

Case Study-Medical Modeling

Medical Modeling Corporation

Medical Modeling Corporation produces a wide range of physical models of internal biologic data derived from imaging modalities such as computed tomography (CT) or magnetic resonance imaging (MRI) to assist surgeons in preparing for especially complex operations, specifically craniofacial reconstruction.

THE CUSTOMER

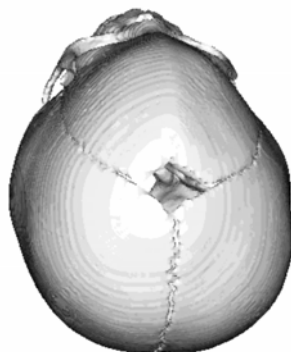
Dr. John Teichgraeber is the Associate Professor of Surgery for the Division of Plastic and Reconstructive Surgery and the Division of Pediatric Surgery at the University of Texas Health Science Center in Houston. Dr. Teichgraeber was searching for a way to more thoroughly prepare for surgery on his young patients by using 3D models as a visual aid. One such case was a young child, nine months old, who suffered from craniosynostosis, a condition where the sutures, or soft spots, of a baby's skull prematurely close, restricting the normal expansion of the brain within the child's skull.

THE SOLUTION

With the aid of the Z Corp. System, Medical Modeling Corp. was able to provide a realistic 3D model for the doctor in less than four hours and at about one third the cost of alternative rapid prototyping methods. Using these models in the surgery planning process produced a better patient experience and reduced costs.

THE RESULT

- **Better Surgical Preparation.** The 3D surgical model acted as a visualization tool providing the surgeon with a better understanding of the child's condition, allowing more effective planning.
- **Reduced Surgery Time.** The use of the 3D model as a planning tool allowed the surgeon to decrease the operation time from four hours to three hours, a 25% improvement.
- **Reduced Cost to the Patient.** The model achieved well over 300% ROI, due to time reduction in the Operating Room which resulted in reduced patient costs.



A 3D reconstruction of the patient's skull from the CT scan data.

"This repair was done in the least amount of time possible, while providing the patient with a great outcome. The model allowed for better communication before the surgery between myself and the neurosurgeon."

--Dr. John Teichgraeber



A 3D physical model produced using Z Corp.'s 3D Printer.

Case Study – Medical Instruments

SYNTHES USA

Synthes USA is a leading provider of instruments, implants and power tools for the orthopedic and spine surgery market. The company develops, manufactures, and distributes products for the surgical treatment of bone fractures, cranial/maxillofacial trauma and deformities, and a full range of products and systems for spine surgery.

THE PROBLEM

Mark Platt and his team are responsible for CAD systems for Synthes USA and provide support and training to the new product development effort. Mark was looking for a tool that could provide cost effective models in three areas:

1. Many of Synthes USA products have assemblies of small components. These designs are verified for form and fit in physical form and optimized before being sent to production.
2. Nearly all of Synthes USA products must work as part of a system that includes tools and guides. Even components that are a single piece must be tested in physical form for fit with the corresponding instruments.
3. Synthes USA has a need to produce bone structures, like skulls, from CAT and MRI scan data to support product development.

“The requests for models either come from our designers and engineers, or from CAT scan data provided by doctors or specialists which we convert into a form that can be 3D printed. Our products are often small, intricate assemblies, so the parts produced from a system would need good accuracy and resolution.”

THE SOLUTION

“We found that all of the technologies we investigated with the exception of the ZPrinter™ 310 System had limitations in speed, accuracy, appearance and cost.”

“The speed and low cost of the ZPrinter made it a natural favorite. We were very pleased to find that using the ZPrint software we could achieve tolerances that were among the highest of the systems we investigated. Our engineers also found that the parts had very good aesthetic qualities. In the end, the ZPrinter was the clear choice.”

THE RESULT

“We are getting more requests from new departments every day as the availability of this system spreads. We are beginning to see these parts appearing in a full range of design and customer communication situations. The ZPrinter is viewed internally as a win- I have never received so many positive comments on any other program or initiative.”

“Just a few words to comment on what I think is one of the best enhancements to come along to the Product Development resource arsenal in a long time - 3D rapid prototyping. The best part of the new system is the quick turnaround time of the parts - most of the time within 24 hours! I believe that this new resource will have a dramatic impact on shortening overall developmental lead times.” -Scott DiDomenico



Excerpt from e-mail sent from Synthes employee to Mark Platt

Example of cranio-maxillofacial implant designed and produced by Synthes USA