



Empowered Surgical Expertise

KING'S COLLEGE HOSPITAL USES 3D PRINTING FOR COMPLEX CASES

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– Dr. Muhanad Hatamleh, King's College Hospital

CASE STUDY



3D printed models help surgeons plan treatment for facial and jaw operations.

Originally founded as a training facility in 1840, King's College Hospital is one of London's busiest teaching hospitals. Internationally renowned for its pioneering work in patient treatment, particularly in liver and fetal medicine, the hospital is also recognized as a national specialist in dealing with trauma cases, and maxillofacial (face and jaw) and craniofacial (skull) care.

Maxillofacial and craniofacial care demand a high-level of expertise and King's College Hospital is a major regional center for facial and jaw surgery., Dr. Muhanad Hatamleh, a senior clinical maxillofacial prosthetist, and his colleagues play a crucial role in providing this specialized care. The hospital has eight surgeons who carry out thousands of planned facial, jaw and skull procedures every year, as well as many trauma surgeries performed shortly after an injury occurs.

Better Planning

To reduce operating times and improve pre-op planning, the maxillofacial, neurosurgery and orthopedic departments of King's College Hospital turned to PolyJet 3D printing technology from Stratasys to produce accurate, customized surgical planning models.

The departments use a 3D printer to convert patient CT scans into physical, patient-specific models to plan complex procedures and highlight any problematic areas before surgery. These physical models enable the surgeons to prepare in ways that computer models cannot.

“In cases of skull meningioma, where there is a tumor growing in the skull, the surgeon needs to remove the tumor and restore the skull during the same surgery,” Hatamleh said. “Producing a 3D printed model of the skull with the tumor enables our surgeons to clearly visualize the outcome of the surgery before it is performed, and make better decisions on the size of the implant required to restore the skull defect after removing the tumor.”

According to Hatamleh, King's College Hospital now produces 3D printed planning models for 100% of its maxillofacial surgery and neurosurgery.

“Since incorporating 3D printing into our planning, even the most complex cases do not surpass long operating hours, which means the hospital is able to potentially make some significant savings using this technology,” Hatamleh said.

With 3D printing, the hospital saves about one-third of surgery time. A procedure that once took from 10 to 12 hours now takes six to seven hours.

Finer Details

Beyond reductions in operating times and costs, 3D printing also plays a crucial role in directly improving patient care. The ability to print fine details is critical to retaining specific and important details of a patient's anatomy.

“For us, having a 3D printed model for restoring skull defects cranioplasties is a must,” Hatamleh said. “It enables us to correctly fill the defect to normal contours, which is then reproduced and used to put a titanium plate in place. The plate is implanted to not only restore the missing skull contours but also protect the brain parenchyma. Overall, this results in a better aesthetic outcome and improves patients' confidence and quality of life.”



3D printed model of a patient's facial bone structure



Interior view of the 3D facial model



Dr. Muhanad Hatamleh

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