> “The ability to quickly 3D print high quality parts that require no post-processing has proven instrumental in cutting our iterations and directly reducing our product development cycle. In fact, since introducing Stratasys 3D printing, we have slashed our prototyping costs by 75% and accelerated our development time by 50%.”
>
> Cesare Tanassi / Nidek Technologies

The external case of the prototype Gonioscope® was built on a Connex3 3D Printer.

CASE STUDY

A Vision for Better Prototyping

NIDEK TECHNOLOGIES ACCELERATES CLINICAL TRIAL EVALUATIONS AND TIME-TO-MARKET WITH 3D PRINTING

Nidek Technologies (Nidek), located in Padova, Italy, specializes in the development and prototyping of high-technology ophthalmological diagnostic systems. With all of its products having direct contact with patients, it’s crucial that Nidek produces fully-functional prototypes that precisely replicate the final product. This enables a comprehensive evaluation of the fit, form and function of new devices before investing in expensive clinical trials and moving to final production. As this process often proved costly in terms of lead-time and capital, Nidek Technologies turned to Stratasys 3D printing in a bid to optimize its prototyping process and, as a result, accelerate its clinical validation.

Accelerating Time-to-Market with 3D Printing

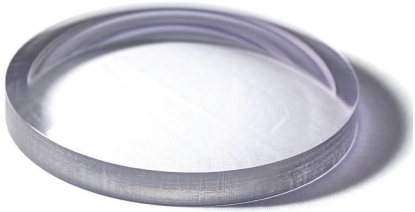
This was demonstrated in a recent project which saw Nidek Technologies produce a new automatic Gonioscope®, a device designed to observe the space between the iris and cornea. Typically, the R&D team would create the prototypes using traditional manufacturing with expensive injection molds or use CNC machines to create the individual device components. This led to escalating lead-times and, should iterations be required, substantially increased prototyping costs.

As a solution to overcome these barriers, Nidek Technologies invested in a Stratasys Objet500 Connex3™ 3D Printer. “Our prototyping process has become much more streamlined since incorporating Stratasys 3D printing into our workflow,” says Cesare Tanassi, CEO at Nidek Technologies. “The technology enables us to develop complex parts with intricate geometries on-demand. The ability to validate designs early in the product development cycle helps us eliminate costly iterations during manufacturing, as well as significantly reducing our time-to-market compared to traditional prototyping methods.”

The assembled Gonioscope® prototype, built with 3D printed parts.

Deploying 3D Printed Devices Into Clinical Trials

According to Tanassi, waiting for production parts to conduct clinical evaluations creates costly delays. “Previously we were constrained by the time restrictions associated with traditional manufacturing. 3D printing overcomes these bottlenecks and permits us to quickly enter our devices into clinical trials. As you can imagine, fully verifying our products is crucial to ensuring that premium healthcare is maintained,” he explains. “In the case of the Gonioscope®, the quality of the Stratasys 3D printed components saw the device pass a year-long clinical trial where eight global medical centers examined it. It will soon be utilized by clinics and hospitals around the globe, contributing to a novel way to diagnose glaucoma.”



Nidek 3D prints prototype lenses using highly polished VeroClear material.

Replacing Metal Parts with Durable Engineered Photopolymers

Beyond the Gonioscope®, the benefits of 3D printing are impacting numerous other products. According to Federico Carraro, Mechanical Division Manager at Nidek Technologies, this occurred when developing the company’s microperimeter, a device used to determine the level of light perceived by specific areas of the retina.

Previously Nidek used metal fabrication for this device, which took around two months to create and dramatically delayed the prototyping cycle. “With our Stratasys Objet500 Connex3, we can combine a wide range of 3D printed materials with contrasting mechanical characteristics. This allows us to accurately emulate final parts, including threads, seals, rubber and transparent components. In this case, we achieved the same functional result within 24 hours by replacing metal parts with robust 3D printed components,” explains Carraro.

Tanassi concurs: “In the case of the Gonioscope®, utilizing the tough flexibility and snap-fit characteristic of the Stratasys Rigur™ 3D printing material, we could replace several aluminum parts with a single 3D printed component. The ability to quickly 3D print high quality parts that require no post-processing has

proven instrumental in cutting our iterations and directly reducing our product development cycle. In fact, since introducing Stratasys 3D printing, we have slashed our prototyping costs by 75% and accelerated our development time by 50%."

Clear Case for Transparent 3D Printed Parts

Nidek Technologies is now pioneering a new proprietary polishing process for its prototype illumination lenses. Traditionally the development of lenses requires several months of build time and cost thousands of Euros per lens. Concludes Tanassi, "In the future, with the VeroClear material, we may quickly 3D print prototype lenses with high clarity and smooth surface finish devoted to our illumination optics. We used a proprietary robotic polishing process for our 3D printed lenses."

The versatility of Connex3 PolyJet materials gives Nidek Technologies the tools to quickly overcome multiple challenges throughout the product development process. From ideation, to iterating prototypes, to clinical evaluation, 3D printing drives innovation, improves product design, saves cost and reduces product development time.

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