

## Dental Assessment

牙科向 3D 打印转化

Stratasys 医疗和牙科解决方案负责人 Avi Cohen 总结了数字牙科的发展趋势以及使用 3D 打印如何能提高质量、精度和速度。

# Dentistry moves to 3D Printing

By: **Avi Cohen** – Head of Medical Solutions, Objet Geometries Ltd.



Rapid manufacturing is about to offer soon for dentists and patients, an affordable and attractive option. The old days when dentists had to ladle quantities of goo into patient's mouths to take impressions for the construction of crowns, bridges and implants, has gone. Instead, exciting new high technology has been developed that will do a two-minute digital scan of a patient's entire set of teeth. Once the information is captured by an intraoral scanner the dentist passes around the teeth, it's delivered to a dental lab where milling or 3D printing machines are used to craft the artificial dentition, most of which is now made from zirconium dioxide. In the past, gold and platinum had been the materials of choice.

Hence, the 3D printing technology bullet train continues to accelerate the pace of change in dentistry. For those who have predicted the day when everything from scheduling to finished restoration can be handled digitally, the day is here.

Intraoral scanners and the software that manages them continue to improve on proven models. And now one can see the astounding diagnostic possibilities provided by cone beam CT scanners, as scan speed and image capture and enhancement capabilities continue to improve at record speed.

Most impressive this year has been the explosion in devices dedicated to digital imaging, impressioning and CAD/CAM fabrication of restorations, both chairside and in the lab. With the roll out of new systems, materials and capabilities over the coming year, many believe that more dentists will begin to see the technology as a viable alternative for their practices.

To summarize the moving trend: Some day in the near future, we may look back at 2009 as the year when the dental laboratory industry passed the point of no return from a traditional manual workflow toward an all-digital design and manufacture process. In many respects, all-digital dentistry is already here, and a growing number of laboratory owners have incorporated digital dentistry in some form into their strategic business models. For many dental professionals, this evolution has been a long-awaited and welcome transition to a more rapid and labor-saving CAD/CAM automation that improves quality and precision while keeping businesses competitive.



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Data capture systems launched recently have expanded the entire concept of digital dentistry for practices and laboratories alike. Through intense R&D, manufacturers have created 3D scanning systems engineered to capture data from the negative spaces inside tray impressions in the laboratory or even in the practice. With the precise, detailed 3D image of the impression, CAD software reconfigures the negative form into a positive 3D representation of the prepared teeth. Working from this virtual model, the technician can design any of a number of different components. This type of technology often is seen as a transitional step for eager laboratories that see the benefits afforded by digital dentistry but who want to accommodate dentist-clients who prefer traditional tray impressions.

For dentists who are ready, willing, and able to integrate digital impression technology, systems are available that move the digital process back to the oral preparation site. By scanning the actual tooth prep and creating a digital impression, the accuracy of the data capture is enhanced, and the digital restorative process begins sooner. For laboratories working with these progressive doctors, for many labs all that is required is an investment in design software (and corresponding training), with manufacturing of components outsourced to production facilities. From this point on, the 3D printing technology will take on, presenting fast printing of accurate 3D models, required by dentistry.

The question remains, however. When will dentists step off the platform and take advantage of these amazing tools, instead of watching the bullet train of advancement pass them by?

## About Objet Geometries

**Objet Geometries Ltd.**, the innovation leader in 3D printing for rapid prototyping and additive manufacturing, provides 3D printing systems that enable manufacturers and industrial designers to reduce cost of product development and dramatically shorten time-to-market of new products.

Objet's ultra-thin-layer, high-resolution 3D printing systems and materials 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,

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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. For more information, visit us at [www.objet.com](http://www.objet.com).

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