

CUSTOM IMPLANTS

**OSSIS**



Over the last 15 years Ossis' orthopaedic surgeons and materials and design engineers have been at the leading-edge of innovation in patient-specific implants.

Ossis combines the use of imaging technologies and powerful software platforms with its extensive implant design and clinical experience, to deliver to surgeons the most advanced and effective patient-specific implants available.

Today Ossis' range of patient-specific implants embody the results of its extensive investment in innovation and technology, with proprietary technologies such as specialised surface textures, fixation structures and other design features, allowing surgeons to offer the best possible treatment of a broad range of major anatomical defects.

*OSSIS is an ISO13-485 accredited company.*



# TRABECULAR ACETABULAR IMPLANT

Severe pelvic bone loss or pelvic dissociation are best treated using an implant that has been specifically designed to match the patient's anatomy. Ossis' trabecular acetabular implants not only match patient anatomy but offer other features that promote maximum long-term fixation and security of the implant, including:

- Trabecular mesh at all bone interfaces with mesh pore size designed to optimise fixation and promote bone ingrowth.
- Features to facilitate the use of morcelised bone.
- Screw design to maximise post-operative fixation prior to osseointegration occurring.
- Variable surface textures to minimise the risk of nerve and soft tissue damage.

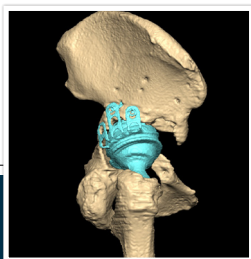
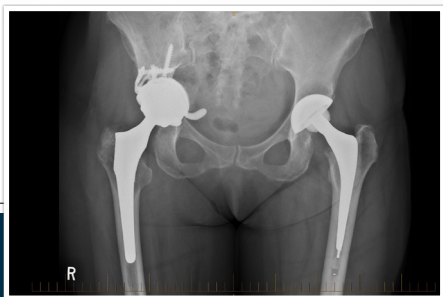
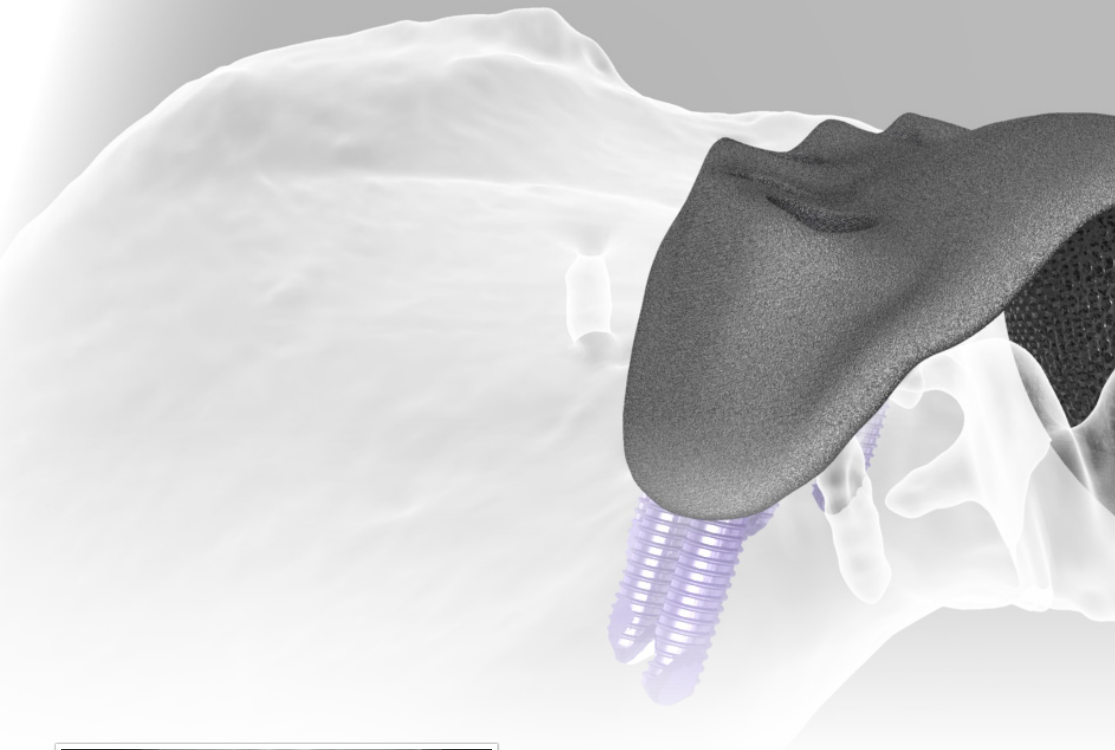
Use of Ossis trabecular acetabular implants provide the best outcomes for surgeons and their patients:

- Cost effective due to reduced theatre time as Ossis' implants are specifically designed to fit the patient and reduced time to weight-bearing results in shorter hospital stays and earlier return to work.
- Surgeries are easier and present no surprises, as surgeons know exactly what they are going to find, how the implant fits the patient's anatomy and are able to practice pre-operatively using the anatomical model and trial supplied with each Ossis implant.
- Higher post-operative hip scores.

## PATIENT SPECIFIC IMPLANT DESIGN PROCESS

Ossis has a reputation for designing and manufacturing custom implants of the highest quality which incorporate extensive clinical experience, ensuring the best possible outcome for the patient.

Working with the surgeon Ossis' engineers design the implant. Surgeon approval of the design is based on digital images of the proposed implant, both in isolation and in position on the patient's anatomy, including screws positions.



### STEP ONE : BEFORE

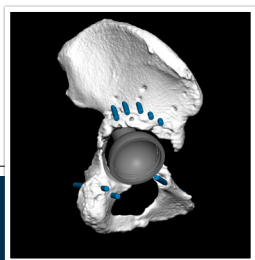
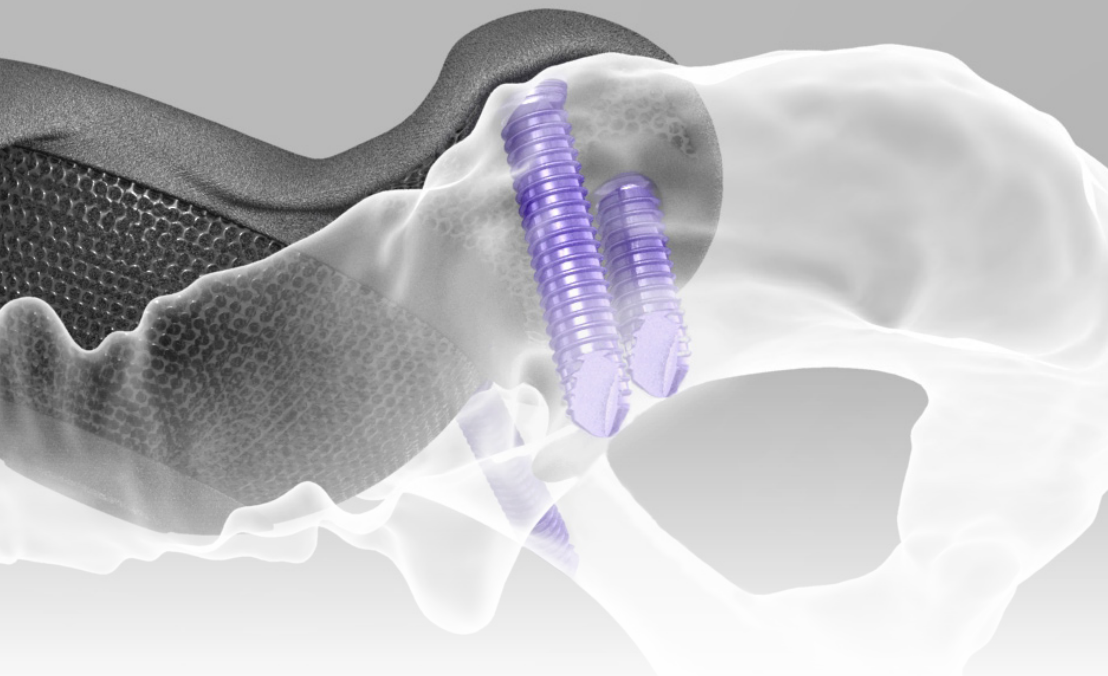
The first step in the design of the implant is Ossis receiving from the surgeon patient xray and high definition CT data.

### STEP TWO

The patient's hip anatomy is digitally reconstructed from the CT data.

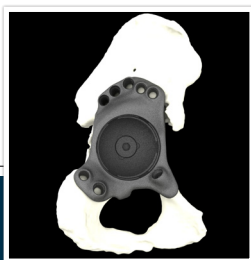
### STEP THREE

Using computer-aided design software and clinical experience Ossis engineers digitally debride the acetabulum to create a healthy margin for the implant.



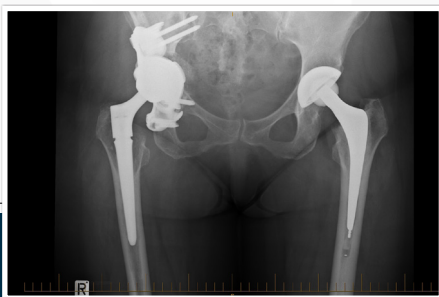
#### STEP FOUR

Based on the resulting shape of the prepared acetabulum a digital implant is created and screw positions are determined.



#### STEP FIVE

Surgeon signs off on the final design of the custom implant for manufacture.



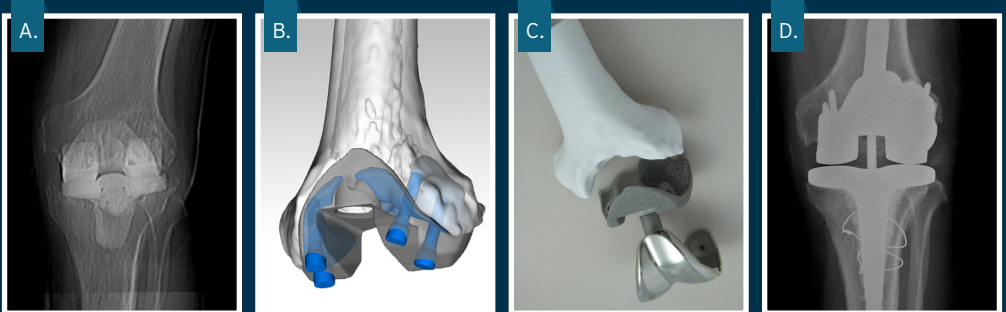
#### STEP SIX : AFTER

Post-operative xray of the custom implant in patient.

# PRECISION ENGINEERED SOLUTIONS

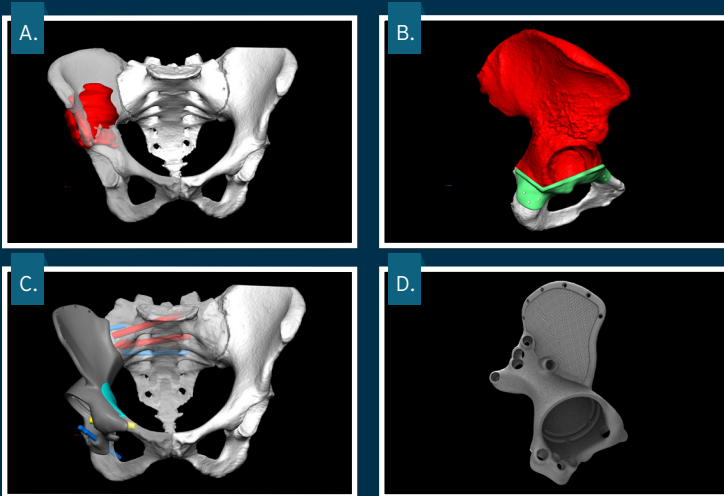
## UNMATCHED DESIGN EXCELLENCE

Ossis' design and manufacturing experience allows it to create custom implant solutions in all areas of the anatomy, not only producing standalone solutions, but also custom solutions based on its unique manufactured structures incorporating 'off the shelf' implants (such as total knee and femoral components) manufactured by all major orthopaedic device companies. The flexibility of Ossis' design and manufacturing processes maximises the range of treatment options available to surgeons.



## CASE STUDY : DISTAL FEMORAL AUGMENT

A 68 year old male presented with severe bone loss in the lateral aspect of his left distal femur (*Image A*). The patient suffered from an infection and osteolysis in the area surrounding a primary joint replacement, causing severe bone loss resulting in a mal-alignment of the tibia-femoral joint which dramatically reduced the patient's flexion range. Ossis designed a 2-stage trabecular titanium augment with a cement spacer and lock screw fixation (*Image B*) to remedy the bone loss, create healthy bone/implant fixation and to bring the distal femoral height back to the correct alignment (*Image C,D*) for integration with a DePuy LCS® Complete™ Revision Mobile Knee Bearing System.



## CASE STUDY : METASTASIS OF THE RIGHT ILIUM

The patient was a 64 year old female who was otherwise medically fit. The patient had a hepatocellular carcinoma resected a year prior to presenting, but had subsequently developed a large solitary bony metastasis in the right ilium. (*Image A*) MRI review shows that the tumour essentially involved the ilium from the sacroiliac (SI) joint to the acetabulum. Hence the resection required (*Image B*) to remove the tumour included the SI joint and the hip (acetabular) joint. The resection line passed through the iliopectineal eminence. The ischial resection line was determined at the lower border of the hip joint level with the superior border of quadratus femoris. The resection was done using an Ossis patient-specific cutting guide to provide the most accurate fit of the definitive implant.

The Ossis implant, which was created from the patient's CT data, was designed (*Image C*) to fill the void in the patient's pelvis in the best possible manner. The implant effectively provided the patient with a right ilium and acetabular socket. The implant was retained by a mixture of compression and fixed screws into the sacrum and ischial bones to provide initial stability and gain fixation across the bone/implant junction. Additional support was also gained across the ischium resection through the addition of flanges which provided weight transfer through to the remaining bone stock.

(*Image D*) Selected areas of the implant were manufactured with a porous titanium mesh to enable bone in-growth. The definitive implant was manufactured in titanium alloy (Ti6Al4V) using Electron Beam Melting, with post-manufacture machining and finishing processes applied to accommodate fixation screws and to promote osseointegration.

## ORDER PROCESS

Call Ossis (+64 3 365 7369) and discuss your case with our engineers. We will give you assistance with defining the CT data required for your implant and completing the prescription and advise you on the most efficient way of getting your information to us.

Within a week of being instructed to proceed with the design we will provide you with digital images of the proposed implant and screw positions for you to sign off.

Three weeks after you sign off on the implant design we will send to you the completed implant, together with an anatomical model and trial implant for use in pre-surgical planning and as an intraoperative guide.



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Ossis designs and manufactures patient-specific implants which are used by surgeons to treat patients with unique clinical needs that cannot be effectively treated with off-the-shelf products.

As each Ossis implant is unique to the patient, mechanical testing and engineering data and clinical test results are often unavailable for such devices. Consequently, the mechanical integrity of such devices cannot be validated. Surgeons should consider these issues and inform their patients about the additional risks associated with patient-specific implants.

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