



Improving Surgical Safety

CASA DI CURA VILLA SANT'APOLLONIA USES 3D PRINTING TO REDUCE MAXILLOFACIAL SURGERY TIMES BY 10-15%

“The Dimension 3D Printer is one of the best. The models it produces using ABS thermoplastic are also more durable than acrylic or resin.”

– Dr. Giorgio Tofanetti, Casa di Cura Villa Sant'Apollonia

CASE STUDY



Plates and screws can be shaped, tested and sterilized in advance of the surgical procedure, ensuring they are ready to use before the patient even enters in the operating room.

Casa di Cura Villa Sant'Apollonia is a medical clinic based in Bergamo, Italy. Founded in the 1980s, the clinic specializes in maxillofacial surgery, dentistry and aesthetic plastic surgery. As one of the leading reconstructive surgery practices in the country, Villa Sant'Apollonia also provides consultation and practical expertise to the University of Verona and other hospitals across northern Italy.

Prioritizing Patient Risk Reduction

Patient safety is paramount at Villa Sant'Apollonia and its surgeons are always looking for ways to reduce risks and improve their performance during surgery. Using CT scans of patients' jaws and facial structures has helped surgeons to 'map out' a procedure before performing but the images lacked the tangibility of a physical model.

Eight years ago, Dr. Giorgio Tofanetti was introduced to additive manufacturing technology as a means for the automotive industry to design, build and develop parts for testing and even for end use purposes. He believed that this technology could help improve his surgery by allowing him to build models from CT scans of his patients and therefore accurately 'rehearse' surgery before the patient was under anaesthetic.

Accurate Simulation Means Greater Patient Safety

Dr. Tofanetti chose to work with Stratasys on one of the first medical applications of its Fused Deposition Modeling (FDM) technology in Italy. "Stratasys is serious about the industry," said Dr. Tofanetti. "The Dimension 3D Printer is one of the best. The models it produces using ABS thermoplastic are also more durable than acrylic or resin."

Dr. Tofanetti also noted that the ABS plastic has a similar touch and feel to actual bone, making working with it a more true-to-life experience. Surgeons at Villa Sant'Apollonia use the Dimension 3D Printer to make accurate models of a patient's body parts straight from the CT scan. These models allow the surgical team to simulate procedures in advance, which translates to safer, more accurate and more efficient surgery. It also means that any screws or plates that will be needed can be produced, tested and sterilised in advance of the procedure, ensuring they are ready to use before the patient even enters the operating room.

In addition, the models can be used as part of the consultation surgeons have with their patients, making it easier to illustrate exactly what will happen during the procedure.

Shorter, Safer Surgeries

In addition to safer surgical procedures, using the Dimension 3D models has also helped the team reduce the amount of time patients are under anaesthetic. For example, by performing a 'dry run' using a model of a patient's actual jaw, the team has found that surgery time is between 10-15% shorter than it was prior to using Dimension models.

"We will literally simulate the entire surgery in advance," said Tofanetti. "Once we have a patient on the operating table it means we have already planned the entire procedure, which means we are faster and that the risk of mistakes is greatly decreased." Faster surgery has also allowed the clinic to optimize cost and time efficiency. In some cases, the team is able to perform two surgeries in one morning, rather than one.

The clinic's relationship with Stratasys continues to grow. The clinic has just purchased a new Dimension Elite from Technimold, Stratasys' licensed Italian reseller.



The bone defect can be measured to decide how to simulate and shape the bone distraction plate.



ABS models allow surgeons to calculate the best direction and the right dimension of the zygomatic (cheekbone) implants.

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