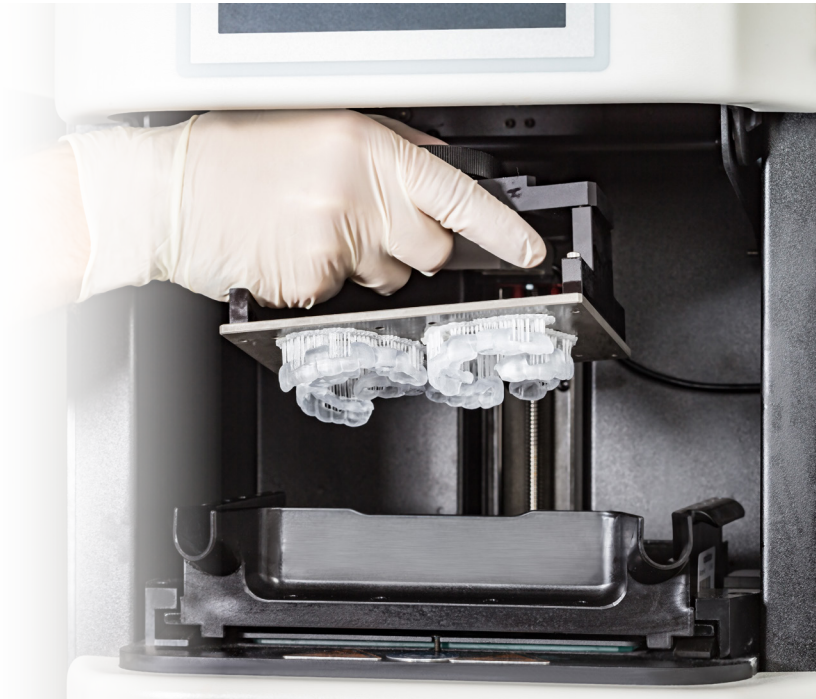




Q&A | Edmonds Dental Prosthetics Lab: The Present and Future of 3D Printing in Labs



DMG Digital Product Manager, Carmen Costa, spoke with Austyn Feldmann (AF), General Manager and Sheila McMasters (SF), Digital Coordinator of Edmonds Dental Prosthetics in Springfield, Missouri, about the role of 3D printing in dental labs in general, and theirs in particular. Edmonds Dental Prosthetics is a member of TERC, a consortium of independently owned and regionally located dental laboratories that work together to bring dentists the collective mindshare of 14 labs with the personal relationship of one.

How long have you been involved with 3D printing?

AF: After beta testing multiple versions of 3D printers from various manufacturers over the years, we purchased our first 3D printer in 2015.

What are the main advantages of 3D printing versus the conventional approach?

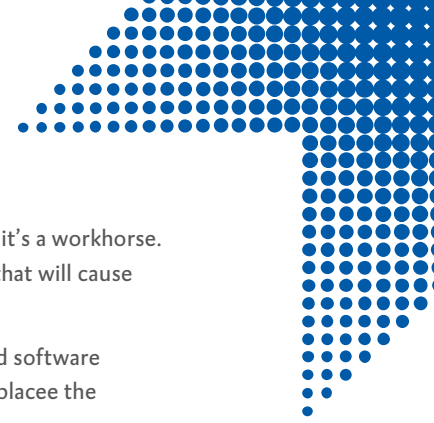
SM: Time and accuracy. The conventional approach to producing an appliance involves several steps. The dentist must first send you a physical impression. Then, the lab will pour a model, wait for it to set, trim it, and then articulate. Precise measurements of stone-to-water ratio is crucial for consistent results, since several variables can affect the expansion of the stone.

With 3D printing, the process is much more streamlined. After receiving digital scans from the dentist, we design the model or restoration based on the parameters of the resin being used. We nest the model or appliance, then send the file directly to the printer. The design and nesting process can be completed again for the next group of files, while the printer is working on the current file. Another nice aspect of a digital workflow is that you can retain the file in the event you need to reprint the model or restoration.



How does the precision of a 3D-printed appliance stack against one produced conventionally?

AF: Let's take cast partial frameworks for example. The partial frameworks that we print and then place on a 3D-printed model always fit superbly. A dentist who's relatively new to IOS units may prefer to send an impression that we pour out of stone, along with a digital scan. We traditionally go with the digital scan, since we're confident that the printed model from an intraoral scan will be accurate.



Are there any challenges you've faced with 3D-printing?

SM: Just like any other technology, if you take care of the equipment, keep it clean and calibrate it regularly, it's a workhorse. But when it's not calibrated routinely, you could end up with a poor fitting restoration or a distorted model that will cause internal reworks.

With 3D printing, it's important to follow the manufacturers' recommendations for cleaning, calibration, and software updates. And since you're also dealing with either lasers or digital light projectors, it's always a good idea to place the printers in a "clean room" to keep dust particles out of the equipment.

Does that place a premium on the level of customer service by the manufacturer?

AF: Customer service and technical support are crucial when shopping for a 3D printer. We looked at the infrastructure of several manufacturers and also got reviews from other laboratories that are knowledgeable in 3D printing. You're relying on this technology to produce an accurate and consistent product for your company, and internal remakes can become very costly. With 3D printers or any other technology, the first things we ask ourselves are, "Who's going to support this? What's their reputation in the industry? Will they be here when we need them?"

SM: Fortunately, many 3D printers can be accessed remotely by the manufacturer to troubleshoot any problems. In some cases, it helps to get the equipment back up and running quickly.

How many 3D printers do you currently have?

AF: Right now we have 16 printers, most of which, are designated for a specific material or product. One of our most recent purchases was a 3Dmax from DMG.

What's the advantage of the 3Dmax?

AF: Its biggest advantage is that it's FAST. For example, our Ortho Department can print a set of three splints in 20 minutes. It's a fraction of the time it would take our techs to process them conventionally. Another advantage is that while it has an average-sized build plate, it's incorporated into a cabinet with a smaller-than-average footprint. This is a great feature when you don't have a lot of counter space.

SM: The 3Dmax has become our workhorse. If we have any misprints with another printer, rush cases, or prints that are running behind schedule, the 3Dmax can get us back on track very quickly. Any lab that only uses large printers should consider adding a compact printer like the 3Dmax for these types of situations, and maybe also designating it to print a specific resin to increase their printing capacity.



How is the Customer Service that DMG provides for the 3Dmax?

SM: We've been very happy with their Customer Service and Technical Support teams. We had a few minor hiccups at the very beginning, but that's to be expected when getting to know a new piece of technology. If we do encounter a problem, I don't have to call their Customer Service department; we have a dedicated DMG technician readily available to us.

AF: While DMG is an obviously highly regarded dental materials company, they're relatively new to the 3D printing equipment market. For them to have delivered a state-of-the-art printer and such outstanding support is pretty impressive.



Do you also have the DMG 3Dewash and 3Decure post processing units?

AF: We don't only because we already have several wash and cure units on site. I do like the fact that they offer a compact, integrated system that includes a 3D printer, a cure unit, and a wash unit. If we were a lab just getting into 3D printing, I'd give this complete package serious consideration.

What percentages of the appliances you produce are 3D-printed?

SM: That's hard to say, because we have different departments that utilize printing technology to different extents. For each department, the percentage is based on the incoming digital workflow, which seems to be increasing every quarter as more doctors are embracing the intraoral scanning (IOS) technology.

Which of your departments do the most 3D printing?

AF: They all utilize some form of 3D printing. For example: our Denture Department prints models, custom trays, and some one-off prototypes; our Implant Department prints models, custom trays, surgical guides and soft tissue; and our Cast Partial Department prints models and partial frameworks to be casted. We constantly seek out new materials to test, because we're always looking to find that next material that can integrate seamlessly into our workflow without sacrificing quality.

Sheila, how does your Digital Department interact with the other departments in the laboratory?

SM: The dental practice sends their scan to my department. We schedule the case, import the file, mark the margins, design, nest, and print the digital model work. The printed models are then sent to the appropriate departments to manufacture the final restoration or appliance for the case.

What determines if an appliance/restoration is suited for 3D printing?

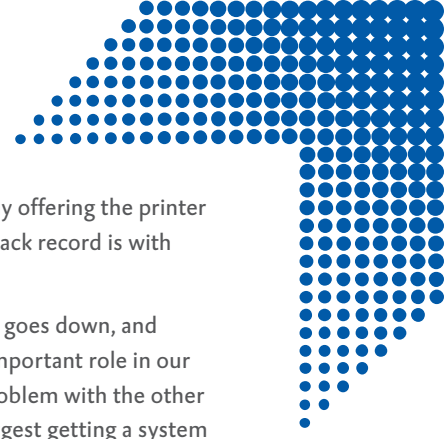
AF: It's generally whether high quality resin materials are available for the printing process for that specific appliance or restoration. Some appliances or restorations don't have resins formulated or validated for printing yet, so for them you really need to stay with traditional methods and materials.

SM: Also, some resins can only be used in printers sold by the resin manufacturer, and some printers require the use of specific resins. Fortunately, many manufacturers are now taking an open approach. For example, the DMG 3Demax printer works with several other resins in addition to its LuxaPrint line of resins, and LuxaPrint resins can also be used with other 3D printers.



What advice do you have for labs that aren't using 3D printing yet?

AF: I think there's an expectation from clinicians today that if you're a dental laboratory, you're already implementing some sort of 3D printing process in your day-to-day workflow. If you're not, my advice would be to take another look at the current 3D printing options out there, ask questions, and educate yourself on the various methods used. After you've done your homework, pick a product and process you want to convert into a digital workflow.



SM: When researching a new technology like 3D printing, any lab needs to consider how viable the company offering the printer is, how well they're staffed to handle customer support and training, and most important, how good their track record is with technical support.

AF: To that point, a lab needs to ask the manufacturer who's going to support them the instant their printer goes down, and what their policy is to ensure that they're still able to source models while it's down. Redundancy plays an important role in our laboratory; they should have at least a second printer to make sure they've got a back-up in case there's a problem with the other printer. It will still hurt when a printer's down, but you won't be crippled. And, as I mentioned earlier, I'd suggest getting a system that integrates a printer with wash and cure units.

SM: One more piece of advice that I think is important: Don't just look at the price of the 3D printer itself. In addition to customer service and training capabilities, there's also the cost of things like design software and lab scanners that let you scan conventional impressions to convert them into digital impressions. There are also a lot of recurring costs associated with things like resin trays, cleaning supplies, post-processing costs, and so on. Make sure you understand what those other costs are going to be before you decide.

Where do you see 3D printing going in the dental industry?

SM: Because of the growth in the number of dental practices with intraoral scanners, we're printing at least twice as many appliances as we were in 2019. I see that trend continuing.

AF: I agree. We could easily see that number double again over the next three-to-five years in large part because of increased use of intraoral scanners. However, there's also a second reason: Necessity. Many labs are having more and more difficulty hiring and keeping the work force they need to produce appliances conventionally. Because it requires less labor, 3D printing becomes a great option for labs.



Edmonds Dental Prosthetics is a family-owned and operated full-service dental laboratory in Springfield, Missouri. They offer the latest innovations in the dental industry, and provide a wide range of CE-accredited courses that are vital to a growing dental practice. With two locations, one in Missouri and one in Arkansas, they strive to be the best in the field by providing doctors and their patients with the highest quality products and services available.