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Brian McLaughlin,
Business Development Manager,
Orchid Design



Case Study

At a Glance

Company: Orchid Design
URL: <http://www.orchid-orthopedics.com/design>
Location: Shelton, CT
Industry: Medical Design

Challenges

- Help clients accelerate time-to-revenue for orthopedic innovations with in-house rapid prototyping capabilities, without breaking the bank

Solution

Objet Alaris30 Desktop 3D printer

Results

- Prototypes can now be produced in-house 10-20x faster than before; overall product development timelines reduced by 20 percent on average

Objet 3D Desktop Printer Helps Orchid Design Accelerate Time-to-Revenue for New Orthopedic Devices by 20 Percent

In-house rapid prototyping helps firm produce high-resolution models up to 20x faster than before

Orchid Design, a division of Orchid Orthopedic Solutions, helps bring orthopedic innovations to life. Its staff of designers and engineers work with medical professionals to design, prototype and test new orthopedic solutions. Orchid Design's customers are Orthopedic OEM's who develop and sell implants, instrumentation and minimally invasive devices.

According to Brian McLaughlin, Business Development Manager at Orchid Design, getting a new orthopedic device from the drawing board to manufacturing typically takes months. "It involves very high-precision design work, and of course it's all subject to FDA approval," says McLaughlin. "There's no room for error."

In the past, prototypes were used sparingly in orthopedic design work due to cost and time considerations

Most orthopedic devices are originally conceived by physicians, who work with specially trained design engineers like those at Orchid in order to make their concepts a reality. They describe what they want to the engineers, who create 3D designs using Computer-Aided Design (CAD) software such as SolidWorks. It's an iterative process that typically involves many rounds of edits.





While prototypes can be very helpful both for refining designs and verifying manufacturability, cost and time considerations often make them a luxury. “Most design shops outsource rapid prototyping because the high-end equipment required has traditionally been very expensive,” explains McLaughlin. “We used an outside vendor for rapid prototypes, and they did great work – but each prototype cost up to thousands of dollars, and took up to weeks to produce. It just wasn’t feasible to do that for every project.”

So Orchid Design, like its peers, used rapid prototyping sparingly, where time and budget permitted. In most cases, the firm and its clients worked off CAD drawings, using them to help refine designs and then developed metal samples further along in the development cycle.



Often, that was sufficient, says McLaughlin. But sometimes, design flaws didn’t emerge until later in the process, when they became very expensive and more time consuming to fix. “Ideally, we would produce rapid prototypes for every project, in order to work out design flaws or manufacturability issues early on,” says McLaughlin. “But from a financial perspective, that approach just didn’t make sense when we had to outsource.”

“We’d considered moving to in-house rapid prototyping over the years – we’re always looking for new ways to help our customers accelerate time-to-revenue for new devices,” McLaughlin explains. “Unfortunately, every 3D printer we evaluated either didn’t meet our resolution standards, or was too expensive, or both. Until we found the Objet Alaris30.”



Objet removes barriers with high-resolution, high-precision Alaris30 3D printer

Objet’s Alaris30 Desktop 3D Printer delivers a unique combination of high-quality, finely detailed printed prototypes available in a compact office-friendly system. Models produced on the Alaris30 are smoothly surfaced and finely detailed; the strong model material and highly accurate printing enable thin walls and small moving parts. The models are ideal for painting; functional, fit and form testing; and vacuum forming.

“It took about 30 minutes to learn how to print with the Alaris30, and then we were off and running,” says McLaughlin. “Using the Objet Studio software is simple and straightforward.”

“Now we can print very high-resolution prototypes right in our office in a matter of hours,” he reports. “With the Alaris30, it’s feasible for us to produce prototypes for every project. And that’s had a major impact on the quality and manufacturability of our designs.”

Overall, McLaughlin cites three major areas of improvement stemming from Orchid Design’s ability to do rapid prototyping in house on its Objet printer.

- Better quality and manufacturability of designs.
- Reduced overall product development timelines, meaning customers can get their innovations to market faster; and Improved response times to customers, leading to increased customer loyalty.
- Helps drive more revenue for us, with more repeat business for Orchid Design due to the added value we have created for our customers.



Better quality and manufacturability of designs:

Often, something the designer sees on a rapid prototype – such as an undercut, or some other area of difficulty – will cause them to tweak the design before it goes to the customer for review, or on to metal machining. Similarly, sometimes the customer will change the design after seeing a prototype. “Often, we hear, ‘You created it just as I described, but now that I see it, I think we need to change X, Y or Z,’” says McLaughlin. “Giving them something solid they can see and touch, rather than just a CAD rendering or drawing, makes everything less abstract. There’s no doubt that having the Objet Alaris30 has helped Orchid turn out better designs.”

Rapid prototyping with the Objet Alaris30 has been particularly helpful for determining the functional requirements for the very small parts commonly used in the orthopedic field: the Orchid team can print out a prototype at 5-10x size to see how it will function, and adjust the design if necessary.



Reduced overall product development times:

Aside from design quality improvements, another major benefit to having in-house prototyping capabilities is of course the speed with which rapid prototypes can be printed. “Overall, we’ve compressed the time it takes to produce a rapid prototype by 10-20x – from weeks to hours,” says McLaughlin. “We now produce rapid prototypes for virtually every project. And that’s helped us reduce the average overall product development cycle by about 20 percent.”

McLaughlin provides the following example to illustrate how much time rapid prototyping can shave off the overall product development cycle:



Recently, a physician approached Orchid Design with an idea for a new spinal device that he wanted to explore very quickly. He described the concept to an Orchid staff designer on a Thursday.

The designer spent Friday and Saturday creating CAD drawings that captured the concept, and by Monday night was ready to print out a 3D prototype

He reviewed the prototype with the physician on Tuesday, got some feedback, and then worked on design refinements on Wednesday. By Thursday, he was ready to print a second 3D prototype. The physician brought that prototype to a meeting with potential investors on Friday. With the prototype in hand, the physician successfully communicated the design to investors and officially founded the company that day.

Eight days from concept to funding. While that may not be typical, says McLaughlin, it demonstrates the value of a high-quality, working prototype. “A CAD printout just isn’t as compelling,” he says. “The physician told us that having that physical, working prototype was definitely a factor in his being able to land funding so quickly.”

In another example, Orchid Design worked with a client who was designing a plate that would be used for fractures. Using CT and MRI data and the Objet Alaris30, the designers were able to print 5 to 10 bones of varying surface geometry and 5 prototype plates, to see which plate design would be most versatile on different types of surfaces. “Outsourcing all of those prototypes to a service bureau would have cost at least \$3,000 and taken weeks,” says McLaughlin. “With the Alaris30, we did it all in-house in a couple of days. In fact, we now print a lot of bones when we’re working on a project, to double check design and fit. That would have been cost prohibitive in the past.”

Helps drive more revenue for Orchid Design

In-house rapid prototyping capability has also helped Orchid Design earn more repeat business from happy clients. "Rapid prototyping, and the subsequent design enhancements it facilitates, really helps showcase our expertise not just in design, but also in manufacturability," says McLaughlin. "And our customers remember that when it comes time to transfer the product into manufacturing. It gives them a really high degree of comfort about working with Orchid for the entire process, not just design."

McLaughlin strongly believes that having the Objet Alaris30 printer is a competitive advantage for Orchid Design. "Until the Objet Alaris30 came to market, high-resolution 3D printing was really cost prohibitive for a company our size," says McLaughlin. "Now that we have it, we tend to use it for all our projects, and the feedback from our customers has been terrific. It's pretty amazing to see someone's face when you give them a real model that brings their idea to life. It really blows them away."

"As soon as we saw the Objet Alaris30, we knew we had to have it," McLaughlin concludes. "It was a no brainer. Objet provides by far the best resolution and speed at this price point. Nothing else even comes close."

About Objet Geometries

Objet Geometries Ltd., the innovation leader in 3D printing, develops, manufactures and globally markets ultra-thin-layer, high-resolution 3-dimensional printing systems and materials that utilize PolyJet™ polymer jetting technology, to print ultra-thin 16-micron layers.

The market-proven Eden™ line of 3D Printing Systems and the Alaris™30 3D desktop printer are based on Objet's patented office-friendly PolyJet™ Technology. The Connex™ family is based on Objet's PolyJet Matrix™ Technology, which jets multiple model materials simultaneously and creates composite Digital Materials™ on the fly. All Objet systems use Objet's FullCure® materials to create accurate, clean, smooth, and highly detailed 3D parts.

Objet's solutions enable manufacturers and industrial designers to reduce cost of product development and dramatically shorten time-to-market of new products. Objet systems are in use by world leaders in many industries, such as Education, Medical / Medical Devices & Dental, Consumer Electronics, Automotive, Toys, Consumer Goods, and Footwear industries in North America, Europe, Asia, Australia, and Japan.

Founded in 1998, Objet serves its growing worldwide customer base through offices in USA, Mexico, Europe, Japan, China and Hong Kong, and a global network of distribution partners. Objet owns more than 50 patents and patent pending inventions. Visit www.objet.com.

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