To print or not to print?

The lost-wax method, has been largely replaced with the advent of computer-aided design and computer-aided manufacturing (CAD/CAM) for the fabrication of everyday crown and bridge dentistry, implant superstructures, bar overdentures, and much more. Additionally, the continued development of new and improved materials have created strong, aesthetic, long lasting restorations fabricated by a subtractive process facilitated by large lab-based milling machines. Smaller in-office milling machines, combined with highly accurate intraoral scanners have helped to bring the process directly to the clinician’s private office providing the state-of-the-art digital workflow for faster design and fabrication of patient-specific restorations.

For most clinicians, the term ‘rapid prototyping’ is a concept that applies more to big industry rather than dentistry. However, many clinicians involved with implant dentistry and guided surgery applications are familiar in some way with the term ‘stereolithography’. As defined by the Oxford Dictionary, stereolithography is ‘a technique or process for creating three-dimensional objects, in which a computer-controlled moving laser beam is used to build up the required structure, layer by layer, from a liquid polymer that hardens on contact with laser light’. This modality is therefore an ‘additive’ process, differing from the ‘subtractive’ process required for milling, and until recently was not practical or cost-effective for the routine dental practice.

The proliferation of low-cost 3-D printers during the past few years has ignited tremendous interest in rapid prototyping using additive fabrication modalities. Many dental laboratories, single and group practitioners around the globe have taken the digital workflow to new levels by printing models for orthodontics, oral surgery, restorative dentistry, night guards, occlusal orthotic devices, surgical templates, and much more. 3-D printing has become the new catalyst, helping to bring diagnostic and manufacturing control to the dentist, and a new fabrication process to the dental laboratory.

It must be stated that there is a significant difference in printing a word processing document from your computer to a laser printer – going from the virtual to a physical piece of paper you can hold in your hand. 3-D printing is not quite that simple. Regardless of the type or cost of a 3-D printer, in order to ‘print’ a file, there needs to be three-dimensional data. This data can come from an intraoral scanner, a desktop optical scanner, cone beam computed tomography, singularly or in combination. The data needs to be managed using appropriate software to produce the desired outcome. This takes knowledge and time to get it right. So as we continue to move from the analogue to the digital workflow, it may be time to evaluate the state-of-the-art and ask the question: To print or not to print?

The answers to this and many other questions can be found among the pages of this publication representing some of the best clinical minds of our time. We hope that you will enjoy the current issue!

Respectfully
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Editor in Chief