



How 3D printing is taking hold in dental laboratories.

Master dental technician Andreas Hoch (Dental Technik Kiel, Bonn), speaks from the point of view of a dental engineering "production facility". Much has been spoken and written about 3D printing. The marketing messages of many companies are putting 3D printing technology on a high pedestal. But what's the story in the daily routine? How are dental laboratories taking advantage in the daily work process and for what indications is a 3D printer (e.g. ASIGA Pro2, Dentona) really expedient at this time? Master dental technician Andreas Hoch has been working with 3D printing in his laboratory for a number of years and answers some questions in this interview.

Please give a brief introduction to your laboratory. How is your company set up?



Andreas Hoch, CEO of Dentaltechnik Kiel.

With a staff of more than 50, we are one of the dental industry's leading medium-sized companies in the Bonn region. We are now represented at two locations – Bonn and Lohmar. The laboratory was established 70 years ago. But the number of years a company has been in existence does not in itself reveal anything about its future viability and power of innovation. We have succeeded over four generations in guiding the company from tradition to innovation. Since before the end of the millennium, Dental Technik Kiel has been involved with digital production; not as an end in itself, but with regard to the benefit for dental offices and their patients. These days, analogous technical prowess and digital technologies go hand in hand.

What corporate philosophy do you represent?

The philosophy is clearly defined: Benefits for customers and patients. Our team is very committed to this. We consider ourselves to be problem-solvers and full-service providers for our customers, and not just in the technical realm. As dental technicians, we should never forget that we are working for the well-being and satisfaction of patients – for their quality of life. Among others, four master dental technicians contribute their technical knowledge and expertise to our laboratory. With such a wealth of experience and specialist knowledge, we make dentures for 8,000-9,000 people a year on average. What's more, we have been collaborating for more than 40 years with the Bonn Dental Clinic, which on one hand bears witness to our endurance and on the other hand knows our innovations. Sustainability is moreover an important principle in our company. On this point, 3D printing comes in very handy to us. From the standpoint of environmental policy or ecology, additive manufacturing seems to be much more effective than the subtractive approach. Only material that is needed is used. For us, this is an important aspect that often gets a raw deal in dental engineering.



Open and transparent – the laboratory has an inviting design.



In a separate patient room for instance, minor measures can be performed on the patient by the dentist.

How long have you been working with 3D printing technology?

We have already been working with printer technology for many years. In our view, 3D printing is the next great revolution in the dental industry. But as is the case with new technologies, while they come onto the market, they are often not yet fully developed – neither the technology as such nor the materials. We have always been close to developments and have kept an eye on what's going on. We first used 3D printing about two years ago by handing various cases over to external suppliers. The results were good, so we soon decided to embark on a testing phase of our own. Now we were spoiled for choice. We put the various applications of different suppliers to the test and after this pilot phase, chose the ASIGA PRO2 printer (supplied by Dentona).



3D printing has been well-established in the laboratory for quite some time (ASIGA PRO2, supplied by Dentona)

What reinforced the decision in favor of the ASIGA PRO2? What are its advantages?

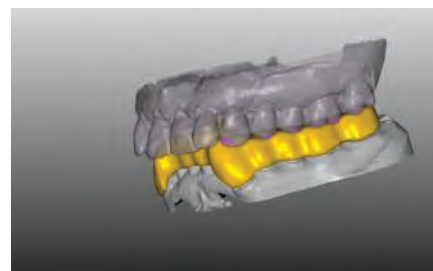
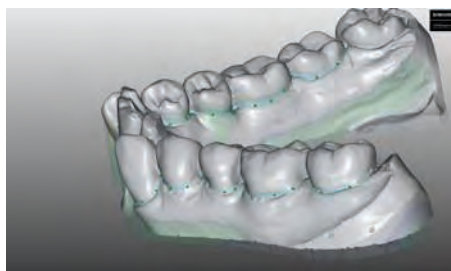
As a general rule, many paths lead to a destination, but only a few lead to success. In daily laboratory routine, we see the device's advantages primarily in the superior precision and noticeably lower failures or printing errors compared to the previous model. Thanks to the improved technical work flow, we can spend less time re-hardening and have much less post-processing. The large build platform and new software mean a significant amount of time saved in the printing process, which makes it much easier to create a support.

What indications are implemented with the printer in your laboratory?

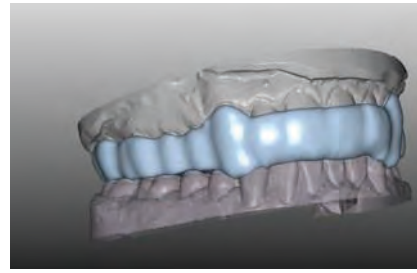
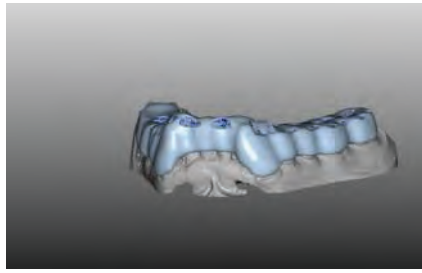
We mainly fabricate splints for various splint therapies used by our partner dental offices. So about 85% of the printer capacity is used. What's more, we fabricate models in a direct digital work flow. We obtain data from digital impressions and fabricate e.g. models for the aligner technique. The printer is also being used more often for impression trays and bite recordings.

There is frequent debate about whether to mill or print splints. What are the advantages of printing?

One advantage of printing is the pure material costs, which are comparatively low. With milling, the material costs (blank) are high; a lot of waste is left over. On the other hand, only the material actually needed is used in printing. Furthermore, the speed of fabrication during printing is superior to that of milling technology. Subdividing our production into printing and milling moreover takes a load off of our milling machines (Zirkonzahn M1, M4 and Cercon Brain Expert). With the establishment of the 3D printer, we have once again created more milling capacity for products that need to be made with a subtractive process. In addition, considerably superior seating can be achieved with the printing technique, especially for very complex tooth positions, because overlapping areas can also be optimally printed. The milling technique hits a brick wall here.



CAD construction of a bite guard splint in the mandible



CAD construction of a bite guard splint in the maxilla



Immediately after the printing process in the ASIGA-Pro2. The splints here are still on the build platform.



The splints after light curing and before separation of the support.



Minimal post-processing. The finished bite guard splint with a precise fit.



How is the staff involved in the new production process?

For the pilot phase and introduction of printer technology, we assembled a team of specialists consisting primarily of technicians in charge of in-house CAD/CAM production. Thanks to this "pilot phase team", we ensured that the processes could be channeled and readjusted better. Now that the printer technology has proven its suitability for everyday use, the team is growing. It's important to us to let our interested employees in every department share in this technology.

What's the potential of 3D printing that you see for your laboratory's future?

We think 3D printing is pioneering, and not just for fabricating prosthetic restorations. For example, pre-prosthetic planning could be combined with the 3D printer, which offers added economic value. Another example is implant insertions in tumor patients. 3D animations can be used as printed models for even more specific planning of complex cases. More certainly needs to be done in terms of materials. The materials available at the moment currently make a limited range of applications possible; there is potential for development here. I think we'll be able to print ceramics or ceramic-like materials and composites in the foreseeable future. The next IDS will show this.

We're excited about it and look forward to developments. The dentist clients of Dental Technik Kiel in Bonn and their patients are already taking advantage of the impressive possibilities now.

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