defects
3. Any bone defect that involves more than 50% of the acetabulum (contained or uncontained)

It is extremely important that the Reinforcement ring is supported by host bone along its rim superoposteriorly and inferomedially. It must be seated firmly against bone with no toggling. **If the ring is supported primarily against morsellized allograft bone, the device will obtain anchorage only superoposteriorly and will fail because of the hinge-like forces that will be placed upon it.**

Reinforcement Ring Surgical Technique

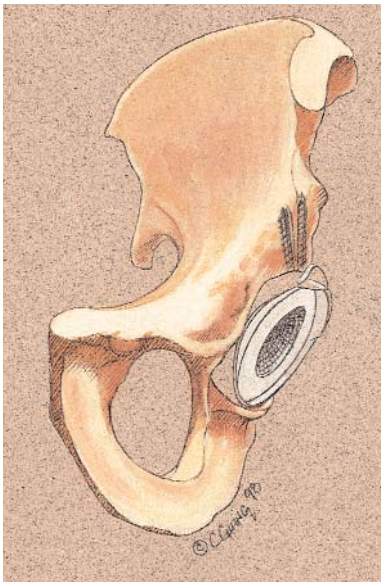
CONTOUR® Reinforcement Ring Insertion

The CONTOUR Reinforcement Ring is fitted superiorly against the superior rim of the acetabulum, posteriorly against the posterior wall and column, and inferomedially against the floor of the acetabulum. The ring must have good purchase and support superiorly and posteriorly and it must rest inferomedially against host bone and not on morsellized allograft bone. It must have a firm seat and must not have any potential for toggling. The CONTOUR Reinforcement Ring has a threaded center hole for the threaded cup positioner.

The Reinforcement ring is secured with screws that are directed into the dome of the acetabulum. It is best to start with a central screw which forces the ring upwards and medially in line with the resultant forces and in about 15-20° to the vertical axis of the body. At least three screws should be inserted into this area of the dome. Screws can be inserted along the rim if necessary but must have the same direction as those entering the plane more centrally. Screws should not be directed anteriorly or medially because of the danger of penetration into the pelvis and risk to vital structures.

Reinforcement ring insertion

Acetabular screw alignment



Acetabular screw alignment A-P view

Reconstruction Ring Surgical Technique

Indications for the CONTOUR® Reconstruction Ring
The CONTOUR Reconstruction Ring can be used as long as there is support superoposteriorly against the ilium and inferiorly against the ischium.

1. Large cavitary defects involving all quadrants of the acetabulum. This device is used in conjunction with morsellized allograft bone. The ring is screwed to the ilium and the dome, and must be supported by the posterior column and the ischium.
2. Medial wall segmental defects where this device can be used in conjunction with cancellous allograft slices and morsellized bone.
3. Segmental defects that involve anterior or posterior column and involve more than 50% of the acetabulum. The device is used in conjunction with a solid acetabular allograft.
4. Pelvic discontinuity may occur if there is a discontinuity of both columns or a massive global bone defect involving both columns. The pelvic discontinuity is stabilized by the ring being fixed by screws to both the ilium and ischium. The bone deficiency is replaced with a structural graft (usually replacing the posterior column). The graft is fixed superiorly to the ilium, and if possible, inferiorly to the ischium with 6.5mm cancellous screws before application of the ring.

CONTOUR® Reconstruction Ring Insertion

The CONTOUR Reconstruction Ring is stabilized superoposteriorly by at least three screws in the superior flanges or through the ring into the dome. It should be buttressed against the posterior column, the inferior rim of the acetabulum, and the ischium, before screw insertion.

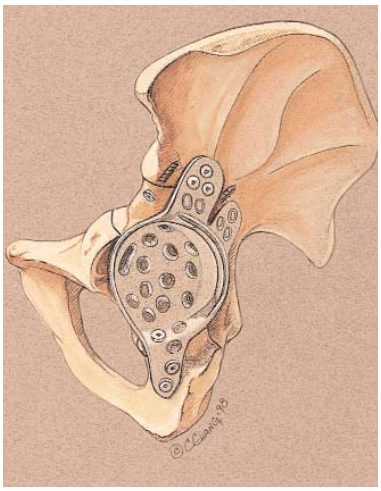
If a structural bulk allograft is being used, it is important to use screws in both the superior and inferior flanges to stabilize the ring and bridge the allograft. If it is impossible to gain good purchase of the screws in the inferior flange sitting on the ischium, it can be used as a buttress against the ischium or slotted into the ischium.

As an alternative, the inferior flange can be buttressed against the ischium with a screw being placed through the ring adjacent to the flange and into the body of the ischium.

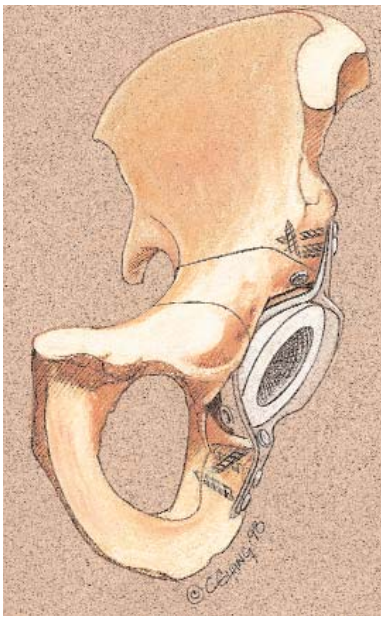
If there is a pelvic discontinuity, the inferior flange should be screwed to the ischium. If there is no pelvic discontinuity, the inferior flange can be slotted into or buttressed against the ischium without screws.

Screws passing through the ring can also be used to add to the fixation of the solid allograft, but great care must be exercised so that the screws do not penetrate anteriorly or medially.

It is important to contour this device very closely to the bone before placing the screws. **If the device is not contoured, tightening the screws either superiorly or inferiorly causes the device to lift off the bone.**



Reconstruction ring fixed to ilium and ischium



Reconstruction ring with all-poly cup A-P view

The ring must not be inserted too vertically or the inferior rim will impinge on the neck of the femoral component, producing instability or loosening.

In summary, if the CONTOUR® Reconstruction ring is used to reconstruct cavitary defects where stability of the ring can be gained against the ilium and dome superiorly and the posterior wall and column, then inferiorly, it is enough to buttress the ring against the inferior acetabular remnant or the ischium. If it is used in conjunction with a structural acetabular allograft or in the presence of a pelvic discontinuity, the inferior flange should be fixed to the ischium by screws or slotted into the ischium. If possible, at least three screws should be used in the superior and one or two screws through the inferior flanges.

Reconstruction Ring Surgical Technique

Cementing the Polyethylene Cup
The polyethylene cup is oriented relative to the pelvis and the long axis of the patient. Do not reference the position of the ring when determining the proper position of the polyethylene socket. Select the polyethylene socket size that corresponds to, or is 2mm smaller than, the inner diameter size of the metal ring.

Global contained cavitary defect

Catalog Information

Reconstruction Ring

Implant Cat. No.	OD	ID	Side
7133-7150	50	46	Left
7133-7156	56	52	Left
7133-7162	62	58	Left
7133-7250	50	46	Right
7133-7256	56	52	Right
7133-7262	62	58	Right

Reinforcement Ring

Implant Cat. No.	Trial Cat. No.	OD	ID
7133-7044	7136-7044	44	40
7133-7047	7136-7047	47	43
7133-7050	7136-7050	50	46
7133-7053	7136-7053	53	49
7133-7056	7136-7056	56	52
7133-7059	7136-7059	59	55
7133-7062	7136-7062	62	58
7133-7065	7136-7065	65	61
7133-7068	7136-7068	68	64

Preoperative Templates

Cat. No.	Description
7138-0365	Reinforcement
7138-0362	Reconstruction

Universal Acetabular Cancellous Screws, 6.5mm

Cat. No.	Length
7133-6515	15mm
7133-6520	20mm
7133-6525	25mm
7133-6530	30mm
7133-6535	35mm
7133-6540	40mm
7133-6550	50mm

Catalog Information

Acetabular Reamer Domes

Cat. No.	Size	Cat. No.	Size
41-7138	38mm	41-7154	54mm
41-7139	39mm	41-7155	55mm
41-7140	40mm	41-7156	56mm
41-7141	41mm	41-7157	57mm
41-7142	42mm	41-7158	58mm
41-7143	43mm	41-7159	59mm
41-7144	44mm	41-7160	60mm
41-7145	45mm	41-7161	61mm
41-7146	46mm	41-7162	62mm
41-7147	47mm	41-7163	63mm
41-7148	48mm	41-7164	64mm
41-7149	49mm	41-7165	65mm
41-7150	50mm	41-7166	66mm
41-7151	51mm	41-7167	67mm
41-7152	52mm	41-7168	68mm
41-7153	53mm		

Impaction Domes

Cat. No.	Description
7136-7341	41mm
7136-7344	44mm
7136-7347	47mm
7136-7350	50mm
7136-7353	53mm
7136-7356	56mm
7136-7359	59mm
7136-7362	62mm
7136-7365	65mm
7136-7368	68mm

Dome Handle with Positive Lock

Cat. No. 7136-2105

T-Handle

Cat. No. 7136-4006

Acetabular Cup Positioner/Impactor

Cat. No. 73-2120

CONTOUR® Flange Bender

Cat. No. 7136-7001

Vice Grip Pliers

Cat. No. 7136-7537

Acetabular Screw Drill Guide

Cat. No. 7136-2101

Catalog Information

Acetabular Screw Drill

Cat. No.	Length
7136-2115	15mm
7136-2125	25mm
7136-2135	35mm
7136-2150	50mm

Depth Gauge

Cat. No. 7136-2012

REFLECTION® Curved Screw Forceps

Cat. No.	Bend
73-2136	35°
73-2137	75°

Acetabular Cup Screwdriver Ratchet Handle

Cat. No. 73-2112

Straight Screwdriver Shaft

Cat. No. 7136-2011

Acetabular Cup Universal Screwdriver Shaft

Cat. No. 73-2113

Flexible Screwdriver Shaft

Cat. No. 7136-2010

Mallet

Cat. No. 7136-2106

Catalog Information

Polyethylene Cup

Cat. No.	OD	ID
7135-2240	40mm	22mm
7135-2243	43mm	22mm
7135-2246	46mm	22mm
7135-2249	49mm	22mm
7135-2252	52mm	22mm
7135-2255	55mm	22mm
7135-2258	58mm	22mm
7135-2261	61mm	22mm
7135-2846	46mm	28mm
7135-2849	49mm	28mm
7135-2852	52mm	28mm
7135-2855	55mm	28mm
7135-2858	58mm	28mm
7135-2861	61mm	28mm
7135-3249	49mm	32mm
7135-3252	52mm	32mm
7135-3255	55mm	32mm
7135-3258	58mm	32mm
7135-3261	61mm	32mm

Positioner

Cat. No. MT-2200

X-Bar

Cat. No. MT-2201

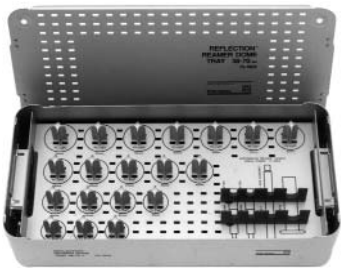
Placement Head

Cat. No.	Size
MT-2222	22mm
MT-2228	28mm
MT-2232	32mm

Catalog Information

Reamer Dome Tray

Cat. No.	Description
73-1004	38mm - 70mm

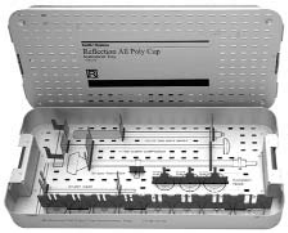


Impactor Dome Tray

Cat. No. 7136-7004

All-Poly Cup Instrument Tray

Cat. No. 7136-2110



Screw Caddy

Cat. No. 7136-2108

Notes

Notes

Orthopaedic Reconstruction
Smith & Nephew, Inc.
1450 Brooks Road
Memphis, TN 38116
USA

Telephone: 1-901-396-2121
Information: 1-800-821-5700
Orders/Inquiries: 1-800-238-7538

www.smith-nephew.com

45700101-1 7138-0728 05/07