For facial and jaw reconstruction, 3D printed surgical models save three to four hours in the OR.

3D Printed
Medical
Solutions

Queen Elizabeth Hospital saves time, cost, while improving patient outcome

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The ability to produce life-like medical models in-house on our Stratasys 3D printer saves three to four hours in OR time per surgery, which at a cost of £5,000 an hour, is a substantial cost saving."

Stefan Edmondson
Queen Elizabeth Hospital

stratasys

Prosthetist Stefan Edmondson and the Stratasys Objet Eden 350 3D Printer.

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Challenging Clinical Outcomes

Cancer patients in the maxillofacial wing of Queen Elizabeth Hospital in Birmingham, UK, often require a surgical procedure to remove a tumor or bone fragment. This space then needs to be replaced or bridged with another piece of bone or material. Prosthetic plates or bone replacements are very commonly used in these cases, yet the exact fit is typically achieved only after many alterations by surgeons in the operating room – while the patient is on the operating table.

Several factors help ensure a good surgical outcome, including efficient completion of the procedure, fully briefed and prepared surgeons, and an understanding of patient-specific risks to help avoid complications during or post-surgery.

The dilemma for Queen Elizabeth's hospital was how to prepare for patient-specific surgeries in a time and cost-effective way that could also save lives.

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Saving Money and Providing Customized Care

The hospital learned about the benefits of 3D printing technology for medical modeling and began outsourcing its 3D printing requirements. But soon, the far-reaching benefits of 3D printing technology became obvious and the hospital purchased a Stratasys PolyJet™ 3D Printer. The hospital integrated the 3D models into its maxillofacial practice for the rapid production of patient-specific cutting guides and pre-surgical planning models, a way to provide more customized care for their patients. "The ability to produce life-like medical models in-house on our Stratasys 3D Printer translates to up to £20,000 per surgery in savings, with a reduction in surgical planning time of 93 percent," said Stefan Edmondson, Consultant Maxillofacial Prosthetist at the hospital.

The hospital's 3D printing applications quickly extended from the pre-surgical process throughout several departments, including burns and plastic surgery, ear, nose and throat, as well as neurosurgery units, which now all benefit from the technology.

From Scan to Model

The hospital has combined its ability to 3D print models with the production of cutting guides, allowing the metal plates or bone replacements to match the patient perfectly prior to the operation.

The process begins with patient CT scans being converted into highly accurate 3D printed models, helping medical practitioners better understand and study a patient case prior to performing the actual surgery.

Combining dimensional stability and fine detail, Stratasys' VeroWhite material provides the smooth, high-resolution finish necessary for accurate anatomical models. Furthermore, Stefan Edmondson and his team can sterilize the bio-compatible MED610™ material used for cutting guides and plates, which permits surgeons to take these models into operating rooms.

The in-house Stratasys 3D Printer enables the creation of exact replicas of the patient's anatomy.
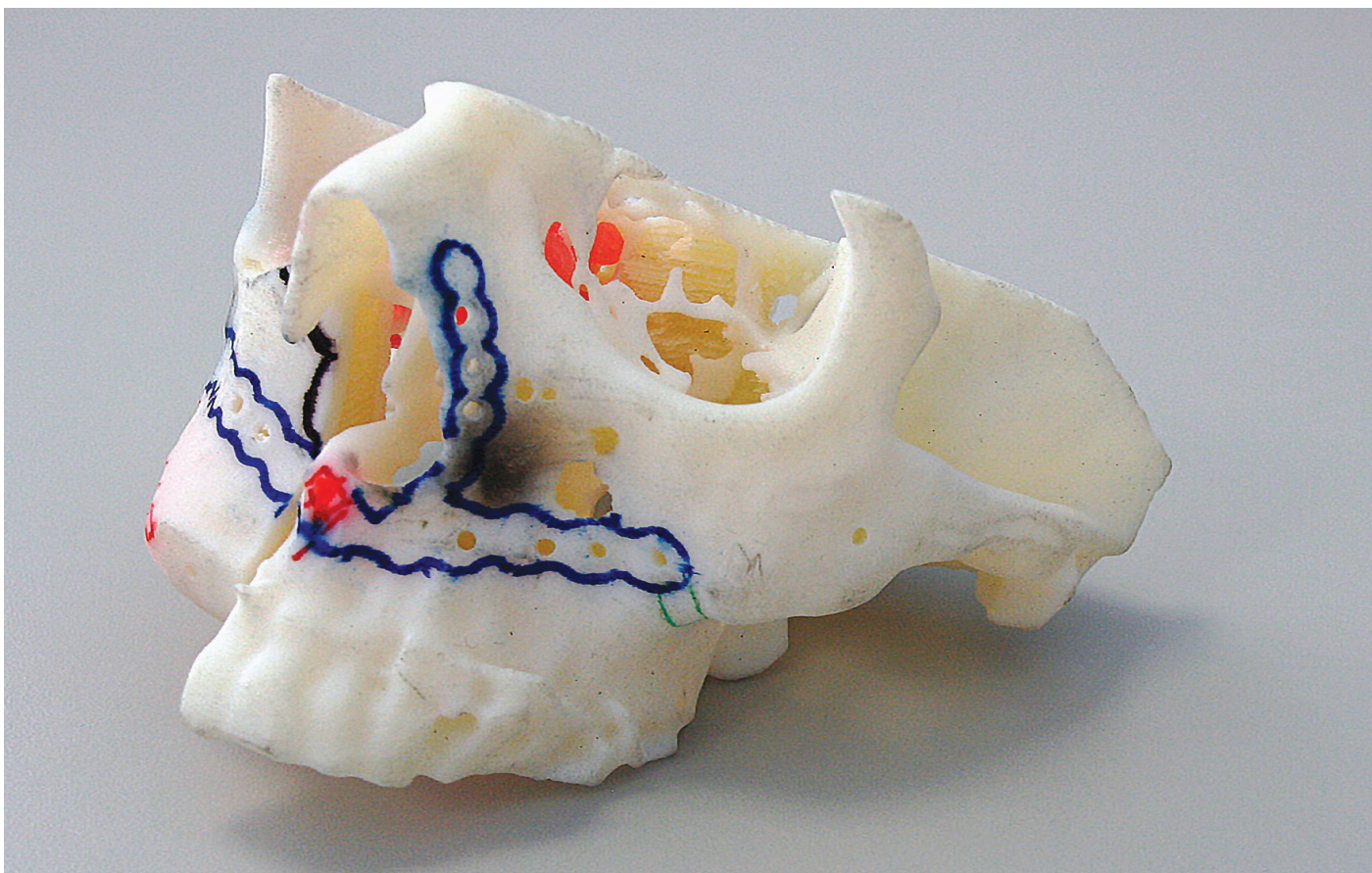
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"If we need to remove part of a patient's face and replace it with a piece of their shoulder blade, we can produce an exact 3D printed model to develop the cutting guides," continues Edmondson. "This not only allows the surgical team in the operating room to harvest the perfect piece of bone more efficiently, but means we can then design and produce customized 3D printed parts to replace the missing bone. 3D printing revolutionizes the entire procedure."

A 3D Future

Queen Elizabeth Hospital continues to integrate the Stratasys 3D printing technology into its pre-surgical operations. But already the additive technology has led to revolutionary time and cost savings in operating room times, enabling surgeons to work more quickly and precisely to meet the exact needs of each patient case.

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