

## Reconstructive Surgery Goes Rapid

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Today's Medical Developments

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Accident victims often require reconstructive surgery to help them move past their handicap and re-enter a more familiar lifestyle, and rapid prototyping is aiding that need.

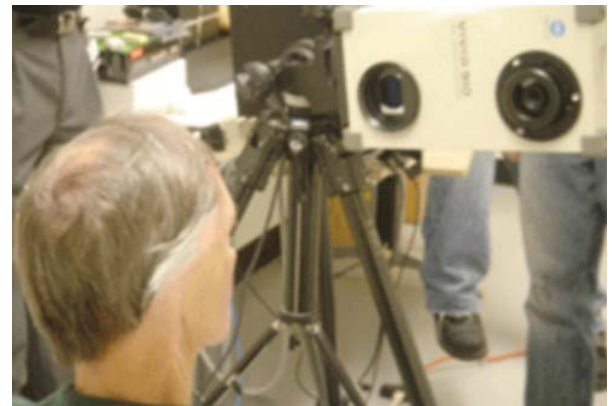
The prosthetics industry has long relied on the talents of medical artists to sculpt and paint custom prosthetics that seamlessly replace missing body parts and features without drawing attention to them. This artistry will always be a critical part of their success, but with the adoption of 3D scanning techniques and rapid prototyping technology, it is possible for the creation of prostheses with higher levels of confidence and accuracy, all while saving providers valuable time.

Direct Dimensions Inc. (DDI) has been on the front end of this movement from the beginning because they have worked closely with institutions like Johns Hopkins for years doing active research and development.

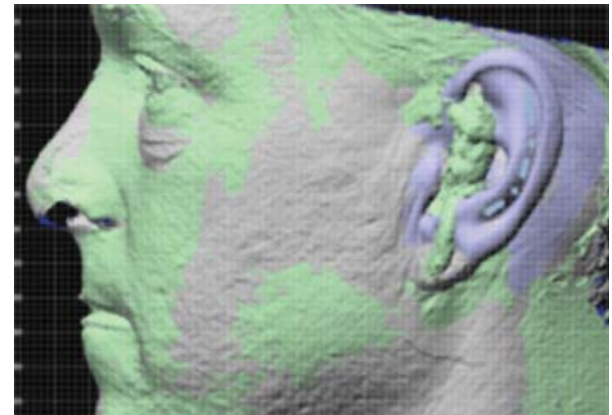
According to Harry Abramson, business development manager with Direct Dimensions, "I have worked in this industry for seven years and there has been a constant interest in using 3D imaging within prosthetics and anaplastology, but price has always been a big issue. We provide affordable scanning, but the high cost of rapid prototyping has always been a limitation. The uniquely low minimum order prices and super fast turnaround at ZoomRP.com are a sign that digital prosthetics is ready for wider adoption.

DDI offers an array of 3D imaging products and services and works with many industries including, medical, aerospace, heavy industry, entertainment, construction and architecture, art and cultural heritage, and forensics. Their services include capturing 3D data through laser scanning, providing 3D geometries through CMM arm-based digitizing, reverse engineering, digital modeling, inspection and analysis, replication, and visualization and animation.

While working in the medical field, DDI interfaces with doctors, anaplastologists, dentists, and other professionals to assist with surgery to



*To create a prosthetic ear, DDI first scans the unaffected ear to produce a positive pattern for the rest of the processes.*



*Point data from the patient scan is used to mirror the polygonal model – flipping the data. That data is output to an STL file and uploaded to ZoomRP.com online.*

create custom prostheses, help develop new methods of creating dentures, and more. In prosthetics, it is a world of mass customization. Each product is custom made for an individual person and on a very tight budget.

Traditionally, making a prosthetic ear involves making a plaster casting of the good ear, and using that as a pattern for hand sculpting a mirror image for the opposite ear, which will be the pattern for the new ear. Now anaplastologists can send the plaster casting directly to DDI, who then scans it, mirrors the design digitally, and sends the file to be rapid prototyped. The new ear arrives within days, saving the anaplastologist a half day to a whole day of effort, which can be focused on higher value activity.

“By outsourcing the RP portion to ZoomRP.com costs have been reduced, processes speeded, and we have received higher accuracy prosthetics as well,” Abramson states.

The PolyJet process uses a jetting head to build one layer of resin to the next. The unit uses digital data downloaded into a motion system, tracing a cross-section of the part layer by layer. Each layer of resin hardens and bonds to the just-completed layer below it. The process repeats continually until the machine builds the complete 3D prosthetic. PolyJet parts are cured in-line while layering and do not need secondary curing inside an oven like some other prototyping processes. The jetting head accurately builds each layer 0.0006” thick.

The steps in making an ear are similar to those for making other prosthetics as well, including noses, fingers, and toes.



*ZoomRP.com created a PolyJet prosthetic model from a 3D scan of the customer's good ear. Rapid prototyping of prosthetic models has helped to change people's lives.*

For an ear, DDI first scans the unaffected ear to produce a positive pattern for the rest of the processes. Point data from the scan is then used to mirror the polygonal model – flipping the data. That data is output to an STL file and uploaded to ZoomRP.com online. The rapid prototyped ear is delivered the next day. Typically, when DDI's client gets the RP part, they create a mold and then paint colored silicone into the mold to recreate the appearance of skin and veins.

Rapid prototyping of prosthetic models has helped to change people's lives. Through a process of analysis and streamlined operations, DDI and ZoomRP.com have been able to help many people live better lives.