



Objet in Medical
Application

CASE STUDY

**Conjoined twins' operation planned using the
Objet QuadraTempo™ RP System**

**Operation takes 22 hours instead of 97 hours,
using Objet RP models**



"No matter how good our 3-D graphics are, there is nothing like a model in your hands . . . Many thanks again for your wonderful support."

**Henry K. Kawamoto, Jr.,
M.D., D.D.S. UCLA
Medical Center**



says that *"similar procedures in the past have taken as long as 97 hours. Part of the time savings almost certainly was attributable to the RP models."*

The QuadraTempo system builds parts by selectively jetting tiny droplets of acrylic photopolymer creating layers and then curing layer-by-layer, using UV light. A second, gel-like photopolymer material is used for support and is wiped off or removed by water jets.

"We're so pleased to see that our technology was chosen for this humane undertaking, and this example is just one of many that we have envisioned for our company," says Objet Geometries' CEO Hanan Yosefi. "We believe that there are many benefits the Objet QuadraTempo can offer the medical community in applying prototyping for medical modeling and other essential applications."

About the Objet Product Line

Objet product line systems provide high-quality, 3D models quickly and conveniently throughout the design process. They enable manufacturers and industrial designers to reduce product-development cycles and dramatically decrease time-to-market of new products in many industries.

The Objet product line RP system is based on Objet's innovative PolyJet™ polymer jetting technology. It jets layer upon layer of an Objet-developed photopolymer; each layer is cured by exposure to UV light. Objet RP systems' innovative design incorporates advances in software, electronics, mechanical design and materials.

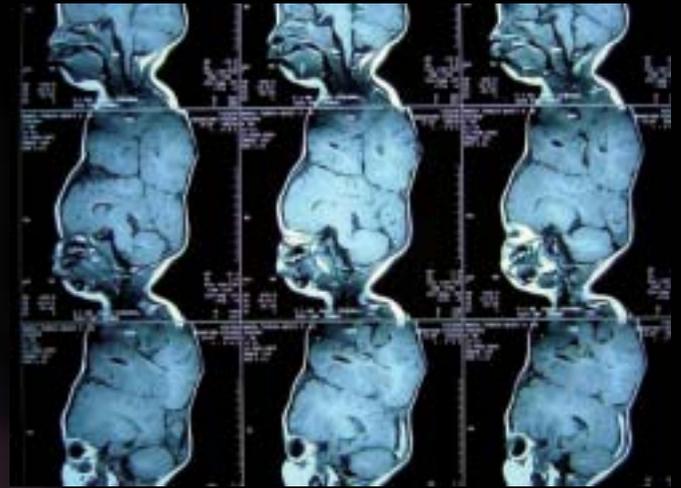
About Objet Geometries

Objet develops, produces and markets rapid prototyping systems and resins that utilize PolyJet™ - proprietary polymer jetting technology. Models are created directly from CAD files using an innovative, multidisciplinary approach to hardware, software and polymer materials.

Objet is the only company to offer a balance of accurate, clean, smooth and detailed prototypes, on an easy-to-use platform, all at an affordable price.

Objet's customers in the US, Europe, Asia and Australia include world leaders in numerous industries: toys, electronics, automotive, consumer goods, and footwear. The company has distribution partners all around the globe.

Objet Geometries was founded in 1998 and is based in Rehovot, Israel. For more details, please visit our website: <http://www.2objet.com>



Rehovot, Israel, September 5, 2002

Objet Geometries' QuadraTempo™ system for building highly accurate 3D models was used to plan the successful separation of conjoined twins in Los Angeles last month.

Guatemalan twins Maria Teresa and Maria de Jesus Quij-Alvarez were born joined at the head on July 24, 2001. The twins' brains were separate and complete, with separated arteries and a dividing membrane. The veins draining the blood, however, were interwoven and fed into each others' circulatory system. Separating conjoined twins is a highly complicated procedure, but surgeons at the University of California's Mattel Children's Hospital determined that an operation was possible. The most complex part of the operation was to sort out the veins and reroute the twins' blood supply. Because the blood vessels were crisscrossed, tracking them using standard, two-dimensional x-rays would be impossible. One of the hospitals' doctors suggested using 3-dimensional rapid prototyping to help the plastic surgeons practice how to

separate the girls' brain skulls, reroute the blood supply and plan skin grafting to cover the separated brains. Boston-based Biomedical Modeling Inc. (BMI), an RP fabricator for medical uses, handled the process. The UCLA team had to supply BMI with three CT scans at different angles – it wasn't possible to arrange the twins for one scan. The company registered and combined the scans of the twins' brains and the intersection of the two skulls into a single, 3d model. BMI then used *Materialise's MIMICs* software to merge the scans and process the data, including a biomodel of the skull that included the maze of blood vessels. BMI asked InterPRO a Connecticut-based RP service bureau, to build the three models. *"We determined that the QuadraTempo was the best choice for building these highly detailed models with the high accuracy needed," says InterPRO co-owner Kevin Dyer. "The QuadraTempo's ability to build the delicate features without support structures allowed us to clean the models much more easily after printing them. The fine details in the Tempo models proved especially critical to achieving success, since the surgeons needed to look inside the model and plan the rerouting of the blood vessels."*

The operation to separate the Quij-Alvarez twins on August 5 took about 22 hours. Biomedical founder Eitan Priluck



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