



# Getting Started with 3D Printing

Written by Dr. Julia Latham

Incorporating 3D printing into the office workflow may seem like a daunting process, but the numerous benefits to the office and the patient make it worth the effort. We have a large, 4 doctor practice in Stratford CT, and our focus is on creating the best experience for the patient while finding the balance between the art, science and business of dentistry. Providing same day service as often as possible is of great importance to our practice; we accommodate emergencies the same day, and often take patients from hygiene to provide same day treatment. Patients appreciate how we value their time; reducing the number of visits to the office is a huge practice builder.

Since the Covid pandemic began, the turn-around and shipping time for many laboratories has increased. Relying on dental laboratories means scheduling patients further out and occasionally having to reschedule when the appliance is not back in time, an inconvenience for both the practice and the patient. 3D printing has eliminated the time wasted in shipping and has given us the control over when a case is ready to be delivered. For this reason, the ability to 3D print is very important to our office. If a patient loses a retainer or night guard, we are able to fabricate a new one the same day, and reduce the risk of orthodontic relapse, or patient symptoms returning.

## Introducing 3D into your practice

The biggest challenge in introducing 3D printing is learning the digital workflow. However, once the team learns the software and the process for converting the STL file into a printable file, the rest of the process is very simple. The software training that DMG provides is very comprehensive and our team was able to quickly learn and begin 3D printing the same day.

Several components are required to 3D print dental workpieces in the office: an intra-oral scanner, appliance design software, nesting software, a printer, a wash and a curing unit. When choosing the right 3D printing solution for your office, I quickly learned that it is important to fully understand the process and workflow that needs to be implemented. After understanding this process, we chose to begin our printing journey with DMG's 3D Digital Printing Solution. We did this for several reasons which I will cover below. Overall, we found that DMG integrates a complete workflow system with cloud-based software, RFID technology and a validated process to create quality print results, which is incorporated into an efficient, compact, easy, and user-friendly design.



## Understanding the process

1. The process begins with an intra-oral scan to generate an STL file of the patient's oral environment. Getting a high resolution, quality scan is important. There are many great scanners on the market. For our office, we incorporated the iTero and Medit scanners.
2. Next is the design of the workpieces. For most 3D printers to custom design workpieces such as sleep appliances, occlusal guards, or aligners, a 3rd party software is used to create the design before sending it to the printer. Software such as Mesh mixer or Blue-Sky Bio, may be used for design. We are currently using Blue-Sky Bio to create each step in the clear aligner treatment.
3. The designed STL files are then imported to a nesting and slicing software, Netfabb®, where the workpieces are positioned on the printer's build area in preparation for printing.
4. The 3D printer is then used to print the workpieces. We produce a high number of models for aligners orthodontic treatment. With the 3Dmax (DMG), the build area is a generously size area, allowing multiple models to be printed simultaneously. Tags may be added to these models using nesting software, to identify the patient and the patented Force Feedback technology accelerates the printing process by up to 50%.  
DMG's LuxaPrint materials have a unique RFID tag, which communicates with the printer using RFID technology. Once a print job is started, the screen displays the amount of time required for printing the piece and the progress.
5. After printing, the pieces go through additional processing steps of washing residual resin and curing to lock the mechanical properties. Many printing systems do not provide solutions for final fabrication processes of the workpiece, giving only general instruction for using your choice of wash and cure systems. DMG has a validated, easy workflow for printing, washing and curing which ensures a quality printed workpiece every time. The appropriate material is chosen for the printed piece and loaded into the printing tray.

## Important Factors to Consider When Choosing A 3D Printer

Other factors that were of importance to us when selecting the correct 3D printer was the importance of being with a company that was invested in the future of technology. At the top of our list was software integration. DMG is dedicated to developing and implementing software technology to meet the demands for the growth in our practice. Later this year, DMG will be launching a cloud-based software, DentaMile connect, which simplifies the process even further. We are in the process of testing the software and currently with DentaMile connect, a splint or nightguard can be designed and printed using one software platform. DMG continues to refine its DentaMile connect software for the easy printing of all types of applications with its comprehensive line of complementary resins.



We are looking forward to the launch of LuxaPrint Crown, where the printing of long-term temporary crowns and bridges will be possible, and LuxaPrint Ortho Flex for the printing of flexible dental splints. DMG's DentaMile connect is an intuitive software with easy-to-follow steps for incorporating undercuts on the appliance, vertical opening, and occlusion for a precisely planned and an accurate fitting appliance with fewer chairside adjustments. Once the team members are familiar with the software, this process is completed in just a couple of minutes.

### **Benefits to Patient and Practice**

The benefits of in-office 3D printing are numerous and include reducing laboratory costs, and an improved patient experience. Eliminating the laboratory turn-around time and being able to provide your patients with same day service is a benefit for both the patient and the dental office. The ability to 3D print workpieces can reduce the need to reschedule patients due to shipping or laboratory delays.

Taking an intra-oral scan, rather than a traditional putty impression, is a more comfortable experience for the patient and allows them to visualize their oral environment and better understand and accept the treatment required. The digital file is also much more convenient to store. The large build area of the 3Dmax allows several workpieces to be printed at the same time, and at a faster pace than using a laboratory. The simple, user-friendly design allows the staff to learn the process and incorporate it into the office workflow quickly and easily.

Reducing office overhead is also a major benefit. The ability to design and print your own clear aligners can cut down on outside laboratory costs.