



RAPID DESIGN & MANUFACTURING OF SURGICAL GUIDES

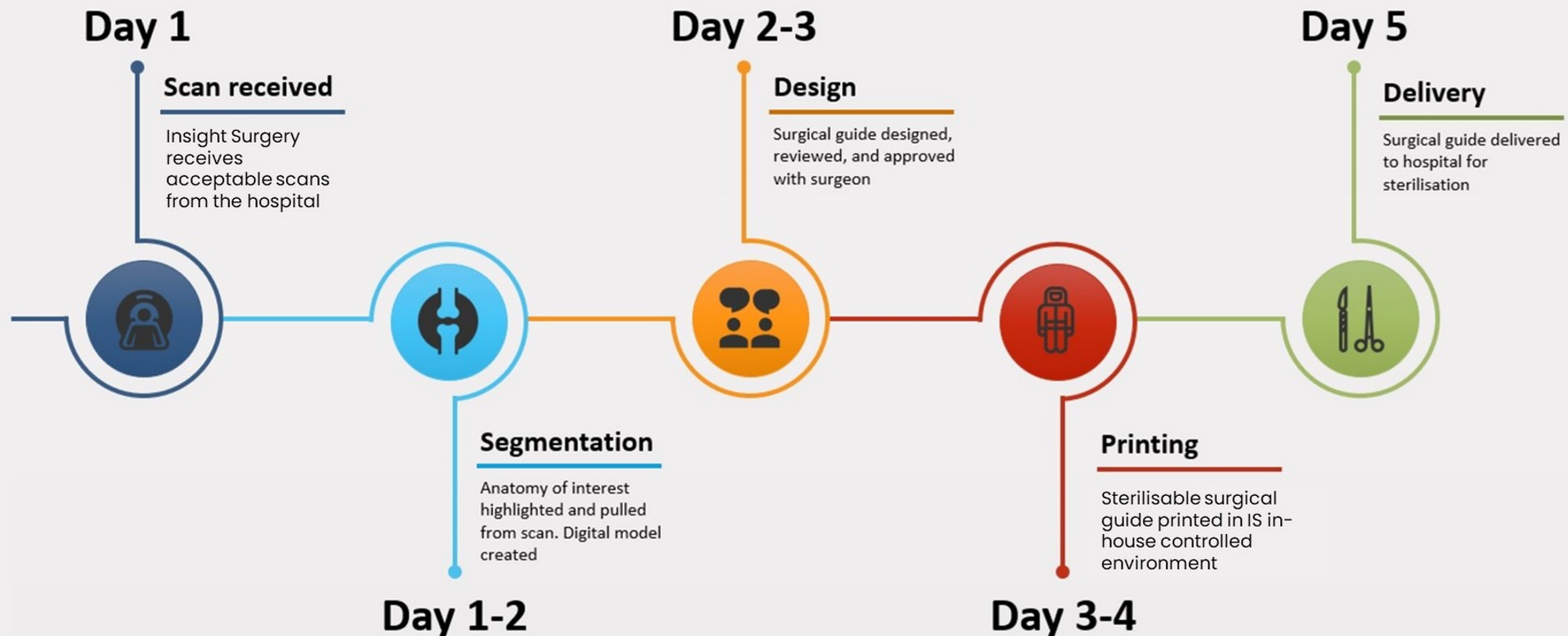


www.insightsurgery.com

Timeline

Rapid Guide Manufacture Service

5 day turnaround service dependent upon on extreme level of surgical urgency and scan quality being compatible with protocols designed to ensure quality medical devices that adhere to our ISO 13485 standards. Typical service time of 10 working days advised.



Case Summary

This patient presented with a non-symptomatic Grade 1 chondrosarcoma that had been picked up in a routine scan for a separate investigation. The tumour was small and localised in their left ilium, and the surgeon planned to do a targeted, bone-conserving resection that preserved the integrity of the ilium whilst maintaining safe margins.

Insight Surgery was asked to design and deliver a novel sterilizable surgical drill guide that allowed for this.

Description

Simpleware Medical ScanIP was used to segment both bony structures from the patient's CT scan (a 1 mm slice of the left ilium) and tumour structures from the MRI. These were combined in Simpleware to create a virtual model. The tumour was then grown digitally by 10mm to create a safe surgical margin and highlighted for better visualization.

The consultant determined their ideal path for resection and Insight Surgery's devised a patient-specific, circular drilling channel guide for use in theatre.

The surgical guide was printed in Biomed Clear, a biocompatible, sterilizable material on a Formlabs 3D Printer, and delivered to the surgical team alongside a 3D printed anatomical model for intra-operative reference. The guide was printed in Insight Surgery's controlled environment facilities, located within its Nuffield Orthopaedic Centre hub (UK).

INSIGHT SURGERY CASE STUDY

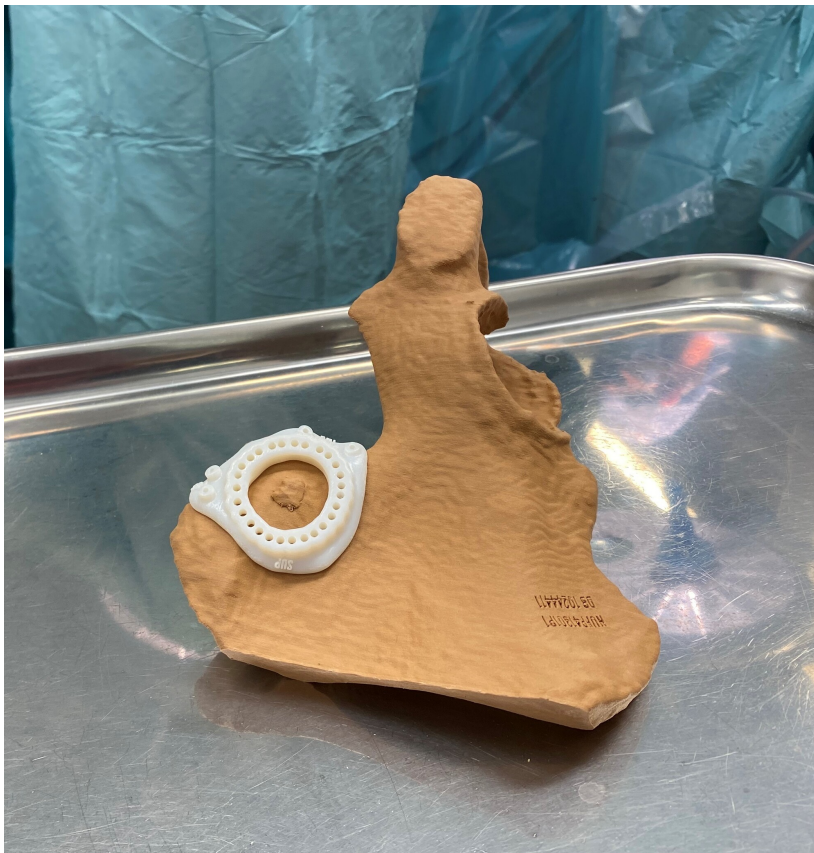


ONCOLOGICAL PRE-SURGICAL PLANNING, VIRTUAL SIMULATION, SURGICAL GUIDE

HOSPITAL: NUFFIELD ORTHOPAEDIC CENTRE

PROCEDURE: TARGETED RESECTION OF ILIUM

DEVICE: 3D PRINTED PATIENT-SPECIFIC ANATOMICAL MODEL AND SURGICAL GUIDE



OUTCOME / BENEFITS

The surgery was extremely straightforward and completed within an hour. The guide fitted well and once the drill holes were made the surgeon was able to easily complete the osteotomy with a uni sawblade. The surgical team appreciated the level of precision the guides enabled and were able to salvage all of the sacroiliac joint, whilst also avoiding disturbance of any neurovascular structure. Sectioning of the tumour showed good margins.

Post-operatively, the patient experienced a quick rehabilitation period and was able to return home after 48 hours.

Case Summary

This patient presented with a chondrosarcoma and a last minute request was made to Insight Surgery to provide sterilisable surgical cutting guides to aid in a PII/PIII resection of the right hemipelvis. The scans were segmented, surgery planned, and model and guide approved, manufactured and sterilised inside 72 hours of receipt of the scans and instruction.

Description

Upon receiving the patient's PET CT scan, Insight Surgery segmented the imagery to build the virtual model of the pelvis and tumour. The tumour boundary was grown by a 10mm margin, as instructed. The optimal cutting planes were then agreed upon by the surgeon and the biomedical engineer.

The first guide provided allowed for an accurate tri-planar cut through the acetabulum from the lateral aspect. The accuracy of the cuts allowed the surgeon to keep enough bone stock for an effective reconstruction. A second guide for the Pubic Symphysis was created but only used as a reference template for the osteotomy. The guides and models were designed and printed in Insight Surgery controlled environment facilities located within its Nuffield Orthopaedic Centre hub. Optimally, we would ask for 10-14 days to complete this service, having the facility onsite allows us to meet very tight turnarounds in emergency situations.

Blade - 0.89mm

Fixation - 1.6mm K Wire

INSIGHT SURGERY CASE STUDY



ONCOLOGICAL PRE-SURGICAL PLANNING, VIRTUAL SIMULATION, SURGICAL GUIDE

HOSPITAL NUFFIELD ORTHOPAEDIC CENTRE

PROCEDURE PII/PIII HEMIPELVECTOMY

DEVICE 3D PRINTED PATIENT SPECIFIC ANATOMICAL MODEL AND SURGICAL GUIDE (POLYAMIDE)



OUTCOME / BENEFITS

Use of the model in pre-surgical planning, and the surgical guide in theatre, meant the surgical approach could be limited to posterior extensile Kocker Langenbeck approach. Significant operative time was saved and bone stock was preserved, excluding use of augments to support the Lumic Cup (Implantcast).

Clear margins were confirmed in post operative tests, confirming complete removal of the tumour tissue.

Case Summary

A request was made to Insight Surgery by the Nuffield Orthopaedic Centre to provide sterilizable surgical guides to assist in the partial removal of a patient's pelvis (left side) due to it being compromised by tumorous tissues.

A fast-track service was required to meet the urgent surgery date for the resection of the sarcoma.

Description

Insight Surgery used Simpleware Medical ScanIP to segment the patient's latest CT and MRI scans to build a virtual model of the left hemipelvis. The sarcoma within was digitally grown by a 15mm margin and highlighted in order for the consultant to determine the optimum surgical cutting planes.

The first guide allowed for a bilateral cut through the ilium for the lateral aspect. The second guide allowed for a single cut through the pubis. The third guide directed a single cut through the ischium.

All three guides were printed in Biomed Clear, a clear, sterilizable material on a Formlabs 3B printer, at Insight Surgery's controlled environment facilities, housed within its Nuffield Orthopaedic Centre hub (UK).

INSIGHT SURGERY CASE STUDY

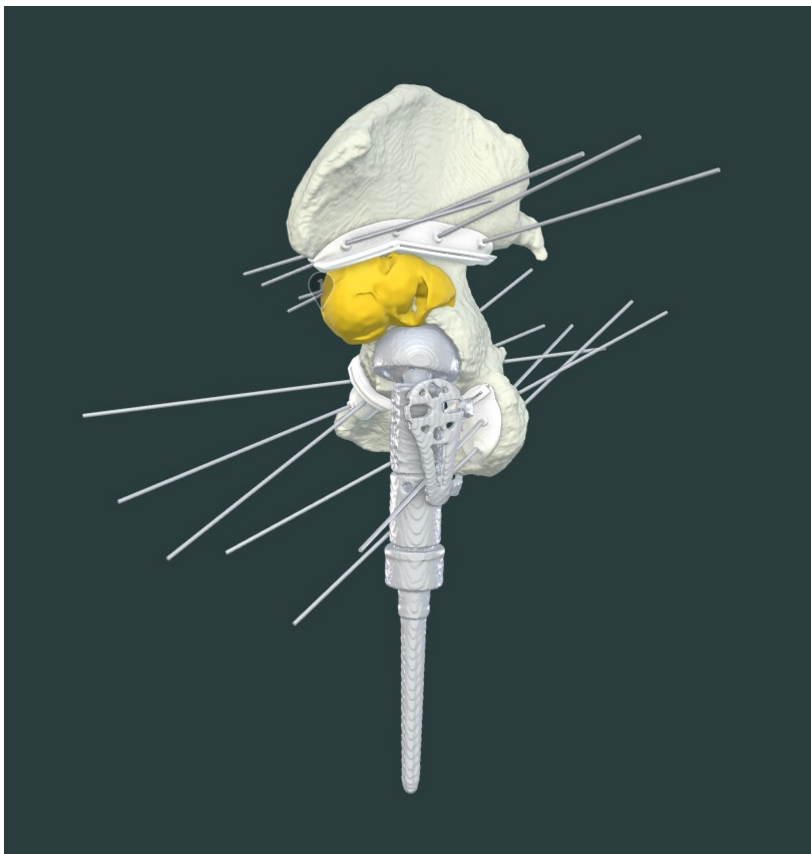


ONCOLOGICAL PRE-SURGICAL PLANNING, VIRTUAL SIMULATION, SURGICAL GUIDE

SPECIALITY: ORTHOPEDIC ONCOLOGY

PROCEDURE: PI/II HEMIPELVECTOMY

DEVICE: 3D PRINTED PATIENT-SPECIFIC ANATOMICAL MODEL AND SURGICAL GUIDES



OUTCOME / BENEFITS

- Rapid turnaround of the design and manufacture of the model and guides was achieved within one week.
- Pre-operatively, the surgical team used the anatomical model and guides to engage the patient in a thorough discussion regarding tumour re-recurrence and the metastasis of the tumour.
- Intra-operatively, the guides fitted optimally and allowed for a single posterior extensile approach to be used. Significant operative time was saved.

Case Summary

A patient's previous fracture had malunited, causing a reduced range of motion in their wrist.

Insight Surgery was asked to provide a patient-specific open wedge osteotomy cutting guide to allow the surgeon to accurately realign articulating cartilage with the carpals of the hand in an effort to restore mobility in the wrist.

A standard plate would also be implanted using Insight Surgery's predetermined drilling locations to secure realignment.

Description

Insight Surgery used Simpleware Medical ScanIP to segment CT scans of both the patient's left and right (affected) wrist anatomy. The left side was mirrored and the right side was orientated to match the radiocarpal alignment present on the left side.

The optimum location of the cutting planes was identified by the surgeon and converted by the biomedical engineer into a surgical guide which would allow accurate recreation of the cuts in theatre.

The guide was printed in Biomed Clear, a biocompatible, sterilisable material on a Formlabs 3D printer, and delivered to the surgical team. The guide was printed in Insight Surgery's controlled environment facilities, located within its Nuffield Orthopaedic Centre Hub (UK).

INSIGHT SURGERY CASE STUDY



ORTHOPEDIC PRE-SURGICAL PLANNING, VIRTUAL SIMULATION, SURGICAL GUIDE

SPECIALITY: ORTHOPEDIC

PROCEDURE: RADIOCARPAL REALIGNMENT VIA OPEN WEDGE OSTEOTOMY

DEVICES: 3D PRINTED PATIENT-SPECIFIC ANATOMICAL MODEL AND SURGICAL GUIDE



OUTCOME / BENEFITS

Pre-surgical planning with the virtual model, and the use of the patient-specific guide intra-operatively, resulted in time saved during theatre. Improved accuracy of the cuts to the bone, and securing of the implant, also improved the procedural outcome.

Realignment surgery proved to be a success with post-op x-rays showing good placement of the plate and alignment of the radiocarpals.

