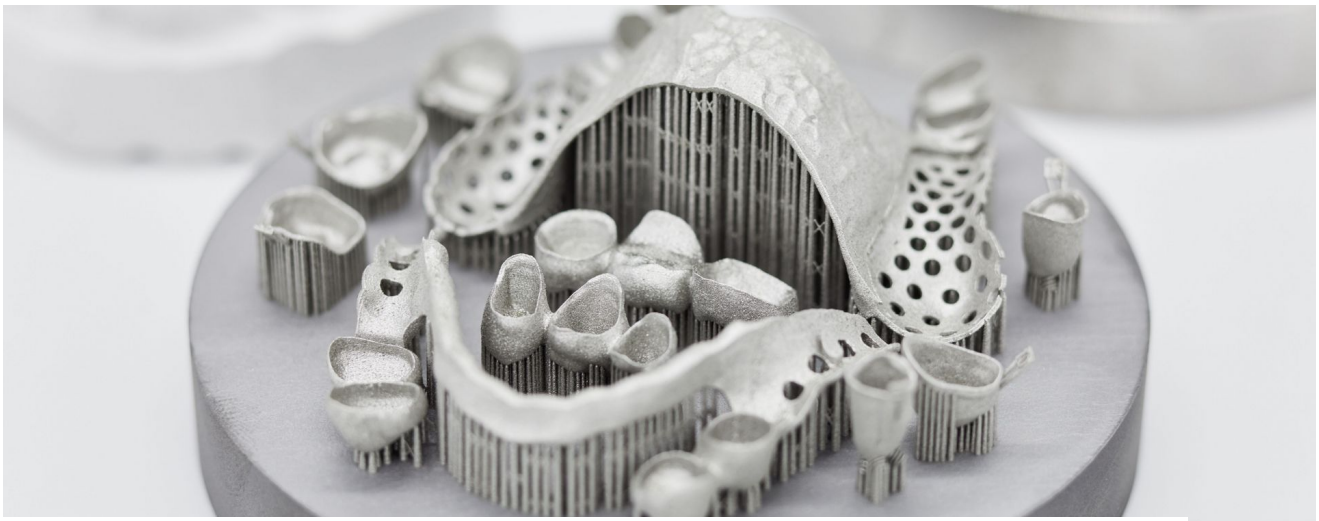


RAMONA HÖNL

How 3D Printing is Revolutionizing Dental Technology

Many people would love to have the perfect smile, or be able to take a good bite into harder foods. When your own teeth have reached their limits, it's time for dentures. However, it is very difficult to manufacture crowns, prostheses, and bridges using conventional methods. 3D printing provides the answer here, as it makes everything faster and simpler. The company CADSPEED has seen the benefits for itself, as it uses a 3D printer from TRUMPF to print dentures for clients throughout Europe.

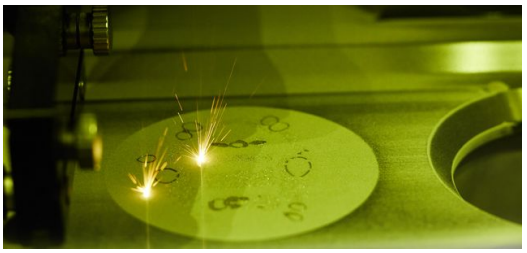
When a patient needs dentures, they set off a whole chain of events. First of all, the dentist creates an impression of the patient's teeth. To do so, they press two impression trays filled with silicone onto the upper and lower jaws. They then send the trays to a dental laboratory. Here, dental technicians mold a plaster cast to act as a template for the dentures. The next stage is to manufacture the dental products. The basic shape is created using die casting or on a milling machine before being reworked. All in all, it can take several weeks until the dentures are actually fitted in the patient's mouth.

Digital tools for dental technology: scanners and 3D printers

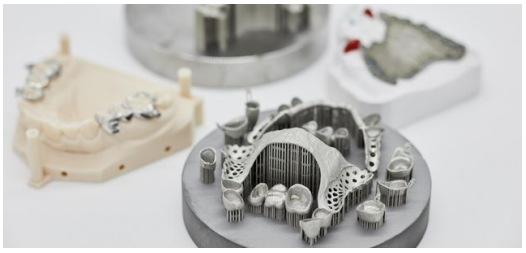
The CAD digital milling center, located near Hanover, offers a much faster solution. The owner, Hindrik Dehnbostel, and his 38-strong team will even make deliveries overnight if required. Their clients include dentists, orthodontists, and dental laboratories throughout Europe. So how do they do it? By using 3D printing and taking advantage of the opportunities afforded by digitalization. "It takes a lot of time and effort to handle the trays, mold the cast, dispatch the goods, and run the whole production line," explains Hindrik, who is himself a master dental technician. "Digitalization has been a blessing for the industry and means everything is much faster and simpler."



Hindrik Dehnbostel uses a TRUMPF 3D printer to manufacture dentures for clients throughout Europe.



On the TruPrint 1000 3D printer from TRUMPF, two laser beams build up the denture in the powder bed.



Dentures from the TruPrint 1000 3D printer from TRUMPF.

For example, instead of relying on impression trays, CADSPEED offers its clients the use of so-called intra-oral dental scanners. These are manual scanners equipped with sensor systems, which dentists can use to digitally map the patient's mouth in 3D. This data can then be processed further directly, negating the need for a plaster cast. As a result, the whole process is faster, more affordable, and more precise.

Improved dental product quality due to 3D printing

3D printing brings with it a whole host of advantages when it comes to manufacturing dentures. One of the biggest benefits is the improved quality. Dental technicians almost always struggle with space constraints. It's almost impossible to map corners and edges using a milling machine – the tooth is simply too small and the requirements too high. In addition, the tools cannot reach all areas and sometimes break off. Such problems do not exist when using a 3D printer. Even delicate structures can easily be created as the component is built up layer-by-layer and the process is controlled by a software program. There are also no tools which could break.

Less material wasted with 3D-printed teeth

3D printing also uses the material more efficiently. In the conventional method, dental technicians first create the basic shape and then hollow it out. This means that up to 80 percent of the material ends up being thrown out. In contrast, a 3D printer only needs the exact amount of powder required to create the component. This not only saves you money, it also benefits the environment. A further advantage of 3D printing is that, on an hourly comparison, the whole process is much faster. Dental technicians normally need around 20 minutes per tooth. However, in the space of just two to three hours a 3D printer can manufacture up to 70 teeth per cycle on a platform – which equates to less than three minutes per tooth. "When you're running at full capacity and need to produce a lot, 3D printing really comes into its own," comments Hindrik.

TRUMPF 3D printer produces teeth in three-shift mode

Since November 2017, CADSPEED has also been using a TruPrint 1000 from TRUMPF with multilaser functionality. Two laser beams melt on the denture geometries at the same time, which significantly speeds up the process. Hindrik Dehnbostel tested the machine for three months before deciding to buy it. Ever since then, the 3D printer has been running in three-shift mode five days a week. "The system is reliable and robust," he explains.

3D printing for dental technology is now inevitable

So what does the future hold for dental technology? Hindrik Dehnbostel is clear: there's no avoiding 3D printing. After all, at some point it will be the patient who decides how their denture is manufactured. "Today's generation are increasingly growing up with digitalization in their lives. They know that a 3D printer produces better quality than a milling machine," clarifies Hindrik.

TRUMPF will be taking part in the IDS specialist trade show, which will be held from March 12 through 16 in Cologne. The company will showcase its innovations for dental technology, including the TruPrint 1000, the fastest dental 3D printer on the market.



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